REPORT

Tonkin+Taylor

Site Management Plan for Ground Contamination

Replacement Huia Water Treatment Plant

Prepared for
Watercare services Ltd
Prepared by
Tonkin & Taylor Ltd
Date
May 2019
Job Number
30848.2000.v2

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Document Control

Title: Site Management Plan for Ground Contamination					
Date	**Version**	**Description**	**Prepared by:**	**Reviewed by:**	**Authorised by:**
May 2019	1.0	Final	P. Walker	L. Phuah	P. Roan

Applicability

This report has been prepared for the exclusive use of our client, Watercare services Ltd, 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.

Report prepared and certified by a suitably qualified and experienced practitioner as prescribed under the NES Soil:

Report prepared by:

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Authorised for Tonkin & Taylor Ltd by:

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Report reviewed by a suitably qualified and experienced practitioner as defined in the NES Soil Users Guide (April 2012):

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Principal Contaminated Land Specialist

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Distribution:

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1 Introduction

Tonkin & Taylor Ltd (T+T) has been commissioned by Watercare Services Ltd (Watercare) to prepare this Site Management Plan (SMP) to manage ground contamination associated with the development of the replacement Water Treatment Plant (WTP) on Scenic Drive (Woodlands Park Road), in Titirangi, Auckland (herein referred to as the site, Figure 1.1).

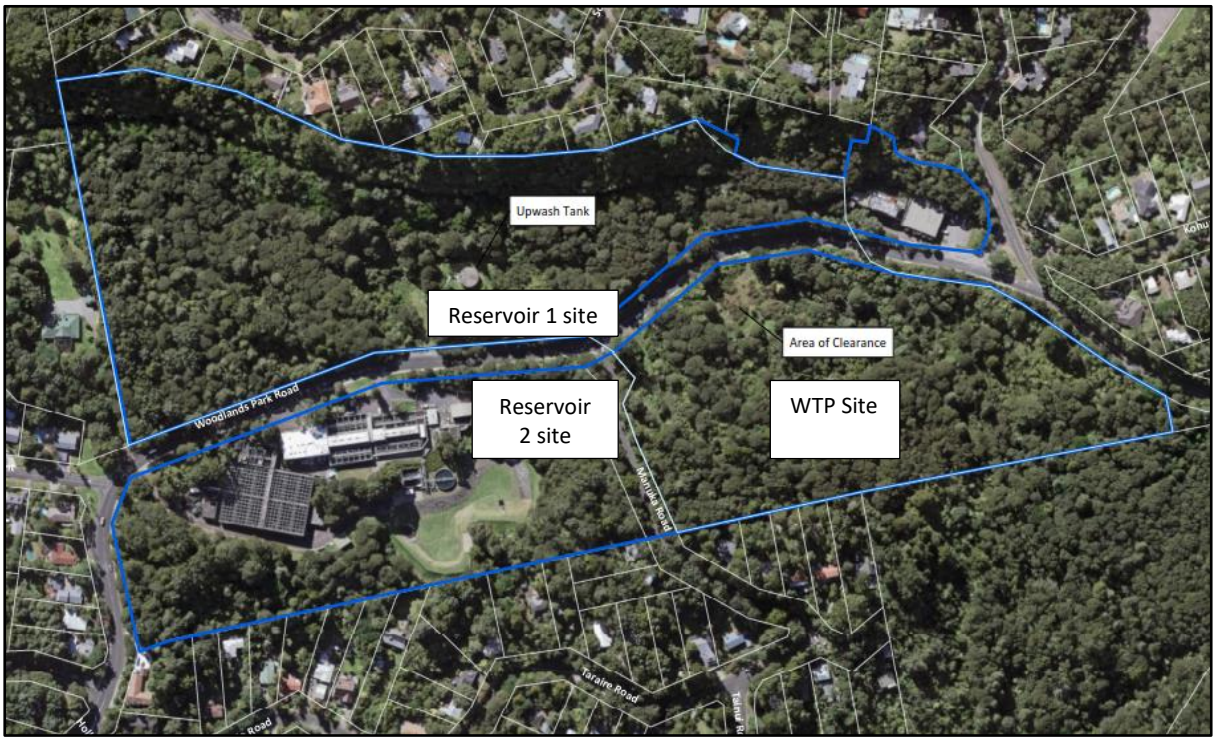


Figure 1.1: Site Location (Source: LINZ, copyright reserved)

This SMP has been prepared in accordance with our proposal of 30 June 2017.

1.1 Background

Watercare Services Limited (Watercare) is responsible for the treatment and supply of potable water and for the collection, treatment and disposal of wastewater to around 1.5 million people in Auckland. Watercare is a Council Controlled Organisation (CCO), wholly owned by the Auckland Council.

Watercare operates five dams within the Waitākere Ranges, including the Upper and Lower Huia Dams and the Upper and Lower Nihotupu Dams. Water from these western water supply dams is treated at the Huia and Waitākere Water Treatment Plants before being distributed via the water transmission network, primarily to west and north Auckland. The Huia Water Treatment Plant (Huia WTP) is the third largest water treatment plant in Auckland and is a crucial component of Auckland's water supply network, treating approximately 20% of Auckland's water.

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 (50 ML total capacity) to increase treated water storage within the western supply zone.

The proposed works are located within an area of land that encompasses three properties that are designated by Watercare for 'water supply purposes – water treatment plants and associated structures'. The replacement WTP will be constructed on the corner of Manuka Road and Woodlands Park Road directly across from the existing Huia WTP site. The replacement WTP will have a treatment capacity of 140 mega-litres per day (MLD).

A new 25ML treated water reservoir will be located on the northern side of Woodlands Park Road (Reservoir 1), with another 25 ML reservoir (Reservoir 2) subsequently constructed on the existing Huia WTP site once the existing plant has been decommissioned. The proposed works also includes construction of the North Harbour 2 watermain (NH2) valve chamber and tunnelling reception shaft within the Reservoir 1 site.

Extensive earthworks will be required for the WTP, reservoirs and associated infrastructure.

T+T has completed a preliminary site investigation[1] (PSI) for the site which has identified that housing that may have used asbestos containing materials and lead-based paints were present on the Reservoir 1 and replacement WTP sites from the 1940s until the 1990s. The removal/demolition of these building could have resulted in localised ground contamination by asbestos and lead.

1.2 Proposed works

This SMP relates to pre-construction enabling works that are anticipated to include:

- Vegetation removal;
- Site establishment including the construction of site access and haul roads;
- Diversion of services;
- Establishment of erosion and sediment controls;
- Stream diversion and reclamation works;
- Construction of retaining walls and slope stabilisation;
- Bulk earthworks; and
- Placement of engineered fill.

1.3 Objectives and Scope of SMP

Given the potential presence of ground contamination at the site, this SMP has been prepared to detail earthworks procedures and controls which will be appropriate for mitigating potential contamination effects during the proposed earthworks, and to provide procedures for unexpected contamination should it be encountered during the works. The SMP also provides an outline for contamination investigations which will occur prior to earthworks commencing.

1.4 Regulatory compliance

This SMP has been prepared in general accordance with Ministry for the Environment (MfE) Contamination Land Management Guidelines (CLMG) No.1 "*Guidelines for Consultants Reporting on Contaminated Sites in New Zealand"* (revised 2011). Sampling procedures provided in the plan generally comply with the MfE CLMG No.5 "*Site Investigation and Analysis of Soils"* (revised 2011).

This plan considers the requirements of the Health and Safety at Work (Asbestos) Regulations (2016), the WorkSafe NZ *Approved Code of Practice (ACOP): Management and Removal of Asbestos* (September 2016) and the BRANZ document *New Zealand Guidelines for Assessing and Managing Asbestos in Soil* (November 2017).

[1] Preliminary Site Investigation – Huia Water Treatment Plant. Tonkin & Taylor Ltd. July 2018.

This plan is also prepared in general accordance with the soil disturbance related controls referred in the Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NES Soil). The persons preparing and certifying this SMP are suitably qualified and experienced practitioners (SQEP)as required by the NES Soil and defined in the NES Soil Users' Guide (April 2012)[2].

This SMP has been produced to support resource consent applications for soil disturbance works as a discretionary activity under the NES Soil[3] and Section E.30 of the Auckland Unitary Plan Operative in Part (AUP).

[2] MfE (2012). User's Guide: National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health.

[3] Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations, 2011

2 Roles and responsibilities

This SMP provides a framework for managing contamination hazards on site by identifying potential hazards and suggesting mitigation measures. It provides information and recommendations to augment this process but is not intended to relieve the person conducting business or undertaking (PCBU) of either their responsibility for the health and safety of their workers, Contractors and the public, or their responsibility for protection of the environment.

The provisions of this SMP are mandatory for all persons (employees, contractor and sub-contractors) involved in undertaking any of the proposed ground disturbance works (excavation, piling etc.).

2.1 General

The proposed roles and responsibilities under the SMP are provided in Table 2.1.

Table 2.1: Organisational involvement

Company/Organisation	Role and responsibilities
Watercare services Ltd	Project owner
Main Contractor (Contractor)	Responsible for implementation of SMP
Subcontractor(s)	Responsible for undertaking works in accordance with requirements of the SMP
Contaminated Land Specialist	Soil testing, pre and during works, and validation reporting. Provision of ground contamination advice during the works.

2.2 Distribution

A copy of the SMP shall be kept onsite at all times. It is the responsibility of Watercare to distribute the plan to the Contractor appointed to carry out the work. It is the responsibility of Watercare's nominated Contractor to distribute the SMP to any other sub-contractors or parties carrying out earthworks.

2.3 Review and update

Statutory requirements, operating procedures or site conditions may vary and may require that this plan be amended or updated.

Any variations to the SMP proposed by the Contractor must be approved by the Contaminated Land Specialist prior to works commencing, or the variation being implemented if works have already commenced. If the changes are substantive they may need to be approved by Council prior to implementation.

It is the responsibility of the appointed Contractor to distribute any changes to the plan to the relevant parties involved in the construction works and update the site copy.

2.4 Implementation

Responsibility for the implementation of the SMP lies with the appointed Contractor and their sub-contractors. In the case of unexpected contamination the Contractor shall notify Watercare (or its designated project manager) immediately. Further information regarding first response is provided in Section 7.

Watercare shall engage a Contaminated Land Specialist to carry out inspection and provide advice as required during the works (refer Sections 4 to 6). The Contaminated Land Specialist shall be sufficiently experienced to comply with the “suitably experienced practitioner” as described in and required by the NES Soil Regulation (2011) Users Guide (April 2012).

3 Site characterisation

3.1 Site identification

The replacement Huia WTP is proposed to be located adjacent to the existing Huia WTP site on the corner of Woodlands Park Road and Manuka Road. The first 25 ML reservoir (Reservoir 1) will be located on the northern side of Woodlands Park Road below Exhibition Drive directly across from the existing Huia WTP. The second 25 ML reservoir (Reservoir 2) will be located on the existing Huia WTP sites. The sites are all accessed from Woodlands Park Road. These three sites are collectively referred to as "the project site".

The project spans three sites owned by Watercare which have a total site area of approximately 145,700 m^2. The site on which the proposed replacement Huia WTP is located has an area of approximately 42,000 m^2, the proposed Reservoir 1 site has an area of approximately 63,600 m^2, and the existing WTP site (on which Reservoir 2 is proposed) has an area of approximately 40,100 m^2.

The project site is located approximately 1 km from Titirangi Village and approximately 1.5 km north of the closest reach of the Manukau Harbour.

3.2 Site layout

The replacement WTP site slopes gently from the Woodlands Park Road to the south with gullies located at the southern boundary running north to south. The eastern extent of this site features steep slopes which rise up towards Scenic Drive. A section of the Yorke Gully Stream traverses the south eastern part of the replacement WTP site and a small tributary of the Armstrong Gully Stream is located in the north-western corner of the site.

The Reservoir 1 site is relatively hummocky with a knoll located in the middle of the site near the southern boundary, and a small gully feature (Armstrong Gully) runs through the site. Extremely steep slopes are present along the northern boundary beneath and above Exhibition Drive. A permanent section of Armstrong Gully stream is located to the west of Reservoir 1.

The existing WTP site where Reservoir 2 will be located has been developed as a WTP for the last 90 years. The site has a generally moderate to steep slope towards the south, with very steep slopes along the eastern and southern site boundaries. The Armstrong Gully watercourses are piped beneath the centre of the site, discharging into an open channel near the southern boundary. A small tributary of the Armstrong Gully Stream extends from the replacement WTP site into the north-eastern corner of the existing Huia WTP site.

Both the WTP and Reservoir 1 sites are almost completely vegetated in native bush, while the existing WTP site is partly covered in native bush with the remainder developed as part of the existing Huia WTP.

There are a number of features that are currently present on site which include:

- An upwash tank located in the western part of the Reservoir 1 site;
- An area of cleared ground evident on aerial photographs of the replacement WTP site.

3.3 Geology and hydrogeology

The published geological information[4,5] indicates the site is located on the boundary between two geologic groups; the Waitemata and Waitakere Groups, and underlain by both the Nihotupu Formation to the east and the Cornwallis Formation to the west (see **Figure 3.3** below).

The Nihotupu Formation of the Waitakere Group is composed of basaltic, andesitic sandstone and is underlain by the Cornwallis Formation of the Waitemata Group. The Nihotupu Formation forms the bluffs to north of the site. The Cornwallis Formation is an alternating, thick bedded sandstone and thin bedded mudstone (volcanogenic flysch) underlain by the East Coast Bays Formation.

Geotechnical borehole logs indicate that the replacement WTP site and the Reservoir 1 site are underlain by fill material in areas of previous development, and generally underlain by colluvial landslide slope deposits and potentially buried alluvial deposits overlying bedrock containing slickenside layers indicative of possible deep seated slope movement[6].

The available data indicates that two groundwater levels are present within the Reservoir 1 site: a groundwater level of approximately 6.5 m below ground level (mbgl) for shallow-screened piezometers and approximately 10 mbgl for the deeper screened piezometers. Similar groundwater levels were recorded in the existing WTP, where available data indicate a mean groundwater level of 5.5 mbgl for shallow or single piezometers and 8.5 mbgl for deeper screened piezometers[7].

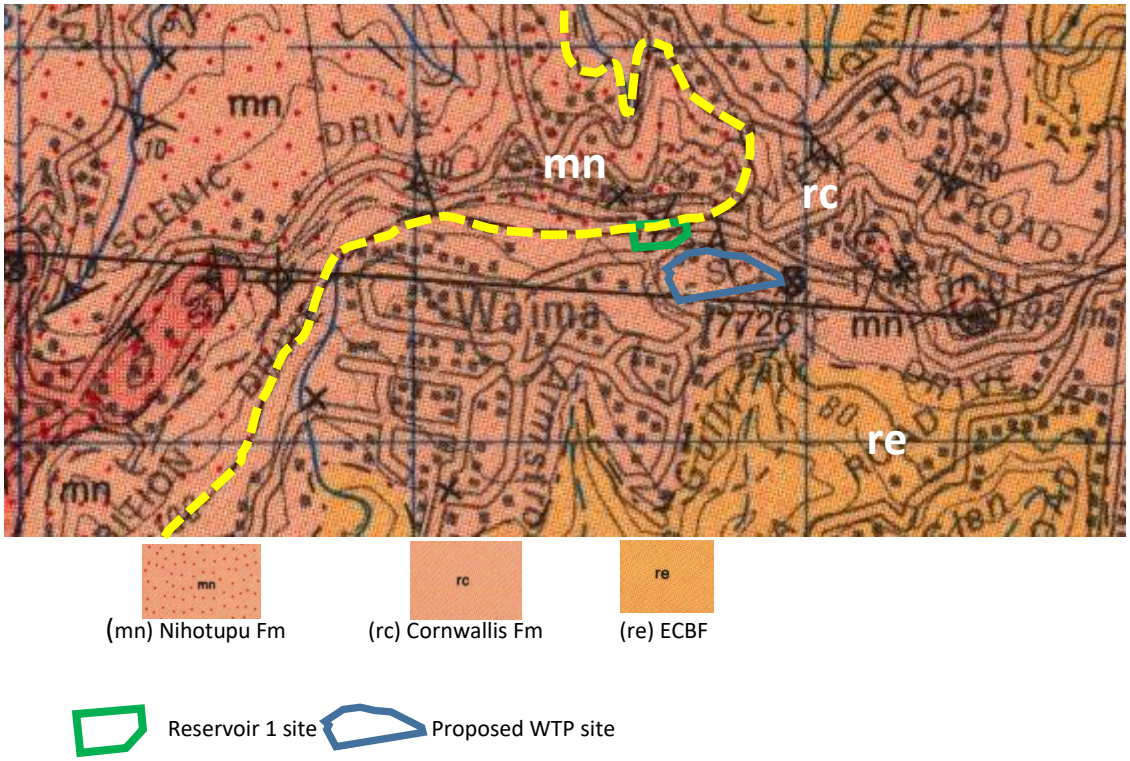


Figure 3.3: Published geology (source: Kermode, 1992). The yellow line has been added to distinguish the Nihotupu Formation (left) from the Cornwallis Formation (right)

[4] Kermode, L. O. (1992) *Geology of the Auckland urban area*. Scale 1:50,000. Institute of Geological & Nuclear Sciences, Geological map 2. Institute of Geological & Nuclear Sciences Ltd., Lower Hutt, New Zealand
[5] Edbrooke, S. W. (2001). Geology of the Auckland Area. Scale 1:250,000. Institute of Geological & Nuclear Sciences, Geological map 3. Institute of Geological & Nuclear Sciences Ltd., Lower Hutt, New Zealand
[6] GHD (2016). *Huia WTP Site Selection Study Shortlist Site Development Report* – prepared for Watercare Services Ltd. September 2016.
[7] Site Management Plan for Ground Contamination - Replacement Huia Water Treatment Plant. Prepared for Watercare services Ltd by Tonkin & Taylor Ltd, May 2019.

3.4 Hydrology

The replacement WTP is situated at the head of the Little Muddy Creek catchment within the wider Manukau Harbour catchment. There are numerous surface water channels and several flood prone areas on site. Streams on the site discharge into the Warituna Stream.

The Armstrong Stream runs through the Reservoir 1 site. Largely, this is a permanent stream with varying water levels and is in generally good condition. Overland flow paths are also identified on the western side of the replacement reservoir site and along its southern boundary. Potentially flood prone areas are identified alongside the permanent stream on the Reservoir 1 site.

3.5 Site history and potential for contamination

The T+T PSI (2018) includes a detailed account of the site history as obtained from a desk-based review of available information. The historical review has identified one activity on site that could cause ground contamination, this being the removal and/or demolition of the former houses on the Reservoir 1 site and the replacement WTP site that were present between the 1940s and 1990s. Table 3.1 summarises the potentially applicable HAIL reference for this activity, the nature, and potential magnitude and extent of contamination that may be associated with this activity.

Table 3.1: Potential for contamination

Land use/activity	Potential contaminants	Magnitude and possible extent of contamination	HAIL Activity reference
Asbestos containing materials (ACM) and lead-based paints within former residential dwellings (Reservoir 1 and replacement WTP sites)	The various forms of asbestos as fragments and free fibres. Lead associated with lead-based paints.	Buildings (six dwellings and associated structures/garages etc) were constructed, altered and removed from the site during the period when use of ACM and lead-based paint was common. If ACM and/or lead based paints were used in the buildings and not handled appropriately during previous alteration or removal/demolition works there is potential for these contaminants to contaminate the surrounding ground. Localised ground contamination may have also occurred due to the degradation of painted surfaces and asbestos materials prior to removal. The extent of contamination is likely to be limited to the building footprint plus a buffer (nominally 100m^2 per dwelling).	Activity not specifically included in HAIL but could be captured under Category I – Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment, if contaminant concentrations exceed risk based assessment criteria.

Ground contamination (if any) is likely to be limited to the near surface, dependent on how deep the filling activities have occurred.

Depending on contaminant concentrations, the contaminants can pose a risk to:

- Human health of the workers undertaking the development works, future workers of the WTP if they come into contact with, ingest or inhale the contaminants;
- Wider environment particularly via stormwater, if the contaminants are mobilised during earthworks.

To the best of T+Ts knowledge, there has been no previous sampling and analysis completed to confirm (or otherwise) the presence of contamination associated with the above on-site activities. Consequently, this work is proposed to be undertaken prior to bulk earthworks (refer Section 4).

4 Pre-works testing

Prior to earthworks commencing, pre-works contamination testing will be undertaken to establish actual contamination concentrations within materials that will likely be disturbed during development earthworks on the site. The sampling programme is outlined below.

4.1 Confirmation of sampling regime

Prior to sampling taking place, a site walkover assessment shall be carried out by the Contaminated Land Specialist to confirm there are no other potential sources of contamination present at the site. The following pre-works testing outline can then be confirmed.

4.2 Sampling rationale

Sampling shall be undertaken where proposed ground disturbance (indicatively shown in the plan included in Appendix A of this SMP) intersects former building areas. Based on the likely distribution of contamination, sampling shall occur on a grid basis. To meet the minimum number of samples set out within the MfE Guideline No 5[8] and New Zealand Asbestos Guidelines[9], samples shall be collected at 20 m – 30 m spacing across the proposed soil disturbance area. The number of samples collected shall at least comply with the minimum sampling numbers set out within the MfE Guideline No 5[10] and New Zealand Asbestos Guidelines[11].

Samples shall be collected using a hand auger or machine-excavated test pits, whichever is more appropriate given site access constraints at the time.

Samples shall therefore be collected to the maximum depth of cut, or to 0.5 m into natural soils, whichever is reached first. Samples shall be collected every 0.5 m, or at changes in lithology.

4.3 Sampling methodology

Soil samples for chemical testing shall be collected in general accordance with the MfE Guideline No. 5:

- Materials encountered shall be logged in accordance with the NZ Geotechnical Society "Guidelines for the classification and field description of soils and rocks for engineering purposes";
- Freshly gloved hands shall be used to collect soil samples from the recovered core or test pit walls. All samples will be placed immediately into 300 ml glass jars.

Samples for asbestos testing shall be collected in general accordance with the methods for semi-quantitative analysis of asbestos in soil as set out in the New Zealand Asbestos Guidelines as follows:

- Inspect a 10 L volume of soil for potential ACM fragments. Collect all suspected ACM into a zip-lock plastic bag;
- Collect a 500 mL sample of the soil in a separate zip-lock plastic bag using freshly gloved hand;
- Decontamination of the shovel and hand auger between samples was achieved using decon-90 and water.

[8] Contaminated Land Management Guideline No 5. Site investigation and analysis of soils. Ministry for Environment, revised 2011.
[9] New Zealand Guidelines for Assessing and Managing Asbestos in Soil. BRANZ. November 2017.
[10] Contaminated Land Management Guideline No 5. Site investigation and analysis of soils. Ministry for Environment, revised 2011.
[11] New Zealand Guidelines for Assessing and Managing Asbestos in Soil. BRANZ. November 2017.

Any equipment used to collect the samples shall be decontaminated between sample locations using clean water and Decon 90 (a phosphate-free detergent).

Samples shall be shipped in chilled conditions to an IANZ accredited laboratory under chain of custody documentation.

4.4 Testing suite and evaluation criteria

It is expected that one sample of fill and one of natural soil shall be collected from each of the sampling locations. Analysis will be determined by the Contaminated Land Specialist but would be expected to include metals (arsenic, cadmium, chromium, copper, lead, nickel and zinc) and asbestos (semi-quantitative analysis in accordance with New Zealand Asbestos Guidelines). If there is evidence of ash, coal or other contamination such as hydrocarbons, additional testing for the observed contaminant of concern shall also be included.

Samples shall be compared against the following evaluation criteria:

- To assess potential human health risks, the NES Soil contamination standards for commercial/ industrial use (for site workers during construction and future site use);
- To assess environmental discharge risks, the Auckland Unitary Plan (Operative in Part) permitted activity discharge criteria; and
- Background values for non-volcanic soils in the Auckland Region. This will allow assessment against default cleanfill criteria.

4.5 Reporting

Results from the above pre-works testing shall be reported in a letter report to Watercare and a copy of the report provided to Auckland Council prior to works commencing.

If required, this SMP shall be updated to reflect the findings of the soil sampling, and a new version issued prior to works commencing.

If sampling demonstrates that the investigation areas are not contaminated then it is considered that the contamination-related earthworks controls set out in this SMP would not apply to the earthworks, which could then be undertaken with standard earthworks controls in place.

5 Site condition and management rationale

5.1 Soil contamination

Metals are the most likely contaminants to be encountered within fill materials at the site. Asbestos contamination may also be present.

The management rationale below, and site management procedures that follow, are based on low levels of asbestos and metal contamination being present in fill materials (i.e. below criteria for the protection of site workers). Natural soils are expected to be at background concentrations for non-volcanic soils in Auckland. The management procedures in this SMP shall be confirmed on completion of pre-works testing.

Preliminary asbestos controls have been included due to the current uncertainty with regard to actual asbestos contamination at the site. For the purposes of this plan, it is assumed that asbestos is present in fill in the development footprints, but at levels that are sufficiently low that earthworks in fill can be undertaken as *unlicensed asbestos works*.

5.2 Management rationale

The replacement WTP development will require a significant volume of cut to allow the construction of the proposed reservoirs and WTP and fill to form building and site access platforms. If contaminated materials are retained on site, encapsulation beneath hard standing or landscaping will occur.

Based on the above, the objectives of the management plan are to:

- Remove or encapsulate contaminated soils as required to enable safe occupation of the WTP;
- Mitigate effects of contamination on site workers and neighbouring residents/ the general public during and following earthworks, including from asbestos-contaminated soils;
- Ensure appropriate disposal of potentially contaminated materials; and
- Avoid discharges of sediment and dust to the surrounding environment.

With respect to the potential for ACM and asbestos fibres to be present in soil in the development areas, the Health and Safety at Work (Asbestos) Regulations (2016) enacted on 1 April 2016 are relevant. Worksafe New Zealand has prepared an Approved Code of Practice (ACoP): Management and Removal of Asbestos (November 2016). The key requirements of the regulations and ACoP are that works involving asbestos contaminated soils must be undertaken with appropriate asbestos controls in place and that contaminated soil removed from site must be taken to an approved disposal site. Details relating to the standards and controls that apply to asbestos-in-soils, are outlined in BRANZ (*New Zealand Guidelines for Assessing and Managing Asbestos in Soil, November 2017)* which is incorporated by reference into the Worksafe ACOP.

The management rationale shall be reviewed on completion of pre-works testing to ensure the appropriate level of control is implemented for the contamination identified (if any).

6 Site Management Procedures

The following earthworks controls and procedures will be implemented to manage potential contamination during works. These are expected to comply with consent conditions and with best practice guidance for the Auckland Region, including *Guidance Document 05: Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (June 2016)*. The procedures below will be reviewed and updated following pre-works testing. As noted above, if sampling demonstrates that the investigation areas are not contaminated then it is considered that the contamination-related earthworks controls set out in this SMP would not apply to the earthworks, which could then be undertaken with standard earthworks controls in place.

Also refer to the following sections:

- Contingency procedures are outlined in Section 7. These should be followed in the event of unexpected contamination;
- Health and safety procedures relating to contaminated soils are outlined in Section 8;
- Validation procedures are outlined in Section 9.

All procedures employed by the Contractor shall comply with the relevant Council bylaws and conditions of any resource/building consent(s).

Table 6.1: General earthworks procedures

Earthworks practice	Contamination-specific management
Site establishment	• If identified in pre-works testing, the site hazard board shall state that there is a risk from contamination on the site, including asbestos if applicable. • Decontamination facilities shall be established if asbestos is confirmed on the site. • Personal protective equipment shall be purchased and held on site. This includes disposable gloves, overalls and P2/P3 dust masks. • All staff undertaking disturbance work shall be inducted so they are aware of contamination risks. • If off-site disposal is required, approval must be received from fill site prior to commencing work.
Excavation and transport	• Trucks shall be loaded directly with stockpiling avoided where possible. • Where stockpiling of fill is necessary, stockpiles shall be kept damp during works and covered with polythene or similar overnight and during weekends. • Fill stockpiles shall be placed on hard standing or polythene to prevent contamination of underlying soils. Alternatively, the stockpile areas need to be validated following removal. • Trucks are to be lined and covered when transporting asbestos-contaminated material off the site. • Soil disposal records (summaries) shall be kept for later validation reporting, if necessary.

Earthworks practice	Contamination-specific management
Soil disposal	• All fill/contaminated material must be disposed of to an appropriately licenced landfill facility. If asbestos is present, the landfill must be made aware that the soils contain asbestos. • Natural soils are expected to be suitable for disposal to cleanfill if earthworks methods allow clear separation of natural soils from fill. • The Contaminated Land Specialist must review the site prior to any material being disposed of to a cleanfill site.
Water disposal	• Groundwater may be encountered during excavations, however, it is unlikely that groundwater will be encountered within fill. Groundwater removed from excavations may require treatment to remove suspended solid before discharge to stormwater or sewer. The Contaminated Land Specialist shall determine testing and discharge consent requirements prior to discharge being undertaken. • Surface water that accumulates within the excavation and has been in contact with fill material shall be allowed to drain to ground. • No water that has been in contact with fill material shall be disposed to stormwater or sewer prior to a Contaminated Land Specialist providing advice and if required, undertaking testing to determine disposal requirements. Water may need to be treated prior to disposal.
Encapsulation procedures	• If contaminated soils are to be encapsulated on site, the encapsulation method shall be advised by the Contaminated Land Specialist to suit the type and level of contamination that is to remain. • Encapsulation generally requires placement of geotextile or similar over the remaining contamination, followed by a minimum thickness of soil or hardstanding. Specific encapsulation is required for odorous/ volatile material and for asbestos.
Imported material	• All soils imported to site must be either hardfill direct from a quarry (no recycled hardfill) or the following: – Be derived from a source, which is previously verified in accordance with the methods described in the NES Soil Regulations, as being a piece of land to which the NES Soil Regulations do not apply; or – Have been adequately investigated in accordance with MfE Contamination Land Management Guidelines No.5 – Site Investigation and Analysis of Soils (Revised 2011) by a SQEP to meet the 'cleanfill' definition and comply with the published background concentrations for Auckland non-volcanic soils. Testing will depend on the potential contamination sources and may include metals, PAH, organochlorine pesticides (OCPs) and asbestos content. • It is preferable that the material is tested at its source prior to its importation. However, if this is not possible, then the Contractor shall stockpile the material in a clean area of the site until test results are available.

Earthworks practice	Contamination-specific management
Asbestos management	• Asbestos controls shall be confirmed with Worksafe NZ prior to works commencing. • Any soils containing asbestos shall be separated from and managed independently to natural soils to prevent cross-contamination. • Stockpiling of asbestos-containing material shall be avoided at all times if possible. If stockpiling is required, it shall be covered with geotextile or a polythene cover to prevent dust and erosion. • Equipment used for disturbance of asbestos-containing material shall be decontaminated before leaving site or moving to an area of site that is not contaminated. • All workers must go through a decontamination process before leaving the asbestos works area. This will vary depending on the level of asbestos present. • Dust shall be maintained with frequent spraying of water over the excavation and truck loading area when disturbing asbestos-contaminated soils. Works shall cease if the wind conditions are too strong to continue in a safe manner. • Air monitoring may be required to monitor for dust discharges during asbestos-removal works.

7 Contingency procedures

The following actions are proposed in the event that unexpected conditions are encountered, discharges occur and/or complaints are received in relation to the works. Mitigation measures should be applied in accordance with the hierarchy of control described in the Health and Safety at Work Act 2015 – eliminate or minimise.

As described in Section 2, the Contractor shall be responsible for implementation of all aspects of this SMP, including contingency procedures.

7.1 Unexpected contamination conditions

The onus is on the Contractor to note where visual and olfactory indicators of contamination exist and liaise with the Contaminated Land Specialist to ensure the controls in place remain appropriate to the type and level of contamination encountered. Typical visual and olfactory indicators of contamination could include the following:

- Odour (petroleum hydrocarbons, oil);
- Black staining coupled with an odour may indicate heavy oil/hydrocarbon contamination;
- Green/yellow discoloured soil may indicate high levels of copper and chromium;
- Suspected or confirmed asbestos containing material (ACM); and
- Black gravel/sand may be boiler ash materials that could be high in metals and PAHs.

The following is a "first response" checklist for the Contractor to follow should visual or olfactory evidence of contamination be encountered during the works onsite.

The presence of other contaminants in high levels may dictate further controls be implemented and additional or difference containment/disposal be required. The first response procedures are to ensure contamination is appropriately contained while decisions about its management are being undertaken.

Table 7.1: Potential contaminated materials first response checklist

First Response Checklist:	
Stop work in the immediate vicinity of the contamination discovery and isolate the area by taping, coning or fencing off.	☐
Advise Watercare services Ltd (or the designated project manager).	☐
Update the site Hazard Board and prevent access to the area by unnecessary personnel.	☐
Ensure appropriate personal protective equipment is available to all staff entering the isolated area.	☐
If odours are present cover the material over with non-odorous soil or hay/straw and lime to prevent nuisance odour.	☐
Watercare services Ltd must advise the Contaminated Land Specialist to inspect and advise of specific controls if appropriate. No materials shall be removed from the affected area until approval has been provided by the Contaminated Land Specialist.	☐

7.2 Emergency response procedures

Should an incident occur on site which may result in any unauthorised discharges (vapour, odour, water, soil, separate phase hydrocarbon etc.), the Contractor will take control of the situation and

coordinate the efforts of all on site to minimise the impact as per First Response procedures in Table 7.1.

In the event that sustained and uncontrollable discharges occur from the site, emergency response and evacuation procedures, including provisions for notifying and managing neighbouring site users, shall be implemented. The emergency response and evacuation procedures shall be specified in the Contractors JSA.

7.3 Complaints procedure

The contact details for occupants of the neighbouring sites will be obtained by the Contractor prior to commencement of the works. These parties will be advised of the 24 hour emergency contact number for the project and the associated complaints procedure at this time.

In regard to the general public, signage advising the 24 hour emergency contact number for the project will be posted around the fenced site frontages.

A written record of all complaints received will be maintained. The Contractor will initiate an investigation as soon as practicable on receipt of a complaint. The Contractor will provide appropriate feedback to the complainant, such as the response made and any corrective actions taken in response to the complaint.

8 Health and safety procedures

The contractor shall prepare and implement a risk assessment in compliance with the Health and Safety at Work Act, 2015 and associated regulations, and other applicable legislation, regulations, codes and guidelines. This is likely to comprise a Job Safety Environmental Analysis (JSEA) or similar document. The contractor's assessment shall also cover measures related to the presence of potentially contaminated material.

The expected minimum procedures for handling asbestos-contaminated materials are set out in Section 6 of this document. Additional procedures may be required by Worksafe NZ at the time of earthworks, depending on the level of asbestos contamination identified during site investigation (Section 4).

Specific contamination-related health and safety procedures that should be included in the Contractor's health and safety plan are outlined below:

- Procedures for the safe handling of asbestos, if required, as outlined in Section 6. This includes decontamination procedures and facilities on site;
- Provision for PPE appropriate to the contamination on site for all workers. Whilst no asbestos-specific PPE is required for *Unlicensed Asbestos Works*, it would be prudent to hold stocks of include disposable gloves and overalls, respiratory protection, Tyvek suits and boot covers;
- All workers shall be required to undergo a contaminated soil safety inducted prior to carrying out works at the site. The inductions shall describe the PPE requirements and outline the potential contamination that could be encountered at the site and procedures specified in this SMP before commencement of site work. For staff involved directly with the earthworks the induction shall be conducted by the Contaminated Land Specialist;
- Avoidance of hand-to-mouth contact when working with contaminated soils;
- Workers that come into contact with contaminated soil (if discovered) shall be required to wash hands with soap and water as soon as possible. Eating, drinking and smoking shall only be allowed within designated areas away from those contaminated areas.

Once contaminated materials have been removed from site or encapsulated to the satisfaction of the Contaminated Land Specialist, it is expected that standard health and safety procedures for earthworks and construction sites will be implemented.

9 Validation and reporting

Validation is the process of confirming the objectives of the works have been achieved, confirming works were undertaken according to agreed procedures and reporting on any incidents.

Validation of the site shall be conducted by the Contaminated Land Specialist. The validation programme recommended includes observation of the ground works and collection of soil samples to record the level of any remaining contamination (if required).

Validation will not be required if contamination concentrations in fill are below relevant human health and environmental standards. The following sections outline the requirements if validation of the site is required.

9.1 Information required from the contractor

Information is required from the contractor for inclusion in the validation report as indicated in the contractor checklist (Appendix B). The information requirements are:

- Copies of weigh bridge summaries for the disposal destination for contaminated soil;
- Disposal volumes for natural soil removed and disposed;
- Records of visits by council representatives;
- Details of any contamination-related complaints; and
- Details of any health and safety incident related to the contamination and how they were resolved.

The contractor shall provide the required information within one month of completion of the works to which the information relates.

9.2 Validation method

Depending on the contamination levels within fill material, for any areas of the site where fill is completely removed from site, soil validation sampling may be undertaken to update the site condition post redevelopment.

The validation process may involve:

- Visual inspection of the excavated surface for any evidence of contamination, such as the presence of fill or discoloured materials;
- Collection of samples from the final exposed subgrade (if required);
- If samples are collected and tested, testing shall be as per the procedures outlined in Section 4*;*
- Sampling shall be undertaken by a suitably qualified Contaminated Land Specialist.

9.3 Reporting

On completion of the soil disturbance works, if validation is required, a validation report shall be prepared and provided to Auckland Council. The report shall include, as a minimum:

- Confirmation that soil disturbance works were completed according to this SMP and that there were no variations during the works;
- Volumes of soil removed from the site, associated chemical test results (if any), disposal destination of surplus soils and waste disposal acceptance receipts; and

- Confirmation that there were no environmental incidents during the works. If there was an environmental incident then the letter shall detail the nature of the incident and the measures taken to mitigate effects.

This report shall be provided to Auckland Council within 3 months of completion of the soil disturbance works.

The validation report shall comply with the Ministry for the Environment *Contaminated Land Management Guideline No. 1: Guidelines for Reporting on Contaminated Sites in New Zealand*.

9.4 Ongoing monitoring and management

The requirement for ongoing for monitoring or management with respect to ground contamination will be assessed on completion of the earthworks.

Appendix A: Development Plans

PLAN
SCALE 1:500

CUT FILL VOLUMES

TOTAL CUT VOLUME: 41,460m³
TOTAL FILL VOLUME: 30,400m³

TOTAL DISTURBED AREA: 27,200m²

EARTH WORKS CUT / FILL DEPTH			
CUT / FILL DEPTH			DEPTH COLOUR
-13	to	-12	
-12	to	-11	
-11	to	-10	
-10	to	-9	
-9	to	-8	
-8	to	-7	
-7	to	-6	
-6	to	-5	
-5	to	-4	
-4	to	-3	
-3	to	-2	
-2	to	-1	
-1	to	0	
0	to	1	
1	to	2	
2	to	3	
3	to	4	
4	to	5	
5	to	6	
6	to	7	
7	to	8	
8	to	9	
9	to	10	

NOTES:

1. EARTHWORKS SHOWN ARE TO ESTABLISH FINAL WTP PLATFORM ONLY.
2. STAGING AND POSSIBLE ENABLING EARTHWORKS REQUIRED NOT SHOWN

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
1	FOE CONSENT		EP	CG	PF	11/18
0	FOR CONSENT		EP	CG	PF	10/18

0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE

Watercare

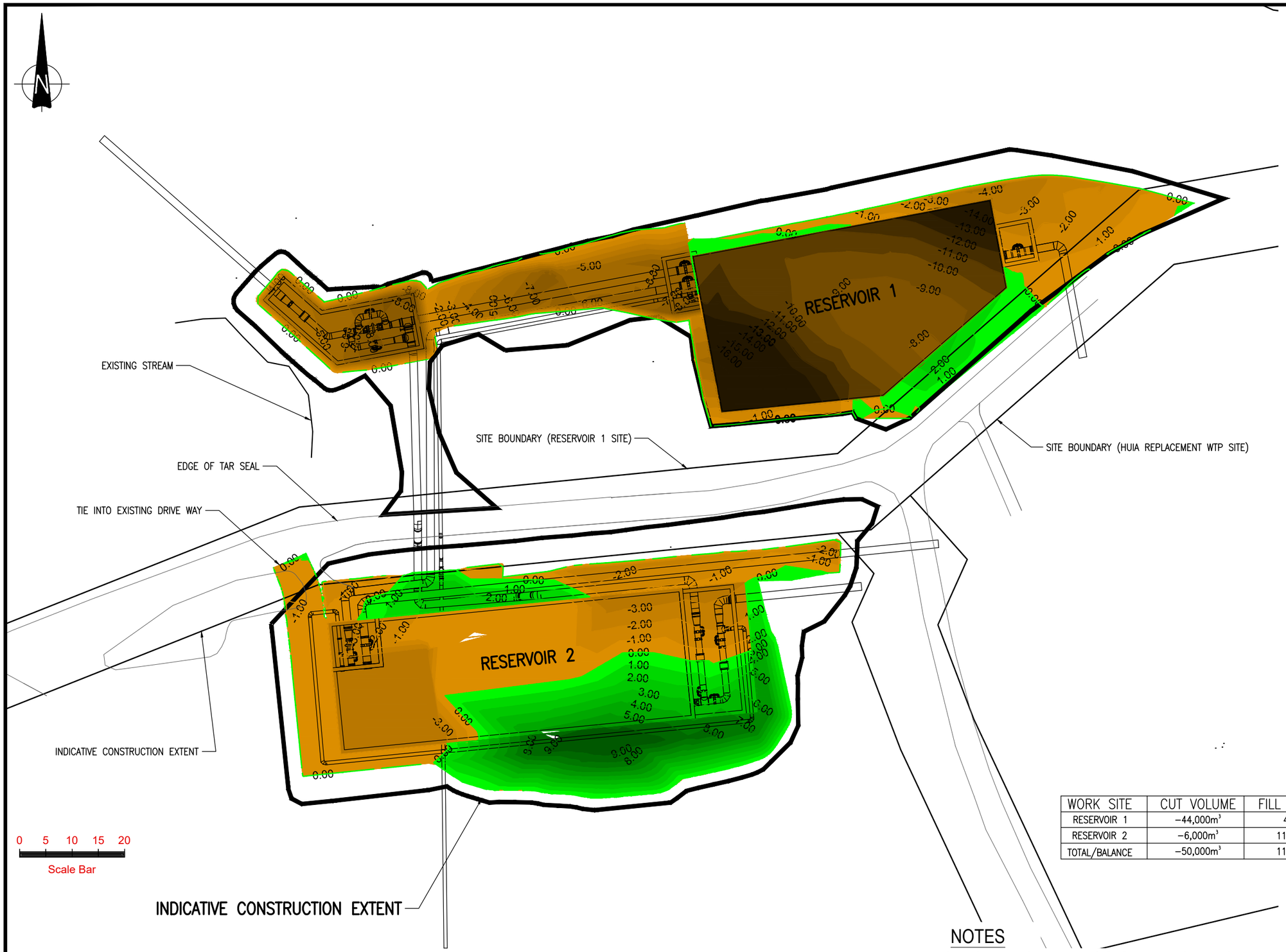
GHD
Level 3, GHD Centre
27 Napier Street, Freemans Bay, Auckland 1011 New Zealand
T 64 9 370 8000 F 64 9 370 8001
E auckland@ghd.com W www.ghd.com

Drawn	E. PARCIA	Designer	A.BLOW
Drafting Check	C.GAMST	Design Check	C.GAMST
Approved (Project Director)	P.FREE		
Date	10/2018		
Scale	1:500	This Drawing must not be used for Construction unless signed as Approved	

Client: WATERCARE SERVICES LTD
Project: HUIA REPLACEMENT WATER TREATMENT PLANT
Title: EARTHWORKS CUT/FILL DEPTHS WATER TREATMENT PLANT SITE

Original Size A1
Drawing No: 51-3357505-C006
Rev: 1

Plot Date: 14 November 2018 - 4:24 p.m. Plotted by: Catherine Shen
Cad File No: G:\51\3357505\CADD\Drawings\51-3357505-C006.dwg



EARTH WORKS CUT / FILL DEPTH

CUT / FILL DEPTH			DEPTH COLOUR
-16	to	-13	
-13	to	-12	
-12	to	-11	
-11	to	-10	
-10	to	-9	
-9	to	-8	
-8	to	-7	
-7	to	-6	
-6	to	-5	
-5	to	-4	
-4	to	-3	
-3	to	-2	
-2	to	-1	
-1	to	0	
0	to	1	
1	to	2	
2	to	3	
3	to	4	
4	to	5	
5	to	6	
6	to	7	
7	to	8	
8	to	9	
9	to	10	

WORK SITE	CUT VOLUME	FILL VOLUME	BALANCE	DISTURBED AREA
RESERVOIR 1	−44,000m³	400m³	−43,600m³	8,800m²
RESERVOIR 2	−6,000m³	11,000m³	5,000m³	9,000m²
TOTAL/BALANCE	−50,000m³	11,400m³	−38,600m³	17,800m²

NOTES

1. SITE LAYOUT AND DESIGNS ARE INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN

ORIGINAL DRAWING IN COLOUR

RESOURCE CONSENT
NOT FOR CONSTRUCTION

ISSUE	DATE	AMENDMENT	BY	APPD.
OB	21.05.19	ISSUED FOR RESOURCE CONSENT	GT	JR

DESIGNED	SP	05.19
DES. APPROVED	PA	05.19
DRAWN	SMB	05.19
DWG. APPROVED	SP	05.19
WSL DESIGN MGMT.		
WSL PROJ. LEAD		
BY		DATE

Watercare

HUIA REPLACEMENT WATER TREATMENT PLANT
TREATED WATER STORAGE RESERVOIRS
RESERVOIR CONCEPT – EARTHWORKS PLAN

CAD FILE 3255336-K116	DATE 21.05.19
ORIGINAL SCALE A3 1:1000	CONTRACT No. –
REF No.	
DWG No. 3255336 –K116	ISSUE OB

Document: p:\3255\3255336\cad\3255336-k116.dwg

Appendix B: Contractor Checklist

Tonkin+Taylor

Contractor checklist

Watercare services Ltd– Summary of key SMP requirements

The Contractor shall undertake the following during earth works for the Proposed Huia Water Treatment Plant

Timing	Key task	Details	Completed
Prior to ground works commencing	Site set up	a Watercare to appoint a contaminated land specialist: Name: b Contact	
		c Contaminated land specialist to conduct pre-works testing	
		d Contaminated land specialist to review and update this SMP	
		e Watercare services Ltd to advise Auckland Council of works commencing;	
		f If required, engage with WorkSafe NZ and appoint a Licensed Asbestos Removalist	
		g Establish earthworks (dust, erosion, sediment, stormwater) controls and asbestos controls as per SMP Section 6;	
		h Hazard board to state contaminated soil may be present and indicating health and safety requirements for workers;	
		i Obtain PPE;	
		j Arrange disposal permits	
During the works	General SMP Compliance	k Maintain earthworks (dust, erosion, sediment, stormwater) controls as per SMP Section 6;	
		l Implement health and safety procedures in Section 8;	
		m Retain all weighbridge and disposal dockets and provide to Contractor;	
		n Ensure imported material meets requirements in Section 6;	
		o Undertake air monitoring if required for asbestos/ dust monitoring;	
	Alert Watercare Project Manager and Contaminated Land Specialist	If any of the following situations arise: p Contaminated soil is encountered that includes: - odours (petroleum, oil) - Discolouration (black, green/blue staining most common) q - Groundwater with an oil sheen, odour or discolouration	
Within one month of completion of the relevant works	Provide contaminated land-related information to Watercare	r Details of any complaints relating to odour or dust made during the works	
		s Details of unexpected encounters/events and the action taken;	
		t Details of visits made by Council representatives;	
		u Summary of weighbridge information for disposal verification;	

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