






# CIVIL INFRASTRUCTURE REPORT

Mt Welcome

# DOCUMENT CONTROL RECORD

<b>CLIENT</b>	Pukerua Property Group LP
<b>PROJECT</b>	Mt Welcome
<b>PROJECT NO.</b>	1753-02
<b>DOCUMENT TYPE</b>	R001v2-1753-02 Infrastructure Report - DRAFT
<b>DATE ISSUED</b>	09 March 2026
<b>ADDRESS FOR SERVICE</b>	Envelope Engineering Limited Level 1, 65 Cuba Street, Te Aro, Wellington
<b>CONTACT</b>	Kyle Dirse, Director <a href="mailto:kyle.dirse@envelope-eng.co.nz">kyle.dirse@envelope-eng.co.nz</a> +64 27 568 2788

# ISSUE AND REVISION RECORD

<b>DATE OF ISSUE</b>	09 March 2026
<b>STATUS</b>	Final
<b>ORIGINATOR</b>	 Kyle Dirse - Director, Senior Civil Engineer
<b>REVIEWED</b>	 Andrew Jackson - Director, Civil
<b>APPROVED FOR ISSUE</b>	 Kyle Dirse - Director, Senior Civil Engineer



## **1.0 EXECUTIVE SUMMARY**

### **INTRODUCTION**

This Infrastructure Report is intended to support a Fast-Track Approvals Act 2024 application for the Mt Welcome development within the Porirua Northern Growth Area (NGA). It outlines the key infrastructure requirements, opportunities, and constraints to enable the construction of 949 new homes and a 1.3-hectare commercial centre. While Envelope has led the civil and servicing design, the report draws on specialist inputs from ENGEO (geotechnical), BlueGreen Ecology (ecology), Pattle Delamore Partners – PDP (hydrology, contamination, water quality), Heritage & Archaeology Services Ltd (archaeology), BLAC (landscape and urban design), and Stantec (transport), and is intended to be read alongside their respective reports to demonstrate compliance with Porirua City Council, Greater Wellington Regional Council, and Wellington Water requirements.

### **EARTHWORKS**

The development requires significant earthworks to form stable, buildable platforms across moderately steep and undulating terrain. The design approach achieves a cut-fill balance, minimises off-site disposal, and avoids ecologically sensitive areas. Erosion and sediment control will follow Greater Wellington Regional Council (GWRC) guidelines, with measures such as sediment ponds and staged construction utilised to manage runoff. A draft Earthworks and Construction Management Plan (ECMP) is appended to this report and outlines the proposed earthworks methodology and environmental controls.

### **ROADING**

The proposed primary road network generally follows the Northern Growth Area (NGA) Structure Plan and has been designed to suit the site's varied topography. It establishes a connected, safe, and efficient local network that provides access throughout the development and integrates with State Highway 59 via a new roundabout at the main entry to the development. The internal roads include collector routes, local streets, and shared access lanes designed to support low-speed residential traffic and provide for walking and cycling. Pedestrian paths, on-road cycle lanes, and recreational trails connect homes, open spaces, and the commercial centre, ensuring a well-linked and accessible neighbourhood.

### **STORMWATER**

Stormwater management focuses on protecting sensitive downstream environments, including Taupō Swamp and Te Awarua-o-Porirua Harbour. The strategy uses a combination of underground networks, raingardens, four large retention wetlands, and smaller basin to manage post development discharge and water quality. These systems will ensure post-development discharges match pre-development levels, achieving hydraulic neutrality and meeting the requirements of Wellington Water (WWL) and GWRC.

### **WASTEWATER**

A primarily gravity-based wastewater system will service the development, with several small pump stations and low-pressure systems in areas where gravity is not feasible. The network has been designed to integrate with the neighbouring Muri Road development and connect to the existing SH59 trunk main. Some upgrades to the downstream wastewater network are required to improve capacity to cater for this development. These consist of three discrete sections of pipe upgrades which are proposed to remedy the downstream constraints. Ongoing coordination with Wellington Water to confirm the timing of these upgrades and the operation of the new infrastructure will ensure network performance and future resilience.



## **WATER SUPPLY**

The site will be supplied by both the existing Pukerua Bay reservoir and a new 3.7 ML shared reservoir located on the Muri Road block. A new DN225 bulk main and pump station will transfer water from the existing bulk main in SH59 to the new reservoir, which will in turn supply the elevated areas within Mt Welcome. The reservoir is currently being consented under a separate application. The reticulation network has been designed in accordance with Wellington Water RSWS and ensures adequate pressure, fire-fighting capacity, and network redundancy.

## **UTILITIES**

Telecommunications providers (Tuatahi First Fibre and Chorus) have confirmed that they have infrastructure in the SH59 corridor available to service the proposed development.

Wellington Electricity (WE) have advised that some reinforcement of their existing network will be required to enable power supply to the site. Wellington Electricity are currently preparing an assessment to identify the necessary network upgrades.

No gas network is proposed for the residential or commercial areas.

## **SUMMARY**

The proposed infrastructure provides a coordinated and practical servicing solution for Mt Welcome, enabling staged delivery of 949 homes and a commercial centre. The design meets regional and local standards, integrates with adjoining land, and supports the long-term vision for the Porirua Northern Growth Area.



# CONTENTS

<b>1.0</b>	<b>EXECUTIVE SUMMARY</b> .....	<b>1</b>
<b>2.0</b>	<b>INTRODUCTION</b> .....	<b>3</b>
<b>2.1</b>	<b>BACKGROUND</b> .....	<b>3</b>
<b>2.2</b>	<b>LOCATION</b> .....	<b>3</b>
<b>2.3</b>	<b>SCOPE</b> .....	<b>4</b>
<b>2.4</b>	<b>PROJECT OBJECTIVES</b> .....	<b>4</b>
<b>3.0</b>	<b>PLANNING CONTEXT</b> .....	<b>4</b>
<b>3.1</b>	<b>COUNCIL-LED PLAN CHANGE</b> .....	<b>4</b>
<b>3.2</b>	<b>STRUCTURE PLAN</b> .....	<b>4</b>
<b>4.0</b>	<b>THE SITE</b> .....	<b>5</b>
<b>4.2</b>	<b>PROPOSED DEVELOPMENT</b> .....	<b>6</b>
<b>4.3</b>	<b>COMMERCIAL AREA</b> .....	<b>6</b>
<b>4.4</b>	<b>RESERVES AND OPEN SPACE</b> .....	<b>6</b>
<b>4.5</b>	<b>DEVELOPMENT STAGING</b> .....	<b>6</b>
<b>5.0</b>	<b>MANA WHENUA VALUES</b> .....	<b>7</b>
<b>6.0</b>	<b>SAFETY IN DESIGN</b> .....	<b>7</b>
<b>6.2</b>	<b>RISK IDENTIFICATION</b> .....	<b>8</b>
<b>6.3</b>	<b>MITIGATION MEASURES</b> .....	<b>8</b>
<b>7.0</b>	<b>EARTHWORKS</b> .....	<b>8</b>
<b>7.1</b>	<b>OVERVIEW AND DESIGN OBJECTIVES</b> .....	<b>8</b>
<b>7.2</b>	<b>GEOTECHNICAL CONSIDERATIONS</b> .....	<b>8</b>
<b>7.3</b>	<b>CONTAMINATION ASSESSMENT &amp; REMEDIATION</b> .....	<b>9</b>
<b>7.4</b>	<b>ECOLOGY AND ENVIRONMENTAL</b> .....	<b>9</b>
<b>7.5</b>	<b>ARCHAEOLOGICAL ASSESSMENT</b> .....	<b>9</b>
<b>7.6</b>	<b>EARTHWORKS AND CONSTRUCTION MANAGEMENT</b> .....	<b>11</b>
<b>7.7</b>	<b>FLOCCULATION MANAGMENT PLAN (FMP)</b> .....	<b>12</b>
<b>7.8</b>	<b>WATER QUALITY</b> .....	<b>12</b>
<b>8.0</b>	<b>ROADING AND ACCESS</b> .....	<b>12</b>
<b>8.1</b>	<b>OVERVIEW AND DESIGN OBJECTIVES</b> .....	<b>12</b>
<b>8.2</b>	<b>DESIGN STANDARDS &amp; COMPLIANCE</b> .....	<b>12</b>
<b>8.3</b>	<b>EXISTING ROADING</b> .....	<b>12</b>
<b>8.4</b>	<b>PROPOSED ROAD NETWORK</b> .....	<b>13</b>
<b>8.5</b>	<b>ROAD CLASSIFICATIONS</b> .....	<b>14</b>
<b>8.6</b>	<b>PAVEMENT DESIGN</b> .....	<b>17</b>
<b>8.7</b>	<b>SH59 INTERSECTION</b> .....	<b>17</b>
<b>8.8</b>	<b>TEMPORARY TURN LANE</b> .....	<b>18</b>
<b>8.9</b>	<b>INTEGRATED TRANSPORT ASSESSMENT</b> .....	<b>18</b>
<b>8.10</b>	<b>STRUCTURE PLAN TRANSPORT CONNECTIONS</b> .....	<b>18</b>
<b>9.0</b>	<b>STORMWATER</b> .....	<b>21</b>
<b>9.1</b>	<b>PRINCIPLES OF STORMWATER MANAGEMENT</b> .....	<b>21</b>
<b>9.2</b>	<b>STORMWATER MANAGEMENT PLAN</b> .....	<b>21</b>
<b>9.3</b>	<b>STORMWATER IMPACT ASSESSMENT</b> .....	<b>22</b>
<b>9.4</b>	<b>EXISTING STORMWATER INFRASTRUCTURE</b> .....	<b>22</b>



9.5	PROPOSED STORMWATER NETWORK .....	22
9.6	ASSET OWNERSHIP, OPERATION & MAINTENANCE .....	23
10.0	<b>WASTEWATER .....</b>	<b>23</b>
10.1	OVERVIEW AND DESIGN OBJECTIVES .....	23
10.2	DESIGN STANDARDS & COMPLIANCE .....	23
10.3	EXISTING NETWORK .....	23
10.4	INTEGRATION WITH MURI ROAD DEVELOPMENT .....	24
10.5	PROPOSED NETWORK DESIGN .....	24
10.6	LOW PRESSURE WASTEWATER SYSTEMS (LPS) .....	26
10.7	WASTEWATER MODELLING .....	28
10.8	WASTEWATER PUMPSTATION 1 (PS1) .....	29
10.9	PROPOSED BULK NETWORK UPGRADES .....	30
10.10	SUMMARY .....	34
11.0	<b>WATER SUPPLY .....</b>	<b>35</b>
11.1	OVERVIEW AND DESIGN OBJECTIVES .....	35
11.2	DESIGN STANDARDS & COMPLIANCE .....	35
11.3	EXISTING INFRASTRUCTURE .....	35
11.4	PROPOSED RETICULATION DESIGN .....	35
11.5	SUPPLY AND PRESSURE ZONING .....	36
11.6	LOWER ZONE .....	36
11.7	UPPER ZONE .....	37
11.8	PROPOSED RESERVOIR .....	37
12.0	<b>UTILITIES .....</b>	<b>39</b>
12.1	TELECOMMUNICATIONS .....	39
12.2	EXISTING POWER .....	39
12.3	PROPOSED POWER .....	39
12.4	GAS .....	39
13.0	<b>CONCLUSION .....</b>	<b>39</b>
14.0	<b>ADHERENCE TO THE EXPERT CONDUCT CODE .....</b>	<b>39</b>
15.0	<b>LIMITATIONS .....</b>	<b>39</b>

## APPENDICES

APPENDIX 1	ENGINEERING PLANS
APPENDIX 2	WASTEWATER HYDRAULIC MODEL REPORT
APPENDIX 3	RESERVOIR DESIGN PLANS (RCA24215)
APPENDIX 4	UTILITY PROVIDER LETTERS
APPENDIX 5	EXISTING UTILITY SERVICES



## FIGURES

Figure 1. Site Extents Plan – Entire Site.....	3
Figure 2. Northern Growth Area Structure Plan.....	5
Figure 3. Existing Site Plan.....	5
Figure 4.: Road Classification.....	14
Figure 5.: Typical Cross-Section (A) Collector – 21.7m With Cycleway and Carpark.....	14
Figure 6. Typical Cross-Section (B) Collector - 21.7mwith Cycleway and Berm.....	15
Figure 7.: Typical Cross-Section (C) Collector – 19.7m with Cycleway.....	15
Figure 8.: Typical Cross-Section (D) Collector – 18.6m with Berm.....	15
Figure 9.: Typical Cross-Section (E) Collector – 18.6m with Berm & Carpark.....	15
Figure 10.: Typical Cross-Section (F) Local Road - 16.7m with Carpark and Berm.....	16
Figure 11.: Typical Cross-Section (G) Local Road - 14.5m With Carpark.....	16
Figure 12.: Typical Cross-Section (H) Local Road - 14.5m With Berm.....	16
Figure 13.: Typical JOAL Cross-Section (1) - 8.0m Minimum with Berms.....	17
Figure 14.: Typical JOAL Cross-Section (1) - 9.0m Minimum with Footpath.....	17
Figure 15.: Typical JOAL Cross-Section (3) – 5.5m Minimum.....	17
Figure 16. Northern Growth Area Structure Plan.....	19
Figure 17. Lower Route.....	20
Figure 18. Central Route.....	21
Figure 19: Upper Route.....	21
Figure 20: Pump Station Locations.....	26
Figure 21. Low Pressure System Diagram.....	27
Figure 22. Low Pressure System Catchments.....	28
Figure 23 Upgrade 1.....	31
Figure 24. Upgrade 2.....	32
Figure 25. Upgrade 3 (163m).....	33
Figure 26. Backup Feed Diagram.....	37
Figure 27. Proposed Bulk Network.....	38

## TABLES

Table 1. Development Staging.....	6
Table 2. Earthwork Staging.....	10
Table 3: SH59 Options Assessment.....	18
Table 4: Design Flows.....	25
Table 5: Pump Station Summary.....	26
Table 6: LPS Catchments.....	28
Table 7: PSI Storage Scenarios.....	29



Table 8. Bulk Network Upgrade Summary ..... 30  
Table 9: Wastewater Enabling Upgrades ..... 34  
Table 10. Reservoir & Pressure Summary ..... 36



## 2.0 INTRODUCTION

### 2.1 BACKGROUND

The proposed development is located south of Pukerua Bay, within the Porirua Northern Growth Area. This land was rezoned as part of Council-led Plan Variation 1 to Plan Change 19 (PC19), which was notified in 2022 and is now operative.

This report addresses the civil engineering components of the project to support a Fast-track application under the Fast-track Approvals Act 2024.

### 2.2 LOCATION

The site is located at 422, 422A and 422B State Highway 59, Pukerua Bay, and encompasses a total area of 205.60 hectares. It formally comprises the following land parcels:

- Part Lot 1 DP 89102 (4.38 ha)
- Lot 2 DP 891020 (5.64 ha)
- Lot 1 DP 534864 (55.33 ha)
- Lot 2 DP 534864 (140.25 ha)
- Lot 1 DP 608433, Lot 1000 DP 608433 (34 Muri Road)
- Road Reserve (SH59 Corridor)

References to “the site” within this report refer collectively to all seven allotments, unless stated otherwise.

The site is situated in a rural area south of Pukerua Bay and north of Plimmerton, within the Porirua City boundaries in the Wellington region. It is bounded by State Highway 59 to the west and three adjoining land blocks to the north, east, and south.



Figure 1. Site Extents Plan – Entire Site.



## 2.3 SCOPE

The scope of works includes:

- Earthworks and Erosion & Sediment Control – Bulk earthworks design including cut/fill balance, retaining structures, and management of unsuitable material. Incorporates erosion and sediment control measures consistent with the GWRC Erosion and Sediment Control Guide.
- Rooding – Design of the internal road network, intersections, and connections to the external transport network. The design includes geometric and cross-sectional design, provision for walking, cycling, and public transport, and integration of a new intersection with State Highway 59 (SH59).
- Stormwater – Design of the primary and secondary stormwater systems, including piped reticulation and centralised treatment, retention, and detention devices. The system is designed to achieve hydraulic neutrality, provide effective water-quality treatment, and ensure protection of downstream environments.
- Wastewater – Gravity and pumped wastewater reticulation including upgrades to the SH59 bulk main. Design scope includes capacity assessments, modelling and coordination with the adjacent Muri Road development for shared infrastructure.
- Water Supply – Design of the potable water network, including reticulation, service connections, and to meet requirements for flow, pressure, and fire-fighting capacity.
- Utilities Servicing – Provision for underground power, telecommunications, and fibre services. project objectives

## 2.4 PROJECT OBJECTIVES

The Mt Welcome development seeks to deliver safe, efficient, and sustainable infrastructure to support 949 homes and a commercial area. The project will carry out earthworks to provide a stable landform, provide a connected rooding network, manage stormwater through wetlands and raingardens, and deliver resilient wastewater and water supply systems. All works will meet council and regional standards, be staged to support growth, and protect the natural environment.

## 3.0 PLANNING CONTEXT

### 3.1 COUNCIL-LED PLAN CHANGE

Porirua City Council (PCC) initiated Variation 1 to the District Plan to rezone land within the Northern Growth Area for residential development. This variation has now been made operative. As part of the plan change process, a series of technical reports were prepared to support the rezoning. From a civil infrastructure perspective, these reports assessed the bulk servicing requirements needed to service future development.

### 3.2 STRUCTURE PLAN

The Northern Growth Area (NGA) Structure Plan establishes the framework for coordinated development across the Mt Welcome and Muri Road block, ensuring integrated land use, transport, and infrastructure outcomes. The Structure Plan defines the layout of key rooding corridors, pedestrian and cycle connections, open space networks, and the sequencing of bulk infrastructure required to support urban development.

The Structure Plan encompasses both the Mt Welcome and Muri Road developments, ensuring a coordinated and consistent approach to urban form, transport, and servicing across the wider catchment. The Muri Road block, located immediately north of Mt Welcome and under separate ownership, is integrated within the overall framework. Both developments will share key infrastructure, including transport connections, pedestrian links, wastewater storage and a water reservoir site. Collaborative discussions between the landowners are ongoing to coordinate the design and delivery of infrastructure across the shared boundary.



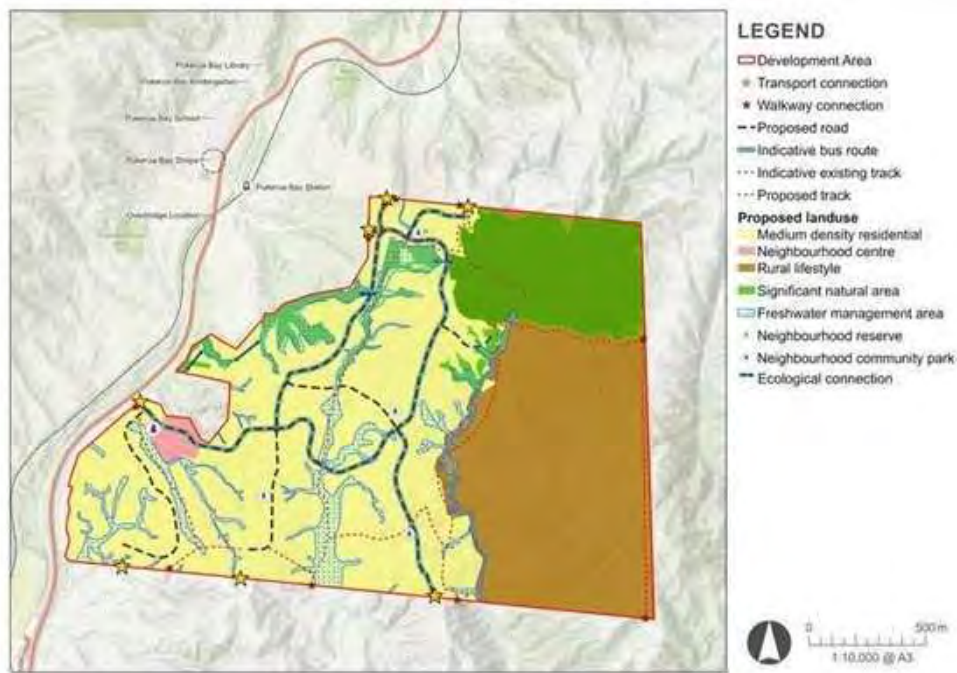


Figure 2. Northern Growth Area Structure Plan

## 4.0 THE SITE

### 4.1.1 EXISTING LAND USE & TOPOGRAPHY

The site is currently used as a deer farm, comprising predominantly pastoral grassland with several existing homesteads, farm sheds, and associated agricultural infrastructure. Historical aerial imagery dating back to 1942 shows the land as open pasture, and it has remained pasture since that time, with no significant changes in land use or built development.

The topography is varied and includes some land that is moderately steep and undulating, with elevations ranging from approximately RL 50 m near the western boundary (adjacent to SH59) to RL 300 m at the eastern extent of the site. The landform includes three prominent high points separated by two gullies. The western portion of the site comprises of rolling hills and shallow gullies, while the central and eastern areas are steeper, with slopes typically between 26° and 45°, and locally exceeding 45° in areas.

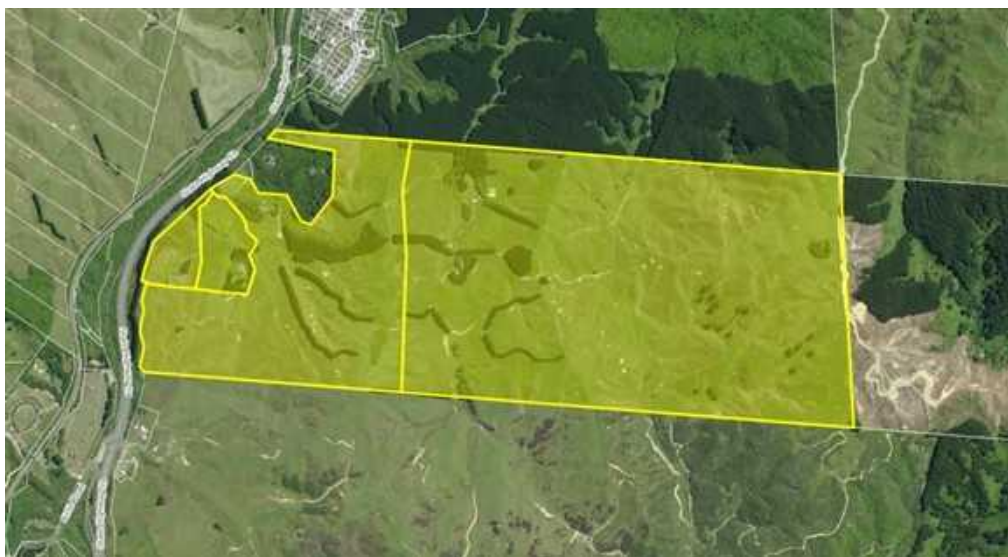


Figure 3. Existing Site Plan



## 4.2 PROPOSED DEVELOPMENT

The proposed development comprises 949 residential allotments ranging in size from 316m<sup>2</sup> to 2,386m<sup>2</sup>, enabling the construction of 949 future dwellings with an average lot size of around 523m<sup>2</sup>. The development also includes a commercial centre to serve the new local community, together with associated three-waters infrastructure (wastewater, including storage facilities; stormwater management systems; and water reticulation), roading, and a connected network of pedestrian and cycling trails.

Earthworks will be undertaken to establish suitable finished surface levels for building platforms, roads, parks, and drainage systems. The proposal will also incorporate extensive landscaping and public open spaces, including recreation and drainage reserves for stormwater attenuation and conveyance. A new intersection with State Highway 59 will provide primary access to the site and integrate the development with the wider transport network.

## 4.3 COMMERCIAL AREA

A 1.3-hectare commercial centre is proposed on the main entry road to the development, nearby the new SH59 intersection. It is located within the neighbourhood centre zone identified in the Structure Plan. It is currently intended as mixed-use centre with a small supermarket, early childcare centre, and retail and hospitality spaces. This proposed land-use has been incorporated into all relevant infrastructure design calculations presented in this report, including impervious surface allowances for stormwater management, commercial wastewater flows, and water-demand assessments.

At the detailed design stage, once the commercial area layouts are confirmed, secondary earthworks and civil works will be undertaken to finalise site levels, drainage, and service connections in accordance with the development design.

## 4.4 RESERVES AND OPEN SPACE

The development incorporates a network of reserves and open spaces that provide both ecological and recreational functions. The layout follows the *Mt Welcome Landscape and Urban Design Strategy* (BLAC, 2025), which establishes green corridors linking residential areas, reserves, wetlands, and the neighbourhood centre.

This network includes existing landform, gullies, and wetlands, with improvements designed to enhance biodiversity and visual amenity. Stormwater management has been considered, and a variety of stormwater design measures have been integrated into this open space network. Steeper slopes are retained as natural open space, with walking tracks, parks, and playgrounds positioned along ridges and valleys to connect key areas. The reserve system also strengthens links from the site to Pukerua Bay and the Muri Road block.

## 4.5 DEVELOPMENT STAGING

Staging of the development will be undertaken to enable a progressive delivery of housing. Indicative staging is shown on the scheme plans in Appendix 1 and summarised in Table 1 below. A total of 24 stages are proposed. It is recommended that conditions provide for flexible staging to occur, provided that appropriate infrastructure is in place for each stage.

Table 1. Development Staging

Stage	Lots	Stage	Lots
Stage 1	54	9	55
Stage 2	57	10	42
Stage 2b	19	11	48
Stage 3a	37	12	56
Stage 3b	22	13	43
Stage 4a	32	14	47



Stage	Lots	Stage	Lots
Stage 4b	32	15	21
Stage 5a	Commercial	16a	43
Stage 5b	62	16b	23
Stage 6	48	17	48
Stage 7	37	18	39
Stage 8	44	19	40

Prior to the subdivision of the final individual lots, four super lots will be created to facilitate staging of the development. These super lots will subsequently be further subdivided into the individual residential lots as each stage progresses. This approach enables more efficient delivery of infrastructure, supports commercial flexibility, and allows for continued interim agricultural use of undeveloped areas.

## 5.0 MANA WHENUA VALUES

### 5.1.1 GENERAL

This Infrastructure Report has been prepared to manage freshwater values in a manner consistent with Te Mana o te Wai and the principles of the National Policy Statement for Freshwater Management.

Mana whenua values, as expressed by Ngāti Toa Rangatira the iwi with mana whenua status over the Porirua catchment—have been recognised across all infrastructure components, including earthworks, stormwater, wastewater, water supply, transport, and open space planning.

### 5.1.2 CONSULTATION

Engagement with Ngāti Toa Rangatira has been ongoing throughout the design and development process, ensuring iwi values and cultural considerations are incorporated into the design and implementation of the project. A summary of engagement is outlined below:

- 10 June 2025 – Initial meeting: Project overview, timeframes, process, and discussion of key issues to work through.
- 19 June 2025 – Site visit: Initial site orientation and walkover of the Lower Terrace to familiarise iwi representatives with the project area.
- 25 September 2025 – Hui: Progress update in response to further information sought on Structure Plan compliance, stormwater management, ecology, and works in waterways.
- 13 October 2025 – Site visit: Follow-up visit to discuss key areas of interest including the design of the roundabout, approach to ecology and archaeology, attended by the applicant's planning, ecology, archaeology, and engineering experts.
- 05 November 2025 – CVA: A Cultural Values Assessment was received and reviewed by the project team, which provided several comments on the development proposal and highlighted a number of matters. A follow-up meeting was subsequently scheduled, and these matters will be addressed through the AEE.

## 6.0 SAFETY IN DESIGN

### 6.1.1 GENERAL

A Safety in Design (SiD) process has been initiated for the Mt Welcome infrastructure works in accordance with the Health and Safety at Work Act 2015 and standard industry practice. The purpose is to identify and address potential health and safety risks throughout the design, construction, and operational stages of the development.



## 6.2 RISK IDENTIFICATION

Preliminary risk identification has been undertaken during the design phase to consider hazards associated with key civil and servicing activities. These include excavation and trenching for drainage systems, installation of underground utilities, construction around raingardens and other stormwater treatment devices, roading alignment and sightlines, and interactions between construction plant and the public. No specific items have yet been recorded in the SiD register; however, the register will be developed and populated as the detailed design advances toward construction.

## 6.3 MITIGATION MEASURES

The design seeks to eliminate or reduce risks through the design process in consultation with the wider team. Measures include minimising excavation depths where practicable, maintaining clear sightlines for vehicles and pedestrians, providing adequate edge protection around open structures and stormwater devices, and ensuring utilities and crossings are located to avoid conflicts with traffic and pedestrians. Residual risks identified during later design stages will be documented in the SiD register and communicated to the contractor for inclusion in construction safety planning.

# 7.0 EARTHWORKS

## 7.1 OVERVIEW AND DESIGN OBJECTIVES

The earthworks design aims to achieve a balanced, and environmentally conscious outcome that supports the overall development. Key objectives include:

- Comply with Greater Wellington Regional Council (GWRC)'s Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region.
- Ensure geotechnical compliance in accordance with geotechnical engineer (ENGEO) recommendations.
- Incorporate ecological requirements in line with ecologist (Blue Green Ecology) and hydrological (PDP) advice.
- Achieving a practical cut-fill balance and minimising material disposal off-site.
- Eliminate the need for future secondary earthworks.
- Incorporate ecological and environmental constraints into the design.
- Stage works to enable progressive development and minimise exposed areas.
- Apply Safety in Design principles and identify project specific risks

### 7.1.1 DESIGN STANDARDS & COMPLIANCE

The following documents and standards have been adopted for the design and assessment of earthworks:

- GWRC Erosion and Sediment Control Guide for Land-Disturbing Activities in the Wellington Region (2021)
- ENGEO Geotechnical Report
- Blue Green Ecology Report
- PDP Hydrological Advice
- PDP Preliminary Site Investigation Report
- Heritage & Archaeology Services Ltd Archaeological Report

## 7.2 GEOTECHNICAL CONSIDERATIONS

ENGEO have completed a geotechnical report for the Mt Welcome development, which should be read in conjunction with this report. The key points relevant to the proposed civil works are summarised below:

- The site is located approximately 500 m from the mapped trace of the Pukerua Fault, within a seismically active area that also includes the Ohariu and Wellington Faults. While the site is not



directly traversed by a known fault, ground rupture and regional subsidence could occur during a major seismic event on nearby or unmapped faults.

- Liquefaction risk is considered low within the developable areas but may occur locally in low-lying gullies and valley floors.
- Groundwater was recorded between approximately 0.4 m and 3.8 m below ground level, varying seasonally and by location. Continued groundwater monitoring is recommended to inform the detailed design of earthworks, retention wetlands, and slope stability assessments.
- Slopes steeper than 25 degrees require specific engineering assessment and mitigation where development is proposed above or below them. Specifically Engineered Design (SED) zones should be applied in these areas.
- Most surficial soils and Greywacke rock are suitable for reuse as engineered fill, subject to verification and field compaction testing.
- Detailed design of the proposed stormwater retention wetlands and adjacent embankments is required by a chartered professional engineer.
- Installation of piezometers for ongoing groundwater monitoring for a minimum of four months prior to major earthworks is recommended to support final design and construction staging.

### **7.3 CONTAMINATION ASSESSMENT & REMEDIATION**

Pattle Delamore Partners (PDP) have been engaged to carry out a Preliminary Site Investigation (PSI) to assess the risk of any previous land activities on the health of future residents. The investigation identified potential contamination sources from historical sheep dip/spray race operations and from older buildings that may have contributed asbestos and lead residues to surrounding soils.

PDP recommend that areas associated with these potential HAIL activities are subject to a Detailed Site Investigation (DSI) to confirm the extent of contamination and whether the National Environmental Standard for Assessing and Managing Contaminants in Soil (NESCS) will be triggered. An asbestos survey will also be required prior to demolition of existing buildings, with shallow soil testing undertaken around building footprints.

A Soil Management Plan (SMP) will be required for the duration of the earthworks to manage the potential discovery of contaminated soils and to set out safe handling and disposal requirements. Any soils to be removed from site will require testing against landfill acceptance criteria before disposal to an approved facility.

Following remediation and development works, a Site Validation Report (SVR) will be required to confirm that all remediation has been undertaken in accordance with the SMP and NESCS requirements.

### **7.4 ECOLOGY AND ENVIRONMENTAL**

BlueGreen Ecology have prepared the ecological assessment for the site. Their investigations identified that the existing streams, wetlands, and terrestrial habitats are of low ecological value, being largely exotic and modified by historic farming activities.

Ecological enhancement measures have been integrated into the earthworks design, including riparian planting and sediment treatment feature

### **7.5 ARCHAEOLOGICAL ASSESSMENT**

The Archaeological Assessment found no recorded sites within the project area but noted a possibility of uncovering unrecorded remains during earthworks. An Archaeological Authority is recommended, along with archaeological monitoring, recording, and information recovery if discoveries occur. Any demolition or modification of pre-1900 buildings will also require assessment and recording by a built heritage specialist.

#### **7.5.1 BULK EARTHWORKS**

This section summarises the extent and purpose of proposed bulk earthworks and the design approach adopted to achieve a balanced and stable landform.



Bulk earthworks will need to facilitate a balanced approach between cut and fill, ensuring there is no excess material requiring removal from site or additional material import, achieve compliant road gradients, and produce flat buildable house sites. This will also minimise the need for secondary earthworks, retaining requirements and encourage batter slopes to be designed at grades to minimise the time required for rehabilitation and revegetation post earthworks. The methodology for the earthworks is outlined within the ECMP. Autodesk Civil 3D 2025 was used for overall 3D model design and plan production. A complete set of plans can be found in Appendix 1. The earthworks proposed on the site consist of:

- Total earthworks area: 81.46 ha.
- Topsoil stripping is estimated at 128,000m<sup>3</sup>, assuming an average depth of 300 mm.
- Subgrade preparation is assumed to extend 200mm below finished ground level (FGL).
- Maximum cut height is approximately 21m, and maximum fill depth is approximately 24m.
- Total earthworks area: 81.46 ha.
- Total cut volume: 1,905,000m<sup>3</sup>.
- Total fill volume: 1,806,000m<sup>3</sup>.
- Approximately 135,000m<sup>3</sup> of unsuitable material allowance

These volumes are solid volumes and make no allowances for bulking as advised by the geotechnical engineer based on field experience in similar ground conditions.

A cut/fill balance has generally been achieved meaning no earthworks are intended to be removed from the site, subject to detailed geotechnical testing and civil design. Ground material that is unsuitable has been accounted for and will generally be disposed of on site in the designated unsuitable fill area, as detailed below.

To achieve a cut/fill balance, certain gullies and low-lying areas will be utilized for placement of fill material. Through close collaboration with the ecology team, we have identified areas of lower ecological value that can accommodate earthworks, alongside areas that have higher ecological sensitivity and should be protected or enhanced. It is expected these gullies will contain material unsuitable for fill, and fill be disposed of within the fill site as detailed below.

Excess topsoil material will be managed in accordance with the ECMP and placed within the designated unsuitable material stockpile. Topsoil identified for reuse will be stockpiled around the perimeter of the earthworks area for later reinstatement within lots and berms upon completion of civil works. All topsoil stockpile locations and management measures will be shown on the certified Erosion and Sediment Control Plans.

## 7.5.2 EARTHWORKS STAGING

The earthworks will be carried out in a staged approach. These stages have been designed to enable the civil works to be carried out as outlined in the development staging and to balance earthworks. They have also been designed to be carried out in an earthworks season. Prior to the commencement of each stage of earthworks a detailed ECMP will be submitted for certification prior to commencement.

**Table 2.** Earthwork Staging

Stage	Area (ha)	Cut (m <sup>3</sup> )	Fill (m <sup>3</sup> )	Unsuitable (m <sup>3</sup> )	Enables Civil
Stage 1	10.2ha	195,000	167,500	27,500	Stage 1, 5A
Stage 2A	8.2	230,000	75,000	10,000	Stage 2A, 2B, 3A, 3B
Stage 2B	4.7	50,000	187,500	2,500	Stage 4A, 4B
Stage 2C	15.9	7,500	10,000	2,500	SH59
Stage 3	11.6	250,000	220,000	30,000	Stage 5B
Stage 4	12.4	320,000	31,000	10,000	Stage 6, 7, 8, 9



Stage	Area (ha)	Cut (m <sup>3</sup> )	Fill (m <sup>3</sup> )	Unsuitable (m <sup>3</sup> )	Enables Civil
Stage 5	2.8	32,500	30,000	2,500	Stage 10
Stage 6A	11.7	257,500	182,500	15,000	Stage 11, 13, 14
Stage 6B	2.2	15,000	95,000	7,500	Stage 12
Stage 7	10.5	380,000	360,000	20,000	Stage 15, 16A, 16B, 17
Stage 8	6.0	177,500	170,000	7,500	Stage 18, 19
<b>Total</b>	<b>81.46</b>	<b>1,905,000</b>	<b>1,806,000</b>	<b>130,000</b>	

Detailed earthworks plans, including existing and proposed contours, cut-fill layouts, and staging plans, are provided in the 2000-series Civil Design Drawings in Appendix 1.

### 7.5.3 FILL SITE

A dedicated fill area has been incorporated into the development to minimise the need for off-site disposal of unsuitable material. The 2ha area has capacity for approximately 135,000 m<sup>3</sup> of surplus material and will be contained by a structural bund, with finished grades designed at flatter slopes to ensure stability. Primarily clean, uncontaminated material will be placed within this area; however, if material with minor or localised contamination is encountered, it may be blended or encapsulated in accordance with a site-specific management plan.

### 7.5.4 EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures have been developed in accordance with the Greater Wellington Regional Council (GWRC) Erosion and Sediment Control Guide for Land-Disturbing Activities in the Wellington Region (2021).

A preliminary Erosion and Sediment Control Plan (ESCP) has been prepared to demonstrate the feasibility of the proposed controls and forms part of this application. The plan includes catchment layouts, sediment retention pond (SRP) and decanting earth bund (DEB) sizing, and outlines the proposed methodology for gully filling and early-stage earthworks. Given the requirement for early fill placement, a temporary DEB will be utilised prior to SRP construction.

Ongoing monitoring will be undertaken in accordance with the Erosion and Construction Management Plan (ECMP), developed in collaboration with PDP, to address water quality testing and outflow monitoring requirements. The preliminary ESCP is provided on sheets 2300, with the detailed Stage 1 ESCP provided on sheets 2400, which also sets the standard for subsequent stages.

- SRP and DEB detailed sizing
- Construction methodology and staging
- Stabilized construction entrance will be utilised at the existing site entrance
- Silt fence installed along the site boundary
- Stormwater culvert sizing

## 7.6 EARTHWORKS AND CONSTRUCTION MANAGEMENT

Envelope have prepared a draft Earthworks and Construction Management Plan (ECMP) for works at the site, which should be read in conjunction with this report.

This plan is intended to provide the information required to establish a framework for the safe and environmentally conscious completion of earthworks and civil construction proposed to be undertaken for the project.

The intention of this document is to set out the key parameters and likely site conditions that are required to be considered to assist the contractor in preparing their site-specific ECMP, for which they will be contractually responsible.



It is not intended to be prescriptive, and the contractor will be free to propose alternative measures if they meet the minimum performance standards as outlined in this document and in accordance with the GWRC document “Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region – Issued Feb 2021” and if compliance is still achieved with the relevant conditions of consent.

It is our view that the erosion and sediment control design can be adequately addressed to ensure that potential adverse effects are managed and mitigated to an acceptable level. We consider that subject to employing the measures outlined above, there will be no significant adverse effects relating to the proposed earthworks. We propose finalising the ECMP as a condition of consent prior to the commencement of earthworks for each relevant stage.

## **7.7 FLOCCULATION MANAGEMENT PLAN (FMP)**

It is likely that control of sediment on this site will require the use of a flocculant and the use of this would be controlled a Flocculation Management Plan (FMP). We propose developing this as a condition of consent, to be certified by GWRC prior to commencing earthworks for each relevant stage.

## **7.8 WATER QUALITY**

As large-scale earthworks progress, careful management of erosion and sediment generation will be essential, reinforcing the need for robust erosion and sediment control measures to maintain water-quality standards during and after construction.

Baseline water-quality monitoring is currently underway to establish existing conditions across the site. This provides a reliable pre-development benchmark against which future changes can be measured. While this dataset is still being finalised, baseline water-quality conditions will be confirmed prior to construction commencing for each stage. Testing locations are described in the PDP Hydrological Assessment.

# **8.0 ROADING AND ACCESS**

## **8.1 OVERVIEW AND DESIGN OBJECTIVES**

- Deliver a clear and connected road hierarchy suited to the site’s topography.
- Achieve compliant road geometry, grades, and sight distances.
- Integrate pedestrian, cycle, and recreational paths to support multimodal travel.
- Design for future public transport within collector roads.
- Apply Safety in Design principles to reduce risks and promote safe operation.
- Provide resilient and attractive streetscapes with capacity for long-term growth.

## **8.2 DESIGN STANDARDS & COMPLIANCE**

- Porirua City Council District Plan
- Porirua City Council: Code of Land Development and Subdivision Engineering, (2010)
- Porirua City Council: Track Standards Manual Version 1.2 – May 2014
- Austroads Guide to Road Design Part 6A: Paths for Walking and Cycling
- Austroads Guide to Road Design Part 3: Geometric Design
- Austroads – Guide to Road Design, Part 4A

## **8.3 EXISTING ROADING**

The Mt Welcome site has sole frontage and legal access to State Highway 59 (formerly State Highway 1), immediately south of Pukerua Bay. The existing driveway currently provides access to lifestyle blocks within the property.

SH59 in this location is a regional route, operating as a two-lane highway with a posted speed limit of 100 km/h, reducing to 50 km/h at the northern edge of Pukerua Bay. Daily traffic volumes adjacent to the site are around 9,000–10,000 vehicles per day.



There are currently no footpaths or cycle facilities within the SH59 corridor, however the Ara Harakeke shared path runs parallel on the western side of the highway, providing an off-road walking and cycling link between Plimmerton and Pukerua Bay, and connecting to nearby rail stations. Public transport in the area is served by the Kapiti Line rail service at Pukerua Bay Station to the north and local Metlink bus services from Pukerua Bay.

This significant reduction in highway traffic volumes at the site, associated with the opening of the Transmission Gully motorway (SH1), has created capacity within the SH59 corridor, enabling new growth and subdivision development without requiring major roading upgrades.

## **8.4 PROPOSED ROAD NETWORK**

The roading layout and geometric design have been informed by earthworks and traffic modelling, with an emphasis on connectivity and compliant road grades. The primary network follows the Northern Growth Area (NGA) Structure Plan, linking to both SH59 and the Muri Road block. Two southern connections have not been included due to engineering and ecological constraints, as detailed in this report and within the AEE.

The roading design plans are provided in the 3000-series Civil Design Drawings in Appendix 1.

### **8.4.1 PARKING**

On-street parking will be provided throughout the development via designated parking bays. Provision of parking bays will be alternate with grassed berms or landscape areas. The total number of spaces proposed has been determined in consultation with the traffic engineer. Given the high frequency of driveway crossings, some parking bays overlap with driveways. These bays have been designed with increased crossfall to minimise kerb lips and ensure smooth vehicle access, reducing the likelihood of future rework or non-compliant alterations by property owners. No-parking restrictions will be applied across driveways, and bays have been sized to ensure adequate parking without encroaching into private accessways.

The development layout has been designed to provide an appropriate balance of on-street and off-street parking, sufficient to meet the anticipated parking demands associated with the scale and nature of the proposed activities. Off-street parking spaces will comply with the *Porirua District Plan* requirements, providing a minimum width of 2.1m and a length of 5.0–6.6m, depending on adjacent obstructions.

### **8.4.2 PEDESTRIAN, CYCLING AND MULTI MODAL TRANSPORT**

Pedestrian footpaths have been designed at varying widths across the development. Along collector roads, footpaths will generally be 2.5m wide on one side and 2.0m on the other, providing shared space for pedestrians and non-commuter cyclists. On local roads, 1.8 m footpaths will typically be provided on both sides, with single-sided footpaths applied to smaller road classifications in accordance with the PCC Code of Practice.

### **8.4.3 CYCLE AND COMMUTER PATHS**

Commuter cycle lanes are incorporated within the collector roads across the development, each 1.8 m wide and located within the carriageway, consistent with the Northern Growth Area (NGA) Structure Plan provisions. These routes will connect to the northern block, providing future access to the Pukerua Bay train station while avoiding direct reliance on SH59.

### **8.4.4 RECREATIONAL TRACKS & TRAILS**

Recreational tracks have been designed in collaboration with the landscape architect to create walking routes through otherwise inaccessible terrain. These routes will strategically link key features of the development, including recreational reserves, commercial areas, and connections to both the Muri Road block to the north and to the southern boundary of the site.



## 8.4.5 STREETScape

Drainage services have been designed within the carriageways to allow for tree planting within berms and the integration of other landscape elements, while avoiding conflicts with drainage infrastructure. The Landscape and Urban Design has been prepared by Blac as part of the Landscape and Urban Design Strategy.

## 8.5 ROAD CLASSIFICATIONS

The proposed roading network comprises six primary road typologies across three road classifications. A map illustrating these is provided in Figure 4 below. Each classification is discussed in further detail below in this report, with the detailed proposed roading plans included in the 3000-series Civil Design Drawings within Appendix 1.



Figure 4.: Road Classification

### 8.5.1 COLLECTOR ROADS (21.7M-18.6M)

Collector roads have been designed to accommodate public transport, shared paths, and dedicated cycle lanes, forming the primary connection to the proposed SH59 roundabout. Vertical grades and turning radii have been developed to support future bus operations, with bus stop locations to be confirmed in consultation with GWRC. 5 primary cross-section types are proposed:

- **Type A & B:** Standard Collector Road, 7m carriageway, 1.8m on-road cycle lanes, 2.5m kerbside parking or berms on both sides, a 2.5m shared path on one side, and a 2m footpath on the other. This road type will continue into the Muri block to the north
- **Type C:** Collector Road adjacent to steep topography (entry to site), 7m carriageway, 1.8m on-road cycle lanes on both sides, 2.5m kerbside parking or berm on one side, a 2.5m shared path, and a 3.5m berm on the opposing side.
- **Type D & E:** Collector Road specifically for Road 2, 7m carriageway, 2.5m kerbside parking or berms on both sides, a 2.5m shared path on one side, and a 2m footpath on the other. This road type provides access to the Skaiffe block to the south.

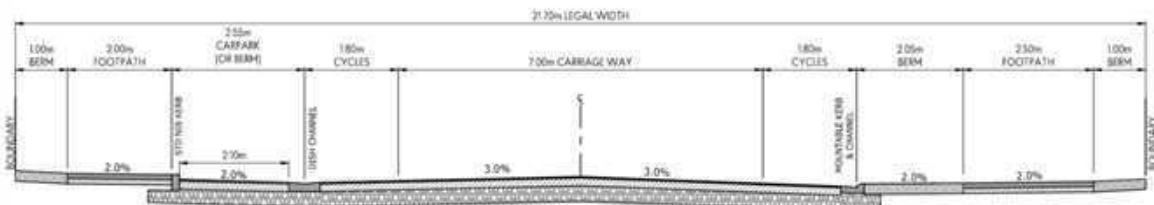


Figure 5.: Typical Cross-Section (A) Collector - 21.7m With Cycleway and Carpark



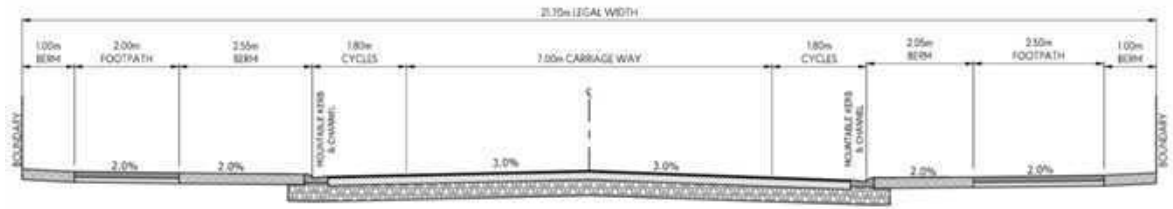


Figure 6. Typical Cross-Section (B) Collector - 21.7m with Cycleway and Berm

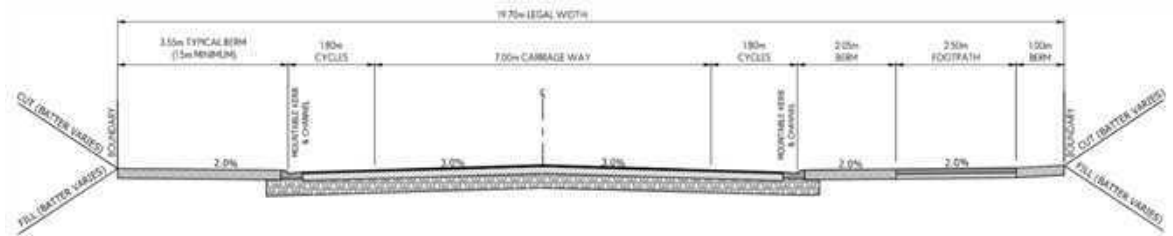


Figure 7.: Typical Cross-Section (C) Collector - 19.7m with Cycleway

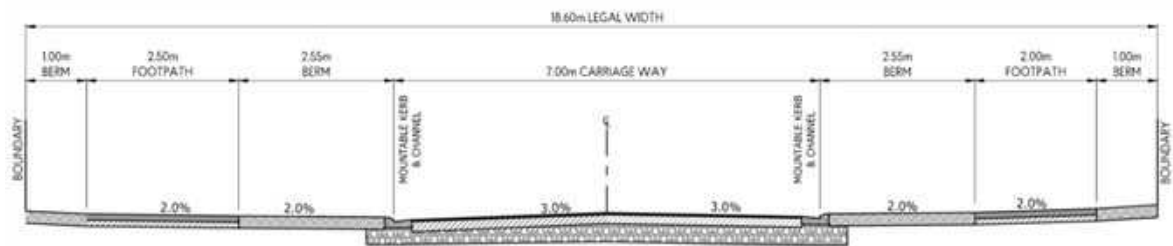


Figure 8.: Typical Cross-Section (D) Collector - 18.6m with Berm

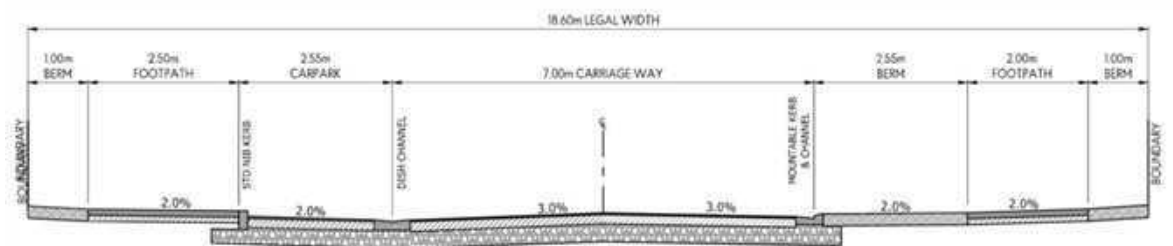


Figure 9.: Typical Cross-Section (E) Collector - 18.6m with Berm & Carpark

## 8.5.2 LOCAL / ACCESS ROADS (16.7M-14.5 M)

Access roads are designed as residential streets featuring indented parking bays and 1.8m footpaths, providing direct property access while maintaining safe and efficient traffic movement. In constrained locations where lots front only one side of the road, a reduced total width of 14.5m is adopted, with a single footpath provided.

- **Type F:** Standard Access Road, 6m carriageway with indented 2.5m kerbside parking lanes or berms on both sides, 1.8m footpaths on both sides, and rear berms.
- **Type G & H:** Access Road adjoining steep topography or single-sided development, 6m carriageway with a 2.5m indented kerbside parking lane or berm on one side, a 1.8m footpath on one side, and a 3m berm on the opposite side.



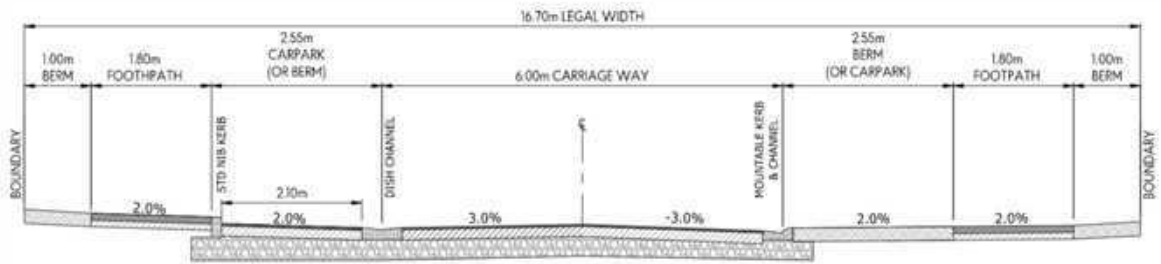


Figure 10.: Typical Cross-Section (F) Local Road - 16.7m with Carpark and Berm

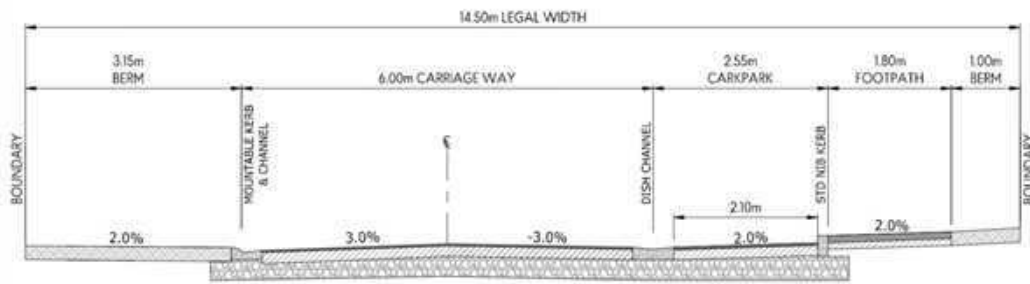


Figure 11.: Typical Cross-Section (G) Local Road - 14.5m With Carpark

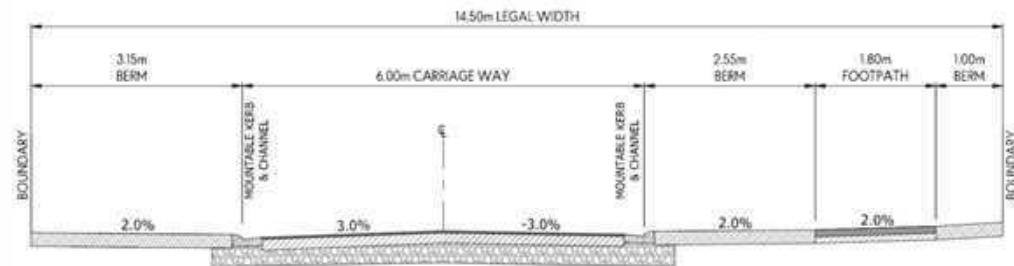


Figure 12.: Typical Cross-Section (H) Local Road - 14.5m With Berm

### 8.5.3 PRIVATE JOALS (5.5M-9M)

Short, low-speed access lanes are proposed to serve small clusters of dwellings (typically ten or fewer). These lanes are designed as shared spaces for both vehicles and pedestrians, featuring narrow carriageways (3.5m-5.5m) with berms on either side. Each Jointly Owned Access Lot (JOAL) has been designed to suit its specific use and layout, resulting in more variable widths than standard public roads. The three primary JOAL types are illustrated below, showing the minimum legal widths



and typical configurations that reflect their intended functions.

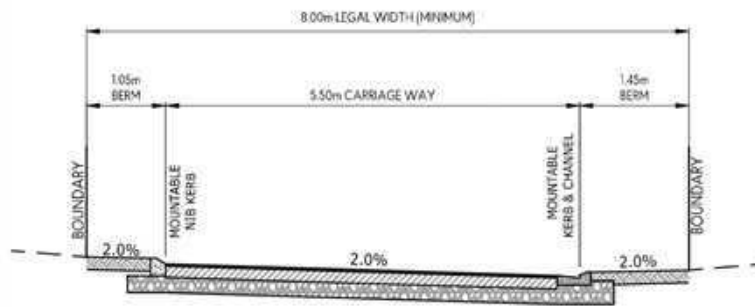


Figure 13.: Typical JOAL Cross-Section (1) - 8.0m Minimum with Berms

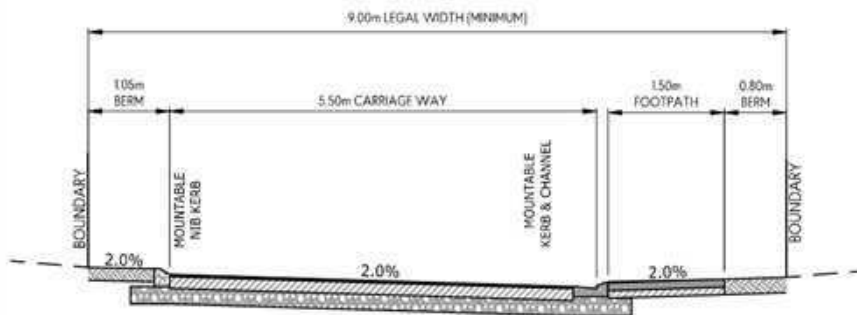


Figure 14.: Typical JOAL Cross-Section (1) - 9.0m Minimum with Footpath

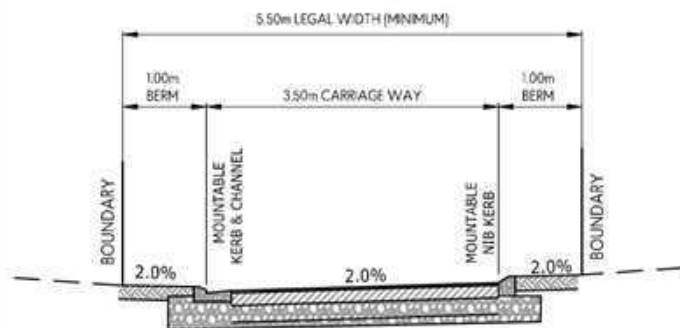


Figure 15.: Typical JOAL Cross-Section (3) - 5.5m Minimum

## 8.6 PAVEMENT DESIGN

Pavement design will be undertaken during the detailed design stage and will be informed by the fully developed traffic volumes and ground conditions.

## 8.7 SH59 INTERSECTION

A new roundabout is proposed on SH59 to provide the main site access. The design is being coordinated between Stantec and Envelope. The roundabout has been conceptually designed to accommodate full traffic demands from both the Mt Welcome and the adjacent Muri Road block. Two-lane approaches and circulating lanes have been included to provide sufficient capacity and to future-proof the intersection for expected traffic growth. The roundabout can operate at the current 100km/h speed limit but also has been designed with the potential to operate at a reduced 60km/h



speed environment. The roundabout will also reduce operating speeds along this section of SH59, improving safety outcomes compared to the existing highway environment. The design is further detailed in Stantec’s ITA and integrated into the 8000-series Civil Design Plans in Appendix 1.

A number of intersection options were assessed for this intersection, including alternative layouts and locations; however, NZTA design and safety requirements limit flexibility in the design. The options summarised below were explored during the design process but were not progressed, as they were not supported by NZTA and are therefore not considered suitable. Table 3 below provides a brief summary of the options assessment.

**Table 3: SH59 Options Assessment**

Option	Assessment	Suitability
Change Location	<p>The proposed location aligns with the Northern Growth Area Structure Plan.</p> <p>Relocating east would move SH59 through-lanes outside the legal NZTA corridor.</p> <p>Due to the existing topography, this shift would require additional earthworks and result in greater stream impacts on the eastern side of the highway</p> <p>It would also create issues with horizontal and vertical geometry relative to the existing highway alignment. The current location represents the easternmost alignment within NZTA design tolerances.</p>	No
Change Size	<p>The roundabout diameter and approach geometry are governed by NZTA geometric design standards for a 100km/h highway. Reducing the size would compromise safety and operational performance and is non-negotiable with NZTA</p>	No
Change Intersection Type	<p>A signalised intersection was considered; however, NZTA has confirmed that only a dual-lane roundabout is acceptable at this location given the speed environment and traffic volumes.</p>	No

## 8.8 TEMPORARY TURN LANE

Prior to construction of the roundabout, an interim access arrangement will be implemented at the existing site driveway. This will involve upgrading the current priority T-intersection to include a dedicated right-turn bay for northbound SH59 traffic, shifting the existing northbound merge taper further south, and realigning the site access to a 90-degree approach to improve sightlines and vehicle tracking. The temporary right-turn lane is proposed to operate until 110 dwellings are occupied.

## 8.9 INTEGRATED TRANSPORT ASSESSMENT

Stantec have prepared an Integrated Transport Assessment (ITA) for the Mt Welcome development, which should be read in conjunction with this report. The ITA confirms that the proposed subdivision, with its planned access via SH59 and internal road hierarchy, can be accommodated within the surrounding transport network without compromising safety, function, or capacity. The assessment demonstrates that the development provides suitable provision for vehicles, pedestrians, and cyclists, integrates with the Northern Growth Area structure plan, and achieves appropriate outcomes for all transport modes and users.

## 8.10 STRUCTURE PLAN TRANSPORT CONNECTIONS.



The Northern Growth Area (NGA) Structure Plan identifies key transport connections extending both north and south of the Mt Welcome site. To the south, three potential connection points were originally identified to the adjoining Skaife Block. Preliminary investigations into these options have been undertaken; however, opportunities to establish practical and meaningful connections are limited due to topographical and environmental constraints. The potential southern connections are discussed in more detail below.

### 8.10.1 ASSESSMENT

The primary road network within Mt Welcome generally aligns with the NGA Structure Plan, providing strategic connections to State Highway 59 and the Muri Road block. However, the three suggested southern connections have been found to offer limited feasibility or practical connectivity. Our desktop engineering assessment indicates that only the central southern alignment is technically viable, primarily due to steep topography and ecological constraints within the Skaife Block. Accordingly, only the central route has been retained as the provisional southern link toward the Skaife Block.

It is also important to note that the Skaife Block remains zoned rural, with no current development plans. We understand that no ecological or geotechnical field investigations have been undertaken, and any assessment to date have been at a desktop level only. If development of the Skaife Block proceeds in the future, the site already benefits from direct access to SH59. Together with the provisional upper-terrace connection through Mt Welcome, this would provide sufficient transport connectivity. The feasibility of extending this provisional central connection further south within the NGA remains uncertain, as such works would likely involve significant earthworks that may not be practical or feasible.

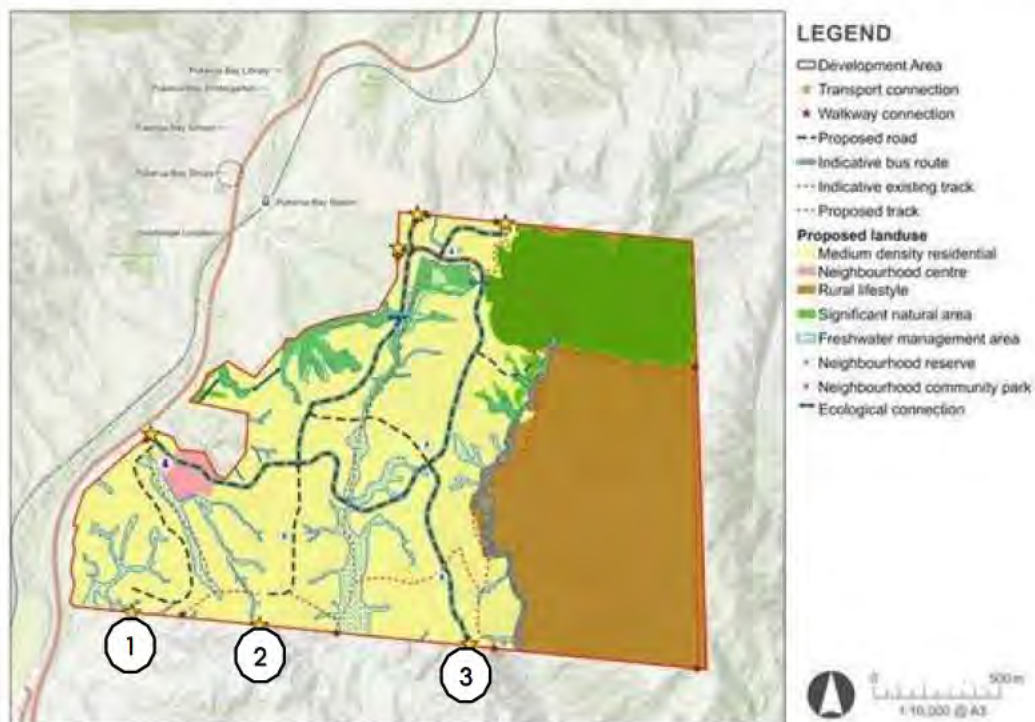


Figure 16. Northern Growth Area Structure Plan

The following section summarises the outcomes of the engineering assessment for the three key transport connections identified within the Structure Plan. These connections numbered 1–3, correspond to the annotations presented in Figure 16 of the Structure Plan above.

#### 1. Lower Route:

The proposed transport connection traverses the lower terrace of the development. As identified within the technical assessments, this part of the site is constrained by streams, wetlands, and freshwater management areas. The wetland and gully system identified within Mt



Welcome appears to extend along the site boundary. Even if the ecological constraints could be mitigated, the topography would soon force any potential road alignment westward toward SH59. Given that the Skaiffe Block already has a direct intersection with SH59, this connection would effectively create a short loop between the existing Skaiffe Block intersection and the new Mt Welcome roundabout, providing access only to a single local road within the lower terrace of Mt Welcome.



Figure 17. Lower Route

In summary, this potential connection is significantly constrained both ecologically and topographically and would offer limited additional connectivity or value to the wider transport network within the Northern Growth Area. For this purpose, no transport link has been provided within our civil design.

2. **Central Route:**

This option provides the most viable connection, linking directly to the upper terrace of Mt Welcome, which is suitable for development. However, any continuation further south is limited by steep terrain and would require substantial earthworks. While it could potentially support future development within the Skaiffe Block, its feasibility remains dependent on future land-use decisions. A further extension south into Plimmerton Farms is considered unlikely to be feasible. Provision has nevertheless been made for a possible connection should development of the Skaiffe Block proceed in the future.



Figure 18. Central Route

3. Upper Route:

Follows a steep ridgeline and terminates soon after the development boundary. Refer to figure 19 below with the portion of this road that would be inside the Skaife block. The alignment is flanked by steep embankments and stream corridors, limiting any practical extension south. No meaningful connectivity or development opportunity would result from this option. For this reason, no transport link has been provided within our civil design.



Figure 19: Upper Route

## 9.0 STORMWATER

### 9.1 PRINCIPLES OF STORMWATER MANAGEMENT

The stormwater management approach for the Mt Welcome development has been guided by the principles of integrated catchment management, water-sensitive urban design, and hydraulic neutrality, consistent with the Wellington Water RSWS v3.0 and GWRC Plan Change 1. These principles ensure that stormwater is managed in a way that protects downstream environments, enhances ecological and cultural values, and supports long-term asset resilience and maintainability.

Key principles applied to this development include:

- Stormwater treatment and attenuation are centralised, minimising the use of on-lot devices and reducing operation and maintenance costs.
- Post-development catchments are aligned with pre-development catchments to maintain existing discharges and downstream receiving environments
- Apply Safety in Design principles and identify project specific risks
- Support of development staging to ensure the network can be constructed and commission progressively
- Recognise and protect the natural environment with low impact and water sensitive design
- Incorporate cultural values through engagement with mana whenua

### 9.2 STORMWATER MANAGEMENT PLAN

Envelope Engineering has prepared a Stormwater Management Plan, which should be read in conjunction with this report. The Stormwater Management Plan makes a range of recommendations on items including water sensitive urban design and hydraulic neutrality. This also contains details to meet stormwater impact assessment and requirements under PC1.



### **9.3 STORMWATER IMPACT ASSESSMENT**

A Stormwater Impact Assessment has been prepared and is submitted as part of the application, in accordance with Schedule 29 of the NRP-PC1. This will include detailed assessment of stormwater and hydrological controls, prepared with input from the specialist team, including hydrology (PDP) and ecology (Blue Green Ecology).

### **9.4 EXISTING STORMWATER INFRASTRUCTURE**

There is no existing public stormwater infrastructure within site. However, there are a number of existing culverts as well as areas identified as freshwater management areas within the structure plan.

### **9.5 PROPOSED STORMWATER NETWORK**

The proposed stormwater management system has been designed to collect, convey, treat, and attenuate runoff from all developed areas in accordance with Wellington Water RSWS v3.0, GWRC Plan Change 1, and the Porirua District Plan.

Detailed modelling is provided within the Stormwater Management Plan (SMP).

#### **9.5.1 PRIMARY NETWORK**

Stormwater from lots and road surfaces during the 10 % AEP event is collected via downpipes, catchpits, and a piped network discharging to centralised treatment and attenuation devices. The primary network has been designed for the 10 % AEP storm (with climate-change allowance) and includes sufficient capacity for larger events given the site's steep topography.

Catchpits are positioned at low points and along road corridors to efficiently capture runoff, with all residential lots connected via laterals. Network layouts are shown on the 4000-series Civil Design Drawings.

Flows from the piped network discharge to centralised raingardens which provide water-quality treatment. Each raingarden is sized to treat at least 85% of the Mean Annual Runoff Volume from its contributing impervious area. High-flow bypasses convey larger events directly to downstream attenuation devices to maintain treatment efficiency.

#### **9.5.2 SECONDARY NETWORK**

For the 1 % AEP event, overland flow will be safely conveyed via the road corridors toward the retention wetlands. The road profiles have been designed to form defined secondary flow paths, ensuring surface water is directed away from dwellings and toward designated outlet locations. These larger rain events will bypass the rain gardens. No low-lying or flood-prone areas have been identified, and no additional freeboard controls are required.

Where overland flow descends steep embankments, energy-dissipation measures such as rock armouring and vegetation will be provided to protect slope stability and receiving environments.

#### **9.5.3 ATTENUATION AND RETENTION**

Four primary retention wetlands (A, B, C and E) and one smaller attenuation basin (D) are proposed within the site's gullies to provide both peak-flow control and hydrological retention. These wetlands temporarily detain and release stormwater to match pre-development discharge rates, achieving hydraulic neutrality across all design storms up to the 1 % AEP event.

Each wetland includes a permanent water level for extended detention storage for frequent rainfall events, and multi-stage outlets to control peak flows.

Together, these devices provide flow control across the site, ensuring the protection of downstream waterways.



## 9.5.4 STORMWATER TREATMENT

Water-quality treatment is provided through a network of centralised raingardens. These systems are designed in accordance with the Wellington Water Design for Stormwater: Treatment Device Design Guide and GWRC PC1.

Treated flows from the raingardens are conveyed to the downstream retention wetlands, which provide retention functionality before discharging to existing natural watercourses.

These combined systems achieve both hydrological control and water-quality treatment targets required under the RSWS and GWRC Plan Change 1.

Detailed modelling is provided within the Stormwater Management Plan (SMP).

## 9.6 ASSET OWNERSHIP, OPERATION & MAINTENANCE

All public stormwater infrastructure—including pipes, manholes, raingardens, wetlands, and attenuation basins—will be vested in Porirua City Council and managed under Wellington Water’s asset-management framework, with private laterals remaining the responsibility of lot owners. Shared access lots will include vested underground networks protected by easements, while catchpits within private driveways will be privately maintained. Dedicated maintenance and inspection access will be provided to all stormwater infrastructure.

## 10.0 WASTEWATER

### 10.1 OVERVIEW AND DESIGN OBJECTIVES

- Utilise a gravity system wherever practicable.
- Centralise and minimise the number of pump stations.
- Adopt low-pressure systems only where no other option is practicable.
- Support of development staging to ensure the network can be constructed and commissioned progressively.
- Apply Safety in Design principles and identify project specific risks.
- Recognise and protect the natural environment with low impact design.
- Incorporate cultural values and engagement with mana whenua.

### 10.2 DESIGN STANDARDS & COMPLIANCE

The following guidance documents were used in the design of the proposed reticulated gravity and low-pressure wastewater networks:

- Regional Standard for Water Services, RSWS, Version 3.0
- Wellington Water Pressure Sewer Design Guide and Water Services Association of Australia WSA 0716.

Additional references and models were used to inform network modelling and storage assessments:

- Regional Wastewater Model Specification: Modelling Specifications – Draft 2020
- InfoWorks ICM Model - System Performance 2024 Porirua D (SP.2024.POR.D)
- InfoWorks ICM Model - System Performance 2024 Porirua S (SP.2024.POR.S (interim))

All wastewater modelling and analysis were based on the SP.2016.POR.D model provided by Wellington Water Ltd (WWL) in May 2024. existing network

A Wastewater Hydraulic Modelling Report has been prepared by Envelope and is included in Appendix 2. This report provides detailed modelling inputs, outputs, and the range of options assessed to inform the final design.

### 10.3 EXISTING NETWORK

There is currently no reticulated wastewater network within the Mt Welcome site, with existing rural dwellings relying on on-site septic disposal systems.



The nearest Council-owned network comprises a DN250 gravity trunk main that conveys flows from Pukerua Bay southwards along State Highway 59 to Plimmerton. Wastewater is then pumped via Pump Station 13 (PS13) to the Porirua Wastewater Treatment Plant (WWTP), where it is treated and ultimately discharged to the sea west of Titahi Bay.

Much of the downstream network is already operating near or beyond its design capacity, with overflows observed during storm events with return periods of less than 1 year ARI.

Hydraulic modelling of the existing network confirms the following:

- The existing wastewater trunk main along the Pukerua Bay section has been assessed for flow capacity within the three identified upgrade sections. The current capacities are summarised below:
  - **Upgrade 1:** Existing DN250 main at 0.4% gradient with a flow capacity of approximately 39 L/s. There is no residual capacity under current conditions.
  - **Upgrade 2:** Existing DN250 main at 0.4% gradient with a flow capacity of approximately 39 L/s. There is no residual capacity under current conditions.
  - **Upgrade 3:** Existing DN250 main at 1.0% gradient with a flow capacity of approximately 60 L/s, providing a residual capacity of 20 L/s under current conditions.
- Pump Station 13 (PS13) currently operates with a pump rate of approximately 68 L/s, controlling discharge to the downstream system.
- Downstream sections near Plimmerton are not expected to experience immediate issues under current conditions, as any surcharging would occur further upstream before flows reach these lower parts of the network.
- Overall, the existing network performs adequately under current (2018 baseline) conditions but has limited available capacity to accommodate additional flows from the fully developed NGA without bulk upgrades and storage.

The PCC GIS data contains some inconsistencies when compared with the WWL InfoWorks ICM model, with the GIS indicating some flows heading north toward Pukerua Bay. These discrepancies have been reviewed, and the GIS data has been disregarded for the purposes of this assessment. All analysis has been based on the WWL-supplied calibrated InfoWorks ICM model, which WWL has confirmed as being the most accurate and up-to-date representation of the existing bulk wastewater network and the preferred source for all network data and analysis.

## 10.4 INTEGRATION WITH MURI ROAD DEVELOPMENT

The wastewater design for Mt Welcome incorporates allowance for flows from the adjoining Muri Road Development, which is designed to discharge to the SH59 bulk main via the proposed Mt Welcome wastewater network. The Muri Road site is constrained by existing downstream infrastructure and has limited direct access to the SH59 network and has therefore been designed integrally with Mt Welcome.

For modelling and planning purposes, the Muri Road development has been designed for 500 lots, with the catchment being split into East and West sub-catchments, each representing approximately 250 lots. A cost-sharing agreement between both developers is currently being established to formalise shared infrastructure responsibilities and funding contributions. While we expect the number of lots to be approximately 500, there is the design flexibility for storage design and network capacity to be adjusted as the development design process progresses.

The same hydraulic modelling and design parameters have been applied to Muri Road as to Mt Welcome to ensure network consistency and performance alignment. Final flow rates and storage volumes will be confirmed through detailed design. Further coordination between both development teams is required to refine upgrade triggers, staging, and programme alignment.

## 10.5 PROPOSED NETWORK DESIGN

A predominantly gravity-based network has been designed across the site. Given the topography minimum grade requirements are not generally a constraint, and local network standards can be achieved. However, the undulating terrain and constraints within gullies, means that 6 pump stations will be required along with localised low-pressure systems. The pump station and low-pressure



systems designs are detailed further in this report. The below tables outlines design flows for each pump station catchment. Below summarises the parameters used for the internal reticulation network.

- ADWF (per person): 200 L/person/day
- Dry Weather Peaking Factor (PF):  $PF = 7.23 \times \text{Area}^{0.2}$  (Area in ha)
- PDWF:  $ADWF \times PF$
- Self-cleansing velocity:  $\geq 0.75$  m/s at PDWF
- Maximum velocity:  $\leq 3.0$  m/s at PWWF
- Minimum grades:
  - DN 150  $\rightarrow$  1.11 %
  - DN 225  $\rightarrow$  0.69 %
  - DN 300  $\rightarrow$  0.44 %

Table 4 below summarises the calculated flows for each catchment based on the design flow parameters outlined above. These results differ from the InfoWorks ICM model outputs, which simulate wastewater flows under historical rainfall conditions; however, the calculated flows have been used as a reference for assessing smaller catchments and confirming pipe gradients. These design flows have also been used as a check and for guidance against the ICM model. WWF outputs from the ICM model can be found in attached Hydraulic Modelling Report in Appendix 2.

Table 4: Design Flows

Asset ID	Catchment	Population	ADWF (L/s)	PDWF (L/s)	PWWF (L/s)
WWPS - 1	374 lots 1.3ha Commercial	1309	3.01	10.52	12.57
WWPS - 2	136 lots	476	1.09	5.11	5.87
WWPS - 3	27 lots	94.5	0.22	1.41	1.53
WWPS - 4	42 lots	147	0.34	1.80	2.07
WWPS - 5	171 lots	598.5	1.38	5.28	6.17
WWPS - 6	203 lots	710.5	1.63	6.99	8.10
Muri West	250 lots	875	2.01	8.44	15.88
Muri East	250 lots	875	2.01	8.38	16.09

The piped network is also designed to incorporate flows from the Muri Road development and convey them through this site to the SH59 bulk main.

The proposed wastewater network layout is illustrated on the 4000-series Civil Design Drawings in Appendix 1.

## 10.5.1 PUMP STATION DESIGN AND STORAGE

Six wastewater pump stations are proposed across the site. Pump Station 1 (PS1) will serve as the primary peak wet-weather storage facility, providing the main attenuation function for the development prior to discharging to the existing bulk main. The PS1 discharge rate will be controlled and rate-limited to align with the capacity of the downstream trunk network and the proposed bulk-main upgrades.

The remaining five pump stations are designed solely to convey wastewater from local low points where gravity discharge is not achievable. It is understood that Wellington Water's current telemetry and control systems do not support operation of multiple linked pump stations in a daisy-chain configuration, meaning that each station cannot dynamically manage storage based on downstream water levels. As a result, 8 hours of maintenance storage has been incorporated into each internal pump station, with PS1 providing the final attenuation and flow control prior to discharge to the public network. Each pump station is intended to be vested to Council.



Figure 20 below illustrates the general locations of the proposed pump stations. All internal pump stations discharge via gravity mains to PSI for flow attenuation. Table 5 summarises the proposed internal storage capacities and pump rates, with PSI discussed in further detail later in this report.

Table 5: Pump Station Summary

Asset ID	Catchment	Storage (Hours)	No Pumps (l/s)	Pump Rates (l/s)	Max Storage (m <sup>3</sup> )
WWPS - 1	Full Development	-	-	-	-
WWPS - 2	136 lots	8	1	6	32.6
WWPS - 3	27 lots	8	1	2	6.8
WWPS - 4	42 lots	8	1	2	10.3
WWPS - 5	171 lots	8	2	11 and 25	91.7
WWPS - 6	203 lots	8	1	7	49.2
Muri West*	250 lots	8	1	8.5	70.4
Muri East*	250 lots	8	1	8.5	69.0

\*The Muri Road catchments have been included more hydraulic modelling purposes only. Gravity discharge has been assumed into the respective east-west catchment pump stations, with those requiring pumping directed to WWPS-5. Pump rates and maximum storage volumes have been provisionally assumed using the same methodology applied to Mt Welcome but remain subject to refinement. The final Muri Road pump station configuration and wastewater servicing methodology will be confirmed during their detailed design of the development.

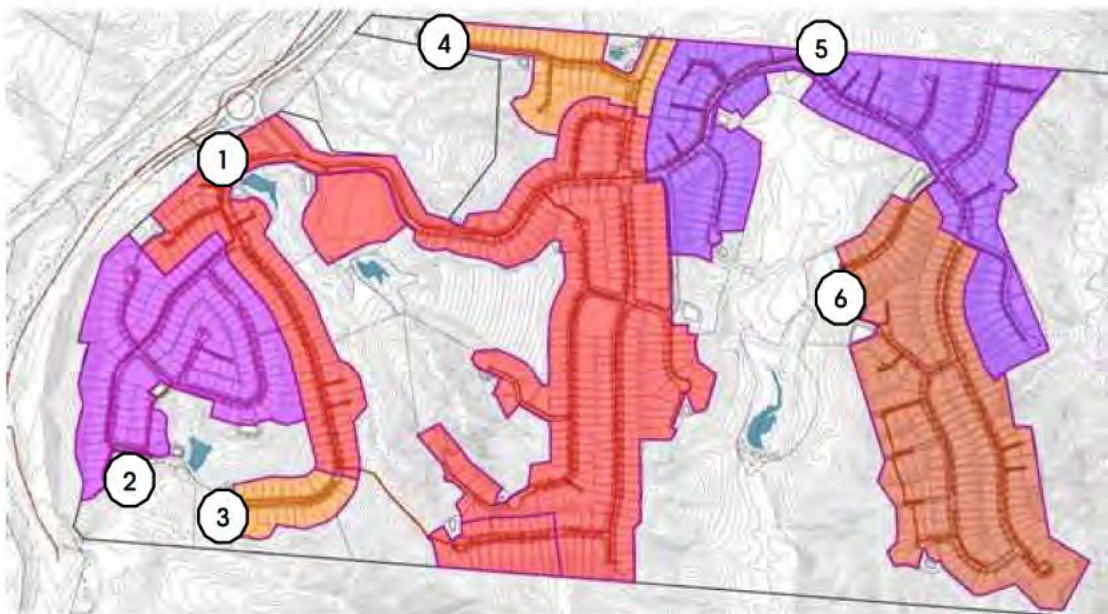


Figure 20: Pump Station Locations

Storage requirements for each pump station have been modelled using InfoWorks ICM, accounting for the hydraulic interaction between stations operating in series. Several design scenarios were tested within the model to evaluate alternative storage configurations and discharge control strategies. Detailed ICM outputs are located within Appendix 2 along with the detailed hydraulic modelling report.

## 10.6 LOW PRESSURE WASTEWATER SYSTEMS (LPS)

Topographical constraints within the site necessitate the use of low-pressure wastewater systems in 7 localised catchments. These catchments are small and do not warrant construction of an additional public pump station. A low-pressure unit will be installed on each lot at the time of development, with the unit remaining a private asset of the lot owner.



The system will provide up to 24 hours of storage and allow controlled discharge from each property. Discharge management, including restriction of flows during significant wet weather events, will be achieved through a smart pressure sewer system enabling centralised monitoring and control of individual units. The proposed approach is consistent with Wellington Water’s Pressure Sewer Design Guide and Water Services Association of Australia WSA 0716.

At the property boundary, a boundary box containing backflow prevention, an isolation valve and a flushing tee will mark the point of transfer to public ownership. The low-pressure sewer network downstream of the boundary is proposed to be vested in Council.



**Figure 21.** Low Pressure System Diagram

Wellington Water has advised that, while its policy on pressure sewers is currently under review, these systems have been accepted in areas where direct wastewater flow mitigation is not required. For this development, mitigation will be provided further downstream of the low-pressure outlets rather than at the immediate connection to the gravity network.

### 10.6.1 LOW PRESSURE DESIGN

For the performance assessment and hydraulic calculations of the LPS system the following assumptions have been adopted:

- Residential loading: 420 L/lot/day (140 L/person/day × 3 people) = ~0.0049 L/s per lot
- No allowance for inflow and Infiltration:
- Smart system operation
- Network sized to carry  $\geq 1.5 \times$  ADWF at ultimate build-out
- Performance checks:
  - Minimum velocity 0.6 m/s (target 0.9 m/s) for daily solids removal.
  - Retention < 8 hrs

Table 6 below summarises flow and catchment sizes from each LPS catchment.



Table 6: LPS Catchments

LPS ID	Lots	ADWF (L/s)	1.5 x ADWF (L/s)
LPS A	7	0.049	0.073
LPS B	7	0.049	0.073
LPS C	12	0.084	0.126
LPS D	26	0.182	0.273
LPS E	4	0.028	0.042
LPS F	19	0.133	0.200
LPS G	13	0.091	0.137



Figure 22. Low Pressure System Catchments

#### 10.6.2 LPS SUMMARY

Within specific catchments, a low-pressure wastewater system is considered more suitable than a public or centralised pump station due to local topographical constraints and catchments sizes. The system will be designed in accordance with Wellington Water's standards and the WSAA 07-16 Pressure Sewer Design Manual.

A dispensation application will be lodged with Wellington Water to obtain early approval for the proposed systems.

#### 10.7 WASTEWATER MODELLING

An assessment of wastewater network capacity, proposed network performance, and pump station storage has been undertaken to identify system constraints and confirm the upgrades required to service the development.

The report outlines modelling undertaken under various development and upgrade scenarios to determine the most effective servicing approach for the site. Discussion and technical guidance were provided throughout by the Wellington Water Limited (WWL) modelling team. Hydraulic modelling was completed using InfoWorks ICM 2024.5, based on the current 2018 Porirua base model and proposed design layouts prepared in Autodesk Civil 3D 2025. Below table outlines key parameters used to model the networks:



- Model: Simplified Northern Growth Area Model (v2024.5)
- Scenario: 2018 ICM model baseline
- Baseflow: 0.1 L/s per ha
- Domestic flow: 200 L/person/day
- PS13 – Plimmerton Pump Station: P1 – Duty 68.0 L/s
- Pump station storage: PS2 to PS6 – 8 hours; PS1 – PWWF
- Pump capacity:  $\geq 120$  % of design PWWF (duty/assist or standby)

A detailed Hydraulic Modelling Report is provided in Appendix 9.

## 10.8 WASTEWATER PUMPSTATION 1 (PS1)

Pump Station 1 (PS1) will provide peak wet-weather attenuation for the Mt Welcome development prior to discharge into the existing SH59 bulk main. Several scenarios were assessed, covering internal storage, pump rates, and downstream capacity to identify a balanced approach between storage requirements, network upgrades, and development staging.

The key scenarios, storage requirements, discharge rates, and network overflows are summarised below with further detail provided in the Hydraulic Modelling Report within Appendix 2.

Table 7: PS1 Storage Scenarios

Scenario	Discharge leaving site (L/s)	Storage on site (m <sup>3</sup> )	Overflow in the bulk network
1. Mt Welcome fully developed (949 lots + commercial)	31 (gravity)	-	-
2. NGA fully developed (incl. Muri Road)	27	1,590	None
3. NGA fully developed (incl. Muri Road)	42	380	S133404 (79m <sup>3</sup> ), S130207 (42m <sup>3</sup> ), S130204 (33m <sup>3</sup> )
4. NGA fully developed (incl. Muri Road), No trunk upgrades	20	1940	None

### Scenario 1

Hydraulic modelling indicates that Mt Welcome can discharge via gravity without on-site attenuation at PS1 or bulk network upgrades if developed solely. This provides a peak discharge of approximately 31.26 L/s, servicing 949 residential lots and a commercial area. This scenario assumes no concurrent NGA development and demonstrates the feasibility of gravity servicing while deferring the need for large-scale storage infrastructure. Upgrade staging is detailed in Section 10.9.4 of this report.

### Scenario 2

Flow rates leaving the site are reduced under the fully developed 1,500-lot NGA scenario, as discharge volumes are increased due to the tank and pump requirement. This scenario results in significant on-site storage requirements to prevent overflow within the lower reaches of the bulk network. This scenario assumes that the three key downstream upgrades have been implemented, these are discussed further in Section 10.9.

### Scenario 3

At higher discharge rates (42 L/s), the system is generally capable of conveying flows; however, minor overtopping is observed at critical manholes near Plimmerton. These effects can be addressed through future downstream upgrades.



#### Scenario 4

This scenario tests network performance under a constrained discharge condition of 20 L/s, assuming no bulk main upgrades are implemented.

When the Muri Road development is included, both on-site storage and bulk network upgrades become essential to accommodate additional flows. Under this combined, fully developed NGA scenario, substantial storage capacity is required to manage peak wet-weather discharges.

The final storage requirements for PSI will depend on development timing across the wider Northern Growth Area (NGA). It is recommended that consent conditions require confirmation of storage sizing when future civil stages trigger the need for PSI construction.

Real-time control (RTC) systems could be developed and implemented to coordinate storage and discharge across the Northern Growth Area (NGA). Such a system would allow flows to PS13 to be timed and optimised, improving the overall efficiency and utilisation of available storage throughout the network. This concept should be further explored with Wellington Water (WWL) during the detailed design stage of the project.

### 10.9 PROPOSED BULK NETWORK UPGRADES

Targeted capacity upgrades are proposed along key sections of the SH59 bulk main to address existing network constraints identified through hydraulic modelling. Several pipe upgrade options and on-site attenuation measures were evaluated; however, while additional storage can assist in managing peak wet-weather flows, it does not resolve the underlying downstream pipe capacity limitations. A storage only approach can often concentrate higher pumped discharges, worsening downstream pipe capacity constraints.

The proposed upgrade locations were identified in areas where existing capacity is limited and surcharging occurs by low pipe gradients or where overflows are first expected to occur under increased discharge conditions.

In this context, surcharge refers to water levels rising above the pipe crown but remaining contained within the underground network, such as within pipes and manholes. Overtopping, however, occurs when surcharge levels exceed the ground surface or manhole rim, causing uncontrolled overflow.

It should be noted that the development will add flow to pipes that are already operating close to capacity (Upgrades 1 and 2). Although these sections are expected to surcharge under future development conditions, modelling confirms that water levels will remain contained within the system and will not overtop. This controlled surcharge also assists in attenuating peak flows entering the more constrained downstream network within the Plimmerton catchment and network. These upgrades may be brought forward if required. The proposed upgrades are summarised in table below.

Table 8. Bulk Network Upgrade Summary

Upgrade	Existing	Existing Capacity	Proposed	Proposed Capacity
1	DN250 0.4%	39 L/s	DN375 at 0.4%	112 L/s
2	DN250 0.4%	39 L/s	DN375 at 0.4%	112 L/s
3	DN250 1.0%	60 L/s	DN375 at 1.0%	219 L/s

As the existing pipe grades cannot be increased, the solution involves upsizing specific pipe sections to improve capacity. It is acknowledged that this will temporarily result in larger upstream pipes discharging into smaller downstream sections, which does not fully comply with the WWL RSWS. However, this staged upgrade approach is considered fit for purpose as an interim measure until the remaining downstream sections are upgraded as identified in PCC's Long-Term Plan and Development Contribution Policy.



## 10.9.1 BULK WASTEWATER UPGRADE 1



**Figure 23** Upgrade 1

The first stage of works involves upgrading approximately 189 m of the existing DN250 wastewater main to DN375. This section follows the Ara Harakeke Pathway alignment, avoiding the trafficable off-ramp from SH59 to Airlie Road. The existing DN250 main, laid at a 0.4% gradient, currently conveys approximately 39 L/s. Upgrading to DN375 will increase the capacity to around 112 L/s, providing sufficient allowance for the proposed additional discharge. The works can be undertaken without disrupting vehicle traffic; however, temporary pedestrian management along the Ara Harakeke Pathway will be required during construction.



## 10.9.2 BULK WASTEWATER UPGRADE 2



**Figure 24.** Upgrade 2

The second upgrade involves replacing approximately 22m of the existing DN250 wastewater main with a DN375 pipe. Two approaches are being considered: either replacing the existing main along its current alignment or installing a new section within the SH59 berm. Locating the new main within the berm, outside the trafficable carriageway, would enable the works to be undertaken with minimal traffic disruption, reduce vegetation removal, and allow the pipe to be installed offline.

The existing DN250 main, is at a 0.4% gradient, with a capacity of 39L/s; upgrading to DN375 will increase capacity to around 112L/s



### 10.9.3 BULK WASTEWATER UPGRADE 3



**Figure 25.** Upgrade 3 (163m)

The third upgrade requires 163 m of the existing DN250 wastewater main to DN375. This may be achieved either by replacing the existing pipe or by constructing a new bypass. Installing a bypass along the Ara Harakeke Pathway alignment would avoid vegetation removal, provide a more accessible construction corridor, and improve access for future maintenance activities.

The existing DN250 main, is at 1.0% gradient and a current capacity of 60L/s. Upgrading to a DN375 main at the same gradient will increase capacity to approximately 219L/s.

### 10.9.4 UPGRADE STAGING

We have proposed a staged approach to wastewater upgrades that aligns with the progression of development. The staging has been based on Mt Welcome as the primary development, noting that other known developments discharging to the same bulk main include Plimmerton Farms and Muri Road.

For the purposes of this staging assessment, we have adopted the 2018 base scenario, excluding the delivery of surrounding developments. This will be further refined during detailed design. It is anticipated that the number of lots supported under each stage may reduce once the Muri Road development is incorporated into the programme. Until development sequencing is confirmed, Muri Road has not been included in the current staging.

Given the long-term development programme, it is recommended that storage capacity and network upgrade requirements be periodically reviewed as the development progresses. The next review should occur at Stage 10, when the Muri Road connection is established. This stage will enable servicing of approximately 541 residential lots and the commercial area, for which the existing infrastructure has sufficient capacity. At that time, the hydraulic design and modelling should be reassessed to confirm and refine storage requirements prior to commissioning the Muri Road connection.



Table 9: Wastewater Enabling Upgrades

No of Lots	Proposed Infrastructure	Proposed Upgrades
301	Gravity Network (GN)	
375	GN + PS2	
407	GN + PS2	
501	GN + PS2 + PS3	
542	GN + PS2 + PS3 + PS4	<i>Review Model &amp; Storage</i>
590	GN + PS2 + PS3 + PS4 + PS5	
759	GN + PS2 + PS3 + PS4 + PS5 + PS6	
949	GN + PS2 + PS3 + PS4 + PS5 + PS6	<i>Review Model &amp; Storage</i>
949 + Muri 1 (1199)	GN + PS1 + PS2 + PS3 + PS4 + PS5 + PS6 + PS7	Bulk Upgrades + PS1 Storage
949 + Muri 2 (1449)	GN + PS1 + PS2 + PS3 + PS4 + PS5 + PS6 + PS7 + PS7	PS1 Storage

Detailed wastewater modelling and calculations can be found in Appendix 2.

### 10.9.5 BULK UPGRADE OUTCOMES

Three staged wastewater main upgrades are proposed, totalling approximately 395 m of pipe capacity improvements, with diameters increased from DN250 to DN375 to address existing constraints and support future development within the NGA.

- Stage 1 – 210 m of main along the Ara Harakeke Pathway, avoiding the SH59 off-ramp to Airlie Road. Works can proceed without disrupting vehicle traffic, though temporary pedestrian management will be required.
- Stage 2 – 22 m of main within the berm outside the trafficable carriageway, enabling construction with minimal disturbance to road users.
- Stage 3 – 163 m of main, either by replacing the existing pipe or constructing a new bypass within the Ara Harakeke Pathway corridor to minimise vegetation removal and improve long-term maintenance access.

These upgrades will increase trunk main capacity near Mt Welcome from 39 L/s to 112 L/s, improving network performance and enabling staged NGA development. Some surcharging may occur during peak wet-weather events, but no overflows are expected once upgrades and interim storage are in place. On-site storage can be reduced as downstream upgrades near Plimmerton and PS13 are completed.

### 10.10 SUMMARY

- The full NGA development (1,449 lots + 1.7 ha commercial) produces a peak discharge of approximately 56 L/s at manhole PCC\_WW007923, resulting in limited downstream capacity and an estimated 389 m<sup>3</sup> overflow under existing conditions.
- The Mt Welcome development alone (excluding Muri Road Stage 2) can discharge 32 L/s by gravity without causing new overflows downstream.
- Three option sets were tested to mitigate the increased flows of the NGA.
  - Localised bulk main upgrades increase capacity locally but shift hydraulic constraints further downstream toward PS13.



- PS1 attenuation (1,600 m<sup>3</sup>) reduces peak discharge to around 28 L/s and effectively prevents downstream overflows; however, it does not resolve the underlying capacity limitations in the bulk main, and the required storage volume is not considered feasible. Relying solely on this option would also constrain all further NGA development.
- A combined option (bulk upgrades + PS1 attenuation) enables higher discharge rates (42 L/s) and reduced storage on site. Storage can be reduced with only minor, localised overtopping near Plimmerton, which can be addressed through future downstream upgrades.
- An 8-hour storage duration across the proposed pump stations provides the best performance balance, minimising downstream impacts.

## **11.0 WATER SUPPLY**

### **11.1 OVERVIEW AND DESIGN OBJECTIVES**

- Looped reticulation where practicable for network redundancy
- Integration with the Muri Road bulk main and reservoir
- Support staged delivery so construction and commissioning can proceed progressively.
- Apply Safety in Design
- Incorporate mana whenua values through ongoing engagement.

### **11.2 DESIGN STANDARDS & COMPLIANCE**

The water supply system is designed to provide a reliable primary supply for Mt Welcome and to interface with the Muri Road works, meeting Wellington Water's service levels and firefighting requirements. Capacity and pressure targets are set to support the planned yield while maintaining compliance with RSWS v3.0.

- Wellington Water RSWS v3.0 compliance.
- Minimum operating pressure: 25 m (may be reduced to ~10 m near a reservoir).
- Maximum operating pressure: 90 m.
- Firefighting: SNZ PAS 4509:2008 compliance

### **11.3 EXISTING INFRASTRUCTURE**

The site is not currently connected to a public potable network; the few existing dwellings use roof water. A DN225 transmission main runs adjacent to the site beneath SH59, supplying the Pukerua Bay Reservoir.

### **11.4 PROPOSED RETICULATION DESIGN**

The proposed water network consists of primary water mains located within the road berms on one side of each road, with rider mains extending to service lots on the opposite side of the roads. The network configuration is generally described below:

- Primary watermains in one road berm; rider mains to opposite lots.
- Hydrants at ~135 m spacing (final locations at detailed design).
- Looping where feasible; residual dead-ends provided with flushing points.
- DN150 connection to the existing Pukerua Bay DMA Zone at Gray St
- Pressure reducing valve (PRV) at RL 90
- Pipe sizes/materials to be confirmed through detailed design

The proposed water supply plans are provided in the 5000-series Civil Design Drawings in Appendix 1.



## 11.5 SUPPLY AND PRESSURE ZONING

The network will operate as two pressure zones, separated by a pressure-reducing valve (PRV) at RL 90 located within the bulk-main pump house that feeds the new reservoir. The PRV will cap pressures in the lower zone to WWL RSWS limits (slightly lower than existing Pukerua Bay reservoir pressure) and enable controlled back-feeding from the new reservoir, increasing effective storage and resilience within the Pukerua Bay zone. The reservoir and zoning are summarised in Table 10. below.

Table 10. Reservoir & Pressure Summary

Zone	Top Water Level (TWL)	RSWS Service Range	Proposed Service Range	Lots
Lower Zone Existing Pukerua Bay Reservoir 2.3ML	RL 125	RL 35-100	RL 53 - 82	263 + Commercial
Upper Zone Proposed 3.7ML Reservoir	RL 186	RL 96-161	RL 90 - 162	686

## 11.6 LOWER ZONE

The lower zone will be supplied primarily by the existing Pukerua Bay reservoir, with a supplementary interconnection to the new reservoir for redundancy. All lots in this zone comply with RSWS pressure requirements.

The existing Zone Management Plan (ZMP) indicates that the Pukerua Bay reservoir has approximately 0.8 ML of spare capacity, based on information provided by Wellington Water. This equates to capacity for approximately 326 additional residential lots. Of this, 144 lots have already been allocated under Resource Consent RC8763 (34 Muri Road subdivision), although only 46 of those lots are located below RL 100 and consented to be supplied from the existing reservoir, with the remaining lots to be serviced from the future reservoir.

In addition, an allowance of 44 lots for infill development is identified in Table 7-2 of the *Porirua City Model Update and SMP 7 Growth* report. This results in an available capacity for approximately 236 lots from the existing Pukerua Bay reservoir.

Based on this assessment, the proposed 263 lots within the lower terrace are expected to be adequately serviced by the existing reservoir until the new reservoir becomes operational.

### 11.6.1 LOWER ZONE BACK UP FEED

Under WWL RSWS requirements, no more than 50 lots are to be isolated from a single point of supply. Given the staging and layout of the development, a temporary secondary feed from the proposed bulk main is planned to ensure compliance and maintain a backup feed. The proposed configuration is summarised below and shown in Figure 26.

- Domestic Main:**  
A new DN150 domestic main will be installed within the SH59 berm, connecting to the existing DN150 main at Gray Street. This will supply the lower zone, as further described in Section 11.5.
- Bulk Main:**  
A new DN225 bulk main will be constructed, connecting to the existing trunk main within SH59. This main will ultimately supply the future reservoir and will initially extend to the proposed pump station and PRV located within Road 1.
- Interim Secondary Supply.**  
The bulk main will initially extend to the future pump station and PRV located within Road 1. In the interim, the PRV will supply a DN150 domestic main that extends back down Road 1 to



service the lower terrace. This arrangement provides a secondary feed and should be operational prior to, or at the time of, construction of the 50th lot.

Once the reservoir is commissioned, the bulk main will be connected directly to the reservoir, and the PRV will be reconfigured to supply the domestic network from the reservoir, maintaining a resilient dual-supply arrangement.

This approach has been discussed with Wellington Water and has been agreed to be acceptable in principle.



Figure 26. Backup Feed Diagram

## 11.7 UPPER ZONE

The upper zone servicing 686 residential lots will be supplied by the proposed reservoir, described in Section 11.8 below. Two minor exceptions are noted: 3x lots at RL 90–96 near the Road 1 pump station will experience >90 m head (slightly above the RSWS upper limit), and 29x lots at the southern end of the Lucas Block will have ~24 m head (marginally below the 25 m minimum). Given the close proximity to the reservoir and short distribution lengths, these are considered an acceptable departure from the standards.

The upper zone will be connected to the lower zone through a pressure reducing valve at RL85 as described above to increase network redundancy.

## 11.8 PROPOSED RESERVOIR

A new reservoir will provide the primary water supply to the development. The reservoir has been approved under a separate resource consent (RCA24215), granted on 3 February 2026 in conjunction with the northern landowners (Muri Road).

This consent authorises land use consent for the construction of a water supply reservoir with associated earthworks, reticulated water mains, a pumping station, accessway, and subdivision consent to create two infrastructure allotments accommodating the reservoir and pumping station.

The design and coordination of the reservoir works are being undertaken by Envelope Engineering. The reservoir is located on elevated land within the neighbouring Muri Road block to the north and is intended to service both the Mt Welcome and Muri Road developments.

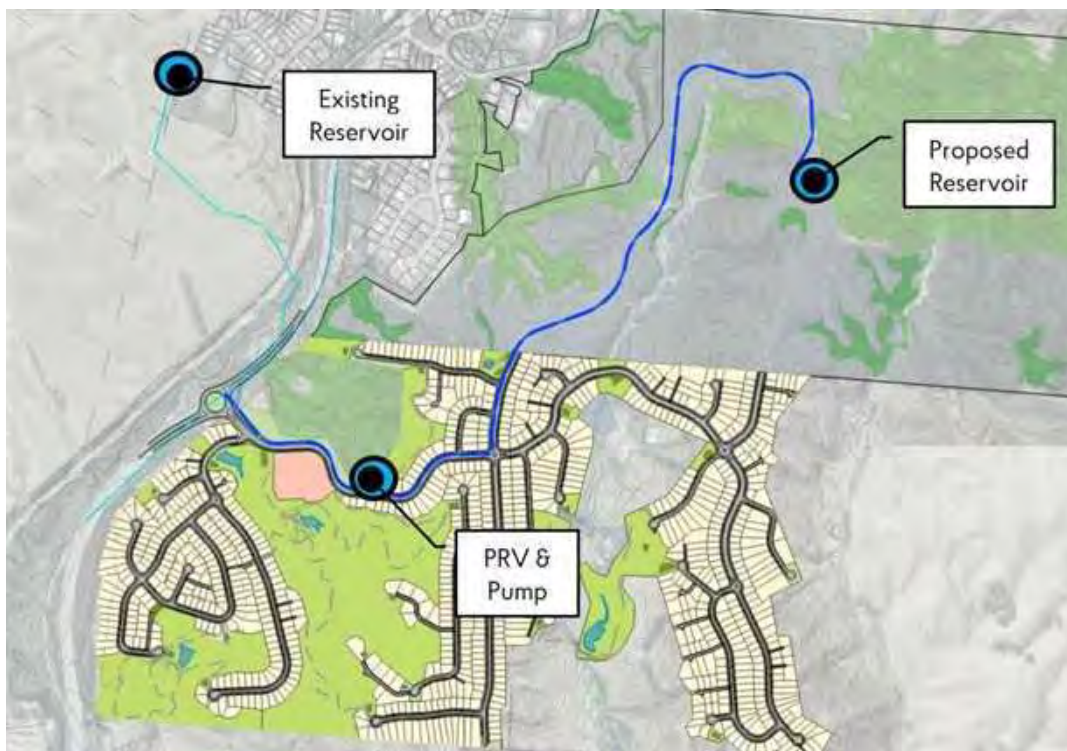


The following key design parameters are being adopted in the reservoir design:

- Primary supply to both Mt Welcome Upper Zone and Muri Road.
- 3.7 ML storage, sized to service up to ~1,500 lots (~900 Mt Welcome, ~600 Muri Road).
- Sizing based on RSWS assumptions: 3.5 occupants/dwelling and 700 L/person/day.
- Constructed at RL 180 with TWL RL 186; compliant service range RL 96–161.
- Final sizing and specifications to be confirmed at detailed design.

The later stages of the development within the upper zone will require the new reservoir to be constructed and commissioned before lots can be serviced, while the lower lots can be supplied from the existing Pukerua Bay reservoir, with commissioning of the new reservoir occurring concurrently with early-stage development.

The proposed location of the reservoir and connecting bulk main are shown in Figure X below. The final reservoir capacity and design parameters will be confirmed during detailed design in consultation with Wellington Water.



**Figure 27.** Proposed Bulk Network

The proposed reservoir and bulk main design can be found in Appendix 3.

### 11.8.1 PROPOSED BULK MAIN

Approximately 2.4 km of new public bulk main is required to connect the proposed reservoir to the existing bulk main along SH59. This proposed bulk main is being designed and consented under the same application as the reservoir. The following points summarize the proposed bulk watermain design.

1. Connect to the existing DN225 bulk main within the SH59 corridor adjacent to the site.
2. Install ~2,400m of DN225 main to provide bulk supply to the reservoir.
3. Construct a pump station at RL 90 to boost pressure in the bulk main to the reservoir operating level.
4. Provide an equipment building of approximately 6m × 4m to house the pumps and PRV.

The bulk main alignment runs within the Mt Welcome road reserve, then continues into the Muri Road site within a same planned road reserve. The road cross-section and location of the bulk main within the road



will be consistent across the boundaries. The route is being coordinated with the Muri Road developer and design team.

## **12.0 UTILITIES**

### **12.1 TELECOMMUNICATIONS**

We have initiated discussions with Tuatahi First Fibre and Chorus as two potential network operators. Both have confirmed through their initial high-level assessments that the existing fibre infrastructure along SH59 is sufficient to service the site. Conditional clearance letters have been issued and are included in Appendix 4 of this report.

### **12.2 EXISTING POWER**

An existing overhead power line traverses the site, with underground 11 kV cables connected at various pole locations. These cables are routed underground to service the individual dwellings within the development. Any realignment of existing services will be addressed during the detailed design phase.

### **12.3 PROPOSED POWER**

Envelope have had ongoing discussions with Wellington Electricity Limited (WEL) and Edison Consulting Group regarding options to service the development. It is recognised that power infrastructure is not yet in place, consistent with other services required to accommodate the fully developed site. Network reinforcement will be necessary and will need to be delivered alongside other developments and projects in the area.

To confirm the extent of network upgrades and associated costs, a High-Level Report (HLR) will be commissioned by Pukerua Property Group LP. This will assess the network and provide a concept design for power supply. A supporting letter from WEL has been provided in Appendix 4 of this report.

### **12.4 GAS**

No gas supply is proposed for the new residential or commercial areas.

## **13.0 CONCLUSION**

In summary, this report confirms that the site can be developed and adequately serviced subject to further engineering design, provided that the recommendations of this report are followed.

## **14.0 ADHERENCE TO THE EXPERT CONDUCT CODE.**

While this is not a matter before the Environment Court, the author of this report has read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 ('Code'). The author has complied with the Code in the preparation of this report.

The data, information, facts and assumptions the author has considered as part of this report are set out in this report. The reasons for the conclusions of the report are also set out in this report. Unless stated otherwise, this report is within the author's expertise and the author has not omitted to consider material facts known to him that might alter or detract from the opinions expressed.

## **15.0 LIMITATIONS**

This report has been prepared for the project described to us and its extent is limited to the scope of work agreed between the client and Envelope Engineering Limited. No responsibility is accepted by Envelope Engineering Limited or its directors, servants, agents, staff or employees for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.



# APPENDICES

**APPENDIX 1**  
**ENGINEERING PLANS**

The full drawing package is provided as a separate attachment.



WWW.ENVELOPE-ENG.CO.NZ

CLIENT:  
PUKERUA PROPERTY GROUP LP

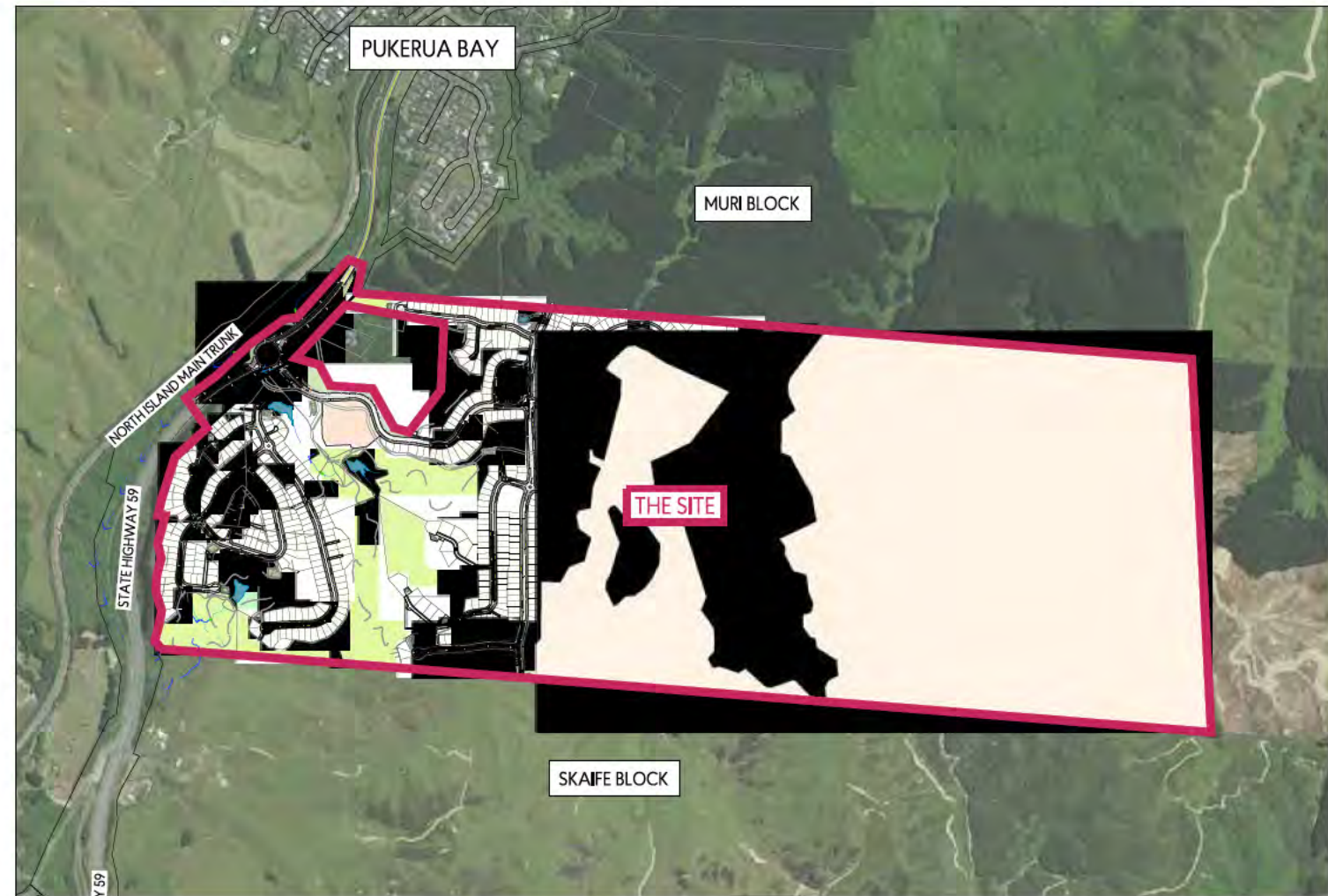
PROJECT:  
MT WELCOME  
PUKERUA BAY  
PORIRUA

PLAN SET:  
CIVIL ENGINEERING DRAWINGS

ISSUE:  
RESOURCE CONSENT

DATE:  
20th NOVEMBER 2025

REFERENCE:  
1753-02



LOCATION PLAN  
SCALE A3 - 1:8000



W W W . E N V E L O P E - E N G . C O . N Z

CLIENT:  
PUKERUA PROPERTY GROUP LP

PROJECT:  
MT WELCOME  
PUKERUA BAY  
PORIRUA

PLAN SET:  
CIVIL ENGINEERING DRAWINGS

ISSUE:  
RESOURCE CONSENT

DATE:  
20th NOVEMBER 2025

REFERENCE:  
1753-02

DRAWING INDEX		
MT WELCOME SITE PLANS		
DRAWING	REVISION	TITLE
1753-02-1000 to 1001	R1	SCHEME PLAN - EXISTING TITLE INFORMATION
1753-02-1004 to 1009	R1	SCHEME PLAN - SUPERLOT SUBDIVISION
1753-02-1010 to 1035	R1	SCHEME PLAN - PROPOSED DEVELOPMENT
1753-02-2000	R1	EXISTING CONTOURS OVERALL PLAN
1753-02-2100 to 2106	R1	PROPOSED CONTOUR PLANS - OVERALL
1753-02-2110 to 2130	R1	PROPOSED CONTOUR PLANS - DETAILED
1753-02-2150 to 2151	R1	PROPOSED CONTOUR PLANS - SURPLUS FILL ZONE
1753-02-2200 to 2206	R1	PROPOSED CUT/FILL CONTOUR PLANS - OVERALL
1753-02-2210 to 2230	R1	PROPOSED CUT/FILL CONTOUR PLANS - DETAILED
1753-02-2250	R1	PROPOSED CUT/FILL CONTOUR PLANS - SURPLUS FILL ZONE
1753-02-2280 to 2285	R1	PROPOSED EARTHWORKS CONCEPT STAGING PLANS
1753-02-2300 to 2309	R1	PROPOSED EROSION AND SEDIMENT CONTROL PLANS - OVERALL
1753-02-2400 to 2410	R1	PROPOSED EROSION AND SEDIMENT CONTROL PLANS - STAGE 1
1753-02-2450 to 2451	R1	PROPOSED EROSION AND SEDIMENT CONTROL PLANS - STAGE 1 TYPICAL DETAILS
1753-02-3000 to 3008	R1	PROPOSED ROADING PLANS - OVERALL LAYOUTS
1753-02-3100 to 3147	R1	PROPOSED ROADING PLANS - DETAILED LAYOUTS
1753-02-3200 to 3228	R1	PROPOSED ROAD LONG-SECTIONS PROFILES
1753-02-3300 to 3303	R1	PROPOSED ROAD TYPICAL CROSS-SECTIONS
1753-02-4000 to 4009	R1	PROPOSED DRAINAGE PLANS - OVERALL LAYOUTS
1753-02-4100 to 4158	R1	PROPOSED DRAINAGE PLANS - DETAILED LAYOUTS
1753-02-4200 to 4258	R1	PROPOSED DRAINAGE STORMWATER LONG-SECTIONS
1753-02-4300 to 4351	R1	PROPOSED STORMWATER ATTENUATION RETENTION WETLAND
1753-02-4400 to 4441	R1	PROPOSED DRAINAGE WASTERWATER LONG-SECTIONS
1753-02-4600	R1	PRE-DEVELOPMENT EXISTING STORMWATER CATCHMENT PLAN
1753-02-4650 to 4651	R1	POST-DEVELOPMENT PROPOSED STORMWATER CATCHMENT PLAN
1753-02-4900 to 4904	R1	PROPOSED TYPICAL DRAINAGE DETAILS
1753-02-5000 to 5007	R1	PROPOSED WATER & SERVICES PLANS - OVERALL LAYOUTS
1753-02-5100 to 5119	R1	PROPOSED WATER & SERVICES PLANS - DETAILED LAYOUTS
SH59 PLANS		
DRAWING	REVISION	TITLE
1753-02-8210 to 8214	R1	PROPOSED CONTOURS PLANS SH59
1753-02-8230 to 8234	R1	PROPOSED CUT/FILL CONTOURS PLANS SH59
1753-02-8240 to 8245	R1	PROPOSED EROSION AND SEDIMENT CONTROL PLANS SH59
1753-02-8300 to 8304	R1	PROPOSED ROADING PLANS SH59
1753-02-8400 to 8404	R1	PROPOSED DRAINAGE PLANS SH59
1753-02-8420 to 8421	R1	PROPOSED DRAINAGE SH59 STORMWATER LONG-SECTIONS
1753-02-8800 to 8802	R1	SH59 BULK WASTEWATER UPGRADES
1753-02-8850 to 8852	R1	SH59 BULK WASTEWATER UPGRADES - LONG-SECTION

**APPENDIX 2**  
**WASTEWATER HYDRAULIC MODEL REPORT**



# WASTEWATER HYDRAULIC MODEL REPORT

Mt Welcome

# DOCUMENT CONTROL RECORD

<b>CLIENT</b>	Pukerua Property Group LP
<b>PROJECT</b>	Mt Welcome
<b>PROJECT NO.</b>	1753-02
<b>DOCUMENT TYPE</b>	R004v1-1753-02 Wastewater Hydraulic Model Report
<b>DATE ISSUED</b>	21 November 2025
<b>ADDRESS FOR SERVICE</b>	Envelope Engineering Limited Level 1, 65 Cuba Street, Te Aro, Wellington
<b>CONTACT</b>	Kyle Dirse, Director <a href="mailto:kyle.dirse@envelope-eng.co.nz">kyle.dirse@envelope-eng.co.nz</a> +64 27 568 2788

# ISSUE AND REVISION RECORD

<b>DATE OF ISSUE</b>	21 November 2025
<b>STATUS</b>	Final 
<b>ORIGINATOR</b>	Miguel Hernandez – Senior Hydraulic Modeller 
<b>REVIEWED</b>	Andrew Jackson – Director, Civil 
<b>APPROVED FOR ISSUE</b>	Kyle Dirse – Director, Senior Civil Engineer



# CONTENTS

<b>1.0</b>	<b>INTRODUCTION</b> .....	<b>2</b>
<b>1.1</b>	<b>BACKGROUND</b> .....	<b>2</b>
<b>1.2</b>	<b>LOCATION</b> .....	<b>2</b>
<b>1.3</b>	<b>PROPOSED DEVELOPMENT</b> .....	<b>3</b>
<b>2.0</b>	<b>METHODOLOGY</b> .....	<b>3</b>
<b>2.1</b>	<b>WASTEWATER MODEL</b> .....	<b>3</b>
<b>2.2</b>	<b>CUT-OFF MODEL</b> .....	<b>3</b>
<b>3.0</b>	<b>MODEL DEVELOPMENT</b> .....	<b>4</b>
<b>3.1</b>	<b>OPERATION</b> .....	<b>4</b>
<b>3.2</b>	<b>DRY WEATHER PARAMETERS</b> .....	<b>5</b>
<b>3.3</b>	<b>WET WEATHER PARAMETERS</b> .....	<b>5</b>
<b>3.4</b>	<b>NGA NETWORK SCHEME</b> .....	<b>6</b>
<b>4.0</b>	<b>EXISTING SYSTEM PERFORMANCE</b> .....	<b>7</b>
<b>5.0</b>	<b>PROPOSED NETWORK DESIGN</b> .....	<b>8</b>
<b>5.1</b>	<b>PROPOSED NETWORK</b> .....	<b>8</b>
<b>5.2</b>	<b>MODELLED NETWORK</b> .....	<b>9</b>
<b>5.3</b>	<b>PUMP AND STORAGE</b> .....	<b>10</b>
<b>5.4</b>	<b>MOUNT WELCOME WWF MODEL RESULTS</b> .....	<b>11</b>
<b>5.5</b>	<b>MODEL - STAGING</b> .....	<b>11</b>
<b>5.6</b>	<b>BASE STAGE - ASSUMPTIONS</b> .....	<b>12</b>
<b>5.7</b>	<b>STAGING MODEL RESULTS</b> .....	<b>12</b>
<b>6.0</b>	<b>ALTERNATIVE OPTIONS</b> .....	<b>15</b>
<b>6.1</b>	<b>BULK NETWORK UPGRADES ONLY</b> .....	<b>15</b>
<b>6.2</b>	<b>ATTENUATION TANK ONLY</b> .....	<b>16</b>
<b>6.3</b>	<b>COMBINED NETWORK UPGRADES AND ATTENUATION</b> .....	<b>16</b>
<b>7.0</b>	<b>CONCLUSIONS</b> .....	<b>17</b>
<b>8.0</b>	<b>ADHERENCE TO THE EXPERT CONDUCT CODE</b> .....	<b>18</b>
<b>9.0</b>	<b>LIMITATIONS</b> .....	<b>18</b>

## APPENDICES

<b>APPENDIX 1</b>	<b>WASTEWATER DESIGN TABLES</b>
<b>APPENDIX 2</b>	<b>MT WELCOME NETWORK – MODEL RESULTS</b>
<b>APPENDIX 3</b>	<b>BULK NETWORK – MODEL RESULTS</b>
<b>APPENDIX 4</b>	<b>BULK NETWORK – MODEL RESULTS PROFILES</b>
<b>APPENDIX 5</b>	<b>WWL CORRESPONDENCE</b>



## FIGURES

Figure 1. Site Extents Plan – Entire Site.....	2
Figure 2. Cut off model extent. ....	4
Figure 3. Wet Weather Flow – Rainfall Time Series. ....	6
Figure 4. NGA Schema of The Provided Wastewater Model.....	7
Figure 5. Model catchments.....	8
Figure 6. Proposed Wastewater Network.....	10
Figure 7. Mount Welcome – Stage locations.....	12
Figure 8. Mt Welcome full development discharge for different storage duration .....	14

## TABLES

Table 1. Model Update – Operational Updates.....	4
Table 2. Dry Weather Parameters.....	5
Table 3. Wet Weather Parameters.....	5
Table 4. Network properties and model results for a WWF 2018 scenario.....	8
Table 5. Wastewater Catchment Description.....	9
Table 6. Modelled Network.....	9
Table 7. Designed Pump Stations and Storage.....	10
Table 8. Mount Welcome - WWF Model Results.....	11
Table 9. Mt Welcome Staging description.....	11
Table 10. Model Results WWF-2018 – Bulk network overflows.....	13
Table 11. Model Results WWF-2018 – Maximum Storage and Pump Station activation count.....	14
Table 12. Model Results WWF 2018 – Option with bulk network upgrade.....	15
Table 13. Model Results WWF 2018 – Option with PSI / attenuation tank.....	16
Table 14. Model Results WWF 2018 – Option with bulk upgrade and PSI.....	16



## 1.0 INTRODUCTION

### 1.1 BACKGROUND

The proposed development is located south of Pukerua Bay, within the Porirua Northern Growth Area. This land was rezoned as part of Council-led Plan Variation 1 to Plan Change 19 (PC19), which was notified in 2022 and is now operative.

This report addresses the wastewater modelling options and staging that could be utilised to service Mt Welcome Developments within the Northern Growth Area (NGA). This report should be read together with the infrastructure report (R001-v1-1753-02) to understand the proposed development scope.

### 1.2 LOCATION

The site is located at 422, 422A and 422B State Highway 59, Pukerua Bay, and encompasses a total area of 205.60 hectares. It formally comprises the following land parcels:

- Part Lot 1 DP 89102 (4.38 ha)
- Lot 2 DP 891020 (5.64 ha)
- Lot 1 DP 534864 (55.33 ha)
- Lot 2 DP 534864 (140.25 ha)
- Lot 1 DP 608433, Lot 1000 DP 608433 (34 Muri Road)
- Road Reserve (SH59 Corridor)

References to “the site” within this report refer collectively to all seven allotments, unless stated otherwise.

The site is situated in a rural area south of Pukerua Bay and north of Plimmerton, within the Porirua City boundaries in the Wellington region. It is bounded by State Highway 59 to the west and three adjoining land blocks to the north, east, and south.



Figure 1. Site Extents Plan – Entire Site.



## 1.3 PROPOSED DEVELOPMENT

The proposed development comprises 949 residential allotments ranging in size from 316m<sup>2</sup> to 2,386m<sup>2</sup>, enabling the construction of 949 future dwellings with an average lot size of around 523m<sup>2</sup>. The development also includes a commercial centre to serve the new local community, together with associated three-waters infrastructure (wastewater, including storage facilities; stormwater management systems; and water reticulation), roading, and a connected network of pedestrian and cycling trails.

## 2.0 METHODOLOGY

### 2.1 WASTEWATER MODEL

A Porirua City Council (PCC) wastewater hydraulic model has been developed by Wellington Water. This calibrated model was provided by WWL in May 2024, and it was used to assess effects of the proposed development on the downstream network, identify constraints and develop mitigation and upgrade options within the network. This allowed us to assess the wastewater network capacity, network performance, and proposed pump station storage requirements for the proposed development. With the model results it is possible to identify system constraints and confirm the upgrades required to service the development.

This model has the following features:

- Software and Version: Infoworks ICM 2024.5
- Extent: The model considered all the catchments associated with the Porirua City wastewater treatment plant (WTP).
- Network scenarios: The following scenarios were included in the System Performance network:
  - Base. Built with 2018 information.
  - Forecasting scenarios for an existing 2033 and 2068 population.
- The model considered long-term rainfall scenarios for the dry (DWF) and wet weather flows (WWF) as follows.
  - DWF: Seven days starting the 08 Jan 2006. No rain in this period
  - WWF: Three days of rainfall starting the 04 April 2017. Total model simulation 7 days.

For more detailed information about the hydraulic model, refer to the following documents:

- Cannons Creek and Porirua Long-Term Flow Monitoring - Model Calibration Report. By Wellington Water Limited. August 2018.
- System performance assessment – Porirua Wastewater Network. By Stantec for Wellington Water Limited. December 2018.

### 2.2 CUT-OFF MODEL

For this project assessment, the model was cut off to just consider the network upstream of the existing public pump station 07 (model ID S070000). It was decided to reduce the extent of the model to allow the level of detail to be increased in a defined area, while reducing the simulation computational time for optioneering purposes. The final model extent is seen in Figure 2 below.





Figure 2. Cut off model extent.

### 3.0 MODEL DEVELOPMENT

#### 3.1 OPERATION

Table 1 summarises the updates made to several pump stations relevant to the project. These changes reflect refinements to the model inputs and operational settings based on the latest information. Some parameters have been updated following correspondence with WWL, as referenced in Appendix 5.

Table 1. Model Update – Operational Updates.

	Provided Model	Updated Model
Muri Road Pump Station PS-30 Asset ID: WWPS230 Location: 12 Muri Road.	P1 – Duty: 3.0l/s On: 73.5mRL   Off: 72.96mRL P2: 5.0l/s On: 73.8mRL   Off: 72.96mRL Storage: 2.9 m <sup>2</sup>   4m height   11.6m <sup>3</sup> volume approx..	P1 – Duty: 6.0l/s On: 73.5mRL   Off: 72.96mRL P2: 12.0l/s On: 73.8mRL   Off: 72.96mRL Storage: No changes * Email from Alister O'Callagha.
Plimmerton Pump Station PS-13 Asset ID: WWPS31436	P1 – Duty: 30.0l/s On: -0.746mRL   Off: -1.342mRL P2: 71.0l/s On: -0.546mRL   Off: -1.342mRL Storage:	P1 – Duty: 68.0l/s On: -0.746mRL   Off: - 1.342mRL Storage: No changes

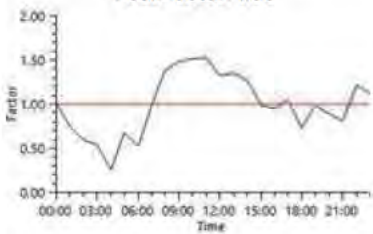
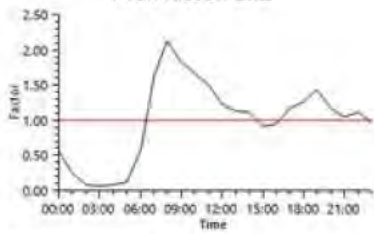


Location: 212 St Andrews Road	14.0 m <sup>2</sup>   5m height   70.0m <sup>3</sup> approx..	* Changes suggested by WWL (Manu Ward).
Paremata Pump Station PS-08 Asset ID: WWPS31410 Location: 106 St Andrews Road	P1 – Duty: 50.0l/s On: -1.319mRL   Off: -1.619mRL P2: 25.0l/s On: -0.919mRL   Off: -1.619mRL P3: 37.0l/s On: -0.819mRL   Off: -1.619mRL Storage: 8.0m <sup>2</sup>   4.5m height   36.0m <sup>3</sup> approx.	P1 – Duty: 62.0l/s On: -1.319mRL   Off: -1.619mRL P2: 20.0l/s On: -0.919mRL   Off: -1.619mRL Storage: No changes * Changes suggested by WWL (Manu Ward)

### 3.2 DRY WEATHER PARAMETERS

For the proposed draining areas, the model has been edited with the dry weather parameters shown in Table 2. Some of these values came from correspondence with WWL, see Appendix 5.

Table 2. Dry Weather Parameters.

	Provided Model	Proposed
Flow Per Capita	ID: 364055_S130201A_PLIMMERTON Flow: 177.348l/day	ID: Residential 200 Flow: 200.0l/day
Foul Profile	Peak factor: 1.53 	Peak factor: 2.12 
Population	As provided model for the scenario 2018 (Base scenario). Upstream PS30:	<b>Mu Rd Stage 2</b> 1750 population 500 lots <b>Mount Welcome</b> 3335 population 949 lots / 1 Commercial lot.
Base Flow	As provided model for the scenario 2018 (Base scenario).	Assume 0.1 l/ha for greenfield areas.

These changes have been shared with WWL through internal correspondence.

### 3.3 WET WEATHER PARAMETERS

For the proposed draining areas, the model has been edited with the wet weather parameters shown in Table 3. Some of these values came from correspondence with WWL, see Appendix 5.

Table 3. Wet Weather Parameters.

	Provided Model	Proposed	
Run Off	ID	364055_S130201A_PLIMMERTON	
	Run Off	RUNOFF NEW DEV	
	Run Off area – Road:	0.5%	Run Off area – Road: 0.2%
	Run Off area – pavement:	0.5%	Run Off area – pavement: 0.2%
	Run Off area – permeable:	3.2%	Run Off area – permeable: 2.0%
	Run Off area – GWI:	32%	Run Off area – GWI: 20%
		<i>Based on correspondence with WWL</i>	
Ground	ID	364055_S130201A_PLIMMERTON	
	Soil depth (m)	1	1



	Provided Model	Proposed
Percolation coefficient (days)	0.5	0.8
Percolation threshold (%)	20	20
Percolation percentage infiltrating (%)	10	5
Baseflow coefficient (days)	0.01	0.01

The model considers an observed rainfall time series database from 00:00 on 04 April 2017 to 24:00 on 10 April 2017 (7 days). During this period, there are nearly three days of rainfall with a peak intensity of 30.54mm/hr, see Figure 3.

The model period was extended to consider some dry weather flow.

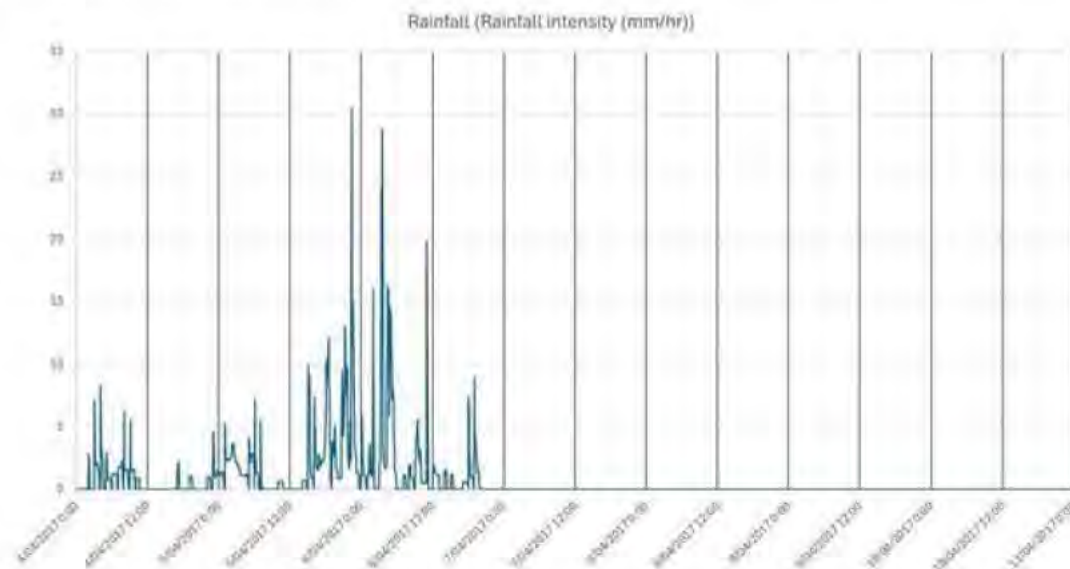


Figure 3. Wet Weather Flow – Rainfall Time Series.

### 3.4 NGA NETWORK SCHEME

Model results show that in the WWF, there are no overflows, see Appendix 2 for a base stage scenario. There were branches with a lack of capacity (surcharge state = 2), and they are located mainly from Pukerua 3 to Pukerua 8. Critical branches present a surcharge state larger than 1 at the branches Pukerua 3, 4, 9 and Plimmerton. It is evident that upstream of Pump Station 13 (PS13), the network has limited spare capacity. Other critical reach is located to the east of the pump station (along James Street), outside the main trunk line conveying flows toward Pukerua Bay. Overall, the existing network performs adequately under current (2018 baseline) conditions but has very limited available capacity to accommodate additional flows from the NGA without bulk upgrades. The following items represent key constraints within the network that limit upstream flows and future development capacity: shows the scheme used to evaluate the system performance of the existing public network. The level of service considered for this performance assessment corresponds to the existing scenario, the 2018 population for a WWF.



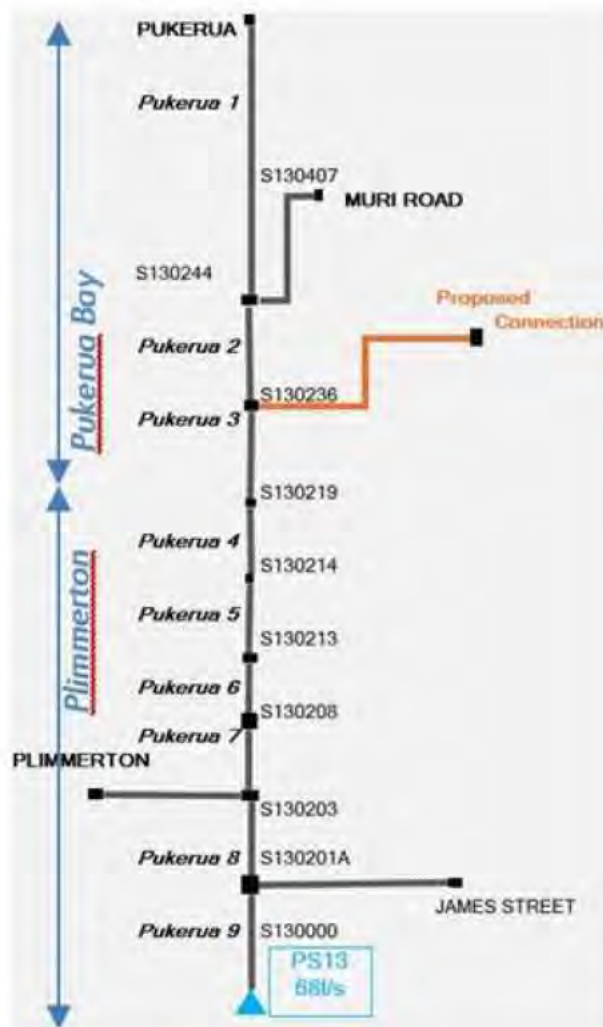


Figure 4. NGA Schema of The Provided Wastewater Model.

#### 4.0 EXISTING SYSTEM PERFORMANCE

Model results show that in the WWF, there are no overflows, see Appendix 2 for a base stage scenario. There were branches with a lack of capacity (surcharge state = 2), and they are located mainly from Pukerua 3 to Pukerua 8. Critical branches present a surcharge state larger than 1 at the branches Pukerua 3, 4, 9 and Plimmerton. It is evident that upstream of Pump Station 13 (PS13), the network has limited spare capacity. Other critical reach is located to the east of the pump station (along James Street), outside the main trunk line conveying flows toward Pukerua Bay. Overall, the existing network performs adequately under current (2018 baseline) conditions but has very limited available capacity to accommodate additional flows from the NGA without bulk upgrades. The following items represent key constraints within the network that limit upstream flows and future development capacity:

- Reduction of pipe diameters between the branch Pukerua 4, from 315mm to 250mm, between manholes S130231 (PCC\_W00792) and S130233 (PCC\_WW007936).
- Low gradient values. Pukerua 4 with 0.42% and 8 with 0.325%.
- Pipe capacity reduction. See branches Muri Rd3, Pukerua 3, 4, 7 and 8.

Table 4 shows the following constraints in the existing network (highlighted in red):



Table 4. Network properties and model results for a WWF 2018 scenario.

Network Properties							Model Results - WWF 2018 (April 04 to April 10, 2017)			
BRANCH	Min Diam (mm)	Max Diam (mm)	Min Gradient %	Max Gradient %	Min Full Capacity (L/s)	Max Full Capacity (L/s)	Max. Flow (l/s)	Acum Vol (m³)	Volume lost (m³)	Max SS*
Pukerua 2	250	250	1.40	5.38	71	140	46.8	8314	0	0.6
Pukerua 3	250	315	0.429	8.22	39	208	46.0	8320	0	1
Pukerua 4	250	375	0.423	1.02	39	179	44.0	8321	0	2
Pukerua 5	375	375	0.53	0.53	129	129	43.5	8313	0	0.4
Pukerua 6	375	375	0.52	1.00	128	177	43.5	8313	0	0.4
Pukerua 7	375	375	0.45	0.51	119	127	43.4	8316	0	0.49
Pukerua 8	375	375	0.325	0.425	101	115	55.2	9575	0	0.53
Pukerua 9	375	375	0.72	15.81	151	706	60.6	10258	0	1
Plimmerton	150	150	0.33	5.20	9	35	12.0	1258	0	2
James St	150	150	0.32	31.76	9	88	7.3	683	0	0.74

(\*) Surcharge State. 1 = Surcharge by depth (by backflow). 2 = surcharge by flow (by capacity)

## 5.0 PROPOSED NETWORK DESIGN

### 5.1 PROPOSED NETWORK

Given the undulating topography, the wastewater network has been designed as a predominantly gravity-based system, supported by six pump stations and several localised low-pressure areas. The catchments contributing to each pump station are illustrated in Figure 5. A detailed description of the proposed network layout is provided in the Civil Infrastructure Report (R001v1-1753-02).

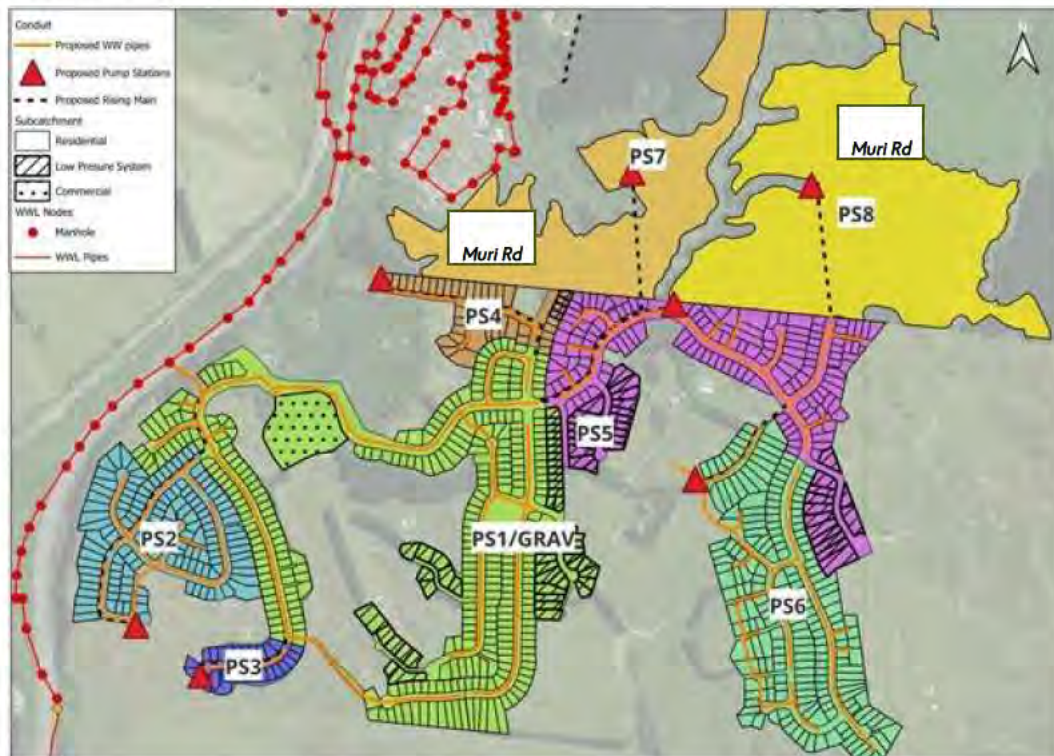


Figure 5. Model catchments.

The piped network is also designed to incorporate flows from the Muri Road development and convey them through this site to the SH59 bulk main. Collaborative discussions with the Muri Road project team are progressing to establish an integrated catchment solution.



Table 5 shows the main catchment descriptions for the wastewater design.

**Table 5. Wastewater Catchment Description.**

Asset ID	Gravity Area (ha)	Pressure Area (ha)	Gravity Lots	Pressure Lots	Yield (lots)	Population	Gravity Area (ha)
WWPS - 1	22.55	3.43	324	50	374	1309	22.55
WWPS - 2	8.90	0	136	0	136	476	8.90
WWPS - 3	1.71	0	27	0	27	94.5	1.71
WWPS - 4	3.03	0.15	38	4	42	147	3.03
WWPS - 5	10.83	3.16	139	32	171	598.5	10.83
WWPS - 6	13.83	0	203	0	203	710.5	13.83
WWPS - 7 Muri Rd West	15.25	0	250.0	0	250	875	15.25

## 5.2 MODELLED NETWORK

Table 6 summarises the wastewater network configuration adopted for the simulation. The proposed development ultimately discharges to the existing manhole PCC\_WW007923 (model ID S130236), as shown in Figure 6.

In the model, low-pressure lots are assumed to discharge directly into the final gravity manhole, and no infiltration flow has been applied to these catchments.

**Table 6. Modelled Network.**

<b>Nodes Total</b>	232
Manholes	217
Storage	7
Outfall	8
<b>Pipes</b>	222
Orifice Fixed	2
Pump Fixed	8
Pipe Length (m)	9000
Pipe Size (mm)	150 - 300
Length 300mm	74m
Length 225mm	1565m
Length 150mm	7361m
<b>Catchments</b>	956
Catchments Contributing Area (ha)	82.76
Catchments Population Count	5086



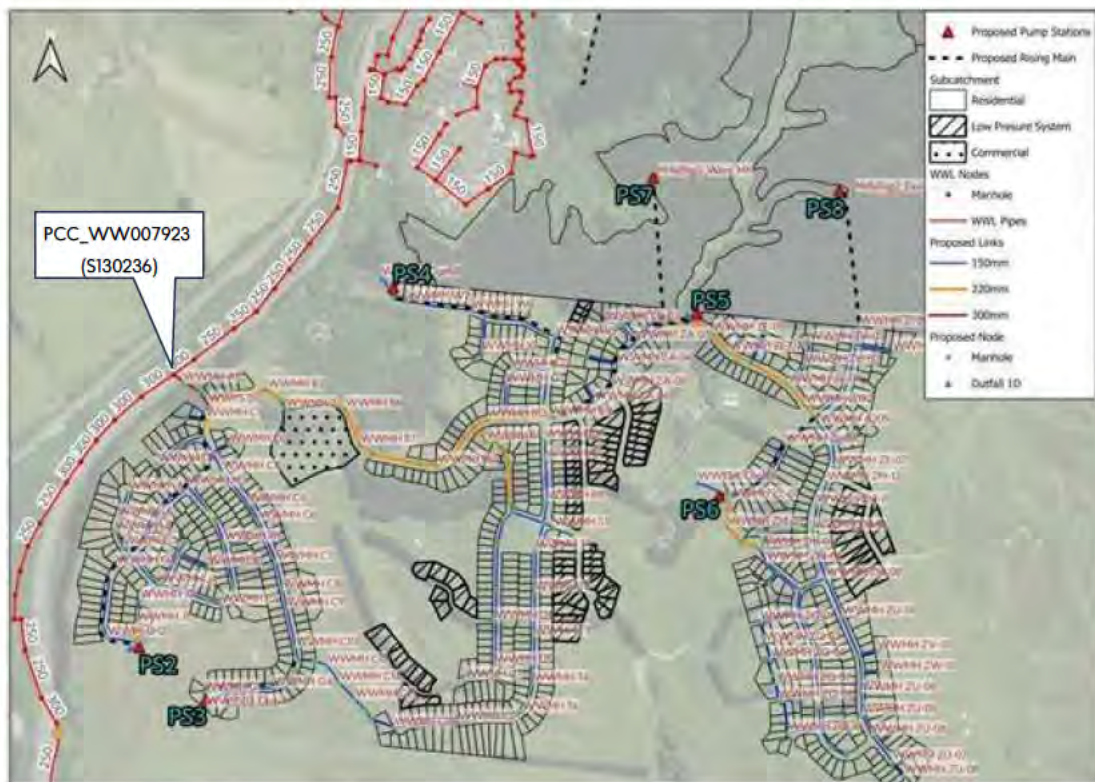


Figure 6. Proposed Wastewater Network.

### 5.3 PUMP AND STORAGE

Six wastewater pump stations are proposed across the Mt Wellington site. Five pump stations (PS2 to PS5) are designed solely to convey wastewater from local low points where gravity discharge is not achievable. Two pump stations (PS7 and PS8) were designed for the Muri East and West development, respectively. PS5 receives accumulated volume from other pump stations; from this, an accumulated ADWF has been included at the moment of the storage capacity. Pump Station 1 / attenuation tank (PS1) will serve as the primary peak wet-weather storage facility, providing the main attenuation function for the development prior to discharging to the existing bulk main. PS1 discharge rate will be controlled and rate-limited to align with the capacity of the downstream trunk network and the proposed bulk-main upgrades. Table 7 shows the proposed pump rates and wet well storage volumes. Appendix 1 includes the design calculation tables.

Table 7. Designed Pump Stations and Storage

Asset ID	Catchment	ADWF (l/s)	Acum. ADWF (l/s)	Design Storage [8hr] (m <sup>3</sup> )	Design Storage [12hr] (m <sup>3</sup> )	Design Storage [20hr] (m <sup>3</sup> )	No Pumps	Pump Rates (l/s)
WWPS - 1	Full Development	3.01	11.70	336.9	505.3	842.2	-	-
WWPS - 2	136 lots	1.09	=	31.5	47.3	78.8	1	6
WWPS - 3	27 lots	0.22	=	6.3	9.4	15.6	1	2
WWPS - 4	42 lots	0.34	=	9.7	14.6	24.3	1	2
WWPS - 5	171 lots	1.38	7.04	202.6	303.9	506.6	2	11 and 25
WWPS - 6	203 lots	1.63	=	47.1	70.6	117.7	1	7
(WWPS-7) Muri West*	250 lots	2.01	=	58.0	86.9	144.9	1	8.5
(WWPS-8) Muri East*	250 lots	2.01	=	58.0	86.9	144.9	1	8.5



## 5.4 MOUNT WELCOME WWF MODEL RESULTS

Appendix 2 shows a graph with the Mount Welcome model results for a level of service of WWF 2018. The model result shows that there is no overflow in the system, and the proposed network complies with the WWL specifications criteria in terms of velocity and capacity. The proposed development provides a peak discharge of approximately 56.24 L/s (14355m<sup>3</sup> during the simulation period), servicing 1449 residential lots and a commercial area.

**Table 8.** Mount Welcome - WWF Model Results.

Asset ID	Max WWF (L/s)	Max. Vol (m <sup>3</sup> )	[8hrs] Max Storage (m <sup>3</sup> )	[12hrs] Max Storage (m <sup>3</sup> )	[20hrs] Max Storage (m <sup>3</sup> )
WWPS - 1	51.39	14363	-	-	-
WWPS - 2	4.2	1200	33	82	79
WWPS - 3	1.06	229	7	16	16
WWPS - 4	1.43	395	20	25	24
WWPS - 5	29.25	8991	92	322	546
WWPS - 6	6.54	1885	49	123	118
(WWPS-7) Muri West	15.6	2745	84	159	145
(WWPS-8) Muri East	16.03	2795	89	168	145

## 5.5 MODEL - STAGING

The proposed Mount Welcome development was divided into 25 stages of approximately 30 to 50 lots, as seen in Figure 7 and these were grouped by the addition of a new proposed pump station. Table 9 summarise the accumulated number of lots.

**Table 9.** Mt Welcome Staging description.

Stages	Accumulated No of Lots	Proposed Infrastructure
1-7	301	Gravity Network (GN)
8-12	472	GN + PS2
13	501	GN + PS2 + PS3
14	542	GN + PS2 + PS3 + PS4
15-18	738	GN + PS2 + PS3 + PS4 + PS5
19-23	949	GN + PS2 + PS3 + PS4 + PS5 + PS6
24	949 + Muri 1 (1199)	GN + PS1 + PS2 + PS3 + PS4 + PS5 + PS6 + PS7
25	949 + Muri 2 (1449)	GN + PS1 + PS2 + PS3 + PS4 + PS5 + PS6 + PS7 + PS8



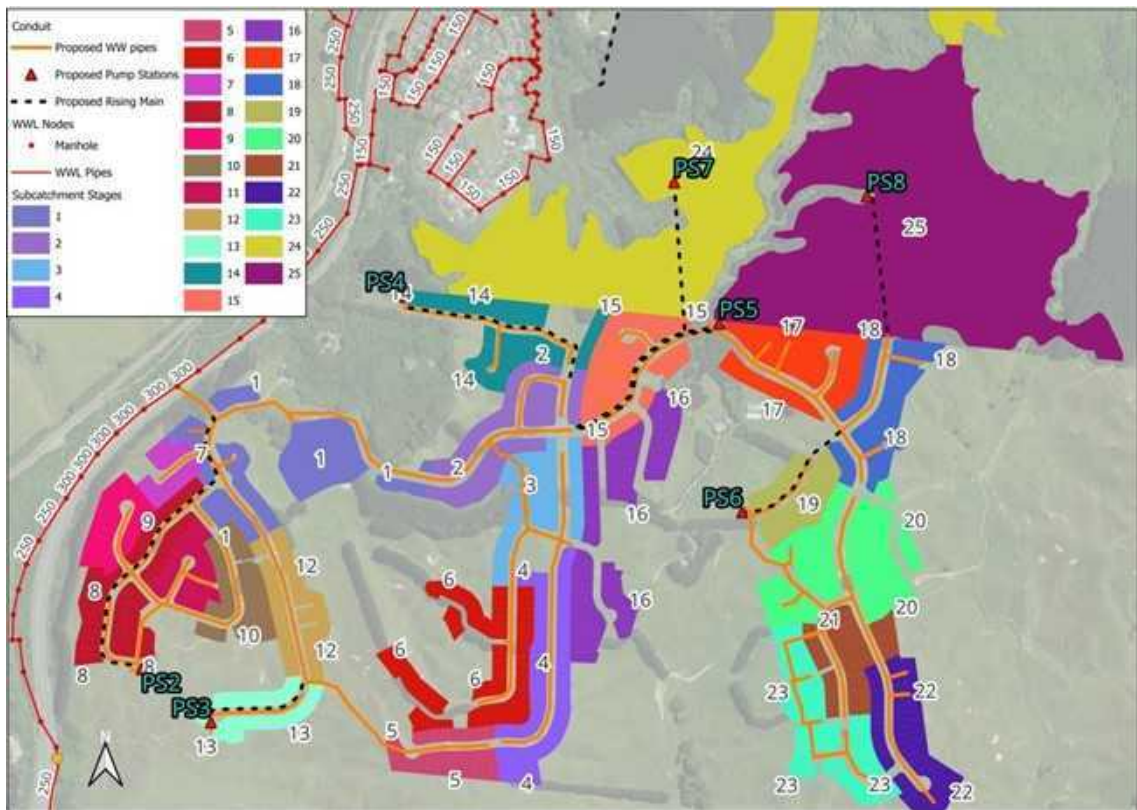


Figure 7. Mount Welcome – Stage locations

## 5.6 BASE STAGE - ASSUMPTIONS

The following are the main modelling assumptions for the assessment of wastewater impact:

- Population: 2018 population for all the stage scenarios around the catchment. These values were given in the provided model.
- Muri Road Development Stage 1: The development located at 34 Muri Road is not included in any of the stages. This development would discharge upstream pump station PS30.
- Plimmerton Farm development: This proposed development was not included into the assessment of the bulk main, due to the unknown development programme and the development discharging lower into the catchment. Development programmes are further detailed in the Infrastructure Report,

Appendix 3 and Appendix 4. shows the model results for the base stage scenario.

## 5.7 STAGING MODEL RESULTS

Table 10 shows the peak flows and the accumulated volume discharged into the existing network for the 8-, 12- and 20-hours storage duration together with the overflows in Pukerua Bay (between bulk manholes S130236 and S130218) and Plimmerton (manholes between S130218 and PS13). From the model results it is possible to confirm that just with the Mount Welcome development (stages 1 to 23) there is no overflows in the existing network, as soon as Muri Road development is included, both on-site storage and bulk network upgrades become essential to accommodate additional flows.

Under the full NGA development, total overflow volumes are approximately 360m<sup>3</sup>, 562m<sup>3</sup>, and 578 m<sup>3</sup> for the 8-, 12-, and 20-hour storage scenarios respectively, assuming no PSI attenuation or bulk upgrades. These differences arise from the way the internal pump stations at Mount Welcome discharge to the network—shorter storage durations result in more frequent pump activation, which reduces the peak load on the downstream system over time, as illustrated in Figure 8.



Table 10. Model Results WWF-2018 – Bulk network overflows.

Stage	Acum. No Lots	Proposed Infrastructure	Storage Vol. Duration	Mount Welcome Max Flow/Vol	Pukerua Bay Overflow	Plimmerton Overflow
1-12	472	Gravity network +PS2	8 hrs	15.7 l/s   4455 m <sup>3</sup>	None	None
			12 hrs	16.0 l/s   4475 m <sup>3</sup>		
			20 hrs	17.2 l/s   4420 m <sup>3</sup>		
1-14	542	Gravity network +PS2 +PS3+PS4	8 hrs	19.59 l/s   5093 m <sup>3</sup>	None	None
			19 hrs	19.3 l/s   5120 m <sup>3</sup>		
			20 hrs	20.6 l/s   5033 m <sup>3</sup>		
1-18	738	Gravity network +PS2+PS3+PS4+PS5	8 hrs	30.7 l/s   6854 m <sup>3</sup>	None	None
			12 hrs	28.1 l/s   6835 m <sup>3</sup>		
			20 hrs	27.3 l/s   6662 m <sup>3</sup>		
1-23	949	Gravity network +PS2+PS3+PS4+PS5+PS6 <i>See Appendix 3.</i>	8 hrs	31.26 l/s   8855 m <sup>3</sup>	None	None
			12 hrs	31.2 l/s   8831 m <sup>3</sup>		
			20 hrs	32.0 l/s   8778 m <sup>3</sup>		
1-24	1199	Gravity network +PS2+PS3+PS4+PS5 +PS6+PS7	8 hrs	55.9 l/s   11586 m <sup>3</sup>	[1] S130219 (96 m <sup>3</sup> )	None
			12 hrs	56.2 l/s   11535 m <sup>3</sup>	[1] S130219 (74 m <sup>3</sup> )	[3] S133404 (92 m <sup>3</sup> ), S130207 (61 m <sup>3</sup> ) and S130204 (47 m <sup>3</sup> )
			20 hrs	54.1 l/s   11382 m <sup>3</sup>	[1] S130219 (66 m <sup>3</sup> )	[3] S133404 (57 m <sup>3</sup> ), S130207 (33 m <sup>3</sup> ) and S130204 (10 m <sup>3</sup> )
1-25 FULL	1449	Gravity network +PS2+PS3+PS4+PS5 +PS6+PS7+PS8.  <i>See Appendix 3 and Appendix 4 for the full development scenario.</i>	8 hrs	56.3 l/s   14355 m <sup>3</sup>	[1] S130219 (193 m <sup>3</sup> )	[3] S133404 (84 m <sup>3</sup> ), S130207 (49 m <sup>3</sup> ) and S130204 (34 m <sup>3</sup> )
			12 hrs	54.4 l/s   14250 m <sup>3</sup>	[1] S130219 (189 m <sup>3</sup> )	[3] S133404 (192 m <sup>3</sup> ), S130207 (108 m <sup>3</sup> ) and S130204 (74 m <sup>3</sup> )
			20 hrs	56.2 l/s   14127 m <sup>3</sup>	[1] S130219 (187 m <sup>3</sup> )	[3] S133404 (204 m <sup>3</sup> ), S130207 (118 m <sup>3</sup> ) and S130204 (69 m <sup>3</sup> )



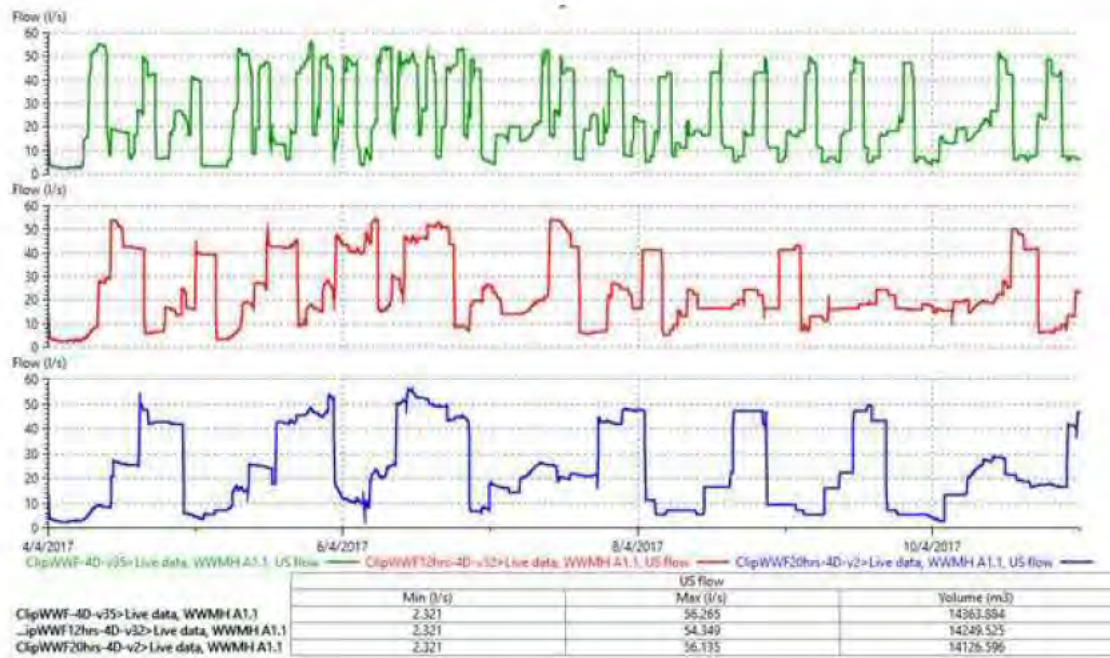


Figure 8. Mt Welcome full development discharge for different storage duration

Figure 8 illustrates the discharge profiles for each storage scenario—8 hours (green), 12 hours (red), and 20 hours (blue). While the total discharged volume is the same across all scenarios, the 8-hour storage option distributes flows more evenly, resulting in improved flow management from the site and preventing overflows within the bulk network.

Table 11 shows the maximum storage capacity per pump station and the pump activation count within the modelling period. Notice that the PS5 wet weather pump is needed when the Muri development is in place. Under this combined, fully developed NGA scenario, substantial storage capacity is required to manage peak wet-weather discharges as seen in the 20-hour duration for PS-5.

Table 11. Model Results WWF-2018 - Maximum Storage and Pump Station activation count.

	Storage Vol. Duration	Stage 1-12	Stage 1-14	Stage 1-18	Stage 1-23	Stage 1-24	Stage 1-25 [Full]
PS-2	8 hrs	33 m³ [24]	33 m³ [24]	33 m³ [24]	33 m³ [24]	33 m³ [24]	32 m³ [24]
	12 hrs	49 m³ [17]	49 m³ [17]	49 m³ [17]	49 m³ [17]	49 m³ [17]	49 m³ [17]
	20 hrs	82 m³ [11]	82 m³ [11]	82 m³ [11]	82 m³ [11]	82 m³ [11]	82 m³ [11]
PS-3	8 hrs	-	7 m³ [25]	7 m³ [25]	7 m³ [25]	7 m³ [25]	7 m³ [25]
	12 hrs	-	10 m³ [18]	10 m³ [18]	10 m³ [18]	10 m³ [18]	10 m³ [18]
	20 hrs	-	36 m³ [6]	36 m³ [6]	36 m³ [6]	6 m³ [6]	36 m³ [6]
PS-4	8 hrs	-	10 m³ [25]	10 m³ [25]	10 m³ [25]	10 m³ [25]	10 m³ [25]
	12 hrs	-	15 m³ [17]	15 m³ [17]	15 m³ [17]	15 m³ [17]	15 m³ [17]
	20 hrs	-	24 m³ [11]	24 m³ [11]	24 m³ [11]	24 m³ [11]	24 m³ [11]
PS-5	8 hrs	-	-	61 m³ [20] and [0]	61 m³ [16] and [0]	91 m³ [18] and [14]	92 m³ [16] and [25]
	12 hrs	-	-	196 m³ [7] and [0]	196 m³ [10] and [0]	321 m³ [6] and [3]	321 m³ [11] and [10]
	20 hrs	-	-	282 m³ [5] and [0]	282 m³ [8] and [0]	545 m³ [5] and [2]	545 m³ [8] and [8]
PS-6	8 hrs	-	-	-	49 m³ [21]	49 m³ [21]	49 m³ [21]
	12 hrs	-	-	-	74 m³ [15]	74 m³ [15]	74 m³ [15]
	20 hrs	-	-	-	123 m³ [21]	123 m³ [21]	123 m³ [21]
PS-7	8 hrs	-	-	-	--	83 m³ [19]	83 m³ [19]
	12 hrs	-	-	-	--	90 m³ [14]	90 m³ [14]
	20 hrs	-	-	-	--	160 m³ [9]	160 m³ [9]
PS-8	8 hrs	-	-	-	-	-	89 m³ [19]
	12 hrs	-	-	-	-	-	102 m³ [13]



Hydraulic modelling indicates that Mt Welcome can discharge via gravity without on-site attenuation at PS1 or bulk network upgrades if developed solely. This provides a peak discharge of approximately 31.26 L/s, servicing 949 residential lots and a commercial area. This scenario assumes no concurrent NGA development and demonstrates the feasibility of gravity servicing while deferring the need for large-scale storage infrastructure.

## 6.0 ALTERNATIVE OPTIONS

To address the constraints identified in Section 5, three mitigation approaches have been assessed:

- Bulk network upgrades only,
- On-site attenuation/storage only, and
- A combined approach using both bulk upgrades and storage at PS1.

Each option is summarised below, including the various internal pump-rate settings and storage configurations assessed.

### 6.1 BULK NETWORK UPGRADES ONLY

Under this option, development flows are mitigated solely by increasing the downstream conveyance capacity of the existing wastewater trunk main. No on-site attenuation is provided.

The following upgrades along the bulk network are considered:

- **Upgrade 1.** 210m of the existing DN225 wastewater main to DN375. This section follows the Ara Harakeke Pathway alignment, avoiding the trafficable off-ramp from SH59 to Airlie Road.
- **Upgrade 2.** 22m section of the existing DN225 wastewater main to DN375. Two approaches are being considered: either replacing the existing main in its current alignment or installing a new section within the SH59 berm
- **Upgrade 3.** The final stage of works involves upgrading approximately 163m of the existing DN225 main to DN375. This may be achieved either by replacing the existing pipe or by constructing a new bypass.

These upgrades will increase trunk-main capacity from 66 L/s to 93 L/s, providing an additional 27 L/s of conveyance and resulting in approximately 47 L/s of available capacity near Mt Welcome.

Table 12 shows some of the results after upgrades 1 to 3 and 1 to 4.

Table 12. Model Results WWF 2018 – Option with bulk network upgrade.

Stage	Proposed Solution	Mount Welcome Max Flow	Pukerua Bay Overflow	Plimmerton Overflow
1-24	v-2 Replace trunk pipe S130221.1, S130219.1, S130224, S130225 and S130226	55.6 [14355m <sup>3</sup> ]	None	[3] S133404 (14 m <sup>3</sup> ), S130207 (26 m <sup>3</sup> ) and S130204 (5 m <sup>3</sup> )
	v 30 Replace trunk pipe S130221.1, S130219.1, S130224, S130225 and S130226. Sealing S130207	55.6 [14355m <sup>3</sup> ]	None	[3] S133404 (28 m <sup>3</sup> ), and S130204 (16 m <sup>3</sup> )
1-25	v-2 Replace trunk pipe S130221.1, S130219.1, S130224, S130225 and S130226	55.6 [14355m <sup>3</sup> ]	None	[3] S133404 (126 m <sup>3</sup> ), S130207 (174 m <sup>3</sup> ) and S130204 (61 m <sup>3</sup> )
	v 31 Replace trunk pipe S130221.1, S130219.1, S130224, S130225 and S130226. <i>See Appendix 3.</i>	55.6 [14355m <sup>3</sup> ].	None	[3] S133404 (226 m <sup>3</sup> ), and S130204 (135 m <sup>3</sup> )



Residual overflows remain under full development scenarios. The approximate lost volume (spill) during the simulation period, with a development until stage 24 is 45 m<sup>3</sup>, and after the full development is 361 m<sup>3</sup>.

## 6.2 ATTENUATION TANK ONLY

This option manages development flows by throttling discharge at PSI and providing on-site attenuation storage before connection to the trunk network. No downstream bulk upgrades are undertaken.

A number of configurations have been simulated to optimise the volume of the tanks, and at the same time reduce the spill volume downstream and ensure the tank is emptied. These simulations are shown in Table 13. The use of this attenuation device is more effective in order to reduce overflows downstream.

Table 13. Model Results WWF 2018 – Option with PSI / attenuation tank.

Stage	Proposed Solution	Mount Welcome Max Flow	Pukerua Bay Overflow	Plimmerton Overflow
1-24	v-2 PSI-20l/s Grav: 15l/s Storage: 605 m <sup>3</sup>  360m <sup>2</sup>	35 l/s [11100m <sup>3</sup> ]	[1] S130219 (23 m <sup>3</sup> )	[3] S133404 (91 m <sup>3</sup> ), S130207 (80 m <sup>3</sup> ) and S130204 (20 m <sup>3</sup> )
	v-32 Grav: 27l/s +1 Storage: 697 m <sup>3</sup>   400 m <sup>2</sup>	28.l/s [10950m <sup>3</sup> ]	None	None
1-25	v-2 PSI-15l/s Grav: 12.1l/s Storage: 1936 m <sup>3</sup> .   400m <sup>2</sup>	27.1 l/s [14349m <sup>3</sup> ]	None	None
	v-32 Grav: 27l/s +1 Storage: 1584 m <sup>3</sup>   400 m <sup>2</sup> <i>See Appendix 3.</i>	28 l/s [13398m <sup>3</sup> ]	None	None

The use of this attenuation device is more effective than an upgrade only option in order to reduce overflows downstream.

## 6.3 COMBINED NETWORK UPGRADES AND ATTENUATION

This hybrid option utilises both upstream attenuation and targeted downstream upgrades to optimise performance and reduce reliance on very large tank volumes.

Table 14 summarises the assessment of various combinations of gravity discharge, pump discharge, and attenuation storage, along with the resulting overflows at key locations in the network.

Table 14. Model Results WWF 2018 – Option with bulk upgrade and PSI.

Stage	Proposed Solution	Mount Welcome Max Flow	Pukerua Bay Overflow	Plimmerton Overflow
1-24	v-2 PSI-20l/s Grav: 15l/s Storage: 605 m <sup>3</sup> Replacing bulk pipes (1 to 3).	35 l/s [11100m <sup>3</sup> ]	[1] S130219 (23 m <sup>3</sup> )	[3] S133404 (91 m <sup>3</sup> ), S130207 (80 m <sup>3</sup> ) and S130204 (20 m <sup>3</sup> )
	v34 Grav: 27l/s +1 Storage: 688 m <sup>3</sup> Replacing bulk pipes (1 to 4).	28.L/S 10960m <sup>3</sup>	None	None
1-25	v-10 PSI-0l/s Grav: 40+2 l/s Storage: 377 m <sup>3</sup> Replacing bulk pipes (1 to 3). <i>See Appendix 3.</i>	42.2 l/s [14435m <sup>3</sup> ]	None	S133404 (79 m <sup>3</sup> ) S130207 (42 m <sup>3</sup> ) and S130204 (33 m <sup>3</sup> )



Stage	Proposed Solution	Mount Welcome Max Flow	Pukerua Bay Overflow	Plimmerton Overflow
v-17	PS1-0l/s Grav: 40+1 l/s Storage: 457 m <sup>3</sup> Replacing bulk pipes (1 to 3).	41.3 l/s [14081m <sup>3</sup> ]	None	S133404 (91 m <sup>3</sup> ) S130207 (33 m <sup>3</sup> ) and S130204 (30 m <sup>3</sup> )
v-19	Grav: 30+5 l/s Storage: 635 m <sup>3</sup> Replacing bulk pipes (1 to 4). <i>See Appendix 3.</i>	36/14296m <sup>3</sup>	None	S133404 (61 m <sup>3</sup> ) and S130204 (3 m <sup>3</sup> )
v-23	Grav: 30l/s +1 Storage: 826 m <sup>3</sup> Replacing bulk pipes (1 to 4).	31l/s/11871 [P1-SPILL]	None	S133404 (37 m <sup>3</sup> ) and S130204 (20 m <sup>3</sup> )
v-25	Grav: 25l/s +0.5 Storage: 1033 m <sup>3</sup> Replacing bulk pipes (1 to 4).	25.5L/S 12986m <sup>3</sup> [P1-SPILL]	None	None
v-28	Grav: 27l/s +1 Storage: 1241 m <sup>3</sup> Replacing bulk pipes (1 to 4).	28.55L/S 13304m <sup>3</sup> [P1-SPILL]	None	None /S133404 (3 m <sup>3</sup> )
v30	Grav: 27l/s +1 Storage: 1587 m <sup>3</sup> Replacing bulk pipes (1 to 4). <i>See Appendix 3. and Appendix 4.</i>	28.L/S 13398m <sup>3</sup>	None	None

## 7.0 CONCLUSIONS

### General Conclusions:

- Unsteady-flow modelling provides a more accurate representation of the existing network's performance under the assumptions outlined in Section 9.1
- The wet weather flows with historic rainfall data reflect a better representation of the inflows and infiltration within the wastewater network.
- The modelling outputs have been used to develop a compliant wet-weather network design, incorporating six pump stations that meet the following standards:
  - Regional Standard for Water Services, RSWS, Version 3.0.
  - Regional Wastewater Model Specification: Modelling Specifications – Draft 2020
  - Wellington Water's Pressure Sewer Design Guide and Water Services Association of Australia WSA 0716.

### Staging Key Conclusions:

- The full development discharges a peak flow of 56.2 l/s servicing 1449 residential lots and a commercial area (1.7 ha). The final discharged manhole is PCC\_WW007923 (model ID S130236). This peak flow considers the fully developed Mount Welcome internal design, where pump rates and storage volumes are critical to end up with this value. This flow and volume impact the existing wastewater network, generating a total overflow of 389m<sup>3</sup>, see Table 10. This assessment does not include any attenuation or storage at PS1, nor does it account for bulk network upgrades.
- The Mount Welcome development, excluding Muri Road Stage 2, can discharge a peak gravity flow of approximately 32 L/s without impacting the downstream network or creating any new overflows
- Including the Muri Road development, both on-site storage and bulk network upgrades become essential to accommodate fully developed flows.
- An assessment of different pump storage duration designs was undertaken, providing more confidence in the proposed wastewater design. The 8-hour storage duration for the proposed pump stations results in a lower impact on the downstream network, as seen in Figure 8 and Table 10.



- The bulk upgrade option increases the capacity in the Porirua Bay reaches (near to Mt Welcome); however, this allows more flow going down where the network near PS13 turns more critical. The bulk upgrades essentially move the overflows from Pukerua Bay to Plimmerton with a maximum overflow volume of 361m<sup>3</sup>, if attenuation at PS1 is not considered, see Table 12.
- Using PS1, or an attenuation device upstream of the discharge point, is the most effective option for reducing downstream overflows. This approach can reduce peak flows from 56.2 L/s to approximately 28 L/s, keeping the system within critical capacity without further upgrades to the existing network and without causing downstream spills. However, the required storage volume for this device is significant, and at larger sizes it becomes impractical as a standalone solution.
- A combination of bulk upgrades and on-site storage within PS1 can limit the site discharge to 28 L/s and prevent overtopping in the bulk network upstream of PS13. For the fully developed site, this approach would require approximately 1,590m<sup>3</sup> of storage.
- Alternatively, combining bulk upgrades with on-site storage to limit discharge to 42 L/s reduces the required PS1 storage volume to 380m<sup>3</sup>. However, this scenario results in some overtopping in the downstream network near Plimmerton. These effects could be mitigated through additional downstream upgrades or network sealing, which should be considered when it becomes critical in later development stages.

## 8.0 ADHERENCE TO THE EXPERT CONDUCT CODE.

While this is not a matter before the Environment Court, the author of this report has read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 ('Code'). The author has complied with the Code in the preparation of this report.

The data, information, facts and assumptions the author has considered as part of this report are set out in this report. The reasons for the conclusions of the report are also set out in this report. Unless stated otherwise, this report is within the author's expertise, and the author has not omitted to consider material facts known to him that might alter or detract from the opinions expressed.

## 9.0 LIMITATIONS

This report has been prepared for the project described to us and its extent is limited to the scope of work agreed between the client and Envelope Engineering Limited. No responsibility is accepted by Envelope Engineering Limited or its directors, servants, agents, staff or employees for the accuracy of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.



# APPENDICES

**APPENDIX 1**  
**WASTEWATER DESIGN TABLES**

Client	Classic developments NZ Ltd
Project Site	Mt Welcome SH 59 - Pukerua Bay- Porirua
Envelope Ref	1753-02
Version	1
Date	30/10/2025



### WASTEWATER MAXIMUM DEVELOPMENT FLOWS - PUMPSTATION

#### WWPS 1 STORAGE

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	324.00	50.00	374.00		WWPS 1 - Residential
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	3.877	1.000	-		Wellington 5.3.2.1
Total ADWF	2.608	0.403	3.011	litres/second	Ave Dry Weather Flow
Total PDWF	10.112	0.403	10.515	litres/second	Peak Dry Weather Flow
Total PWWF	12.175	0.403	12.577	litres/second	Peak Wet Weather Flow
Catchment Area	22.55	3.43	25.98	ha	
Pipe Length	3.38	0.00	3.38	km	
Total Discharge used for pipe sizing L/s) =					12.68

#### WWPS 2

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	136	0	136.00		WWPS 2 - Residential
People per dwelling	3.500	-	-		Assumed max occupants per unit
ADWF per person	0.002	-	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.670	1.000	-		Wellington 5.3.2.1
Total ADWF	1.095	-	1.095	litres/second	Ave Dry Weather Flow
Total PDWF	5.112	-	5.112	litres/second	Peak Dry Weather Flow
Total PWWF	5.867	-	5.867	litres/second	Peak Wet Weather Flow
Catchment Area	8.90	-	8.90	ha	ha
Pipe Length	1.24	0.00	1.24	km	km
Total Discharge used for pipe sizing L/s) =					5.87

#### WWPS 3

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	27	0	27.00		WWPS 3 - Residential
People per dwelling	3.500	-	-		Assumed max occupants per unit
ADWF per person	0.002	-	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	6.495	1.000	-		Wellington 5.3.2.1
Total ADWF	0.217	-	0.217	litres/second	Ave Dry Weather Flow
Total PDWF	1.412	-	1.412	litres/second	Peak Dry Weather Flow
Total PWWF	1.532	-	1.532	litres/second	Peak Wet Weather Flow
Catchment Area	1.71	-	1.71	ha	ha
Pipe Length	0.20	0.00	0.20	km	km
Total Discharge used for pipe sizing L/s) =					1.53

#### WWPS 4

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	38	4	42.00		WWPS 4 - Residential
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	5.793	1.000	-		Wellington 5.3.2.1
Total ADWF	0.306	0.032	0.338	litres/second	Ave Dry Weather Flow
Total PDWF	1.772	0.032	1.804	litres/second	Peak Dry Weather Flow
Total PWWF	2.042	0.032	2.075	litres/second	Peak Wet Weather Flow
Catchment Area	3.03	0.15	3.18	ha	ha
Pipe Length	0.44	0.00	0.44	km	km
Total Discharge used for pipe sizing L/s) =					2.04

#### WWPS 5

Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	139	32	171.00		WWPS 5 - Residential
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.490	1.000	-		Wellington 5.3.2.1
Total ADWF	1.119	0.258	1.377	litres/second	Ave Dry Weather Flow
Total PDWF	5.024	0.258	5.281	litres/second	Peak Dry Weather Flow
Total PWWF	5.915	0.258	6.173	litres/second	Peak Wet Weather Flow
Catchment Area	10.83	3.16	13.99	ha	ha
Pipe Length	1.46	0.00	1.46	km	km
Total Discharge used for pipe sizing L/s) =					5.91

WWPS 6					
Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	203.00	0.00	203.00		WWPS 6 - Residential
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.275	1.000	-		Wellington 5.3.2.1
Total ADWF	1.634		1.634	litres/second	Ave Dry Weather Flow
Total PDWF	6.987		6.987	litres/second	Peak Dry Weather Flow
Total PWWF	8.104		8.104	litres/second	Peak Wet Weather Flow
Catchment Area	13.83	0.00	13.83	ha	ha
Pipe Length	1.83	0.00	1.83	km	km
Total Discharge used for pipe sizing L/s) =					8.10

WWPS MrRdStg2West					
Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	250.00	0.00	250.00		WWPS MrRdStg2West - Residential
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.193	1.000	-		Wellington 5.3.2.1
Total ADWF	2.013		2.013	litres/second	Ave Dry Weather Flow
Total PDWF	8.438		8.438	litres/second	Peak Dry Weather Flow
Total PWWF	15.879		15.879	litres/second	Peak Wet Weather Flow
Catchment Area	15.25	0.00	15.25	ha	ha
Pipe Length	12.20	0.00	12.20	km	km
Total Discharge used for pipe sizing L/s) =					15.88

WWPS MrRdStg2East					
Development	Gravity	Pressure	Total	Units	Comments
Number of dwellings	250.00	0.00	250.00		WWPS MrRdStg2East - Residential
People per dwelling	3.500	3.500	-		Assumed max occupants per unit
ADWF per person	0.002	0.002	-	litres/s	Wellington 5.3.1.3
Peaking factor PF	4.163	1.000	-		Wellington 5.3.2.1
Total ADWF	2.013		2.013	litres/second	Ave Dry Weather Flow
Total PDWF	8.378		8.378	litres/second	Peak Dry Weather Flow
Total PWWF	16.089		16.089	litres/second	Peak Wet Weather Flow
Catchment Area	15.80	0.00	15.80	ha	ha
Pipe Length	12.64	0.00	12.64	km	km
Total Discharge used for pipe sizing L/s) =					16.09



Client: Class c developments NZ Ltd  
 Project Site: Mt Welcome SH 59 - Pukerua Bay- Poi rua  
 Envelope Ref: 1753-02  
 Version: 1  
 Date: 13/11/2025



**WASTEWATER MAXIMUM DEVELOPMENT FLOWS - STORAGE DIMENSIN**

**CONCEPT WASTEWATER SIZING**

Pump Station	REQUIREMENTS				NTWK PROPERTIES								STORAGE / WET WELL PROPERTIES								PUMP STATION							
	Cumulative ADWF litres/second	PDWF litres/second	PWWF litres/second	Storage Required (hours)	Total Storage Required (L)	Total Storage Required (m3)	Wet Well Ground Level [mRL]	Discharge Invert Level [mRL]	Discharge Pipe Slope [%]	Discharge Pipe Length	Discharge Pipe Diam [mm]	Depth to US Sffit [m]	Storage Type	Number Wet Well	Diam (m)	Length (m)	Width (m)	Area Storage [m²]	Height (Above Pump Start Level) [m]	Permanent Wet Well Height [m]	Free Level (m)	Total Height (m)	New Floor Level	Invert Outfall Pipe [mm]	Switch ON Level [mRL]	Switch OFF Level [mRL]	Pump Rate (l/s)	Pump Rate (m³/s)
Pumpstat on 1	11.70	19.20	32.0	8.0	336863.5	336.9	59.074	56.502	0.75%	6.70	300	2.22	RECT	1	1	15	5	75.00	4.49	0.1	2.22	6.8	52.26	56.85	56.85	52.36	20.00	0.020
Pumpstat on 2	1.09	5.11	5.9	8.0	31530.2	31.6	52.915	50.302	1.00%	15.00	300	2.16	CIRC	1	3.5			9.62	3.28	0.1	2.16	5.5	47.37	50.75	50.75	47.47	6.00	0.006
Pumpstat on 3	0.22	1.41	1.5	8.0	6259.7	6.3	62.787	60.649	1.50%	13.50	300	1.64	CIRC	1	2.5			4.91	1.28	0.1	1.64	3.0	59.77	61.15	61.15	59.87	2.00	0.002
Pumpstat on 4	0.34	1.80	2.1	8.0	9737.3	9.7	83.784	82.309	1.50%	19.50	300	1.00	CIRC	1	2.5			4.91	1.98	0.1	1.00	3.1	80.70	82.78	82.78	80.80	2.00	0.002
Pumpstat on 5	7.04	10.94	17.1	8.0	202628.2	202.6	109.771	107.502	2.00%	7.50	300	1.82	CIRC	3	3.2			72.38	2.8	0.1	1.82	4.7	105.05	107.95	107.95	105.15	11.00	0.011
Pumpstat on 6	1.63	6.99	8.1	8.0	47063.5	47.1	110.627	107.892	2.00%	10.00	300	2.24	CIRC	2	2.5			19.63	2.4	0.1	2.24	4.7	105.89	108.39	108.39	105.99	7.00	0.007
Pumpstat on 7	2.01	8.44	15.9	8.0	57960.0	58.0	96.5	94.5	1.00%	10.00	300	1.60	CIRC	2	3			28.27	2.05	0.1	1.60	3.8	92.75	94.90	94.90	92.85	8.50	0.009
Pumpstat on 8	2.01	8.38	16.1	8.0	57960.0	58.0	132.5	130.5	1.00%	10.00	300	1.60	CIRC	2	3			28.27	2.05	0.1	1.60	3.8	128.75	130.90	130.90	128.85	8.40	0.008

Client: Class c developments NZ Ltd  
 Project Site: Mt Welcome SH 59 - Pukerua Bay - Porirua  
 Envelope Ref: 1753-02  
 Version: 1  
 Date: 13/11/2025



**WASTEWATER MAXIMUM DEVELOPMENT FLOWS - STORAGE DIMENSION**

**CONCEPT WASTEWATER SIZING**

Pump Station	REQUIREMENTS				NTWK PROPERTIES							STORAGE / WET WELL PROPERTIES								PUMP STATION								
	Cumulative ADWF litres/sec	PDFW litres/sec	PWWF litres/sec	Storage Required (hours)	Total Storage Required (L)	Total Storage Required (m3)	Wet Well Ground Level (mRL)	Discharge Invert Level (mRL)	Discharge Pipe Slope (%)	Discharge Pipe Length	Discharge Pipe Diam (mm)	Depth to US Suffix (m)	Storage Type	Number Wet Well	Diam (m)	Length (m)	Width (m)	Area Storage (m²)	Height (Above Pump Start Level) (m)	Permanent Wet Well Height (m)	Free Level (m)	Total Height (m)	New Floor Level	Invert Outfall Pipe (mm)	Switch ON Level (mRL)	Switch OFF Level (mRL)	Pump Rate (L/s)	Pump Rate (m³/s)
Pumpstation 1	11.70	19.20	32.0	12.0	505295.3	505.3	59.074	56.502	0.75%	6.70	300	2.22	RECT	1	1	25	10	250.00	2.02	0.1	2.22	4.3	54.73	56.85	56.85	54.83	20.00	0.020
Pumpstation 2	1.09	5.11	5.9	12.0	47295.4	47.3	52.915	50.302	1.00%	15.00	300	2.16	CIRC	2	2.5			19.63	2.41	0.1	2.16	4.7	48.24	50.75	50.75	48.34	6.00	0.006
Pumpstation 3	0.22	1.41	1.5	12.0	9389.5	9.4	62.787	60.649	1.50%	13.50	300	1.64	CIRC	1	2.2			3.80	2.47	0.1	1.64	4.2	58.58	61.15	61.15	58.68	2.00	0.002
Pumpstation 4	0.34	1.80	2.1	12.0	14605.9	14.6	83.784	82.309	1.50%	19.50	300	0.88	CIRC	1	2.5			4.91	2.98	0.1	0.88	4.0	79.82	82.90	82.90	79.92	2.00	0.002
Pumpstation 5	7.04	10.94	17.1	12.0	303942.2	303.9	109.771	107.502	2.00%	7.50	300	1.82	RECT	1	1	15	8	120.00	2.53	0.1	1.82	4.4	105.32	107.95	107.95	105.42	11.00	0.011
Pumpstation 6	1.63	6.99	8.1	12.0	70595.3	70.6	110.627	107.892	2.00%	10.00	300	2.24	CIRC	3	2.2			34.21	2.06	0.1	2.24	4.4	106.23	108.39	108.39	106.33	7.00	0.007
Pumpstation 7	2.01	8.44	15.9	12.0	86940.0	86.9	96.5	94.5	1.00%	10.00	300	1.60	CIRC	2	3			28.27	3.07	0.1	1.60	4.8	91.73	94.90	94.90	91.83	8.50	0.009
Pumpstation 8	2.01	8.38	16.1	12.0	86940.0	86.9	132.5	130.5	1.00%	10.00	300	1.60	CIRC	2	3			28.27	3.07	0.1	1.60	4.8	127.73	130.90	130.90	127.83	8.40	0.008

Client: Class c developments NZ Ltd  
 Project Site: Mt Welcome SH 59 - Pukerua Bay- Porua  
 Envelope Ref: 1753-02  
 Version: 1  
 Date: 13/11/2025



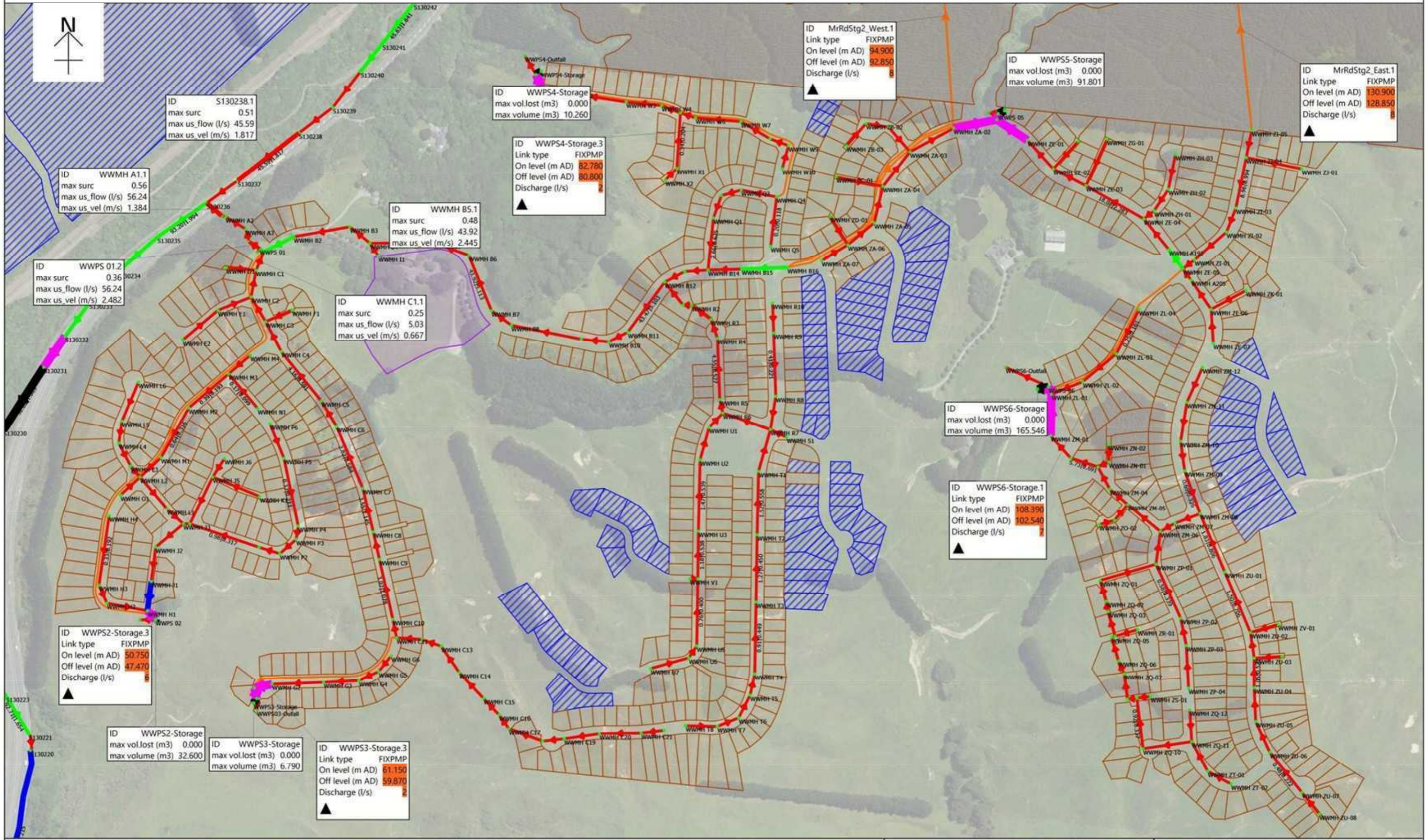
**WASTEWATER MAXIMUM DEVELOPMENT FLOWS - STORAGE DIMENSIN**

**CONCEPT WASTEWATER SIZING**

Pump Station	REQUIREMENTS						NTWK PROPERTIES						STORAGE / WET WELL PROPERTIES										PUMP STATION					
	Cumulative ADWF litres/sec	PDWF litres/sec	PWWF litres/sec	Storage Required (hours)	Total Storage Required (L)	Total Storage Required (m3)	Wet Well Ground Level [mRL]	Discharge Invert Level [mRL]	Discharge Pipe Slope [%]	Discharge Pipe Length	Discharge Pipe Diam [mm]	Depth to US Soffit [m]	Storage Type	Number Wet Well	Diam [m]	Length [m]	Width [m]	Area Storage [m²]	Height (Above Pump Start Level) [m]	Permanent Wet Well Height [m]	Free Level [m]	Total Heigh [m]	New Floor Level	Invert Outfall Pipe [mm]	Swiath ON Level [mRL]	Swiath OFF Level [mRL]	Pump 1 Rate [l/s]	Pump 1 Rate [m³/s]
Pumpstat on 1	11.70	19.20	32.0	20.0	842159	842	59.1	56.5	0.75%	6.70	300	2.22	RECT	1	1	30	12	360.00	2.34	0.1	2.22	4.7	54.41	56.85	56.85	54.51	20.00	0.020
Pumpstat on 2	1.09	5.11	5.9	20.0	78826	79	52.9	50.3	1.00%	15.00	300	2.16	CIRC	2	3.2			32.17	2.45	0.1	2.16	4.7	48.20	50.75	50.75	48.30	6.00	0.006
Pumpstat on 3	0.22	1.41	1.5	20.0	15649	16	62.8	60.6	1.50%	13.50	300	1.64	CIRC	1	3			7.07	2.21	0.1	1.64	3.9	58.84	61.15	61.15	58.94	2.00	0.002
Pumpstat on 4	0.34	1.80	2.1	20.0	24343	24	83.8	82.3	1.50%	19.50	300	0.88	CIRC	1	3			7.07	3.44	0.1	0.88	4.4	79.36	82.90	82.90	79.46	2.00	0.002
Pumpstat on 5	7.04	10.94	17.1	20.0	506570	507	109.8	107.5	2.00%	7.50	300	1.82	RECT	1	1	25	10	250.00	2.03	0.1	1.82	4.0	105.82	107.95	107.95	105.92	11.00	0.011
Pumpstat on 6	1.63	6.99	8.1	20.0	117659	118	110.6	107.9	2.00%	10.00	300	2.24	RECT	1	1	10	5	50.00	2.35	0.1	2.24	4.7	105.94	108.39	108.39	106.04	7.00	0.007
Pumpstat on 7	2.01	8.44	15.9	20.0	144900	145	96.5	94.5	1.00%	10.00	300	1.60	RECT	1	1	10	5	50.00	2.9	0.1	1.60	4.6	91.90	94.90	94.90	92.00	8.50	0.009
Pumpstat on 8	2.01	8.38	16.1	20.0	144900	145	132.5	130.5	1.00%	10.00	300	1.60	RECT	1	1	10	5	50.00	2.9	0.1	1.60	4.6	127.90	130.90	130.90	128.00	8.40	0.009

## **APPENDIX 2**

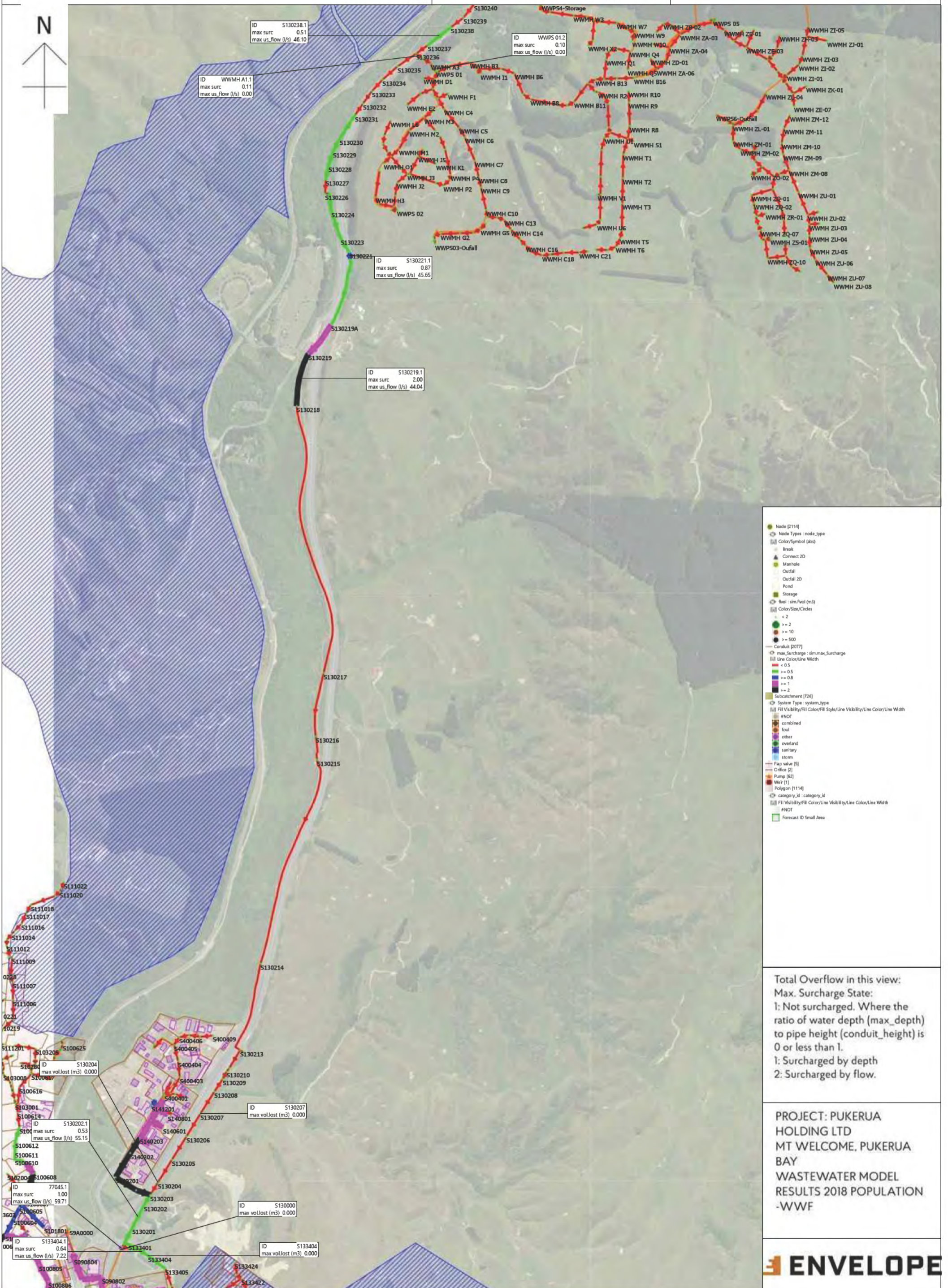
### **MT WELCOME NETWORK - MODEL RESULTS**



PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER MODEL RESULTS 2018  
 POPULATION - WWF  
 FULL DEVELOPMENT

Total Overflow in this view:  
 Max. Surcharge Status:  
 1 Not surcharged. Where the ratio of water depth (max\_depth) to pipe height (conduit\_height) is 0 or less than 1.  
 2 Surcharged by depth.  
 3 Surcharged by flow.

**APPENDIX 3**  
**BULK NETWORK – MODEL RESULTS**



**Node [2114]**

- Node Types : node\_type
- Color/Symbol (abs)
- Break
- Connect 2D
- Manhole
- Outfall
- Outfall 2D
- Pond
- Storage
- flow : sim\_flow (m3)
- Color/Size/Circles
- < 2
- >= 2
- >= 10
- >= 500

**Conduit [2077]**

- max\_Surcharge : sim\_max\_Surcharge
- Line Color/Line Width
- < 0.5
- >= 0.5
- >= 0.8
- >= 1
- >= 2

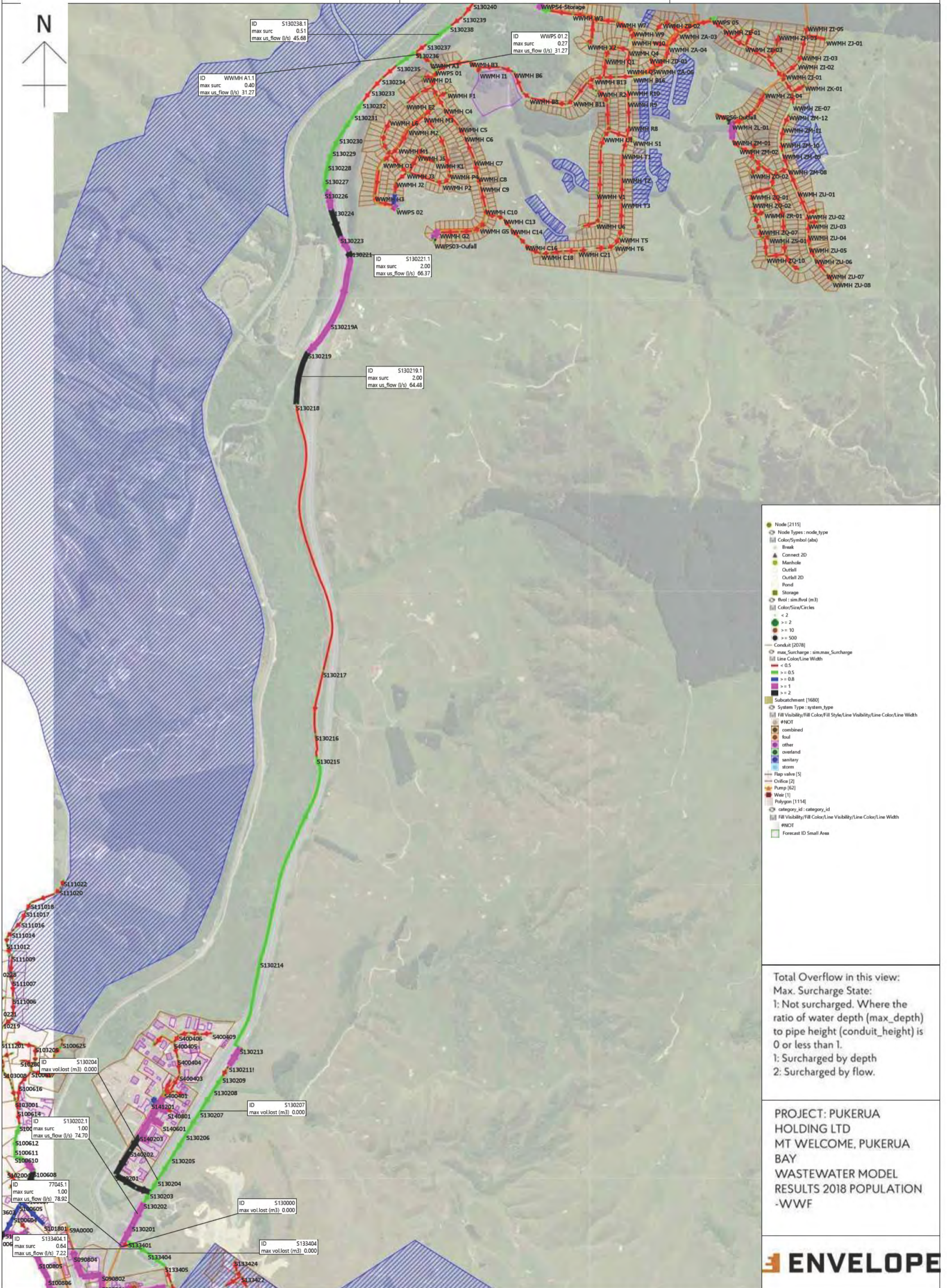
**Subcatchment [726]**

- System Type : system\_type
- Fill Visibility/Fill Color/Line Style/Line Visibility/Line Color/Line Width
- #NOT
- combined
- food
- other
- overland
- sanitary
- storm
- Flap valve [5]
- Orifice [2]
- Pump [62]
- Weir [1]
- Polygon [1134]
- category\_id : category\_id
- Fill Visibility/Fill Color/Line Style/Line Visibility/Line Color/Line Width
- #NOT
- Forecast ID Small Area

Total Overflow in this view:  
 Max. Surcharge State:  
 1: Not surcharged. Where the ratio of water depth (max\_depth) to pipe height (conduit\_height) is 0 or less than 1.  
 2: Surcharged by flow.

PROJECT: PUKERUA  
 HOLDING LTD  
 MT WELCOME, PUKERUA  
 BAY  
 WASTEWATER MODEL  
 RESULTS 2018 POPULATION  
 -WWF





**Node [2115]**

- Node Types : node\_type
- Color/Symbol (abs)
- Break
- Connect 2D
- Manhole
- Outfall
- Outfall 2D
- Pond
- Storage
- flvol : sim.flvol (m3)
- Color/Size/Circles
- < 2
- >= 2
- >= 10
- >= 500

**Conduit [2078]**

- max\_surcharge : sim\_max\_surcharge
- Line Color/Line Width
- < 0.5
- >= 0.5
- >= 0.8
- >= 1
- >= 2

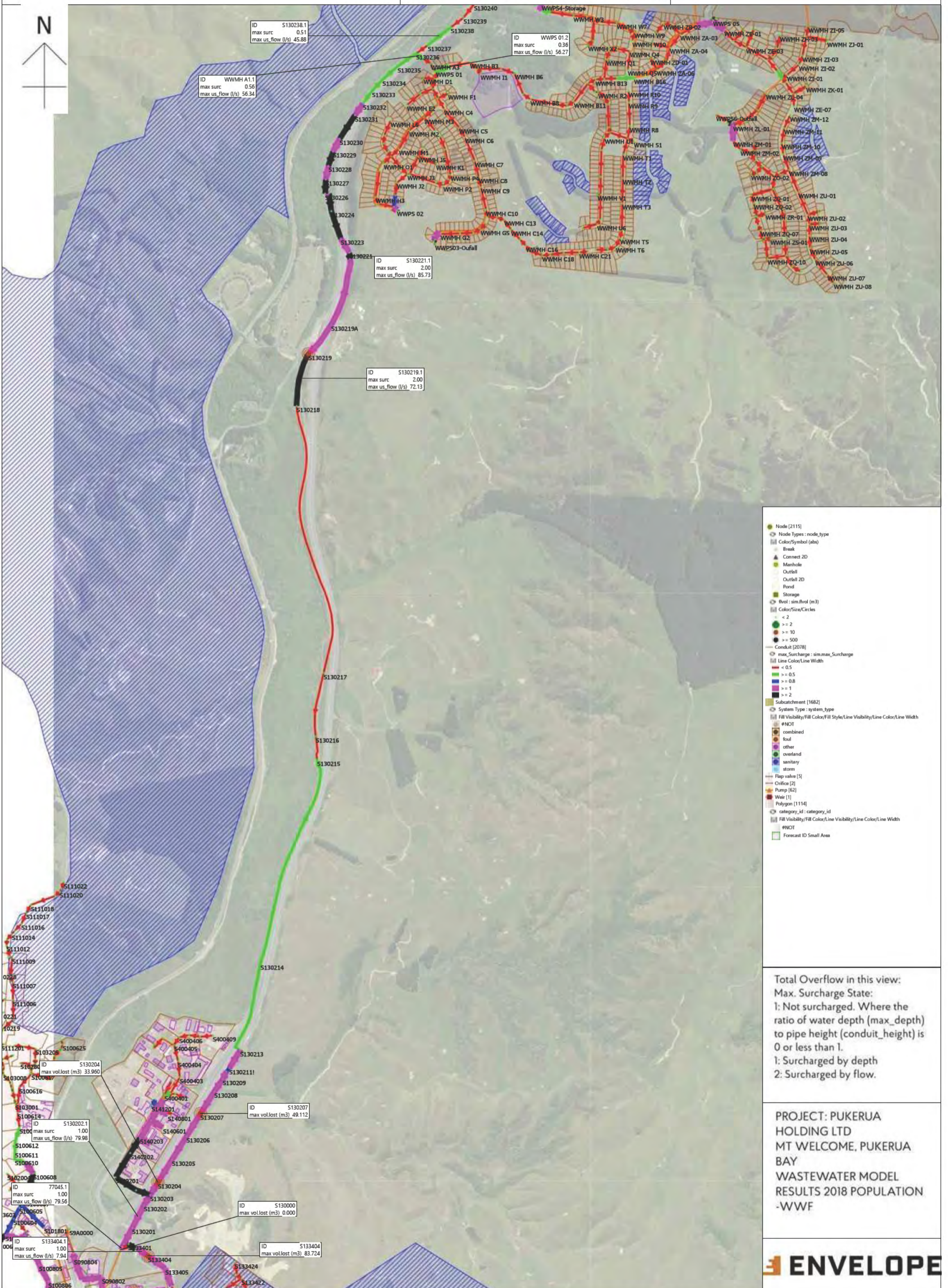
**Subcatchment [1680]**

- System Type : system\_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
- #NOT
- combined
- foul
- other
- overland
- sanitary
- storm
- Trap valve [5]
- Orifice [2]
- Pump [62]
- Weir [1]
- Polygon [1114]
- category\_id : category\_id
- Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
- #NOT
- Forecast ID Small Area

Total Overflow in this view:  
 Max. Surcharge State:  
 1: Not surcharged. Where the ratio of water depth (max\_depth) to pipe height (conduit\_height) is 0 or less than 1.  
 2: Surcharged by depth  
 3: Surcharged by flow.

PROJECT: PUKERUA  
 HOLDING LTD  
 MT WELCOME, PUKERUA  
 BAY  
 WASTEWATER MODEL  
 RESULTS 2018 POPULATION  
 -WWF





**Node [2115]**

- Node Types : node\_type
- Color/Symbol (abs)
- Break
- Connect 2D
- Manhole
- Outfall
- Outfall 2D
- Pond
- Storage
- flvol : sim.flvol (m3)
- Color/Size/Circles
- < 2
- >= 2
- >= 10
- >= 500

**Conduit [2078]**

- max\_surcharge : sim\_max\_surcharge
- Line Color/Line Width
- < 0.5
- >= 0.5
- >= 0.8
- >= 1
- >= 2

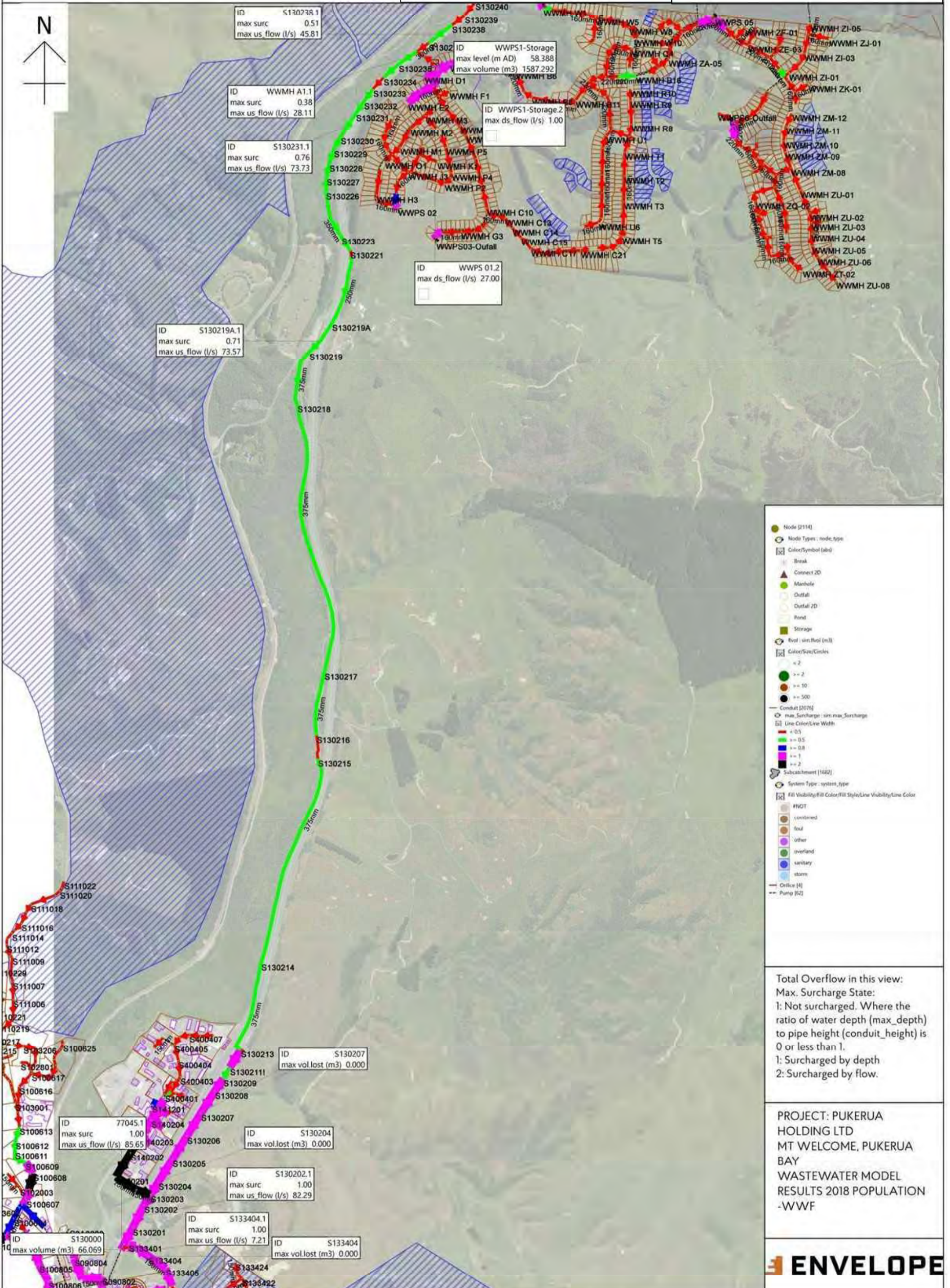
**Subcatchment [1682]**

- System Type : system\_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
- #NOT
- combined
- foul
- other
- overland
- sanitary
- storm
- Trap value [5]
- Orifice [2]
- Pump [62]
- Weir [1]
- Polygon [1114]
- category\_id : category\_id
- Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
- #NOT
- Forecast ID Small Area

Total Overflow in this view:  
 Max. Surcharge State:  
 1: Not surcharged. Where the ratio of water depth (max\_depth) to pipe height (conduit\_height) is 0 or less than 1.  
 1: Surcharged by depth  
 2: Surcharged by flow.

PROJECT: PUKERUA  
 HOLDING LTD  
 MT WELCOME, PUKERUA  
 BAY  
 WASTEWATER MODEL  
 RESULTS 2018 POPULATION  
 -WWF





**Node [2114]**

- Node Types : node\_type
- Color/Symbol (abbr)
- Break
- Connect 2D
- Manhole
- Outfall
- Outfall 2D
- Pond
- Storage
- Node : sim:flow (m3)
- Color/Size/Circles
- <= 2
- >= 2
- >= 10
- = 500

**Conduit [2076]**

- max\_Surcharge : sim\_max\_Surcharge
- Line Color/Line Width
- <= 0.5
- >= 0.5
- >= 0.8
- >= 1
- >= 2

**Subcatchment [1682]**

- System Type : system\_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color
- #N/GT
- contained
- foul
- other
- overland
- sanitary
- storm

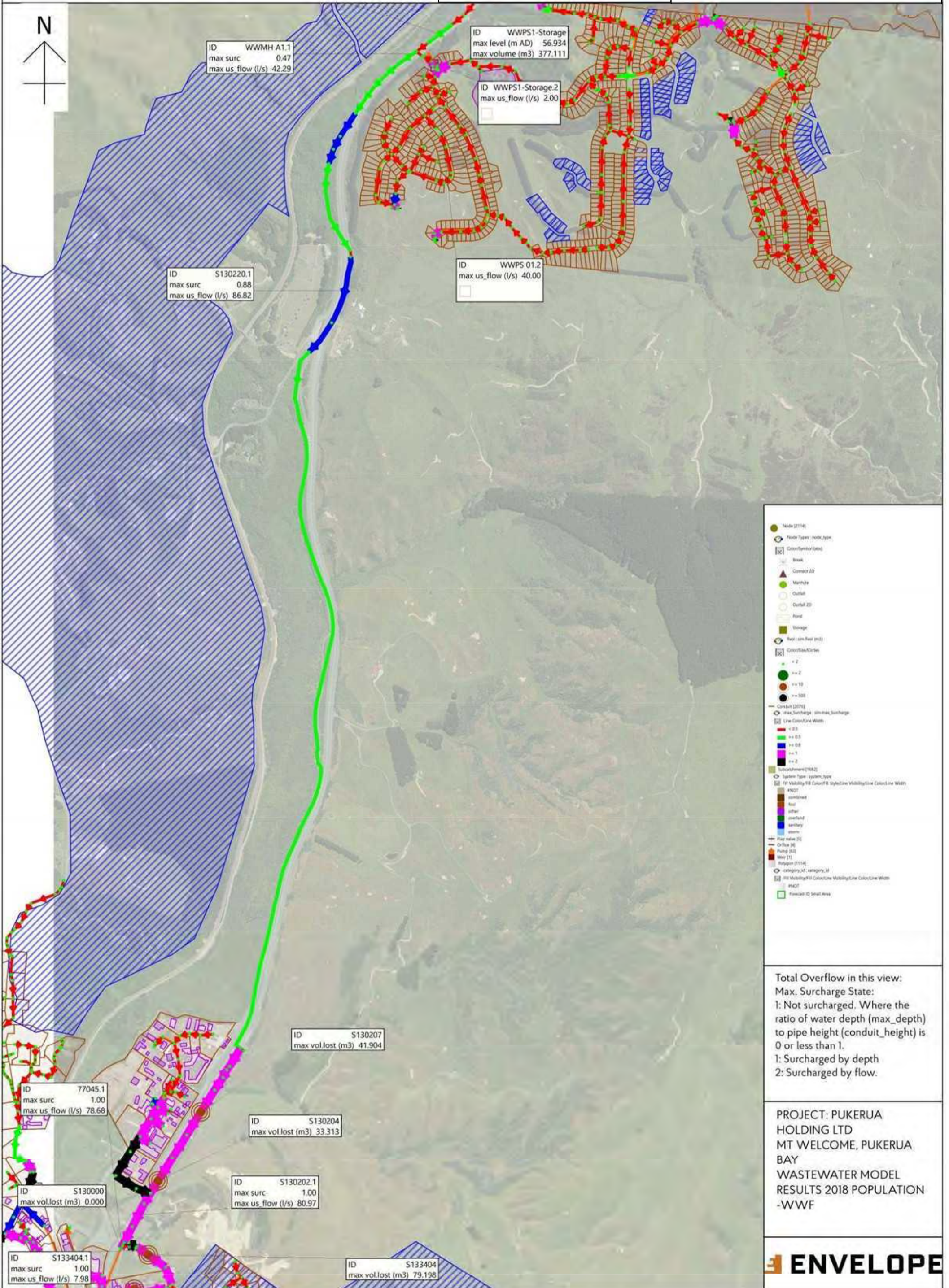
**Orifice [4]**

**Pump [52]**

Total Overflow in this view:  
 Max. Surcharge State:  
 1: Not surcharged. Where the ratio of water depth (max\_depth) to pipe height (conduit\_height) is 0 or less than 1.  
 1: Surcharged by depth  
 2: Surcharged by flow.

PROJECT: PUKERUA  
 HOLDING LTD  
 MT WELCOME, PUKERUA  
 BAY  
 WASTEWATER MODEL  
 RESULTS 2018 POPULATION  
 -WWF





Total Overflow in this view:  
 Max. Surcharge State:  
 1: Not surcharged. Where the ratio of water depth (max\_depth) to pipe height (conduit\_height) is 0 or less than 1.  
 1: Surcharged by depth  
 2: Surcharged by flow.

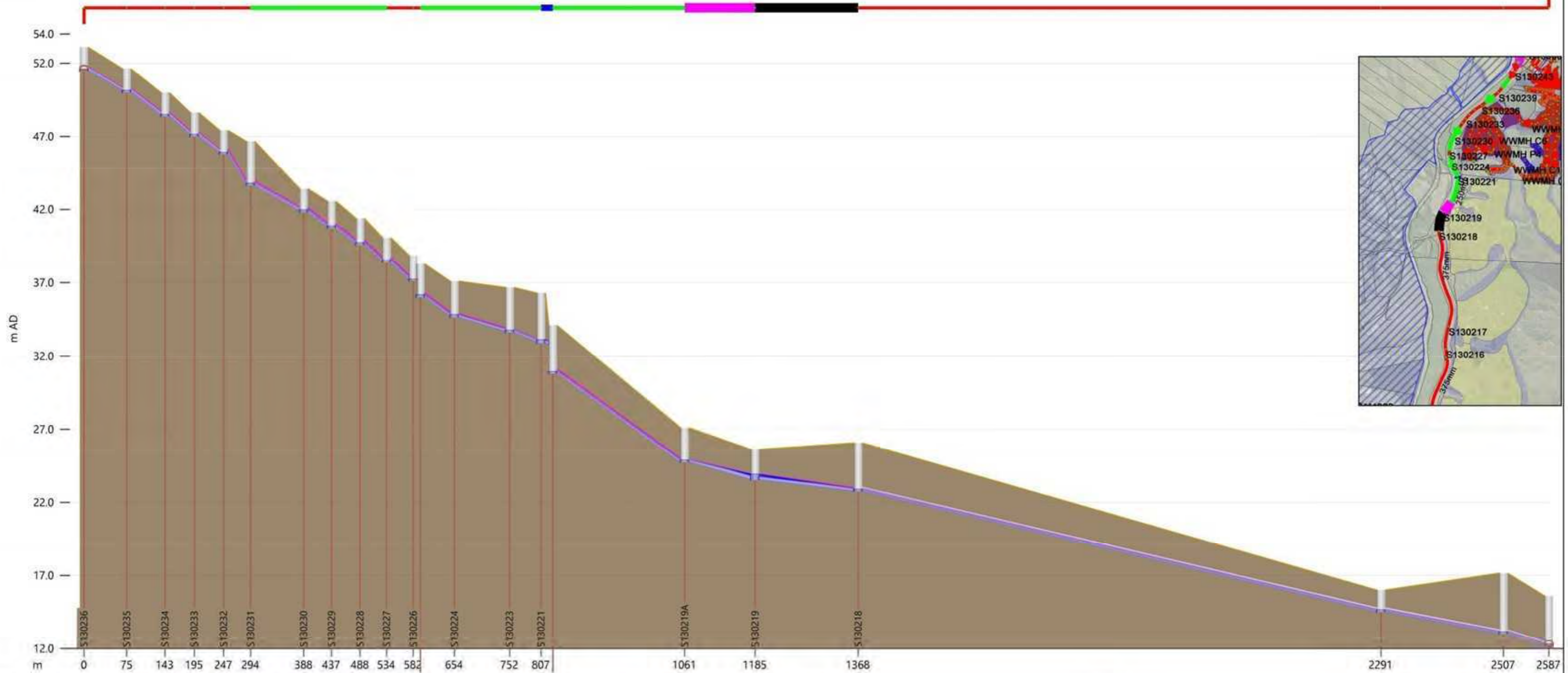
PROJECT: PUKERUA  
 HOLDING LTD  
 MT WELCOME, PUKERUA  
 BAY  
 WASTEWATER MODEL  
 RESULTS 2018 POPULATION  
 -WWF

## **APPENDIX 4**

### **BULK NETWORK – MODEL RESULTS PROFILES**

Network: SP ENV Clip 2018 Stages 8hrStrg  
 Simulation Name: ClipWWF-4D-v35>0 - No Development Live data  
 Simulation Time: maximum

Scenario: NO DEVELOPMENT  
 Stage: 0  
 Proposed Number of Lots: 0  
 Mt Welcome Storage Duration: -  
 Level of Service: WWF 2018 Population  
 Upgrades: None



Link	S130236.1	S130235	S130234	S130233	S130232	S130231	S130230	S130229	S130228	S130227	S130226	S130224	S130223	S130221	S130219A	S130219	S130218	S130218.1	S130217.1	S130216.1	
width (mm)	300	300	300	300	300	250	250	250	250	250	250	250	300	250	250	315	250	375	375	375	
us inv (m AD)	51.470	50.000	48.360	47.000	45.860	44.900	44.830	40.730	40.730	39.650	38.710	33.680	32.960	30.800	24.730	23.520	22.750	14.500	13.000	13.000	
ds inv (m AD)	50.070	48.430	47.070	45.860	44.900	40.800	39.650	38.710	37.992	36.670	34.710	33.680	32.960	24.730	23.520	22.750	14.500	13.000	12.180	12.180	
Length (m)	75.5	67.6	51.8	51.7	47.7	93.9	49.2	50.3	46.7	47.2	59.9	97.5	55.5	232.7	124.5	182.1	923.2	216.4	80.1	80.1	
surc	0.42	0.39	0.39	0.40	0.36	0.55	0.53	0.52	0.50	0.50	0.52	0.66	0.53	0.57	1.00	2.00	0.38	0.38	0.35	0.35	
DS flow (l/s)	45.94	45.91	45.87	45.86	45.81	45.78	45.77	45.75	45.74	45.73	45.72	45.68	45.65	45.62	44.18	43.84	43.64	43.60	43.57	43.57	
DS velocity (m/s)	1.644	1.777	1.820	1.745	2.057	1.670	1.750	1.766	1.845	1.867	1.768	1.324	1.335	1.569	0.723	1.219	1.150	1.150	1.262	1.262	
Node		S130236.1	S130235	S130234	S130233	S130232	S130231	S130230	S130229	S130228	S130227	S130226	S130224	S130223	S130221	S130219A	S130219	S130218	S130218.1	S130217.1	S130216.1
ground (m AD)		51.630	49.990	48.360	47.000	46.660	43.416	41.830	40.730	39.650	38.710	37.992	36.670	34.710	33.680	32.960	26.070	26.070	16.000	17.150	17.150
Flood level (m AD)		51.630	49.990	48.360	47.000	46.660	43.416	41.830	40.730	39.650	38.710	37.992	36.670	34.710	33.680	32.960	26.070	26.070	16.000	17.150	17.150
flood dep (m)		-1.512	-1.514	-1.514	-1.514	-1.514	-1.453	-1.453	-1.453	-1.453	-1.453	-1.453	-1.453	-1.453	-1.453	-1.453	-1.453	-1.354	-1.354	-1.354	-1.354
level (m AD)		50.118	48.476	47.000	45.860	44.900	43.768	41.963	40.730	39.650	38.710	37.992	36.670	34.710	33.680	32.960	22.882	22.882	14.641	13.111	13.111
vol lost (m3)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

● Node [2115]  
 ○ Node Types : node\_type  
 Color/Symbol (abs)  
 Break  
 ▲ Connect 2D  
 ● Manhole  
 ○ Outfall  
 ○ Outfall 2D  
 ■ Pond  
 ■ Storage  
 ● fivol : sim.fivol (m3)  
 Color/Size/Circles  
 < 2  
 ● >= 2  
 ● >= 10  
 ● >= 500  
 Conduit [2078]  
 ● max\_Surcharge : sim.max\_Surcharge  
 Line Color/Line Width  
 < 0.5  
 >= 0.5  
 ● >= 0.8  
 ● >= 1  
 ● >= 2  
 Subcatchment [1682]  
 System Type : system\_type  
 Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color  
 #NOT  
 ● combined  
 ● foul  
 ● other  
 ● overland  
 ● sanitary storm  
 — Orifice [2]  
 --- Pump [62]

PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PUKERUA BAY)

SCALE: 1:2000

0 2 km

DESIGNED: MH  
 DATE: 11/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 01

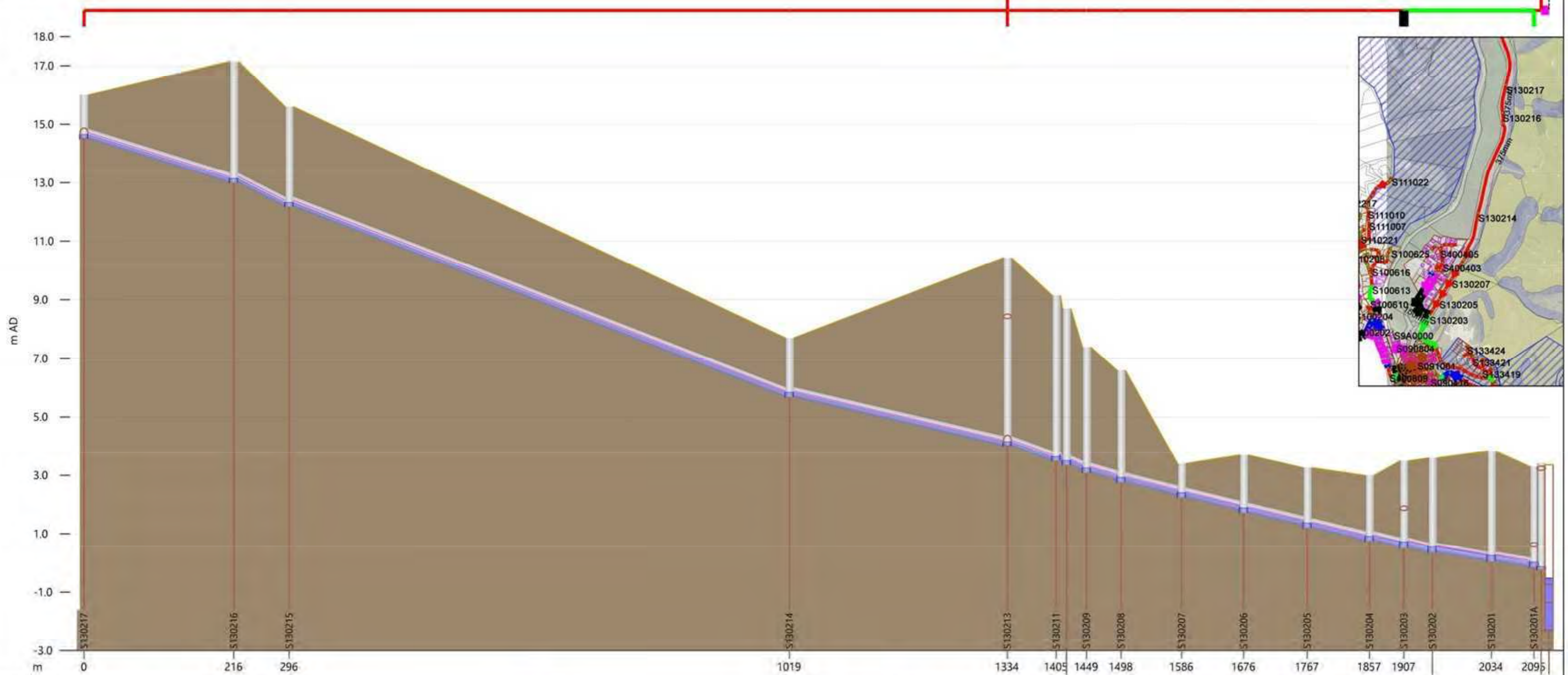
**ENVELOPE**

Network: SP ENV Clip 2018 Stages 8hrStrg  
 Simulation Name: ClipWWF-4D-v35>0 - No Development Live data  
 Simulation Time: maximum

Scenario: NO DEVELOPMENT

Stage: 0  
 Proposed Number of Lots: 0  
 Mt Welcome Storage Duration: -

Level of Service: WWF 2018 Population  
 Upgrades: None



Link	S130217.1	S130216.1	S130215.1	S130214.1	S130213.1	S130208.1	S130207.1	S130206.1	S130205.1	S130204.1	S130203.1	S130202.1	S130201.1		
width (mm)	375	375	375	375	375	375	375	375	375	375	375	375	375		
us inv (m AD)	14.500	13.000	12.180	5.680	4.000	2.760	2.240	1.720	1.200	0.750	0.525	0.350	0.050		
ds inv (m AD)	13.000	12.180	5.680	4.000	3.500	2.310	1.790	1.270	0.750	0.525	0.350	0.050	-0.150		
Length (m)	216.4	80.1	722.6	314.9	70.5	28.8	49.9	87.6	89.7	91.7	89.9	49.7	41.2	85.3	61.6
surc	0.38	0.35	0.40	0.40	0.37	0.38	0.40	0.41	0.41	0.42	0.49	0.52	0.53	0.53	
DS flow (l/s)	43.60	43.57	43.50	43.46	43.46	43.44	43.43	43.41	43.40	43.39	43.38	55.15	55.13	55.13	
DS velocity (m/s)	1.150	1.262	1.045	1.045	1.159	1.040	1.040	1.040	1.040	0.980	0.834	0.952	1.124	1.124	
Node	S130217	S130216	S130215	S130214	S130213	S130208	S130207	S130206	S130205	S130204	S130203	S130202	S130201		
ground (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	
Flood level (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	
flood dep (m)	-1.359	-4.019	-3.289	-1.869	-6.283	-3.684	-1.007	-1.816	-1.907	-2.082	-3.046	-3.578	-3.578	-3.578	
level (m AD)	14.641	13.131	12.311	5.831	-4.140	3.629	2.912	2.393	1.674	1.353	0.908	0.710	0.545	0.249	
vol lost (m3)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

● Node [2115]  
 ○ Node Types : node\_type  
 [ ] Color/Symbol (abs)  
 Break  
 ▲ Connect 2D  
 ● Manhole  
 ○ Outfall  
 ○ Outfall 2D  
 ■ Pond  
 ■ Storage  
 ○ flvol : sim.flvol (m3)  
 [ ] Color/Size/Circles  
 < 2  
 ● >= 2  
 ● >= 10  
 ● >= 500  
 --- Conduit [2078]  
 [ ] Line Color/Line Width  
 < 0.5  
 >= 0.5  
 ■ >= 0.8  
 ■ >= 1  
 ■ >= 2  
 Subcatchment [1682]  
 System Type : system\_type  
 [ ] Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color  
 #NOT  
 combined  
 foul  
 other  
 overland  
 sanitary storm  
 Orifice [2]  
 Pump [62]

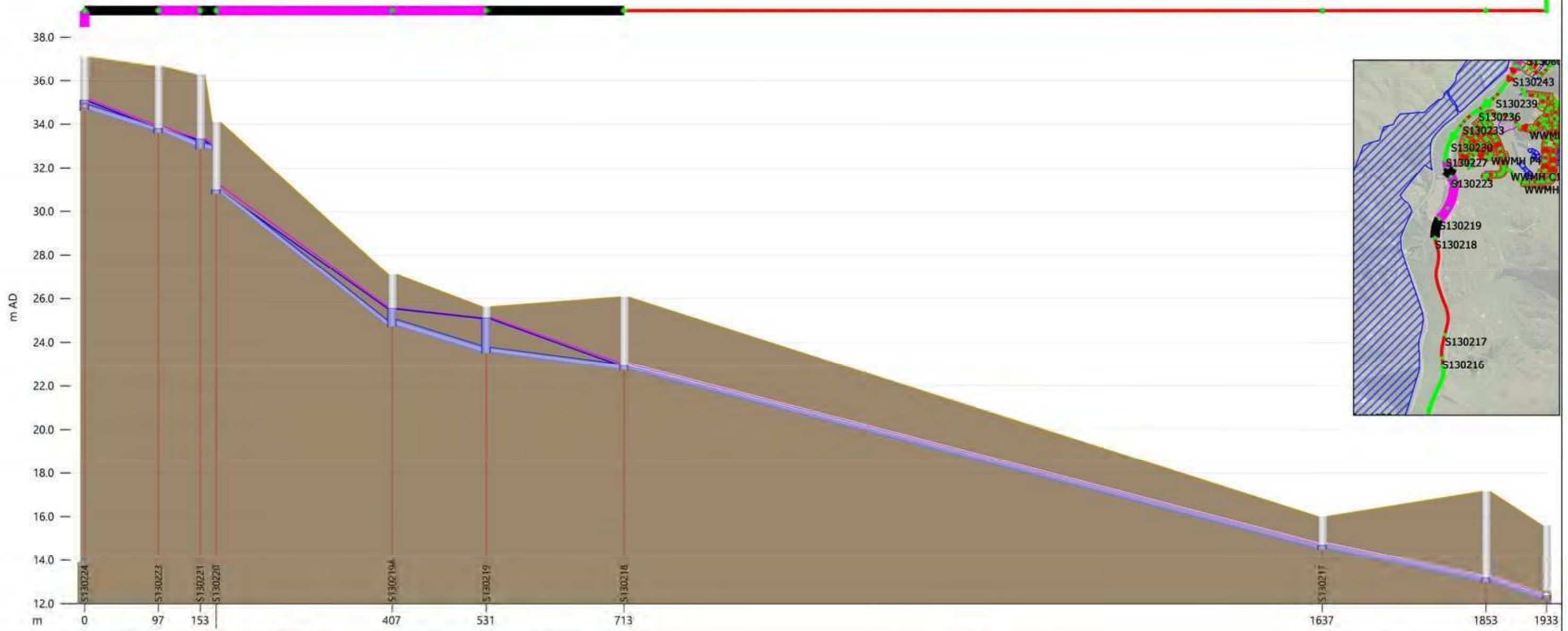
PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PLIMMERTON)

DESIGNED: MH  
 DATE: 11/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 02

SCALE: 1:2000

0 2 km

**ENVELOPE**



Link	S130224.1	-	S130220.1	S130219A.1	S130219.1	S130218.1	S130217.1	S130216.1
width (mm)	250	300	250	315	250	375	375	375
us inv (m AD)	34.640	33.610	30.800	24.730	23.520	22.750	14.500	13.000
ds inv (m AD)	33.680	32.960	24.730	23.520	22.750	14.500	13.000	12.180
Length (m)	97.5	55.5	232.7	124.5	182.1	923.2	216.4	80.1
surc	2.00	1.00	1.00	1.00	2.00	0.47	0.47	0.43
DS flow (m3/s)	0.06647	-	0.06524	0.06456	0.06447	0.06439	0.06436	0.06435
DS velocity (m/s)	1.513	1.337	1.724	0.733	1.487	1.278	1.279	1.406
Node	S130223	S130220	S130219A	S130219	S130218	S130217	S130216	
ground (m AD)	36.670	34.100	27.102	25.620	26.070	16.000	17.150	
Flood level (m AD)	36.670	34.100	27.102	25.620	26.070	16.000	17.150	
flood dep (m)	-2.879	-3.139	-1.568	-0.522	-3.157	-1.325	-3.990	
level (m AD)	33.791	30.961	25.535	25.098	22.913	14.675	13.160	
vol lost (m3)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

**Node [2115]**  
 Node Types: node\_type  
 Color/Symbol (abbr)

- Break
- Connect 2D
- Manhole
- Outfall
- Outfall 2D
- Pond
- Storage

**Conduit [2078]**  
 max\_Surcharge: sim\_max\_Surcharge  
 Line Color/Line Width

- < 0.5
- >= 0.5
- <= 0.8
- >= 1

**Flap valve [5]**  
**Orifice [2]**

**Subcatchment [1680]**  
 System Type: system\_type  
 Fill Visibility/Fill Color/Fill Style/Line Viability/Line Color/Line Width

- #NOT
- combined
- foul
- other
- overland
- sanitary
- storm

**Pump [62]**  
**Weir [1]**  
 Polygon [1114]  
 category\_id: category\_id  
 Fill Visibility/Fill Color/Line Viability/Line Color/Line Width

- #NOT
- Forecast ID Small Area

PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PUKERUA BAY)

DESIGNED: MH  
 DATE: 21/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 01

SCALE: 1:2000

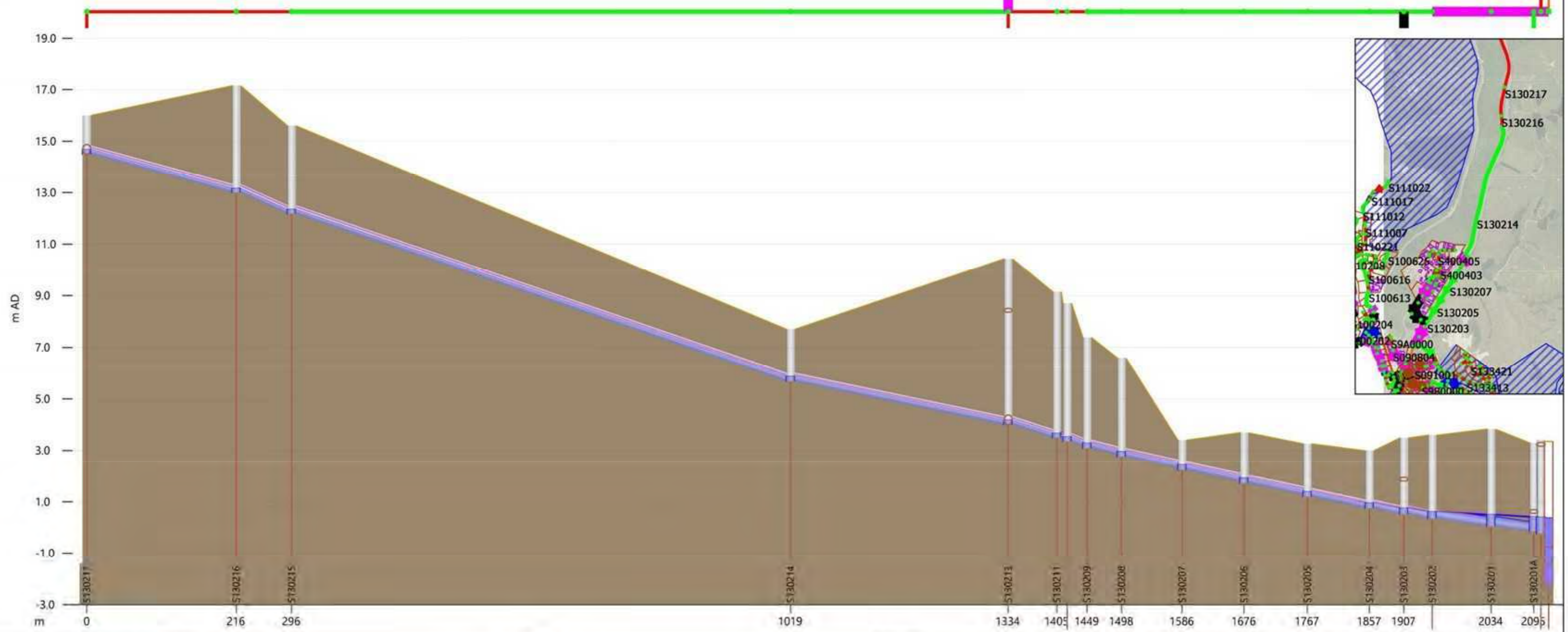


Network: SP ENV Clip 2018 Stages 8hrStrg (version 35) (Scenario Stage 01-23)  
 Simulation Name: ClipWWF-4D-v35>Stage 01-23 Live data  
 Simulation Time: maximum

Scenario: MT WELCOME STAGES 1-23 (NO MURI ROAD)

Stage: 1-23  
 Proposed Number of Lots: 949  
 Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population  
 Upgrades: None



Link	S130217.1		S130215.1		S130214.1		S130208.1		S130207.1	S130206.1	S130205.1	S130202.1	
width (mm)	375	375	375	375	375	375	375	375	375	375	375	375	375
us inv (m AD)	14.500	13.000	12.180	5.680	4.000	3.500	3.090	2.760	2.240	1.720	1.200	0.750	0.350
ds inv (m AD)	13.000	12.180	5.680	4.000	3.500	2.830	2.310	1.790	1.270	0.750	0.525	0.050	-0.150
Length (m)	216.4	80.1	722.8	314.9	70.5	49.9	87.6	89.7	91.7	89.9	49.7	41.2	85.3
surc	0.47	0.43	0.50	0.46	0.50	0.51	0.51	0.51	0.51	0.53	0.60	0.71	1.00
DS flow (m3/s)	0.06436	0.06435	0.06427	0.06419	0.06416	0.06411	0.06409	0.06407	0.06405	-	-	0.07465	-
DS velocity (m/s)	1.279	1.406	1.158	1.181	1.288	1.180	1.180	1.180	1.180	1.079	0.980	-	0.995
Node	S130217	S130216	S130215	S130214	S130213	S130207	S130206	S130205	S130204	S130203	S130202	S130201	S130201A
ground (m AD)	16.000	17.150	15.600	7.700	10.423	6.597	3.400	3.690	3.260	2.990	3.591	3.827	-
Flood level (m AD)	16.000	17.150	15.600	7.700	10.423	6.597	3.400	3.690	3.260	2.990	3.591	3.827	-
flood dep (m)	-1.325	-3.990	-3.258	-1.832	-6.249	-3.646	-0.969	-1.777	-1.868	-2.042	-	-3.321	-
level (m AD)	14.675	13.160	12.342	5.868	4.174	2.950	2.431	1.913	1.392	0.948	0.617	0.506	-
vol lost (m3)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-

**Legend**

- Node [2115]
- Node Types : node\_type
- Color/Symbol (abi)
- Break
- Connect 2D
- Manhole
- Outfall
- Outfall 2D
- Pond
- Storage
- Flow (l/s) : sim\_flow (m3)
- Color/Size/Circles
- Conduit [2078]
- max\_surcharge : sim\_max\_surcharge
- Line Color/Line Width
- Subcatchment [1880]
- System Type : system\_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
- #NOT
- combined
- foul
- other
- overland
- sanitary
- storm
- Flap valve [5]
- Orifice [2]
- Pump [62]
- Weir [1]
- Polygon [1114]
- category\_id : category\_id
- Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
- #NOT
- Forecast ID Small Area

PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PLIMMERTON)

SCALE: 1:2000

0 2 km

DESIGNED: MH  
 DATE: 21/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 02

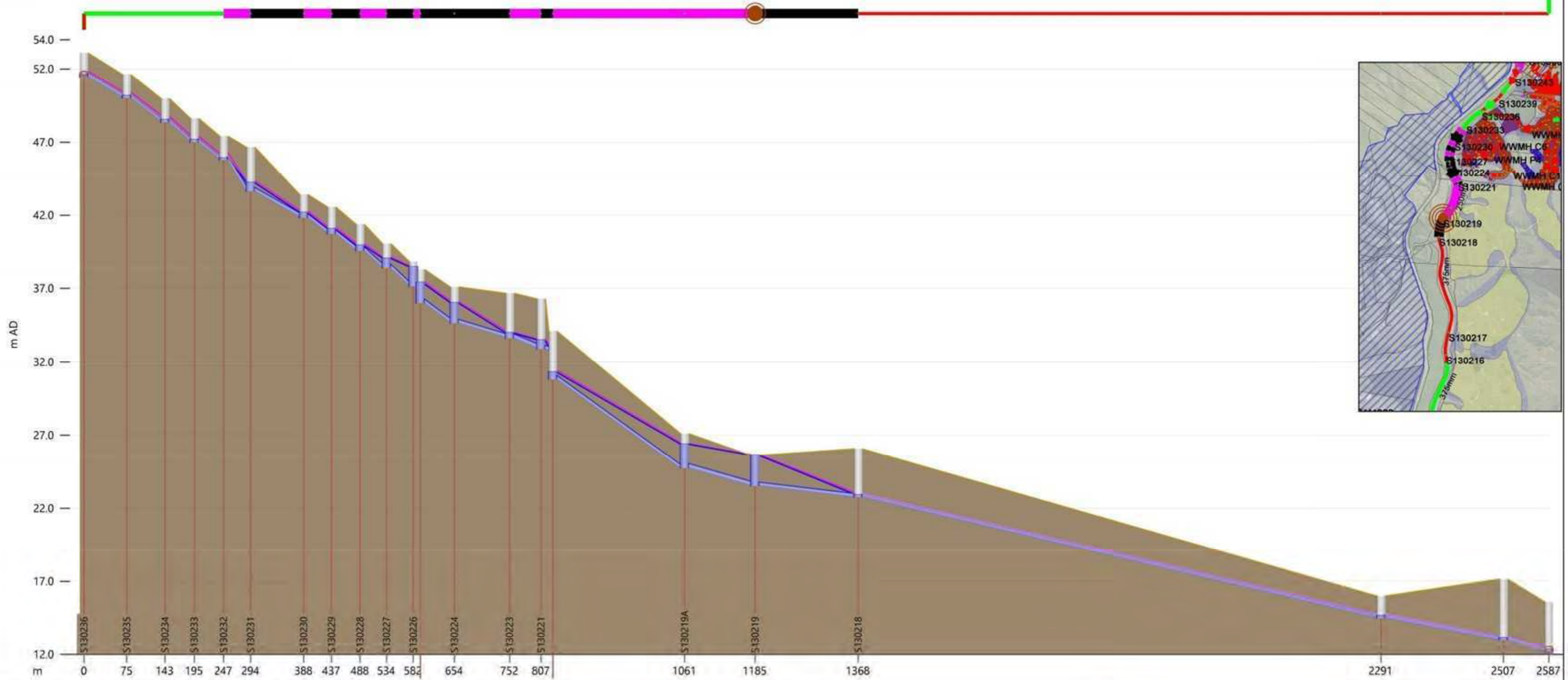
**ENVELOPE**

Network: SP ENV Clip 2018 Stages 8hrStrg  
 Simulation Name: ClipWWF-4D-v35>Live data  
 Simulation Time: maximum

Scenario: FULL DEVELOPMENT

Stage: 1-25  
 Proposed Number of Lots: 1449  
 Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population  
 Upgrades: None



Link	S130236.1	S130235	S130234	S130233	S130232	S130231	S130230	S130229	S130228	S130227	S130226	S130224	S130223	S130221	S130219A	S130219	S130218	S130217.1	S130216.1
width (mm)	300	300	300	300	300	250	250	250	250	250	250	250	300	250	250	250	375	375	
us inv (m AD)	51.470	50.000	48.360	47.000	45.860	43.630	41.830	40.730	39.650	38.710	36.000	34.640	33.610	30.800	24.730	23.520	22.750	14.500	13.000
ds inv (m AD)	50.070	48.430	47.070	45.860	44.900	40.800	39.650	38.710	37.960	34.710	33.680	32.960	32.960	24.730	23.520	22.750	14.500	13.000	12.180
Length (m)	75.5	67.6	51.8	51.7	47.7	93.9	49.2	50.3	46.7	47.2	59.9	97.5	55.5	232.7	124.5	182.1	923.2	216.4	80.1
surc	0.62	0.58	0.57	0.59	1.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	2.00	1.00	2.00	0.50	0.50	0.46
DS flow (l/s)	92.34	92.20	92.12	92.02	90.65	89.82	89.53	89.74	88.92	88.35	85.74	85.73	85.67	85.67	85.67	71.98	71.98	71.98	71.98
DS velocity (m/s)	1.990	2.167	2.224	2.124	2.077	1.930	1.986	2.011	2.528	3.546	1.990	1.820	1.356	1.743	0.931	1.596	1.315	1.316	1.449
Node		S130235	S130234	S130233	S130232	S130231	S130230	S130229	S130228	S130227	S130226	S130224	S130223	S130221	S130219A	S130219	S130218	S130217	S130216
ground (m AD)		51.630	49.990	48.430	47.000	45.860	43.416	41.830	40.730	39.650	38.710	37.092	36.670	34.100	27.102	25.620	26.070	16.000	17.150
Flood level (m AD)		51.630	49.990	48.430	47.000	45.860	43.416	41.830	40.730	39.650	38.710	37.092	36.670	34.100	27.102	25.620	26.070	16.000	17.150
flood dep (m)		-1.448	-1.453	-1.453	-1.453	-1.453	-1.220	-1.220	-1.220	-1.220	-1.060	-1.060	-1.060	-2.671	-0.705	0.000	-3.147	-1.314	-3.980
level (m AD)		50.182	48.537	47.070	45.860	44.246	42.196	40.730	39.650	38.710	36.032	33.999	33.999	31.317	26.398	25.620	22.923	14.686	13.170
vol lost (m3)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	192.826	0.000	0.000	0.000	0.000

● Node [2115]  
 ○ Node Types : node\_type  
 Color/Symbol (abs)  
 Break  
 ▲ Connect 2D  
 ● Manhole  
 ○ Outfall  
 ○ Outfall 2D  
 ■ Pond  
 ■ Storage  
 ● tivol : sim.tivol (m3)  
 Color/Size/Circles  
 < 2  
 ● >= 2  
 ● >= 10  
 ● >= 500  
 Conduit [2078]  
 ● max\_Surcharge : sim.max\_Surcharge  
 Line Color/Line Width  
 < 0.5  
 >= 0.5  
 ● >= 0.8  
 ● >= 1  
 ● >= 2  
 Subcatchment [1682]  
 System Type : system\_type  
 Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color  
 #NOT  
 combined  
 foul  
 other  
 overland  
 sanitary storm  
 Orifice [2]  
 Pump [62]

PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PUKERUA BAY)

DESIGNED: MH  
 DATE: 11/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 01

SCALE: 1:2000

0 2 km

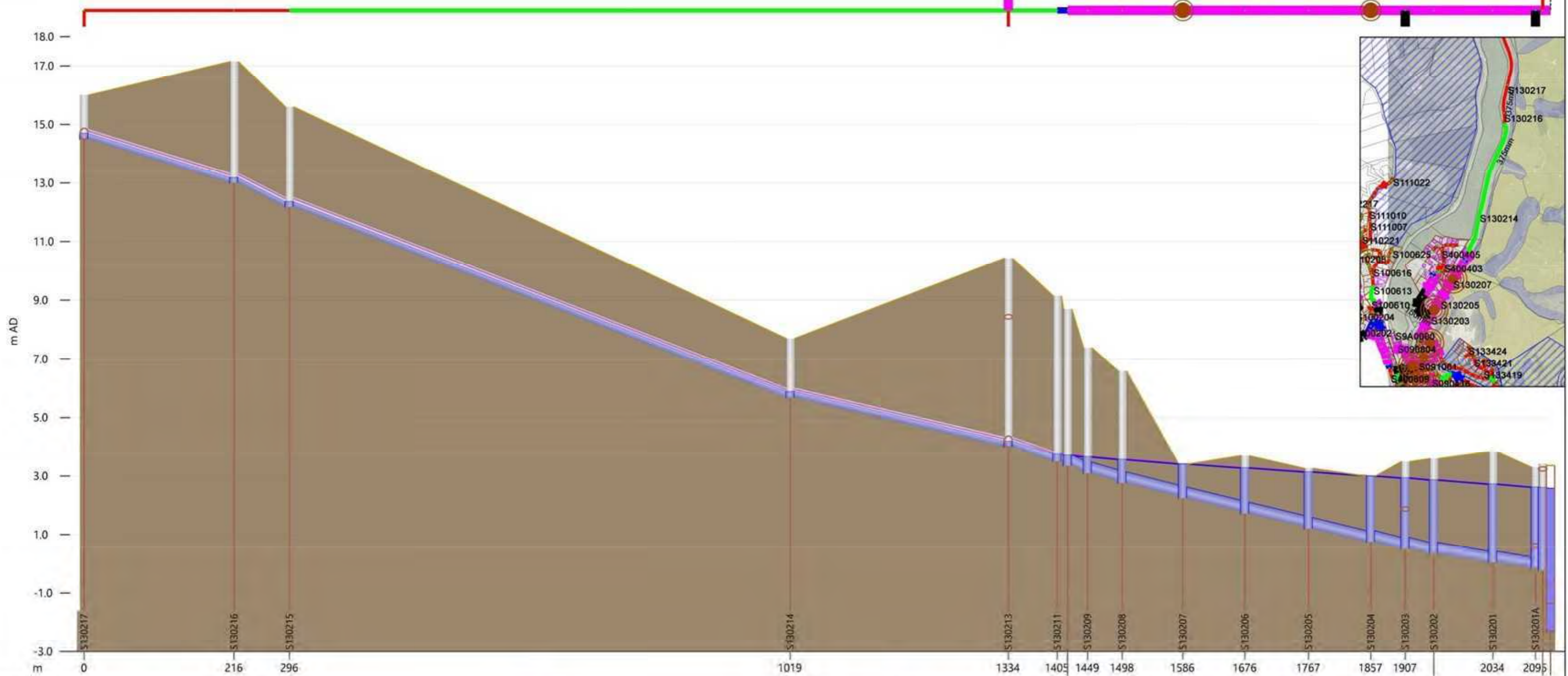
**ENVELOPE**

Network: SP ENV Clip 2018 Stages 8hrStrg  
 Simulation Name: ClipWWF-4D-v35>Live data  
 Simulation Time: maximum

Scenario: FULL DEVELOPMENT

Stage: 1-25  
 Proposed Number of Lots: 1449  
 Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population  
 Upgrades: None



Link	S130217.1	S130216.1	S130215.1	S130214.1	S130213.1	S130208.1	S130207.1	S130206.1	S130205.1	S130204.1	S130203.1	S130202.1	S130201.1
width (mm)	375	375	375	375	375	375	375	375	375	375	375	375	375
us inv (m AD)	14.500	13.000	12.180	5.680	4.000	2.760	2.240	1.720	1.200	0.750	0.525	0.350	0.050
ds inv (m AD)	13.000	12.180	5.680	4.000	3.500	2.310	1.790	1.270	0.750	0.525	0.350	0.050	-0.150
Length (m)	216.4	80.1	722.8	314.9	70.5	288	49.9	89.7	91.7	89.9	49.7	41.2	61.6
surc	0.50	0.46	0.54	0.54	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DS flow (l/s)	71.98	71.98	71.98	71.98	71.98	71.98	71.98	71.98	71.98	71.84	71.85	80.11	77.63
DS velocity (m/s)	1.316	1.449	1.185	1.228	1.327	1.228	1.228	1.228	1.110	1.064	1.020	1.003	1.260
Node	S130217	S130216	S130215	S130214	S130213	S130208	S130207	S130206	S130205	S130204	S130203	S130202	S130201
ground (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	6.597	3.400	3.690	3.260	2.990	3.486	3.591
Flood level (m AD)	16.000	17.150	15.600	7.700	10.423	9.147	6.597	3.400	3.690	3.260	2.990	3.486	3.591
flood dep (m)	-1.314	-3.980	-3.247	-6.237	-0.036	0.000	-0.418	-0.126	0.000	-0.730	-1.109	-1.109	-1.109
level (m AD)	14.686	13.170	12.353	5.882	4.186	3.742	3.561	3.400	3.272	3.134	2.990	2.931	2.861
vol lost (m3)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	49.112	0.000	0.000	33.960	0.000	0.000

● Node [2115]  
 ○ Node Types : node\_type  
 Color/Symbol (abs)  
 Break  
 ▲ Connect 2D  
 ● Manhole  
 ○ Outfall  
 ○ Outfall 2D  
 ■ Pond  
 ■ Storage  
 ● #vol : sim.flvol (m3)  
 Color/Size/Circles  
 < 2  
 ● >= 2  
 ● >= 10  
 ● >= 500  
 Conduit [2078]  
 Line Color/Line Width  
 < 0.5  
 >= 0.5  
 ■ >= 0.8  
 ■ >= 1  
 ■ >= 2  
 Subcatchment [1682]  
 System Type : system\_type  
 Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color  
 #NOT  
 combined  
 foul  
 other  
 overland  
 sanitary storm  
 Orifice [2]  
 Pump [62]

PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PLIMMERTON)

SCALE: 1:2000

0 2 km

DESIGNED: MH  
 DATE: 11/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 02

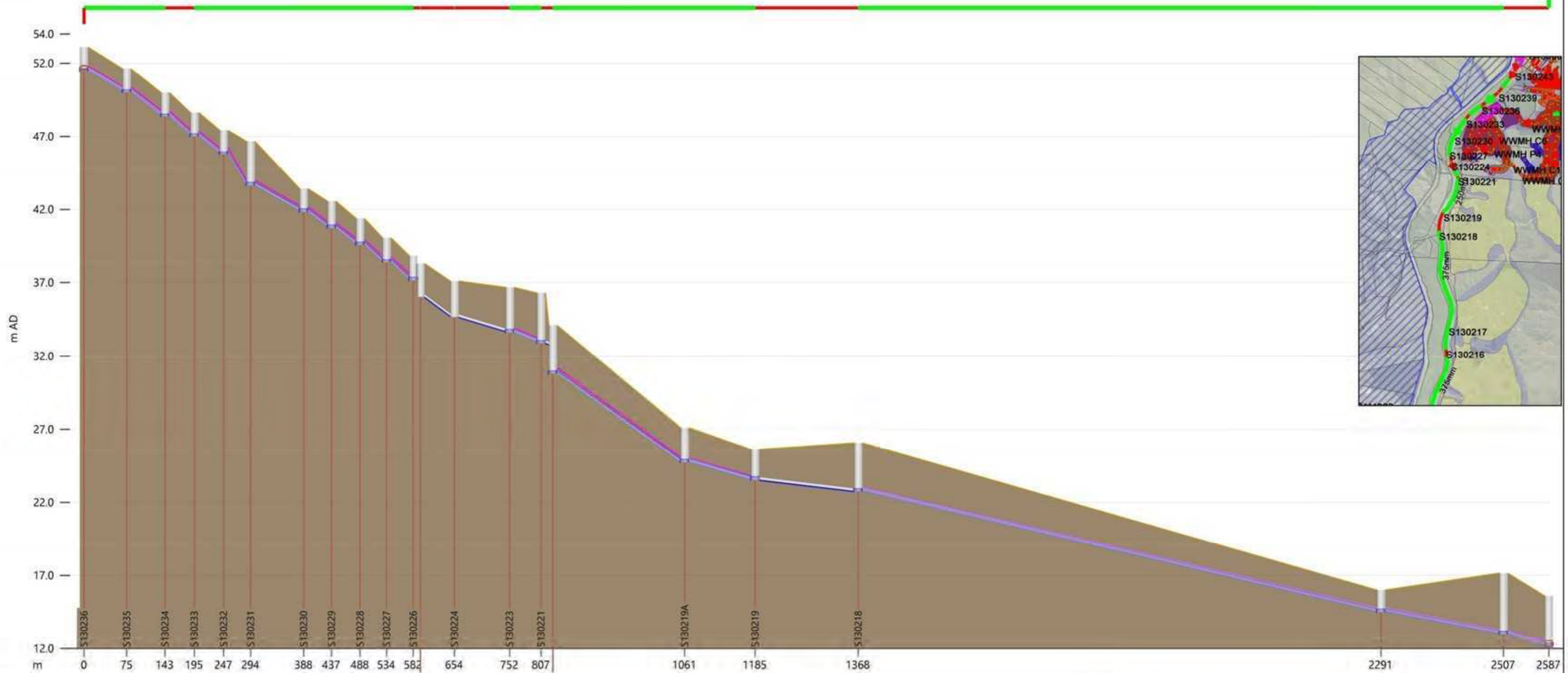
**ENVELOPE**

Network: SP ENV Clip 2018 Stages 8hrStrg  
 Simulation Name: ClipWWF-4D-v30>Stage 01-25 Upgrd 02 Live data  
 Simulation Time: maximum

Scenario: FULL DEVELOPMENT - BULK NETWORK UPGRADES AND PUMP STATION 1

Stage: 1-25  
 Proposed Number of Lots: 1449  
 Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population  
 Upgrades: Grav: 27+1 l/s | Storage: 1587m<sup>3</sup>  
 + Bulk Upgrades



Link	S130236.1	S130235	S130234	S130233	S130232	S130231	S130230	S130229	S130228	S130227	S130226	S130224	S130223	S130221	S130219A	S130219	S130218	S130217.1	S130216.1	
width (mm)	300	300	300	300	300	250	250	250	250	250	250	250	300	250	250	315	250	375	375	
us inv (m AD)	51.470	50.000	48.360	47.000	45.860	43.630	41.830	40.730	39.650	38.600	36.000	34.640	33.610	32.960	30.800	24.730	23.520	22.750	14.500	13.000
ds inv (m AD)	50.070	48.430	47.070	45.860	44.900	40.800	39.650	38.600	37.620	36.670	34.710	33.680	32.960	32.960	24.730	23.520	22.750	14.500	13.000	12.180
Length (m)	75.5	67.6	51.8	51.7	47.7	93.9	49.2	50.3	46.7	47.2	55.5	232.7	0.63	0.78	0.68	0.71	124.5	923.2	216.4	80.1
surc	0.54	0.51	0.50	0.52	0.57	0.76	0.72	0.71	0.68	0.67	0.63	0.78	0.68	0.71	0.68	0.71	0.71	0.50	0.50	0.46
DS flow (l/s)	73.77	73.76	73.75	73.75	73.73	73.69	73.70	73.68	73.67	73.67	73.62	73.57	73.57	73.54	73.54	73.54	73.12	73.12	72.98	72.96
DS velocity (m/s)	1.882	2.044	2.097	2.005	2.078	1.851	1.954	1.975	2.073	2.101	1.582	1.795	1.795	1.239	1.239	1.239	1.321	1.321	1.321	1.454
Node	S130236.1	S130235	S130234	S130233	S130232	S130231	S130230	S130229	S130228	S130227	S130226	S130224	S130223	S130221	S130219A	S130219	S130218	S130217.1	S130216.1	
ground (m AD)	51.630	49.990	46.660	43.416	37.092	36.670	34.100	27.102	25.620	26.070	16.000	17.150	17.150	17.150	17.150	17.150	17.150	17.150	17.150	
Flood level (m AD)	51.630	49.990	46.660	43.416	37.092	36.670	34.100	27.102	25.620	26.070	16.000	17.150	17.150	17.150	17.150	17.150	17.150	17.150	17.150	
flood dep (m)	-1.476	-1.480	-2.829	-1.397	-2.865	-3.125	-3.125	-1.876	-3.145	-3.145	-3.145	-3.145	-3.145	-3.145	-3.145	-3.145	-3.145	-3.145	-3.145	
level (m AD)	50.154	48.510	43.831	42.024	33.805	30.975	24.923	23.744	22.925	22.925	14.668	13.171	13.171	13.171	13.171	13.171	13.171	13.171	13.171	
vol lost (m3)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

● Node [2115]  
 ○ Node Types : node\_type  
 Color/Symbol (abs)  
 Break  
 ▲ Connect 2D  
 ● Manhole  
 ○ Outfall  
 ○ Outfall 2D  
 ■ Pond  
 ■ Storage  
 ● fivol : sim.fivol (m3)  
 Color/Size/Circles  
 < 2  
 ● >= 2  
 ● >= 10  
 ● >= 500  
 Conduit [2078]  
 ● max\_Surcharge : sim.max\_Surcharge  
 Line Color/Line Width  
 < 0.5  
 >= 0.5  
 ● >= 0.8  
 ● >= 1  
 ● >= 2  
 Subcatchment [1682]  
 System Type : system\_type  
 Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color  
 #NOT  
 combined  
 foul  
 other  
 overland  
 sanitary storm  
 Orifice [2]  
 Pump [62]

PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PUKERUA BAY)

DESIGNED: MH  
 DATE: 11/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 01

SCALE: 1:2000

0 2 km

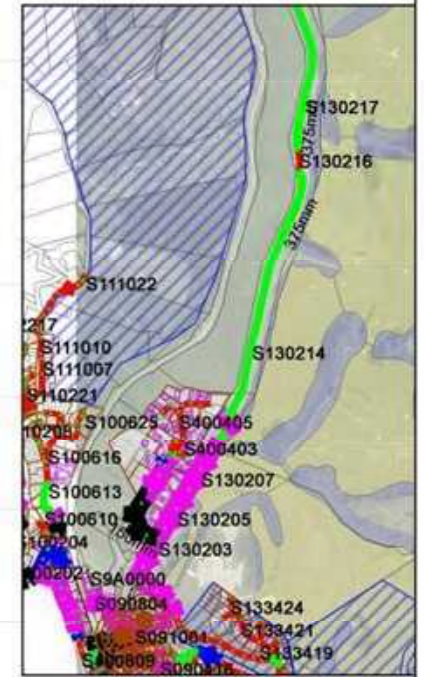
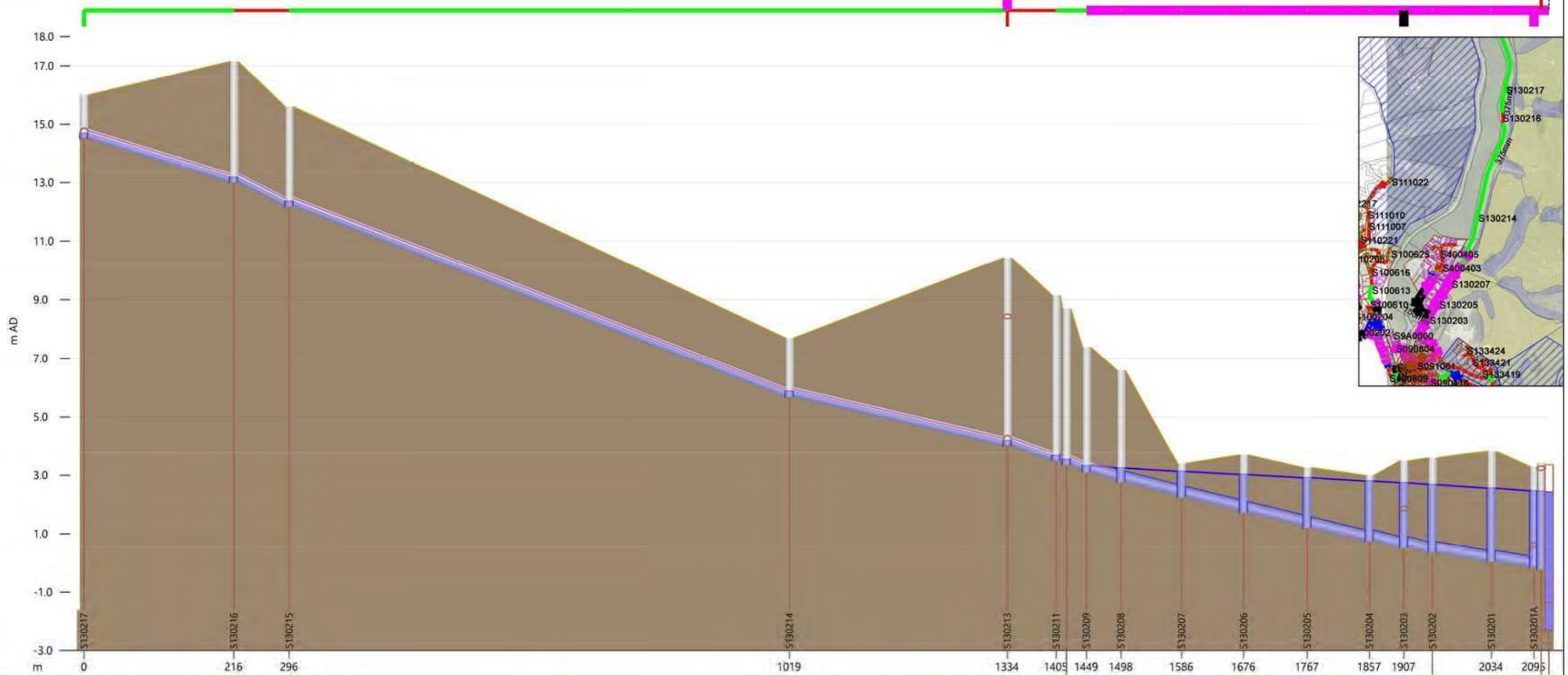


Network: SP ENV Clip 2018 Stages 8hrStrg  
 Simulation Name: ClipWWF-4D-v30>Stage 01-25 Upgrd 02 Live data  
 Simulation Time: maximum

Scenario: FULL DEVELOPMENT - BULK NETWORK UPGRADES AND PUMP STATION 1

Stage: 1-25  
 Proposed Number of Lots: 1449  
 Mt Welcome Storage Duration: 8 HR

Level of Service: WWF 2018 Population  
 Upgrades: Grav: 27+11/s | Storage: 1587m<sup>3</sup>  
 + Bulk Upgrades

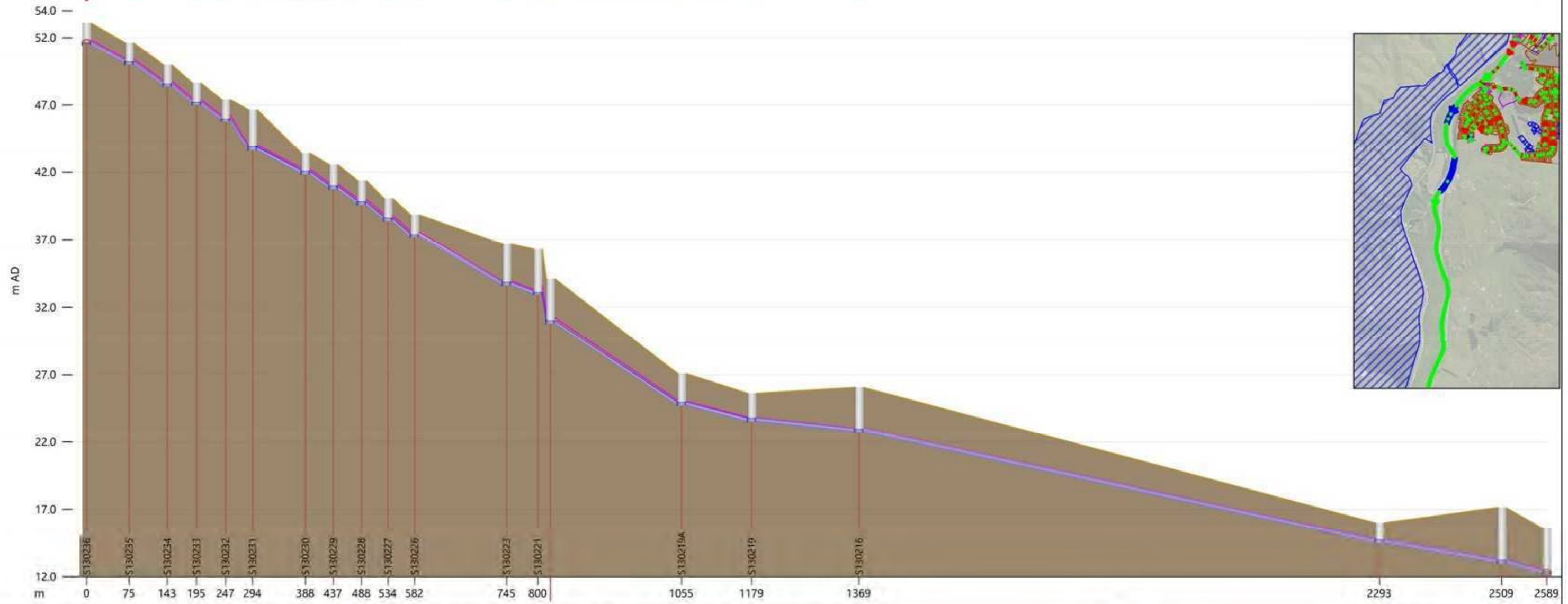


Link	S130217.1		S130216.1		S130215.1		S130214.1		S130213.1		S130208.1		S130207.1		S130206.1		S130205.1		S130204.1		S130203.1		S130202.1		S130201.1	
width (mm)	375		375		375		375		375		375		375		375		375		375		375		375		375	
us inv (m AD)	14.500		13.000		12.180		5.680		4.000		2.760		2.240		1.720		1.200		0.750		0.350		0.050		0.050	
ds inv (m AD)	13.000		12.180		5.680		4.000		3.500		2.310		1.790		1.270		0.750		0.350		0.050		-0.150		-0.150	
Length (m)	216.4		80.1		722.8		314.9		70.5		87.6		89.7		91.7		89.9		49.7		41.2		85.3		61.6	
surc	0.50		0.46		0.54		0.54		0.49		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
DS flow (l/s)	72.98		72.96		72.63		72.34		72.27		72.14		72.07		72.00		71.93		71.88		82.30		82.19		82.15	
DS velocity (m/s)	1.321		1.454		1.187		1.230		1.329		1.229		1.229		1.228		1.105		0.979		1.030		1.017		1.288	
Node	S130217	S130216	S130215	S130214		S130213	S130211	S130209	S130208	S130207	S130206	S130205	S130204	S130203	S130202	S130201	S130201A									
ground (m AD)	16.000	17.150	15.600	7.700		10.423	9.147	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	3.827										
Flood level (m AD)	16.000	17.150	15.600	7.700		10.423	9.147	6.597	3.400	3.690	3.260	2.990	3.486	3.591	3.827	3.827										
flood dep (m)	-1.312	-3.979	-3.246	-1.817		-6.237	-3.353	-0.267	-0.667	-0.348	-0.186	-0.186	-0.908	-1.269	-1.269											
level (m AD)	14.688	13.171	12.354	5.843		4.186	3.671	3.243	3.133	3.023	2.912	2.804	2.744	2.682	2.558											
vol lost (m3)	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											

● Node [2115]  
 ○ Node Types : node\_type  
 [ ] Color/Symbol (abs)  
 Break  
 ▲ Connect 2D  
 ● Manhole  
 ○ Outfall  
 ○ Outfall 2D  
 ■ Pond  
 ■ Storage  
 ○ flvol : sim.flvol (m3)  
 [ ] Color/Size/Circles  
 < 2  
 ● >= 2  
 ● >= 10  
 ● >= 500  
 --- Conduit [2078]  
 [ ] Line Color/Line Width  
 - < 0.5  
 - >= 0.5  
 ■ >= 0.8  
 ■ >= 1  
 ■ >= 2  
 Subcatchment [1682]  
 ○ System Type : system\_type  
 [ ] Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color  
 #NOT  
 ● combined  
 ● foul  
 ● other  
 ● overland  
 ● sanitary storm  
 --- Orifice [2]  
 --- Pump [62]

PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PLIMMERTON)  
 SCALE: 1:2000  
 0 2 km

DESIGNED: MH  
 DATE: 11/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 02  
**ENVELOPE**



Link											S130226.2	-	S130220.1	S130219A.1	S130219.2			S130218.1	S130217.1	-	
width (mm)	300	300	300	300	300	250	250	250	250	250	350	300	250	315	375			375	375	375	
us inv (m AD)	51.470	50.000	-	-	-	43.630	-	-	-	-	37.200	-	30.800	24.730	23.520			22.750	14.500	13.000	
ds inv (m AD)	50.070	48.430	-	-	-	41.900	-	-	-	-	33.610	-	24.730	23.520	22.750			14.500	13.000	12.180	
Length (m)	75.5	67.6	51.8	51.7	47.7	93.9	49.2	50.3	46.7	47.2	163.2	55.5	232.7	124.5	190.0			923.2	216.4	80.1	
surc	0.60	0.56	0.55	0.57	0.76	0.94	0.83	0.82	0.77	0.76	0.64	0.70	0.88	0.80	0.66			0.56	0.56	0.51	
DS flow (m <sup>3</sup> /s)	-	-	-	-	-	0.08684	-	-	-	-	0.08683	-	0.08681	0.08681	0.08678			0.08675	0.08674	0.08674	
DS velocity (m/s)	1.961	2.135	-	-	-	1.866	-	-	-	-	1.341	-	1.893	1.297	1.314			1.367	1.378	1.516	
Node											S130226	S130223	S130220	S130219A	S130219	S130218			S130217	S130216	-
ground (m AD)	-	-	-	-	-	-	-	-	-	-	38.848	36.670	34.100	27.102	25.620	26.070			16.000	17.150	
Flood level (m AD)	-	-	-	-	-	-	-	-	-	-	38.848	36.670	34.100	27.102	25.620	26.070			16.000	17.150	
flood dep (m)	-	-	-	-	-	-	-	-	-	-	-1.490	-2.836	-3.097	-2.153	-1.849	-3.127			-1.291	-3.961	
level (m AD)	-	-	-	-	-	-	-	-	-	-	37.358	33.834	31.003	24.949	23.771	22.943			14.709	13.189	
vol lost (m <sup>3</sup> )	-	0.000	-	-	-	-	-	-	-	-	0.000	0.000	-	0.000	0.000	0.000			0.000	0.000	

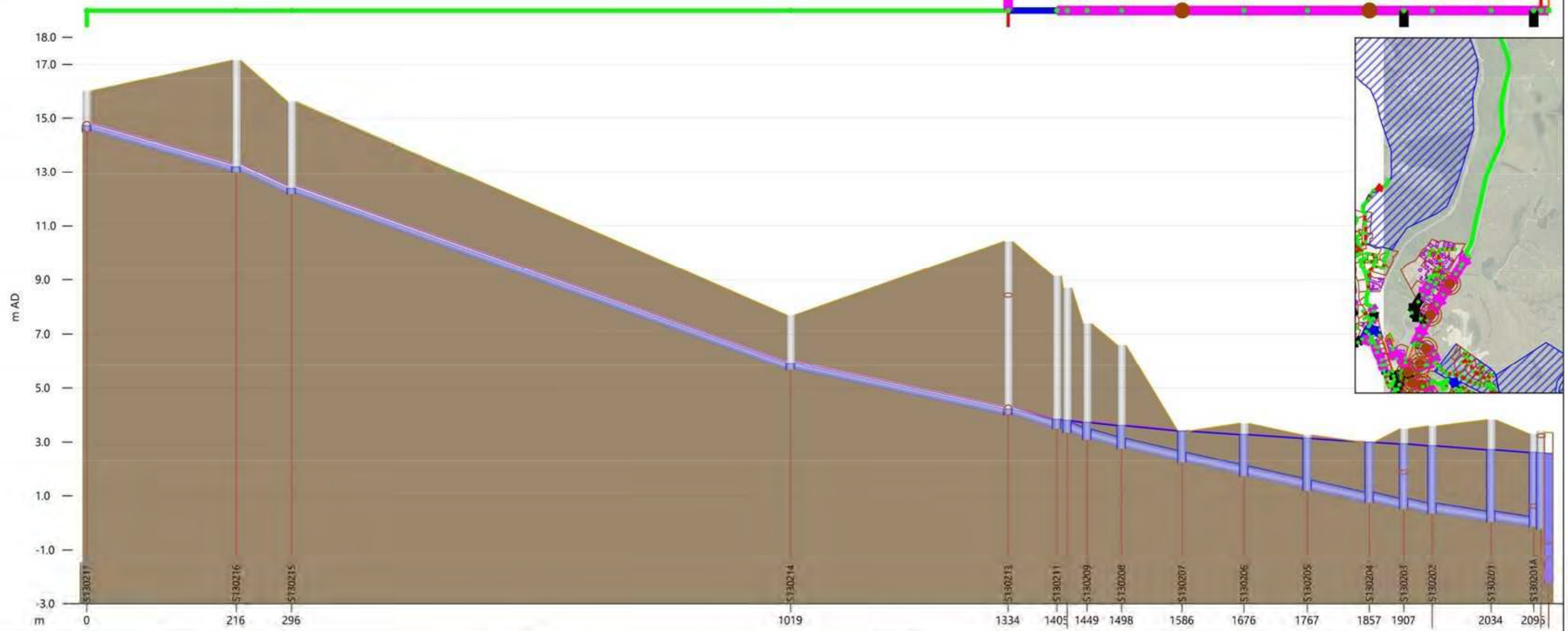
- Node [114]
- Node Types - node\_type
- Color/Symbol (lbs)
- Break
- Conduit 2D
- Manhole
- Outfall
- Outfall 2D
- Pond
- Storage
- Flow (m<sup>3</sup>/s)
- Color/Size/Circle
- v2
- v > 2
- v > 10
- v > 500
- Conduit [2076]
- max\_surge : min\_max\_surge
- Line Color/Line Width
- v < 0.5
- v < 0.5
- v < 0.8
- v < 1
- v < 2
- Subcatchment [1682]
- System Type - system\_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
- #NOT
- combined
- foul
- other
- overland
- sanitary
- storm
- Flap valve [5]
- Orifice [4]
- Pump [93]
- Wear [1]
- Polygon [1114]
- category\_id - category\_id
- Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
- #NOT
- Forecast ID Small Area

PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PUKERUA BAY)

SCALE: 1:2000

DESIGNED: MH  
 DATE: 21/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 01

**ENVELOPE**



Link	S130217.1			S130215.1			S130214.1			-	-	S130208.1	S130207.1	S130206.1	S130205.1	-	-	S130202.1	-		
width (mm)	375	375		375			375			375		375	375	375	375	375	375	375			
us inv (m AD)	14.500	13.000		12.180			5.680			4.000		3.090	2.760	2.240	1.720	1.200	0.750	-	0.350		
ds inv (m AD)	13.000	12.180		5.680			4.000			3.500		2.830	2.310	1.790	1.270	0.750	0.525	-	0.050		
Length (m)	216.4	80.1		722.8			314.9			70.5		49.9	87.6	89.7	91.7	89.9	49.7	41.2	85.3		
surc	0.56	0.51		0.61			0.60			0.89		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
DS flow (m <sup>3</sup> /s)	0.08674	0.08674		0.08671			0.08669			0.08669		0.08605	0.08165	0.07540	0.07430	-	-	0.08049	-		
DS velocity (m/s)	1.378	1.516		1.226			1.309			1.390		1.313	1.309	1.284	1.243	1.094	1.038	-	0.986		
Node	S130217	S130216	S130215				S130214				S130213	-	-	S130207	S130206	S130205	-	-	S130202	-	
ground (m AD)	16.000	17.150	15.600				7.700				10.423	-	-	6.597	3.400	3.690	3.260	2.990	-	3.591	3.827
Flood level (m AD)	16.000	17.150	15.600				7.700				10.423	-	-	6.597	3.400	3.690	3.260	2.990	-	3.591	3.827
flood dep (m)	-1.291	-3.961	-3.227				-1.791				-6.206	-	-	-2.988	0.000	-0.412	-0.123	0.000	-	-	-1.107
level (m AD)	14.709	13.189	12.373				5.909				4.217	-	-	3.608	3.400	3.278	3.137	2.990	-	2.863	2.720
vol lost (m <sup>3</sup> )	0.000	0.000	0.000				0.000				0.000	-	-	0.000	41.904	0.000	0.000	33.313	-	0.000	0.000

**Node (2114)**

- Node Types - node\_type
- Color/Symbol (all)
- Break
- Connect 2D
- Manhole
- Outlet
- Outlet 2D
- Pond
- Storage

**Vol. (m<sup>3</sup>/s)**

- Color/Size/Circle
- <= 2
- >= 2
- >= 10
- >= 500
- Conduit (1076)

**maxSurcharge - mcrmk\_Surcharge**

- Line Color/Line Width
- <= 0.5
- >= 0.5
- >= 0.8
- >= 1
- >= 2
- Subcatchment (1682)
- System Type - system\_type
- Fill Visibility/Fill Color/Fill Style/Line Visibility/Line Color/Line Width
- #NOT
- combined
- foul
- other

**overland**

- overland
- sanitary
- storm
- FIAD valve (5)
- Orifice (4)
- Ramp (42)
- Well (1)
- Polygon (1114)
- category\_id - category\_id
- Fill Visibility/Fill Color/Line Visibility/Line Color/Line Width
- #NOT
- Forecast ID Small Area

PROJECT: PUKERUA HOLDING LTD  
 MT WELCOME, PUKERUA BAY  
 WASTEWATER PROFILE: PROJECT  
 DISCHARGE TO PS13 (PLIMMERTON)

DESIGNED: MH  
 DATE: 21/11/2025  
 PROJECT No: 1753-02  
 DRAWING No: 02

SCALE: 1:2000

**APPENDIX 5**  
**WWL CORRESPONDENCE**



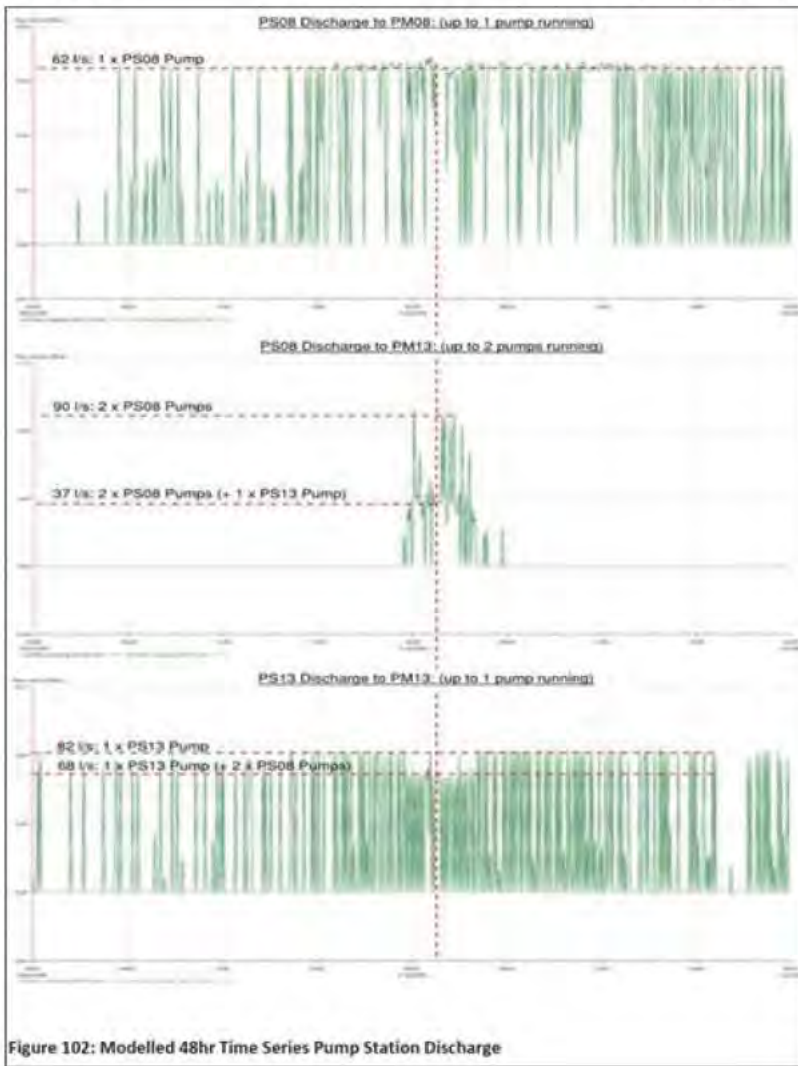


Figure 102: Modelled 48hr Time Series Pump Station Discharge

Although for some periods of a storm all pumps may not be operating simultaneously (e.g. before and after the peak), it would be non-conservative to assume PS13 can still achieve 90L/s with the PS8 works in place.

This reduction in PS13 capacity reduces risk to public health at the Mana Esplanade uncontrolled overflow location. This is the limitation we need to work with.

Let me know if you have any other questions.

Best regards

Manu

**Manu Ward (he, him)**

Senior Modeller – Wastewater (seconded)



Tel [redacted] Mob [redacted]

Private Bag 39804, Wellington Mail Centre 5045  
Level 4, 25 Victoria Street, Petone, Lower Hutt

[www.wellingtonwater.co.nz](http://www.wellingtonwater.co.nz)

---

**From:** Miguel Hernandez <[Miguel.Hernandez@envelope-eng.co.nz](mailto:Miguel.Hernandez@envelope-eng.co.nz)>  
**Sent:** Monday, 6 October 2025 12:50 pm  
**To:** Manu Ward - [REDACTED]; Kyle Dirse <[kyle.dirse@envelope-eng.co.nz](mailto:kyle.dirse@envelope-eng.co.nz)>  
**Cc:** Nadia Nitsche [REDACTED]; Alistair Osborne [REDACTED]  
**Subject:** Re: Mt Welcome – Wastewater Main Upgrade Options Pre App

You don't often get email from [miguel.hernandez@envelope-eng.co.nz](mailto:miguel.hernandez@envelope-eng.co.nz). [Learn why this is important](#)

**Caution:** This is an external email. Please take care when clicking links or opening attachments.

Hi Manu.

Thanks for your comments and provided files, I could open them without any problems.

I have two questions:

**Base flow:** From your model, I noticed a base flow in the Plimmerton Farms sub catchments. Apparently equal to Pop/2400 (l/s). Do you suggest using the same approach for the Mt Welcome proposed sub catchments?

**Pump Rates:** The model version that I have uses fixed existing rates of 30l/s and 71l/s for the PS13 and 50l/s, 25l/s and 37l/s for the PS08. Your version uses 68l/s for the PS13 and 62l/s, 20l/s and 17l/s for the PS08. These are lower than my version. Can you confirm these values?. Mainly PS13 can affect the performance in our scope.

Thank you

**MIGUEL HERNANDEZ**

SENIOR HYDRAULIC ENGINEER

M [+64 21 056 7640](tel:+64210567640)

A 31B Drake Street (inside Victoria Park Market)  
Auckland Central 1010





**From:** Manu Ward [REDACTED]  
**Sent:** Friday, October 3, 2025 5:23 PM  
**To:** Kyle Dirse <kyle.dirse@envelope-eng.co.nz>  
**Cc:** Nadia Nitsche [REDACTED]; Miguel Hernandez <Miguel.Hernandez@envelope-eng.co.nz>; Alistair Osborne [REDACTED]  
**Subject:** RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Kyle.

**Inflow and infiltration parameters**

I have found some work that Hywel was doing to review the Plimmerton Farms tank.

He has noted the following regarding inflow and infiltration parameters for Greenfield assumptions in this area.

The “typical” values are used for sizing long-term options, whilst the “adopted” values could be justified for near-term scenarios (when the asset is new and less RDII can be expected).

**4.1.1 Greenfield Hydrology**

The default greenfield hydrology parameters for groundwater infiltration were updated as shown in Table 2 Greenfield Hydrology Update below; the initial parameters were considered to be conservative for a newly constructed network with modern materials.

parameter	typical	adopted	units
runoff area 1 - road	0.4	0.2	percentage of contributing area
runoff area 2 - pavement	0.4	0.2	percentage of contributing area
runoff area 3 - permeable	4	2	percentage of contributing area
runoff area 4 - GWI	40	20	dummy surface to replicate inflow and infiltration from the soil and ground stores
soil depth (m)	1	1	An estimate of the soil depth
percolation coefficient	0.8	0.8	A time coefficient, determined by calibration from existing data. It is recommended that the value should be between 0.1 and 10
percolation threshold	20	20	The percentage saturation level of the soil at which water starts to percolate downwards
percolation percentage infiltrating	15	5	The percentage of percolation flow that infiltrates directly into the drainage network
porosity of soil	30	30	A coefficient representing the porosity of the soil (upper storage reservoir)
baseflow coefficient	0.01	0.01	A time coefficient, determined by calibration from existing data. It is recommended that the value should be between 100 and 10000

**Domestic profile.**

Please find attached the modelling specification which includes the standard dry-weather profile.

I double checked previous work in the Hutt Valley, and the assumption adopted there was 200 L/Pe/day for new developments, to be consistent with the Regional Standard. Let’s use 200 (instead of alternatives 185 or 250 L/Pe/day).

**Simplified model**

You can download a transportable database of the simplified “Northern Growth Area” model here (ICM v2024.5).

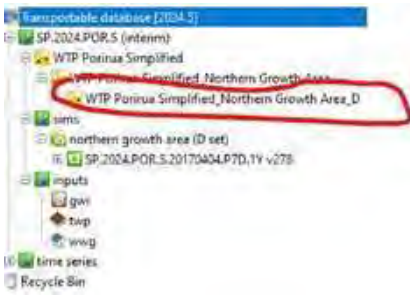
<https://we.tl/t-iPgxGdTrNY>

The relevant scenarios are in the network “WTP Porirua Simplified\_Northern Growth Area\_D”:

- CUR AAA: do nothing 2018 scenario
- DEC: MED growth (2028) scenario, with committed projects – Plimmerton Farms including tank with RTC, PS8 works (which is expected to impact PS8 and PS13 peak capacity), 93 Grays Rd is also included, but this should probably not be considered in this horizon.
- DED: L2M growth (2058) scenario, with all greenfield catchments fully developed, but no additional upgrades above DEC.

This is not a final model, but these may be helpful as reference when considering the assumptions that impact Mt Welcome and Muri Rd. I would update your PS8 and PS13 capacity to be consistent with this model.

Wider review and updates of the strategic/simplified model is ongoing as part of the Porirua Containment Standard and Northern Growth Area Wastewater Servicing project (expected completion June 2026).



Let me know if you have any questions.

Best regards

Manu

---

**From:** Kyle Dirse <kyle.dirse@envelope-eng.co.nz>  
**Sent:** Thursday, 2 October 2025 2:56 pm  
**To:** Manu Ward [REDACTED]  
**Cc:** Nadia Nitsche [REDACTED]; Miguel Hernandez <Miguel.Hernandez@envelope-eng.co.nz>  
**Subject:** RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

**Caution:** This is an external email. Please take care when clicking links or opening attachments.

Hi Manu,

Thanks for your time today. Some rough notes below.

**1. Population 2018, 2038 or 2068?**

R:/ Will use 2018 base with the developed site. This will assess the effects of the development only. Model to be sent, including the added Plimmerton tank.

**2. Impervious**

The runoff inflows in the NGA model are based on the land use distribution (see below) for different projected scenarios.

Should we consider a future impervious of 2013 or 2068? OR a combination?

R: Adopt 2018 scenario. 0.4 / 0.4 / 4 / 40.

**3. Ground infiltration is the same for the projected scenarios, following the figure parameters. Assuming the same for the new project?**

R: Manu to double check, likely RUNOFF (greenfield).

**4. Wet Weather Flow**

Considering a design storm based on specifications OR the provided historical rain data from 2017/04/04 to 2017/04/08?

R: Calibrated flows to be used. Envelope to compare vs design flows.

**5. Should we consider the impervious parameters based on 2068 scenario or the 2013 scenario?**

R: Related to question 2. For future scenario, also consider the 2018 parameters.

#### 6. Domestic profile

The model uses a daily wastewater profile (purely foul flow) in the area, called Porirua FM4\_S130201A\_PLIMMERTON, with a daily peak of 1.52. This was used in the calibrated model.

Because of this methodology, together with the run-off model, the results may vary from the calculated flows in the design (WWF peak factors based on areas and pipe lengths).

Should we consider a design storm based on specifications OR the provided historical rain data from 2014/04/04 to 2014/04/08?

R: Manu to send WWL Modelling Specification (June 2020). Standard profile = 185 L; specification = 250 L; To be confirmed with Nadia.

Cheers.

#### KYLE DIRSE

DIRECTOR

M [+64 27 228 1287](tel:+64272281287)

A 2/21 Joll Road  
Havelock North 4130



---

**From:** Manu Ward [REDACTED]  
**Sent:** Wednesday, 1 October 2025 3:35 pm  
**To:** Kyle Dirse <[kyle.dirse@envelope-eng.co.nz](mailto:kyle.dirse@envelope-eng.co.nz)>  
**Cc:** Nadia Nitsche [REDACTED]  
**Subject:** RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

You don't often get email from [REDACTED]. [Learn why this is important](#)

Hi Kyle

Sorry for the slow response here. Would you be available between 9am-1pm Thursday or Friday or any time Monday to discuss this?

Cheers

Manu

---

**From:** Nadia Nitsche [REDACTED]  
**Sent:** Wednesday, 1 October 2025 8:47 am  
**To:** Manu Ward [REDACTED]  
**Subject:** Fwd: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Manu

Would you be able to help out?

Thank you

Nadia

Sent from my iPhone

Begin forwarded message:

**From:** Kyle Dirse <[kyle.dirse@envelope-eng.co.nz](mailto:kyle.dirse@envelope-eng.co.nz)>  
**Date:** 1 October 2025 at 8:29:16 AM NZDT  
**To:** Nadia Nitsche [REDACTED]  
**Subject:** RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

**Caution:** This is an external email. Please take care when clicking links or opening attachments.

Hi Nadia,

Any update on this?

A quick 30-minute Teams session would be really helpful to ensure we're working with the correct scenarios.

Regards,

**KYLE DIRSE**

**DIRECTOR**

**M** [+64 27 228 1287](tel:+64272281287)

**A** 2/21 Joll Road  
Havelock North 4130




---

**From:** Nadia Nitsche [REDACTED]  
**Sent:** Tuesday, 23 September 2025 7:16 am  
**To:** Kyle Dirse <[kyle.dirse@envelope-eng.co.nz](mailto:kyle.dirse@envelope-eng.co.nz)>  
**Subject:** Re: Mt Welcome – Wastewater Main Upgrade Options Pre App

You don't often get email from [REDACTED] [Learn why this is important](#)

Hi Kyle

Thank you for the email. Our wastewater modeller is on leave this week but will look into it next week when back.

Thanks

Nadia

On 22/09/2025, at 7:24 PM, Kyle Dirse <[kyle.dirse@envelope-eng.co.nz](mailto:kyle.dirse@envelope-eng.co.nz)> wrote:

**Caution:** This is an external email. Please take care when clicking links or opening attachments.

Hi Nadia,

Hope all is well.

I'm wondering if you can provide us with some guidance on the email below.

The Mt Welcome development (south of Pukerua Bay) is currently in the design phase.

We are assessing the constraint areas of the SH59 trunk main and identifying what mitigation will be required for the development.

Could you please connect me with a WWL modeller to discuss the ICM assumptions?

Regards,

**KYLE DIRSE**

**DIRECTOR**

**M** +64 27 228 1287

**A** 2/21 Joll Road  
Havelock North 4130

—

—

**From:** Kyle Dirse  
**Sent:** Wednesday, 17 September 2025 3:39 pm  
**To:** 'Alister O'Callaghan'; [REDACTED]  
**Cc:** [REDACTED]; Andrew Maraura  
[REDACTED]; Mathew Baily [REDACTED]; Nancy Gomez  
[REDACTED]  
**Subject:** RE: Mt Welcome – Wastewater Main Upgrade Options Pre App

Hi Alister,

**Can we book in a team's meetings with the WWL modelling team? We just want to confirm some of the ICM model assumptions.**

Some high level queries below.

1. Population 2013, 2038 or 2068?.
2. Impervious: The runoff inflows in the NGA model are based on the land use distribution (see below) to the different projected scenarios. Should we consider a future impervious of 2013 or 2068? OR a combination?

<image006.png>

3. Ground infiltration is the same for the projected scenarios, following the figure parameters. Assuming the same for the new project?

<image007.png>

4. Wet Weather Flow. Considering a design storm based on specifications OR the provided historical rain data from 2014/04/04 to 2014/04/08?

Muri Road Development Assumption:

1. Should we consider the proposed upgrades in PS30?. PS30 upgrade from 8l/s to 18l/s

Mt Welcome Design:

1. Should we consider the impervious parameters based on 2068 scenario or the 2013 scenario?
2. Domestic profile: The model uses a daily wastewater profile (this is purely foul flow, see below) in the area, this is called 'Porirua FM4\_S130201A\_PLIMMERTON' with a daily peak of 1.52 and this was used in the calibrated model. Because of this methodology, together with the run-off model, the model results may vary from the calculated flows in the design (WWF peak factors based on areas and pipe lengths). Should we consider a design storm based on specifications OR the provided historical rain data from 2014/04/04 to 2014/04/08?

<image008.png>

## **KYLE DIRSE**

**DIRECTOR**

**M** [+64 27 228 1287](tel:+64272281287)

**A** 2/21 Joll Road  
Havelock North 4130

—

—

**From:** Alister O'Callaghan <[REDACTED]>  
**Sent:** Friday, 8 August 2025 3:17 pm  
**To:** Kyle Dirse <kyle.dirse@envelope-eng.co.nz>  
**Cc:** [REDACTED]; Andrew Maraura <[REDACTED]>; Mathew Baily <[REDACTED]>; Nancy Gomez <[REDACTED]>  
**Subject:** Mt Welcome – Wastewater Main Upgrade Options Pre App

Greetings Kyle

### **Mt Welcome – Wastewater Main Upgrade Options Pre App**

Discussion to date suggest council will be interested in working with you on this.

Your option 4 looks complex to administer but most likely will provide the best outcome for council with pushing off the funding requirements and least delays for your developer with a staged approach as demand increases.

Once you have bit of a plan showing the developments 10-year timeline, likely development trigger points and upgrades linked to the trigger points then we can begin the stakeholder discussion to flesh out what actions are required by the stakeholders to facilitate your timeline or roadblocks that need to be addressed.

Kind regards

---

**Subject:** [EXTERNAL] Mt Welcome Wastewater Upgrades.

Hi Alister,

Following up on our meeting from last week, in specific Mt Welcome wastewater.

We're keen to know if you have any information on the planned SH59 gravity sewer capacity upgrade between Pukerua and Plimmerton.

This project is included in the 2024 Porirua DCP as a planned upgrade, partially funded by development contributions from the NGA.

We've explored several options using preliminary modelling based on the 2018 calibrated ICM WW model.

A summary of key options and findings is provided below.

---

#### **Option 1: Council Facilitated Upgrade**

This option involves on-site design using gravity-based systems wherever possible, with pump stations used only where necessary.

On-site storage at pump stations would meet the minimum WWRS requirements, potentially causing downstream issues and overflows during heavy rain.

Wellington Water would need to upgrade infrastructure, partially funded by development contributions.

---

#### **Option 2: Developer Facilitated Upgrade**

Similar to Option 1 but delivered as a developer-led upgrade with partial funding from the council.

---

#### **Option 3: On-site Detention**

This method assumes full site development without downstream upgrades. Storage calculations, based on the 2018 Calibrated Infoworks ICM model require significantly more storage than WWRS standards to retain a three-day wet weather event.

WWRS requires 20 hours of ADWF storage for public pump stations, ensuring localized capacity but not addressing downstream limitations.

High-velocity discharges can worsen these issues. Without upgrades, mitigating the fully developed NGA would require 9,450 m<sup>3</sup> of wet well storage

---

**Option 4: Combined**

This staged approach targets critical network areas, allowing development to begin with minimal upfront costs or delays.

Modelling shows up to 24% of the yield can connect via gravity without surcharging the existing network, assuming no pump stations are used. (applies to all options above)

An additional 11% can be supported by upgrading 204m of pipe. Beyond that, a 400 m<sup>3</sup> pump station at Mt Welcome or further bulk network upgrades (as in Option 1) would be required.

Note these are high level options based on preliminary modelling. But keen for a steer from WWL on expectations or planned upgrades. Potentially a catch up with your modelling team after as well.

Regards,

**KYLE DIRSE**

---

Kind regards

**Alister O'Callaghan** | Senior Engineer

On Behalf of the Wellington Water Land Development Team.

<image001.jpg>

Mobile [REDACTED]

Email [REDACTED]

Zoom meeting request to [REDACTED]

WhatsApp [REDACTED] (Install WhatsApp and call for free)

Messenger <https://www.facebook.com/alister.ocallaghan>

**e2Environmental Ltd**

Office 03 358 4955

46/1 Acheron Drive, Christchurch, 8041

[www.e2Environmental.com](http://www.e2Environmental.com)

---

**From:** Kyle Dirse <[kyle.dirse@envelope-eng.co.nz](mailto:kyle.dirse@envelope-eng.co.nz)>

**Sent:** Friday, 8 August 2025 2:15 pm

**To:** Alister O'Callaghan [REDACTED] Rory Smeaton [REDACTED]

**Cc:** Dan Smyth <[dan.smyth@classicdevelopments.co.nz](mailto:dan.smyth@classicdevelopments.co.nz)>; William Dorset <[william.dorset@classicdevelopments.co.nz](mailto:william.dorset@classicdevelopments.co.nz)>

**Subject:** RE: Mt Welcome - 3 Waters infrastructure pre-app advice

Hi Alister,

Just following up on this again.

There is some urgency to understanding network constraints and developer led upgrade options to help inform our design.

Regards,

**KYLE DIRSE**

**DIRECTOR**

**M** [+64 27 228 1287](tel:+64272281287)

**A** 2/21 Joll Road  
Havelock North 4130

—

—

---

**From:** Kyle Dirse  
**Sent:** Tuesday, 29 July 2025 10:14 am  
**To:** Alister O'Callaghan [REDACTED]; Rory Smeaton [REDACTED]  
**Cc:** Dan Smyth <[dan.smyth@classicdevelopments.co.nz](mailto:dan.smyth@classicdevelopments.co.nz)>; William Dorset <[william.dorset@classicdevelopments.co.nz](mailto:william.dorset@classicdevelopments.co.nz)>  
**Subject:** RE: Mt Welcome - 3 Waters infrastructure pre-app advice

Hi Alister,

Has there been any further discussions on your end?

At the first instance, it might be good to have a meeting the WWL Growth Team or modellers.

Just to discuss model parameters, downstream constraints, etc.

Regards,

**KYLE DIRSE**

**DIRECTOR**

**M** [+64 27 228 1287](tel:+64272281287)

**A** 2/21 Joll Road  
Havelock North 4130

—

---

**From:** Alister O'Callaghan [REDACTED]  
**Sent:** Tuesday, 22 July 2025 3:46 pm  
**To:** Rory Smeaton [REDACTED]; Kyle Dirse <kyle.dirse@envelope-eng.co.nz>  
**Cc:** Dan Smyth <dan.smyth@classicdevelopments.co.nz>; William Dorset <william.dorset@classicdevelopments.co.nz>  
**Subject:** RE: Mt Welcome - 3 Waters infrastructure pre-app advice

Greetings Rory and Kyle

**2025-07-22 WWL Pre-App – Mt Welcome 3 Water Infrastructure (Trunk Wastewater)**

Thanks for the more detailed options than I was able to provide.

The 9400m<sup>3</sup> (4 Olympic swimming pools 50mx25mx2m or 2.5 times the 3.7Ml water reservoirs) of WW detention is Hugh. Thats 10m<sup>3</sup> per lot.

I am sure the Wellington Water Growth Team and PCC will be keen to discuss partnership options to generate a "win win" solution to enable the Mt Welcome growth. I will pass on your query to the internal stakeholders and see if we can get some dialogue in this space.

Kind regards

**Alister O'Callaghan** | Senior Engineer

On Behalf of the Wellington Water Land Development Team.

<image001.jpg>

Mobile [REDACTED]

Email [REDACTED]

Zoom meeting request to [REDACTED]

WhatsApp [REDACTED] (Install WhatsApp and call for free)

Messenger <https://www.facebook.com/alister.ocallaghan>

**e2Environmental Ltd**

Office 03 358 4955

46/1 Acheron Drive, Christchurch, 8041

[www.e2Environmental.com](http://www.e2Environmental.com)

---

**From:** Rory Smeaton <[REDACTED]>  
**Sent:** Tuesday, 22 July 2025 1:10 pm  
**To:** Kyle Dirse <kyle.dirse@envelope-eng.co.nz>  
**Cc:** Dan Smyth <dan.smyth@classicdevelopments.co.nz>; William Dorset <william.dorset@classicdevelopments.co.nz>; Alister O'Callaghan [REDACTED]  
**Subject:** Mt Welcome - 3 Waters infrastructure pre-app advice

Kia ora koutou,

Alister provided the **attached** advice on Friday and asked me to pass it on. Apologies for the delay.

Ngā mihi,

Rory

**Rory Smeaton** MNZPI

Principal Policy Planner

Kaihanga Mahere Kaupapahere Matua

Mob: [REDACTED]

Phn: [REDACTED]

<image005.png>

[porirua.govt.nz](http://porirua.govt.nz)

---

**From:** Kyle Dirse <[kyle.dirse@envelope-eng.co.nz](mailto:kyle.dirse@envelope-eng.co.nz)>  
**Sent:** Tuesday, 22 July 2025 12:32 pm  
**To:** Alister O'Callaghan <[REDACTED]>  
**Cc:** Rory Smeaton <[REDACTED]> Dan Smyth <[dan.smyth@classicdevelopments.co.nz](mailto:dan.smyth@classicdevelopments.co.nz)>; William Dorset <[william.dorset@classicdevelopments.co.nz](mailto:william.dorset@classicdevelopments.co.nz)>  
**Subject:** [EXTERNAL] Mt Welcome Wastewater Upgrades.

Hi Alister,

Following up on our meeting from last week, in specific Mt Welcome wastewater.

We're keen to know if you have any information on the planned SH59 gravity sewer capacity upgrade between Pukerua and Plimmerton.

This project is included in the 2024 Porirua DCP as a planned upgrade, partially funded by development contributions from the NGA.

We've explored several options using preliminary modelling based on the 2018 calibrated ICM WW model.

A summary of key options and findings is provided below.

---

#### **Option 1: Council Facilitated Upgrade**

This option involves on-site design using gravity-based systems wherever possible, with pump stations used only where necessary.

On-site storage at pump stations would meet the minimum WWRS requirements, potentially causing downstream issues and overflows during heavy rain.

Wellington Water would need to upgrade infrastructure, partially funded by development contributions.

---

#### **Option 2: Developer Facilitated Upgrade**

Similar to Option 1 but delivered as a developer-led upgrade with partial funding from the council.

---

**Option 3: On-site Detention**

This method assumes full site development without downstream upgrades. Storage calculations, based on the 2018 Calibrated Infoworks ICM model require significantly more storage than WWRS standards to retain a three-day wet weather event.

WWRS requires 20 hours of ADWF storage for public pump stations, ensuring localized capacity but not addressing downstream limitations.

High-velocity discharges can worsen these issues. Without upgrades, mitigating the fully developed NGA would require 9,450 m<sup>3</sup> of wet well storage

---

**Option 4: Combined**

This staged approach targets critical network areas, allowing development to begin with minimal upfront costs or delays.

Modelling shows up to 24% of the yield can connect via gravity without surcharging the existing network, assuming no pump stations are used. (applies to all options above)

An additional 11% can be supported by upgrading 204m of pipe. Beyond that, a 400 m<sup>3</sup> pump station at Mt Welcome or further bulk network upgrades (as in Option 1) would be required.

Note these are high level options based on preliminary modelling. But keen for a steer from WWL on expectations or planned upgrades. Potentially a catch up with your modelling team after as well.

Regards,

**KYLE DIRSE**

**DIRECTOR**

**M [+64 27 228 1287](tel:+64272281287)**

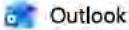
**A 2/21 Joll Road  
Havelock North 4130**

—

==

**Disclaimer**

---  
The content of this email is confidential, may be legally privileged and is intended only for the person named above. If this email is not addressed to you, you must not use, disclose or distribute any of the content. If you have received this email by mistake, please notify the sender by return email and delete the email. Thank you.  
---



FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

From Dave Munro <dave.munro@envelope-eng.co.nz>

Date Wed 12/03/2025 12:48 PM

To Kyle Dirse <kyle.dirse@envelope-eng.co.nz>; Miguel Hernandez <Miguel.Hernandez@envelope-eng.co.nz>

2 attachments (7 MB)

Scada\_MuriRd\_Flow\_1min\_28092024-28102024.xlsx; Scada\_MuriRd\_Pumpdata\_1min\_28092024-28102024.xlsx

Ditto???

**DAVE MUNRO**

PROJECT LEAD / SENIOR ENGINEER

M ±64 21 390 307

A James Smith Building - Level 1, 65 Cuba Street

Te Aro, Wellington 6011



From: Alister O'Callaghan <alister.ocallaghan@e2environmental.com>

Sent: Wednesday, 12 March 2025 12:36 pm

To: Dave Munro <dave.munro@envelope-eng.co.nz>

Subject: FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

**Alister O'Callaghan** | Senior Engineer

On Behalf of the Wellington Water Land Development Team.



Mobile [REDACTED]

Email [REDACTED]

Zoom meeting request to [REDACTED]

WhatsApp [REDACTED] (Install WhatsApp and call for free)

Messenger <https://www.facebook.com/alister.ocallaghan>

**e2Environmental Ltd**

Office 03 358 4955

46/1 Acheron Drive, Christchurch, 8041

[www.e2Environmental.com](http://www.e2Environmental.com)

From: Alister O'Callaghan

Sent: Tuesday, 5 November 2024 4:32 pm

To: Kyle Dirse Envelope (kyle.dirse@envelope-eng.co.nz) <kyle.dirse@envelope-eng.co.nz>

Subject: FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Greetings Kyle.

Some more information re PS30 in Muri Road.

**Alister O'Callaghan** | Senior Engineer

On Behalf of the Wellington Water Land Development Team.



Mobile [REDACTED]

Email [REDACTED]

Zoom meeting request to [REDACTED]

WhatsApp [REDACTED] (Install WhatsApp and call for free)

Messenger <https://www.facebook.com/alister.ocallaghan>

**e2Environmental Ltd**

Office 03 358 4955

46/1 Acheron Drive, Christchurch, 8041

[www.e2Environmental.com](http://www.e2Environmental.com)

From: Manu Ward [REDACTED]

Sent: Tuesday, 5 November 2024 12:46 pm

To: Alister O'Callaghan [REDACTED]

Cc: Alistair Osborne [REDACTED]; Kara Beveridge [REDACTED] Phil Garrity [REDACTED]

Subject: RE: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

You don't often get email from [REDACTED]. [Learn why this is important.](#)

Hi Alister

As promised in our phone conversation last week, here is some information I can find regarding Muri Road pump station.

Modelled Contributing Catchment:



Area: 15.4 Ha  
 Population (2018): 252  
 Average baseflow: 0.46 L/s

Regional Standard static formula for flow:  
 ADWF: 0.6 L/s (assuming 200 L/pe/day)  
 PWWF: 12.3 L/s (assuming 0.8 km/ha pipe length, and "average" groundwater conditions).

Approximate 1-year ARI Event modelled PWWF: 13.5 L/s

Pump Data

The Porirua model is set up with a total pump capacity of 8 L/s, though I can't confirm where this figure comes from. The 3 Waters Mechanical Inspection Report (2016) indicates a capacity of 13.5 (single pump) or 17 (dual pumps) L/s.

Phil Garrity in the Network Engineering team (cc'd to this email) indicates that the pumps were apparently replaced with the Flygt NP3127.185 SH in around 2016/17.

Other relevant data is shown below (from a database last updated in 2020), which indicates a capacity of 10.8 L/s. It is unclear if the stated designed duty point is for a single or dual pump – this should be checked with the pump and system curves.

**Pump Information**

**Renewal and Condition Inform**

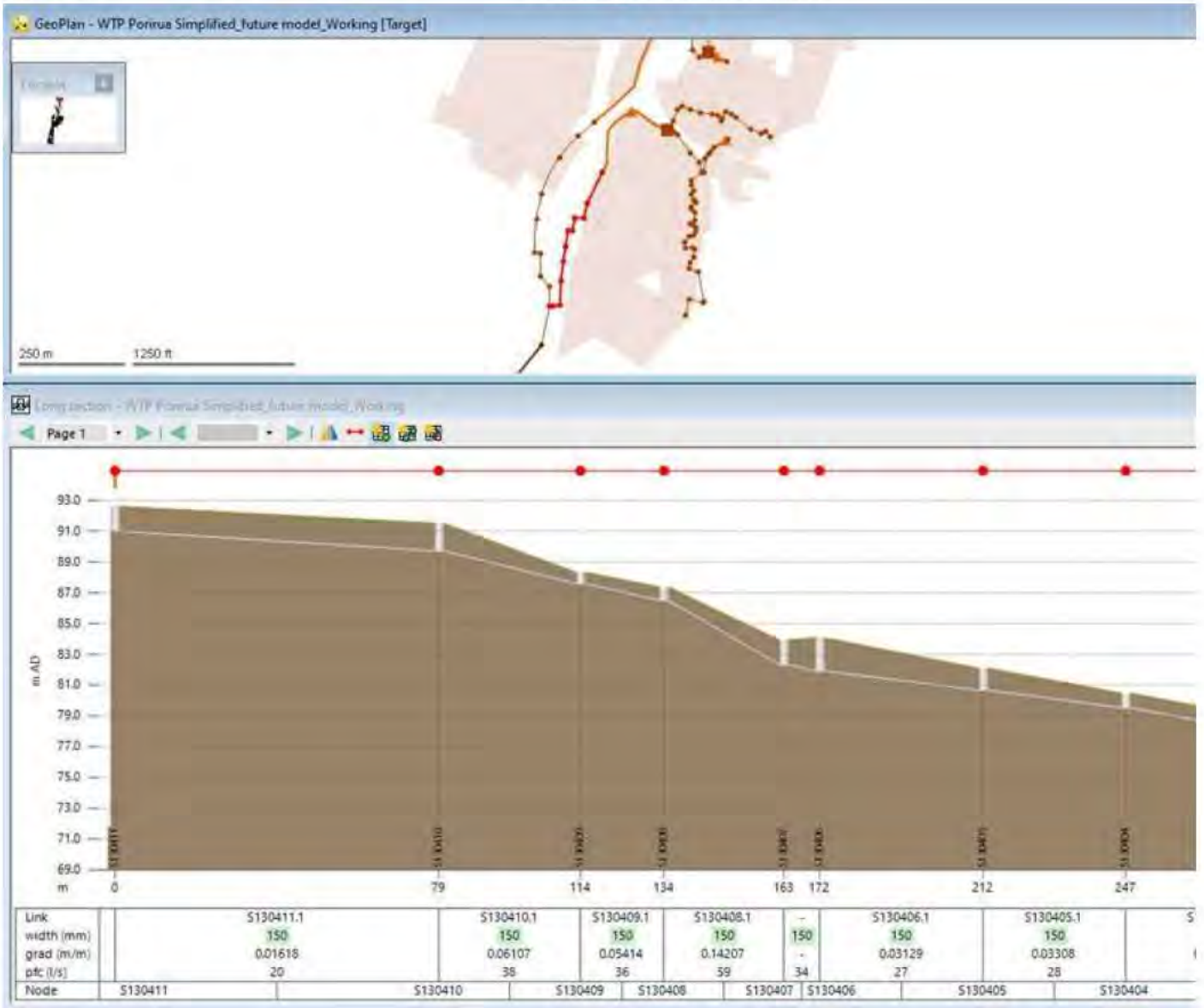
Site Unit ID	Name	No. of Pumps	Manufacturer	Pump Model	Rated Output (kW)	Total Installed (kW)	Designed Duty		Measured Duty		Electrical		Magflow		Pipework		
							Pump Capacity (L/s)	System Head (mWC)	ADWF (L/s)	Pump Capacity (L/s)	Last overhaul	Condition grade	Installed	Magflow location	Last overhaul	Condit grade	
PS230	Muri Road	3	FLYGT	NP 3127 SH 248 185	7.40	22.2	10.80	22.80									

The attached spreadsheets show the previous month of SCADA records for the pump. It is difficult to confirm the total pump capacity from the instantaneous flow records, but the pump starts and run time data may be useful to verify the assessment of the 3 Waters Mechanical Inspection Report.

Downstream pipe data

The following image shows the modelled long-section profile of the downstream pipe data until it connects to the 250mm pipe on the western side of SH59. (The profile is for the pipes selected in red in the plan view).

Note that additional catchments of about 2.7 Ha area and population of 63 also contribute to this pipe between Muri Road PS and SH59. (Modelled 1yr PWWF 3.5 L/s). This implies that pipe upgrades would likely be required to contain the pump discharge if it exceeds the existing pipe-full capacity of about 20 L/s.



Let me know if you have any queries.  
 Best regards  
 Manu

Manu Ward (he, him)  
 Senior Modeller – Wastewater (seconded)



Tel: [Redacted]  
 Private Bag 39804, Wellington Mail Centre 5045  
 Level 4, 25 Victoria Street, Petone, Lower Hutt  
[www.wellingtonwater.co.nz](http://www.wellingtonwater.co.nz)



From: Alistair Osborne [Redacted]  
 Sent: Friday, October 25, 2024 1:45 PM  
 To: Manu Ward [Redacted]  
 Subject: FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Hi Manu,

Any chance you could have a look at the request below. Let me know if I can provide additional info, and Kara can help find the right model if needed.

cheers

Allstair Osborne (he, him) Drainage Modelling - Team Lead



Tel: [Redacted]

Private Bag 39804, Wellington Mail Centre 5045  
Level 3, 25 Victoria Street, Petone, Lower Hutt



**From:** Kara Beveridge - [Redacted] On Behalf Of Modelling Team  
**Sent:** Friday, October 25, 2024 1:39 PM  
**To:** Alistair Osborne [Redacted]  
**Subject:** FW: 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Hi Ali,

Could this query go to Manu? Not entirely sure what information they need though.

Cheers,

Kara Beveridge Graduate Modeller



Tel: [Redacted]

Private Bag 39804, Wellington Mail Centre 5045  
Level 4, 25 Victoria Street, Petone, Lower Hutt

[www.wellingtonwater.co.nz](http://www.wellingtonwater.co.nz)

Wellington Water is owned by the Hutt, Porirua, Upper Hutt and Wellington city councils, South Wairarapa District Council and Greater Wellington Regional Council. We manage their drinking water, wastewater and stormwater services.

**From:** Alister O'Callaghan [Redacted]  
**Sent:** Thursday, October 24, 2024 8:36 AM  
**To:** Modelling Team <[Modelling\\_Team@wellingtonwater.co.nz](mailto:Modelling_Team@wellingtonwater.co.nz)>  
**Cc:** Kyle Dirse Envelope ([kyle\\_dirse@envelope-eng.co.nz](mailto:kyle_dirse@envelope-eng.co.nz)) <[kyle\\_dirse@envelope-eng.co.nz](mailto:kyle_dirse@envelope-eng.co.nz)>  
**Subject:** 2024-10-24 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

**Caution:** This is an external email. Please take care when clicking links or opening attachments.

Greetings Ahmed

Is there any additional information you can provide Kyle from (Envelope) as he is tasked with designing the PS230 wastewater pumping station (located in Muri Road Pukerua Bay) upgrade to service the 34 Muri Road, 152 lot subdivision?

Kind regards

**Alister O'Callaghan** | Senior Engineer  
On Behalf of the Wellington Water Land Development Team.



Mobile [Redacted]  
Email [Redacted]  
Zoom meeting request to [Redacted]  
WhatsApp [Redacted] (Install WhatsApp and call for free)  
Messenger <https://www.facebook.com/alister.ocallaghan>

**e2Environmental Ltd**  
Office 03 358 4955  
46/1 Acheron Drive, Christchurch, 8041  
[www.e2Environmental.com](http://www.e2Environmental.com)

**From:** Alister O'Callaghan  
**Sent:** Tuesday, 22 October 2024 3:27 pm  
**To:** [Redacted]  
**Cc:** [Land\\_Development@wellingtonwater.co.nz](mailto:Land_Development@wellingtonwater.co.nz); [Redacted]  
**Subject:** 2024-10-22 RFI re As-built and O&M INFORMATION re Wastewater PS230 Muri Road Pukerua Bay.

Greetings Ben

Can anyone from your team provide up to date information for this wastewater pumping station Muri Road Pukerua Bay?

The resource consent requires upgrades as the development is over doubling the number of houses being connected.

Kyle from Envelope will be doing the design, so if you have any aspirations for this area now is a great time to let us know so we can hopefully get them included in the engineering plan approval for this development.

Kind regards

**Alister O'Callaghan** | Senior Engineer  
On Behalf of the Wellington Water Land Development Team.



Mobile 0224 074 330

Email [REDACTED]

Zoom meeting request to [REDACTED]

WhatsApp [REDACTED] (Install WhatsApp and call for free)

Messenger <https://www.facebook.com/alister.ocallaghan>

**e2Environmental Ltd**

Office 03 358 4955

46/1 Acheron Drive, Christchurch, 8041

[www.e2Environmental.com](http://www.e2Environmental.com)

**From:** Kyle Dirse <[kyle.dirse@envelope-eng.co.nz](mailto:kyle.dirse@envelope-eng.co.nz)>

**Sent:** Tuesday, 22 October 2024 3:15 pm

**To:** Alister O'Callaghan [REDACTED]

**Cc:** Paul Winstanley [REDACTED]; [Land\\_Development@wellingtonwater.co.nz](mailto:Land_Development@wellingtonwater.co.nz); Dave Munro <[dave.munro@envelope-eng.co.nz](mailto:dave.munro@envelope-eng.co.nz)>; Andrew Horsley <[andrew.horsley@envelope-eng.co.nz](mailto:andrew.horsley@envelope-eng.co.nz)>

**Subject:** RE: 2023-02-16 As-built and O&M INFORMATION re Wastewater PS230

Hi Alister,

Revisiting WWPS (PS30) at SeaVista Drive as part of the Muri Road Development.

We have the 2016 inspection report with recommendations that you provided, but nothing current.  
Can we send us current operational information for this pump station? Were the proposed upgrades constructed?

The ICM wastewater provided does show some backflow effects from PS30 without the future development scenario.  
Just trying to understand current capacity and potential upgrade requirements.

Regards,

#### KYLE DIRSE

DIRECTOR - CIVIL / SENIOR CIVIL ENGINEER

M +64 27 228 1287

A 26A Tawa Street

Mount Maunganui 3116

**ENVELOPE**



**From:** Alister O'Callaghan [REDACTED]

**Sent:** Thursday, 16 February 2023 12:19 pm

**To:** Alan Blyde <[alan.blyde@envelope-eng.co.nz](mailto:alan.blyde@envelope-eng.co.nz)>

**Cc:** Kyle Dirse <[kyle.dirse@envelope-eng.co.nz](mailto:kyle.dirse@envelope-eng.co.nz)>; Paul Winstanley <[REDACTED]>; [Land\\_Development@wellingtonwater.co.nz](mailto:Land_Development@wellingtonwater.co.nz)

**Subject:** 2023-02-16 As-built and O&M INFORMATION re Wastewater PS230

Greetings Alan

**2023-02-16 As-built and O&M INFORMATION re Wastewater PS230**

Please find attached as-built plans as discussed.  
I am waiting on Paul Winstanley re current operation and maintenance information for the pumping station.

Kind regards

**Alister O'Callaghan** | Senior Engineer  
On Behalf of the Wellington Water Land Development Team.



Mobile [REDACTED]

Email [REDACTED]

Zoom meeting request to [REDACTED]

WhatsApp [REDACTED] (Install WhatsApp and call for free)

Messenger <https://www.facebook.com/alister.ocallaghan>

**e2Environmental Ltd**

Office 03 358 4955

46/1 Acheron Drive, Christchurch, 8041

[www.e2Environmental.com](http://www.e2Environmental.com)

**From:** Wade Gosper [REDACTED]

**Sent:** Thursday, 16 February 2023 11:47 a.m.

**To:** Alister O'Callaghan [REDACTED]

**Cc:** Paul Winstanley <[REDACTED]>  
**Subject:** RE: 2023-02-16 As-built and O&M GIS INFORMATION REQUEST Wastewater PS230

Hi Alister,

Please find attached the historic as built plans (See Page 13 of Pukerua Bay Water and Wastewater) and a Mechanical Inspection from 2016.

Any equipment changes or upgrades since this as built plan was printed in 1978 have not been captured in as built form, but may be covered in the Mechanical Inspection document.

If you need more technical information such as any current known capacity issues, you will need to talk to Paul Winstanley.

Ngā mihi nui | Kind Regards,  
**Wade Gosper** (He/Him)  
Senior Analyst – Data Quality (Asset Data Management)



Tel 04 912 4400 DDI 04 912 4570 Mob 021 306 934

Private Bag 39804, Wellington Mail Centre 5045  
Level 4, 25 Victoria Street, Petone, Lower Hutt

[www.wellingtonwater.co.nz](http://www.wellingtonwater.co.nz)

Wellington Water is owned by the Hutt, Porirua, Upper Hutt and Wellington city councils, South Wairarapa District Council and Greater Wellington Regional Council. We manage their drinking water, wastewater, and stormwater services.

---

**From:** Alister O'Callaghan <[REDACTED]>  
**Sent:** Thursday, 16 February 2023 11:09 am  
**To:** Wade Gosper <[REDACTED]>  
**Subject:** 2023-02-16 As-built and O&M GIS INFORMATION REQUEST Wastewater PS230

**Caution:** This is an external email. Please take care when clicking links or opening attachments.

Greetings Wade

**2023-02-16 As-built and O&M GIS INFORMATION REQUEST Wastewater PS230**

I have a large development (157 new lots) wanting to discharge wastewater into WW PS230 located at the intersection of Muri Road Sea Vista Drive in Pukerua Bay.

I need to know the as-built details and existing surplus operational capacity at this pumping station so the developers' engineers (Alan Blyde and Kyle Dirse Envelope Engineering) can undertake design to mitigate peak wastewater flows from the new lots.

Can your team provide the as-built information or call me 0224 074 330 to discuss how I can secure the information needed?

Much appreciated

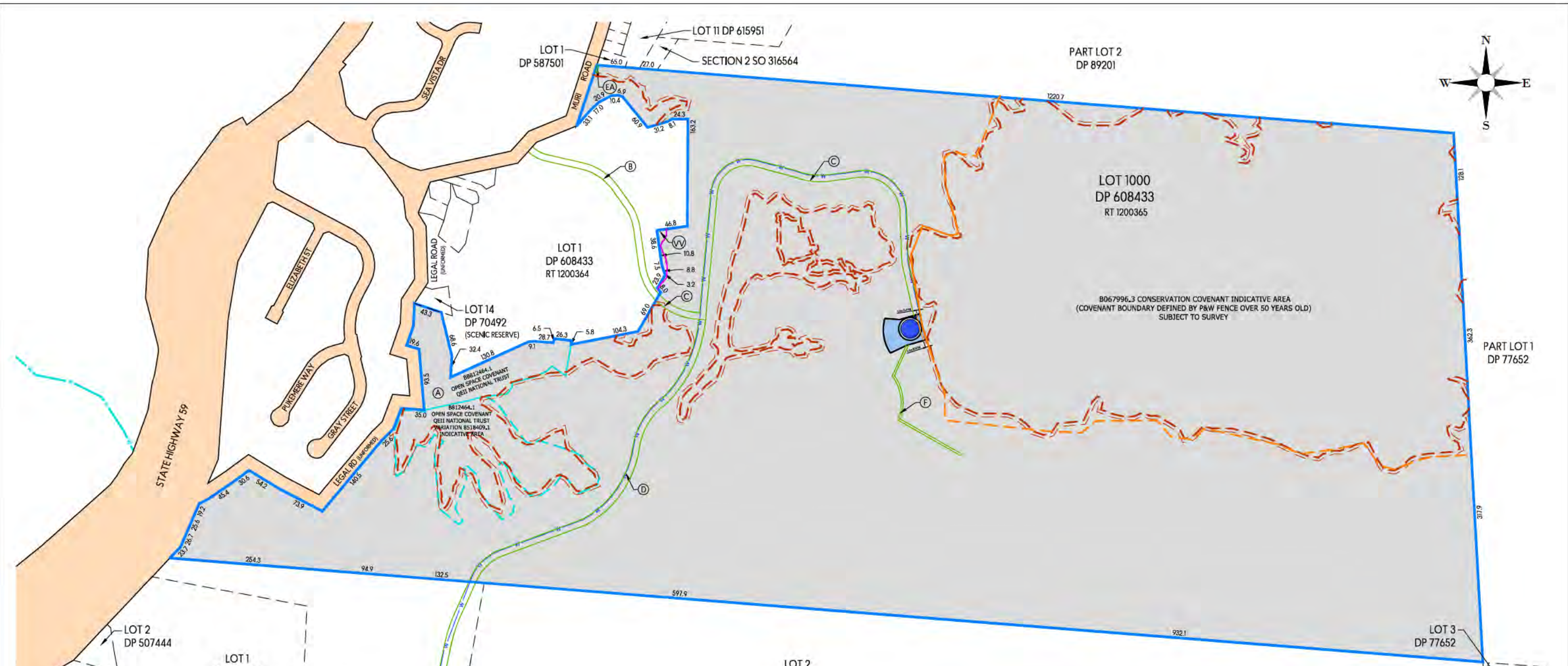
**Alister O'Callaghan** | Senior Engineer  
On Behalf of the Wellington Water Land Development Team.



Mobile [REDACTED]  
Email [REDACTED]  
Zoom meeting request to [REDACTED]  
WhatsApp [REDACTED] (Install WhatsApp and call for free)  
Messenger <https://www.facebook.com/alister.ocallaghan>

**e2Environmental Ltd**  
Office 03 358 4955  
46/1 Acheron Drive, Christchurch, 8041  
[www.e2Environmental.com](http://www.e2Environmental.com)

**APPENDIX 3**  
**RESERVOIR DESIGN PLANS (RCA24215)**



PART LOT 2  
DP 89201

LOT 1000  
DP 608433  
RT 1200365

PART LOT 1  
DP 77652

B067996.3 CONSERVATION COVENANT INDICATIVE AREA  
(COVENANT BOUNDARY DEFINED BY P&W FENCE OVER 50 YEARS OLD)  
SUBJECT TO SURVEY

LOT 2  
DP 534864

LOT 3  
DP 77652

LOT 1  
DP 534864  
RT 883071

LOT 2  
DP 507444

LOT 1  
DP 507444

PT LOT 1  
DP 89102

LOT 2  
DP 89102



SCHEDULE OF EXISTING EASEMENTS IN GROSS				
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE	CREATED BY
RIGHT TO DRAIN WATER	EA	LOT 1	PORIRUA CITY COUNCIL	11732332.3

MEMORANDUM OF EASEMENTS IN GROSS			
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE
RIGHT OF WAY AND RIGHT TO CONVEY WATER	C	LOT 1	PORIRUA CITY COUNCIL
RIGHT TO CONVEY WATER	D		
RIGHT TO DRAIN WATER	F		

SCHEDULE OF PROPOSED EASEMENTS IN GROSS			
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE
RIGHT OF WAY AND RIGHT TO CONVEY WATER	B	LOT 1 DP 604735	PORIRUA CITY COUNCIL
RIGHT TO CONVEY WATER	E	LOT 1 DP 534864	

- NOTES**
- THIS PLAN HAS BEEN PREPARED FOR RESOURCE CONSENT PURPOSES ONLY. NO DETAILED DESIGN SHOULD BE UNDERTAKEN UTILISING THIS DATA.
  - ALL AREAS, EASEMENTS AND DIMENSIONS SHOWN ARE SUBJECT TO A FULL LEGAL SURVEY AND APPROVAL BY LAND INFORMATION NZ.
  - THIS PLAN IS ISSUED FOR A SPECIFIC PROJECT AND MAY NOT BE ALTERED OR USED FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF ENVELOPE ENGINEERING.
  - EXISTING BOUNDARIES SHOWN ON THIS PLAN ARE FROM LAND INFORMATION DC08 (15-10-2025) AND HAVE NOT BEEN SURVEYED. A BOUNDARY DEFINITION SURVEY SHOULD BE CARRIED OUT TO ESTABLISH EXACT BOUNDARY POSITIONS ON SITE.
  - THESE NOTES ARE AN INTEGRAL PART OF PLANS 1677-03-100 TO 102.

- LEGAL DESCRIPTION**
- LOT 1000 DP 608433 (COMPRISED IN RT 1200365) 118.627 Ha.  
SUBJECT TO:
- 999990 GAZETTE NOTICE - LIMITED ACCESS ROAD (AFFECTS PART FORMERLY LOT 2 DP 42644).
  - B067996.3 CONSERVATION COVENANT - SEC. 77 RESERVES ACT 1977.
  - FENCING COVENANT SUBJECT TO SECTION 4(2) FENCING ACT 1978 INDEXED B040333.
  - B024641 OPEN SPACE COVENANT - SHOWN MARKED 'A' HEREON (VARIATION B518409.1).
  - 1314228.3 CONSENT NOTICE PURSUANT TO SEC. 221 RMA 1991.

**LEGEND**

- PROPERTY EXTENTS
- PROPOSED LOT BOUNDARY
- PROPOSED WATERMAIN
- ROAD BOUNDARY
- EXISTING LOT BOUNDARY
- EASEMENT BOUNDARY
- CONSENT NOTICE BOUNDARY (VEGETATION PROTECTION)
- SNA BOUNDARY
- SNA BOUNDARY - 5m OFFSET LINE
- CONSERVATION COVENANT (INDICATIVE BOUNDARY - SUBJECT TO SURVEY)
- CONSERVATION COVENANT (TOPO LOCATION P&W - FENCE 60YRS +/-)
- OPEN SPACE COVENANT QEII NATIONAL TRUST BOUNDARY
- OPEN SPACE COVENANT QEII NATIONAL TRUST (INDICATIVE BOUNDARY)
- LOCAL PURPOSE DRAINAGE RESERVE TO VEST
- BALANCE LOT
- PROPOSED RESERVOIR

**CONSENT NOTICE**

THE AREA MARKED 'V' HEREON IS SUBJECT TO A CONSENT NOTICE CONDITION FOR VEGETATION PROTECTION AND GEOTECH LIMITATION (YET TO BE REGISTERED).

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

**REVISIONS:**

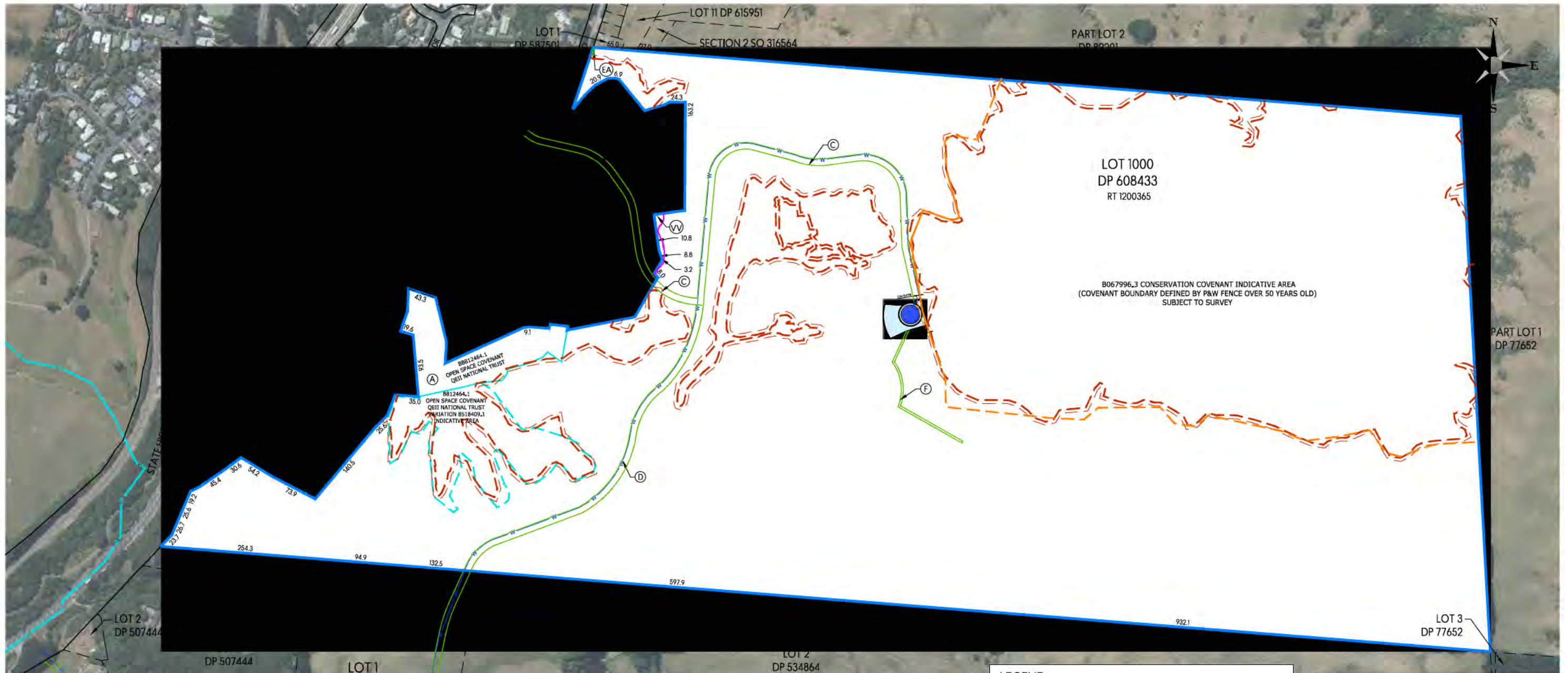
REV	NOTES	BY	DATE
R1	RESOURCE CONSENT	RLI	07.12.2023
R2	EASEMENTS UPDATED & SNA 5m OFFSET LINE ADDED	JEG	04.06.2024
R3	EASEMENTS UPDATED	JEG	27.06.2024
R4	EASEMENTS UPDATED	JEG	16.07.2024
R5	EXTERNAL BOUNDARY UPDATED FROM STAGE 1 PLAN	JEG	15.08.2024
R6	LOT 2000 AND ROW C UPDATED	JEG	12.08.2025
R7	LOT 2000 AND ROW BOUNDARIES UPDATED	JEG	15.10.2025

PROJECT:  
**PUKERUA HOLDINGS LIMITED**  
**MURI ROAD**  
**MURI ROAD, PUKERUA BAY**

TITLE:  
**SCHEME PLAN OF PROPOSED SUBDIVISION**  
**BULK WATERMAIN AND LOWER RESERVOIR**



DESIGNED: JEG  
 CHECKED: EFC  
 SCALE A1: 1:3000  
 STATUS: RESOURCE CONSENT  
 PROJECT No: 1697-03  
 DRAWING No: 100  
 DRAWN: JEG  
 PLOT DATE: 15-10-2025  
 SCALE A3: 1:6000  
 REVISION: R7



**EXHIBIT 1**  
**SCHEME PLAN**  
**FOR THE**  
**PROPOSED**  
**SUBDIVISION**  
**OF**  
**LOT 1000 DP 608433**  
**RT 1200365**

SCHEDULE OF EXISTING EASEMENTS IN GROSS				
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE	CREATED BY
RIGHT TO DRAIN WATER	EA	LOT 1	PORIRUA CITY COUNCIL	11732332.3

MEMORANDUM OF EASEMENTS IN GROSS			
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE
RIGHT OF WAY AND RIGHT TO CONVEY WATER	C	LOT 1	PORIRUA CITY COUNCIL
RIGHT TO CONVEY WATER	D		
RIGHT TO DRAIN WATER	F		

SCHEDULE OF PROPOSED EASEMENTS IN GROSS			
PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE
RIGHT OF WAY AND RIGHT TO CONVEY WATER	B	LOT 1 DP 604735	PORIRUA CITY COUNCIL
RIGHT TO CONVEY WATER	E	LOT 1 DP 534864	

- NOTES**
- THIS PLAN HAS BEEN PREPARED FOR RESOURCE CONSENT PURPOSES ONLY. NO DETAILED DESIGN SHOULD BE UNDERTAKEN UTILISING THIS DATA.
  - ALL AREAS, EASEMENTS AND DIMENSIONS SHOWN ARE SUBJECT TO A FULL LEGAL SURVEY AND APPROVAL BY LAND INFORMATION NZ.
  - THIS PLAN IS ISSUED FOR A SPECIFIC PROJECT AND MAY NOT BE ALTERED OR USED FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF ENVELOPE ENGINEERING.
  - EXISTING BOUNDARIES SHOWN ON THIS PLAN ARE FROM LAND INFORMATION DCDB (15-10-2025) AND HAVE NOT BEEN SURVEYED. A BOUNDARY DEFINITION SURVEY SHOULD BE CARRIED OUT TO ESTABLISH EXACT BOUNDARY POSITIONS ON SITE.
  - THESE NOTES ARE AN INTEGRAL PART OF PLANS 1697-03-100 TO 102.

**LEGAL DESCRIPTION**

LOT 1000 DP 608433 (COMPRISED IN RT 1200365) 101,627 H<sub>a</sub> SUBJECT TO:

- 989190 GAZETTE NOTICE - LIMITED ACCESS ROAD (AFFECTS PART FORMERLY LOT 2 DP 42644)
- 8067996.3 CONSERVATION COVENANT - SEC. 77 RESERVES ACT 1977.
- 824641.3 OPEN SPACE COVENANT - SHOWN MARKED 'A' HEREON (VARIATION 8518409.1)
- 1314228.3 CONSENT NOTICE PURSUANT TO SEC. 221 RMA 1991.

**LEGEND**

- PROPERTY EXTENTS
- PROPOSED LOT BOUNDARY
- W- PROPOSED WATERMAIN
- - - ROAD BOUNDARY
- - - EXISTING LOT BOUNDARY
- EASEMENT BOUNDARY
- CONSENT NOTICE BOUNDARY (VEGETATION PROTECTION)
- - - SNA BOUNDARY
- - - SNA BOUNDARY - 5m OFFSET LINE
- - - CONSERVATION COVENANT (INDICATIVE BOUNDARY - SUBJECT TO SURVEY)
- CONSERVATION COVENANT (TOPO LOCATION P&W - FENCE 60YRS +/-)
- - - OPEN SPACE COVENANT QEII NATIONAL TRUST BOUNDARY
- - - OPEN SPACE COVENANT QEII NATIONAL TRUST (INDICATIVE BOUNDARY)
- LOCAL PURPOSE DRAINAGE RESERVE TO VEST
- BALANCE LOT
- PROPOSED RESERVOIR

**CONSENT NOTICE**

THE AREA MARKED 'V' HEREON IS SUBJECT TO A CONSENT NOTICE CONDITION FOR VEGETATION PROTECTION AND GEOTECH LIMITATION (YET TO BE REGISTERED).

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

**REVISIONS:**

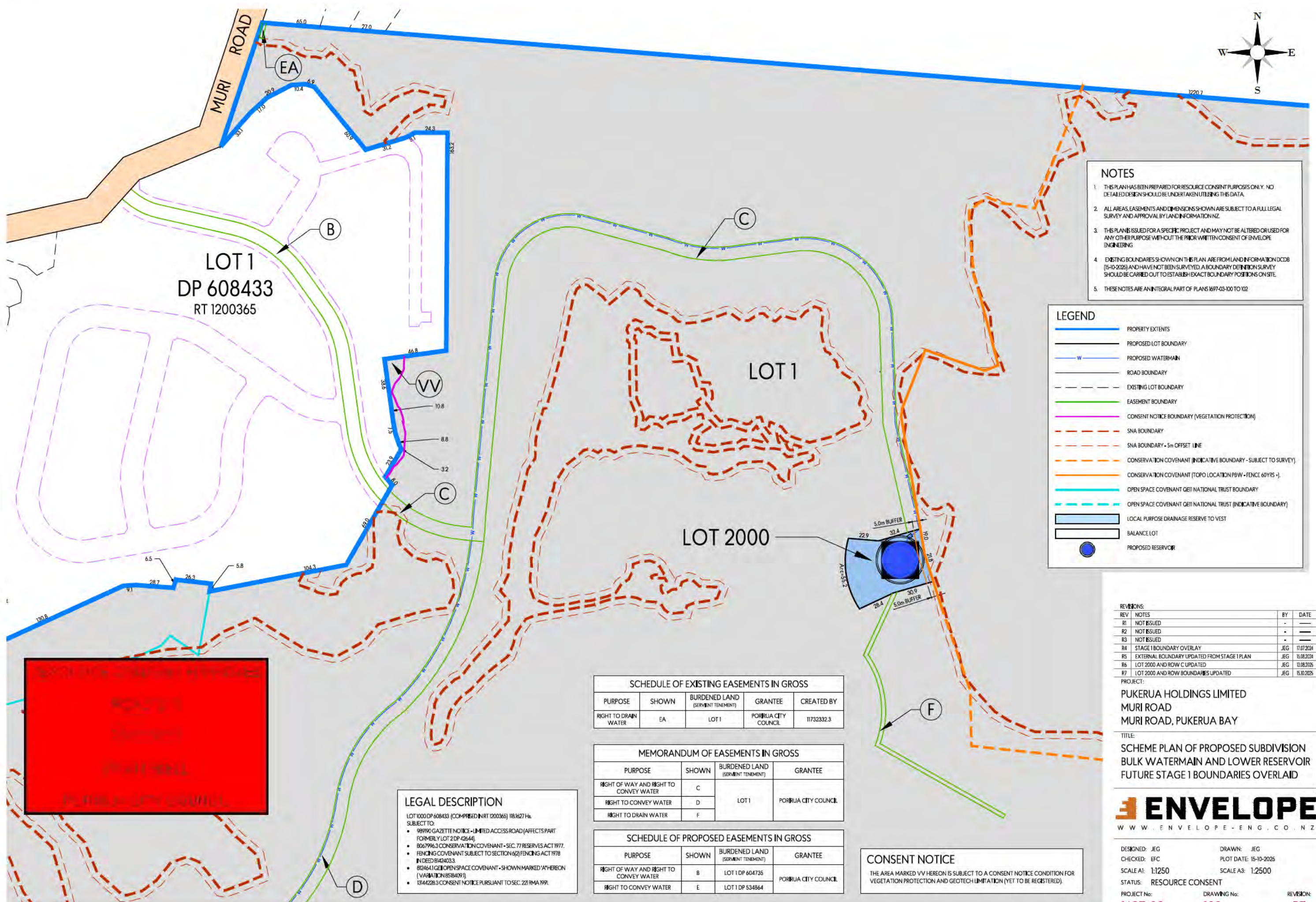
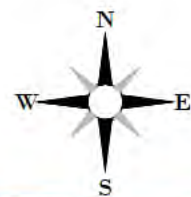
REV	NOTES	BY	DATE
R1	NOT ISSUED	-	-
R2	NOT ISSUED	-	-
R3	EASEMENTS UPDATED	JEG	27.06.2024
R4	EASEMENTS UPDATED	JEG	16.07.2024
R5	EXTERNAL BOUNDARY UPDATED FROM STAGE 1 PLAN	JEG	15.08.2024
R6	LOT 2000 AND ROW C UPDATED	JEG	12.08.2025
R7	LOT 2000 AND ROW BOUNDARIES UPDATED	JEG	15.10.2025

PROJECT:  
**PUKERUA HOLDINGS LIMITED**  
**MURI ROAD**  
**MURI ROAD, PUKERUA BAY**

TITLE:  
**SCHEME PLAN OF PROPOSED SUBDIVISION**  
**BULK WATERMAIN AND LOWER RESERVOIR**  
**WITH AERIAL IMAGERY**



DESIGNED: JEG  
 CHECKED: EFC  
 SCALE A1: 1:3000  
 STATUS: RESOURCE CONSENT  
 PROJECT No: **1697-03**  
 DRAWING No: **101**  
 DRAWN: JEG  
 PLOT DATE: 15-10-2025  
 SCALE A3: 1:6000  
 REVISION: **R7**



- NOTES**
1. THIS PLAN HAS BEEN PREPARED FOR RESOURCE CONSENT PURPOSES ONLY. NO DETAILED DESIGN SHOULD BE UNDERTAKEN UTILISING THIS DATA.
  2. ALL AREAS, EASEMENTS AND DIMENSIONS SHOWN ARE SUBJECT TO A FULL LEGAL SURVEY AND APPROVAL BY LAND INFORMATION NZ.
  3. THIS PLAN IS ISSUED FOR A SPECIFIC PROJECT AND MAY NOT BE ALTERED OR USED FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF ENVELOPE ENGINEERING.
  4. EXISTING BOUNDARIES SHOWN ON THIS PLAN ARE FROM LAND INFORMATION DCDB (5-10-2025) AND HAVE NOT BEEN SURVEYED. A BOUNDARY DEFINITION SURVEY SHOULD BE CARRIED OUT TO ESTABLISH EXACT BOUNDARY POSITIONS ON SITE.
  5. THESE NOTES ARE AN INTEGRAL PART OF PLANS 1697-03-100 TO 102.

**LEGEND**

	PROPERTY EXTENTS
	PROPOSED LOT BOUNDARY
	PROPOSED WATERMAIN
	ROAD BOUNDARY
	EXISTING LOT BOUNDARY
	EASEMENT BOUNDARY
	CONSENT NOTICE BOUNDARY (VEGETATION PROTECTION)
	SNA BOUNDARY
	SNA BOUNDARY - 5m OFFSET LINE
	CONSERVATION COVENANT (INDICATIVE BOUNDARY - SUBJECT TO SURVEY)
	CONSERVATION COVENANT (TOPO LOCATION P91W - FENCE 60YRS -)
	OPEN SPACE COVENANT QE1 NATIONAL TRUST BOUNDARY
	OPEN SPACE COVENANT QE1 NATIONAL TRUST (INDICATIVE BOUNDARY)
	LOCAL PURPOSE DRAINAGE RESERVE TO VEST
	BALANCE LOT
	PROPOSED RESERVOIR

**REVISIONS:**

REV	NOTES	BY	DATE
R1	NOT ISSUED	-	-
R2	NOT ISSUED	-	-
R3	NOT ISSUED	-	-
R4	STAGE 1 BOUNDARY OVERLAY	JEG	17.07.2024
R5	EXTERNAL BOUNDARY UPDATED FROM STAGE 1 PLAN	JEG	15.08.2024
R6	LOT 2000 AND ROW C UPDATED	JEG	13.08.2025
R7	LOT 2000 AND ROW BOUNDARIES UPDATED	JEG	15.10.2025

PROJECT:  
**PUKERUA HOLDINGS LIMITED**  
**MURI ROAD**  
**MURI ROAD, PUKERUA BAY**

TITLE:  
**SCHEME PLAN OF PROPOSED SUBDIVISION**  
**BULK WATERMAIN AND LOWER RESERVOIR**  
**FUTURE STAGE 1 BOUNDARIES OVERLAID**



DESIGNED: JEG      DRAWN: JEG  
 CHECKED: EFC      PLOT DATE: 15-10-2025  
 SCALE A1: 1:1250      SCALE A3: 1:2500  
 STATUS: RESOURCE CONSENT  
 PROJECT No: 1697-03      DRAWING No: 102      REVISION: R7

**SCHEDULE OF EXISTING EASEMENTS IN GROSS**

PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE	CREATED BY
RIGHT TO DRAIN WATER	EA	LOT 1	PUKERUA CITY COUNCIL	11732332.3

**MEMORANDUM OF EASEMENTS IN GROSS**

PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE
RIGHT OF WAY AND RIGHT TO CONVEY WATER	C	LOT 1	PUKERUA CITY COUNCIL
RIGHT TO CONVEY WATER	D		
RIGHT TO DRAIN WATER	F		

**SCHEDULE OF PROPOSED EASEMENTS IN GROSS**

PURPOSE	SHOWN	BURDENED LAND (SERVIENT TENEMENT)	GRANTEE
RIGHT OF WAY AND RIGHT TO CONVEY WATER	B	LOT 1 DP 604735	PUKERUA CITY COUNCIL
RIGHT TO CONVEY WATER	E	LOT 1 DP 534864	

**LEGAL DESCRIPTION**

LOT 1000 DP 608433 (COMPRESSED IN RT 1200365) 1181627 Ha. SUBJECT TO:










- 89990 GAZETTE NOTICE - LIMITED ACCESS ROAD (AFFECTS PART FORMERLY LOT 2 DP 4264)
- 8067996.3 CONSERVATION COVENANT - SEC. 77 RESERVES ACT 1977.
- FENCING COVENANT SUBJECT TO SECTION 4(2) FENCING ACT 1978 IN DEED B1424033.
- 81246411 OPEN SPACE COVENANT - SHOWN MARKED 'A' HEREON (VARIATION B5184091)
- 1314228.3 CONSENT NOTICE PURSUANT TO SEC. 221 RMA 1991.

**CONSENT NOTICE**

THE AREA MARKED VV HEREON IS SUBJECT TO A CONSENT NOTICE CONDITION FOR VEGETATION PROTECTION AND GEOTECH LIMITATION (YET TO BE REGISTERED).

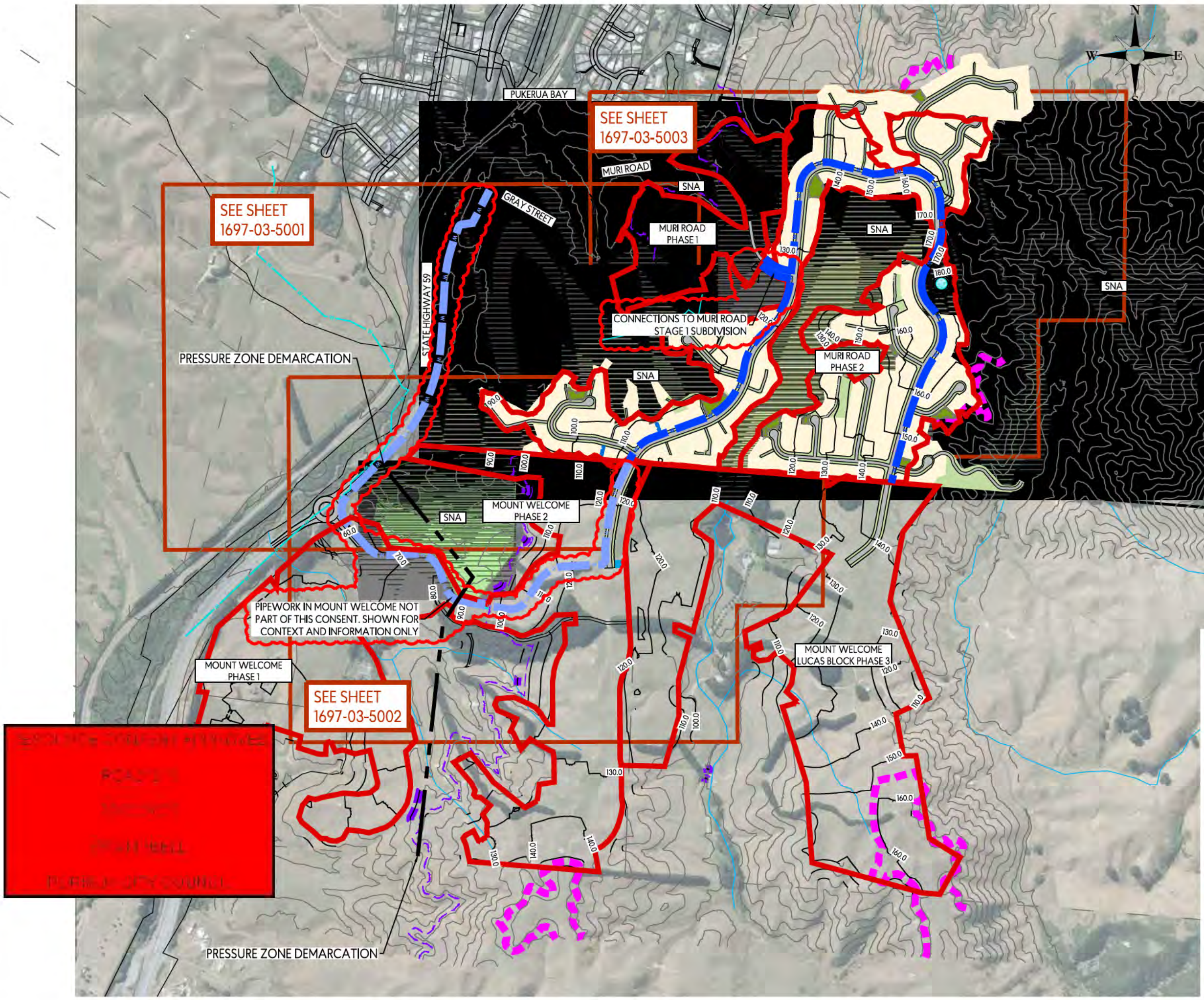


**LEGEND:**

-  EXISTING CONTOURS SHOWN AT 2.0m INTERVALS
-  PROPOSED CONTOURS SHOWN AT 2.0m INTERVALS
-  CONTOUR RL 96.5m
-  CONTOUR RL 155m
-  DN150 / DN200 PRINCIPAL MAIN
-  DN150 / DN200 MAIN (CONTEXT)
-  STAGE BOUNDARIES
-  DN225 TRANSMISSION MAIN
-  EXISTING DN250 TRANSMISSION WATERMAIN ASSET ID GWRC\_PWP001057

**NOTES:**

- EXISTING CONTOURS ARE FROM 2023 LIDAR SOURCED FROM KOORDINATES DATABASE.
- PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
- LEVELS ARE IN TERMS OF NZVD 2016.



This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

**REVISIONS:**

REV	NOTES	BY	DATE
P1	FOR INFORMATION	AS	13-11-2025
P2	ADDITIONAL NOTE ON MOUNT WELCOME PIPEWORK	AKH	12-11-2025

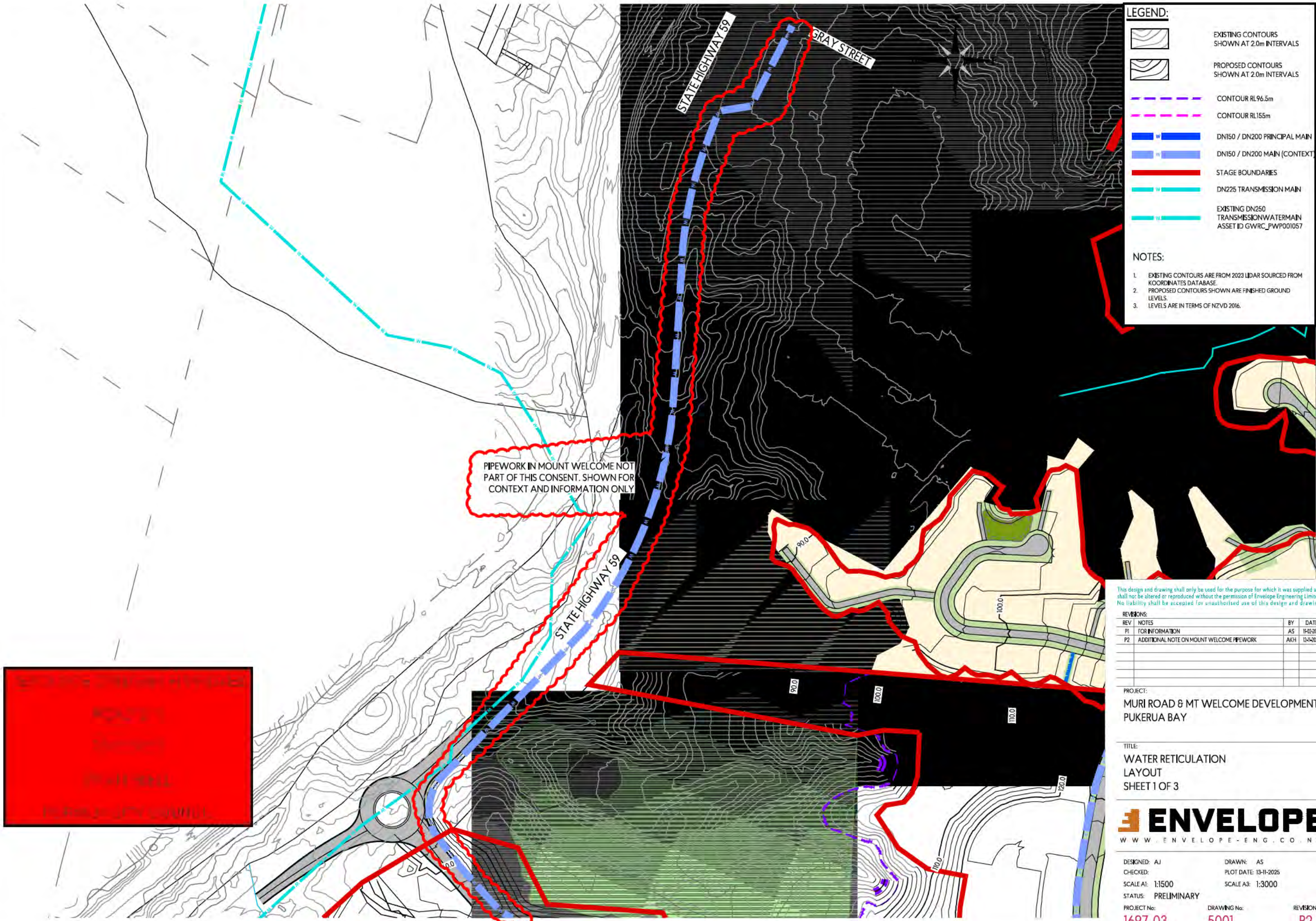
**PROJECT:**  
MURI ROAD & MT WELCOME DEVELOPMENT  
PUKERUA BAY

**TITLE:**  
WATER RETICULATION  
OVERALL LAYOUT



DESIGNED: AJ  
CHECKED: [blank]  
SCALE A1: 1:4000  
STATUS: PRELIMINARY  
PROJECT No: 1697-03

DRAWN: AS  
PLOT DATE: 13-11-2025  
SCALE A3: 1:8000  
DRAWING No: 5000  
REVISION: P2



**LEGEND:**

- EXISTING CONTOURS SHOWN AT 2.0m INTERVALS
- PROPOSED CONTOURS SHOWN AT 2.0m INTERVALS
- CONTOUR RL96.5m
- CONTOUR RL155m
- DN150 / DN200 PRINCIPAL MAIN
- DN150 / DN200 MAIN (CONTEXT)
- STAGE BOUNDARIES
- DN225 TRANSMISSION MAIN
- EXISTING DN250 TRANSMISSION WATERMAIN ASSET ID GWRC\_PWP001057

**NOTES:**

- EXISTING CONTOURS ARE FROM 2023 LIDAR SOURCED FROM KOORDINATES DATABASE.
- PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
- LEVELS ARE IN TERMS OF NZVD 2016.

PIPEWORK IN MOUNT WELCOME NOT PART OF THIS CONSENT. SHOWN FOR CONTEXT AND INFORMATION ONLY

STATE OF THE ART DESIGN  
 MOUNT WELCOME  
 WATER MAIN  
 TO BE INSTALLED BY COUNCIL

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

**REVISIONS:**

REV	NOTES	BY	DATE
P1	FOR INFORMATION	AS	11-02-2025
P2	ADDITIONAL NOTE ON MOUNT WELCOME PIPEWORK	AKH	12-02-2025

PROJECT:  
 MURI ROAD 8 MT WELCOME DEVELOPMENT  
 PUKERUA BAY

TITLE:  
 WATER RETICULATION  
 LAYOUT  
 SHEET 1 OF 3












DESIGNED: AJ  
 CHECKED:  
 SCALE A1: 1:1500  
 STATUS: PRELIMINARY  
 PROJECT No: 1697-03

DRAWN: AS  
 PLOT DATE: 13-11-2025  
 SCALE A3: 1:3000

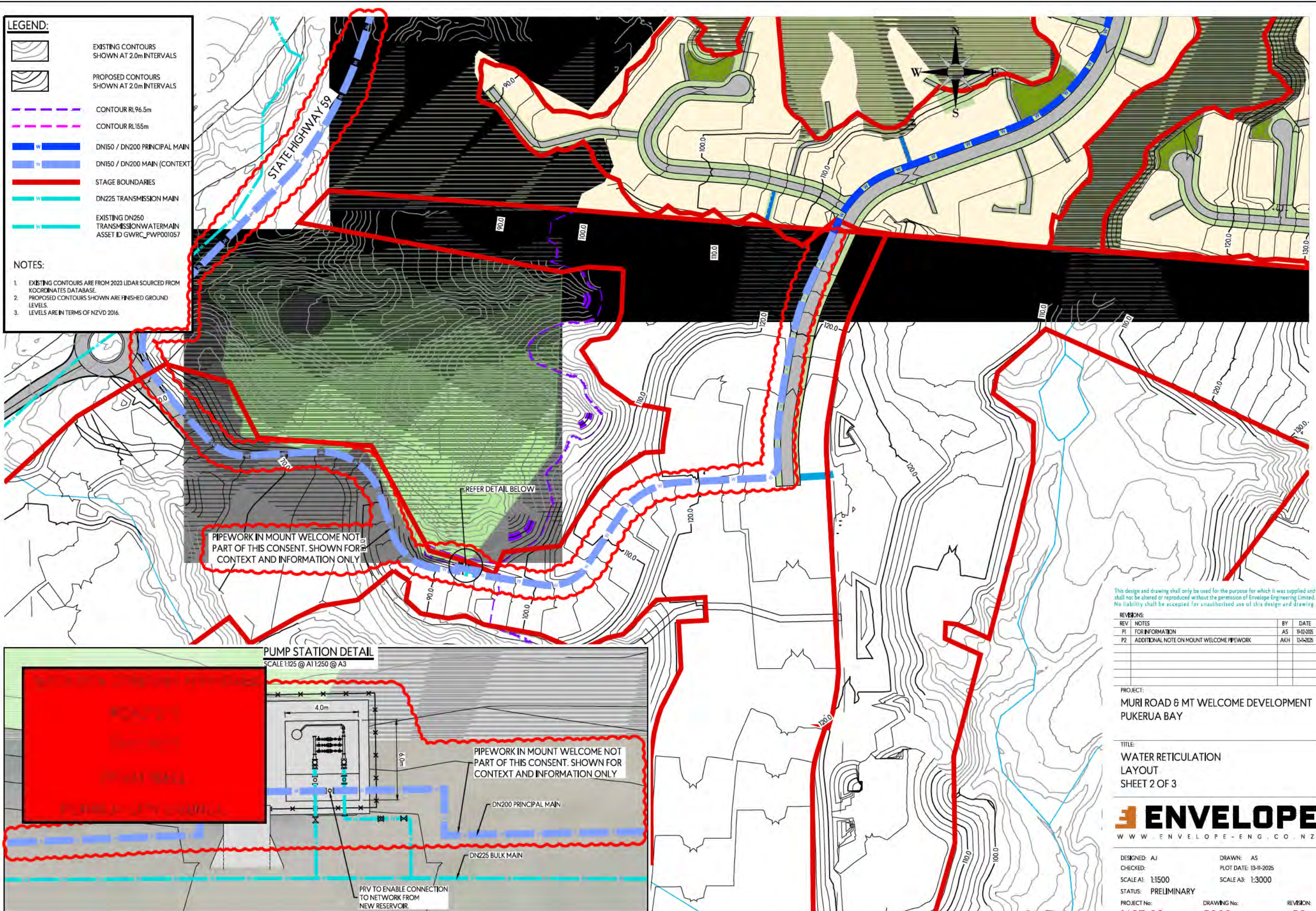
DRAWING No: 5001  
 REVISION: P2

**LEGEND:**

-  EXISTING CONTOURS SHOWN AT 2.0m INTERVALS
-  PROPOSED CONTOURS SHOWN AT 2.0m INTERVALS
-  CONTOUR RL 96.5m
-  CONTOUR RL 155m
-  DN150 / DN200 PRINCIPAL MAIN
-  DN150 / DN200 MAIN (CONTEXT)
-  STAGE BOUNDARIES
-  DN225 TRANSMISSION MAIN
-  EXISTING DN250 TRANSMISSION WATERMAIN ASSET ID GWRC\_PWP001057

**NOTES:**

1. EXISTING CONTOURS ARE FROM 2023 LIDAR SOURCED FROM KOORDINATES DATABASE.
2. PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
3. LEVELS ARE IN TERMS OF NZVD 2016.



This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REV	NOTES	BY	DATE
P1	FOR INFORMATION	AS	13-11-2025
P2	ADDITIONAL NOTE ON MOUNT WELCOME PIPEWORK	AKH	12-12-2025

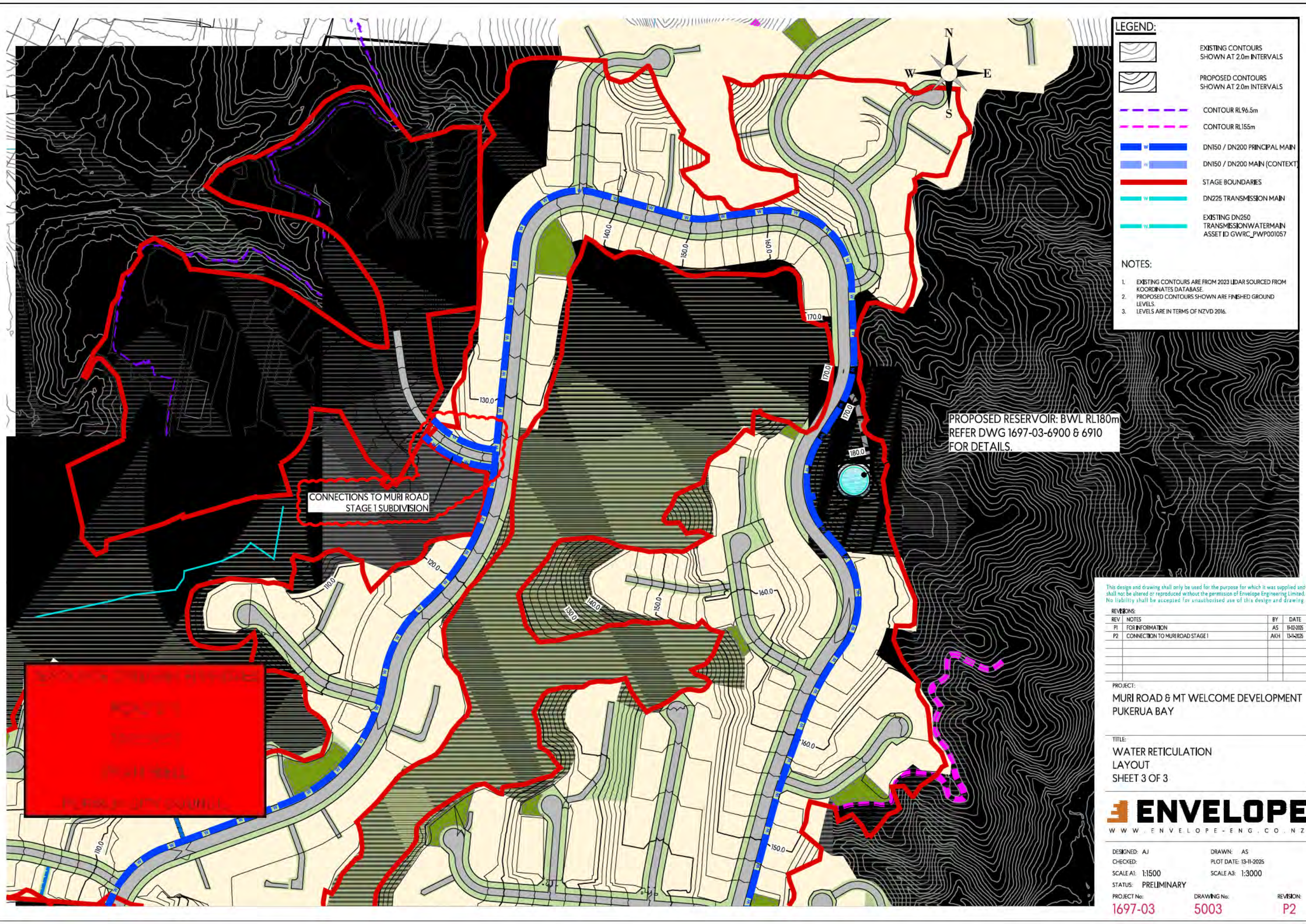
PROJECT:  
MURI ROAD & MT WELCOME DEVELOPMENT  
PUKERUA BAY

TITLE:  
WATER RETICULATION  
LAYOUT  
SHEET 2 OF 3



DESIGNED: AJ  
CHECKED:  
SCALE A1: 1:1500  
STATUS: PRELIMINARY  
PROJECT No: 1697-03

DRAWN: AS  
PLOT DATE: 13-11-2025  
SCALE A3: 1:3000  
DRAWING No: 5002  
REVISION: P2



**LEGEND:**

- EXISTING CONTOURS SHOWN AT 2.0m INTERVALS
- PROPOSED CONTOURS SHOWN AT 2.0m INTERVALS
- CONTOUR RL96.5m
- CONTOUR RL155m
- DN150 / DN200 PRINCIPAL MAIN
- DN150 / DN200 MAIN (CONTEXT)
- STAGE BOUNDARIES
- DN225 TRANSMISSION MAIN
- EXISTING DN250 TRANSMISSION WATERMAIN ASSET ID GWRC\_PWP001057

**NOTES:**

1. EXISTING CONTOURS ARE FROM 2023 LIDAR SOURCED FROM KOORDINATES DATABASE.
2. PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
3. LEVELS ARE IN TERMS OF NZVD 2016.

PROPOSED RESERVOIR: BWL RL180m  
REFER DWG 1697-03-6900 & 6910  
FOR DETAILS.

CONNECTIONS TO MURI ROAD  
STAGE 1 SUBDIVISION

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REV	NOTES	BY	DATE
P1	FOR INFORMATION	AS	11-02-2025
P2	CONNECTION TO MURI ROAD STAGE 1	AKH	13-11-2025

PROJECT:  
MURI ROAD & MT WELCOME DEVELOPMENT  
PUKERUA BAY

TITLE:  
WATER RETICULATION  
LAYOUT  
SHEET 3 OF 3



DESIGNED: AJ  
CHECKED:  
SCALE A1: 1:1500  
STATUS: PRELIMINARY  
PROJECT No: 1697-03

DRAWN: AS  
PLOT DATE: 13-11-2025  
SCALE A3: 1:3000  
DRAWING No: 5003

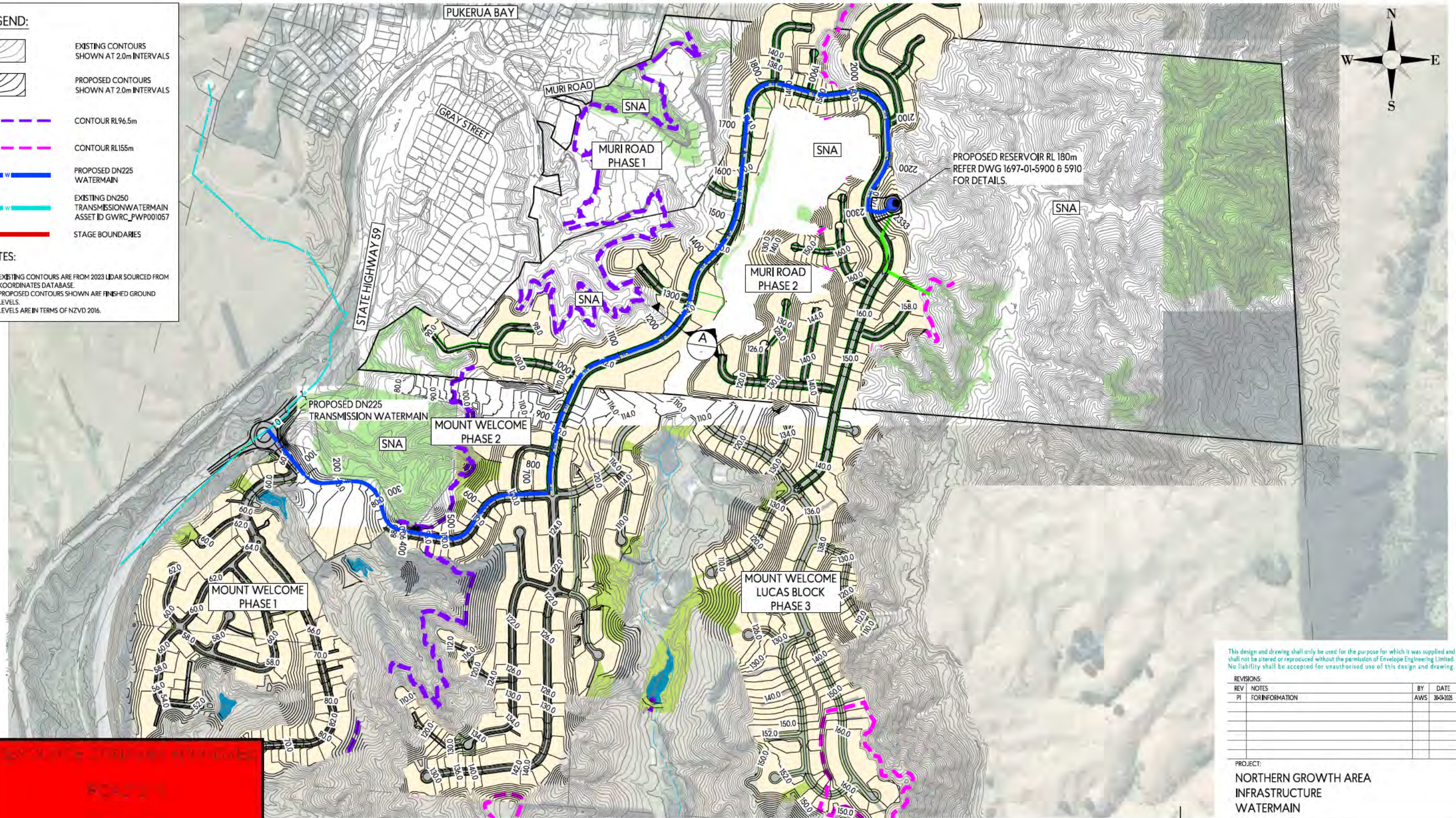
REVISION: P2

**LEGEND:**

- EXISTING CONTOURS SHOWN AT 2.0m INTERVALS
- PROPOSED CONTOURS SHOWN AT 2.0m INTERVALS
- CONTOUR RL 96.5m
- CONTOUR RL 155m
- PROPOSED DN225 WATERMAIN
- EXISTING DN250 TRANSMISSION WATERMAIN ASSET ID GWRC\_PWP001057
- STAGE BOUNDARIES

**NOTES:**

- EXISTING CONTOURS ARE FROM 2023 LIDAR SOURCED FROM KOORDINATES DATABASE.
- PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
- LEVELS ARE IN TERMS OF NZVD 2016.



This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

**REVISIONS:**

REV	NOTES	BY	DATE
P1	FOR INFORMATION	AWS	30-03-2025

**PROJECT:**  
NORTHERN GROWTH AREA  
INFRASTRUCTURE  
WATERMAIN

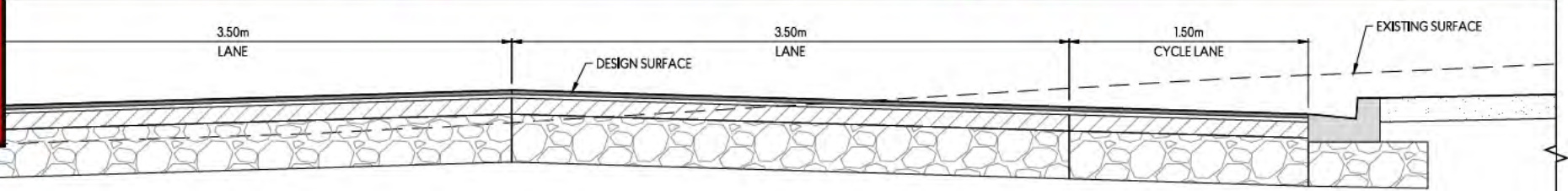
**TITLE:**  
DN250 WATERMAIN  
OVERALL LAYOUT



DESIGNED: AWS  
CHECKED: AWS  
SCALE A1: 1:4000  
STATUS: PRELIMINARY  
PROJECT No: 1697-03

DRAWN: AWS  
PLOT DATE: 04-03-2025  
SCALE A3: 1:8000  
DRAWING No: 6000

REVISION: P1



PROPOSED DN225 WATERMAIN LAID UNDER CYCLE LANE

**A** TYPICAL DETAIL WATERMAIN LOCATION  
Scale: 1:50 @ A1:1:100 @ A3

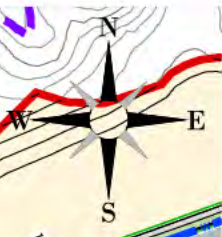
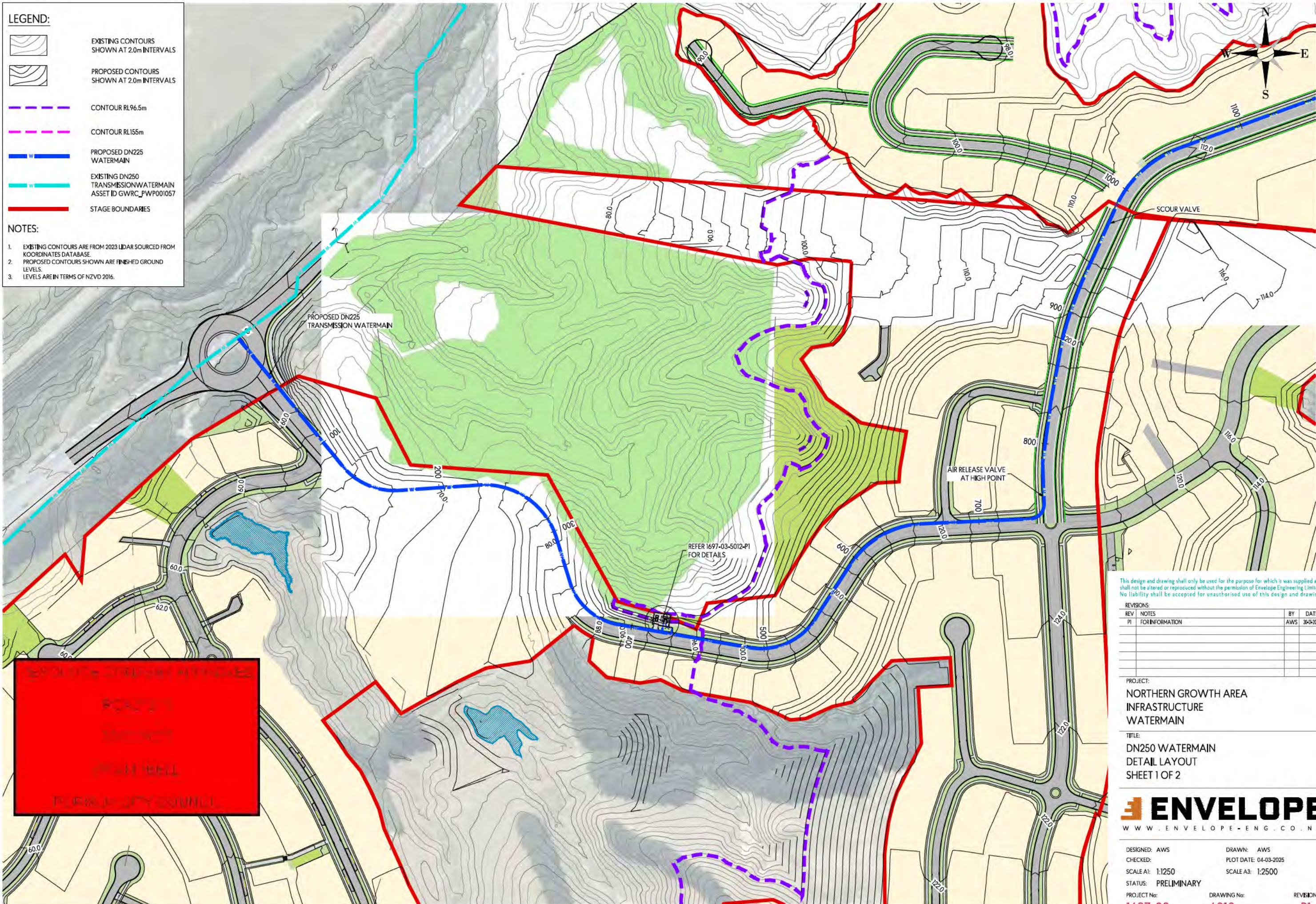
E:\PROJECTS\1697-03 NORTHERN GROWTH AREA\1697-03-01 DN250 WATERMAIN OVERALL LAYOUT.DWG

**LEGEND:**

-  EXISTING CONTOURS SHOWN AT 2.0m INTERVALS
-  PROPOSED CONTOURS SHOWN AT 2.0m INTERVALS
-  CONTOUR RL 96.5m
-  CONTOUR RL 155m
-  PROPOSED DN225 WATERMAIN
-  EXISTING DN250 TRANSMISSION WATERMAIN ASSET ID GWRC\_PWP001057
-  STAGE BOUNDARIES

**NOTES:**

1. EXISTING CONTOURS ARE FROM 2023 LIDAR SOURCED FROM KOORDINATES DATABASE.
2. PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
3. LEVELS ARE IN TERMS OF NZVD 2016.



This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REVISIONS:

REV	NOTES	BY	DATE
PI	FOR INFORMATION	AWS	30-03-2025

PROJECT:  
**NORTHERN GROWTH AREA  
 INFRASTRUCTURE  
 WATERMAIN**

TITLE:  
**DN250 WATERMAIN  
 DETAIL LAYOUT  
 SHEET 1 OF 2**










DESIGNED: AWS  
 CHECKED: AWS  
 SCALE A1: 1:1250  
 STATUS: PRELIMINARY  
 PROJECT No: **1697-03**

DRAWN: AWS  
 PLOT DATE: 04-03-2025  
 SCALE A3: 1:2500

DRAWING No: **6010**  
 REVISION: **P1**

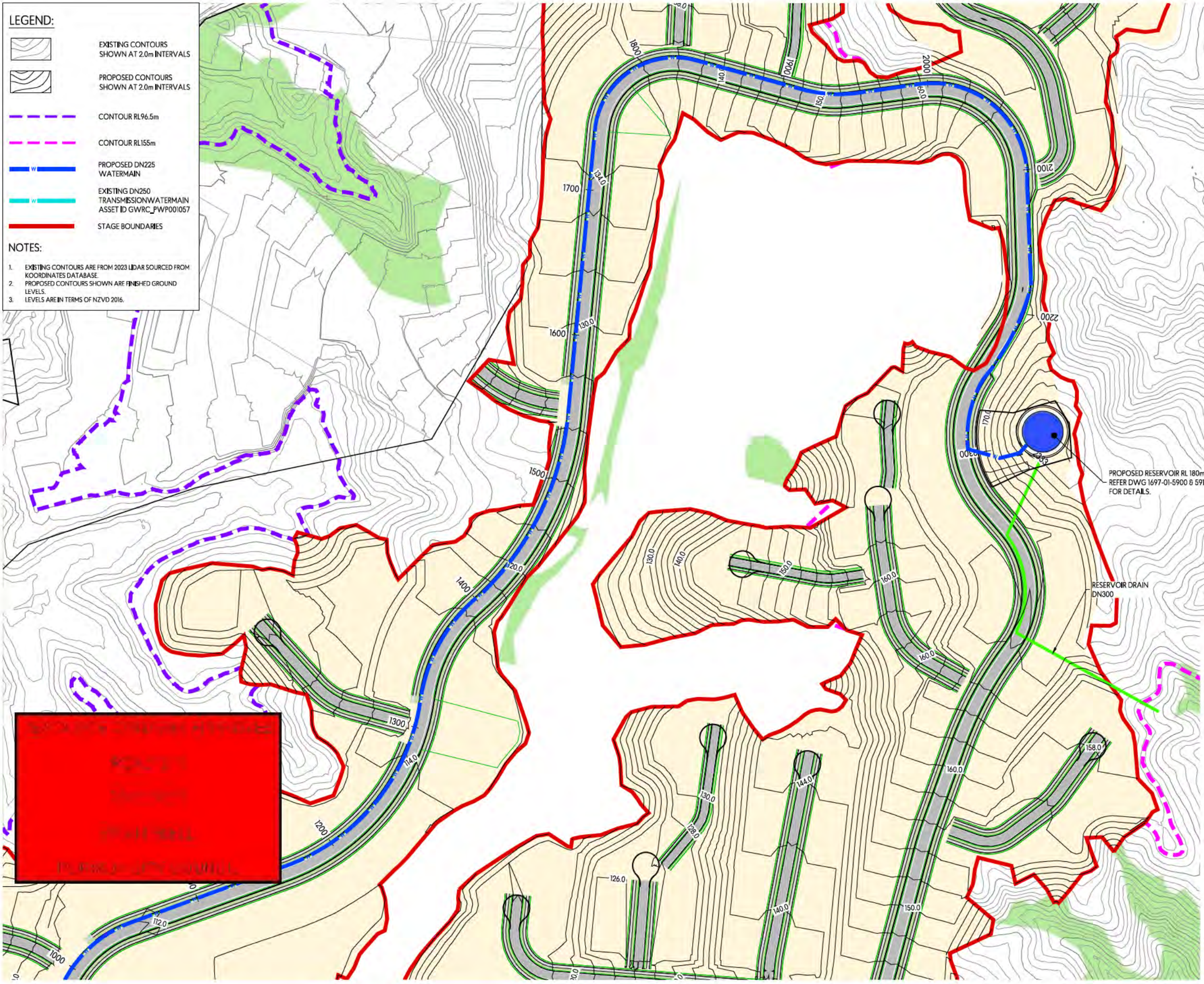
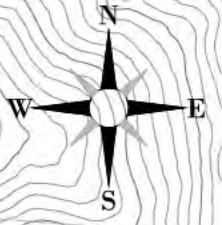
E:\PROJECTS\1697-03\NORTH GROWTH AREA\INFRASTRUCTURE\WATERMAIN\DWG\1697-03-DN250-WATERMAIN-DETAIL-1-OF-2.DWG

**LEGEND:**

-  EXISTING CONTOURS SHOWN AT 2.0m INTERVALS
-  PROPOSED CONTOURS SHOWN AT 2.0m INTERVALS
-  CONTOUR RL96.5m
-  CONTOUR RL155m
-  PROPOSED DN225 WATERMAIN
-  EXISTING DN250 TRANSMISSION WATERMAIN ASSET ID GWRC\_PWP001057
-  STAGE BOUNDARIES

**NOTES:**

1. EXISTING CONTOURS ARE FROM 2023 LIDAR SOURCED FROM KOORDINATES DATABASE.
2. PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
3. LEVELS ARE IN TERMS OF NZVD 2016.



PROPOSED RESERVOIR RL 180m  
REFER DWG 1697-01-5900 & 5910  
FOR DETAILS.

RESERVOIR DRAIN  
DN300

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REVISIONS:			
REV	NOTES	BY	DATE
P1	FOR INFORMATION	AWS	30-03-2025

PROJECT:  
NORTHERN GROWTH AREA  
INFRASTRUCTURE  
WATERMAIN

TITLE:  
DN250 WATERMAIN  
DETAIL LAYOUT  
SHEET 2 OF 2



DESIGNED: AWS  
CHECKED: AWS  
SCALE A1: 1:1250  
STATUS: PRELIMINARY  
PROJECT No: 1697-03

DRAWN: AWS  
PLOT DATE: 04-03-2025  
SCALE A3: 1:2500  
DRAWING No: 6011

REVISION:  
P1



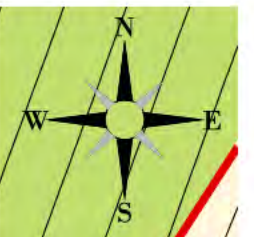
E:\PROJECTS\1697-03\NORTH GROWTH AREA\INFRASTRUCTURE\WATERMAIN\DWG

**LEGEND:**

-  EXISTING CONTOURS SHOWN AT 2.0m INTERVALS
-  PROPOSED CONTOURS SHOWN AT 2.0m INTERVALS
-  CONTOUR RL96.5m
-  CONTOUR RL155m
-  PROPOSED DN225 WATERMAIN
-  EXISTING DN250 TRANSMISSION WATERMAIN ASSET ID GWRC\_PWP001057
-  STAGE BOUNDARIES

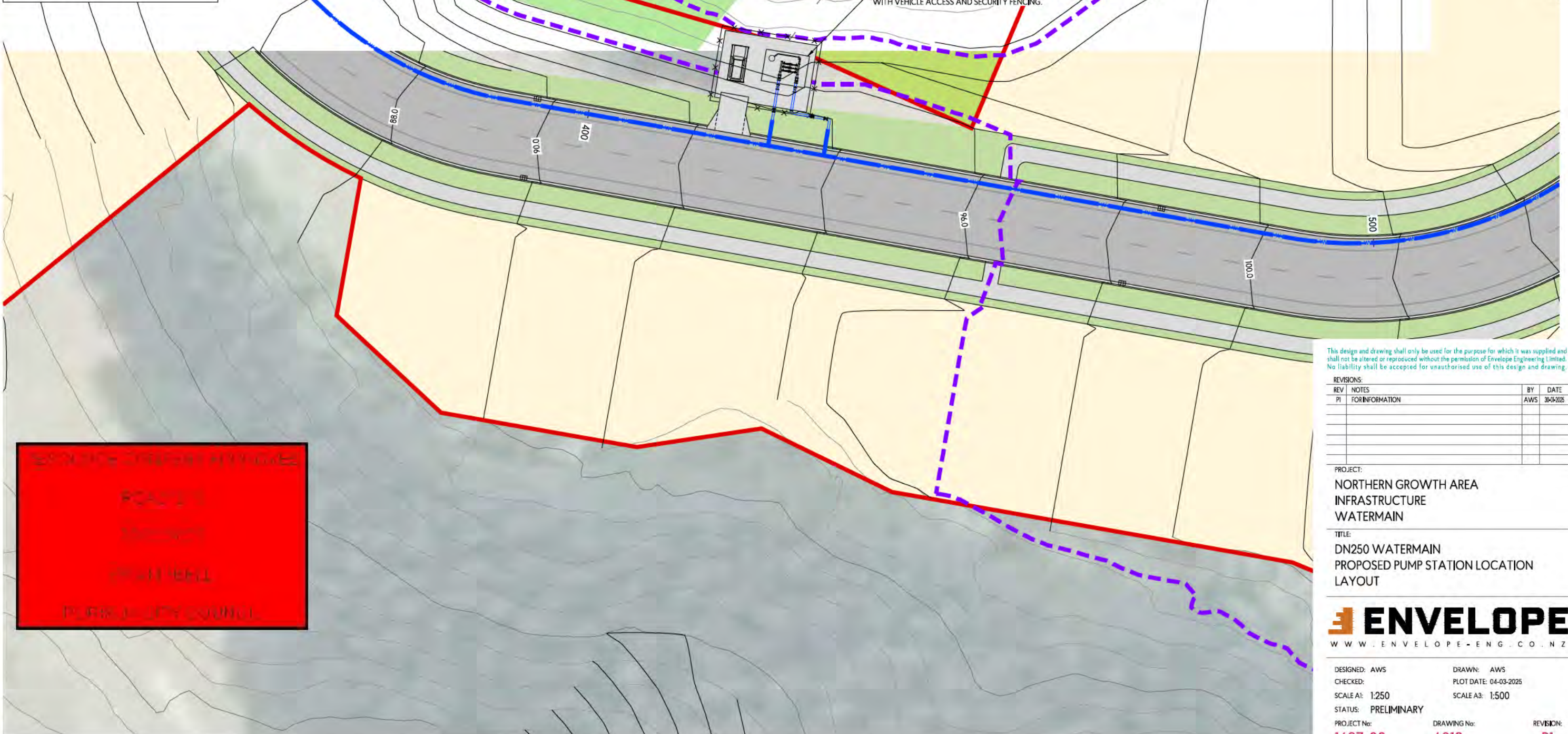
**NOTES:**

1. EXISTING CONTOURS ARE FROM 2023 LIDAR SOURCED FROM KOORDINATES DATABASE.
2. PROPOSED CONTOURS SHOWN ARE FINISHED GROUND LEVELS.
3. LEVELS ARE IN TERMS OF NZVD 2016.



at 240T infrastructure alignment  
 to be aligned at LT P100 at  
 elevation 130.0 and 110.0

PROPOSED LOCATION OF WATERMAIN PUMP STATION  
WITH VEHICLE ACCESS AND SECURITY FENCING.



ENVIRONMENTAL APPROVALS  
 ROAD  
 WATER  
 TRANSPORT  
 PUBLIC WORKS  
 CIVIL ENGINEERING

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

**REVISIONS:**

REV	NOTES	BY	DATE
P1	FOR INFORMATION	AWS	30-03-2025

PROJECT:  
NORTHERN GROWTH AREA  
INFRASTRUCTURE  
WATERMAIN

TITLE:  
DN250 WATERMAIN  
PROPOSED PUMP STATION LOCATION  
LAYOUT



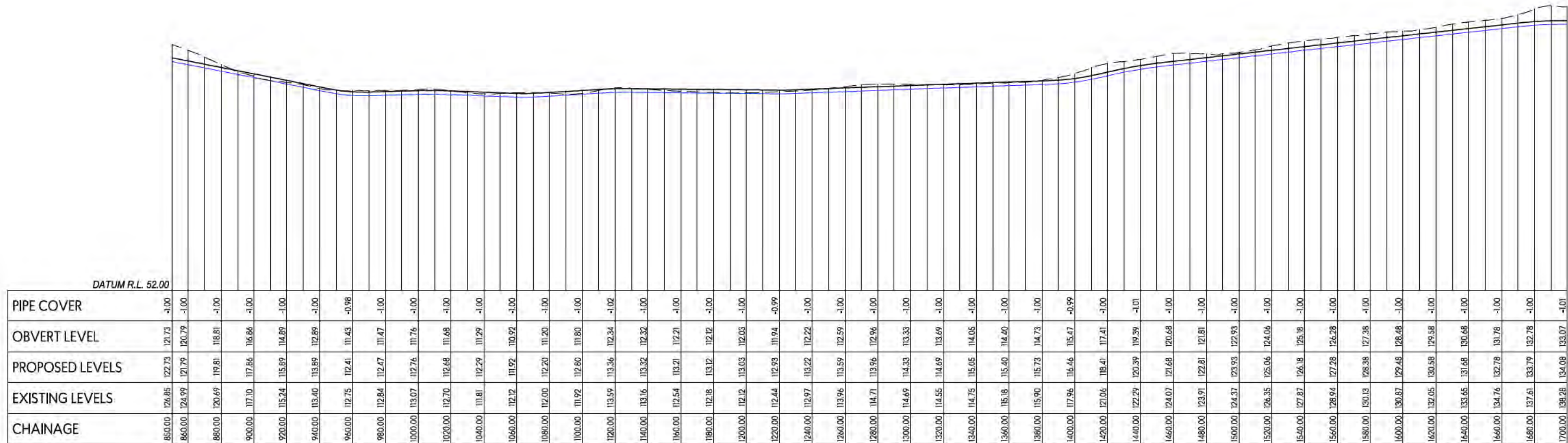
DESIGNED: AWS  
CHECKED: AWS  
SCALE A1: 1:250  
STATUS: PRELIMINARY  
PROJECT No: 1697-03

DRAWN: AWS  
PLOT DATE: 04-03-2025  
SCALE A3: 1:500  
DRAWING No: 6012

REVISION: P1

E:\PROJECTS\1697-03\NORTH GROWTH AREA\ROAD INFRASTRUCTURE\WATERMAIN\WATERMAIN.DWG





WATERMAIN



- NOTES:**
- LONG SECTIONS ARE SHOWN WITH A 2x VERTICAL EXAGGERATION
  - — — — — EXISTING GROUND SURFACE
  - — — — — PROPOSED GROUND SURFACE
  - — — — — PROPOSED DN225 WATERMAIN

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REVISIONS:

REV	NOTES	BY	DATE
P1	FOR INFORMATION	AWS	30-08-25

PROJECT:  
 NORTHERN GROWTH AREA  
 INFRASTRUCTURE  
 WATERMAIN

TITLE:  
 DN250 WATERMAIN  
 LONG SECTION  
 SHEET 2 OF 3



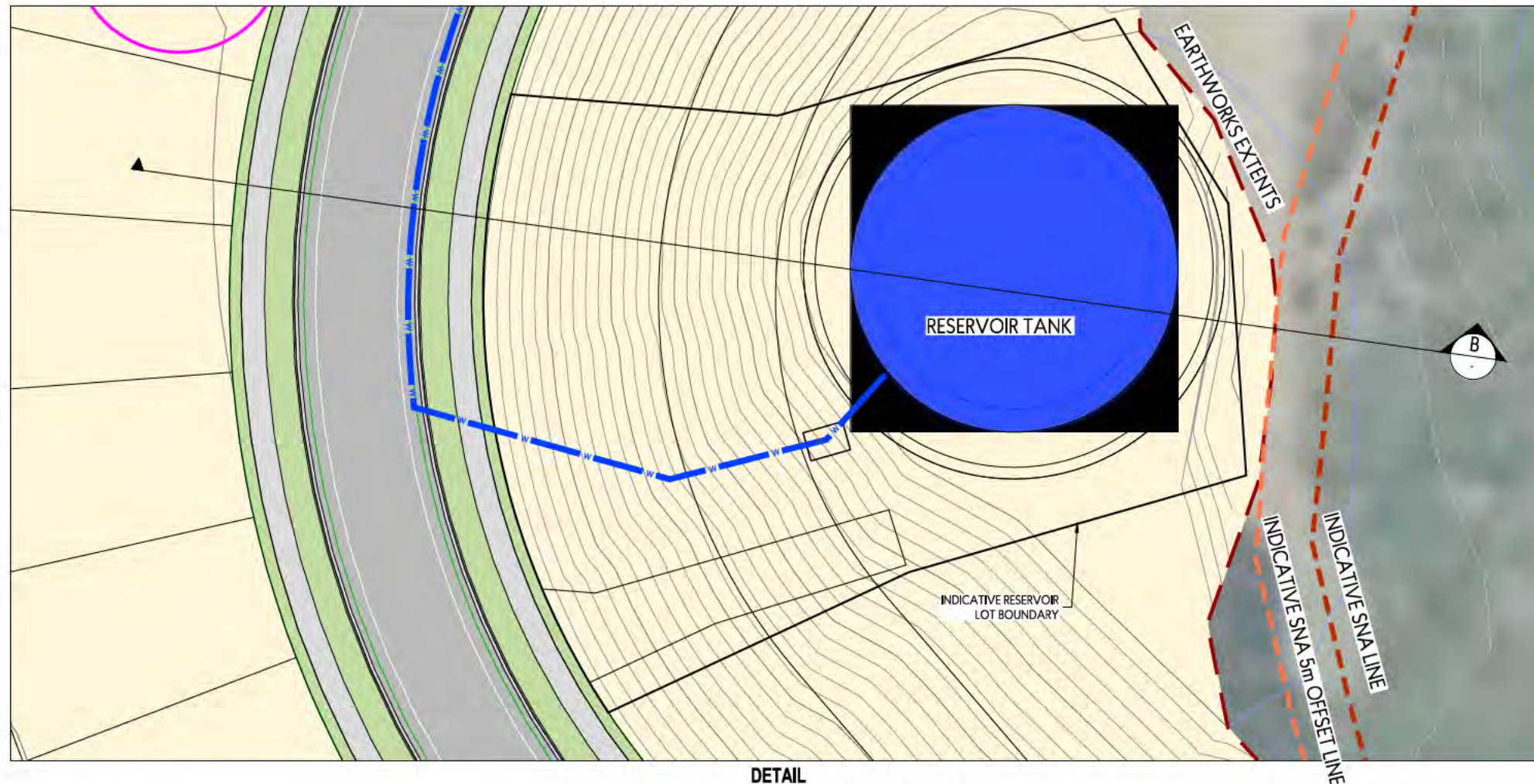
DESIGNED: AWS  
 CHECKED: AWS  
 SCALE A1: 1:1250  
 STATUS: PRELIMINARY  
 PROJECT No: 1697-03

DRAWN: AWS  
 PLOT DATE: 04-03-2025  
 SCALE A3: 1:2500

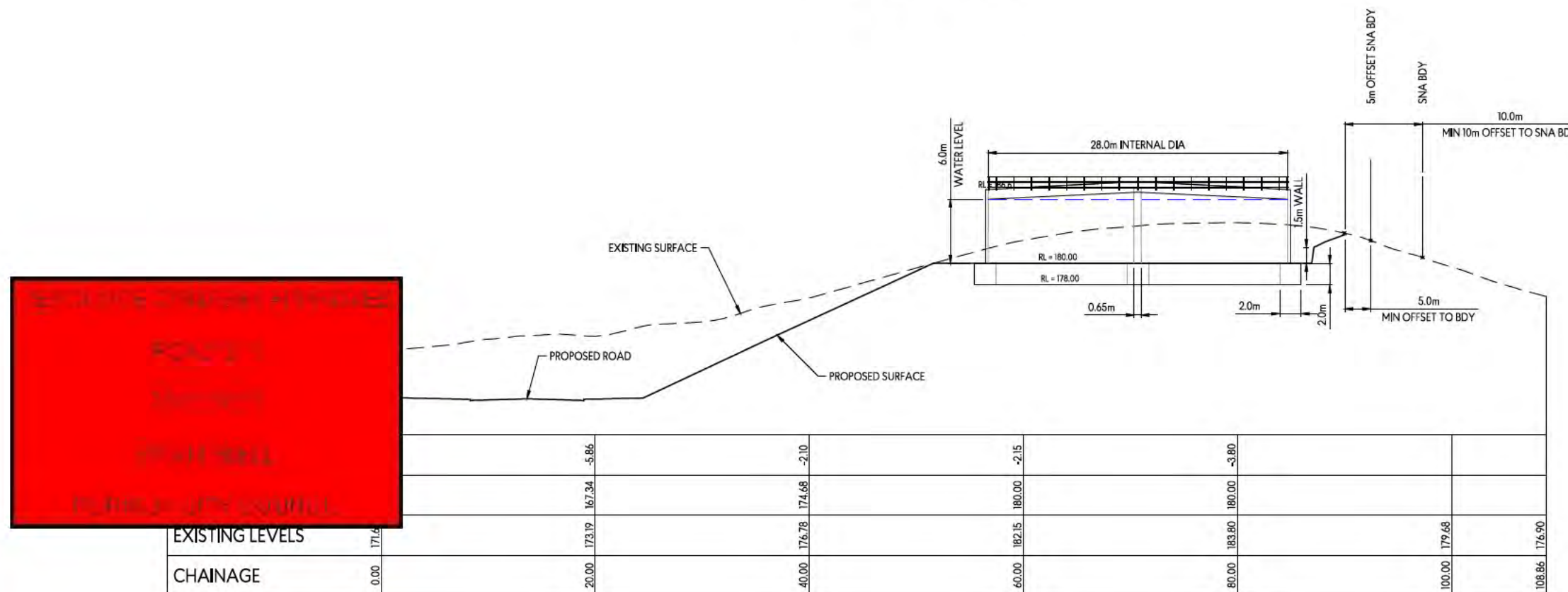
DRAWING No: 6501  
 REVISION: P1

E:\PATH\1697-03\NORTH GROWTH AREA\INFRASTRUCTURE\WATERMAIN\DN250\LONG SECTION\WATERMAIN\_SHEET 2 OF 3.DWG





DETAIL  
SCALE: 1:250 - A1 1:500 - A3



B RESERVOIR CROSS SECTION  
Scale: 1:250 @ A1 1:500 @ A3

This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REV	NOTES	BY	DATE
P4	REVISED RL180 LOCATION	KD	14-01-2022
P5	REVISED LOCATION	KD	14-06-2022
P6	REVISED POSITION AND ACCESS	AKH	21-03-2024
P7	INDICATIVE SNA LINE OFFSET SHOWN	AKH	18-04-2024
P8	GEI COVENANT BOUNDARY UPDATED	AKH	18-04-2024
P9	DUAL TANK LAYOUT	AKH	21-11-2024
P10	SINGLE TANK LAYOUT DIMENSIONS UPDATED	AS	04-03-2025

PROJECT:  
PUKERUA HOLDINGS LTD  
MURI ROAD DEVELOPMENT  
PUKERUA BAY

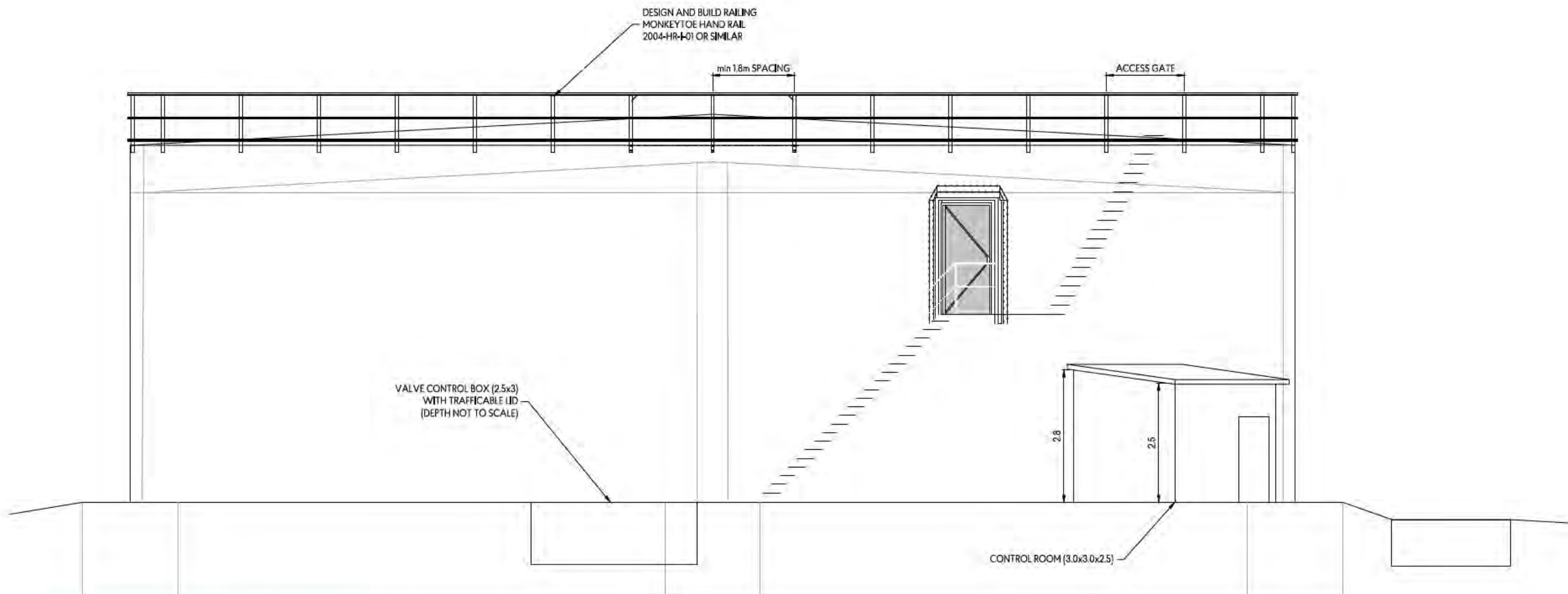
TITLE:  
PROPOSED RESERVOIR  
OVERALL CONCEPT LAYOUT



DESIGNED: KD  
CHECKED: -  
SCALE A1: 1:4000  
STATUS: PRELIMINARY  
PROJECT No: 1697-01

DRAWN: KD  
DATE: 4-4-Mar-2025  
SCALE A3: 1:8000  
DRAWING No: 6900

REVISION: P10



This design and drawing shall only be used for the purpose for which it was supplied and shall not be altered or reproduced without the permission of Envelope Engineering Limited. No liability shall be accepted for unauthorised use of this design and drawing.

REVISIONS:			
REV	NOTES	BY	DATE
P1	CONCEPT	AKH	16-06-2024
P2	DUAL TANK STAIR OPTION	AKH	25-11-2024
P3	SINGLE TANK WITH STAIR CASE	AS	05-02-2025

PROJECT:  
**PUKERUA HOLDINGS LIMITED**  
**MURI ROAD DEVELOPMENT**  
**PUKERUA BAY**

TITLE:  
**WATER CONCEPT**  
**RESERVOIR**  
**MAINTENANCE SAFE ACCESS DETAILS**



DESIGNED: AKH                      DRAWN: AKH  
 CHECKED: DJM                     DATE: 4-Mar-2025  
 SCALE A1: 1:50                     SCALE A3: 1:100  
 STATUS: PRELIMINARY

PROJECT No: **1697-01**                      DRAWING No: **6910**                      REVISION: **P3**



**APPENDIX 4**  
**UTILITY PROVIDER LETTERS**

28/01/2025

**CONDITIONAL ACCEPTANCE BY TUATAHI FIRST FIBRE LIMITED AS TELECOMMUNICATIONS OPERATOR**

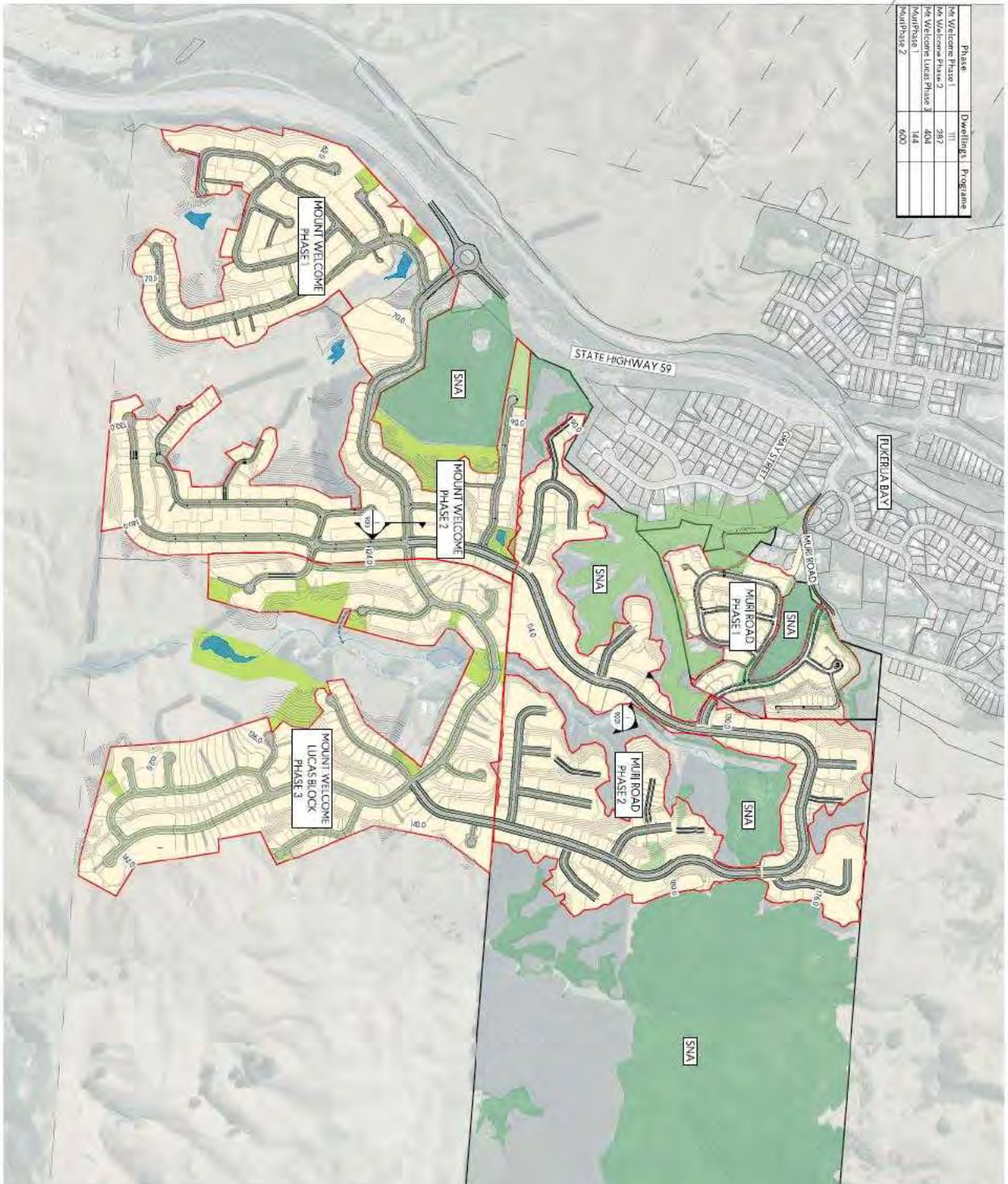
**Development:** Muri Road & Mt Welcome Development  
**Location:** State Highway 59, Pukerua Bay  
PT LOTS 1 & 1000 DP 604735, PT LOTS 1 & 1000 DP 604735, PT LOTS 1 & 1000 DP 604735  
- BALANCE OF LAND, LOT 1 DP 534864, LOT 2 DP 534864, PT LOT 1 DP 89102 - SUBJ TO  
& INT IN ROW, LOT 2 DP 89102 - INT IN ROW

1. Tuatahi First Fibre Limited (TFF) confirms that a TFF telecommunications connection will be made available for each lot in the development, **providing the developer was to sign a TFF Installation Agreement**. Upon approval of this agreement, TFF will undertake to become the telecommunications operator of the telecommunications reticulation in the proposed development (the "**Subdivision**"), to provide network connections to the lots, in the Subdivision (the "**Reticulation**").
2. The Reticulation will be installed in accordance with:
  - (a) the requirements and standards set by the Porirua City Council and advised to TFF via the Council's website; and
  - (b) the requirements of the Telecommunications Act 2001 and all other applicable laws, regulations and codes (as amended).
3. The Reticulation will be installed by our preferred provider to TFF's satisfaction.
4. TFF will be the owner, operator and maintainer of the Reticulation.
5. One or more retail service providers will be available to supply telecommunications services over the completed Reticulation when service is available, provided that TFF shall not be responsible if the retail service provider's offer to supply such telecommunications services or the number of such providers varies from time to time.

**SIGNED** for and on behalf of **TUATAHI FIRST FIBRE LIMITED** by:Signature: 

Name: Jonathan Campbell

Phase	Dwellings	Programs
Mount Welcome Phase 1	282	
Mount Welcome Phase 2	404	
Mount Welcome Phase 3	144	
Muri Road Phase 1	144	
Muri Road Phase 2	400	



**DRAFT PLAN ONLY**



This drawing and design shall be prepared by the project proponent, and the project proponent shall be responsible for the accuracy of the information provided. The project proponent shall be responsible for the accuracy of the information provided. The project proponent shall be responsible for the accuracy of the information provided.

**PROJECT:**  
MURI ROAD & MT WELCOME DEVELOPMENT  
PUKERUA BAY

**TITLE:**  
CONCEPT DESIGN

**ENVELOPE**  
W W ENVIRONMENTAL CONSULTANTS

SHEET: 14  
 GROUP: 00  
 SCALE: 1:600  
 DATE: 16/07/2025  
 PROJECT: CONCEPT  
 DRAWING: 9000  
 REVISION: 01

Chorus NZ Ltd  
4 Graham Street  
Auckland CBD  
Auckland

Classic Developments  
Level 3, 12 Viaduct Harbour Avenue  
Auckland CBD  
**AUCKLAND**

30<sup>th</sup> July 2025

Hi Dan,

Thank you for providing an indication of your development plans in the Pukerua Bay, Porirua, Wellington area. I can confirm that we have infrastructure in the general land area that you are proposing to develop situated at 422 State Highway 1, Pukerua Bay, Porirua, Wellington.

Chorus will be able to extend their network to provide connection availability. However, please note that this undertaking would of course be subject to Chorus understanding the final total property connections that we would be providing, roll-out of property releases/dates and what investment may or may not be required from yourselves and Chorus to deliver the infrastructure to and throughout the site in as seamless and practical way as possible.

The cost can only be finalised at the time that you are ready to proceed.

Chorus is happy to work with you on this project as the network infrastructure provider of choice. What this ultimately means is that the end customers (business and homeowners) will have their choice of any retail service providers to take their end use services from once we work with you to provide the physical infrastructure.

Please reapply with a detailed site plan once you are ready to proceed.

Kind Regards,

Margaret Singh  
**Group Account Manager**  
Chorus NZ Ltd



**APPENDIX 5**  
**EXISTING UTILITY SERVICES**



CABLES IN USE

- ..... 33,000 volt
- ..... 11,000 volt
- ..... 400 volt
- Public Light
- - - Auxiliary

CABLES NOT IN USE

- .....

SYMBOL LEGEND

- Duct Bank
- ..... Trench
- Pillar
- Pit

Distribution Substation

- 

Poles

- 
- 

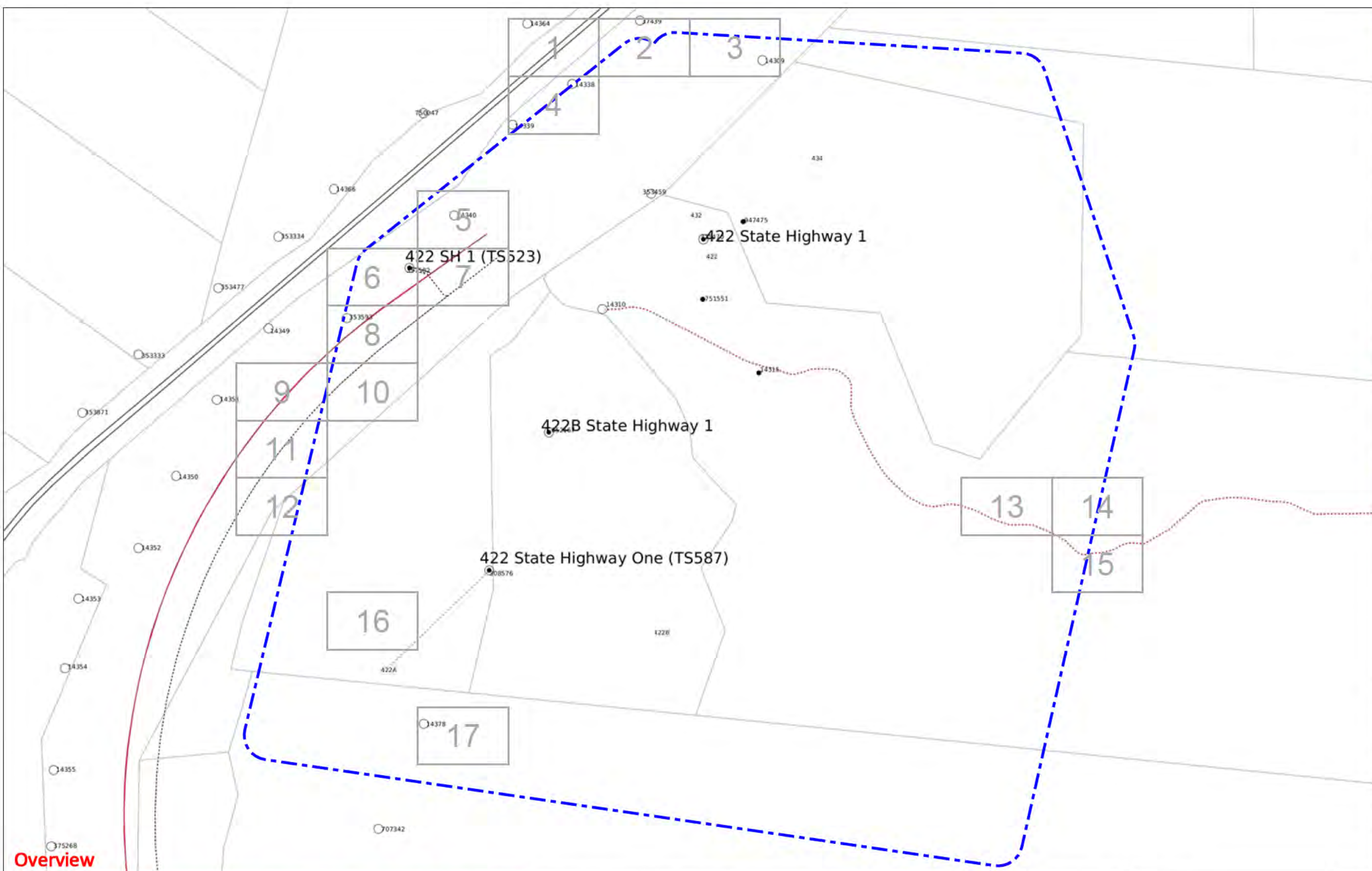
WORK MANAGEMENT

- Proposed



Map Scale: 1:3027

© Wellington Electricity Lines Limited. This plan is the property of Wellington Electricity Lines Limited. "Wellington Electricity" and the "we" image are registered trademarks of Wellington Electricity Lines Limited. All rights reserved. The contents of this document may not be reproduced either in whole or in part by any means whatsoever without the prior written consent of Wellington Electricity Lines Limited.



Overview

**22kV, 33kV, 110kV CABLES-SPECIAL CONDITIONS APPLY: 22kV, 33kV, 110kV cables must be precisely located prior to excavation. Wellington Electricity offers a free location service that requires 2 working days' notice.**

**Hand digging is required when excavating within 1.5 metre of the cable. Replacement trench backfill material must be the same as that removed and it must be replaced to the same level of compaction.**

**Refer to attached covering letter for additional information.**

**If you have requested a Locate DO NOT COMMENCE WORK.**

**You will be contacted within 3 business days to arrange this service.**

**DISCLAIMER:** Whilst care has been taken in the preparation of this plan, Wellington Electricity Lines Limited (Wellington Electricity) do not accept any liability for its accuracy and completeness and do not make any representation or warranty, express or implied, in relation to the same. These drawings are not to scale and may not show customer connections or obsolete lines. In addition, there may be more than one cable present in similar locations represented as a single line on this plan.

Works may have occurred in the vicinity which may not be represented in this plan at the date of issue.

The information contained in this plan is supplied for reference purposes only; actual dimensions and locations on site may differ from those indicated. Any person undertaking excavation works is responsible for the location and protection of underground equipment. Without limiting the foregoing, plans that are more than two weeks old should not be used and new plans should be requested from Wellington Electricity unless an alternative Obstruction Plan management process has been agreed in advance with Wellington Electricity. No excavation of any kind is to take place without locating Wellington Electricity's underground services.

For underground service locations and obstruction plan requests call us on 0800 248 288. If you hit an electricity cable or overhead line call us immediately on 0800 248 148. If you hit any gas pipeline call the Fire Service on 111.

While reasonable measures has been taken to ensure the accuracy of the information contained in this plan response, neither Wellington Electricity or PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

Sequence No:	16112485
Site Address:	432 State Hwy 59 Pukerua Bay, Wellington, 5026
Customer Name:	Mr Kyle Dirse
Company Name:	ENVELOPE ENGINEERING LIMITED
Phone:	0272281287
Date of Issue:	24/09/2025

**A3 ELECTRICITY OBSTRUCTION PLAN**

**Underground Services Only**

DL 64	DL 64
DL 64	DL 64



DEL	CHG	DATE	BY

CHANGE

**PUKERUA BAY**  
**UNDERGROUND TELEPHONE CABLE SYSTEM**  
 EXO CAREFULLY  
 POSITIONAL MEASUREMENTS APPLIED AT THE TIME OF INSTALLATION  
 MAY HAVE CHANGED DUE TO ROADWORK, SOIL SETTLEMENT,  
 UNUSUAL COVER AND SLOPE IN FOOTWAY AND SO ON IN ROADWAY.  
 PLEASE USE HAND TOOLS WHEN EXCAVATING IN THE VICINITY OF  
 CABLES AND DUCTS.

DCO:                      BASE DATA:                      APPD:  
 DEPENDENCY:                      CROSSING

ORIGINAL SCALE 1:1000

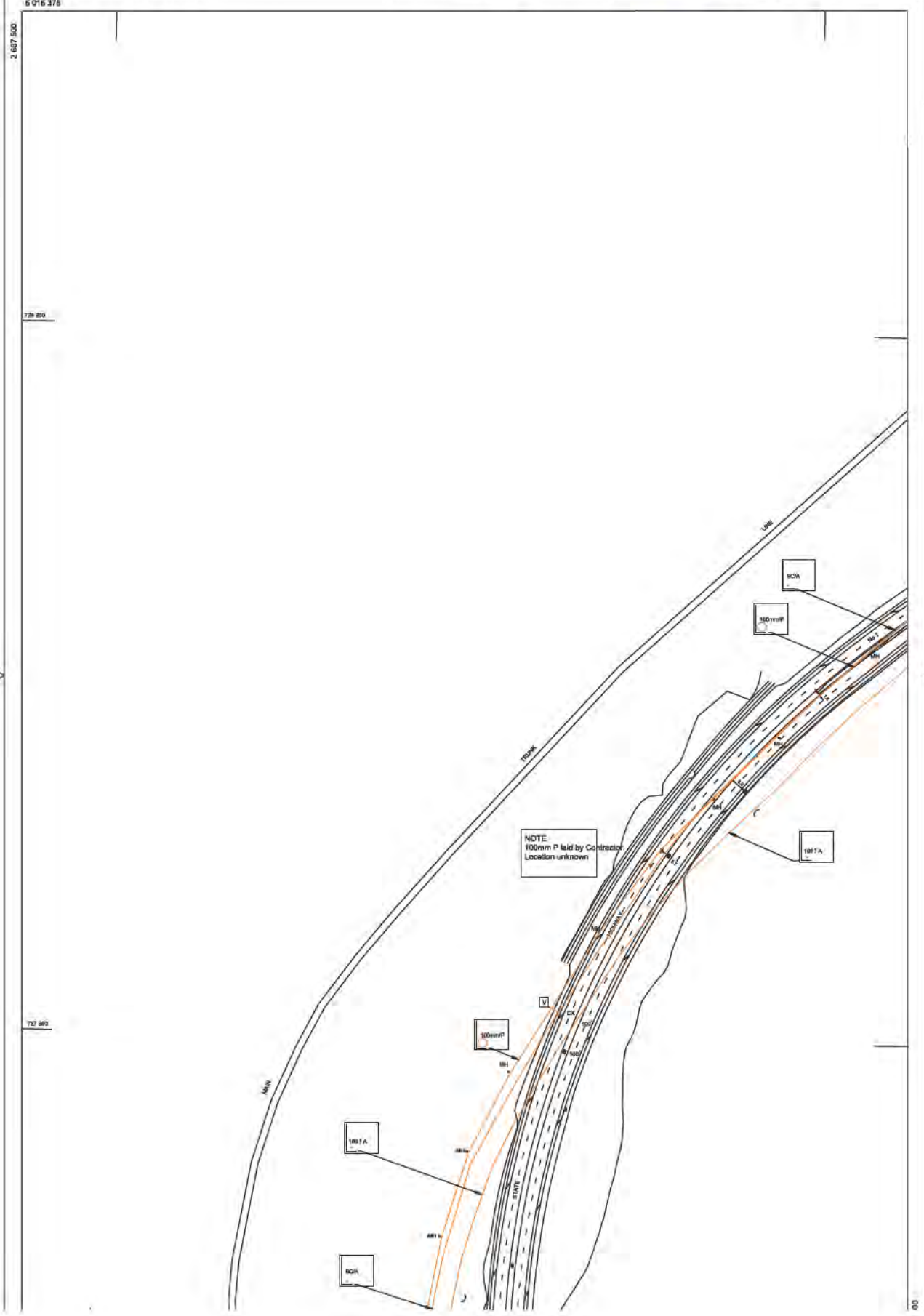
Telecom New Zealand Ltd

**DL.64**

TCNZ SHY No:                      R26-1000/036.32

TCNZ REF:                      W.40500

WN    TCNZ    W.40500    A1



DL:64	DL:64
DN:64	DN:64
DP:63	DP:63



DEL	CHG	DATE	BY	CHANGE
1		11.02.03		
2		24.03.03		
3		15.11.03		
4		01.09.04		

OVERLAY S.A. SOUTH PROMENADE GOODER HYDRAE  
 No. 3 TL56715 RLS APPROX 422 891 13000

**PUKERUA BAY**  
**UNDERGROUND TELEPHONE CABLE SYSTEM**

**DIG CAREFULLY**

ADDITIONAL REQUIREMENTS APPLIED AT THE TIME OF INSTALLATION MAY HAVE CHANGED BECAUSE OF TOLERANCES, UNLIDED JOINTS, OTHERS. COVER SHALL BE IN FOOTWAY AND CAN BE ROADWAY. ALWAYS USE HAND TOOLS WHEN WORKING IN THE VICINITY OF CABLES AND DUCTS.

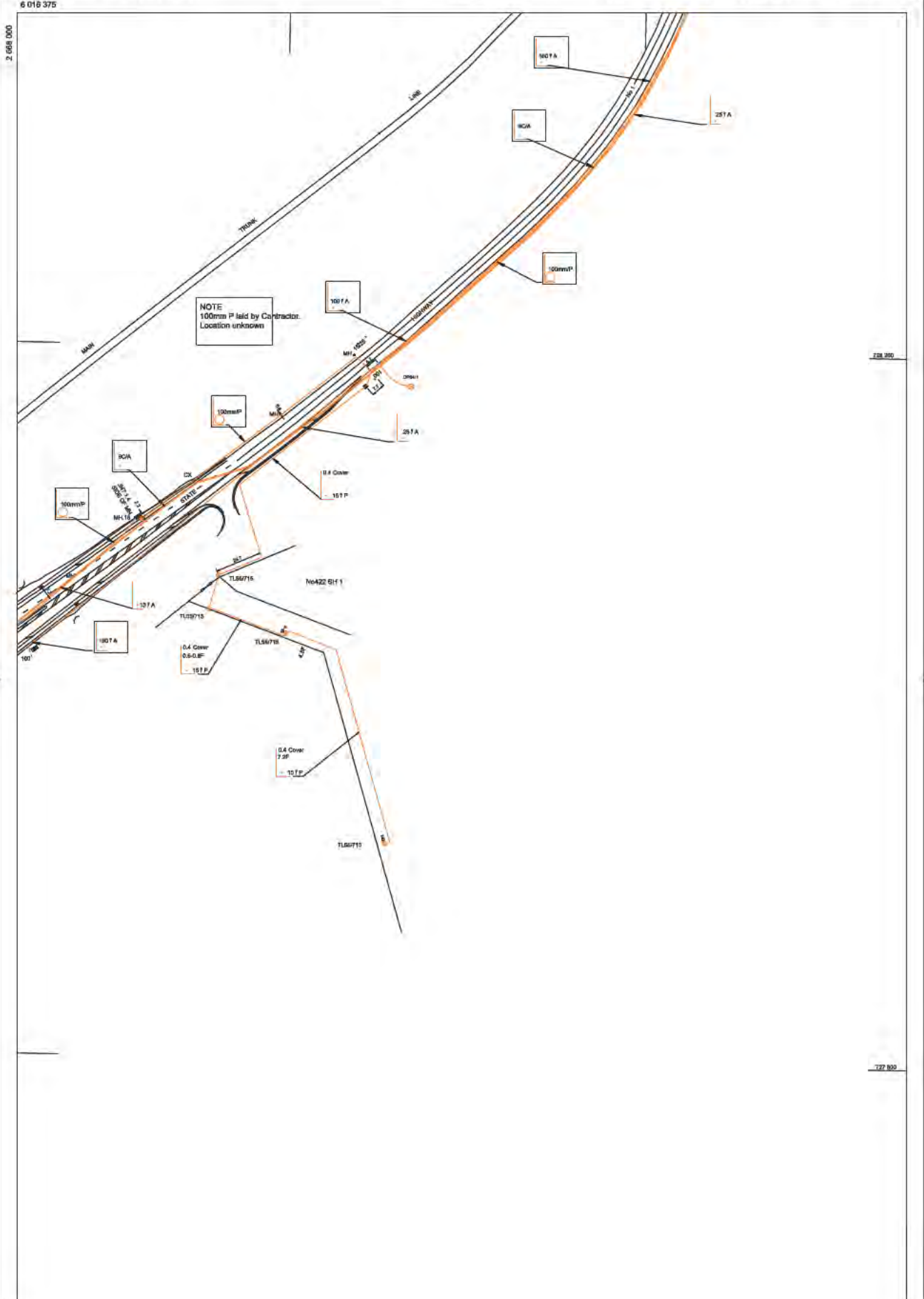
BASE DATA: NONE  
 APPD: NONE  
 ORIGINAL SCALE: 1:1000



TCNZ SHT No: **DN.64**

NZMG REF: **R26-1000/37.32**

WN	TCNZ	W.40500	A1
----	------	---------	----



6 018 375

2 088 000

728 250

727 800