



**Ground Contamination  
Assessment - Northern  
Interceptor Project:**

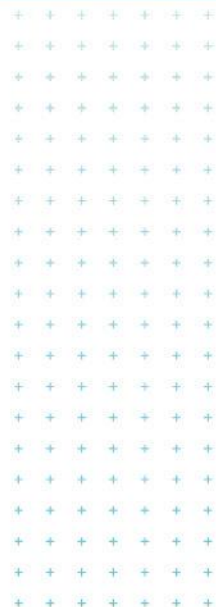
**Notices of Requirement**

**Prepared for**  
Watercare Services Limited

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## 1 Introduction

Tonkin & Taylor Ltd (T+T) has been commissioned by Watercare Services Limited (Watercare) to undertake a ground contamination desk study investigation for the Northern Interceptor (NI) project between The Concourse, Henderson, and the Rosedale Wastewater Treatment Plant (referred to below as the designation). The location of the proposed designation is presented in **Figure 1, Appendix A**.

This report has been prepared in general accordance with the requirements for a Preliminary site Investigation (PSI) referred to in the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulation 2011<sup>1</sup> (herein referred to as the NES), and as outlined in the MfE's Contaminated Land Management Guidelines<sup>2</sup>.

The persons undertaking, managing reviewing and certifying this investigation are suitably qualified and experienced practitioners as defined in the NES.

This investigation was undertaken in accordance with our proposal of 1 December 2015.

### 1.1 Description of proposed works

The Northern Interceptor comprises a new wastewater interceptor and associated infrastructure, from the existing storage tank located at The Concourse, Henderson to the Rosedale Wastewater Treatment Plant (WWTP). It will divert flows from three existing branch sewers (Swanson, Whenuapai and Massey) and connect flows originating from the North West Transformation Area (including Red Hills, Massey North, Kumeu, Riverhead, Huapai and Whenuapai). These flows will be transferred north to the Rosedale WWTP, rather than south to the Mangere WWTP

Phase 1 of the Northern Interceptor was granted consent in January 2016. Phase 1 will transfer existing flows from the existing Hobsonville Pump Station to the Rosedale WWTP. The section of the Northern Interceptor between Hobsonville Road and the western abutment of the Greenhithe Bridge, is in the same corridor as a water infrastructure project, the North Harbour No. 2 Watermain. A notice of requirement for the works within the shared corridor, which include this portion of the Northern Interceptor, was lodged with the Council in June 2016.

This technical report provides specialist input for the Northern Interceptor Assessment of Effects on the Environment (AEE), prepared by MWH New Zealand Limited which supports the Notices of Requirement (NoR) for the remainder of the route (Project), these being NoR – NI (Waitakere) and NoR – NI (North Shore).

The works within NoR - NI (Waitakere) will transfer wastewater flows from The Concourse Storage Tank to Hobsonville Road, where it will connect with the works in the shared corridor.

The works within NoR - NI (North Shore) will transfer wastewater flows from the edge of the future harbour crossing at the eastern abutment of the Greenhithe Bridge to the Rosedale WWTP.

Construction will be staged in response to growth in the area.

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<sup>1</sup> Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

<sup>2</sup> Ministry for the Environment, updated 2011, Contaminated land management guidelines No. 1: *Reporting on Contaminated Sites in New Zealand*.

The Project and a detailed construction methodology are described in detail in the AEE. In summary, the Project works included within NoR – NI (Waitakere) and NoR – NI (North Shore) will comprise of the following elements:

- A new Pump Station at the Concourse Storage Tank site which will divert flow north away from the Western Interceptor;
- A new Booster Pump Station at Wainoni Park to accommodate additional flows from the Northwest Transformation Area;
- A new Intermediate Pump Station at Wainoni Park North to accommodate further growth in the Northwest Transformation Area, and the diverted flows from the Concourse Storage Tank site (Swanson and Waitakere);
- Installation of a wastewater pipe from the Concourse Storage Tank to Hobsonville Road;
- Installation of a wastewater pipe from the eastern abutment of the Greenhithe Bridge, to the Rosedale WWTP;
- Duplication of the rising main section of wastewater pipe from the Intermediate Pump Station at Wainoni Park North to the Rosedale WWTP;
- Associated structures at connection points, including access shafts, drop shafts, flow control structures, etc.; and
- Installation of a pipe bridge at Manutewhau Reserve, West Harbour.

## **1.2 Scope of work and methodology**

This preliminary ground contamination investigation has been undertaken to assess the potential contaminated land effects related to the construction of the NI Project. This investigation has involved the following scope of works:

- Review of readily available geology and hydrogeology information for the project designation;
- Review of 6 sets of historical aerial photographs held by T+T and Auckland Council for the designation;
- Review of a site contamination enquiry obtained from Auckland Council for the designation; and
- Drive-by of the designation to note particular adjacent properties where potentially contaminating activities may be occurring and may have a potential impact on the soil along the route.
- Preparation of this report documenting the work undertaken and commenting on the PSI findings to support the NoR designation application.

All dimensions, areas and volumes provided are approximate and it is possible that some details may change as the design and construction methods are finalised. Any refinements that may occur during this process are not expected to alter the potential for contamination, set out later in this report.

## 2 Project area description

### 2.1 Project area identification

The proposed designation boundary for the NoR – NI (Waitakere) and NoR – NI (North Shore) extends from The Concourse, Henderson, to the western end of Hobsonville Road and from The Knoll at Upper Harbour Highway to the Rosedale WWTP respectively. The designation is generally located within road reserves, although it also has relatively short sections through parkland and private residential properties. The locations of the proposed designation for both NoR sections are shown on **Figure 1** in **Appendix A**.

For ease of reporting and interpretation, each NoR designation has been divided into the following sections:

NoR NI (Waitakere):

- The Concourse to Selwood Road;
- Selwood Road to Huruhuru Road;
- Huruhuru Road to Cedar Heights Avenue;
- Cedar Heights Avenue to Holmes Reserve;
- Holmes Reserve to Holmes Drive; and
- Holmes Drive to Hobsonville Road.

NoR NI (North Shore):

- The eastern abutment of the Greenhithe Bridge to Collins Park;
- Collins Park to Wainoni Park;
- South Wainoni Park;
- North Wainoni Park to North Shore Memorial Park;
- North Shore Memorial Park to Schnapper Rock Road;
- Schnapper Rock Road to North Shore Golf Course;
- North Shore Golf Course to Appleby Road;
- Appleby Road to William Pickering Drive;
- William Pickering Drive to Bush Road; and
- Bush Road to Rosedale WWTP.

Further description of the designation is provided in Section 4.

## 2.2 Geology

A summary of available geological information for the designation is presented in this Section.

### 2.2.1 Published geology

The published geology beneath the project area is described by Kermode<sup>3</sup> and Schofield<sup>4</sup> and is shown in **Figure 2, Appendix A**. The designation is underlain by Puketoka Formation (Tauranga Group alluvium), East Coast Bays Formation (ECBF) and Paremoremo Formation.

<sup>3</sup> Kermode, L. O. (1992). *Geology of the Auckland urban area*. Scale 1:50 000. Institute of Geological and Nuclear Sciences geological map 2. 1 sheet + 63 p. Institute of Geological and Nuclear Sciences Ltd., Lower Hut, New Zealand.

<sup>4</sup> Schofield, J.C, 1989, Sheets Q10 & R10 – Helensville and Whangaparaoa, Geological Map of New Zealand 1:50,000, Department of Scientific and Industrial Research

The NoR NI - Waitakere section of the designation is mostly underlain by ECBF, with pumiceous deposits from the Puketoka Formation present on the northern face of the ridge in Massey East (between Holmes Reserve and Hobsonville Road) and a small gully section in Lowtherhurst Reserve (between Huruhuru Road and Cedar Heights Avenue). Pumiceous deposits are also present along the ridge around Selwood Road, and the low-lying area around The Concourse is underlain by stream alluvium.

The NoR NI – North Shore section of the designation is almost entirely underlain by Puketoka Formation, with the exception of the area around Greenhithe which is underlain by ECBF.

Kermode described the Puketoka Formation as light-grey to orange-brown pumiceous mud, sand and gravel with muddy black peat and lignite; rhyolite pumice, including non-welded ignimbrite, tephra and alluvial pumice deposits (mainly coastal exposures).

The ECBF is described as alternating sandstone and mudstone with variable volcanic content and interbedded volcanoclastic grit beds.

## 2.2.2 Project area geological information

The soil profile and hydrogeological information was obtained from T+T geotechnical investigations carried out in 2015 and 2016<sup>5,6</sup>. The investigations indicate the general geological profile as indicated in **Table 2.1**.

**Table 2.1: Summary of project area geological information above ECBF rock**

Depth below ground level to top of layer (m)	Unit thickness (m)	Geological unit	Description
0	0.2	Topsoil	Dark brown organic silt
0.2	0 - 1.6	Fill	This material typically comprised re-worked soft to stiff, clay/silt mixtures derived from natural Tauranga Group or ECBF soils
Where present – directly underlying fill material	0 - 0.2	Buried topsoil	Dark brown organic silt
0.2 – 1.8	5 – 10	Natural soil (ECBF or Tauranga Group)	Silts and sands

## 2.3 Hydrogeology and hydrology

Groundwater depth tends to be generally within a few metres of the ground surface in the near surface soils. Groundwater flow direction generally follows the surface topography and discharges to the nearest surface water body.

The designation is located in various surface water catchments that generally discharge into the Upper Waitemata Harbour.

<sup>5</sup> T+T, February 2015, Northern Interceptor, Terrestrial Investigation, Factual Geotechnical Report

<sup>6</sup> T+T, February 2016, Northern Interceptor – Phase 2 – 6 Preliminary Ground Investigation, Geotechnical Factual Report

### 3 Previous ground contamination investigations

In June 2015, T+T prepared a ground contamination report<sup>7</sup> for the Northern Interceptor Phase 1 Project, which is an early stage of the wider works and was granted consent in January 2016. That report provides a thorough desk study of the Phase 1 alignment, including a review of information relating to potential historical and recent contamination and intrusive site investigation work to assess soil contamination at various locations along the designation.

Some of the areas assessed in the 2015 report overlap with the present NoR NI – North Shore designation (refer **Figure 1** in **Appendix A**). The areas of overlap, where information from the 2015 report applies to the proposed designation, are as follows:

- Corner of Greenhithe Road and Sunnyview Road to Churchouse Road;
- Both designations run through Wainoni Park, but follow different routes; and
- North Shore Golf Course (near the terminus of Laurel Oak Drive) to the Rosedale WWTP.

Soil sampling within a programme of geotechnical investigations was carried out as part of the 2015 ground contamination assessment. A copy of this 2015 T+T report can be provided upon request. The relevant information and soil sampling results from the 2015 T+T report are included in the project area information and the potential for contamination assessment sections of this report (**Sections 4 and 5** respectively).

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<sup>7</sup> Tonkin & Taylor Ltd, June 2015. Northern Interceptor – Phase 1: Ground contamination assessment. Report prepared for Watercare Services Ltd.



## 4 Project area information

This section summarises the information collected for each section of the proposed designation. The information presented here includes a summary of observations from historical aerial images, project area drive-by inspections, information included in contamination enquiries sourced from Auckland Council and previous ground contamination investigations within and adjacent to the project area. Detailed information documented during the review of historical aerials and the contamination enquiries, including information in the T+T 2015 NI Phase 1 report, are included in **Appendices B and C**.

Drive by inspections were carried out by environmental scientists on 25 November 2014 and 25 February 2016. The land uses and condition of the designation area and surrounding land were observed. A description of the designation and surrounding area is included below for each section. Key features are shown on **Figures 3-11, Appendix A**.

An assessment of potentially contaminating activities identified during this assessment is provided in **Section 5** below.

### 4.1 NoR NI Waitakere

#### 4.1.1 The Concourse to Selwood Road (Figure 3)

The designation is mainly located in the road reserve<sup>8</sup> of The Concourse.

The land surrounding the proposed designation generally slopes downhill from the Lincoln Road onramp northeast to Henderson Creek. Consequently, at the northern end of The Concourse the properties south of the road are elevated above the road reserve and those to the north are below the road.

Historically, from around 1940, land surrounding this section of the designation was used for horticulture including a small plot over the path of the designation on the western part of The Concourse. Commercial and industrial development began along The Concourse around the early 1980s while the surrounding area remained predominantly in agriculture and horticulture. The commercial and industrial development intensified notably around 2001.

The commercial and industrial properties located along The Concourse contain a variety of businesses and activities as detailed below.

- An engineering business servicing the refuse and recycling centre. Staining of the ground is evident in aerial photos but was not obvious from the roadway;
- Vehicle mechanics;
- Waitakere Refuse and Recycling Centre, located behind The Concourse Pump Station;
- A scrap metal buyers business is located opposite the Concourse Pump Station;
- Two businesses related to the application and removal of powder coating;
- A generator rental business, appears to include generator servicing;
- A swimming pool sales business, expected to contain chemical storage;
- Spencer Marine – activities on the site may include maintenance of boats;
- Automotive mechanical repair workshop, staining of the driveway shows water sometimes flows from the workshop into a stormwater drain and into the roadway;

<sup>8</sup> The area from the property boundary on one side of the road to the property boundary on the other side of the road. This includes the berm (grass verge), footpath and carriageway (Road).

- Panel and paint shop;
- Ask Metro Fire, a fire protection systems business providing design supply, installation, commissioning and servicing of fire protection systems. The services provided include training with fire extinguishers, although it is not clear whether this training and servicing occurs on site;
- Henderson Laundry and Dry-cleaning;
- A metal processing and component manufacturing plant; and
- Alloy Yachts, a very large site currently for sale. Contains at least three large warehouse buildings. From the road the site appears entirely sealed with concrete. Activities on the site are likely to have included sanding, painting, fibreglass work and other yacht building and maintenance.

#### **4.1.2 Selwood Road to Huruhuru Road (Figures 3 and 4)**

From Selwood Road, the designation runs parallel to State Highway 16 through the Fulton Hogan Lincoln Road office and across Henderson Creek. On the northern side of the creek, the designation passes through Taitapu Park, which is grassed and bordered with native plantings, through an access way to Kopi Place and along the Kopi Place road reserve to an access way leading to Huruhuru Road. The land surrounding Kopi Place is currently low density residential.

In 1940, an area of horticulture was present at the eastern end of Huruhuru Road, while the land south of Henderson Creek was in pasture. The area around Kopi Place and Huruhuru Road was developed for residential housing in the early 1970s. A small number of residential dwellings were built along Selwood Road before 1959, but by 1996 these had been removed and the land was once again in pasture before being cleared for what appears to be aggregate storage in the early 2000s.

#### **4.1.3 Huruhuru Road to Cedar Heights Avenue (Figure 4)**

The designation runs along the Huruhuru Road reserve, surrounded by low density residential housing, and through Lowtherhurst Reserve which is a grassed park surrounded by large trees. The designation crosses a small stream gully in the reserve before joining Cedar Heights Avenue.

This area was in pasture in 1940 and a residential subdivision around Huruhuru Road was developed beginning in the late 1950s. The northern part of this section was cleared for residential subdivision in the early 1970s.

#### **4.1.4 Cedar Heights Avenue to Holmes Reserve (Figure 5)**

The designation follows the road reserve of Cedar Heights Avenue uphill to the intersection with Jarrah Place. Proposed trenchless construction then follows Cedar Heights Avenue to Makora Park (a small grassed residential park), beneath a badminton club, across Royal Road and through a large section of vacant grassed land. The designation then runs beneath a residential property and across Holmes Drive South to Holmes Reserve. The land use surrounding this section of the designation is low density residential and parkland, with the exception of the badminton club and a block of commercial shops including a supermarket located on Royal Road approximately 30 m southeast of the designation.

This area was originally pasture, with one small area of horticulture where the badminton club is located on Royal Road. The area south of Royal Road was developed for residential landuse around 1970 and the northern section was subdivided in the 1980s.

#### **4.1.5 Holmes Reserve to Holmes Drive (Figure 5)**

Holmes Reserve is a thin gully densely planted with vegetation and surrounded by residential housing. At the north end of the reserve the designation passes under a residential property and along Berkshire Terrace, east along Ruze Vida Drive and along Jadewyn Drive to Lendich Reserve. Two large stormwater ponds are located in Lendich Reserve. The designation then reverts to trenched construction and runs west along Ruze Vida Drive and through a residential property. A pipe bridge is proposed to cross a heavily planted gully to the bottom of Holmes Drive. The land use surrounding this section is residential and parkland.

A relatively large area of horticulture was present in the region of Berkshire Terrace and Ruze Vida Drive from at least 1940 to the mid-late 1990s. This area was subdivided around the turn of the millennium and housing steadily intensified through to the late 2000s.

#### **4.1.6 Holmes Drive to Hobsonville Road (Figures 5 and 6)**

Trenchless construction is proposed along Holmes Drive (except for a small trenched section at the top of the hill), across Oriel Avenue and under a residential property to St Margarets Park. This area is surrounded by low density residential properties and several parks and reserves. The south part of St Margarets Park is a sports field which does not appear to be highly maintained, and a walkway extends north to a playground. From the top of St Margarets Park the designation runs beneath residential properties to the northwest and under Hobsonville Road into farmland.

This area was historically pastoral land which was subdivided around 1980.

### **4.2 NoR NI - North Shore**

#### **4.2.1 The eastern abutment of the Greenhithe Bridge to Collins Park (Figure 7)**

The NoR NI - North Shore designation begins in an area of native bush adjacent to the eastern abutment of the Greenhithe bridge, near the Knoll. The proposed designation is trenchless construction through this section. The designation runs along the Tauhinu Road reserve then turns northeast and runs beneath residential properties to Collins Park.

In 1959 this area was mostly agricultural with some residential subdivision having already occurred. A small amount of horticulture was present in the wider surrounding area. Tauhinu Road and the surrounding area had become almost fully residential by the 1980s. Collins Park was used as a sports field with cricket pitches by 1996.

The 2015 NI Phase 1 investigation involved soil testing on Tauhinu Road near the proposed designation. Metals and PAH were found at concentrations which exceed background levels in the topsoil and fill. The contaminants did not exceed NES soil contaminant standard (SCS) for a commercial/industrial outdoor worker or ALW Plan<sup>9</sup>/PAUP<sup>10</sup> permitted activity (PA) discharge criteria.

#### **4.2.2 Collins Park to Wainoni Park (Figures 7 and 8)**

The designation passes beneath residential housing and along a section of Greenhithe Road to Wainoni Park.

In this area, pastoral land and bush was subdivided into residential land use around the 1970s.

Soil testing carried out in 2015 identified above background concentrations of PAH in the topsoil at the intersection of Greenhithe Road and Sunnyview Road, on the route of the proposed designation.

<sup>9</sup> Auckland Council Regional Plan: Air Land and Water

<sup>10</sup> Proposed Auckland Unitary Plan

The concentrations were below NES SCS for commercial/industrial outdoor worker and ALW Plan/PAUP PA discharge criteria. Another soil sample taken at the intersection of Greenhithe Road and Isobelle Road beside Wainoni Park did not detect any contaminants above published background concentrations.

#### **4.2.3 South Wainoni Park (Figure 8)**

The designation passes through largely grassed areas and through the Greenhithe Pony Club grounds. No chemical storage facilities were observed in the immediate vicinity of the pony club grounds.

This area was historically in pasture with small localised areas of horticulture. The pony club appears to have existed here since the 1960s.

#### **4.2.4 North Wainoni Park to North Shore Memorial Park (Figures 8 and 9)**

North Wainoni Park was pasture in the 1950s, and the sports fields were developed in the mid-1980s.

Previous testing by Kingett Mitchell<sup>11</sup> indicated that the near surface soils from around a shed in the park showed elevated copper and DDT concentrations above NES SCS for recreational and commercial landuse. The shed is located near the proposed designation (refer blue shaded area in Figure 8). The Kingett Mitchell report indicates that soil samples away from the shed showed contaminant concentrations below the NES SCS for recreational and commercial landuse. The actual data was not available for review. The report indicated that contaminant concentrations reduce significantly with depth, but minor residual contaminants were detected at 0.5 m depth near the shed.

#### **4.2.5 North Shore Memorial Park to Schnapper Rock Road (Figure 9)**

The designation passes along the boundary of the North Shore Memorial Park and the foreshore, downgradient of a proposed future extension to the cemetery. The majority of this section of the designation is proposed to be open trench construction. The designation is downgradient of the Memorial Park crematorium and downgradient or level with areas of the existing cemetery in the eastern part of the park. The designation generally follows proposed or existing roadways within the park.

Schnapper Rock Road is visible in the aerial from 1959, and North Shore Memorial Park appears to be in pasture. The central area of the cemetery and the crematorium were built around 1970. The cemetery has slowly expanded since this time.

Council records show that underground diesel and petrol storage tanks were removed from the crematorium but there is no date indicating when this occurred and no tank removal report is available.

Soil samples were taken at three locations in the vicinity of the proposed designation in Memorial Park as part of the 2015 NI Phase 1 investigations (refer Figure 9). The results of sampling at all three locations were below background concentrations.

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<sup>11</sup> Kingett Mitchell Ltd, November 2006, Wainoni Main Park Remediation Action Plan

#### **4.2.6 Schnapper Rock Road to North Shore Golf Course (Figure 10)**

The designation passes along Schnapper Rock Road between residential housing and the cemetery. At the western end of Schnapper Rock Road, the designation passes through a vacant section before reverting to trenchless construction and crossing into the southwestern corner of the North Shore Golf Course.

Schnapper Rock Road was in pasture until the early 2000s when it was subdivided for residential dwellings.

#### **4.2.7 North Shore Golf Course to Appleby Road (Figure 10)**

A short section of the designation passes through the golf course (trenchless construction at the western end, turning to trenched construction) and past the driving range. The designation passes through the carpark of the golf club and down the driveway to Appleby Road.

The golf course and driving range are well maintained. No underground storage or chemical storage facilities were observed immediately adjacent to the proposed designation. Two double-garage sized sheds were located on the south eastern corner of the golf club car park. There was no evidence to indicate bulk chemical storage within the sheds and no evidence of any chemical leaks or staining.

The driveway of the golf course is bordered on one side with recently constructed residential dwellings.

Aerial photographs indicate earthworks and contouring were underway in 1959 for the development of the North Shore Golf Course, and foundations were being laid for the clubhouse. By the early 1970s the golf course was well established and the driving range was visible. Residential development along St Andrews Way began in the early 2000s.

Soil samples were taken at two locations near the proposed designation in the North Shore Golf Course. A sample taken near the clubhouse contained lead above background concentrations in surface fill, with all other contaminants below background. Samples taken near the car park contained dieldrin and nickel above background concentrations in the surface fill and deeper reworked fill respectively. No other tested contaminants exceeded background concentrations.

#### **4.2.8 Appleby Road to William Pickering Drive (Figure 10)**

The designation passes along the Appleby Road reserve. A school is located south of the road, and the golf course and residential properties to the north. The designation runs along Albany Highway and turns northeast through commercial properties to John Glenn Avenue. John Glenn Avenue contains a range of commercial retail and light industrial properties. The properties appear well maintained, with sealed ground cover and operations well separated from the road reserve.

The area was predominantly pasture until around 1990 when some land was developed for horticulture. Industrial and commercial development began in the early 2000s and the school on Appleby Road was built in the mid-2000s.

Two soil samples were taken along Appleby Road as part of the 2015 NI Phase 1 investigations. Neither contained contaminants above background concentrations.

#### **4.2.9 William Pickering Drive to Bush Road (Figure 11)**

The designation runs along William Pickering Drive and Piermark Drive, which have a similar condition and surrounding land use as John Glenn Avenue.

This area was used for horticulture until 1988 when it was cleared and development of light industrial and commercial properties began. The density of these developments increased markedly in the late 1990s and early 2000s.

Soil sampling was carried out at one location on William Pickering Drive and two locations on Piermark Drive as part of the 2015 NI Phase 1 investigations. On William Pickering Drive the surface fill was found to contain PAH, DDE and DDT. The westernmost sample on Piermark Drive contained DDE and DDT in the topsoil and deeper fill, and also DDD in the deeper fill. Further east along Piermark Drive a sample of the natural in situ material was found to contain nickel. All contaminants listed above as being detected in these samples were found at above background concentrations but below NES SCS for outdoor worker in a commercial/industrial setting and ALW Plan/PAUP PA discharge criteria.

#### **4.2.10 Bush Road to Rosedale WWTP (Figure 11)**

On the east side of Bush Road the designation runs down an access way between a Budget Rentals depot, located at 169 Bush Road and a Vector substation located at 179 Bush Road. The Budget Rentals depot includes a campervan wastewater dump point. The Vector substation comprises a gravelled switchyard with two sets of transformers and circuit breakers and an equipment shed. All equipment appeared in good repair and there was no evidence of oil spills or staining.

A concrete recycling yard (Atlas Concrete) and a Fulton Hogan yard are located at 8 Paul Matthews Road, south of the designation before it crosses Alexandra Stream. The designation passes through the Rosedale Park carpark and along a road which is located between a small recreational reserve and several sports fields. The designation enters the Rosedale WWTP in the southwestern corner.

This area was used for agriculture and some horticulture in the 1950s. In 1959 earthworks has begun on construction of the WWTP. Sports fields were developed in the 1980s and the industrial activities located in the western part of this section developed between the 1980s and early 2000s. Soil sampling was undertaken at four locations within this section as part of the 2015 investigations. Two locations (BH16 and BH17) were not found to contain contaminants above background concentrations. DDE was detected in the natural soil collected from HA26, and DDE, DDT and dieldrin were detected in a sample within the former horticultural area beside the Rosedale WWTP (HA27). These contaminants were detected at concentrations which exceeded background concentrations but were below SCS for outdoor worker in a commercial/industrial setting and ALW Plan/PAUP PA discharge criteria.

## 5 Potential for contamination

This investigation has identified that HAIL activities were (or are likely to have been) undertaken at various locations along the designation. The activities, potential contaminants and an assessment of the likelihood, potential magnitude and possible extent of contamination for the Waitakere and North Shore Sections are presented in **Tables 5.1 and 5.2** respectively below. The inferred locations of these activities are presented on **Figures 3 – 11** (provided in **Appendix A**).

**Tables 5.1 and 5.2** also state whether the potentially contaminating activities are identified on the MfE HAIL.

Table 5.1: Potential for contamination – NoR NI Waitakere

Land use/activity	Potential contaminants	Sections potentially affected	Likelihood, magnitude and possible extent of contamination	HAIL reference	Sampled locations
Pesticide and agrichemical use on horticultural sites and sports turfs (refer Figures 3-6 for locations). Note: Only those reserves/parks which include a sports field is identified	Metals (Arsenic (As), Copper (Cu), lead(Pb)) and organochlorine pesticides (OCPs) and organonitrogen and organophosphate pesticides (ONOPs)	<ul style="list-style-type: none"> <li>• Section between 19 The Concourse to Selwood Rd;</li> <li>• Section between Kopi Pl and Taitapu St;</li> <li>• The northern portion of Makora Park;</li> <li>• Section between 15 Berkshire Terrace to 24 Jadewynn Dr; and</li> <li>• The section north of Hobsonville Rd</li> </ul>	Contaminants from this type of activity relates to the use of sprays containing persistent pesticides used prior to the late 1970s. The contaminants are mostly likely to be confined to shallow soil (typically to 400mm depth) where the activities have been undertaken.  On a number of sections, the activities occurred adjacent to the location of the proposed designation. However, in some areas, the activities previously occurred on land in which the designation will pass through. Most areas were subject to the activities from the 1960s to 1980s.  <b>Potential for contamination: low to moderate</b>	Activity A10- Pesticide use	Not yet investigated



Land use/activity	Potential contaminants	Sections potentially affected	Likelihood, magnitude and possible extent of contamination	HAIL reference	Sampled locations
Engineering /motor vehicle workshop (refer Figures 3 and 5)	Metals and Hydrocarbons including Total petroleum hydrocarbons (TPH), volatile organic compounds (VOC) and polyaromatic hydrocarbons (PAH)	<ul style="list-style-type: none"> <li>The section along The Concourse; and</li> <li>The section through 36 – 58 Moire Road</li> </ul>	<p>An earthmoving depot historically occupied 36 – 58 Moire Road. Engineering type workshop activities which could have caused contamination to near surface soils in unpaved areas could have occurred on this property. The proposed designation is located cross gradient to this property.</p> <p>A number of engineering/motor vehicle workshops are located on The Concourse, however, contamination from these sources are likely to be confined to soils within the property.</p> <p><b>Potential for contamination: low</b></p>	None (Activity H - Contaminant migration to the designation is highly unlikely to have occurred)	None required
Bulk storage of chemicals at a drycleaning, swimming pool and powder coating/ painting facilities (refer Figure 3)	VOCs	<ul style="list-style-type: none"> <li>30 The Concourse</li> </ul>	<p>A drycleaners is located at 30 The Concourse. Spills and leaks of drycleaning fluid can affect soils and groundwater at the property. The property is located on the down-gradient side of the proposed designation.</p> <p>There are other potential industries which occupy properties on The Concourse may also store bulk chemicals. No significant spills have been recorded. Due to the distance, the likelihood for contaminant to extend to the road reserve is low.</p> <p><b>Potential for contamination: low</b></p>	None (Activity H - Contaminant migration to the designation is highly unlikely to have occurred)	None required

Land use/activity	Potential contaminants	Sections potentially affected	Likelihood, magnitude and possible extent of contamination	HAIL reference	Sampled locations
Refuse and Recycling Station (refer Figure 3)	Dependent on the type of waste: biological hazards, metals, PAHs, semi VOCs and solvents.	<ul style="list-style-type: none"> <li>The Concourse proposed pump station site</li> </ul>	<p>The refuse and recycling centre is a transfer station located adjacent to the Watercare pump station on The Concourse. Landfilling does not appear to currently occur on the site, although a consent for historic filling using municipal wastes exists for the site. As the project area is located down-gradient and approximately 90 m away from the designation, the potential for contamination of the soil underlying the road reserve is low.</p> <p><b>Potential for contamination: low</b></p>	None (Activity H - Contaminant migration to the designation is highly unlikely to have occurred)	Not required
Electrical transformers A number have been identified adjacent to the designation	Polychlorinated biphenyls (PCBs) if installed prior to the late 1970s, Hydrocarbons and metals	<ul style="list-style-type: none"> <li>A number of locations spread across the full designation</li> </ul>	<p>If present, contamination is likely to be localised to surface soils directly adjacent to the transformer. Future excavations associated with the pipeline will be undertaken at a distance from all existing transformers to avoid interference with existing services. Thus contamination is not likely to be encountered</p> <p><b>Potential for contamination: very low</b></p>	None (Activity H - Contaminant migration to the designation is highly unlikely to have occurred)	N/A

Land use/activity	Potential contaminants	Sections potentially affected	Likelihood, magnitude and possible extent of contamination	HAIL reference	Sampled locations
Filling for land development and/or road construction (Whole designation)	Unknown but a broad range of contaminants possible depending on whether off-site material was sourced. If sourced from industrial areas then typical contaminants include metals and PAH.	<ul style="list-style-type: none"> <li>Whole designation potentially affected</li> </ul>	<p>The fill used to develop land and/or construct roads are most likely to be locally derived source, and is highly unlikely to have been imported from an industrial site.</p> <p>If contaminants are present, they are likely to be confined to the fill material.</p> <p><b>Potential for contamination: Low to moderate</b></p>	Activity I – Intentional or accidental release of a hazardous substances	Not yet investigated

**Table 5.2: Potential for contamination – NoR NI North Shore**

Land use/activity	Potential contaminants	Sections potentially affected	Likelihood, magnitude and possible extent of contamination	HAIL reference	Sampled locations
<p>Pesticide and agrichemical use on horticultural sites and sports turfs. (refer Figures 7 - 11 for locations) Note: Only those reserves/parks which include a sports field is identified</p>	<p>Metals (As, Cu, Pb) and organochlorine pesticides (OCPs) and organonitrogen and organophosphate pesticides (ONOPs)</p>	<ul style="list-style-type: none"> <li>• The section within Collins Park;</li> <li>• The northern section of Wainoni Park;</li> <li>• The section from the North Shore Golf; and Course to Rosedale WWTP.</li> </ul>	<p>Contaminants from this type of activity relates to the use of sprays containing persistent pesticides used prior to the late 1970s. The contaminants are mostly likely to be confined to shallow soil (typically to 400mm depth) where the activities have been undertaken.</p> <p>On a number of sections, the activities occurred adjacent to the location of the proposed designation. However, in some areas, the activities previously occurred on land in which the designation will pass through. Most areas were subject to the activities from the 1960s to 1980s. The area that is currently being used for horticultural purposes is Knights Nurseries located between Albany Highway and William Pickering Drive, Rosedale.</p> <p><b>Potential for contamination: low to moderate</b></p>	<p>Activity A10- Pesticide use</p>	<p>T+T 2015 investigation locations HA19, HA20, HA21, BH14, BH15, HA27, BH16. Previous sampling and testing by Kingett Mitchell at Wainoni Park</p>

Land use/activity	Potential contaminants	Sections potentially affected	Likelihood, magnitude and possible extent of contamination	HAIL reference	Sampled locations
Electrical transformers A number have been identified adjacent to the designation	Polychlorinated biphenyls (PCBs) if installed prior to the late 1970s, Hydrocarbons and metals	<ul style="list-style-type: none"> <li>A number of locations spread across the full designation</li> </ul>	<p>If present, contamination is likely to be localised to surface soils directly adjacent to the transformer. Excavations associated with the Phase 1 pipeline will be undertaken at a distance from all existing transformers to avoid interference with existing services. Thus contamination is not likely to be encountered</p> <p><b>Potential for contamination: very low</b></p>	None (Activity H - Contaminant migration to the designation is highly unlikely to have occurred)	N/A
North Shore Memorial Park Cemetery (refer Figure 9)	Lead, mercury formaldehyde	<ul style="list-style-type: none"> <li>North Shore Memorial Park Cemetery</li> </ul>	<p>Contamination associated with the cemetery is likely to be confined to soils adjacent to grave sites, but could migrate through groundwater as the proposed designation is located on the downgradient side of the burial grounds.</p> <p><b>Potential for contamination: Low to moderate</b></p>	Activity H - Contaminant migration	Not yet investigated
Pollution incident at 15 Unity Drive North, Rosedale (refer Figure 7)	Unknown, but likely to be metals, VOCs and PAH associated with inks and dyes	<ul style="list-style-type: none"> <li>15 Unity Drive North, Rosedale</li> </ul>	<p>The incident file indicates that a moderate volume of ink/dye was spilled and recorded within a pond at the site. Due to the distance to the proposed designation, the possibility of contamination to have migrated is very low.</p> <p><b>Potential for contamination: very low</b></p>	None (Activity H - Contaminant migration to the designation is highly unlikely to have occurred)	T+T 2015 investigation location HA24

Land use/activity	Potential contaminants	Sections potentially affected	Likelihood, magnitude and possible extent of contamination	HAIL reference	Sampled locations
Vector Electrical Substation (refer Figure 11)	Polychlorinated biphenyls (PCBs) if installed prior to the late 1970s, hydrocarbons and metals	<ul style="list-style-type: none"> <li>The section through 179 Bush Rd</li> </ul>	<p>If present, contamination is likely to be localised to surface soils directly beneath the substation. Excavations associated with the NI pipeline is likely to be undertaken at a distance from the substation to avoid interference with existing services. Thus contamination is not likely to be encountered</p> <p><b>Potential for contamination: low</b></p>	None (Activity H - Contaminant migration to the designation is highly unlikely to have occurred)	N/A
Electric equipment storage facility (refer Figure 11)	Polychlorinated biphenyls (PCBs) if installed prior to the late 1970s, hydrocarbons and metals	<ul style="list-style-type: none"> <li>The section through 179 Bush Rd</li> </ul>	<p>The designation crosses a facility that has been used to store electric equipment (Siemens NZ Ltd). A consent for a stormwater related discharge consent (TP10 compliant) was granted to Siemens in 2007. The paving in the area of the proposed designation is likely to have prevented underlying soils to be contaminated or to be isolated to the near surface soils.</p> <p><b>Potential for contamination: low</b></p>	Activity I – Intentional or accidental release of a hazardous substances	T+T 2015 investigation location BH16

Land use/activity	Potential contaminants	Sections potentially affected	Likelihood, magnitude and possible extent of contamination	HAIL reference	Sampled locations
Rosedale WWTP (refer Figure 8)	Contaminants are likely to include metals and PAH.	<ul style="list-style-type: none"> <li>Rosedale WWTP</li> </ul>	<p>The area that the proposed designation is located away from the WWTP facilities. Previous testing in the area where the WWTP facilities are located indicate that near surface soils generally contain low level metals and hydrocarbons, with isolated locations above published background concentrations for non volcanic soils and ALW Plan permitted activity criteria for discharges. The concentrations are below levels that would pose a risk to human health. The soil testing results would provide a likely worst case indication of the soil conditions in the area of the proposed designation.</p> <p><b>Potential for contamination: Low</b></p>	Activity G6 = Wastewater treatment facility	Previous URS report (refer Section B4 in Appendix B)
Historic filling for land development and/or road construction (Whole designation)	Unknown but a broad range of contaminants possible depending on whether off-site material was sourced. If sourced from industrial areas then typical contaminants include metals and PAH.	<ul style="list-style-type: none"> <li>Whole designation potentially affected</li> </ul>	<p>The fill used to construct roads are most likely to be locally derived source, and is highly unlikely to have been imported from an industrial site.</p> <p>If contaminants are present, they are likely to be confined to the fill material.</p> <p><b>Potential for contamination: Low to moderate</b></p>	Activity I – Intentional or accidental release of a hazardous substances	T+T 2015 all investigation locations.

## 6 Assessment of environmental effects

### 6.1 Potential effects

This preliminary investigation indicates there is potential to encounter contaminated soil during the works (refer Tables 5.1 and 5.2). Most of the land comprises areas of former horticulture, with some minor industrial/commercial activity located in the southern part of the NoR NI – Waitakere section. Activities with the potential to have caused soil contamination within the proposed designation have been shown on Figures 3 - 11 provided in **Appendix A**.

An assessment, based on the identified potentially contaminating activities, indicates that there is a very low to moderate risk for significant contamination to be encountered, depending on the source of contamination.

Soil disturbance will be required to construct the NI project. For contamination to pose a risk, there has to be a source that has a high enough concentration and a mechanism (pathway) for the contamination to be exposed to a receptor.

The following potential receptors have been identified:

- Workers undertaking the proposed soil disturbance work and the general public and site users in the vicinity of the proposed designation;
- Flora and fauna of the water courses near the proposed designation, for example, Henderson Creek, Lucas Creek and the Upper Waitemata Harbour.
- Workers and surface water receptors at the fill site receiving the excavated soil from the project.

Exposure pathways include:

- Dermal contact with and ingestion of contaminated soil and groundwater;
- Inhalation of contaminated dust generated during soil disturbance;
- Mobilisation of contaminated soil and groundwater to surface water during rainfall events;

Based on the above, it has been conservatively assumed that the potential contamination sources may pose some risk to human health and the environment during construction of the project. However, the works should be able to be carried out with less than minor effects to the environment with the implementation of a number of standard earthworks measures. These measures are described in the following section.

### 6.2 Proposed mitigation

The key mitigation measures proposed are as follows:

- Further testing to establish contamination levels within sections of the designation where potentially contaminating activities have been identified. These investigations will inform the requirements for consents under the NES and PAUP, and are best undertaken only when the exact location of excavation works has been established.
- The preparation of a Contamination Site Management Plan (SMP) which sets out the procedures for the earthworks contractor to following during the works and implementation of those procedures. The procedures should include (but not be limited to):
  - excavation, handling and storage requirements;
  - dust and erosion control measures to prevent the discharge of contamination;
  - health and safety procedures;



- disposal of contaminated soils to a landfill approved to take the material; and
- procedures for identifying and managing unexpected discovery of contaminated soils or hazardous materials.
- Appointment of a Contaminated Land Specialist who meets the requirements of a suitably qualified and experienced practitioner (SQEP) set out in the NES<sup>12</sup> Users Guide (2012).

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<sup>12</sup> Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011

## 7 Conclusions

Watercare intend to give their Notices of Requirement for a designation for sections of the NI Project. T+T has been engaged to assess the potential contaminated land effects from the future construction of this pipeline and prepare this report to support their application. This investigation has been undertaken in general accordance with the requirements for a PSI as described in the NES Regulations.

Based on the review, potential HAIL activities have been identified on and around the land of the proposed designation. They were:

- Use of persistent pesticides at former and existing horticultural land and sports turfs; and
- Intentional or accidental release of hazardous substances which could migrate onto the land from:
  - former and existing horticultural activities;
  - an existing cemetery;
  - a dye spill incident at Unity Drive North, Rosedale in 2008;
  - an electric equipment storage facility in Rosedale; and
- Intentional or accidental release of hazardous substances as a result of placement of contaminated fill during land development and construction of roads along the designation.

As there is currently limited soil testing information, it has been conservatively assumed that the potential contamination sources may pose some risk to human health and the environment during construction of the project. However, the works should be able to be carried out with less than minor effects to the environment with the implementation of a number of standard earthworks measures.

The key mitigation measures include:

- Further testing to establish contamination levels and the requirement for NES and PAUP consents prior to works commencing.
- The preparation of a Contamination Site Management Plan (SMP) which sets out the procedures for the earthworks contractor to following during the works and implementation of those procedures.
- Appointment of a Contaminated Land Specialist who meets the requirements of a suitably qualified and experienced practitioner (SQEP) set out in the NES Users Guide (2012).

## 8 Applicability

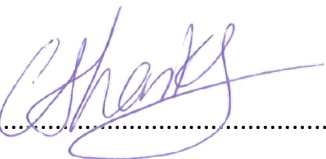
This report has been prepared for the exclusive use of our client Watercare Services Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants


Report prepared by:

Authorised for Tonkin & Taylor Ltd by:



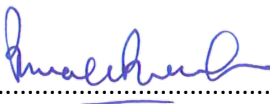
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Alex Beattie and Chris Shanks  
Environmental Scientists

PP   
.....

Peter Roan  
Project Director

Reviewed by a suitably qualified and experienced practitioner under the NES:



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Lean Phuah  
Senior Contaminated Land Specialist

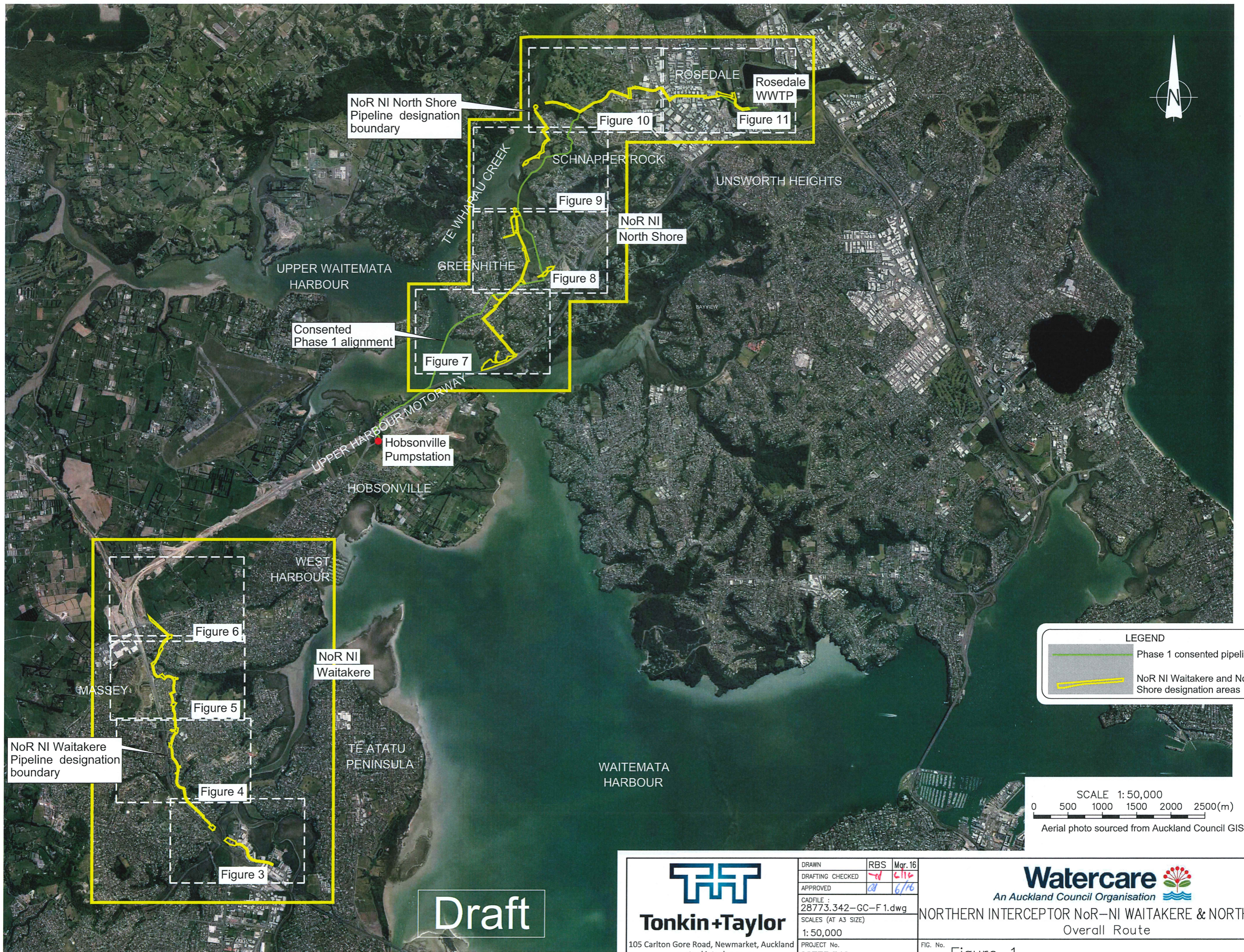
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## Appendix A: Figures

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**LEGEND**

- Phase 1 consented pipeline
- NoR NI Waitakere and North Shore designation areas

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 Aerial photo sourced from Auckland Council GIS Website

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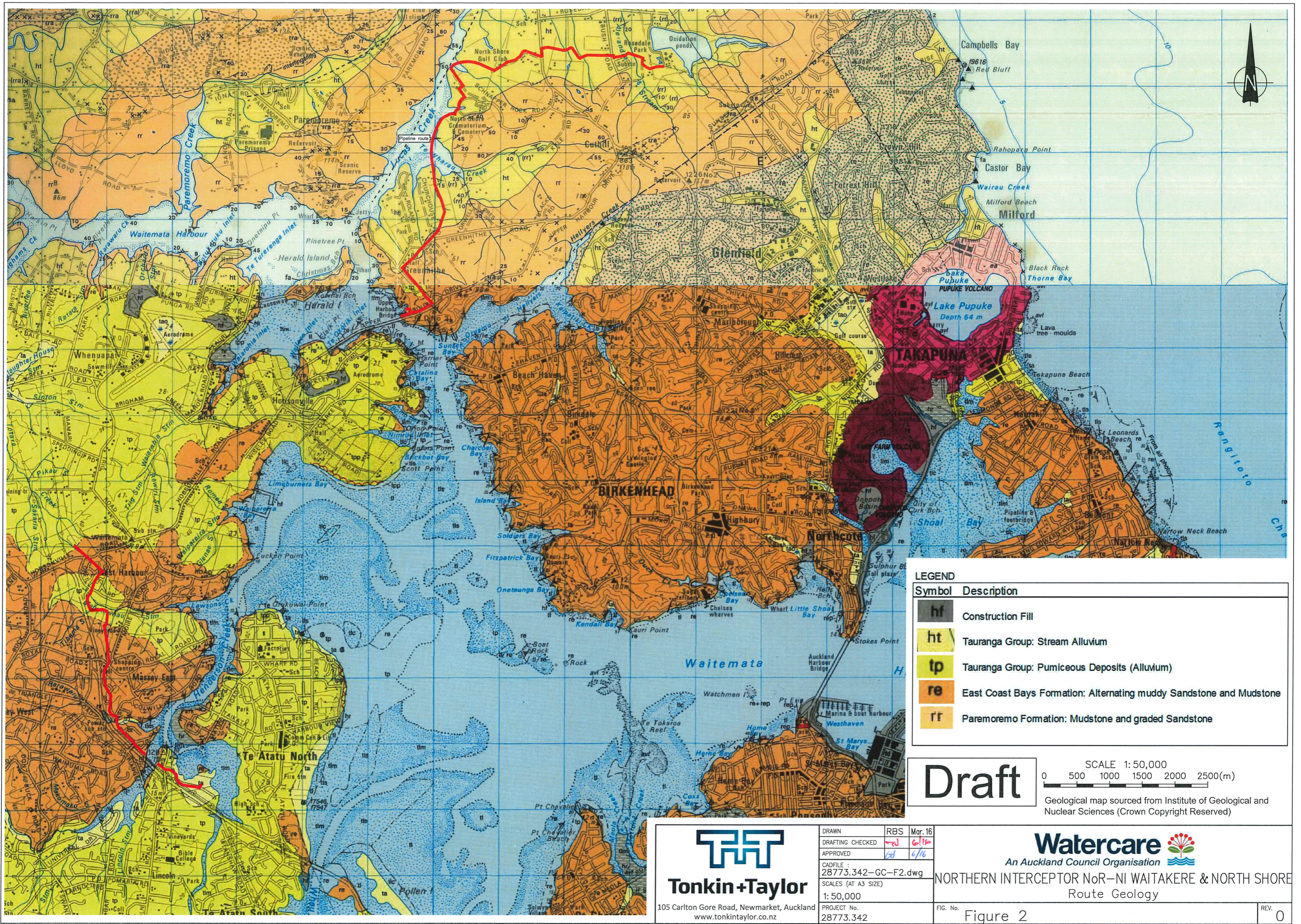
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**NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE**  
 Overall Route

FIG. No. **Figure 1** REV. **0**

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**LEGEND**

Symbol	Description
hf	Construction Fill
ht	Tauranga Group: Stream Alluvium
tp	Tauranga Group: Pumiceous Deposits (Alluvium)
re	East Coast Bays Formation: Alternating muddy Sandstone and Mudstone
rr	Paremoremo Formation: Mudstone and graded Sandstone

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 0 500 1000 1500 2000 2500(m)

Geological map sourced from Institute of Geological and Nuclear Sciences (Crown Copyright Reserved)

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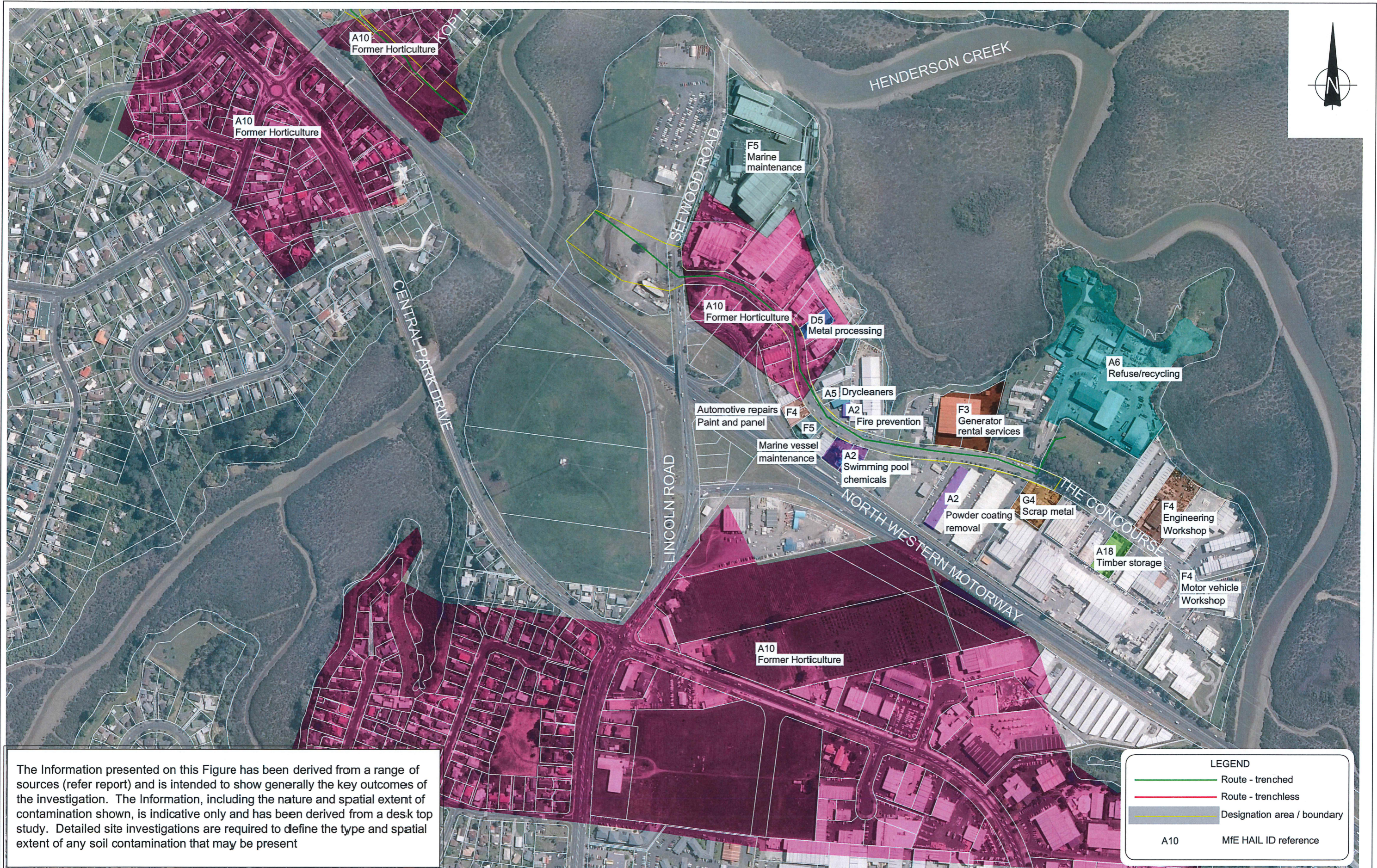
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**NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE**  
 Route Geology

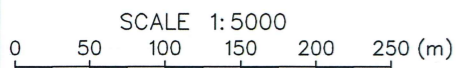
FIG. No. Figure 2

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The Information presented on this Figure has been derived from a range of sources (refer report) and is intended to show generally the key outcomes of the investigation. The Information, including the nature and spatial extent of contamination shown, is indicative only and has been derived from a desk top study. Detailed site investigations are required to define the type and spatial extent of any soil contamination that may be present

NOTE: This review has concentrated around the proposed alignment, HAIL activities at distance from alignment may not be captured.



Aerial photo sourced from Auckland Council GIS Website  
 Property boundaries sourced from Land Information New Zealand data as at 10-Nov-2014 (Crown Copyright Reserved).

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NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE  
 Potential HAIL Activities – The Concourse to Selwood Rd

FIG. No. **Figure 3**

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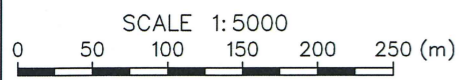


The Information presented on this Figure has been derived from a range of sources (refer report) and is intended to show generally the key outcomes of the investigation. The Information, including the nature and spatial extent of contamination shown, is indicative only and has been derived from a desk top study. Detailed site investigations are required to define the type and spatial extent of any soil contamination that may be present

**LEGEND**

- Route - trenched
- Route - trenchless
- Designation area / boundary
- A10 MfE HAIL ID reference

NOTE: This review has concentrated around the proposed alignment, HAIL activities at distance from alignment may not be captured.



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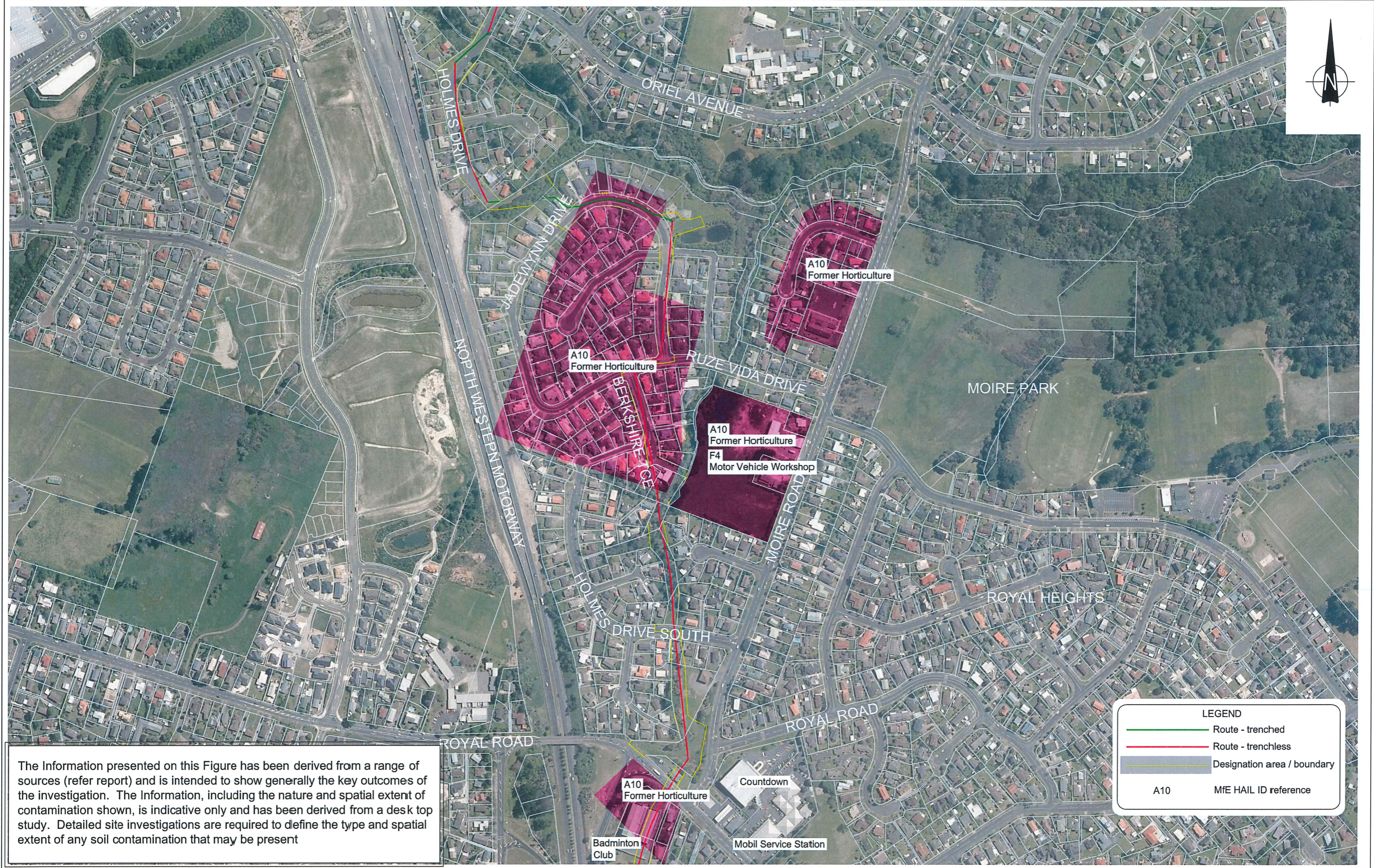
**NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE**  
 Potential HAIL Activities – Huruuru Rd to Cedar Heights Ave

FIG. No. **Figure 4**

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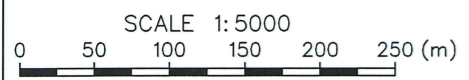
The Information presented on this Figure has been derived from a range of sources (refer report) and is intended to show generally the key outcomes of the investigation. The Information, including the nature and spatial extent of contamination shown, is indicative only and has been derived from a desk top study. Detailed site investigations are required to define the type and spatial extent of any soil contamination that may be present

**LEGEND**

- Route - trenched
- Route - trenchless
- Designation area / boundary

A10 MFE HAIL ID reference

NOTE: This review has concentrated has concentrated around the proposed alignment, HAIL activities at distance from alignment may not be captured.



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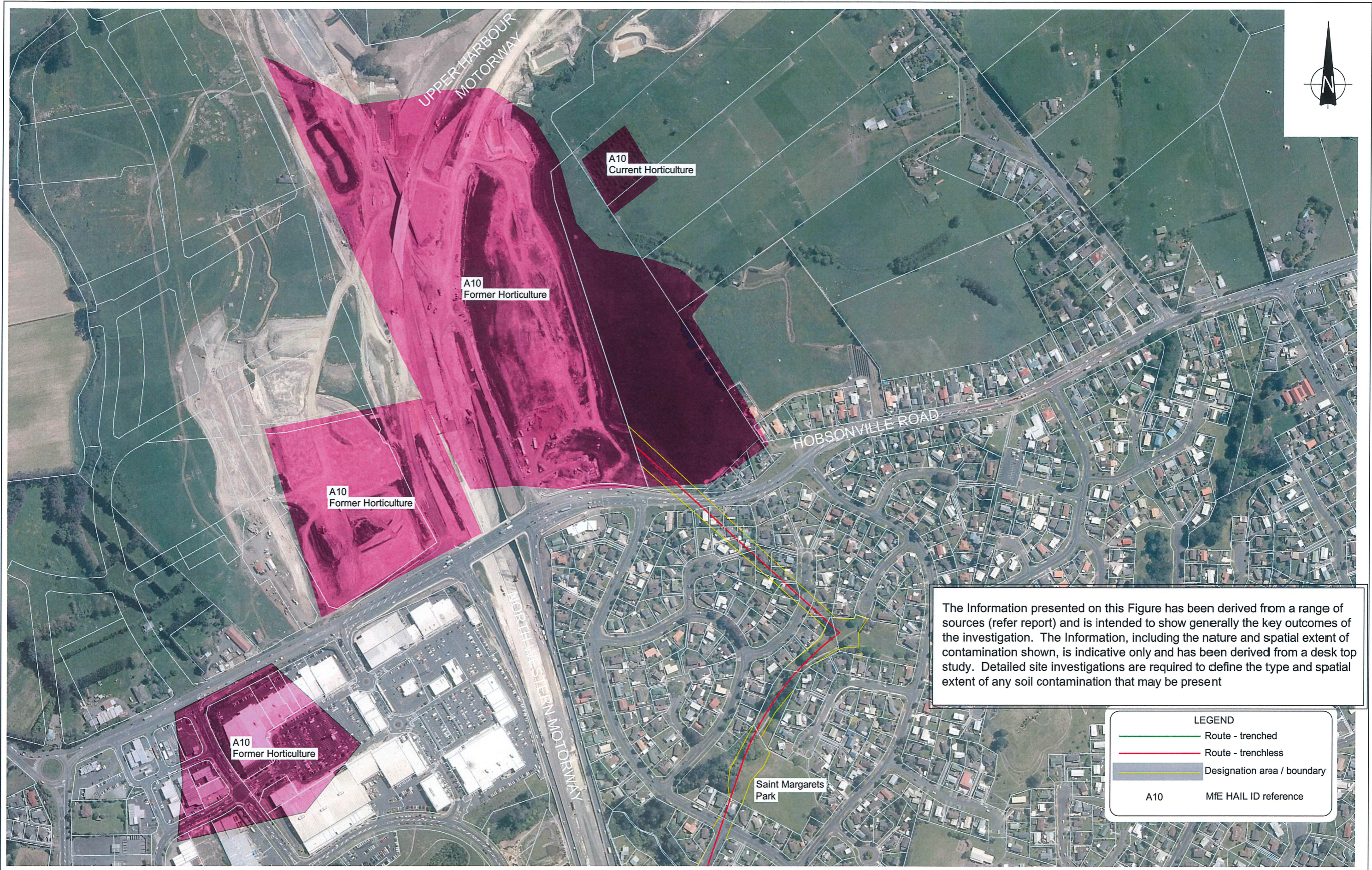
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NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE  
 Potential HAIL Activities – Holmes Drive

FIG. No. **Figure 5** REV. **0**

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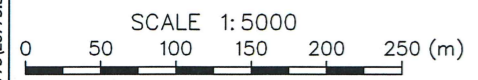
**LEGEND**

- Route - trenched
- Route - trenchless
- Designation area / boundary

A10 MfE HAIL ID reference

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**NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE**  
Potential HAIL Activities – Hobsonville Road

FIG. No. **Figure 6** REV. **0**

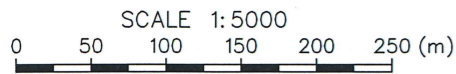


The Information presented on this Figure has been derived from a range of sources (refer report) and is intended to show generally the key outcomes of the investigation. The Information, including the nature and spatial extent of contamination shown, is indicative only and has been derived from a desk top study. Detailed site investigations are required to define the type and spatial extent of any soil contamination that may be present

**LEGEND**

- Route - trenched
- Route - trenchless
- Designation area
- A10 MFE HAIL ID reference
- ◆ HA-1 Handauger location (T&T, Dec. 2014)

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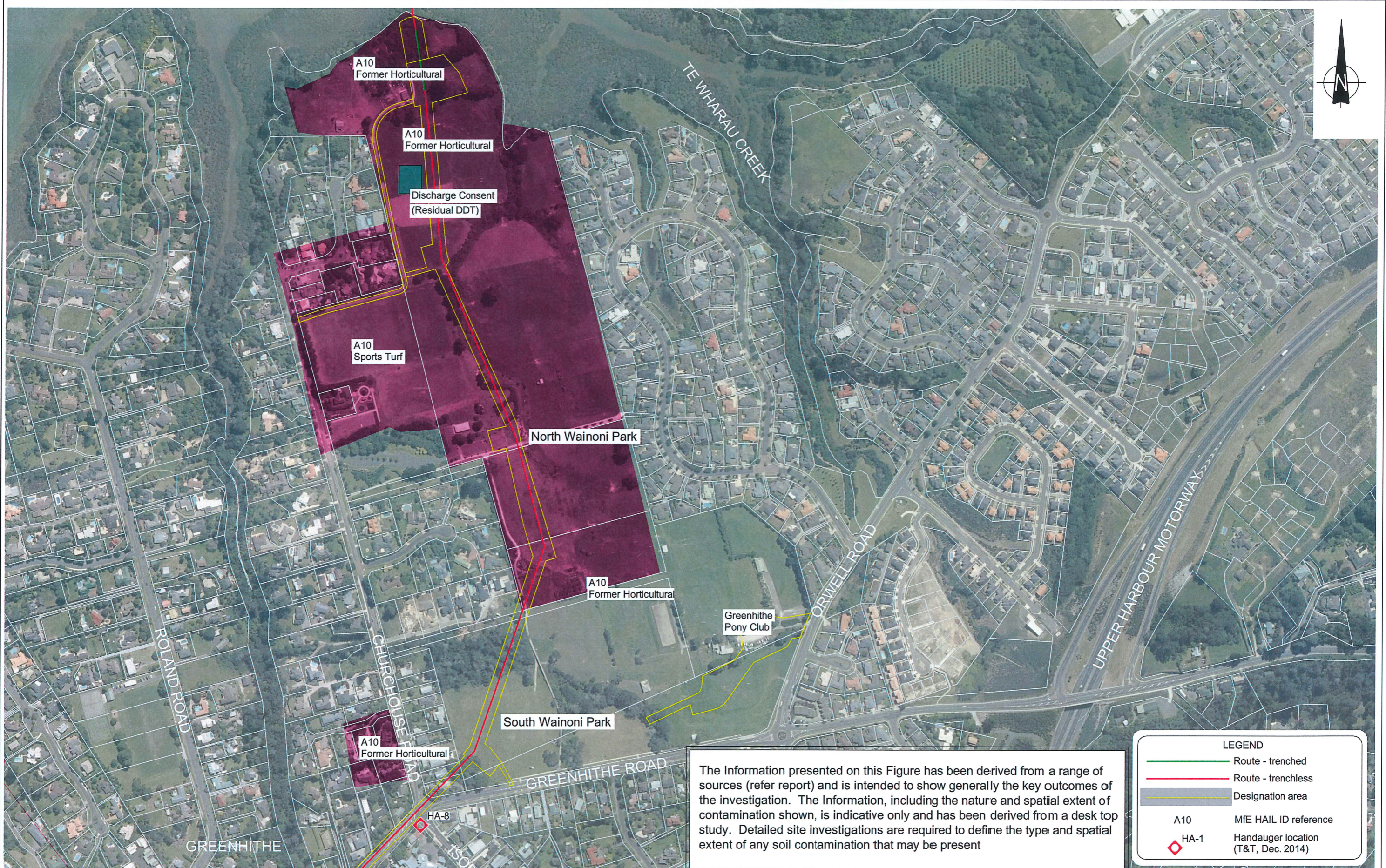
NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE  
 Potential HAIL Activities – The Knoll to Collins Park

FIG. No. Figure 7

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A10  
Former Horticultural

A10  
Former Horticultural

Discharge Consent  
(Residual DDT)

A10  
Sports Turf

North Wainoni Park

A10  
Former Horticultural

Greenhithe  
Pony Club

South Wainoni Park

A10  
Former Horticultural

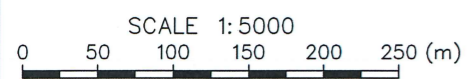
HA-8

The Information presented on this Figure has been derived from a range of sources (refer report) and is intended to show generally the key outcomes of the investigation. The Information, including the nature and spatial extent of contamination shown, is indicative only and has been derived from a desk top study. Detailed site investigations are required to define the type and spatial extent of any soil contamination that may be present

**LEGEND**

- Route - trenched
- Route - trenchless
- Designation area
- A10 MfE HAIL ID reference
- HA-1 Handauger location (T&T, Dec. 2014)

NOTE: This review has concentrated has concentrated around the proposed alignment, HAIL activities at distance from alignment may not be captured.



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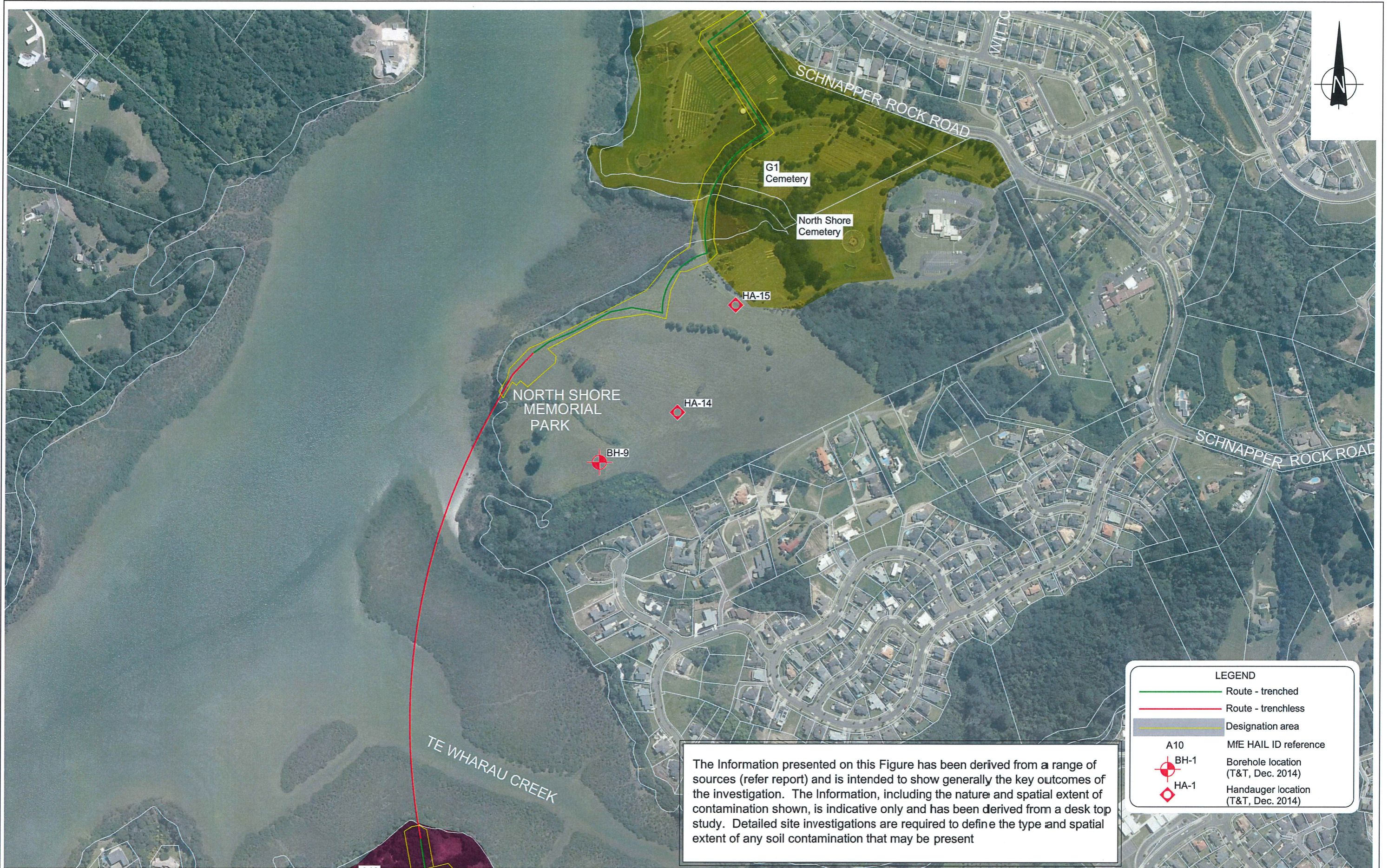
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NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE  
Potential HAIL Activities – Wainoni Park

FIG. No. Figure 8

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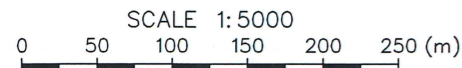


The Information presented on this Figure has been derived from a range of sources (refer report) and is intended to show generally the key outcomes of the investigation. The Information, including the nature and spatial extent of contamination shown, is indicative only and has been derived from a desk top study. Detailed site investigations are required to define the type and spatial extent of any soil contamination that may be present

**LEGEND**

- Route - trenched
- Route - trenchless
- Designation area
- A10 MfE HAIL ID reference
- + BH-1 Borehole location (T&T, Dec. 2014)
- ◇ HA-1 Handauger location (T&T, Dec. 2014)

NOTE: This review has concentrated around the proposed alignment, HAIL activities at distance from alignment may not be captured.



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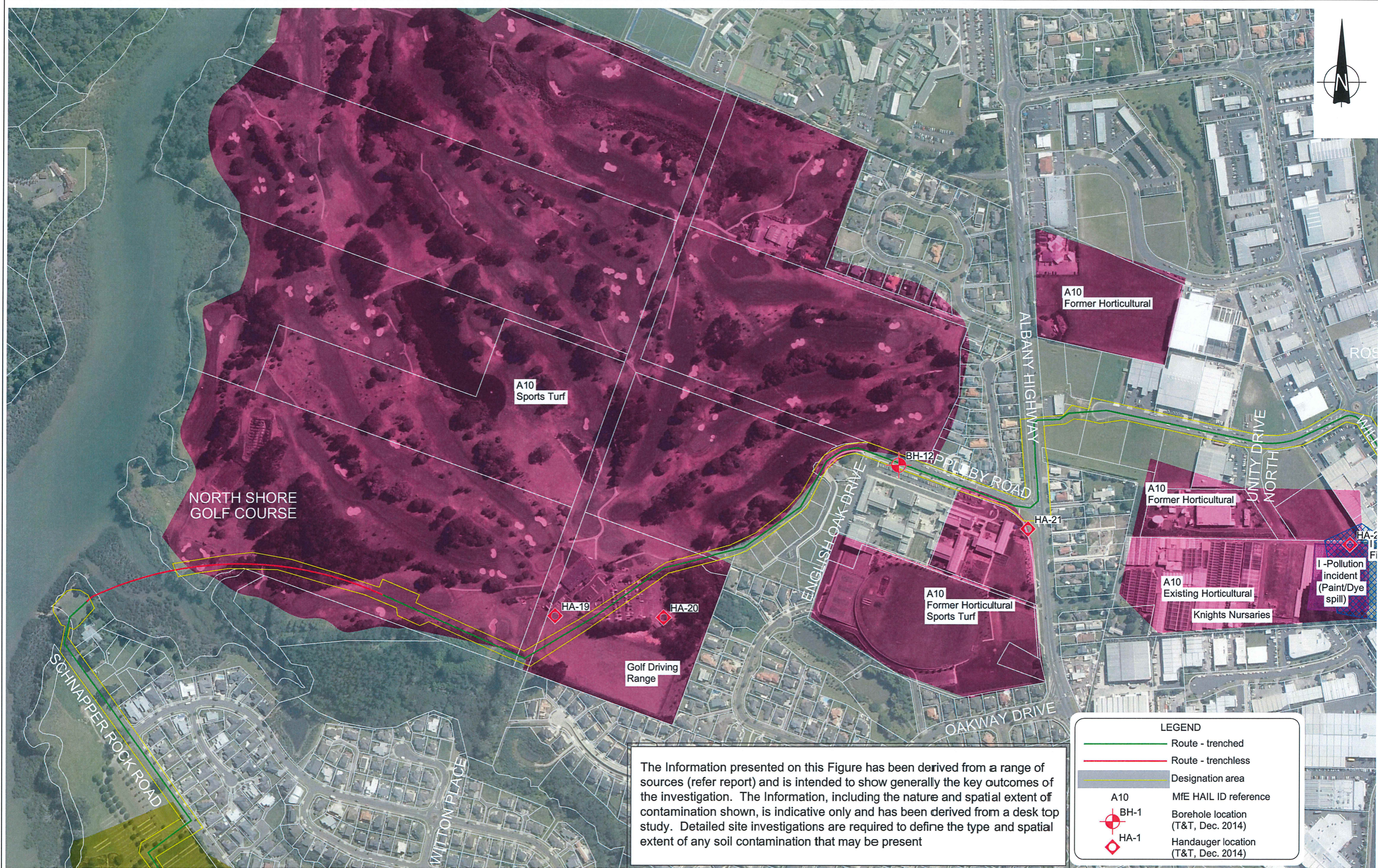
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**NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE**  
Potential HAIL Activities – North Shore Memorial Park to Schnapper Rock Rd

FIG. No. **Figure 9**

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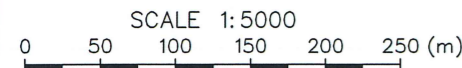


The Information presented on this Figure has been derived from a range of sources (refer report) and is intended to show generally the key outcomes of the investigation. The Information, including the nature and spatial extent of contamination shown, is indicative only and has been derived from a desk top study. Detailed site investigations are required to define the type and spatial extent of any soil contamination that may be present

**LEGEND**

- Route - trenched
- Route - trenchless
- Designation area
- A10 MfE HAIL ID reference
- BH-1 Borehole location (T&T, Dec. 2014)
- ◆ HA-1 Handauger location (T&T, Dec. 2014)

NOTE: This review has concentrated around the proposed alignment, HAIL activities at distance from alignment may not be captured.



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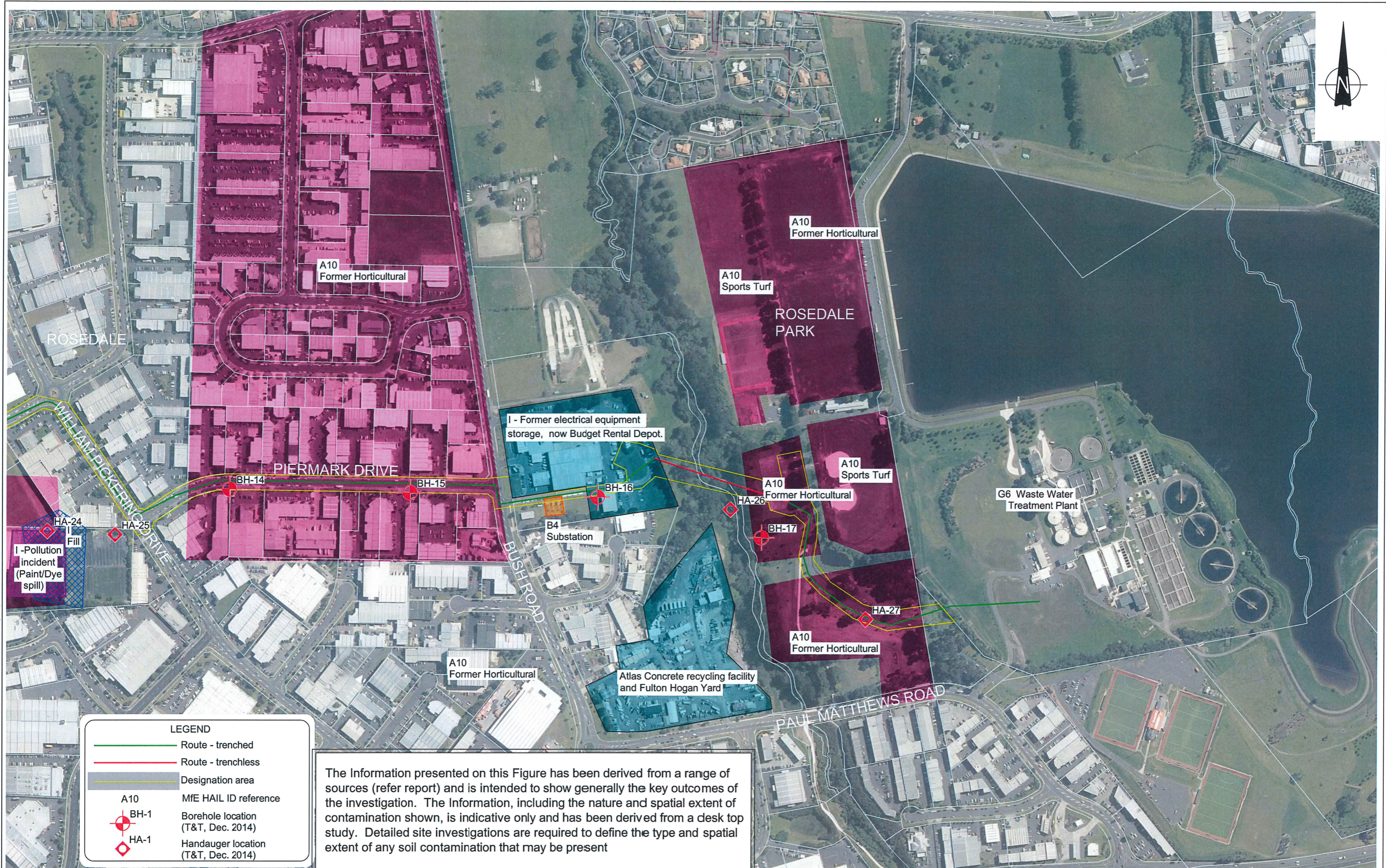
NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE

Potential HAIL Activities North Shore Golf Course to Appley Rd

FIG. No. Figure 10

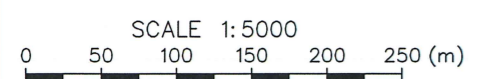
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The Information presented on this Figure has been derived from a range of sources (refer report) and is intended to show generally the key outcomes of the investigation. The Information, including the nature and spatial extent of contamination shown, is indicative only and has been derived from a desk top study. Detailed site investigations are required to define the type and spatial extent of any soil contamination that may be present

NOTE: This review has concentrated around the proposed alignment, HAIL activities at distance from alignment may not be captured.



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**NORTHERN INTERCEPTOR NoR-NI WAITAKERE & NORTH SHORE**  
Potential HAIL Activities – William Pickering Drive to WWTP

FIG. No. **Figure 11**

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## **Appendix B: Historical information review**

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## B1 Introduction

This document is Appendix B of Tonkin & Taylor Ltd March 2016, Northern Interceptor NoR – Waitakere and North Shore Section Ground contamination assessment report. This section contains detailed information on the historical information review carried out for the assessment.

Historical information relating to the designation was collated from a variety of sources. The information presented documents activities within the designation, except for the aerial photograph review which also comments on readily observable surrounding landuse.

## B2 Aerial photograph review

Historic aerial photographs available from both Auckland Council and the T+T library were reviewed. A summary of the findings, focussed on identifying potentially contaminating land uses along the designation from south to north, are presented in **Tables B1 and B2** below. Areas of land not described in **Tables B1 and B2** are generally either pastoral/grazing (earlier) or residential (later) and are not considered to have the potential to have caused contamination.

**Table B1: Summary of aerial photograph review: NoR NI – Waitakere**

Date and source	Observations
1940 T+T Library	<ul style="list-style-type: none"><li>• A large section of horticultural land is present to the south of The Concourse.</li><li>• A small plot of horticultural land is present on the designation path northwest of The Concourse.</li><li>• All other land that the designation passes through is pastoral.</li><li>• Photo coverage ceases north of Royal Road in Henderson.</li></ul>
1959 Auckland Council GIS	<ul style="list-style-type: none"><li>• The westernmost part of the large horticultural section south of The Concourse has now been redeveloped for residential use, and some small horticultural plots have been added in the south and east of the section.</li><li>• The small horticultural plot northwest of The Concourse is now pasture.</li><li>• Some horticultural land has been established around what is now Huruheru Road, in the path of the designation.</li><li>• Further plots of horticultural land can now be observed in Massey.</li><li>• Construction of the Northwestern Motorway is occurring.</li></ul>
1963 T+T Library	<ul style="list-style-type: none"><li>• The land surrounding The Concourse is pasture but some earthworks are occurring further along the designation, where some type of commercial or industrial development is occurring.</li><li>• Residential development is evident along most of the designation path.</li><li>• There is no photo coverage between Massey East and West Harbour.</li></ul>
1972 T+T Library	<ul style="list-style-type: none"><li>• Some sections of the large horticultural land south of The Concourse have been converted back to pasture.</li><li>• The horticultural land observed near Huruheru Road and Royal Road in 1959 is being or has been redeveloped for residential use.</li></ul>
1980/81 T+T Library	<ul style="list-style-type: none"><li>• The land along The Concourse has been redeveloped and features large commercial buildings.</li><li>• The horticultural area east of Lincoln Road remains but all other surrounding land is now residential or undergoing earthworks.</li><li>• The Massey horticultural land remains.</li></ul>

<b>Date and source</b>	<b>Observations</b>
1988 T+T Library	<ul style="list-style-type: none"> <li>No significant changes observed.</li> </ul>
1996 Auckland Council GIS	<ul style="list-style-type: none"> <li>The east and west of the horticultural plots in Massey from 1959 are now pasture and residential respectively. The main horticultural plot is unchanged.</li> <li>A large area of horticultural land has been established in north Massey, north of Hobsonville Road near Trigg Road.</li> </ul>
2001 Auckland GIS viewer	<ul style="list-style-type: none"> <li>There has been further intensification of the commercial land surrounding The Concourse.</li> <li>All land along the designation path north of The Concourse is residential until the horticultural area established in north Massey in 1996.</li> <li>North of this, the land is either pastoral or residential.</li> </ul>
2006 Auckland GIS viewer	<ul style="list-style-type: none"> <li>The cropping area in north Massey is now pasture.</li> <li>No other significant changes observed.</li> </ul>
2008 Auckland GIS viewer	<ul style="list-style-type: none"> <li>No significant changes observed.</li> </ul>
2010/11 Auckland GIS viewer	<ul style="list-style-type: none"> <li>No significant changes observed.</li> </ul>

**Table B2: Summary of aerial photograph review: NoR NI – North Shore**

<b>Date, source and run number</b>	<b>Key project area features</b>
1940 T+T Library	<ul style="list-style-type: none"> <li>No aerial image coverage.</li> </ul>
1959 Auckland Council GIS	<ul style="list-style-type: none"> <li>Small horticultural plots are established in Greenhithe.</li> <li>There is no aerial photo coverage between Greenhithe and Albany.</li> <li>Horticultural land covers much of the northern part of the designation path.</li> <li>Earthworks are being undertaken for the Rosedale water treatment plant.</li> </ul>
1963 T+T Library	<ul style="list-style-type: none"> <li>No aerial photo coverage in southern Greenhithe.</li> <li>A small orchard and possible cropping land is now observable in north Greenhithe.</li> <li>The North Shore Golf Course is undergoing construction.</li> <li>Much of the horticultural land in the north remains, but a few paddocks are now pastoral.</li> <li>The Rosedale treatment plant and pond have been established.</li> </ul>
1972 T+T Library	<ul style="list-style-type: none"> <li>Some new horticultural plots and orchards are now observable in northern Greenhithe.</li> <li>There is no further aerial photo coverage north of Greenhithe.</li> </ul>

Date, source and run number	Key project area features
1980/81 T+T Library	<ul style="list-style-type: none"> <li>• Some large cropping areas in northern Greenhithe have been converted to pasture.</li> <li>• The North Shore Memorial Park cemetery is evident.</li> <li>• The North Shore Golf Course is well established.</li> <li>• A new horticultural plot can now be observed near John Glen Avenue in Rosedale, south of the designation. Redevelopment of the site may have involved filling of a gully.</li> <li>• Small orchard plots have also been established in Albany.</li> </ul>
1988 T+T Library	<ul style="list-style-type: none"> <li>• There has been some further residential development on former pastoral land in Greenhithe.</li> <li>• Commercial redevelopment is being undertaken on the formerly horticultural land near what is now William Pickering Drive and along Piermark Drive.</li> </ul>
1996 Auckland Council GIS viewer	<ul style="list-style-type: none"> <li>• Only one small orchard remains in Greenhithe, all other land is now mostly residential or pasture.</li> <li>• A park with four sports fields has been developed under the proposed designation path near Churchouse Road in Greenhithe.</li> <li>• Horticultural land remains south of the golf course in Rosedale, all other land has either been redeveloped for commercial use or is undergoing earthworks. William Pickering Drive and Piermark Drive are under construction.</li> <li>• Parts of Albany (north of the Rosedale ponds) remain horticultural.</li> </ul>
2001 Auckland Council GIS viewer	<ul style="list-style-type: none"> <li>• The large areas of earthworks around William Pickering Drive and Piermark Drive are now well established for commercial and industrial uses.</li> <li>• There has been further residential development in Albany including of the former horticultural land north of the Rosedale ponds.</li> <li>• South of the ponds, two sports fields have been constructed, they appear to be made with artificial turf.</li> </ul>
2006 Auckland Council GIS viewer	<ul style="list-style-type: none"> <li>• The Upper Harbour motorway is being constructed near Greenhithe.</li> <li>• Land north of the cemetery has been subdivided for residential use.</li> <li>• Horticultural land south of the golf course established in the 1980s and 1990s is now Albany Junior High School. The school has a sports field with cricket pitch.</li> </ul>
2008 Auckland Council GIS viewer	<ul style="list-style-type: none"> <li>• The Upper Harbour motorway is now complete.</li> <li>• Earthworks are occurring south of the easternmost part of the Rosedale ponds.</li> <li>• Two additional fields have been added to the sports turfs south of the Rosedale treatment plant. One is artificial and one is grassed.</li> </ul>
2010/11 Auckland Council GIS viewer	<ul style="list-style-type: none"> <li>• No significant changes observed.</li> </ul>

### B3 Council contamination enquiry

Contamination/pollution incident enquiries were placed with Auckland Council on 6 October 2014 and 22 January 2016. Records relating to contamination along the proposed designation and relevant resource consents in the surrounding area are summarised in **Table B3** below. The

highlighted consents/incidents have been assessed as having the potential to contaminate soils within the designation. The rest are consents or incidents that, based on the nature of the incident and location with respect to the proposed designation (eg. downgradient or distance to designation), are unlikely to have potentially caused soil contamination within the designation.

**Table B3: Pollution incidents and resource consents in the vicinity of the designation.**

Address	Incident / consent details
<b>The Concourse to Selwood Road</b>	
The Concourse Strand, end of Selwood Road, Lincoln	May have been subject to historic filling or importation of unverified-origin material.
50 The Concourse, Henderson	May have been subject to historic filling or importation of unverified-origin material.
75 The Concourse, Henderson	Consent issued to Firth Industries to discharge contaminants to air from a concrete batching plant producing wet mix concrete.
3/71 The Concourse	Report of discharge of radiator fluid to land/water in February 2012, volume not reported.
62 The Concourse	Open burning reported in 2012.
58 The Concourse	Odour complaint, but no pollutant identified upon investigation.
58 The Concourse	Dust complaint, nothing identified upon investigation.
56 The Concourse	Consent was issued for the construction of 13 boreholes for groundwater investigation located on the grassy site opposite 55 The Concourse.
50 The Concourse	Consent was issued to Auckland Council for discharge of contaminants to ground and groundwater as a result of historical filling using buried municipal wastes. The site name is Waitakere Refuse Transfer Station, there are no additional works at the site.
56 The Concourse	An air discharge consent was issued to Watercare, associated with the operation of a proposed wastewater storage tank.
50 The Concourse	A consent for discharge to air was issued to Auckland Council for in-vessel composting of green-waste and municipal food-waste (Concourse Compost).
48 The Concourse	Consent issued to Waitakere District Council for discharge to air from a 50 kg/hr pet crematoria.
11 The Concourse	Report of sediment and commercial water entering stormwater from burst water mains. Pollutant type recorded as dirt/inter minerals/sediment.
Alloy Yachts International Ltd	Contaminated site discharge from earthworks for car parking.
166 Central Park Drive, Henderson	Consent was issued to NZTA to discharge contaminants to land or water from land undergoing disturbance associated with the upgrade of the existing motorway at 165-183 Central Park Drive and 329 Lincoln Road, Henderson.
Waitakere Bailing Station, The Concourse	Construction of 4 bores to approximately 10 m depth for groundwater level and/or chemistry investigations.
Lincoln Road, Henderson	Construction of 6 bores to a depth of approximately 25 m for groundwater and geotechnical monitoring.
10-12 The Concourse	Contaminated site discharge for earthworks to extend the commercial activity facilities on the Alloy Yachts site.

<b>Selwood Road Drive to Huruhuru Road</b>	
5 Selwood Road	10-200L oil spill in 2011 with potential for transport into stormwater drain.
11 Selwood Road	Air pollution from anti-fouling paint drifting.
11 Selwood Road	Construction of up to 9 bores for environmental monitoring.
Triangle Road, Henderson	10-200L of concrete reported running into CMA in 2010.
Triangle Road, Henderson	Diesel spill into natural water when a crane tipped over in 2010.
16A Taitapu Street	Brownish red dye was reported in a creek in 2013.
Huruhuru Road and 35 Kopi Place, Massey	Contaminated land discharge consent relating to the disturbance of potentially contaminated soil during bridge construction.
13 Taitapu Street	Fire water run-off of >1000L related to burning rubbish in a swimming pool.
256 Triangle Road	Water pollution from paint/dye/inks reported in 2013.
Unspecified. Site name is Watercare Services.	Permit for the construction of fifteen bores for geological, geotechnical and groundwater purposes.
<b>Huruhuru Road to Cedar Heights Avenue</b>	
2-12 Lincoln Park Avenue, Massey	Construction of two bores for geological, geotechnical, groundwater and contaminated site investigation purposes.
1 Doone Place, Massey	Contaminated site discharge consent from a former horticultural site being subdivided for residential land use.
232 Triangle Road	Potential unidentified toxic pollution incident.
<b>Cedar Heights Avenue to Holmes Reserve</b>	
5 Chloe Place	Paint was reported in a stream (<10 L) in 2008.
18/138 Royal Road	Sewage smell reported from ceiling, nothing found upon investigation.
138-144 Royal Road	Sewer overflow into stormwater in 2011.
10a Jarrah Place	Strong smell of chloride reported in 2012, noting found upon investigation.
State Highway 16, Whenuapai	Permit to NZTA for eight bores (20-40 m depth) for engineering investigation and monitoring in 2007. State Highway 16 Permit to NZTA for fifteen bores (10-20 m depth) for engineering investigation and monitoring in 2007.
12a Cedar Heights Avenue and 6 Hanui Pl	Sewer overflow into wastewater in 2013.
2-22 Moire Road	Report of a man dumping waste water down the stormwater drain in 2012.
2-22 Moire Road	Unspecified water pollution, nothing found upon investigation.
<b>Holmes Reserve to Holmes Drive</b>	
13 Fresil Lane	Sewer overflow into wastewater in 2013.
52-58 Moire Road	Contaminated site discharge consent relating to the development of a residential subdivision in an area of former horticulture and heavy machinery depot site. Soils testing shows elevated heavy metals, TPH and PAH.
36-46 Moire Road	Contaminated site discharge consent relating to a proposed future residential development – withdrawn.
13 Glenbury Place	Sewer overflow into wastewater in 2009.
'Lendich site' – SH16 or Moire Road	A 6-700 L oil spill was recorded in the yard on 23 January 2002.

(inferred to be 36 – 58 Moire Road)	
Westgate Drive	Report of a leaking sewer line, nothing found upon investigation.
<b>Holmes Drive to Hobsonville Road</b>	
102 Oriel Avenue	Sewer overflow into wastewater in 2013.
Oriel Avenue	Unspecified water pollution relating to paint/dye/inks.
Oriel Avenue	A pink, paint-like substance was recorded coming down the stream in August 2013.
Oriel Avenue	A tree blocking the sewer line was removed and the stream inspected – no clean up required.
52 Oriel Drive	Report of oil leaking from car to stormwater, less than 10 L.
13 Holmes Drive	Construction of 2 bores for geotechnical investigation on the eastern and western sides of the Auckland – Kumeu motorway. Maximum depth 15 m.
13 Holmes Drive	Three reports of open burning generating large amounts of smoke in 2007, 2013 and 2014.
38 Catherine Crescent	Sewer overflow into wastewater (<10 L) in 2013.
4 Fitzherbert Avenue	Air pollution – smoke odour.

#### **B4 Client supplied information**

Contaminated land investigations have been carried out at the Rosedale WWTP for Watercare and reported in URS, May 2014, Rosedale Plant Expansion Geotechnical Factual and Detailed Contaminated Land Investigation Report. Key findings of a review of the report indicated the following:

- No soil sampling and testing have been undertaken to date in the area of the proposed designation within the Rosedale WWTP. The investigations undertaken to date have been focussed on the eastern part of the WWTP where the treatment facilities are located.
- Given that the area of the proposed designation is away from the WWTP facilities, the results of the existing soil testing would provide a likely worst case indication of the soil conditions in the area of the proposed designation.
- The results of testing show the following:
  - No exceedances of the NES Soil SCS for commercial landuse.
  - The soils generally contain low level metals and hydrocarbons, with isolated locations above published background concentrations for non-volcanic soils and ALW Plan permitted activity criteria for discharges.

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