



**CIVIL ENGINEERING ASSESSMENT  
PRIVATE PLAN CHANGE  
68-94 TAHAROTO ROAD, TAKAPUNA**

Engineers and Geologists

## CIVIL ENGINEERING ASSESSMENT 68-94 TAHAROTO ROAD, TAKAPUNA

**Report prepared for:** Northcote RD 1 Holdings Limited

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**Report reviewed and approved for issue by:** Arthur Amputch, Technical Director, CPEng  
  
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**Date:** 21 March 2019

**Copies to:** Vaughan Smith Planning Limited      Electronic copy  
Riley Consultants Ltd                                      1 copy

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1.0	Civil Engineering Assessment	12 July 2018
2.0	Civil Engineering Assessment	21 March 2019

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# CIVIL ENGINEERING ASSESSMENT 68-94 TAHAROTO ROAD, TAKAPUNA

## 1.0 Introduction

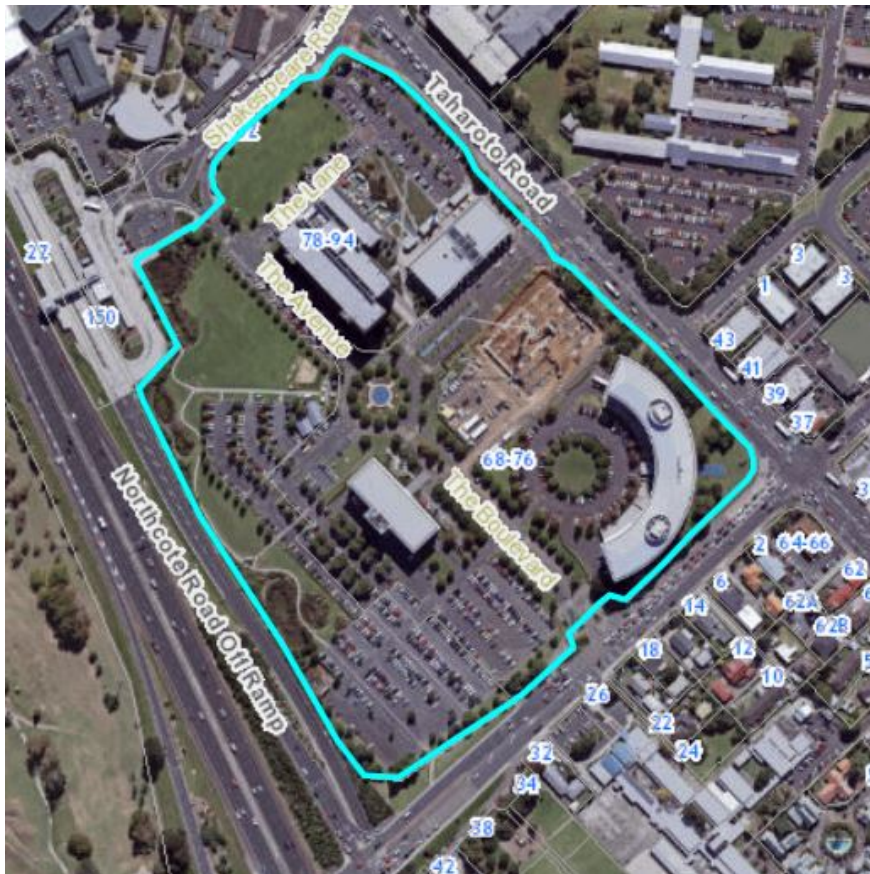
The following report has been prepared by Riley Consultants Ltd (RILEY) at the request of the Northcote RD 1 Holdings Limited. It presents the results of a civil engineering assessment to support a private plan change application. This will seek to amend the provisions of the Smales 1 Precinct in the Auckland Unitary Plan-Operative in part (AUP-Op), to enable more intensive development at Smales Farm, including residential development.

The civil engineering assessment specifically addresses earthwork aspects and the provision of stormwater, wastewater, and water supply services with capacity to enable development of a more intensive scale on the site.

## 2.0 Site Description and Proposed Development

The location of the site is shown on Figure 1.

Figure 1: Site Location



The site consists of two lots with a total site area of 10.8314ha, hereafter referred to as the site.

- 68-76 Taharoto Road, Takapuna, Pt Lot 1 DP 204794 – 53,444m<sup>2</sup>
- 78-94 Taharoto Road, Takapuna, Pt Lot 2 DP 204794 – 54,870m<sup>2</sup>

The existing site is under-developed and consists of multi-storey commercial and retail buildings and car parking. The site is surrounded by the following:

- North – Shakespeare Road and further north is Westlake Girls High School.
- West – Taharoto Road and further west is commercial development and the North Shore Hospital.
- South – Northcote Road and further south is a mixture of residential and commercial development, and Takapuna Normal Intermediate.
- East – Smales Farm Bus Station and further east is the Northern Motorway.

The AUP-Op currently enables development of the following approximate areas:

Offices	- 150,000m <sup>2</sup>
Other Commercial	- 12,000m <sup>2</sup>
<b>Total</b>	<b>- 162,000m<sup>2</sup></b>

It is proposed to amend the precinct provisions applying to the site to enable high-density residential development. It is our understanding that Northcote RD 1 Holdings Limited is not seeking to change the 162,000m<sup>2</sup> limit for non-residential activities, but to enable residential development on the site, most likely above offices within multi-storey buildings.

For assessing the effects of the changes sought with the private plan change, the following areas of development have been assumed. It is important to note that the proposed development changes are to be staged over the next 30-years.

Offices	- 145,500m <sup>2</sup>
Other Commercial	- 16,500m <sup>2</sup>
Residential	- 138,000m <sup>2</sup>
<b>Total</b>	<b>- 300,000m<sup>2</sup></b>

Under the provisions applying to the Business Park Zone, the maximum impervious area is set at 80%, and the plan change application does not seek to increase this intensity. Therefore, in order to not exceed the impervious limit, and achieve the intensity of development enabled by the precinct rules, future development will include a number of multi-storey buildings.

## 3.0 Proposed Engineering Works

The following sections outline the engineering issues, which will need to be addressed to enable development of the site and includes a consideration of the following:

- Earthworks
- Roothing
- Water management
  - Stormwater
  - Wastewater
  - Water supply

### 3.1 Earthwork Activities

Earthworks will be required across the site to achieve the design levels to suit the layout requirements for development (i.e. access roading, building platform levels, etc). Permanent earthworks will be carried out to an engineered standard in accordance with NZS: 4404 and related documents, and with Auckland Council (Council) Standards of Engineering Design and Construction.

The site is generally covered with a stiff volcanic ash and fill of up to 7m thick overlying basalt and Tauranga Group sediments. Foundations for multi-storey high-rise buildings are expected to be founded on piles. A geotechnical report has been produced to support the plan change, Smales Farm Geotechnical Assessment for Proposed Plan Change, Tonkin + Taylor Ltd, March 2018.

Due to the area and volume of earthworks, a resource consent application will be required for the land disturbing activities for each consent application. A detailed earthworks report will be undertaken to provide a comprehensive analysis of the effects of any proposed earthworks and the measures to be implemented in order to reduce the impact on the receiving environment.

The earthworks required to form the site gradients are not uncommon for a development of this size and are certainly achievable. Geotechnical and environmental aspects (i.e. overland flow, flood levels, etc.) will need to be considered during the earthwork assessments.

Sediment and erosion controls implemented to a high standard, in accordance with Council engineering standards and Council Erosion and Sediment Control Guidelines for land disturbing activities in the Auckland region (GD05), will ensure the impact on the environment is appropriately mitigated.

### 3.2 Stormwater Assessment and Management

#### 3.2.1 Background

The current site development is serviced via three stormwater management ponds and a direct connection to the public stormwater reticulation. The existing stormwater ponds are located along the western boundary near to the motorway. Refer to appended Smales Farm Pond Locations plan (Appendix A). All three ponds discharge into the stormwater reticulation at the south-west boundary of the site, which then conveys the runoff downstream into Wairau Creek. The site has been developed through a series of staged developments over the last 20-years.

In circa 1999, plans were developed for the construction of the crescent shaped building and associated car parking on the corner of Northcote and Taharoto Roads, currently tenanted by Vodafone. An internal access road linking Northcote and Taharoto Roads via the central roundabout was also constructed at this time. Stormwater drainage from the building and car park is collected via a private drainage network, falling towards Northcote Road, then west and discharges to an open drain along the eastern side of the motorway. This ultimately flows north into the Wairau Creek. At this time, the site was approximately one quarter impervious. The section of stormwater pipe along Northcote Road is currently shown on the Council GIS as public infrastructure (Council), refer to Appendix B. Wastewater from the Vodafone buildings drains to a public manhole near the future Smales Farm bus station. The majority of this alignment is currently shown as public infrastructure (Watercare Services Limited (WSL)).

In circa 2002, a 9,000m<sup>2</sup> temporary car park located adjacent to Northcote Road (west of the Vodafone building) was consented. This consisted of a fully private reticulation network discharging to a stormwater treatment pond, sized to accommodate the 5% Annual Exceedance Probability (AEP) storm event, and ultimately overflowing to the motorway drain. The 5% AEP storm was the North Shore City Council specification for urban development. The pond design was undertaken in accordance with Auckland Regional Council Technical Publication 10 – Stormwater management devices: Design guidelines manual (TP10) and providing 75% total suspended solids (TSS) removal. This pond was consented under a Council Permit 27653, dated March 2003. The pond is located north-west of the car park and is hereafter referred to as Pond 2.

In 2005, a new car park, soft landscaping, and two large buildings were consented (LN 2121776) in the north-east corner of the site. Stormwater runoff from the car park is treated via swales and flows via private stormwater reticulation to a stormwater pond located at the north-west corner of the site, near the bus station. The pond is consented under Permit 31284, October 2005, hereafter referred to as Pond 3. The stormwater pond/wetland has a catchment area of 2.15ha, designed to achieve 75% TSS removal and outfalls within the motorway corridor. Rainwater harvesting for re-use was accommodated with a volume of 180m<sup>3</sup> (non-potable fixtures). Council did not require any detention of the storm event up to the 1%, as the site is in the lower Wairau Valley catchment and the (Council) catchment model assumes up to 85% impervious area within the Smales site. Additionally, the wetland was designed to accommodate a future building next to the Shakespeare Road extension. Overland flows are onto Shakespeare Road, to the bus station, and then an engineered channel to the Wairau Creek. The future building is currently under construction as a car park.

In circa 2007, a temporary car park was consented within the central western area of the site. This involved the enlarging of Pond 3 and construction of a new pond (Pond 1). Both of these ponds were designed to provide 75% TSS removal from the stormwater runoff, and attenuation of the 2 and 10-year peak flows to pre-development peak flow rates. The stormwater works were consented under Permit 34134, July 2007.

In circa 2015, plans were developed for a new building (Building B5, known as the B: Hive) to be constructed over an existing car park at Taharoto Road, adjacent to the north of the Vodafone building. This building incorporates a re-use volume of 25m<sup>3</sup>, however, there is no treatment or specific design for detention of stormwater runoff as the increase in peak runoff was 1% for the 10% AEP. Stormwater runoff flows into the existing public reticulation at Northcote Road and ultimately to the motorway drain to the west. Construction has recently been completed.

In circa 2016, a new car park adjacent to Shakespeare Road at the north of the site was consented. Previous plans developed in 2005 showed a building at this location and a stormwater connection to Pond 3. The development of a car park does not increase runoff from the catchment area to the pond, however, swales were included to treat the stormwater runoff from the car park prior to discharging to the pond. The treatment swales are required to be constructed in accordance with the approved Permits 31819/33076, July 2012. This car park is currently under construction.

The stormwater ponds have been designed for an impervious catchment area of 6.75ha. All three ponds are treatment ponds with 75% efficiency and designed to accommodate a small detention volume to minimise potentially adverse flooding downstream. A future total site development area of 80% equates to an impervious catchment area of approximately 8.6ha. Therefore, as the site is progressively developed, the ponds will need to be enlarged to accommodate this. This approach has been successfully adopted in the past. Based on the existing detention criteria, we estimate the ponds will increase in size by approximately 25% and this will need to be accommodated within the site masterplan.

### **3.2.2 Stream Erosion**

The discharge location for the site is from the stormwater ponds directly into a pipe network. Site observations confirmed that the existing stormwater pipe outlets to the motorway drain. Additional erosion protection from the ponds and pipe network is, therefore, not required.

### **3.2.3 Water Quality**

The existing site is well serviced through the stormwater treatment ponds. The development of new buildings will replace existing on-grade car park areas, therefore, has a positive effect of water quality within the ponds and within the Wairau Creek.

Development at the site will still need to consider stormwater quality treatment measures to protect the receiving environment from effects of contaminants generated from any new roads and paved surfaces. All roof materials will need to use inert materials and be low contaminant yielding.

The development could utilise a range of measures and a treatment train philosophy, whereby a succession of stormwater treatment devices are utilised to ensure the development does not impact negatively on the operation of the existing ponds and downstream environment. The stormwater quality measures will need to be designed and constructed in accordance with the latest Council guideline documents such as, GD01 Design of Stormwater management devices (an update of TP10), and GD04 Water Sensitive Design (an update of Auckland Regional Council Technical Publication 124 Low Impact Design Manual for the Auckland region, April 2000). Treatment devices may incorporate vegetated drains/swales, rain gardens, ponds, wetlands, and proprietary filtration devices.

Depending on the area of roading and car parks, and development controls at the time of resource consent, the existing stormwater ponds may simply be enlarged to accommodate any additional contaminant loading from the development.

### **3.2.4 Auckland Unitary Plan—Operative in part**

The AUP-Op shows the site does not have any overlays associated with stormwater management, natural hazards, or significant ecological areas.



### 3.2.5 Overland Flow

Potential flooding is indicated to occur along the western boundary near to the stormwater ponds as the site generally falls from east to west. Refer to the appended Stormwater Overland Flowpath plan.

The GIS indicates the site does have overland flowpaths (OLFPs) passing through it. A significant OLFP enters the site south from Northcote Road, and exits the site along the western boundary. This OLFP will need to be considered in any detailed masterplan for the site and be aligned with the internal road network.

The remaining minor OLFPs, shown to originate from within the site, can easily be managed as the site is developed to ensure secondary overland flow is directed away from buildings and to the western boundary.

A detailed flood assessment will need to be carried out at resource consent stage for a future development, which will determine flood extent and levels. This assessment will ensure the development can be achieved without further affecting adjacent property or downstream infrastructure.

### 3.2.6 Summary of Stormwater Management for the Site

- Primary stormwater runoff is via a piped reticulation network to the stormwater management ponds along the western boundary of the site. Secondary OLFPs will need to be provided to ensure minimum freeboard requirements are achieved within the future development areas and ensure flood levels on neighbouring sites are not affected.
- Stormwater management devices should be incorporated in the site development to address issues of water quality, the details of which should be in accordance with Council Guideline Documents GD01 and GD04. These include stormwater ponds.
- Any development of the site will need to comply with the provisions of the AUP-Op.

### 3.3 Wastewater

The site has a connection to the public wastewater reticulation. Currently, all wastewater from individual buildings is collected and directed by private drainage to a 300mm diameter public network, which exits within the site at the north-west corner, adjacent to the bus station, connecting to a 636mm-diameter public trunk main. It is proposed to re-use this existing connection for the future development of the site, enabled by the revised precinct provisions. Refer to Appendix C.

The trunk main flows east to west along Shakespeare Road adjacent to the north of the site. At this location, the trunk sewer changes from 490mm-diameter to 635mm-diameter, before passing under the Northern Motorway. Review of the Council GIS shows there is no as-built level information on this public infrastructure, however, if we were to assume a pipe gradient of 0.5%, the potential conveyance through the 635mm pipe is approximately 560L/sec.

We have undertaken a site wastewater/water assessment based on gross development areas. Using the WSL Code of Practice (CoP), based on the AUP-Op provisions currently applying to the site, we have estimated a peak dry weather flow of 24L/sec. Based on the WSL CoP and the extent of the development enabled by the proposed plan change, we have estimated a peak dry weather flow of 63L/sec. This corresponds to an increase of 39L/sec. The residential flows, which have the greatest influence on the peak flow rates, are based on one person per 15m<sup>2</sup>. This allows for two people in a one-bedroom 50m<sup>2</sup> apartment, or four people in a two-bedroom 100m<sup>2</sup> apartment. An average sized apartment of 100m<sup>2</sup> has been assumed in the economic report<sup>1</sup>, prepared for the plan change application.

In order to understand the validity of high-rise development and peak flow estimations in New Zealand, RILEY has researched similar developments overseas. In particular, Sydney Water Average Daily Water Use Flow Study Report, March 2013. This presents results from a water usage study for various uses. Based on the Sydney Water report and the increased level of development proposed for the site, we have estimated a peak dry weather flow of 29L/sec. This corresponds to an increase of 5L/sec. However, we expect the actual increase in wastewater discharge from the site to be somewhere between the two estimated peak flows presented above.

It is likely that some of the existing private and public wastewater drainage network on-site will be abandoned, with new drainage constructed under building consent and engineering plan approval applications.

Initial discussions have been undertaken between Smales Farm and WSL in October 2017, and again in May 2018, in respect to servicing the site for water and wastewater. Initial discussions with WSL were positive and they are currently working with Smales Farm to review the existing infrastructure, and identify any upgrade works that may be required to support the staged development over the next 30-years. Based on the size of the development and existing and planned public water and wastewater infrastructure surrounding the site, this detailed modelling would need to be undertaken internally by WSL.

### **3.4 Water Supply**

The site has numerous connections to the public water supply network. Reticulation within the site is distributed via public 150mm-diameter lines.

The site is well serviced externally by public infrastructure:

- 200mm, 300mm, and 700mm-diameter within Taharoto Road to the east of the site.
- 150mm, 310mm, 550mm, and 630mm-diameter within Northcote Road to the south of the site.

Detailed assessment of the capacity of the public infrastructure would be undertaken by WSL due to the scale of the development. Again, it is likely that some of the existing private and public water supply network will be abandoned, with new drainage constructed under building consent and engineering plan approval applications.

### **3.5 Utilities Services**

The site is well serviced by various utilities consisting of; gas, power, and telecommunications. Due to the document size associated with these service maps, they have not been appended to this report.

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<sup>1</sup> Likely Economic Effects of a Proposed Private Plan Change for Smales Farm, Insight Economics, May 2018.

## 4.0 Summary

- The report provides a civil engineering assessment to support a private plan change application. The proposal is to incorporate a staged development approach over the next 30-years.
- **Earthworks** will be required to form the new site gradients, incorporating building platforms, access roading, and stormwater management measures. Earthworks consents for earthwork activities and strict compliance of erosion and sediment control measures, designed in accordance with Council GD01 guidelines, will be required. The staging and sequencing of earthworks activities, with the inclusion of specifically designed erosion and sediment control devices, will need to be assessed in order to reduce the volume of sediment leaving the site, thus, protecting downstream environments from excessive sedimentation and water quality degradation. Environmental, geotechnical, and stormwater management measures will need to be considered during detailed earthworks assessment.
- The site can be managed from a **stormwater** quality and quantity perspective to ensure the effect on the environment is less than minor. It may be necessary to increase the capacity of the existing stormwater pond(s) and stormwater quality treatment devices. The quality of the stormwater runoff discharged from the site will improve over time as the existing on-grade parking areas are replaced with buildings. The development will need to ensure that there is no effect on the 1 in 100-year flood level along the western boundary.
- Based on the size of the development, and existing and planned public **water** and **wastewater** infrastructure surrounding the site, detailed capacity and flow modelling is being undertaken by WSL.
- Notwithstanding this, based on the level of development currently provided for at Smales Farm in the AUP-Op, the apparent capacity of the existing water supply and wastewater systems, and the expected staging of new development at Smales Farm over the next 30-years, we do not expect there to be any major capacity issues for wastewater and water supply for the future development, enabled by the proposed plan change.

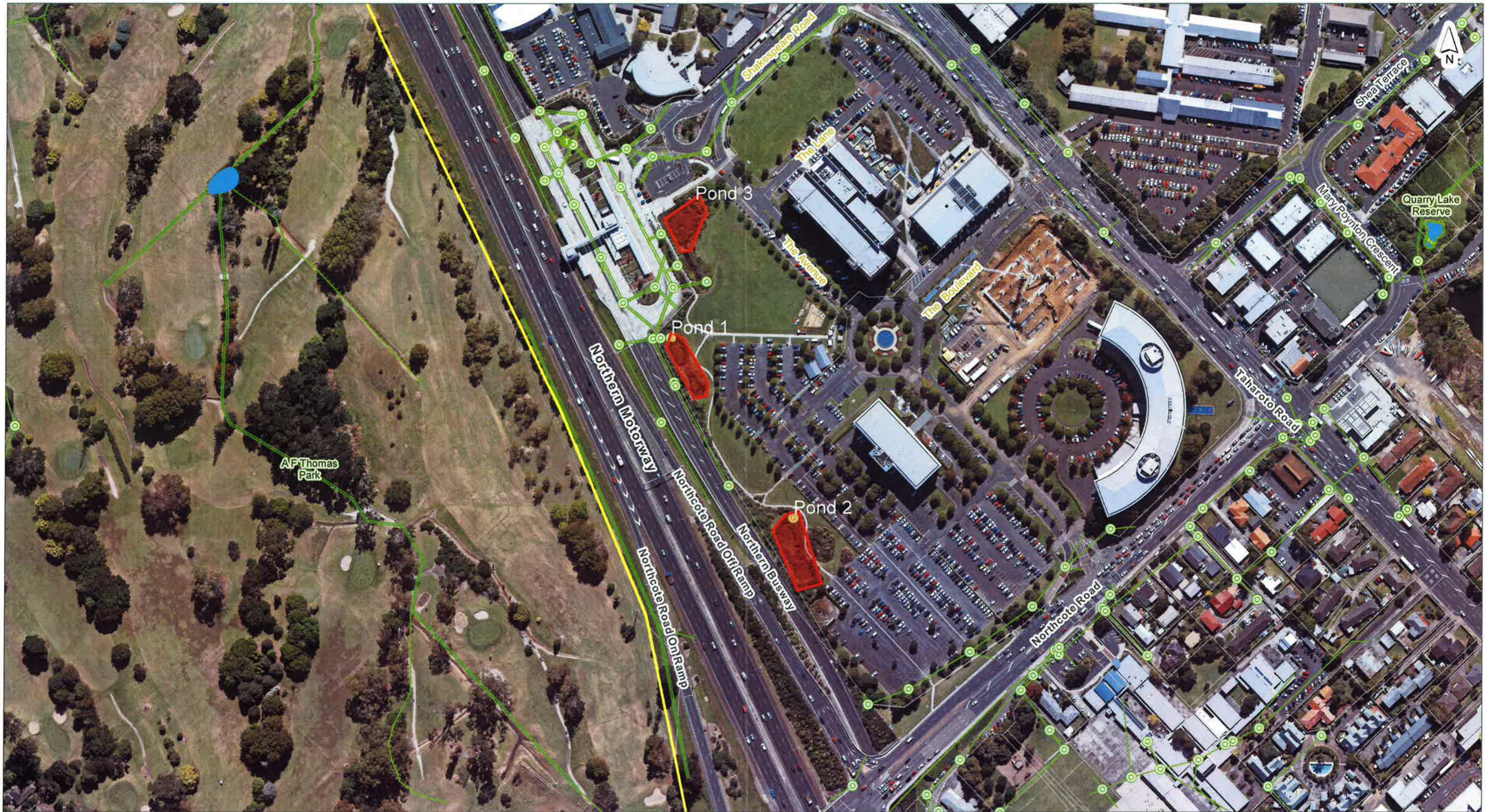
## 5.0 Limitation

This report has been prepared solely for the benefit of the Northcote RD 1 Holdings Limited as our client with respect to the brief and Auckland Council in processing the private plan change application. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such parties' sole risk.

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards and should not be construed as legal or planning opinions. Where opinions or judgements are to be relied on they should be independently verified with appropriate advice.

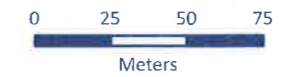
***APPENDIX A***

***Smales Farm Pond  
Locations***



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**SMALES FARM POND LOCATIONS**



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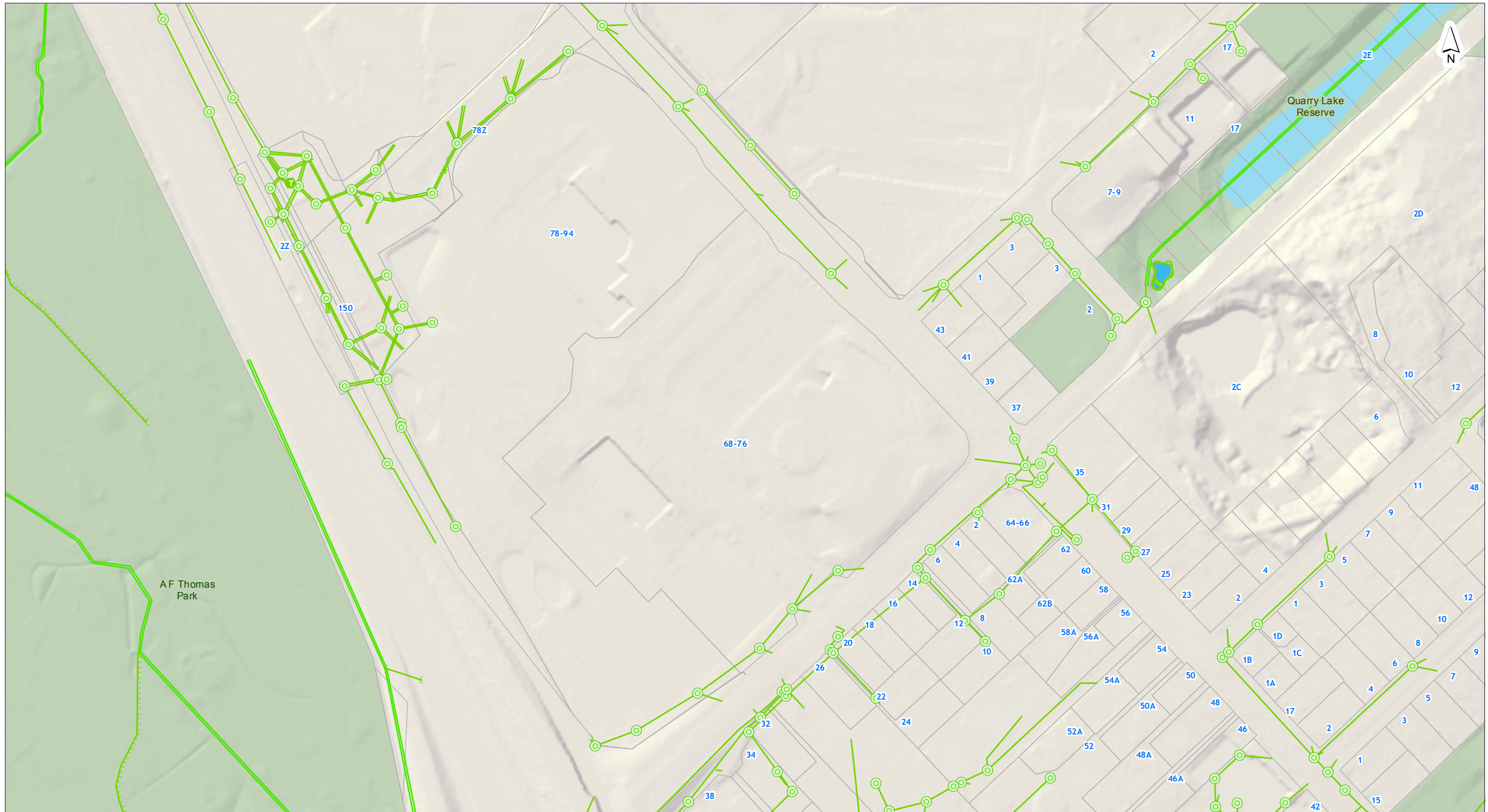
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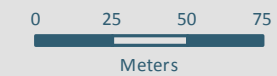
## ***APPENDIX B***

***Stormwater  
Infrastructure and  
Overland Flowpaths  
(extracts from GIS)***



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# PUBLIC STORMWATER RETICULATION



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**Stormwater Treatment Device**

- Public
- Private

**Stormwater Septic Tank**

- Public - Hi-Tech
- Private - Hi-Tech
- Public - Other
- Private - Other

**Stormwater Soakage System**

- Public
- Private

**Stormwater Manhole And Chamber**

- Public - Standard/Custom
- Private - Standard/Custom
- Public - Inspection Chamber
- Private - Inspection Chamber

**Stormwater Inlet And Outlet**

- Public - No Structure
- Private - No Structure
- Public - Structure
- Private - Structure

**Stormwater Catchpit**

- Public
- Private

**Stormwater Spillway**

- Public
- Private

**Stormwater Viewing Platform**

- Public
- Private

**Stormwater Embankment**

- Public
- Private

**Stormwater Safety Benching**

- Public
- Private

**Stormwater Bridge**

- Public
- Private

**Stormwater Forebay**

- Public
- Private

**Stormwater Treatment Facility**

- Public
- Private

**Stormwater Fence**

- Public
- Private

**Stormwater Watercourse**

- Public
- Private

**Stormwater Pipe**

- Public - Gravity Mains
- Private - Gravity Mains

- Public - Culvert/Tunnel
- Private - Culvert/Tunnel

- Public - Rising Main
- Private - Rising Main

- Public - Subsoil Drain
- Private - Subsoil Drain

**Stormwater Overland Flowpath**

- Public
- Private

**Stormwater Connection**

- Public
- Private

**Stormwater Channel**

- Public
- Private

**Stormwater Pump Station**

- Public
- Private

**Stormwater Planting**

- Public
- Private

**Stormwater Erosion And Flood Control**

- Public - Wall Structure
- Private - Wall Structure
- Public - Other Structure
- Private - Other Structure

**Stormwater Abandoned Pipe**

- Public - Gravity Mains
- Public - Culvert/Tunnel
- Public - Rising Main
- Public - Subsoil Drain

**Stormwater Abandoned Connection**

- Public

**Address**

Address

**Rail Stations (8,000)**

- Rail Stations (8,000)

**Railway (2,500)**

- Railway (2,500)

**Auckland Council Boundary**

- Auckland Council Boundary

**Roads (2,500)**

**Parcels**

- Parcels

**Lakes**

- Lakes

**Base Region (CRS)**

- Land Outside
- Water

**Region Cache Public Open Space Extent**

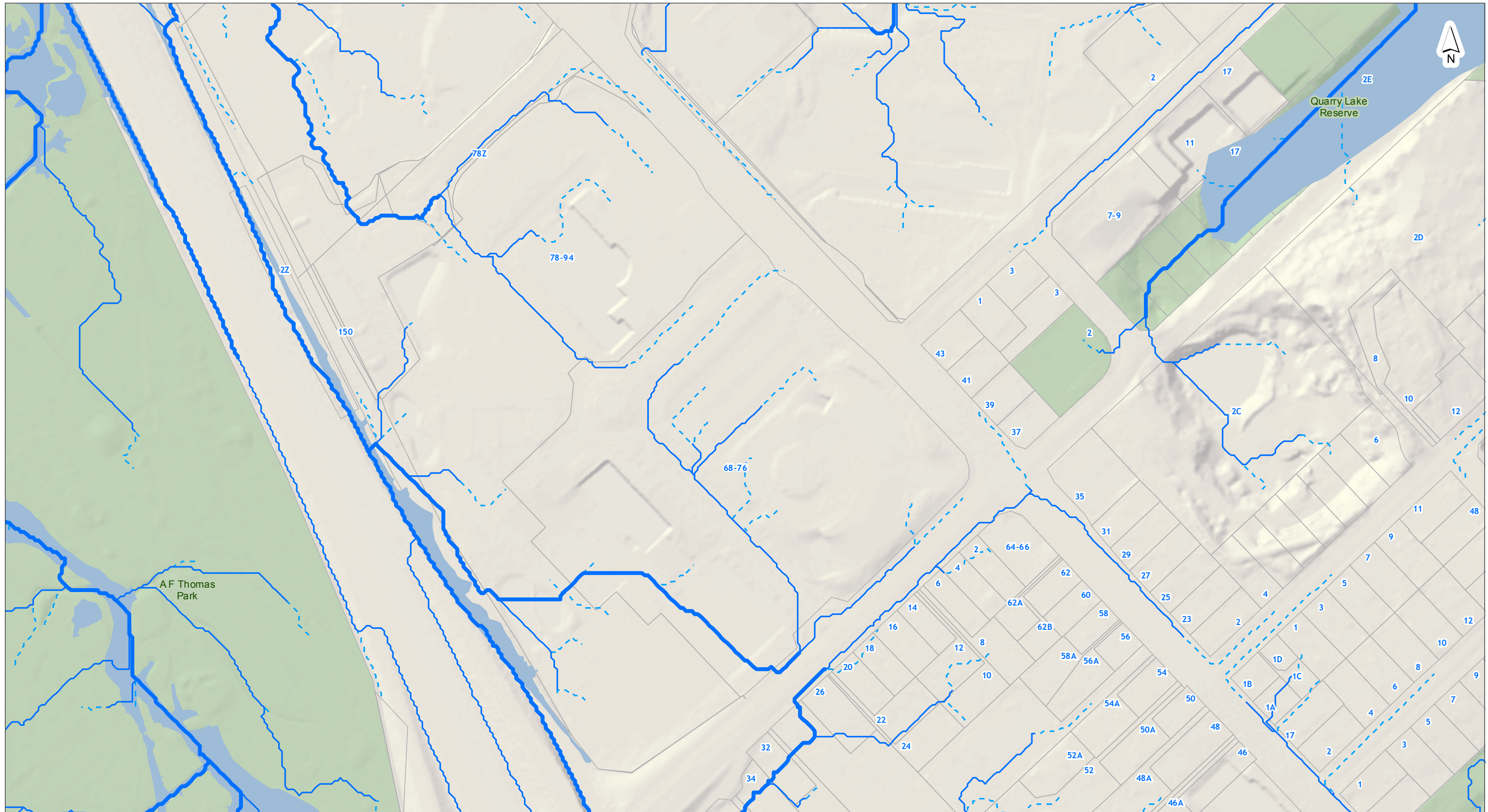
- Region Cache Public Open Space Extent

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Legend

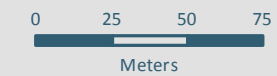
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## STORMWATER OVERLAND FLOWPATHS



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**Overland Flow Paths - 3ha and above**

 Overland Flow Paths - 3ha and above

**Overland Flow Paths - 4000m2 to 3ha**

 Overland Flow Paths - 4000m2 to 3ha

**Overland Flow Paths - 2000m2 to 4000m2**

 Overland Flow Paths - 2000m2 to 4000m2

**Overland Flow Paths**

Overland Flow Paths

**Flood Plains**

 Flood Plains


**Address**

Address


**Rail Stations (8,000)**

 Rail Stations (8,000)

**Railway (2,500)**

 Railway (2,500)

**Auckland Council Boundary**

 Auckland Council Boundary

**Roads (2,500)**

**Parcels**

 Parcels

**Lakes**

 Lakes

**Base Region (CRS)**

 Land Outside

 Water

**Region Cache Public Open Space Extent**

 Region Cache Public Open Space Extent

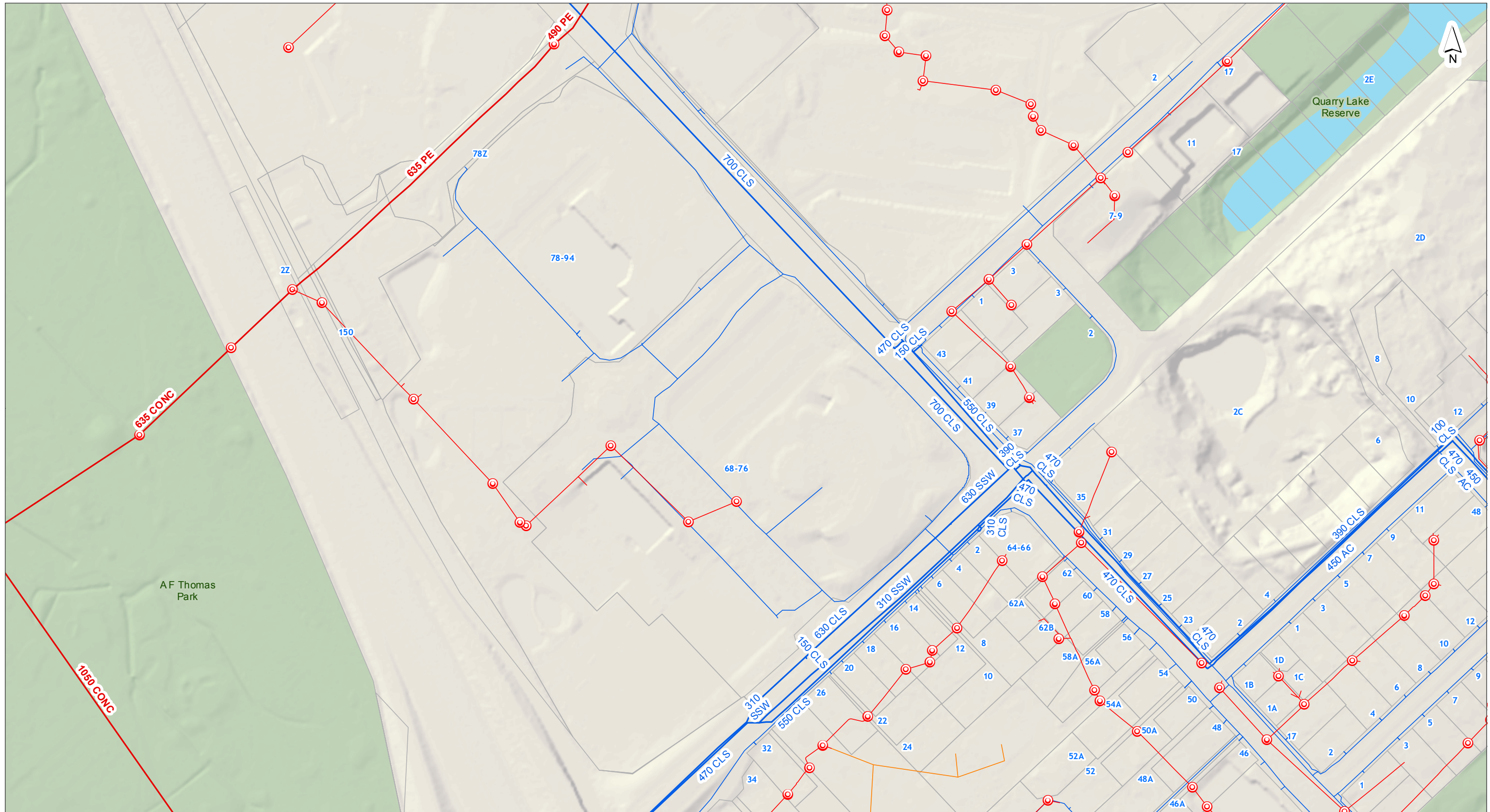
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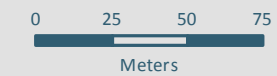
## ***APPENDIX C***

***Water and Wastewater  
Infrastructure  
(extracts from GIS)***



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## PUBLIC WASTEWATER AND WATER RETICULATION











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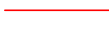


**Wastewater Septic (WCC only)**

-  Septic Tank Hi-Tech
-  Septic Tank Standard
-  Caravan Dumping Point
-  Chemical System
-  Composting Toilet
-  DEVONBLUE - Treatment Plant
-  Recirculation Textile Filter
-  Wastewater Disposal Bed or Field


**Wastewater Manhole (Local)**

-  Wastewater Manhole (Local)


**Wastewater Pipe (Local)**

-  In Service
-  Abandoned
-  Future

**Wastewater Other Structure (Local)**

-  Wastewater Other Structure (Local)




**Wastewater Pump Station (Local)**

-  Wastewater Pump Station (Local)


**Wastewater Manhole (Transmission)**

-  Wastewater Manhole (Transmission)


**Wastewater Pipe (Transmission)**

-  In Service
-  Out Of Service
-  Proposed

**Address**

-  Address


**Rail Stations (8,000)**

-  Rail Stations (8,000)

**Railway (2,500)**

-  Railway (2,500)

**Auckland Council Boundary**

-  Auckland Council Boundary

**Roads (2,500)**

**Parcels**

-  Parcels


**Lakes**

-  Lakes

**Base Region (CRS)**

-  Land Outside
-  Water

**Region Cache Public Open Space Extent**

-  Region Cache Public Open Space Extent

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Legend

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