GTJM Property Ltd

336 Portobello Road

Water, Wastewater, and Stormwater Infrastructure Assessment

October 2021

Fluent SOLUTIONS

GTJM Property Ltd

336 Portobello Road
Water, Wastewater, Stormwater Infrastructure and Flood Assessment

Task	Responsibility	Signature
Project Manager:	A Steel	
Prepared By:	Louise Clarke	
Reviewed By:	Anthony Steel	
Approved For Issue By:	Anthony Steel	

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26 October 2021	0	L Clarke	A Steel	A Steel
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Prepared By:
Fluent Infrastructure Solutions Ltd
Suite 3, First Floor
23-27 Beach Street
Queenstown 9300
Telephone: + 64 3 974 4586
Email: office@fluentsolutions.co.nz
Web: www.fluentsolutions.co.nz

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GTJM Property Ltd

336 Portobello Road
Water, Wastewater, and Stormwater Infrastructure Assessment

APPENDIX A
3 waters services for 336 Portobello Road

1.0 Introduction

1.1 General

Fluent Infrastructure Solutions Limited (FS) has been engaged by GJTM Property Ltd to undertake a water, wastewater and stormwater infrastructure assessment for the proposed subdivision at 336 Portobello Road, Dunedin.

This report has been prepared to support an application for resource consent for the development.

1.2 Site Locality and Features

The development area is located on the north side of Otago Peninsula. The access to the site is through Weller Street, which is approximately 4km along Portobello Road east of Anderson Bay Inlet, as shown in Figure 1.1 below.

The site consists of gently sloping land.

Figure 1.1: Site Location and Features

2.0 The Proposed Development Plan

Figure 2.1 below shows the general layout of the proposed development.

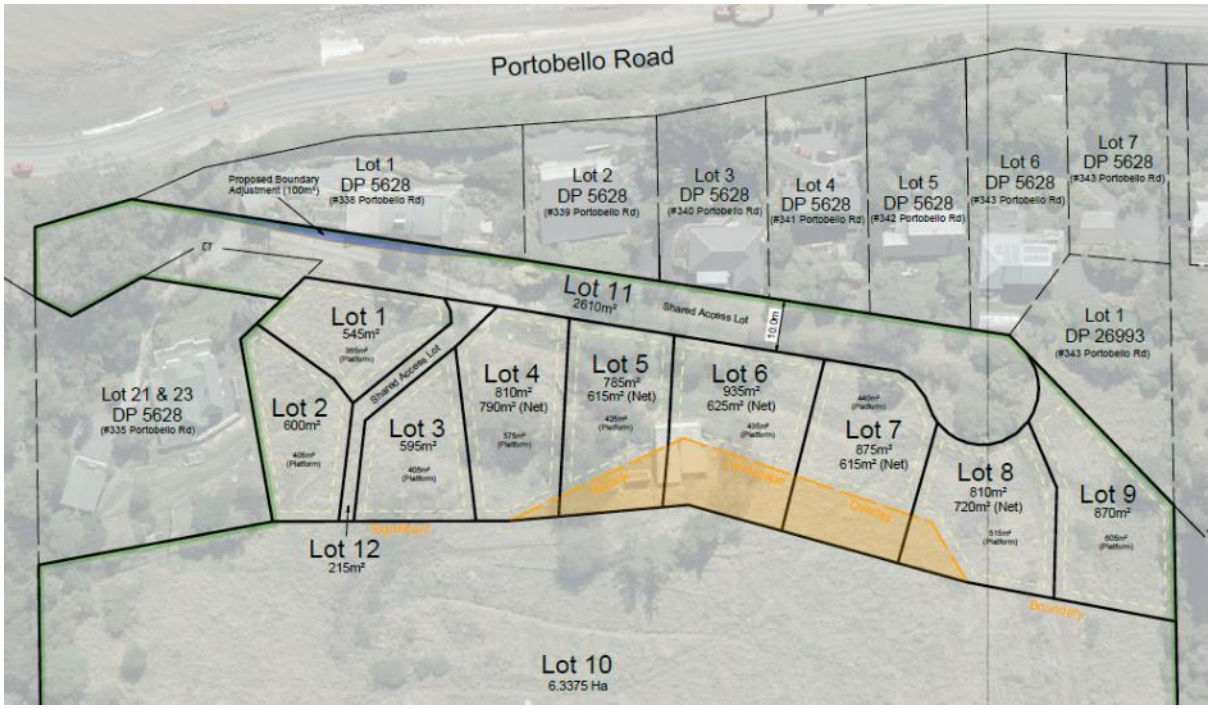

Figure 2.1: Schematic overview of proposed development

The proposed development on which this infrastructure assessment has been undertaken comprises 10 new residential lots.

The infrastructure assessment has also considered the infrastructure requirements of the 9 existing lots adjacent to the proposed development.

3.0 Wastewater

3.1 Wastewater Collection and Conveyance System Design

The design, sizing, and layout of the wastewater collection and conveyance network to service the proposed development have been assessed with regard to the following requirements:

- Population (i.e.: the number of dwellings / lots);
- Wastewater production – both peak wet weather and peak dry weather flows; and
- Accessibility of the existing DCC infrastructure to convey the wastewater loads.

3.2 Wastewater Flows

The design criteria used for estimating wastewater flows have been determined in accordance with the Dunedin City Council Engineering Code of Practice (2010).

The following estimated wastewater design flows for the proposed development are presented in Table 3.1 below.

Table 3.1: Wastewater Design Flows

Unit Type	No. of Dwellings	Max No. of People / dwelling / Day	Daily Water Demand (L/p/d)	Average Daily Water Demand (m^3/d)	Day Weather Diurnal Peaking Factor	Peak Dry Weather Flow (Pdwf - l/s)	Wet Weather Peaking Factor	Peak Wet Weather Flow (Pwwf - l/s)
New dwellings	10	3.5	270	9.45	2	0.22	3	0.7
Existing dwelling	9	3.5	270	8.51	2	0.20	3	0.6
Total Assessed Domestic Waste Water				**18.0**		**0.4**		**1.2**

3.3 Existing DCC Infrastructure

Wastewater from the existing properties on the site are serviced by a private 110mm uPVC main, which exits into a DCC foul sewer node near the junction of Weller Street and Portobello Road.

From there, wastewater is directed to an adjacent waste water pumping station approximately 100m from the intersection. According to the DCC water service map, this appears to be a 100mm dia. trunk main operating under gravity flow.

The wastewater pumping station is connected to a 300mm rising main, which conveys wastewater west, towards the Tahuna Wastewater Treatment Plant. This pump station is one of a series that pumps wastewater from properties and communities located on the Otago Peninsula.

Figure 3.1 presents an overview of the main existing sewer infrastructure in the vicinity of the development area.

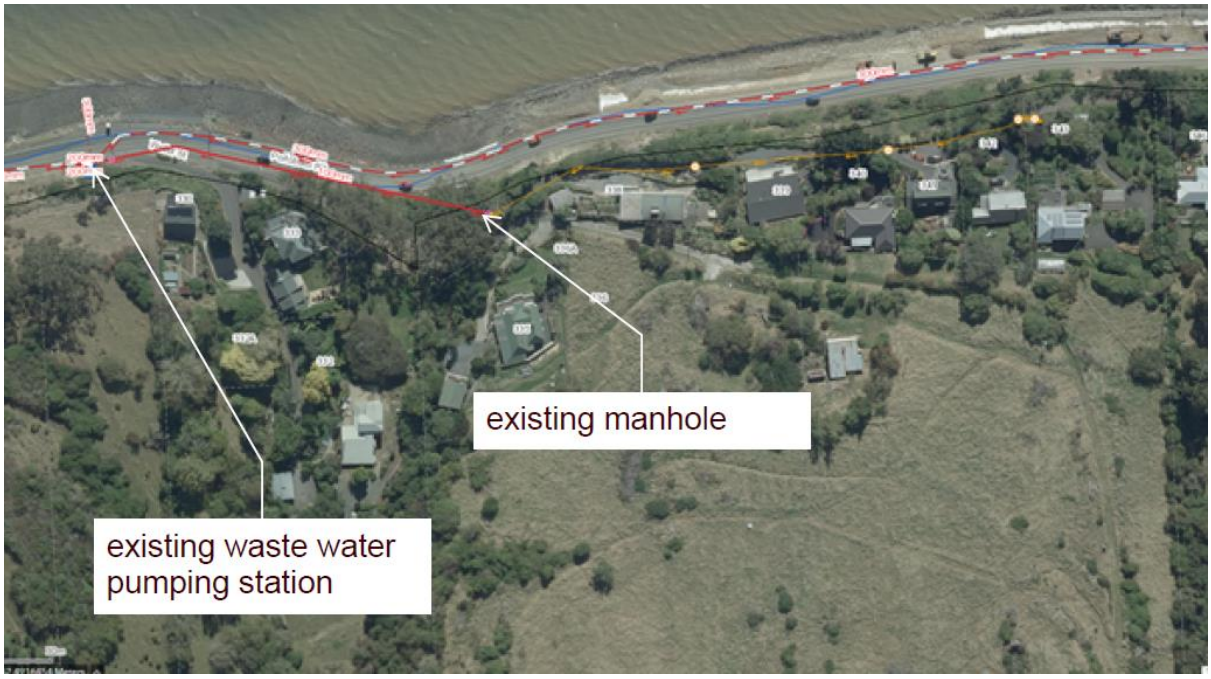

Figure 3.1: Overview of existing wastewater services in the vicinity of the development with the location of a sewer pump station indicated

3.4 Proposed Wastewater System Design

The new lots are proposed to be serviced by a new DN 150 foul sewer gravity mains, sited in the road reserve accessing the lots as shown on the drawing presented in the Appendices. There will also be an additional D150 foul sewer gravity main to service the lots on the smaller ROW, which will empty into the main line at a 1050mm diameter manhole.

The combined flow will then discharge into the existing foul sewer manhole at the junction of Weller Street and Portobello Road, as show in the drawing in Appendix A.

Investigation of the existing gravity sewer and manhole will be required to identify their diameter and characteristics. If required, up-sizing the existing receiving pipeline and manhole will be undertaken to match proposed falling main to ensure that pipe size reduction does not occur on any section.

4.0 Water Supply

4.1 Water Supply System Design

The design, sizing, and layout of the water supply network to service the proposed development has been assessed with regard to the following requirements:

- Population (i.e.: the number of dwellings / lots);
- Water demands – both peak and fire fighting requirements;
- Water supply availability;
- Water pressure requirements;
- Water storage requirements;
- Accessibility of the existing DCC infrastructure.

4.2 Water Demand Assessment

4.2.1 Domestic and Irrigation Water Demands

Based on the Dunedin City Council (DCC) Land Development and Subdivision Code of Practice 2010 the peak day water demand is estimated to be 250 L/person/day with 3.5 persons/dwelling, or 8,750 L/day for the 10 new properties in the subdivision.

It is understood that the current water supply connection to the existing dwellings does not meet council standards. The options presented below have taken this into consideration to provide a new water supply scheme to both the 10 new lots and the 9 existing houses.

The water supply required for the 10 new lots and 9 existing dwellings is 16,600L/day as shown in Table 4.1 below.

Table 4.1: Assessed Water Supply Design Volumes and Flows

Unit Type	No. of Dwellings	Max No. of People / dwelling / Day	Daily Water Demand (L/p/d)	Average Daily Water Demand (m^3/d)	Peak Day Peaking Factor	Peak Daily Water Demand (m^3/d)	Peak Hour Peaking Factor	Peak Hour Demand (L/s)
New dwellings	10	3.5	250	8.75	2	17.5	5	1.0
Existing Dweling	9	3.5	250	7.88	2	15.75	5	0.9
Sub Total Assessed Demand				**16.6**		**33.3**		**1.9**

By applying a peak day factor of 2, the peak daily demand is 33,300 L/day. By applying an additional peak hour factor of 5 results in a peak instantaneous flow of 1.9l/s.

4.2.2 Fire Fighting Demands

The design of the water supply system is also required to meet the fire fighting flow and pressure requirements of *SNZ PAS 4509 – NZ Fire Service Firefighting Water Supplies*

Code of Practice 2013. Based on the water supply classification of FW2, for housing such as single family dwellings, the required flow is a combined 25l/s from no. 2 nearby hydrants.

4.3 Existing Water Supply System

Properties along Portobello Road in this area are currently serviced by a trunk water supply main that runs along the northern side of Otago Peninsula at the approximate elevation of 120m above sea level. A portion of this trunk water supply main traverses the property, as shown in Figure 4.1.

The existing properties adjacent to the development are also serviced by this trunk main via a private connection. These connections however do not meet the current requirements of DCC Code of Subdivision and Development 2010.

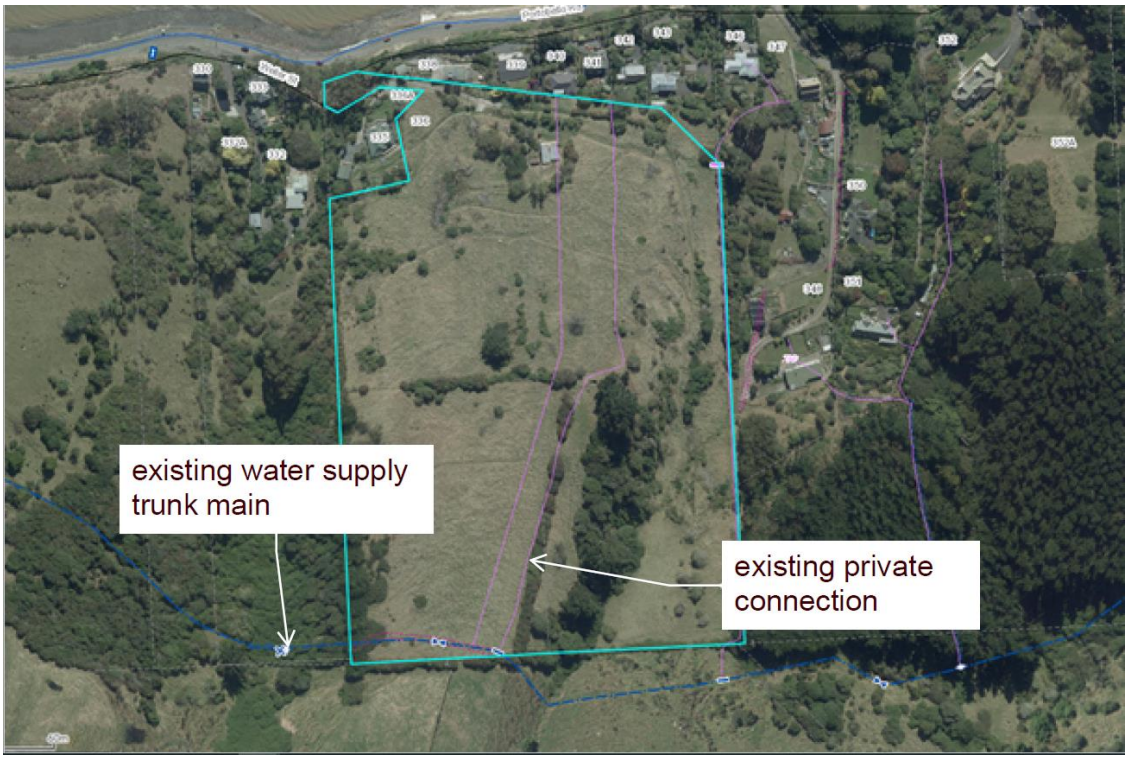

Figure 4.1: Schematic overview of existing water services in the vicinity of the property

4.4 Water Servicing for the Proposed Development

Based on conversations with Jared Oliver of the Dunedin City Council Engineering Planning team, there is capacity in this main to service the average daily demand for the development by supplying water to storage tanks that would service the proposed development and the 9 adjacent houses. Peak instantaneous demands and fire-fighting flows would be supplied directly from the tanks with a larger outlet pipeline.

The layout of proposed development water supply services is shown in Appendix A.

4.4.1 Water Storage Requirements

To manage peak hour demand on the water supply network, it is recommended that water storage be provided to meet the requirements of the development.

The volume of water storage is recommended to cater for fire fighting requirements as well as operational demands.

The fire fighting requirements, assessed in Section 4.2.2 identify the development as FW2, therefore requiring 45m^3 of available water. The number of properties does not affect the volume required for fire-fighting. It is also recommended that water storage also allow for an additional 6 hours of average daily flows to account for peak instantaneous demands higher than the average daily flows being delivered to the tanks. Table 4.2 below presents the tank storage sizing calculations for both the proposed development and the 9 additional existing houses.

Table 4.2: Assessed Water Storage Volumes

	New Lots only	New lots + existing dwellings
6 Average Daily Flow + Fire Fighting Capacity		
hours	6	6
average daily flow / day	8.75	16.63
calculation (6 ADF)	8.75m^3/day x 6hrs / 24	16.6m^3/day x 6hrs / 24
Fire Fighting Volume (m3)	45	45
calculated volume (m3)	**47.2**	**49.2**

As seen in Table 4.2, the required minimum storage is approximately 50m^3 for both cases. To meet the required storage volume and for ease of sourcing, it is proposed that 2no. 30,000 L tanks are installed providing total storage of 60m^3.

4.4.2 Water Supply Servicing Layout

The layout of proposed development water supply services is shown in Appendix A. Sizing of the pipelines will allow to deliver peak flows required to 2 hydrants during a fire.

5.0 Stormwater Management

5.1 Local Topography and Stormwater

The topography of the site is gently sloping land. The site consists of mostly open pasture, with small, wooded areas. A shallow gully runs across the upper reach of the site; however, no water course is noted in the area.

It is understood that current stormwater runs naturally over land, discharging to the Otago Harbour area. There is no stormwater network near the site.

5.2 Proposed Stormwater Management Servicing

The proposed works will only impact a small proportion of the property and there will not be any properties affected downstream of the development. It is therefore proposed that kerbside grated inlet sumps will collect stormwater from the road area to provide primary treatment of any stormwater runoff from the roads. The sumps will then drain to a stormwater trunk pipeline and discharge to the Otago Harbour via an outfall pipeline as shown on the drawings presented in the Appendices

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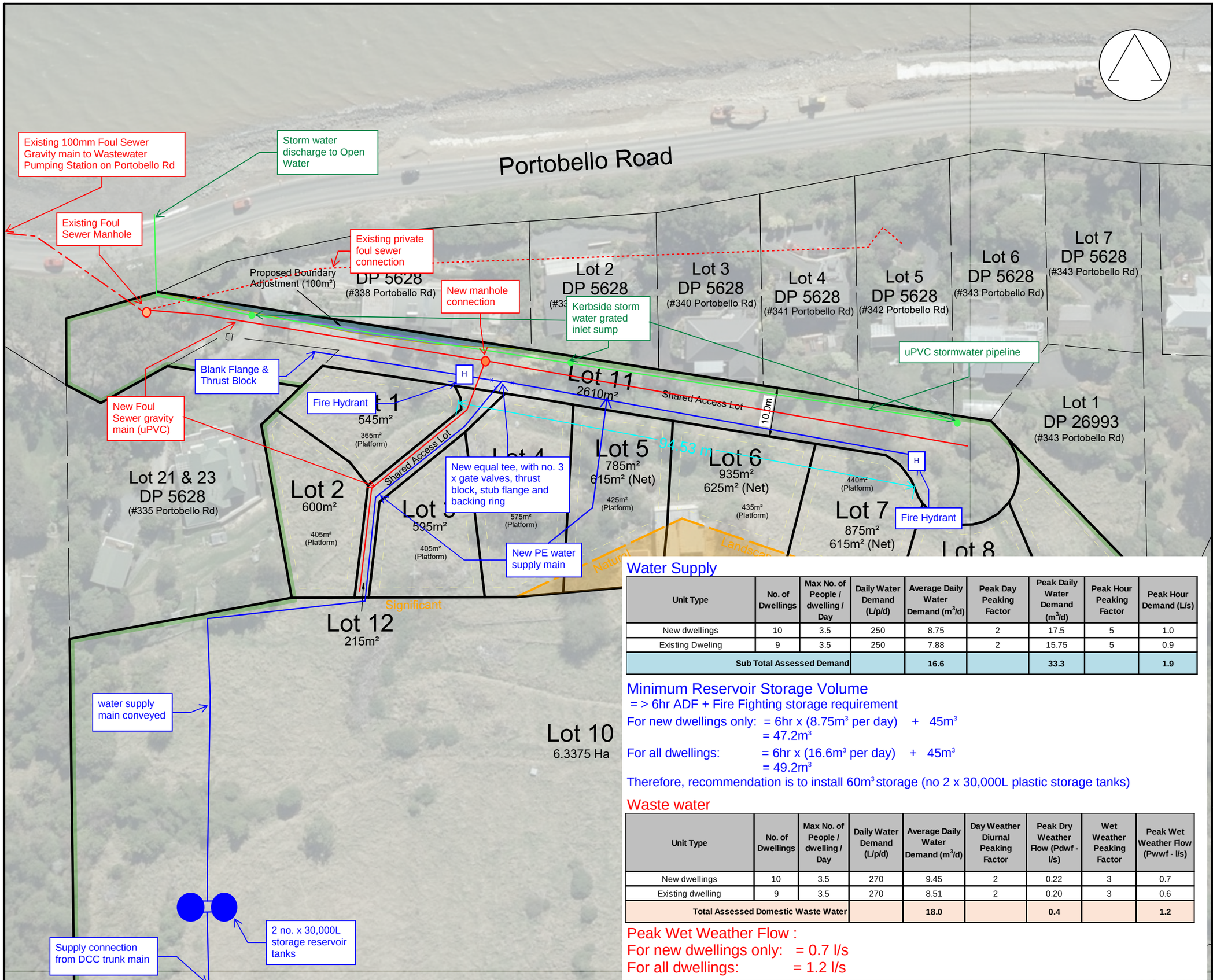
APPENDIX A

3-Waters Services for 336 Portobello Road.



Water Supply

Unit Type	No. of Dwellings	Max No. of People / dwelling / Day	Daily Water Demand (L/p/d)	Average Daily Water Demand (m^3/d)	Peak Day Peaking Factor	Peak Daily Water Demand (m^3/d)	Peak Hour Peaking Factor	Peak Hour Demand (L/s)
New dwellings	10	3.5	250	8.75	2	17.5	5	1.0
Existing Dweling	9	3.5	250	7.88	2	15.75	5	0.9
Sub Total Assessed Demand				**16.6**		**33.3**		**1.9**

Minimum Reservoir Storage Volume

= > 6hr ADF + Fire Fighting storage requirement

For new dwellings only: = 6hr x (8.75m^3 per day) + 45m^3
= 47.2m^3

For all dwellings: = 6hr x (16.6m^3 per day) + 45m^3
= 49.2m^3

Therefore, recommendation is to install 60m^3 storage (no 2 x 30,000L plastic storage tanks)

Waste water

Unit Type	No. of Dwellings	Max No. of People / dwelling / Day	Daily Water Demand (L/p/d)	Average Daily Water Demand (m^3/d)	Day Weather Diurnal Peaking Factor	Peak Dry Weather Flow (Pdwf - l/s)	Wet Weather Peaking Factor	Peak Wet Weather Flow (Pwwf - l/s)
New dwellings	10	3.5	270	9.45	2	0.22	3	0.7
Existing dwelling	9	3.5	270	8.51	2	0.20	3	0.6
Total Assessed Domestic Waste Water				**18.0**		**0.4**		**1.2**

Peak Wet Weather Flow :
For new dwellings only: = 0.7 l/s
For all dwellings: = 1.2 l/s

terramark
setting new boundaries
Surveying, Resource Management, & Engineering Consultants

PROVISIONAL ONLY
DETAIL, AREAS & DIMENSIONS ARE SUBJECT TO FINAL DESIGN, RESOURCE CONSENT & FINAL SURVEY

Project Title:
Lots 1 - 12 Being a Subdivision of Lots 22 & 25 DP 5628 & Pt Section 45 - 46 Upper Harbour East Survey District

Address:
336 & 336a Portobello Road The Cove

Legal Description:
Lots 22 & 25 DP 5628 & Pt Sec 45 - 46 Upper Harbour East SD

Client:
GTJM Property Ltd

Area:	Title Reference:
7.3025 Ha	
Date:	**Scale (A3):**
28/10/2021	1:750

Job No:	Plan No:	Revision:
D12178	5	A