BLUE BARN
CONSULTING ENGINEERS

167-173 Pilkington Road

Proposed Plan Change-Civil Engineering Report

Date:
13/04/2023

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Prepared by:
Blue Barn Consulting Limited

Prepared for:
Wyborn Capital Investments Ltd

0800 BLUE BARN

www.bluebarn.co.nz

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NAME	TITLE/GROUP	ORGANISATION
Callum Bakker	Development Manager	Wyborn Capital Investments Ltd
Kasey Zhai	Senior Planner	Barker & Associates

REVISION HISTORY

The following table outlines the revision history of this document:

REVISION	PUBLICATION DATE	COMMENTS
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Report Prepared For: Wyborn Capital Investment Ltd

Report Prepared By:
Blue Barn Consulting Limited
Level 8, 51 Shortland Street
Auckland 1010
Contact Number: 0800 258 32276 or +6498397009
www.bluebarn.co.nz

Document Author: **Selina Zhu**
Civil Engineer

Reviewed by: **Mark Thomas**
Principal Engineer, Land Development

Authorised for issue: **Sean Dickinson**
Associate Director, Land Development

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1. INTRODUCTION

Blue Barn Consulting Limited (Blue Barn) has been engaged by Wyborn Capital Investments Limited (WCIL) to prepare a Civil Engineering Report in support of a Proposed Private Plan Change of the site located at 167 – 173 Pilkington Road, Point England, Auckland with legal descriptions of LOT 1 DP 86427, Pt Lot 1 DP 32360 and Lot 2 DP 20163.

The site has a total land area of approximately 7.35 Ha. It is bound by Merton Road and the Glen Innes Town Centre to the north, Pilkington Apirana Road Reserve, Apirana Avenue, and Pilkington Road to the east, neighbouring site developed with a warehouse to the south, and the Kiwirail rail corridor to the west as shown in Figure 1-1. The site currently consists of warehouse-type industrial buildings, a childcare facility and some commercial spaces.

FIGURE 1-1 SITE LOCATION PLAN

The site is currently zoned for Business – Light Industry under the Auckland Unitary Plan Operative in Part (AUPOP) and it is proposed to change its zoning to Business – Mixed Use (Mixed Use).

This Report has been prepared to outline the existing three waters reticulation and utility services as well as provide recommendations on any potential upgrades required to support the Proposed Private Plan Change.

2. DEVELOPMENT PROPOSAL OVERVIEW

The Proposed Plan Change will enable the site to be developed in accordance with the provisions of the Mixed Use zone, which provides for a range of residential and commercial activities. The height and density of the proposed development increases towards the north-east of the site where most occupants would be placed closer to the Glen Innes Town Centre and train station.

The Pilkington Park Plan Change Design Report[1] identifies three potential development schemes which could be enabled by this Plan Change. The high-density scheme option with 6 super lots is considered for analysis in this civil engineering report as it is the most conservative case. The proposed high density scheme areas are detailed in section 5.12 of the Design Report as referenced below in Figure 2-1. The number of units and Gross Floor Area (GFA) for each super lot are summarised in Table 2-1.

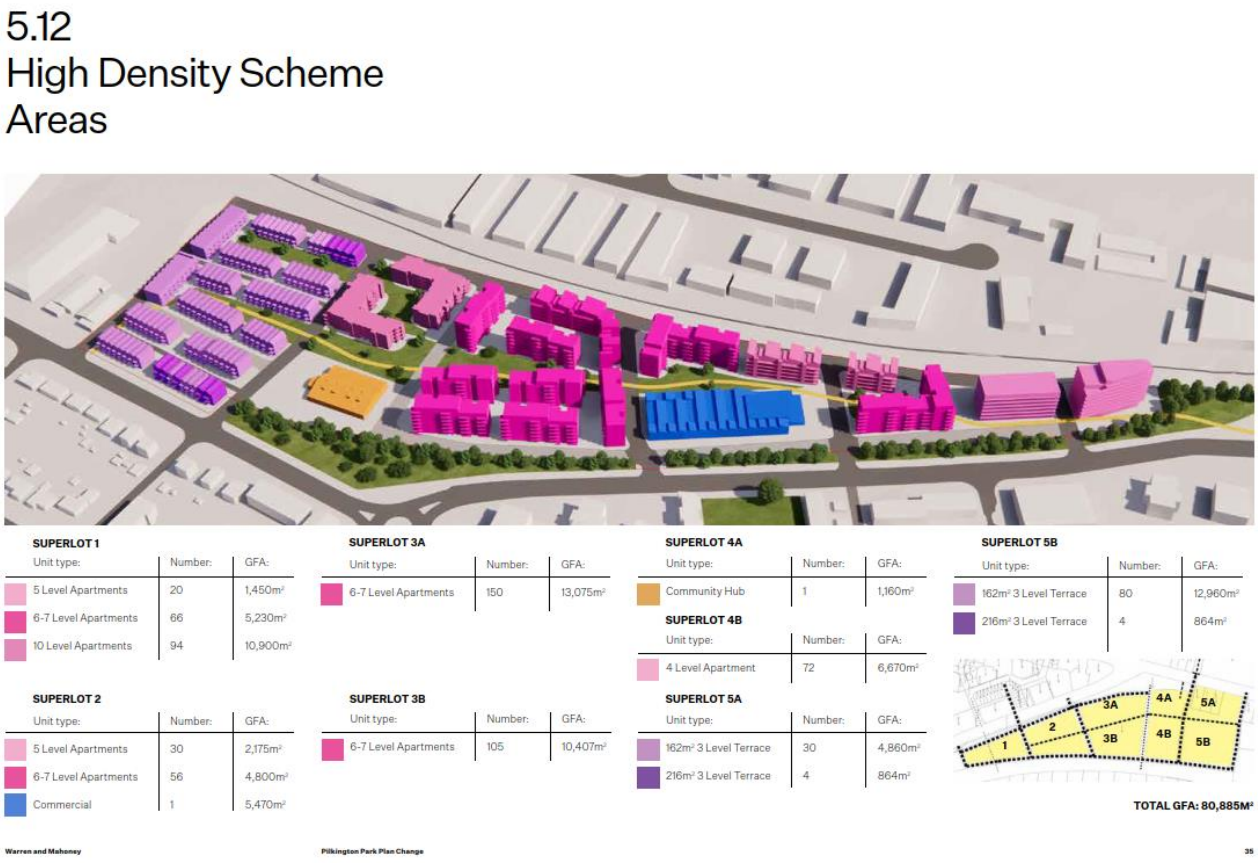

FIGURE 2-1 HIGH DENSITY SCHEME PLAN FROM WM DESIGN REPORT

[1] Pilkington Park Plan Change Design Report by Warren Mahoney dated May 2022.

TABLE 2-1 HIGH DENSITY SCHEME SUPER LOT NUMBERS AND GFA

Superlot	Unit Type	Number	GFA (m^2)
1	5 Level Apartments	20	1450
	6-7 Level Apartments	66	5230
	10 Level Apartments	94	10900
2	5 Level Apartments	30	2175
	6-7 Level Apartments	56	4800
	Commercial	1	5470
3A	6-7 Level Apartments	150	13075
3B	6-7 Level Apartments	105	10407
4A	Community Hub	1	1160
4B	4 Level Apartments	72	6670
5A	162 m^2 3 Level Terrace	30	4860
	216 m^2 3 Level Terrace	4	864
5B	162 m^2 3 Level Terrace	80	12960
	216 m^2 3 Level Terrace	4	864
	Sum	713	80885

3. EXISTING INFRASTRUCTURE

3.1 STORMWATER

3.1.1 SMAF REQUIREMENTS

AUPOP planning maps shows the northern portion of the site is located within a Stormwater Management Area Control Flow 2 (SMAF2) zone as shown in Figure 3-1. According to AUPOP Table E10.6.3.1.1, the hydrology mitigation requirements for a site located within a SMAF2 zone is to provide:

1. Detention with a drain down period of 24 hours for the difference between the pre-development (grassed state) and post-development runoff volumes from the 90th percentile, 24-hour rainfall event minus the 5mm retention volume.
2. Retention of a minimum of 5mm runoff depth for all impervious areas.

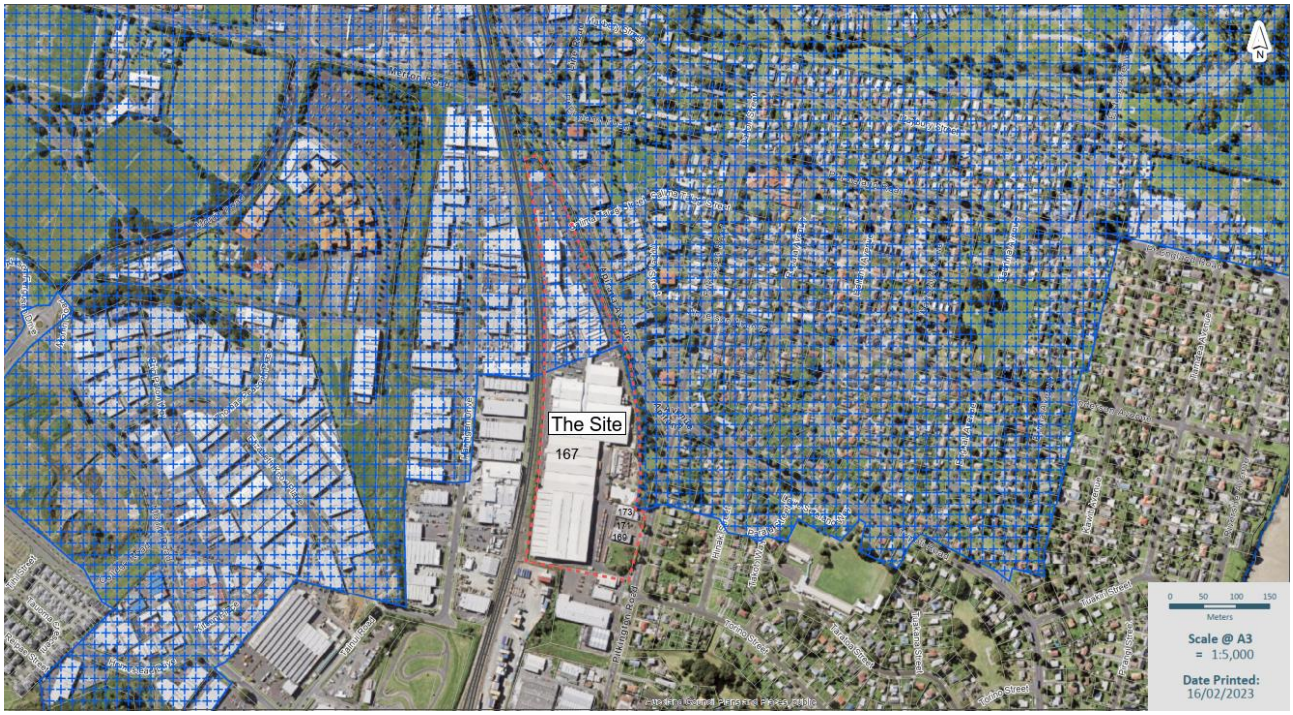

FIGURE 3-1 AUPOP SMAF2 AREA

3.1.2 NETWORK DISCHARGE CONSENT SCHEDULE 4

According to Schedule 4 of Network Discharge Consent (NDC), the subject site is categorised as a large brownfield (20 lots and over or more than 5000 m^2 of new/redeveloped impervious surface). The following requirements need to be met.

- Stormwater treatment is required for all impervious area in accordance with GD01.
- The northern portion of the site is located within a SMAF2 zone which needs to meet the requirements set out by AUPOP E10 as detailed in Section 3.1.1 above. The remainder of the site is located outside of the SMAF2 zone but the stormwater from the site eventually discharges to a stream called Omaru Creek in the Point England Reserve via a public stormwater network. The stream hydrology requirement is to provide:

1. Detention with a drain down period of 24 hours for the difference between the pre-development (grassed state) and post-development runoff volumes from the 95th percentile, 24 hour rainfall event minus the 5mm retention volume.
2. Retention of a minimum of 5mm runoff depth for all impervious areas.

3.1.3 STORMWATER TREATMENT

As covered in section 3.1.2 above, stormwater treatment of flows from all impervious areas by means of a water quality device designed in accordance with GD01 is required. According to AUPOP Chapter J, stormwater treatment is required if the proposed development involves high use road that carries more than 5,000 vehicles per day or high contaminant generating carpark which has a total of more than 30 vehicles.

3.1.4 Stormwater Detention and Retention

The existing site is currently almost completely impervious and the Proposed Plan Change will provide for future development which is likely to increase landscaping and pervious areas across the site, reducing surface stormwater runoff. A high-level assessment has been conducted assuming the entire site complies with the requirements set out in Section 3.1.2 above. Based on the most conservative assumption that the entire site is redeveloped to be fully impervious, the required detention volume is approximately 1687 m^3 and the retention volume is approximately 368 m^3. The volumes can feasibly be obtained through raingardens, tree pits, detention tanks or other devices spread through the site.

Refer to Appendix B for detailed calculations.

3.1.5 Existing Stormwater Network

Existing public stormwater network is present along the eastern and western boundaries. The northern portion of the site presently discharges to the east to a 900mm dia concrete pipe passing under Apirana Ave, while the southern portion discharges via a detention pond to a 375mm dia pipe along Pilkington Road. The GIS records also show 2 x 600mm diameter and 1 x 225mm diameter concrete pipes to the west passing under the railway embankment and discharging into the site. However, there are no obvious signs that these pipes exist on site. Further investigation would be required at the time of any future development to confirm whether or not they are in fact present.

The existing stormwater connections to the east could be utilised as the stormwater discharge points for any future development. Detailed calculations will be carried out to support any Resource Consent applications, at the next design stage to assess whether any stormwater upgrade is required to the existing reticulation. As it is expected that run-off from the site will be reduced compared to the existing situation, it is not anticipated that any major upgrades to the stormwater network downstream of the site will be required and possibly only minor upgrades at the proposed connection points to the existing system may be needed.

FIGURE 3-2 EXISTING STORMWATER NETWORK

3.1.6 FLOODING AND OVERLAND FLOW PATHS (OLFPS)

There are no significant flood plains, flood prone areas, or flood sensitive areas present within the site boundary. It is noted there is a dry pond is located in the south-eastern corner for temporary stormwater detention. OLFPs are present within the site with a OLFP starting within the site boundary and draining along the western boundary of the site before crossing through the middle of the site and draining out towards Apirana Avenue as shown in Figure 3-3. The existing OLFP will be managed within the proposed layout of any future development and the exit point of the OLFP from the site will be maintained or managed in accordance with the Council guidelines. There will be no adverse impacts to the downstream neighbouring properties.

FIGURE 3-3 FLOODING AND OVERLAND FLOW PATHS

3.2 WASTEWATER

A peak wastewater flow analysis has been conducted as per Water and Wastewater Code of Practice for Land Development and Subdivision Chapter 5: Wastewater (WWCOP) to compare the wastewater discharge in pre and post development conditions. It is estimated that the peak wastewater flow in the current developed condition is approximately 34 L/s, which will be reduced to approximately 27 L/s under the proposed high-density scheme. Refer to Appendix B for detailed calculations. It is noted that the anticipated peak wastewater flow from the redevelopment of the site will be less than what is currently permitted.

An existing 2.1m diameter public concrete wastewater transmission line runs through the site from the northeastern boundary to the southwestern corner as shown in Figure 3-4.

This is a major transmission line servicing the eastern suburbs of the Auckland Isthmus and will need to be managed accordingly as part of any future development. The planning and design of future buildings and underground infrastructure will need to consider the pipeline location and protect this transmission line from damage during construction and allow suitable ongoing access for maintenance after the development is completed. The impacts and possible mitigation measures will be further discussed with

Watercare and their guidelines for building over or near existing services will be incorporated during the developed design stages.

There is an existing transmission line satellite manhole located within the property close to the existing Apirana Ave entrance. Subject to confirmation from Watercare, this is the likely connection point for wastewater reticulation from within the site. A preliminary check shows that this manhole is deep enough to allow for gravity reticulation to service the whole site. This will enable wastewater flows from the development to connect directly to the transmission line without impacting the adjoining local reticulation. By providing a connection directly on to the transmission line this will also reduce flows in the local wastewater network to which the site is currently connected. This local network does eventually discharge into the same transmission line just north of the site so there will be no negative downstream impacts on flows.

FIGURE 3-4 EXISTING WASTEWATER NETWORK

3.3 WATER SUPPLY

A peak water demand analysis was conducted according to Water and Wastewater Code of Practice for Land Development and Subdivision Chapter 6: Water (WCOP). The peak water demand for the current development condition is estimated to be approximately 26 L/s. The estimated peak demand increases to approximately 28 L/s under the proposed high-density scheme. Refer to Appendix B for detailed calculations.

An existing water reticulation system is available along the eastern side of the site located along Apirana Avenue and Pilkington Road as shown in Figure 3-5. The existing site is currently served by two main connections, namely a 125PE pipe connecting to a 150AC main in Apirana Avenue and further to the south an additional 100AC pipe connecting to a 180PE main located on Apirana Avenue. Hydrant flow tests were undertaken on these two mains and the results shows the capacity of the hydrant on the 150AC main is 35.33L/s and the hydrant on 180PE main has a capacity of 38.83L/s at 400 kPa, refer to Appendix C for hydrant test results. The residual pressure is able to maintain nominated pressures for both peak demand

(250-800 kPa) and firefighting demand (minimum 100 kPa) scenarios for proposed development under the high-density scheme. A detailed water model will need to be undertaken to finalise the designs.

FIGURE 3-5 EXISTING WATER RETICULATION

3.4 COMMON SERVICES

3.4.1 POWER

Based on the as-built information from BeforeUdig, there are existing power cables available on the boundary of the site, refer to drawings in Appendix A. Given the large electrical power demands of the existing industrial development, it is anticipated that there will be sufficient capacity to service the redevelopment of the site. It is anticipated that any required upgrades will be implemented at the time of any future development and in accordance with Vector guidelines.

3.4.2 GAS

There are no reticulated gas services in close proximity to the site. It is not anticipated that a gas supply will be required for future development.

3.4.3 TELECOMMUNICATIONS

Based on the as-built information from BeforeUdig, there are existing telecommunication cables available on the boundary of the site, refer to drawings in Appendix A.

4. CONCLUSIONS

A high level desktop study has been conducted to analyse the existing infrastructure and utility services available and the proposed impacts a Proposed Private Plan Change to the site located at 167-173 Pilkington Road, Point England, Auckland would have on these services:

- Stormwater management including detention and retention as well as stormwater treatment are required for any future development . The site is not located within any flood plains and existing OLFPs will be managed within the proposed development layout. As any future redevelopment of the site is likely to result in less impervious area than the present site, the net stormwater discharge generated will be less than the present situation and significant downstream stormwater effects are not anticipated.
- Wastewater peak flow is anticipated to be reduced with future development. Watercare will be consulted to discuss the existing public wastewater infrastructure capacity and impacts as well as mitigation measures to protect the existing wastewater transmission line running through the site.
- Water demand is anticipated to increase slightly with the proposed plan change. There are existing water mains located on the boundary of the site which can be utilised to provide water to future development. Hydrant flow tests show that existing water mains on Apirana Avenue have sufficient capacity to serve any future development at the densities proposed in the report. Additional connections could also be provided off the water main located in Pilkington Road to further supplement the supply to the proposed development.
- Utility services are present on the boundary of the site and can be used to serve the future development. The utility service providers will need to further comment on the infrastructure capacity and upgrade requirements once final development layouts are known.

5. LIMITATIONS

This report has been prepared solely for Wyborn Capital Investments Ltd with respect to the plan change and it should not be relied upon in any other context or for any other purpose without Blue Barn's prior review and agreement. Neither Blue Barn Consulting Limited, nor any employee or sub-consultant of this company accepts any responsibility with respect to its use, either in full or in part, by any other person or entity. This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval or to fulfil a legal requirement.

APPENDIX A – DRAWINGS

NOTES:

1. COORDINATES ARE IN TERMS OF MOUNT EDEN 2000. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
2. THE DRAWING IS SHOWN IN METRES UNLESS STATED OTHERWISE.

LEGEND:

SITE EXTENT BOUNDARY

KERBLINE FROM AC GIS

FOR INFORMATION

REV.	REVISION DESCRIPTION	BY	APP.	DATE
0	FOR INFORMATION	SZ	SD	14/04/2023

CLIENT:

BLUE BARN CONSULTING ENGINEERS
LEVEL 8 | 51 SHORTLAND STREET
PO BOX 587 | SHORTLAND STREET | AUCKLAND 1140 | T: 0800 258 32276
www.bluebarn.co.nz

PROJECT:
WYBORN CAPITAL INVESTMENTS LIMITED
167-173 PILKINGTON ROAD
POINT ENGLAND, AUCKLAND 1072

TITLE:
SITE LOCALITY PLAN

DESIGNED: SZ	DATE: 09/02/2023	DRAWING CHECK: DD	DATE: 24/02/2023
DRAWN: SZ	DATE: 09/02/2023	DESIGN CHECK: SD	DATE: 24/02/2023
APPROVED: MT	DATE: 24/02/2023	SCALE: 1:1250 (A1) 1:2500 (A3)	ORIG. SIZE: A1
PROJECT NUMBER: 02278	ISSUE STATUS: FOR INFORMATION		
DRAWING NUMBER: 02278-C-000			REVISION: 0

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NOTES:

1. COORDINATES ARE IN TERMS OF MOUNT EDEN 2000. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
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LEGEND:

- SITE EXTENT BOUNDARY
- KERBLINE FROM AC GIS
- SW — SW — EXISTING STORMWATER NETWORK

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REV.	REVISION DESCRIPTION	BY	APP.	DATE
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BLUE BARN CONSULTING ENGINEERS
LEVEL 8 | 51 SHORTLAND STREET
PO BOX 587 | SHORTLAND STREET | AUCKLAND 1140 | T: 0800 258 32276
www.bluebarn.co.nz

PROJECT:
WYBORN CAPITAL INVESTMENTS LIMITED
167-173 PILKINGTON ROAD
POINT ENGLAND, AUCKLAND 1072

TITLE:
DRAINAGE
EXISTING STORMWATER NETWORK
OVERALL LAYOUT PLAN

DESIGNED: SZ	DATE: 09/02/2023	DRAWING CHECK: DD	DATE: 24/02/2023
DRAWN: SZ	DATE: 09/02/2023	DESIGN CHECK: SD	DATE: 24/02/2023
APPROVED: MT	DATE: 24/02/2023	SCALE: 1:1250 (A1) 1:2500 (A3)	ORIG. SIZE: A1
PROJECT NUMBER: 02278	ISSUE STATUS: FOR INFORMATION		
DRAWING NUMBER: 02278-C-010			REVISION: 0

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LEGEND:

- SITE EXTENT BOUNDARY
- KERBLINE FROM AC GIS
- OVERLAND FLOW PATH FROM AC GIS
- FLOOD PLAIN FROM AC GIS
- FLOOD PRONE AREA FROM AC GIS

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CONSULTING ENGINEERS
LEVEL 8 | 51 SHORTLAND STREET
PO BOX 587 | SHORTLAND STREET | AUCKLAND 1140 | T: 0800 258 32276
www.bluebarn.co.nz

PROJECT:
WYBORN CAPITAL INVESTMENTS LIMITED
167-173 PILKINGTON ROAD
POINT ENGLAND, AUCKLAND 1072

TITLE:
DRAINAGE
EXISTING OVERLAND FLOW PATH
AND FLOODPLAIN

DESIGNED: SZ	DATE: 09/02/2023	DRAWING CHECK: DD	DATE: 24/02/2023
DRAWN: SZ	DATE: 09/02/2023	DESIGN CHECK: SD	DATE: 24/02/2023
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DRAWING NUMBER: 02278-C-020			REVISION: 0

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LEGEND:

- SITE EXTENT BOUNDARY
- KERBLINE FROM AC GIS
- EXISTING WASTEWATER NETWORK

FOR INFORMATION

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BLUE BARN CONSULTING ENGINEERS
LEVEL 8 | 51 SHORTLAND STREET
PO BOX 587 | SHORTLAND STREET | AUCKLAND 1140 | T: 0800 258 32276
www.bluebarn.co.nz

PROJECT:
WYBORN CAPITAL INVESTMENTS LIMITED
167-173 PILKINGTON ROAD
POINT ENGLAND, AUCKLAND 1072

TITLE:
DRAINAGE
EXISTING WASTEWATER NETWORK
OVERALL LAYOUT PLAN

DESIGNED: SZ	DATE: 09/02/2023	DRAWING CHECK: DD	DATE: 24/02/2023
DRAWN: SZ	DATE: 09/02/2023	DESIGN CHECK: SD	DATE: 24/02/2023
APPROVED: MT	DATE: 24/02/2023	SCALE: 1:1250 (A1) 1:2500 (A3)	ORIG. SIZE: A1
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DRAWING NUMBER: 02278-C-030			REVISION: 0

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NOTES:

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LEGEND:

- SITE EXTENT BOUNDARY
- KERBLINE FROM AC GIS
- W — W EXISTING WATERMAIN
- H EXISTING FIRE HYDRANT

FOR INFORMATION

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BLUE BARN CONSULTING ENGINEERS
LEVEL 8 | 51 SHORTLAND STREET
PO BOX 587 | SHORTLAND STREET | AUCKLAND 1140 | T: 0800 258 32276
www.bluebarn.co.nz

PROJECT:
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EXISTING WATER NETWORK
OVERALL LAYOUT PLAN

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APPROVED: MT	DATE: 24/02/2023	SCALE: 1:1250 (A1) 1:2500 (A3)	ORIG. SIZE: A1
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APPENDIX B – CALCULATIONS

BLUE BARN CONSULTING ENGINEERS

TP108 Worksheet Calculations

CLIENT:	Wyborn Capital Investments Ltd	**JOB No:**	2278		
JOB:	167-173 Pilkington Road	**CALCS BY:**	SZ	**DATE:**	13-Feb-23
SUBJECT:	Stormwater Detention and Retention Calculations	**CHECK BY:**	RC	**DATE:**	15-Feb-23

TP108 runoff and volume calculations - Pre development

TP108 Worksheet

Project Task:
To calculate site stormwater runoff in pre any development condition.

A) Runoff Parameters and Time of Concentration- Pre Development

1. Pond Catchment Details

Total Area (ha)	7.35
Pervious Area (ha)	7.35
Impervious Area (ha)	0.000
Channel^{n} factor **C**	0.80
Catchment length **L** (km)	0.448
Catchment slope **Sc**	0.007

Site Area		
167 Pilkington Road	7.05	Ha
173 Pilkington Road	1011	m2
171 Pilkington Road	1153	m2
169 Pilkington Road	870	m2
Sum	**7.35**	Ha

Assumptions (if any):
Assume the entire site area is grassed (pervious) with no existing imperviousness.

2. Runoff Curve Number (CN) and Initial Abstraction (Ia)

Soil Name and Classific.	Area identifier, cover description (cover type, treatment and hydrological condition)	Curve number CN*	Area (ha)	Product CN x Area
	Impervious Area			
		98	0.000	0.0
	Pervious Area			
	Entire Site	39	7.35	286.7
	* from Appendix B	**Total**	**7.35**	**286.7**

CN (weighted) = $\frac{\text{total CN x A}}{\text{total area}} = \frac{286.7}{7.3506} =$ **39.0**

Ia (weighted) = $\frac{\text{5 x pervious are}}{\text{total area}} = \frac{36.8}{7.3506} =$ **5.0**

3. Time of Concentration

Runoff Factor = $\frac{\text{CN}}{\text{200 - CN}} = 0.242$

tc = 0.14C x L0.66 x [CN/(200-CN)]-.55 x Sc-0.30 = **0.646** hrs Note: tc = 10 min = 0.17hrs

SCS Lag for HEC-HMS "tp" = 2/3 x tc = **0.431** hrs

CLIENT:	Wyborn Capital Investments Ltd	**JOB No:**	2278		
JOB:	167-173 Pilkington Road	**CALCS BY:**	SZ	**DATE:**	13-Feb-23
SUBJECT:	Stormwater Detention and Retention Calculations	**CHECK BY:**	RC	**DATE:**	15-Feb-23

TP108 runoff and volume calculations - Pre development

TP108 Worksheet

Project Task:

B) Graphical Peak Flow Rate- Pre Development

1. Catchment Area (km^2)	=	0.073506
2. Calc storage, S = 25.4 x [(1000/CN - 10)]	=	397.282

	95th Percentile
3. Annual Recurrence Interval (ARI)	
4. 24 hour rainfall depth, P_{24} (mm)	34.5
5. Compute c* = $\frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$ (mm)	0.030
6. Specific flow rate q* (from Fig. 5.1 below)	0.006
7. Peak flow rate, q_p = q^*AP_{24} (m^3/sec)	0.014
8. Runoff depth, Q_{24} = $\frac{(P_{24} - Ia)^2}{(P_{24} - Ia) + S}$ (mm)	2.0
9. Runoff Volume, V_{24} = 1000 x $Q_{24}A$ (m^3)	150

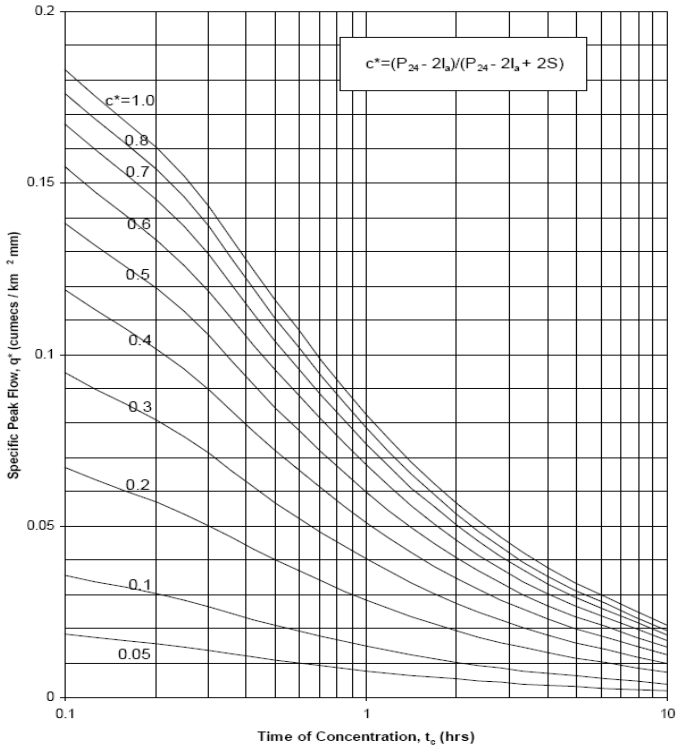

Figure 5.1 - Specific Peak Flow Rate

Figure 5.1, from TP108

Catchment length assuming from the highest and furthest point of the site to the lowest point where it connects to stormwater network.
Catchment slope = Contour level difference / Catchment length

95th percentile 24-hour rainfall depth = 34.5mm

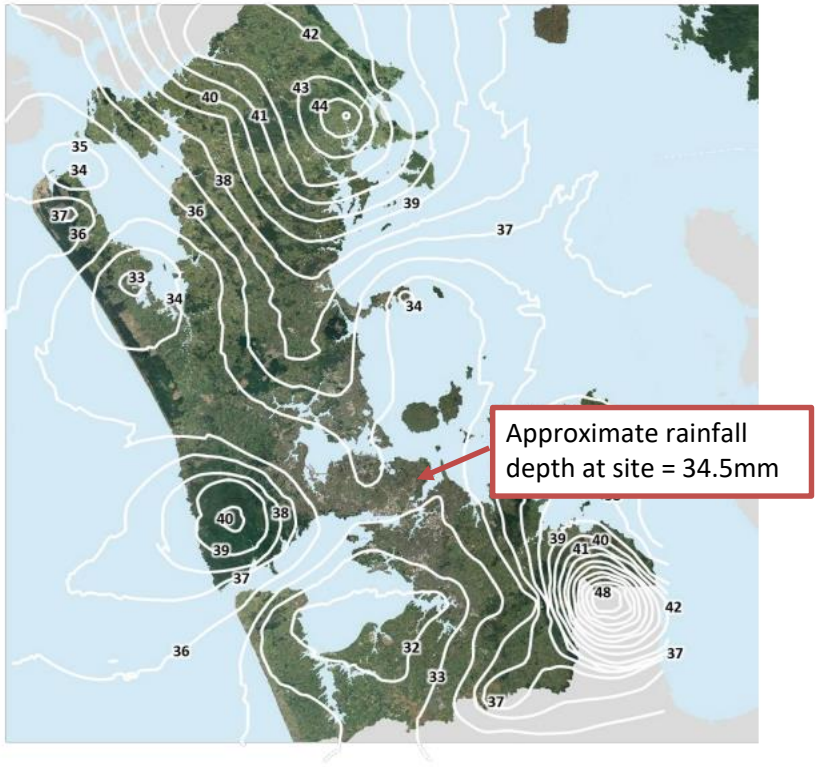

Figure 6: Map of 95th percentile 24-hour rainfall event

Source: Auckland Council TR 2013/035[11]

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TP108 runoff and volume calculations - Post development

TP108 Worksheet

Project Task:
To calculate site stormwater runoff in post development condition.

A) Runoff Parameters and Time of Concentration- Post Development

1. Pond Catchment Details

Total Area (ha)	7.35
Pervious Area (ha)	0.000
Impervious Area (ha)	7.35
Channel^{n} factor **C**	0.60
Catchment length **L** (km)	0.448
Catchment slope **Sc**	0.007

Site Area		
167 Pilkington Road	7.05	Ha
173 Pilkington Road	1011	m2
171 Pilkington Road	1153	m2
169 Pilkington Road	870	m2
Sum	**7.35**	Ha

Assumptions (if any):
Assume the entire site area is impervious except Pilington Apriana Road Reserve in post-development condition.
Assume post-development catchment length and slope is the same as pre any development conditon.

2. Runoff Curve Number (CN) and Initial Abstraction (Ia)

Soil Name and Classific.	Area identifier, cover description (cover type, treatment and hydrological condition)	Curve number CN*	Area (ha)	Product CN x Area
	Impervious Area			
	Entire Site	98	7.35	720.4
				0.0
	Pervious Area			
		39	0.000	0.0
	* from Appendix B	**Total**	**7.35**	**720.4**

CN (weighted) = $\frac{\text{total CN x A}}{\text{total area}} = \frac{720.4}{7.3506} =$ **98.0**

Ia (weighted) = $\frac{\text{5 x pervious area}}{\text{total area}} = \frac{0.0}{7.3506} =$ **0.0**

3. Time of Concentration

Runoff Factor = $\frac{CN}{200 - CN} = 0.961$

tc = 0.14C x L0.66 x [CN/(200-CN)]-.55 x Sc-0.30 = **0.227** hrs Note: tc = 10 min = 0.17hrs

SCS Lag for HEC-HMS "tp" = 2/3 x tc = **0.151** hrs

CLIENT:	Wyborn Capital Investments Ltd	**JOB No:**	2278		
JOB:	167-173 Pilkington Road	**CALCS BY:**	SZ	**DATE:**	13-Feb-23
SUBJECT:	Stormwater Detention and Retention Calculations	**CHECK BY:**	RC	**DATE:**	15-Feb-23

TP108 runoff and volume calculations - Post development

TP108 Worksheet

B) Graphical Peak Flow Rate- Post Development

			95th Percentile
1. Catchment Area (km^2)	=	0.073506	
2. Calc storage, S = 25.4 x [(1000/CN - 10)]	=	5.184	
3. Annual Recurrence Interval (ARI)			95th Percentile
4. 24 hour rainfall depth, P_{24} (mm)			34.5
5. Compute c* = $\frac{P_{24} - 2Ia}{P_{24} - 2Ia + 2S}$ (mm)			0.769
6. Specific flow rate q* (from Fig. 5.1 below)			0.148
7. Peak flow rate, q_p = q*AP_{24} (m^3/sec)			0.375
8. Runoff depth, Q_{24} = $\frac{(P_{24} - Ia)^2}{(P_{24} - Ia) + S}$ (mm)			30.0
9. Runoff Volume, V_{24} = 1000 x Q_{24}A (m^3)			2,205

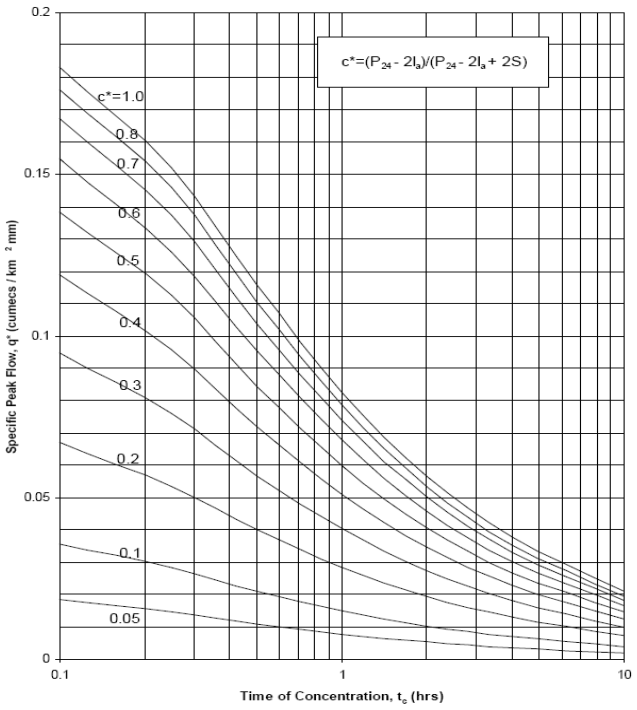


Figure 5.1 - Specific Peak Flow Rate

Figure 5.1, from TP108

C) Retention Volume

Retention Volume = 5 mm x total impervious area/1000

=	5	mm	x	73506	m2	/	1000	=	367.53	m3

D) Detention Volume

Detention Volume = Post-development Runoff Volume - Pre-development Runoff Volume - Retention Volume

=	2,205	-	150	-	367.53	
=	1,687	m3				

BLUE BARN
CONSULTING ENGINEERS

Wastewater Pipeline calculations

CLIENT:	Wyborn Capital Investments Ltd	**JOB No:**	2278	**SHEET:**	1	**of**	1
JOB:	167-173 Pilkington Road	**CALCS BY:**	SZ	**DATE:**	13-Feb-23		
SUBJECT:	Wastewater Demand	**CHECK BY:**	RC	**DATE:**	15-Feb-23		

Design Assumptions

1. The existing site is currently zoned for Business-Light Industry Zone, considering it involves wine making, it is categorised as Heavy Water Users in Dry Industry.
2. Assume superlot 2 commercial development is Office Building and Dry Retail.
3. Assume superlot 4A community hub is Wet Retail.

Existing Wastewater Demand

Industry Identification	Routine Peak Daily Discharge (L/m2/d)	Net Floor Area (m2)	Routine Peak Daily Discharge (L/s)	Peaking Factor: Self-Cleansing Design Flow	Self-Cleansing Design Flow (Normal PDWF)	Peaking Factor: Peak Design Flow	PWWF (L/s)
Dry industry - heavy water users	11	40203	5.118	5	25.592	6.7	34.294

Proposed Development Wastewater Demand

Superlot	Unit Type	Number	GFA (m2)	Assumed number of bedrooms	Occupancy for design purposes (people)	Design Wastewater Flow Allowance (L/p/d)	Design Population	Design ADWF (L/s)	Peaking Factor: Self-Cleansing Design Flow	Self-Cleansing Design Flow (Normal PDWF)	Peaking Factor: Peak Design Flow	Peak Design Flow (L/s)
1	5 Level Apartments	20	1450	2-4	3	180	60	0.125	3	0.375	5	0.625
	6-7 Level Apartments	66	5230	2-4	3	180	198	0.413	3	1.238	5	2.063
	10 Level Apartments	94	10900	2-4	3	180	282	0.588	3	1.763	5	2.938
2	5 Level Apartments	30	2175	2-4	3	180	90	0.188	3	0.563	5	0.938
	6-7 Level Apartments	56	4800	2-4	3	180	168	0.350	3	1.050	5	1.750
	Commercial	1	5470	-	-	65	365	0.275	2	0.549	5	1.373
3A	6-7 Level Apartments	150	13075	2-4	3	180	450	0.938	3	2.813	5	4.688
3B	6-7 Level Apartments	105	10407	2-4	3	180	315	0.656	3	1.969	5	3.281
4A	Community Hub	1	1160	-	-	-	-	0.201	2	0.403	6.7	1.349
4B	4 Level Apartments	72	6670	2-4	3	180	216	0.450	3	1.350	5	2.250
5A	162 m2 3 Level Terrace	30	4860	2-4	3	180	90	0.188	3	0.563	6.7	1.256
	216 m2 3 Level Terrace	4	864	2-4	3	180	12	0.025	3	0.075	6.7	0.168
5B	162 m2 3 Level Terrace	80	12960	2-4	3	180	240	0.500	3	1.500	6.7	3.350
	216 m2 3 Level Terrace	4	864	2-4	3	180	12	0.025	3	0.075	6.7	0.168
Sum		713	80885				2498	4.920		14.283		26.195

Summary for Watercare Wastewater Assessment Form

	Self-Cleansing Design Flow (L/s)	Peak Design Flow (L/s)
Residential Design Flow	13.331	23.473
Non-Residential Design Flow	0.952	2.722
Sum	14.283	26.195
Net difference between post and pre development	-11.309	-8.099

Table 5.1.2 Design residential occupancy allowances

Number of bedrooms (Notes 1 and 2)	*Occupancy for design purposes (i.e. people)*
1	*2*
2-4	*3*
More than 5	*Specific agreement with Watercare*
Unknown	*For high rise apartments (four floors or more) and other residential assume a design occupancy rate of 5 per dwelling unit.*

Table 5.1.1 – Design residential design wastewater flow allowance and peaking factors

Residential property type	*Design wastewater flow allowance*	*Design wastewater peaking factors*	
	Litres per person per day (L/p/d)	*Peaking factor: Self-Cleansing Design Flow (Normal PDWF)*	*Peaking factor: Peak Design Flow (PWWF or Exceptional PDWF)*
Up to three storey residential development	*180*	*3.0*	*6.7*
High-rise residential (or mixed-use) buildings four storeys and above	*180*	*3.0*	*5.0*

5.12
High Density Scheme Areas

NOTES:

1. COORDINATES ARE IN TERMS OF MOUNT EDEN 2000. LEVELS ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
2. THE DRAWING IS SHOWN IN METRES UNLESS STATED OTHERWISE.

LEGEND:

SITE EXTENT BOUNDARY

KERBLINE FROM AC GIS

FOR INFORMATION

REV.	REVISION DESCRIPTION	BY	APP.	DATE
0	FOR INFORMATION	SZ	SD	14/04/2023

CLIENT:

BLUE BARN
CONSULTING ENGINEERS
LEVEL 8 | 51 SHORTLAND STREET
PO BOX 587 | SHORTLAND STREET | AUCKLAND 1140 | T: 0800 258 32276
www.bluebarn.co.nz

PROJECT:
WYBORN CAPITAL INVESTMENTS LIMITED
167-173 PILKINGTON ROAD
POINT ENGLAND, AUCKLAND 1072

TITLE:
SITE BUILDING FOOTPRINT

DESIGNED: SZ	DATE: 09/02/2023	DRAWING CHECK: DD	DATE: 24/02/2023
DRAWN: SZ	DATE: 09/02/2023	DESIGN CHECK: SD	DATE: 24/02/2023
APPROVED: MT	DATE: 24/02/2023	SCALE: 1:1250 (A1) 1:2500 (A3)	ORIG. SIZE: A1
PROJECT NUMBER: 02278	ISSUE STATUS: FOR INFORMATION		
DRAWING NUMBER: 02278-C-001			REVISION: 0

ECAAS ISO 9001 CERTIFIED QUALITY MANAGEMENT

Plotted: Fri, 14 Apr 2023 - 4:33pm By: SELINA.ZHU
File Name: C:\12d\data\BBNA\S01\02278 - 167-173 Pilkington Road_2196\06 Drawings\00 CAD Civil\01 Production Drawings\02278-C-000.dwg

Development information form – Wastewater network planning summary assessment

Information to be completed by Developer/ Engineering Consultant

Development consideration	Description	Comments
Query status	Enquiry to support Plan Change application	*Pre-purchase enquiry / Enquiry to support Plan Change application / Pre-application enquiry / Resource Consent application / Engineering Plan approval.*
Query submission date	14/04/2023	
Address	167-173 Pilkington Road, Point England, Auckland 1072	*Include suburb*
Attach layout plan	Refer to attached layout plan	*Plan must clearly show proposed development site and include:* • *Aerial photograph with elevation contours (Note 1)* • *Road names* • *Boundary of development* • *Preferred point of connection to existing water supply and wastewater asset.*
Current land use	Industrial	*Residential (single family dwellings) / Residential (multi-unit dwellings) / Residential (multi-storey apartment blocks) / Commercial / Industrial / Other (Please specify).*
Proposed land use	Residential (multi-storey apartment blocks)	
Unitary plan zoning	Business – Light Industry Zone	*Refer Auckland Unitary Plan*
Total development site area (m^2/ hectares) (i.e. Land area for residential developments)	7.3506 Ha	
Total development floor area (m^2) (i.e. Include all levels of multi-storey apartments and commercial developments)	8.0885 Ha	
Number of proposed residential dwellings (Typically consent or include ultimate if development is to be staged and consented at a future date)	Multi-storey apartment blocks, refer to attached calculations.	*Include type and number of bedrooms for residential dwellings:* *<u>Type</u>:* *<u>Quantity:</u>* *1 bed* *2 bed* *3 bed* *4bed* *5+bed*
Note: (1) Watercare's GIS Viewer for Asset Data Query and Land Development/ Subdivision can be used to display aerial photography and land contour information.		

(This section should not be duplicated if both water and wastewater is applied. Refer to Chapter 6 of the CoP.)

Refer to the Auckland Code of Practice for Land Development and Subdivision chapter 5: Wastewater, when completing this form:

<table>
<tr><th colspan="4">Wastewater development assessment</th></tr>
<tr><th colspan="2">Design consideration</th><th>Description</th><th>Comments</th></tr>
<tr><td rowspan="2">Existing site design flows - pre-development scenario

(If site is currently undeveloped, write 0.00 L/s in the design flows for this section)</td><td>Residential Design Flows (L/s)</td><td>Self-Cleansing Design Flow
= 0

Peak Design Flow
= 0</td><td rowspan="4">Show calculations based on Watercare CoP.

<u>Ultimate development:</u>
Ultimate development is where further development may / can / will occur upstream / or within the development site currently under consideration.

If relevant Ultimate Peak Design Flow is to be calculated and will include number of potential units/ lot.

For further guidance on whether this application needs to consider Ultimate development, refer CoP Sections:

• 5.3.2 Structure Plan
• 5.3.3 Future development
• 5.3.4 System Design</td></tr>
<tr><td>Non-Residential Design Flows (L/s)</td><td>Self-Cleansing Design Flow
= 25.592

Peak Design Flow
= 34.294</td></tr>
<tr><td rowspan="3">Proposed development site design flows - post-development scenario</td><td>Residential Design Flows (L/s)</td><td>Self-Cleansing Design Flow
= 13.331

Peak Design Flow
= 23.473

And if relevant

Ultimate Peak Design Flow
= NA</td></tr>
<tr><td>Non-Residential Design Flows (L/s)</td><td>Self-Cleansing Design Flow
= 0.952

Peak Design Flow
= 2.722</td></tr>
<tr><td>Non-Residential Discharge profile / trend (i.e. Operations)</td><td>10h (9am – 5pm)</td><td>E.g. 24 hr operation / 10 hr (9am – 5pm) / Other (Please specify).</td></tr>
<tr><td>Change in site flows</td><td>Net difference between post-development and pre-development site design flows (L/s)</td><td>Net Change in Self-Cleansing Design Flow
= -11.309

Net Change in Peak Design Flow
= -8.099</td><td></td></tr>
<tr><td colspan="2">New assets required for development</td><td>NA</td><td>If applicable please provide supporting calculations and indicative design parameters (i.e. pump station and rising main or storage.</td></tr>
</table>

Wastewater development assessment		
Design consideration	**Description**	**Comments**
Existing network infrastructure capacity assessment *A sewer capacity check is to be carried out if the 'Net Change in Peak Design Flow' calculated above shows a net increase of greater than 1.0 L/sec.* <u>Notes:</u> 1. *At Watercare's discretion, a Sewer Capacity Check may be required even if the net increase in site flow is < 1.0 L/sec.* 2. *The Level 1 Sewer Capacity Check as described in the CoP is to be undertaken in the first instance, unless specifically advised by Watercare. The Level 1 Capacity Check is intended to help identify applications that may require more accurate/detailed design calculations and/or identify whether data held on the existing network is sufficient to enable an accurate assessment of capacity.*	Type of Sewer Capacity Check undertaken: = (Level 1 / Level 2 / Level 2) *(circle / delete as appropriate)* Did the *Existing WW Capacity Assessment Design Flow* exceed the pipe-full capacity for <u>*any*</u> pipes within the *Existing Network Assessment Extents?* On pipes where asset data (i.e. gradient and diameter) is known: = (Yes / No) On pipes where asset data was assumed: = (Yes / No)	*See Watercare's GIS Viewer for Asset Data Query and Land Development/Subdivision to assist with obtaining data required for the capacity assessment.* *In addition to the assessment findings summary requested here, other required existing network capacity assessment key steps/ deliverables include<u>:</u>* 1. *<u>Network Assessment Extents</u> to be identified as described in the CoP. A map is to be provided showing the network assessment extent.* 2. *<u>Catchment Boundaries</u> for the assessment is to be determined. Catchment Boundary data (where available) can be viewed in the Watercare GIS Viewer. Where not available, the developer and their engineers will be required to produce catchment boundaries. A map is to be submitted depicting the catchment extents.* 3. *<u>Existing WW Capacity Assessment Design Flow</u> is to be calculated as described in the CoP. The flows are to be tabulated for each pipe-reach within the Network Assessment Extent. A pipe-reach will typically be regarded as the section of network between points where significant tributaries enter the network.* 4. *<u>Pipe Capacity Vs. Design Flow Check is to be carried out;</u> a table detailing the calculated full pipe capacity compared to the 'Existing WW Capacity Assessment Design Flow' is to be provided. Pipes with missing asset data are to have the missing data assumed as described in the CoP.* 5. *<u>Pipe Full Capacity Exceedance</u> - Pipes where the 'Existing WW Capacity Assessment Design Flow'*

Wastewater development assessment		
Design consideration	**Description**	**Comments**
		exceeds the pipe full capacity are to be identified both in the tabular data, and on a map of the Network Assessment Extent. Pipes with assumed data are to be identified separately to those with known data.
Further wastewater comments:		

Water Demand Calculations

CLIENT:	Wyborn Capital Investments Ltd	**JOB No:**	2278	**SHEET:**	1	**of**	1
JOB:	167-173 Pilkington Road	**CALCS BY:**	SZ	**DATE:**	13-Feb-23		
SUBJECT:	Water Demand	**CHECK BY:**	RC	**DATE:**	15-Feb-23		

Design Assumptions

1. The existing site is currently zoned for Business-Light Industry Zone, considering it involves wine making, it is categorised as Heavy Water Users in Dry Industry.
2. Assume superlot 2 commercial development is Office Building and Dry Retail.
3. Assume superlot 4A community hub is Wet Retail.

Existing Water Demand

Industry Identification	Routine Peak Daily Usage (L/m2/d)	Net Floor Area (m2)	Average Demand (L/s)	Peaking Factor: Peak Day Demand	Peak Day Demand (L/s)	Peaking Factor: Peak Hourly Demand	Peak Hourly Demand (L/s)
Dry industry - heavy water users	11	40203	5.118	2	10.237	2.5	25.592

Proposed Development Water Demand

Superlot	Unit Type	Number	GFA (m2)	Assumed number of bedrooms	Occupancy for design purposes (people)	Design Daily Water Consumption (L/p/d)	Design Population	Design Average Daily Demand (L/s)	Peaking Factor: Peak Day Demand	Peak Day Demand (L/s)	Peaking Factor: Peak Hourly Demand	Peak Hourly Demand (L/s)
1	5 Level Apartments	20	1450	2-4	3	200	60	0.139	2	0.278	2.5	0.694
	6-7 Level Apartments	66	5230	2-4	3	200	198	0.458	2	0.917	2.5	2.292
	10 Level Apartments	94	10900	2-4	3	200	282	0.653	2	1.306	2.5	3.264
2	5 Level Apartments	30	2175	2-4	3	200	90	0.208	2	0.417	2.5	1.042
	6-7 Level Apartments	56	4800	2-4	3	200	168	0.389	2	0.778	2.5	1.944
	Commercial	1	5470	-	-	65	365	0.275	2	0.549	2.5	1.373
3A	6-7 Level Apartments	150	13075	2-4	3	200	450	1.042	2	2.083	2.5	5.208
3B	6-7 Level Apartments	105	10407	2-4	3	200	315	0.729	2	1.458	2.5	3.646
4A	Community Hub	1	1160	-	-	-	-	0.201	2	0.403	2.5	1.007
4B	4 Level Apartments	72	6670	2-4	3	200	216	0.500	2	1.000	2.5	2.500
5A	162 m2 3 Level Terrace	30	4860	2-4	3	220	90	0.229	2	0.458	2.5	1.146
	216 m2 3 Level Terrace	4	864	2-4	3	220	12	0.031	2	0.061	2.5	0.153
5B	162 m2 3 Level Terrace	80	12960	2-4	3	220	240	0.611	2	1.222	2.5	3.056
	216 m2 3 Level Terrace	4	864	2-4	3	220	12	0.031	2	0.061	2.5	0.153
Sum		713	80885				2498	5.495		10.991		27.477

Summary for Watercare Water Assessment Form

	Peak Day Demand(L/s)	Peak Hourly Demand(L/s)
Residential Design Flow	5.019	25.097
Non-Residential Design Flow	0.476	2.380
Sum	5.495	27.477
Net difference between post and pre development	0.377	1.885

5.12
High Density Scheme Areas

Watercare
An Auckland Council Organisation

Development information form – Water network planning summary assessment

Development consideration	Description	Comments
Query status	Enquiry to support Plan Change application	*Pre-purchase enquiry / Enquiry to support Plan Change application / Pre-application enquiry / Resource Consent application / Engineering Plan approval.*
Query submission date	14/04/2023	
Address	167-173 Pilkington Road, Point England, Auckland 1072	*Include suburb*
Attach layout plan	Refer to attached layout plan	*Plan must clearly show proposed development site and include:* • *Aerial photograph with elevation contours (Note 1)* • *Road names* • *Boundary of development* • *Preferred point of connection to existing water supply and wastewater asset.*
Current land use	Industrial	*Residential (single family dwellings) / Residential (multi-unit dwellings) / Residential (multi-storey apartment blocks) / Commercial / Industrial / Other (Please specify).*
Proposed land use	Residential (multi-storey apartment blocks)	
Unitary plan zoning	Business – Light Industry Zone	*Refer Auckland Unitary Plan*
Total development site area (m^2/ hectares) (i.e. Land area for residential developments)	7.3506 Ha	
Total development floor area (m^2) (i.e. Include all levels of multi-storey apartments and commercial developments)	8.0885 Ha	

Number of proposed residential dwellings (Typically consent or include ultimate if development is to be staged and consented at a future date)	Multi-storey apartment blocks, refer to attached calculations.	*Include type and number of bedrooms for residential dwellings:* *Type:* *Quantity:* *1 bed* *2 bed* *3 bed* *4bed* *5+bed*
Note: (1) Watercare's GIS Viewer for Asset Data Query and Land Development/ Subdivision can be used to display aerial photography and land contour information.		

Information to be completed by Developer/ Engineering Consultant
(This section should not be duplicated if both water and wastewater is applied. Refer to Chapter 5 of the CoP.)

Refer to the Auckland Code of Practice for Land Development and Subdivision chapter 6: Water, when completing this form:

Water supply development assessment		
Design consideration	**Description**	**Comments**
Average and Peak Residential Demand (L/s)	Average Demand Design Flow = 5.019 Peak Demand Design Flow = 25.097	*Show calculations based on Watercare CoP.*
Average and Peak Non-Residential Demand **(L/s)**	Average Demand Design Flow = 0.476 Peak Demand Design Flow = 2.380	*Show calculations based on Watercare CoP.*

Non-Residential Demand typical daily consumption profile / trend	10h (9am – 5pm)	*E.g. 24 hr operation / 10 hr (9am – 5pm) / Filling on-site storage at certain frequency.*
Fire- fighting classification required by the proposed site	FW2	*Refer to New Zealand Standard SNZ PAS 4509:2008.*
Hydrant flow test results	☒ Yes ☐ No	*Attach hydrant flow test layout plan and results showing test date & time; location of hydrants tested and pressure logged; static pressure; flow; residual pressure.*
Sprinkler system in building?	☒ Yes ☐ No	*Sprinkler design should consider Watercare Level of Service: minimum pressure at 200kPa and minimum flow at 25 l/min. The building owner shall conduct periodic review of sprinkler design.*
Further water supply comments:		

APPENDIX C – HYDRANT TEST RESULTS

NOVA FLOWTEC SERVICES LTD
HYDRANT TESTING SPECIALISTS

E: info@novaflowtec.co.nz
T: 09 444 8375
PO Box 241, Albany Village, Auckland 0755
www.novaflowtec.co.nz

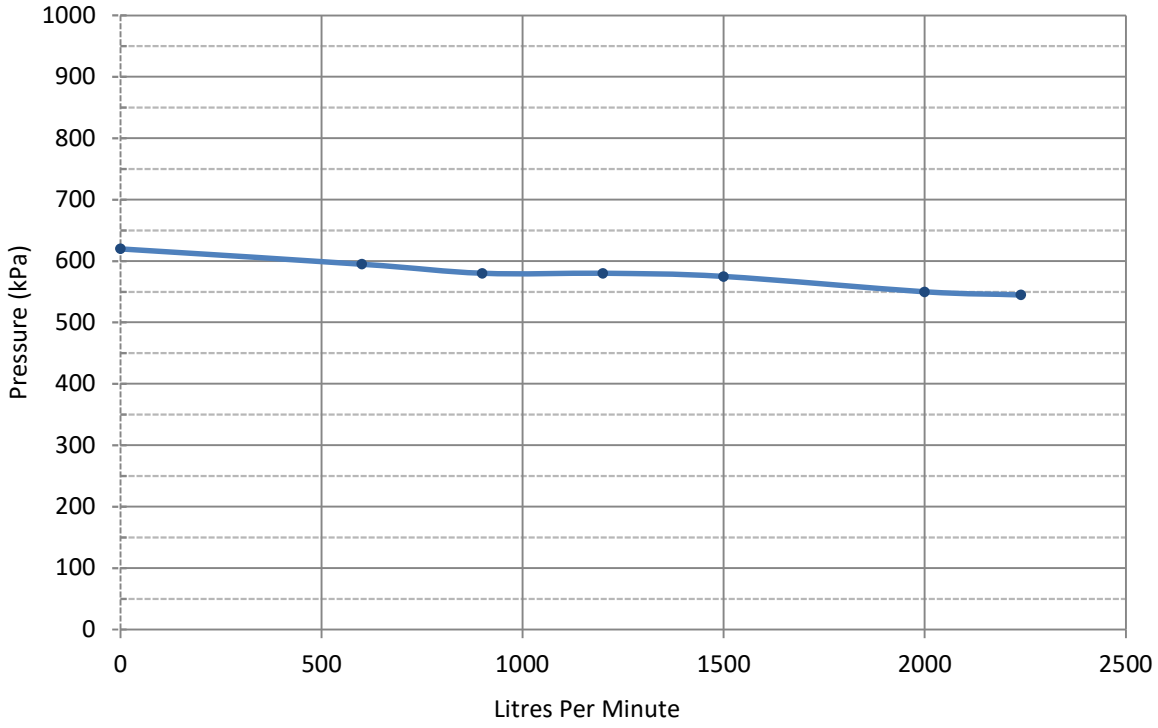
Mains Flow and Pressure Report

Hydrant locations: Apirana Avenue (For 167-173 Pilkington Road, Point England)
Date: 1st March 2023
Time: 1.50pm
Flow: Hydrant 1
Residual pressure: Residual kPa
Maximum flow result: 2240Lpm at 545kPa
Test Supervisor: Anthony Blewman

Data:

Flow (Lpm)	Pressure (kPa)
0	620
600	595
900	580
1200	580
1500	575
2000	550
2240	545

Graph:



Notes: The hydrant was flowed to full capacity during testing.

Disclaimer: These results indicate the water networks performance on this given date and time. The networks performance is subject to fluctuations.

Hydrant Map: See page 2

Hydrant Map

NOVA FLOWTEC SERVICES LTD
HYDRANT TESTING SPECIALISTS

E: info@novaflowtec.co.nz
T: 09 444 8375
PO Box 241, Albany Village, Auckland 0755
www.novaflowtec.co.nz

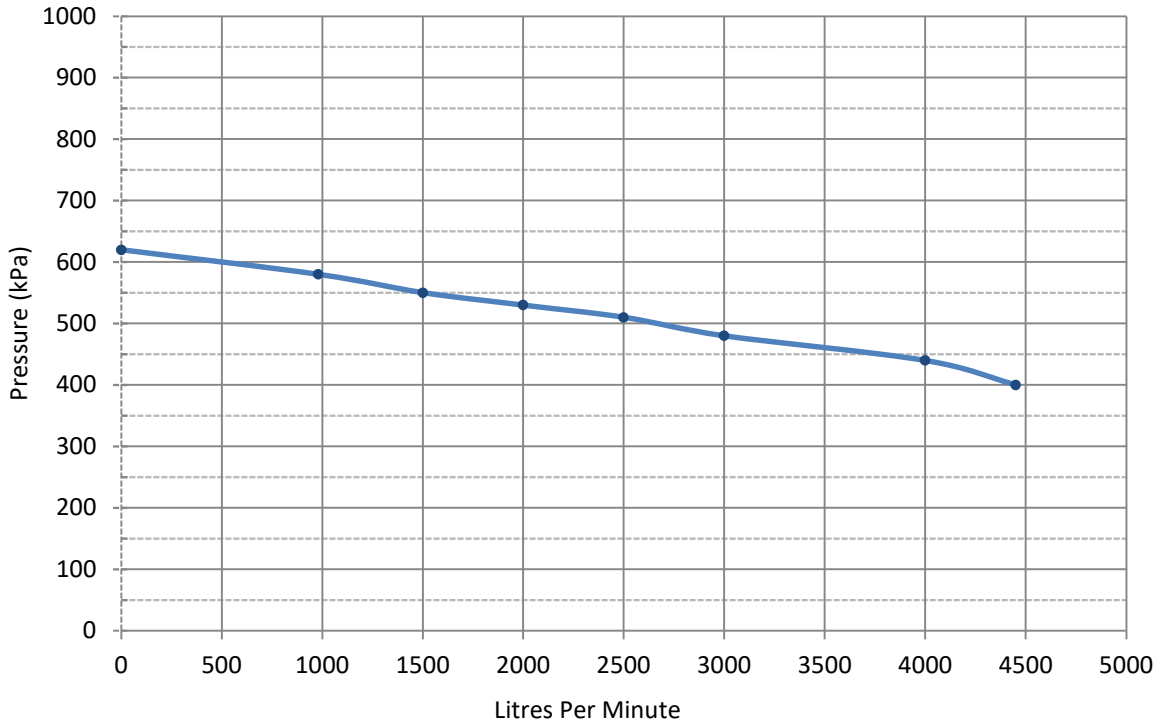
Mains Flow and Pressure Report

Hydrant locations: Apirana Avenue (For 167-173 Pilkington Road, Point England)
Date: 1st March 2023
Time: 1.58pm
Flow: Hydrants 1 and 2
Residual pressure: Residual kPa
Maximum flow result: 4450Lpm at 400kPa
Test Supervisor: Anthony Blewman

Data:

Flow (Lpm)	Pressure (kPa)
0	620
980	580
1500	550
2000	530
2500	510
3000	480
4000	440
4450	400

Graph:



Notes: The hydrants were flowed to full capacity during testing.
At full flow H1 was 2120Lpm and H2 was 2330Lpm.

Disclaimer: These results indicate the water networks performance on this given date and time. The networks performance is subject to fluctuations.

Hydrant Map: See page 2

Hydrant Map


Hydrant 1
Flow
Hydrant 2
Flow
Residual kPa
Salima Talani Street
Pilkington Road
Anderson Avenue
Apirana Avenue
Tripoli Road
Hihaka Street
Parata Street
Hannigan Drive