



# POTABLE WATER AND WASTEWATER CONCEPT REVIEW FOR KIAMA WEST REDEVELOPMENT.



6th October  
2022

For J.Wydhm Prince.

QALCHEK REFERENCE: PM 31060

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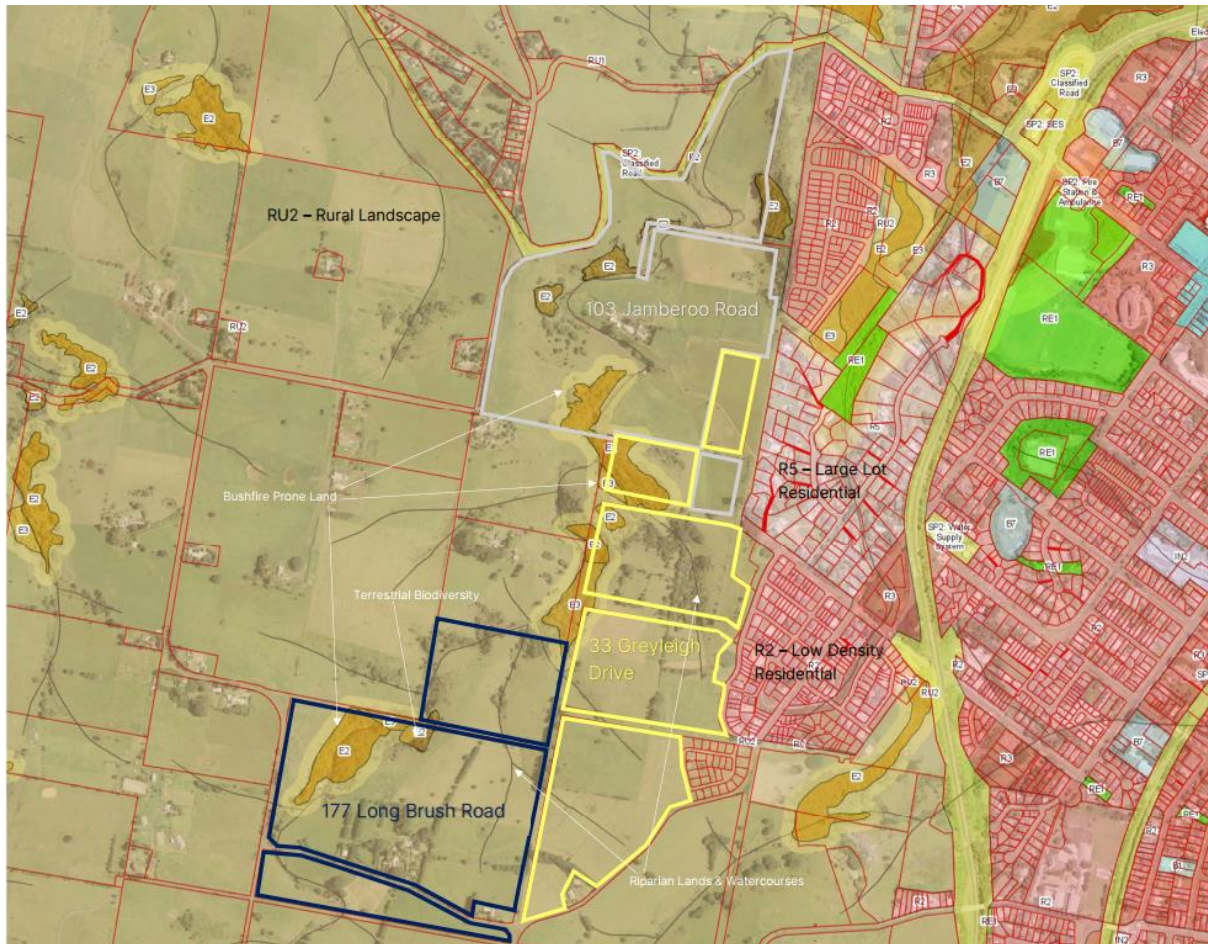
## INTRODUCTION

Qalchek has been engaged by J.Wyndham Prince to undertake a Waster Water / Potable Water strategy for the proposed West Kiama residential redevelopment.

The proposed residential development is located at the following addresses :

No: 103 Jamberoo Road Kiama, No:33 Greyleigh Drive Kiama and No:177 Long Brush Road, Jerrara.

Please refer to the map below for the sites' approximate location.



## REPORT OBJECTIVES

This report aims to determine the following:

- Estimate the possible development flows.
- Review possible Potable Water and Waste Water service options.
- Locate the nearest service which could assist the development.

## DEVELOPMENT YIELDS

Based on the proposed development plans we have identified the following development yields.

Type	No: of	Total Lot Area (m2)	EP per a unit	Total EP
<b>Apartments</b>	466	37,242	2.5	1165
<b>Mews</b>	183	35,439	3	549
<b>Small</b>	61	20,412	3	183
<b>Standard</b>	233	122,547	3.5	815.5
<b>Gully</b>	175	110,413	3.5	612.5
<b>Hobby Lots</b>	22	85,772	3.5	77
<b>Open Space - Active</b>	38	38,150	20	760
	<b>Total Area:</b>	449,975		4164

If the above assumption is incorrect then the calculations below will need to be adjusted.

### ESTIMATED DEMANDS

Based on the above development sewage flows for the development, the table below has been determined using Sydney Water Flow Schedule spreadsheet table.

#### 1. Sewer

	Normal operation
<b>E.P. loading</b>	4922
<b>PDWF L/S</b>	19.26
<b>Design flow L/S</b>	57.77

#### 2. Water

	Normal operation
<b>E.P. loading</b>	4164
<b>Water Demand</b>	1.12 mega litres

## WASTEWATER SERVICING SOLUTIONS

In general, the site falls South to North. Ground levels at the Southern end of the development range between AHD 86 to 118m, while the northern end of the site has levels between AHD 22 to 54 metres.

The nearest gravity sewer is located about 750m north of the site at No: 32 Lilly Pilly Way, Kiama. The sewer is a DN150 pipe and is insufficient in size to service the development.

A DN225 pipe is located about 750m north of the site at No: 34 Lilly Pilly Way, Kiama. Initial Investigation has deemed this sewer too shallow to service the development.

The proposed development is borderline needing a DN300 or DN225 pipe to service this site which will be determined in a detailed design. For the costing proposal, we have assumed a DN300 pipe be installed for the Lead-In works.

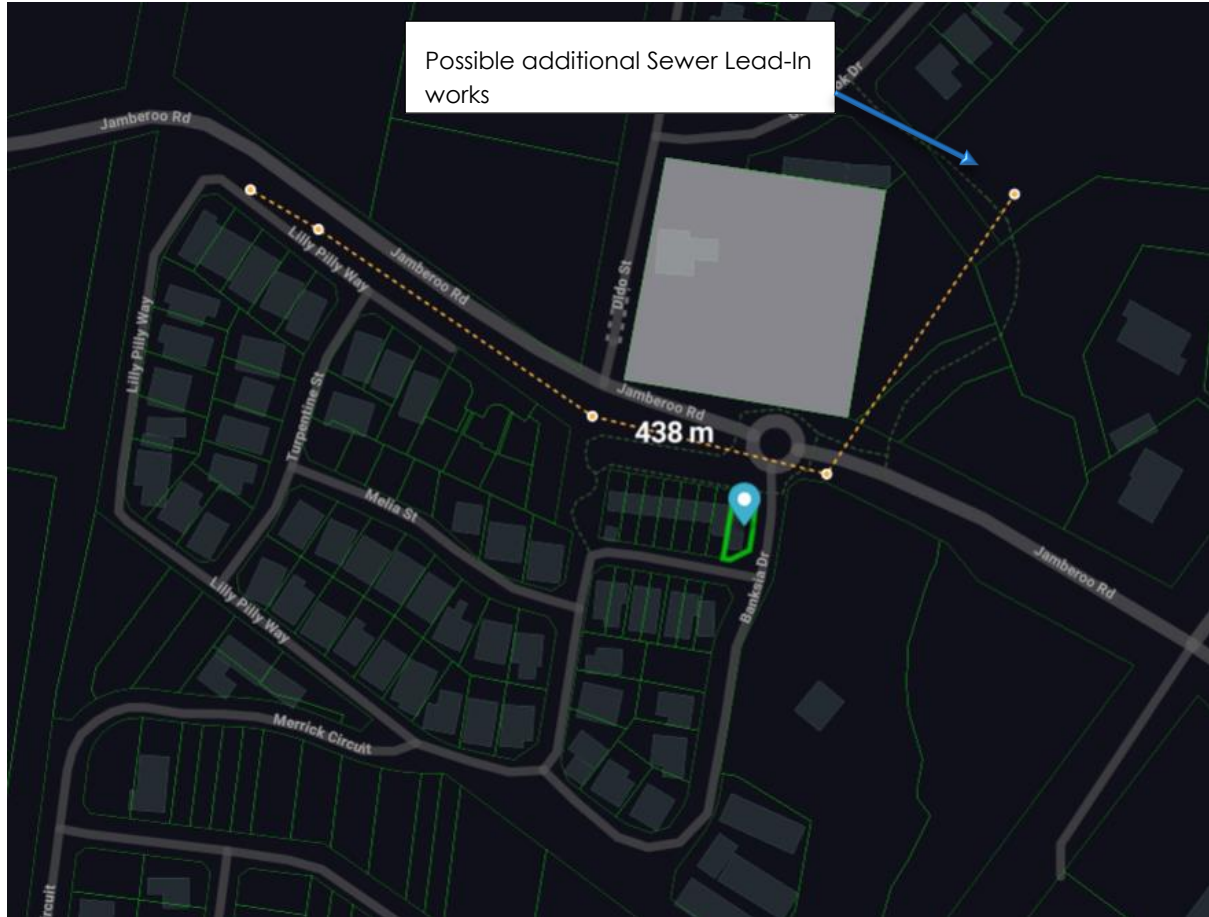
Refer to the diagram below.



It should be noted that the connecting DN225 sewer is around RL 14.00 and the sites RL is around RL22.0.

It has been determined that the existing DN225 sewer cannot service the development and an additional extension is required.

Please refer to the plan below.



### Internal works

It should be noted that there are several steep gullies within the development. The gullies will dictate the sewer design at the Northern end of the site. A detailed sewer design should be completed early for the whole site to identify areas of concern and to possibly modify the lot and road pattern to suit.

The site will have sections of internal sewers in which grades will exceed over 15% . This should be avoided where practical, as it will lead to additional internal construction costs.

## Sewer Costing

Sewer costing	Length	Estimated cost	Cost per /M
First Lead-In from site to the existing DN225 sewer	775	\$406,875.00	\$525.00
Second Lead in from site to sewer	438	\$284,679.00	\$650.00
Internal Reticulation Cost per a lot		\$ TBA	
Anticipated Lead/ internal detail Design / WSC cost		\$ 750,000.00	
<b>Total</b>		<b>\$ 1,441,554.00</b>	

## POTABLE WATER SERVICING

This site has ground levels ranging between 22M to 118 AHD. This range affects the sites' connection to the existing potable water network. The site will need to be serviced by 2 different Sydney Water Reservoirs. The land below RL 82 will most likely be serviced by Sydney Water reservoir 0231 located at Irvine Street, Kiama. While land above RL 82 will need to be serviced by Sydney Water reservoir 0423 located at Old Saddleback road, Kiama. This will need to be confirmed by Sydney Water.

The site split above and below RL82 is shown below.

### Above RL 82

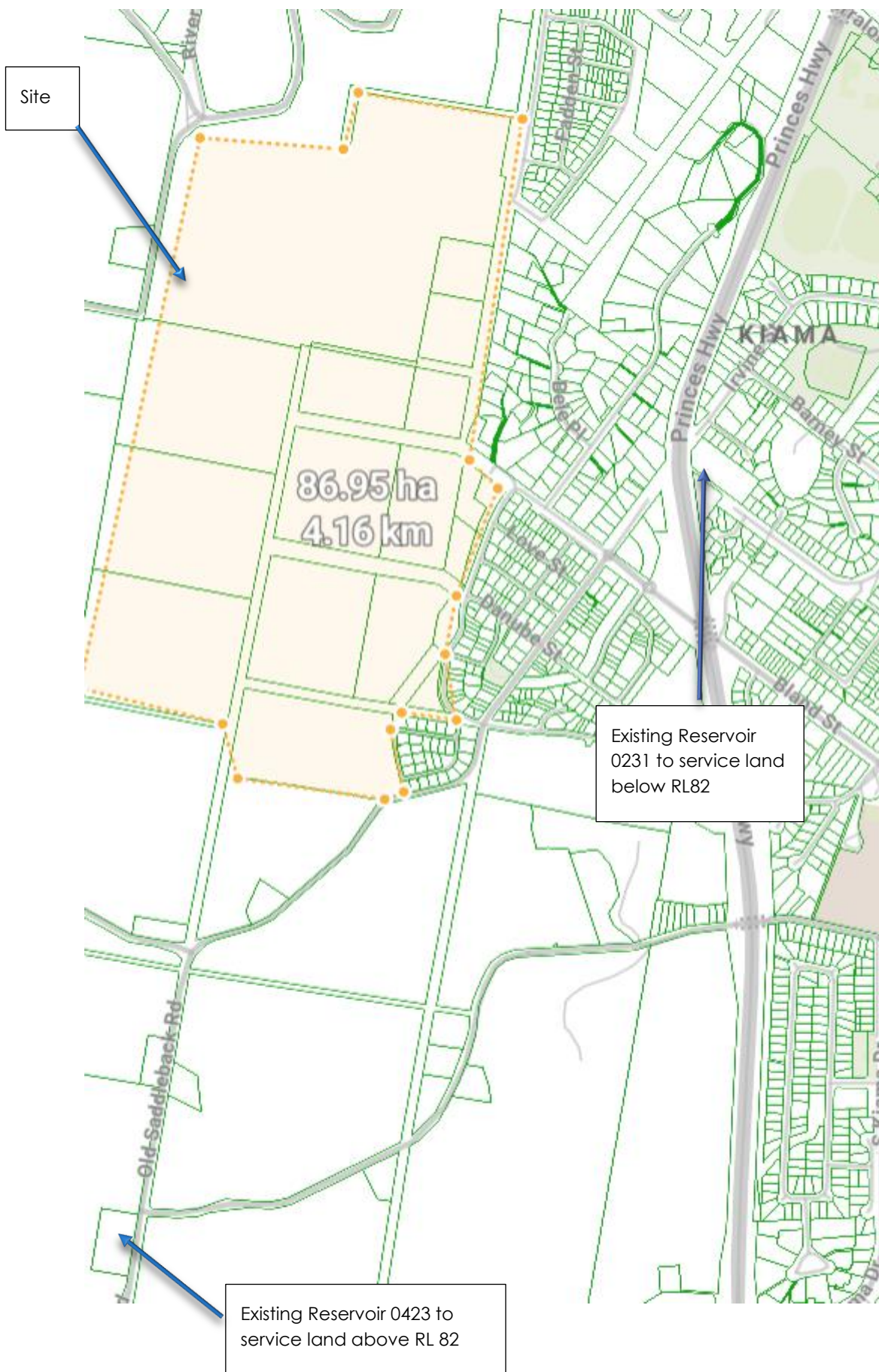
Type:	Apartments	Lots	Mews
No. of:	214	343	130
Total Lot Area (H)	1	45	2

### Below RL 82

Type:	Apartments	Lots	Mews
No. of:	273	143	51
Total Lot Area (H)	2	14	1

The site will also need to be set up into zones to ensure that the lower parts of the development will not have high water pressure. Sydney Water sets a 60 meter head as high pressure. Having two separate zones should eliminate the high-pressure zones issue.

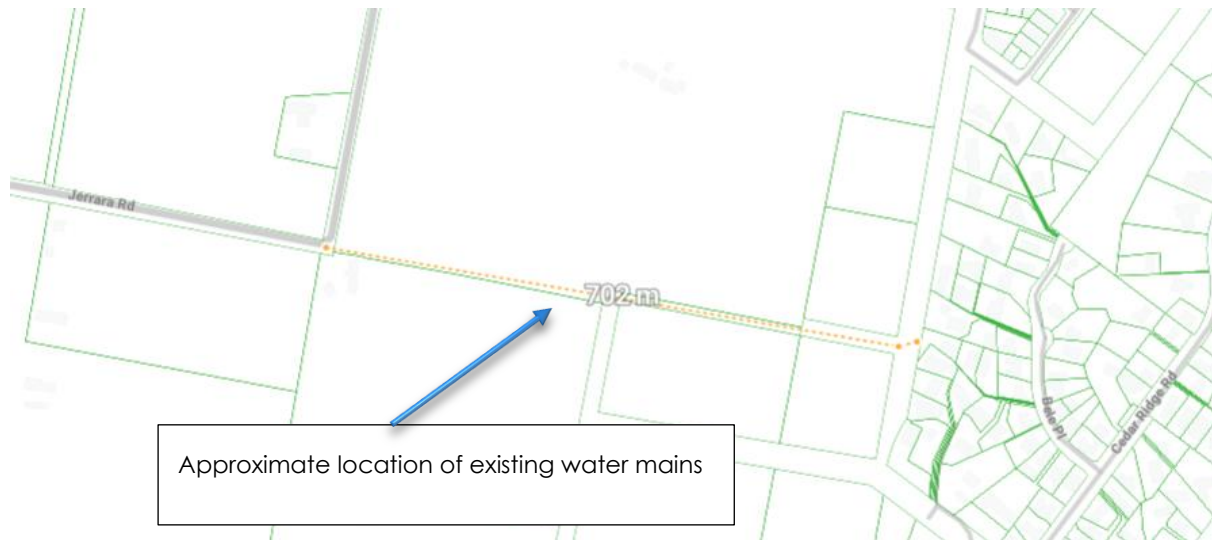
Please refer to the plan below showing the two reservoir locations.





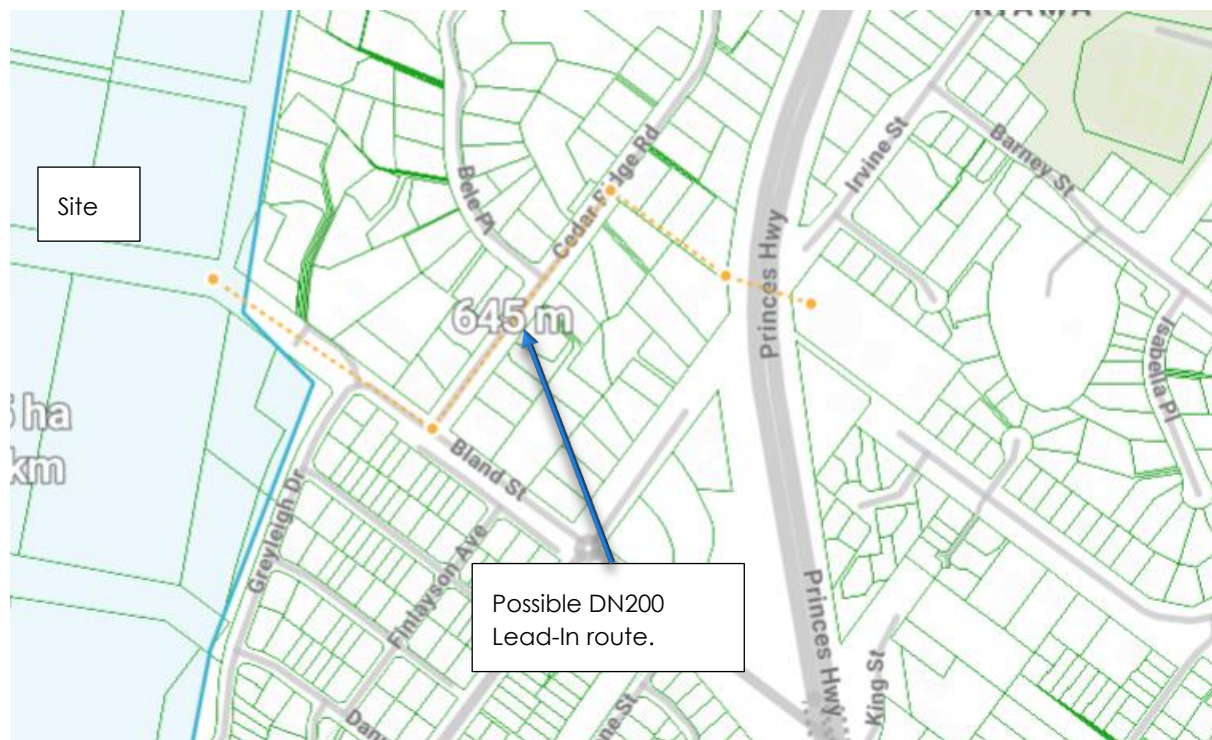
The site also has two existing Water Mains that traverse the site in an East/West direction. The Northern main is a DN225 CICL water main while the Southern main is a DN150 water main. These mains are not considered available for domestic connection as they are transfer mains from one reservoir to another. The mains may need to be adjusted to suit the developments final layout and level.

Below is the approximate location of two existing water mains crossing the site in an East-West direction.



Based on the proposed development yield and the existing potable water network system sizing, we anticipate the following water main upgrades will be required to service the site.

Lead in main to service land below RL 82



Lead in main to service land above RL 82



Based on our assessment we anticipate the following work would be required.

<b>Water costing</b>	
<b>Above RL82 works</b>	
<b>Possible DN200 amplification for 1.1KM</b>	\$ 412,500.00
<b>Possible Reservoir upgrade at Old Saddleback road</b>	\$ 1,300,000.00
<b>Reservoir design</b>	\$ 130,000.00
<b>Below RL 82 works</b>	
<b>DN200 lead in water main 645M</b>	\$ 483,750.00
<b>Adjustment of the existing east/west mains through the site</b>	
<b>DN150 water -about 480m</b>	\$ 180,000.00
<b>DN225 water -about 480m</b>	\$ 235,000.00
<b>Internal water construction cost</b>	TBA
<b>Internal / external design / WSC role</b>	\$ 375,000.00
<b>Total</b>	\$ 3,116,250.00

Please note, Sydney Waters' primary task is to provide potable water for domestic supply. Sydney Water does not need to provide water to meet firefighting requirements.

## RECOMMENDATIONS

1. The client needs to review the development site yields as this will affect all assumptions within the report.
2. Waster Water items:
  - A detailed wastewater master plan should be prepared for the whole site early on in the development process. The internal sewer at the Northern-End of the development may require the road pattern to be adjusted vertically or horizontally to address the sewer design issue in that area.
  - Early consultation with Sydney Water is required to determine if the existing DN225 sewer main has the capacity to service the development.
  - Undertake a detailed survey from the site to the first Lead-In Sewer connection point. The existing sewer invert may not be low enough to connect to the site even if it has spare capacity.
3. Potable Water items:
  - Early consultation with Sydney Water is required to determine if the existing Reservoirs can service the development.
  - There may be an opportunity for the development to connect to the existing Potable Water network in the early stages of the development and delay the lead in potable water main works. Sydney Water should be consulted to determine how many lots could be connected before the lead potable water main works would be required.
  - Sydney Water may require the whole development to connect to existing reservoir 0423 located in Saddleback Road. This would create a high-pressure issue for the lower parts of the development and require a Pressure Reducing Valve to be installed. The Pressure Reducing Valve cost would be similar to the Lead-In water main cost to service the land below RL82. It is anticipated that the Lead-In to service the land below RL 82 would not be required.
4. We recommend lodging a feasibility application to Sydney Water once the development yield and rezoning or Development Application is lodged to commence early consultation with Sydney Water.

## PREPARED / REVIEWED BY

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Reviewed by Mike Plektan

Version A.