Henry & Hymas

Narara Eco-Village

Utility Services Report Planning Proposal

Project Number: 19A86

Date: 25/03/2022

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Report Name:	**Narara Eco-Village – Utility Services Report Planning Proposal**
Project Number:	19A86
Report to:	Narara Eco-Village

PREPARATION, REVIEW AND AUTHORISATION

Revision #	Date	Prepared by	Reviewed by	Approved for Issue by
A (Draft)	31/08/20	H.Williamson	I.Teh	L.Herngren
2	13/11/20	H.Williamson	S.Roach	L.Herngren
3	25/03/22	H.Williamson	I.Teh	L.Herngren

CONTACT DETAILS

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The information within this document is and shall remain the property of H&H Consulting Engineers Pty Ltd.

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1 Introduction

1.1 Background

Henry & Hymas have been engaged to undertake a utility services report to accompany the Planning Proposal for the Narara Eco-Village Development on Research Road Narara NSW. The scope of works included in this report is as follows.

- Outline the strategy for developing infrastructure to support the proposal (proposed lots and land uses types);
- Providing indicating alignment and location for all utilities;
- Discuss any additional infrastructure required to service the development

The report seeks to inform Council of the opportunities and constraints associated with the provision of infrastructure services for the proposal to address the following:

- Layout and capacity of existing services networks
- Indicative utility demands of the proposal
- Current / anticipated infrastructure delivery program for the utility services
- Service infrastructure assets required on site
- Indicative layouts
- Modelling of sewer and water (potable and non-potable) requirements associated with the increase in range of permissible land uses and reduction in minimum lot size as per masterplan;
- Provide comments on the serviceability of water, recycled water and sewer infrastructure to meet additional loads associated with a change in permissible land use and increased occupancy due to reduced minimum lot size;
- Investigate existing electrical and communication services for NEV;
- Determine the additional requirement for electrical and communication services associated with the planning proposal and discuss with relevant authorities and contractors the preferred way to service the proposal;
- Determine if any additional services are required for the site and how they will be met.

The development comprises a range of existing and proposed utilities to service the development including potable water, recycled water, sewer, electrical, and communications. The water infrastructure has been discussed in Section 2 and 3 and electrical and communications has been discussed in Section 4 of this report. There are no requirements for gas services in this development, hence has not been included in this report.

This report assesses the service utilities (designed and modelled for Stage 1 and 2 only) to compare the two following planning scenarios.

- The “base case” scenario is based on the Gosford Local Environmental Plan 2014 (GLEP 2014)
- The “planning proposal” generally is based on the Draft Central Coast Local Environmental Plan 2018 (CCLEP 2018) comprising an increased number of dwellings and community areas.

The potential number of additional dwellings could increase by 11 to a total of 158 across the site based on the indicative scheme shown in the masterplan

The infrastructure planning for the Stage 3 (remaining stage of works) is currently in the planning or design phase.

Table 1 – Additional dwellings/areas with the Planning Proposal

	Lots (No.)	**Dwellings (No.)**	**Business premises [m^2]**	**Neighbourhood Shops (m^2)**
Base Case	94	147	841	490
Base Case with Planning Proposal	97	158	1200	650
Additional with Planning Proposal	***3***	***11***	***359***	***160***

The number of dwellings per stage has been summarised in Table 2 and the overall masterplan layout of the development is shown in Figure 1.

Table 2 – Dwellings per Stage

Stage 1	73	44 single dwellings; 18 cluster units; 11 estimated additional dwellings via dual occupancy or a secondary dwelling.
Stage 2	76	33 dwellings on 550m^2; 8 dwellings on 450m^2, 1 shop-top; 12 (4x3) individual multi-dwelling units; 22 estimated additional dwellings via dual occupancy or a secondary dwelling.
Stage 3	9	3 dwellings on 550m^2; 2 dwellings on 450m^2; 2 shop-top (near Village Hall); 2 estimated additional dwellings via dual occupancy or a secondary dwelling.
Total	**158**	

Figure 1 - NEV Staging Plan

2 Base case

2.1 Potable Water

The site is currently being supplied by a temporary 50mm diameter potable water line from Monarchy Way, east of the site. This supply was installed to service Stage 1 of the development with a new water connection from Research Rd to service the development as a whole as per Development Application No. 44994/13. The water is sent to a number of header tanks at the high point of the site, re-chlorinated and distributed to lots via a gravity system. Distribution pipe work has been installed for Stage 1 and consists of DN125 PE pipe. Stage 2 distribution network has been designed and is a continuation of the Stage 1 network to deliver sufficient pressure and flow for each dwelling.

The potable water demand is estimated to be 150kL/ET/year based on the Central Coast Council Northern Region Water Supply and Sewerage Development Servicing Plan, October 2019 (Version 2). Refer to Table 3.

Table 3 – Potable Water Demands for Base Case

Scenario	Dwellings (No.)	Community facilities (m2)	Potable Water Demand (kL/dwelling/year)	Total Potable Water Demand (kL/year)
Base Case	147	1,331	150	23,070

The approval for the potable water main connection received from Central Coast Council has been attached in Appendix A. This approval was based on the estimated demands for the Stage 1 DA and allows NEV to use up to 20,805 kL/year. A new Section 305 application will need to be applied for with Council after the DA is approved for all subsequent staging (ie. Stages 2 and 3).

2.2 Recycled Water

The recycled water supply is being sourced from the 45ML capacity dam north-west of the site fed from natural bushland catchment and the M1 motorway. There are existing and proposed non-potable water lines installed throughout the site used to distribute recycled water to Stages 1 and 2 of the development.

The recycled water will be treated via a proposed recycled water treatment plant and distributed to all residential properties through a second purple pipe. Distribution pipe work has been installed for Stage 1 and consists of DN125 PE pipe. Stage 2 distribution network has been designed and is a continuation of the Stage 1 network to deliver sufficient pressure and flow for each dwelling.

The recycled water demand accounts for an estimated 33% of the potable water demand. This has been outlined below in Table 4.

Table 4 – Recycled Water Demands for Base Case

Scenario	Dwellings (No.)	Community facilities (m2)	Total Potable Water Demand (kL/year)	Recycled Water Demand ratio	Total Recycled Water Demand (kL/year)

Base Case	147	1,331	23,070	33%	7,613

2.3 Sewer

The site is currently being serviced by utilising existing underground tanks located north-east of the site. All existing properties in Stage 1 are currently gravity fed to these tanks and a pump out system has been utilised to dispose the sewer to offsite.

The sewer loads are estimated to be 125kL/ET/year based on the Central Coast Council Northern Region Water Supply and Sewerage Development Servicing Plan, October 2019 (Version 2). Refer to Table 5.

Table 5 – Sewer Demands for Base Case

Scenario	Dwellings (No.)	Community facilities (m2)	Sewer Loads (kL/dwelling/year)	Total Sewer Loads (kL/year)
Base Case	147	1,331	125	19,076

The future proposal for the sewer infrastructure is to connect to Council's sewer network via a gravity and pump-out arrangement. The approval for the sewer connection can be found in Appendix A. This approval was based on the estimated demands for Stage 1 only and allows NEV to discharge up to 10,950 kL/year of sewerage into Council's sewer network. A new Section 305 application will need to be applied for with Council after the DA is approved for all subsequent staging (ie. Stages 2 and 3).

3 Planning Proposal

The water and sewer modelling of the development included the possibility of additional dwellings and increased floor space for business, educational and retail in the future. As such, the overall design capacity of the network is much higher than the base case which is evident by Table 6.

Table 6 – Sewer and Water Modelling

Parameter	Base Case	Planning Proposal (Stages 1, 2 & 3)	Design Capacity	Spare Capacity	Capacity available
Sewer capacity (dwellings)	147	158	196	+38	Yes
Potable water capacity (dwellings)	147	158	196	+38	Yes
Recycled water capacity (dwellings)	147	158	196	+38	Yes

The total potable water demand for the planning proposal has been provided in Table 7.

Table 7 – Potable Water Demands for Planning Proposal

Scenario	Dwellings (No.)	Community facilities (m2)	Potable Water Demand (kL/dwelling/year)	Total Potable Water Demand (kL/year)
Base Case with Planning Proposal	147 + 9	1,331 + 519	150	25,118

The total recycled water demand for the planning proposal has been provided in Table 8.

Table 8 – Recycled Water Demands for Planning Proposal

Scenario	Dwellings (No.)	Community facilities (m2)	Total Potable Water Demand (kL/year)	Recycled Water Demand ratio	Total Recycled Water Demand (kL/year)
Base Case with Planning Proposal	147 + 9	1,331 + 519	25,118	33%	8,289

The total sewer loads for the planning proposal has been provided in Table 9.

Table 9 – Sewer Loads for Planning Proposal

Scenario	Dwellings (No.)	Community facilities (m2)	Sewer Loads (kL/dwelling/year)	Total Sewer Loads (kL/year)
Base Case with Planning Proposal	147 + 9	1,331 + 519	125	20,451

H&H revisited the base case model for the potable water system and the parameters it had been designed against. With the indicative increase in dwellings (noting that this is a representation of one likely development outcome in the event that the changes to the dwelling size, minimum lot sizes and gross floor area is approved), the minimum requirements as per Table 10 are still met within the network. Hence, the designed network has sufficient capacity to allow for the 11 additional dwellings and floor space which could result should the changes to the planning controls be approved.

The below table shows the requirements and results that the potable water system has been designed against.

Table 10 – Requirements and results for the potable water system

Item	Requirement	Code	Result from Design for Stages 1, 2 and 3	Comments
Minimum pressure at property boundary	25m	Water System Planning Guideline (Sydney Water 2014)	28m minimum pressure at property boundary	Minimum pressure is met at the boundary of all properties
Hydrant pressure and flow	Min 10L/s and 150kPa	AS 2419.1:2017	10.92 L/s lowest hydrant flow and 261kPa lowest pressure	Complies
Scour valves	Low points at end of mains, low points between valves, maximum water main drainage time 1h between isolation points	Water Supply Code of Australia WSA 03—2011-3.1 Sydney Water Edition 2014	Scour valves at all low points between valves and maximum drainage time less than 1 hour	Concept design meets requirements
Isolation valves	Maximum valve spacing, location of valves for ease of maintenance, all sections of main	Water Supply Code of Australia WSA 03—2011-3.1 Sydney Water Edition 2014	Isolation valves located so that all sections of the main are able to be isolated,	Concept design meets requirements

	to be able to be isolation, dewatered and charged		dewatered and charged	
Hydrants	Hydrant locations (high points and low points, ease of access, swabbing and flushing etc), spacing, between stop valves	Water Supply Code of Australia WSA 03—2011-3.1 Sydney Water Edition 2014, AS 2419.1:2017	Hydrants have been located at all high and low points, ease of maintenance locations, between stop valves and provide the required fire coverage	Complies (hydrant spacing meets requirements under AS 2419 and Council rural areas requirements)

H&H revisited the base case model for the recycled water system and the parameters it had been designed against. Based on 167 dwellings (planning proposal), the minimum requirements as per Table 11 are still met within the network. Hence, the designed network has sufficient capacity to allow for the 20 additional dwellings and additional floor space which could result should the changes to the planning controls be approved.

The below table shows the requirements and results that the recycled water system has been designed against.

Table 11 – Requirements and results for the recycled water system

Item	Requirement	Code	Result from Design for Stages 1, 2 and 3	Comments
Minimum pressure at property boundary	20m	Water System Planning Guideline (Sydney Water 2014)	20.7m minimum pressure at property boundary	Minimum pressure is met at the boundary of all properties
Scour valves	Low points at end of mains, low points between valves, maximum water main drainage time 1h between isolation points	Water Supply Code of Australia WSA 03—2011-3.1 Sydney Water Edition 2014	Scour valves at all low points between valves and maximum drainage time less than 1 hour	Concept design meets requirements
Isolation valves	Maximum valve spacing, location of valves for ease	Water Supply Code of Australia WSA 03—2011-3.1	Isolation valves located so that all sections of the main are	Concept design meets requirements

	of maintenance, all sections of main to be able to be isolation, dewatered and charged	Sydney Water Edition 2014	able to be isolated, dewatered and charged	
Hydrants	Hydrant locations (high points and low points, ease of access, swabbing and flushing etc), spacing, between stop valves	Water Supply Code of Australia WSA 03—2011-3.1 Sydney Water Edition 2014, AS 2419.1:2017	Hydrants have been located at all high and low points, ease of maintenance locations, between stop valves and provide the required fire coverage	Complies (hydrant spacing meets requirements under AS 2419 and Council rural areas requirements)
Hydrant pressure and flow	Min 10L/s and 150kPa	AS 2419.1:2017	10.85 L/s lowest hydrant flow and 181kPa lowest pressure	Complies

The future development of the ecovillage in line with the planning proposal and the indicative scheme can be assured that there is sufficient pressure and flow and that the capacities are within the expected loads.

All of the gravity collection network will be leak tight PE pipe and design flows have been calculated in accordance with the leak tight approach outlined in WSA 02-2002 Sewerage Code of Australia – Sydney Water Edition version 4.0 2017 (Water Services Association of Australia 2017). The detailed design for the potable water, recycled water and sewer for the base case and planning proposal scenario's can be found in Appendix C.

4 Existing Electrical and Communication Services

4.1 Electrical

The electrical network has been installed by NEV Power Pty Ltd and a letter confirming that NEV Power plans to extend its LV network to cater for electricity connections to the stage 2 and 3 dwellings and commercial premises when and as required.

The letter from NEV Power Pty Ltd is attached in Appendix B.

4.2 Communications

NBN Co. have confirmed capacity to cater for up to 120 lots within Narara Ecovillage which currently only caters for Stage 1 and part of Stage 2.

NEV Power Pty Ltd has correspondence with NBN about the capacity of the NBN system and confirm that NEV Power plans to extend its communications network to cater for communications connections to the stage 2 and 3 dwellings and commercial premises when and as required.

NEV Power Pty Ltd will need to apply for additional capacity to expand the NBN network to cater for part of Stage 2 and all of Stage 3.

5 Conclusion

In conclusion, based on our assessment of the service utilities in the base case scenario and proposed case scenario, it is evident there is sufficient serviceability of water, recycled water and sewer infrastructure to meet the additional loads from the the future development of the ecovillage in line with the planning proposal which could result should the changes to the planning controls be approved.

According to the modelling which has taken into account the future potable water demands and sewer loads from the proposed case scenario, no additional sewer, water or recycled water services are required.

As per the statement from NEV Power, currently NEV Power have in place an underground LV network utilising an 11kV supply from Ausgrid and can confirm that there is adequate capacity in the existing 1 MVA connection to supply the proposed development considered in the Planning Proposal Masterplan dated 28 July 2020. This allows for up to 158 new residential dwellings on 97 residential lots, along with proposed commercial premises and ancillary infrastructure.

	Sewer	**Potable**	**Recycled**	**Electricity**	**Communications**
Spare Capacity	Yes	Yes	Yes	To be extended	To be extended

It is noted that some dwellings may chose not to be connected to the NBN and electricity networks

Appendix A – Water Main and Sewer Connection Approval by Council

25 May 2020

John Talbott
Narara Ecovillage Co-operative Ltd
25 Research Road
NARARA NSW 2250

john@nararaecovillage.com

Dear John,

Development Application No. 44994/13
Lot No. 37, DP: 270882
33 Gugandi Road
Narara NSW 2250

WATER MANAGEMENT ACT 2000
Revised SECTION 306
Stage 1B

With respect to your application for a Section 307 Certificate for the subject development, upon completion of the following conditions, a Certificate will be issued.

1 The payment to the Authority of the following contributions towards the cost of construction of works specified in Schedule 1 which will benefit the development:-

		Rate/ET	No of ET	Total
a)	Water Headworks (Account No 706)	$1,843.39	80.50	$148,392.9
b)	Water Augmentation (Account No 705)	$306.76	80.50	$24,694.18
			SUB TOTAL	**$173,087.10**
2	Administration Fee (To be paid equally into Accounts 819 and 820)			$327.52
			TOTAL	**$173,414.60**

The Rate/ET and the total contribution amount may be altered as they are subject to annual review. The amount payable is based on the current rate at time of payment. The contributions do not include the cost associated with connection of the service.

3 Sewer contribution and relevant fees as outlined in the Stage1A Section 306 letter shall be paid.

4. The peak daily water usage shall not exceed 57 kL/day.

6. Should the additional water demand to that detailed above, be required by the development, another application is required to be made under Section 305 of the Water Management Act 2000 for a new Section 307 Certificate of Compliance.

7. All operations are to comply with Narara Ecovillage Water Utility network licence.

8. Connection to live water or sewer mains may only be carried out by Council at the expense of the developer. Council quoted the connection costs separately. Please note that Council will not program any connection works prior to payment of the estimated connection costs.

9. The developer is responsible for all protection works of all water supply and sewer infrastructure during construction works. The Developer will be responsible for all costs associated with any damage to the water and/or sewer infrastructure and any other damage as a result. Details of proposed protection methods are to be submitted to Council prior to issue of the Construction Certificate.

10. The required works are to be provided in accordance with WSA 03 Sydney Water Edition (Gosford Amendments) and AS/NZS 3500.

NOTE: The above fees do not include internal sewer plumbing and drainage inspection fees. If applicable, you are advised to complete the Council's *Application for Plumbing and Drainage Inspection* form. This form is available on the Council's website: https://www.centralcoast.nsw.gov.au/council/forms/plumbing-and-drainage-inspection-south-application-online-form

- Please ensure you bring this letter when making payment.

SCHEDULE 1

Water Headworks

Components of Gosford/Wyong Joint Water Supply Scheme, including:-

- Dams
- Service reservoirs
- Filtration plants
- Trunk mains
- Major pumping stations

Water Augmentation/Distribution

The components of the water supply scheme which connect a service area to a water supply headworks component, including:-

- Site reservoirs
- Minor pumping stations

Sewer Augmentation/Distribution

The components of the sewerage system which connect a service area to a sewerage headworks component, including:-

- Minor pumping stations
- Rising mains
- Gravity sewers

Yours faithfully

J.Zhang

For Chief Executive Officer
Internal Reference: ECMD24971147
Telephone: 1300 463 954

25 May 2020

John Talbott
Narara Ecovillage Co-operative Ltd
25 Research Road
NARARA NSW 2250

john@nararaecovillage.com

Dear John,

Development Application No. 44994/13
Lot No. 37, DP: 270882
33 Gugandi Road
Narara NSW 2250

WATER MANAGEMENT ACT 2000
Revised SECTION 306
Stage 1A

With respect to your application for a Section 307 Certificate for the subject development, upon completion of the following conditions, a Certificate will be issued.

1 The payment to the Authority of the following contributions towards the cost of construction of works specified in Schedule 1 which will benefit the development:-

	Rate/ET	No of ET	Total
a) Sewer Augmentation (Account No 703)	$1,379.32	48.80	$67,310.82
		SUB TOTAL	**$67,310.82**
2 Administration Fee (To be paid equally into Accounts 819 and 820)			$327.52
3 Water Engineering Plan and Technical Assessment Fee			$895.67
		TOTAL	**$68,534.01**

The Rate/ET and the total contribution amount may be altered as they are subject to annual review. The amount payable is based on the current rate at time of payment. The contributions do not include the cost associated with connection of the service.

4. No water contribution payable apply under stage 1A development and the interim water supply arrangements is in line with the current Deed of Agreement executed August 2016. (ECMD21641835).

5. Water contribution will be applied upon termination of the Deed of Agreement (ECMD21641835). Please refer to Section 306 letter for stage 1B development.

6. The annual sewerage loading shall not exceed 10950 kilolitres.

7. Should the additional sewer loading to that detailed above, be required by the development, another application is required to be made under Section 305 of the Water Management Act 2000 for a new Section 307 Certificate of Compliance.

8. All operations are to comply with Narara Ecovillage Water Utility network licence.

9. Connection to live water or sewer mains may only be carried out by Council at the expense of the developer. Council quoted the connection costs separately. Please note that Council will not program any connection works prior to payment of the estimated connection costs.

10. The developer is responsible for all protection works of all water supply and sewer infrastructure during construction works. The Developer will be responsible for all costs associated with any damage to the water and/or sewer infrastructure and any other damage as a result. Details of proposed protection methods are to be submitted to Council prior to issue of the Construction Certificate.

11. The required works are to be provided in accordance with WSA 03 Sydney Water Edition (Gosford Amendments) and AS/NZS 3500.

NOTE: The above fees do not include internal sewer plumbing and drainage inspection fees. If applicable, you are advised to complete the Council's *Application for Plumbing and Drainage Inspection* form. This form is available on the Council's website: https://www.centralcoast.nsw.gov.au/council/forms/plumbing-and-drainage-inspection-south-application-online-form

- Please ensure you bring this letter when making payment.

SCHEDULE 1

Water Headworks

Components of Gosford/Wyong Joint Water Supply Scheme, including:-

- Dams
- Service reservoirs
- Filtration plants
- Trunk mains
- Major pumping stations

Water Augmentation/Distribution

The components of the water supply scheme which connect a service area to a water supply headworks component, including:-

- Site reservoirs
- Minor pumping stations

Sewer Augmentation/Distribution

The components of the sewerage system which connect a service area to a sewerage headworks component, including:-

- Minor pumping stations
- Rising mains
- Gravity sewers

Yours faithfully

J.Zhang

For Chief Executive Officer
Internal Reference: ECMD24971147
Telephone: 1300 463 954

Appendix B – Statement from NEV Power

13th August 2020

Narara Ecovillage – Planning Proposal Development

DP 270882
Community Title Development
25 Research Road, Narara 2250

Supply of Electrical Power

Narara Ecovillage is a Community Title development (DP270882) with private water and electricity supply arrangements.

NEV Power Pty Ltd is the energy retail supplier and electrical network operator for Narara Ecovillage (as an AER approved embedded network, reference number E-2113 exemption class NR2)[1]

We currently have in place an underground LV network utilising an 11kV supply from Ausgrid and can confirm that there is adequate capacity in the existing 1 MVA connection to supply the proposed development considered in the Planning Proposal Masterplan dated 28 July 2020. This allows for up to 167 new residential dwellings on 97 residential lots, along with proposed commercial premises and ancillary infrastructure. It should be noted that proposed commercial and business premises will be carried out in existing buildings currently supplied by our network.

NEV Power plans to extend its LV network to cater for electricity connections to the stage 2 and 3 dwellings and commercial premises when and as required.

Yours faithfully

Lincoln de Kalb
Director, Head of Power

John Talbott
Director

[1] https://www.aer.gov.au/networks-pipelines/network-exemptions/public-register-of-network-exemptions/narara-ecovillage-co-operative-narara-ecovillage-network-exemption

NEV Power Pty Ltd
Mail: c/o Company Secretary, 25 Research Road, Narara NSW 2250.
e: power@nararecovillage.com p: (02) 4328 1588
w: nararaecovillage.com ABN: 51 611 577 103 ACN: 611 577 103

Appendix C – Masterplan Drawings for Potable, Recycled and Sewer Networks

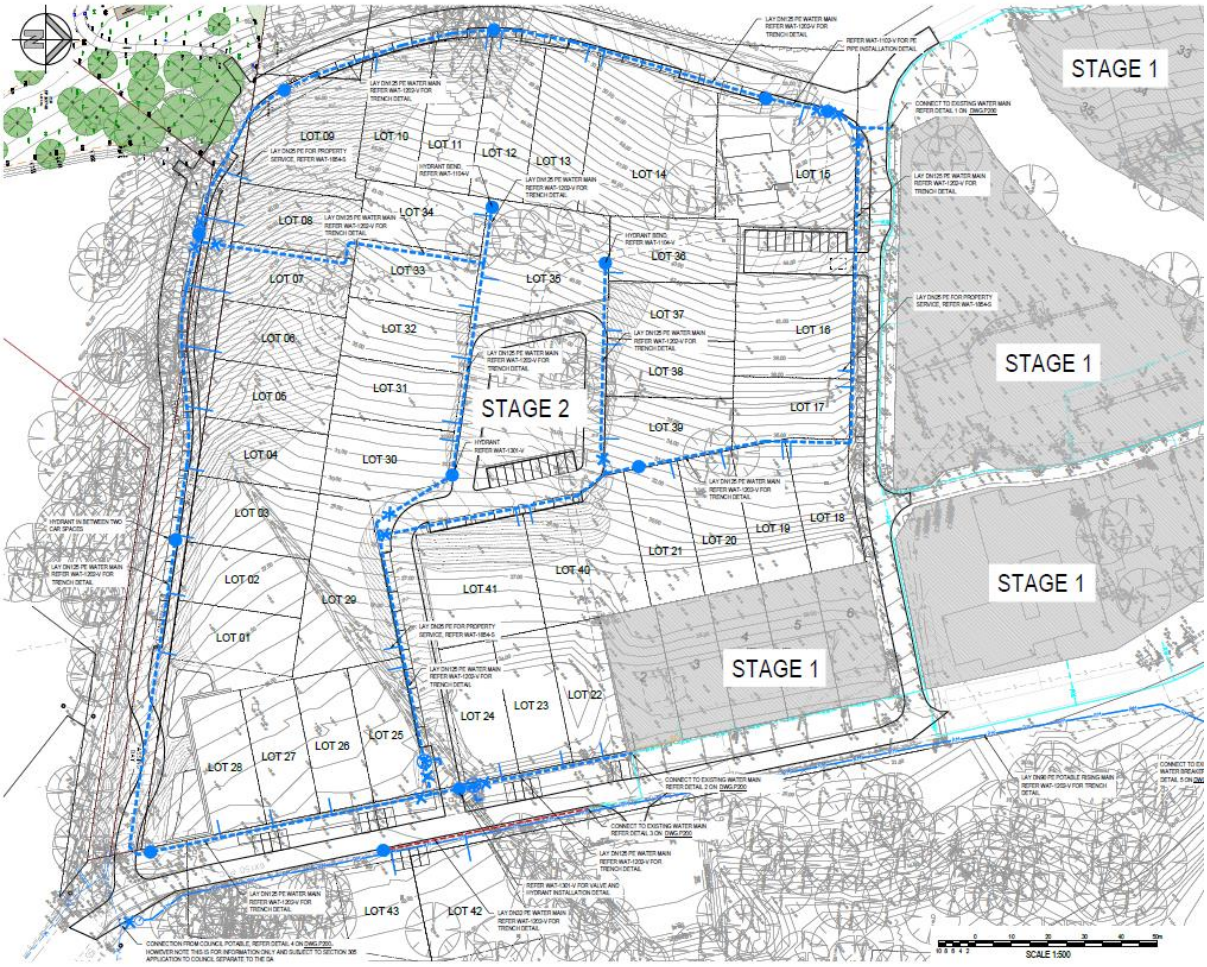

Figure 2 – Proposed potable water network for base case scenario

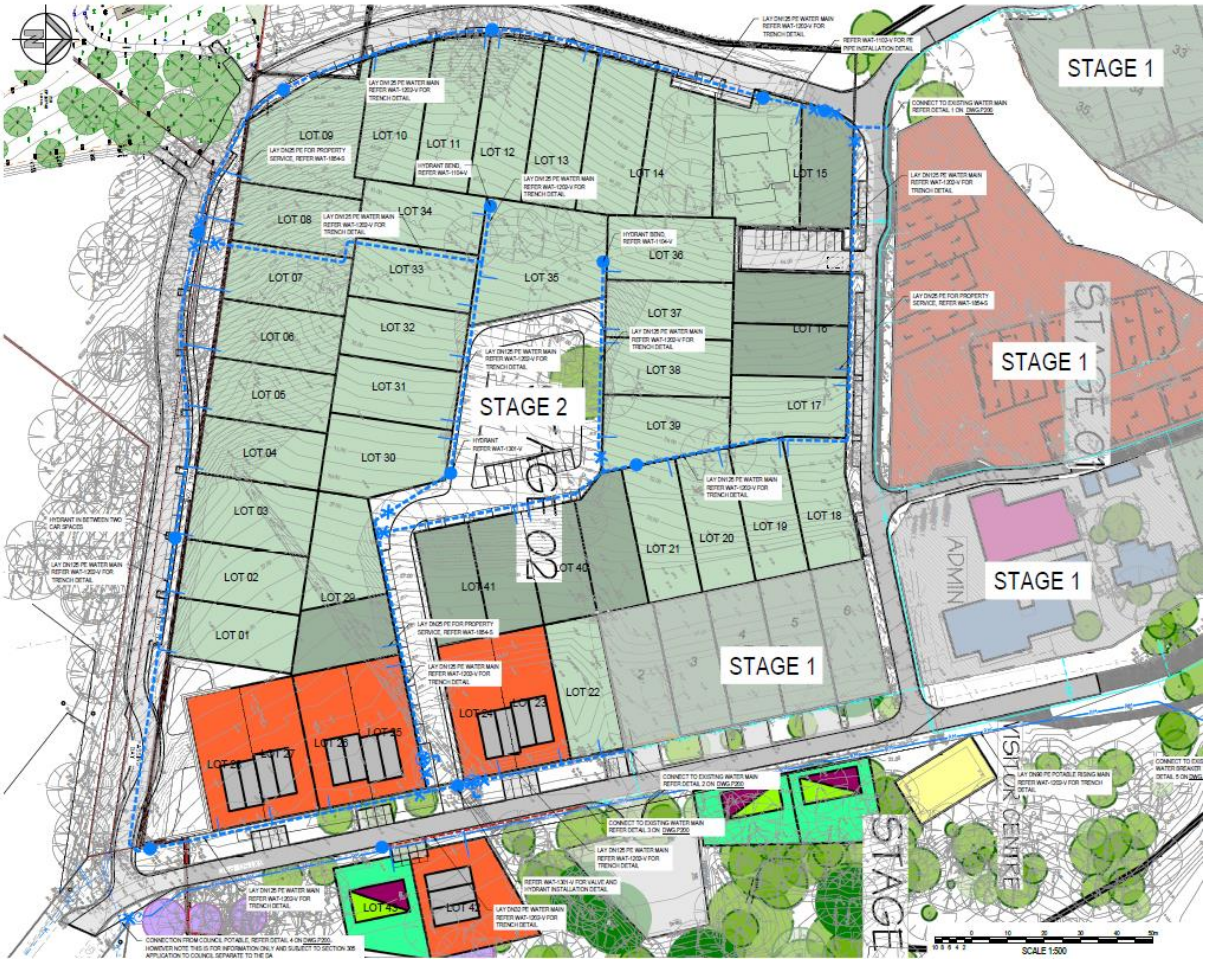

Figure 3 – Proposed potable water network for proposed scenario

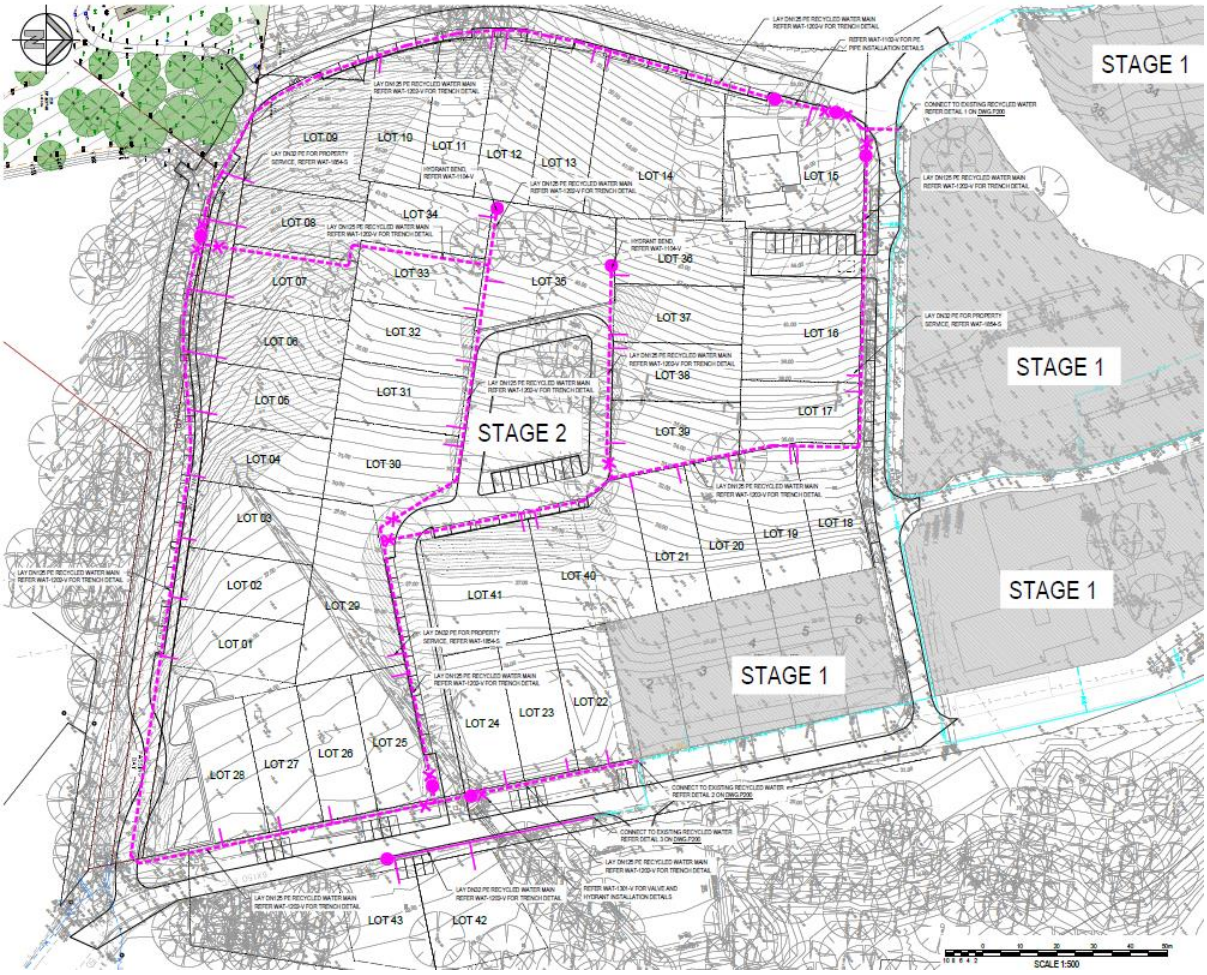

Figure 4 – Proposed non-potable water network for base case scenario

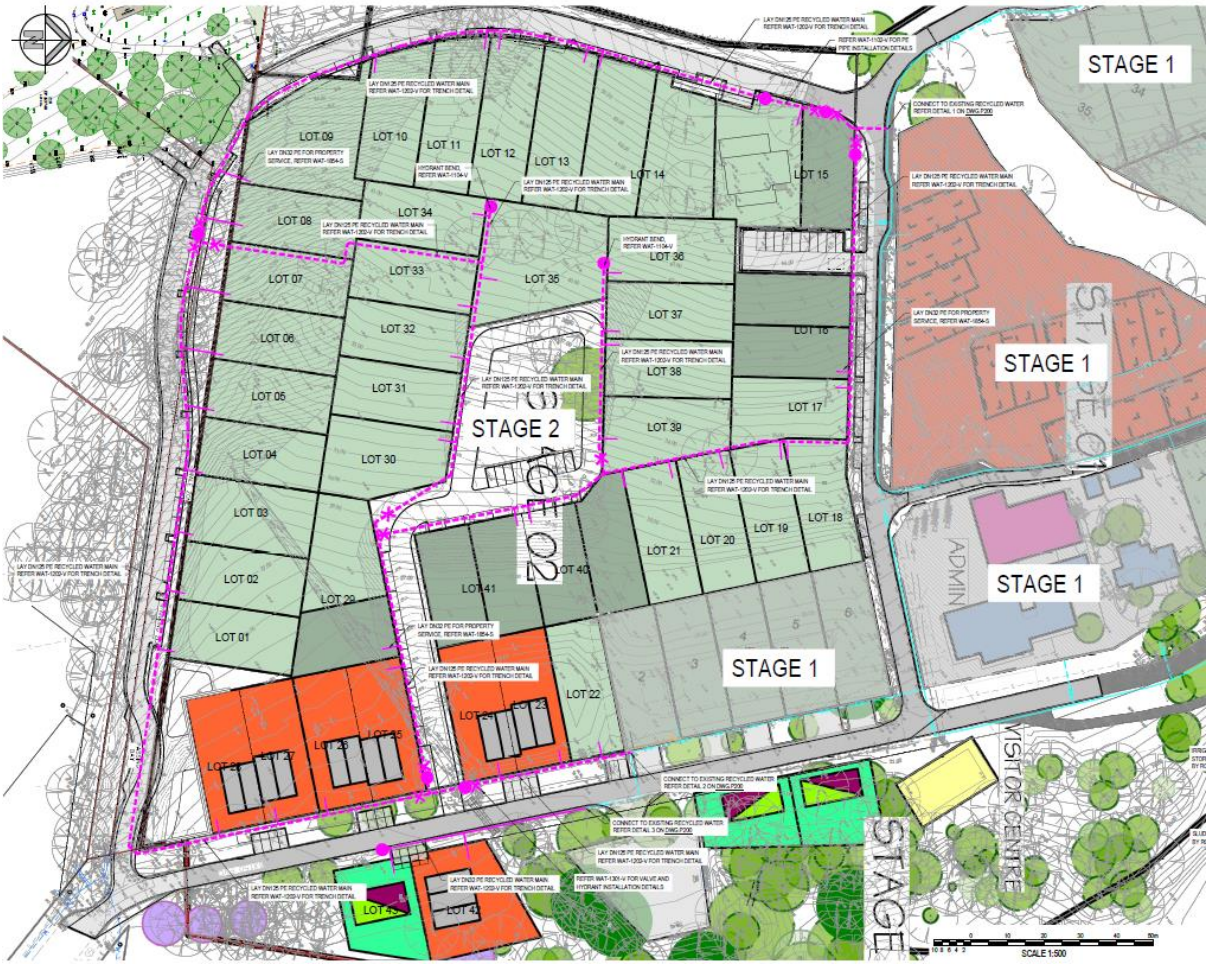

Figure 5 – Proposed non-potable water network for proposed scenario

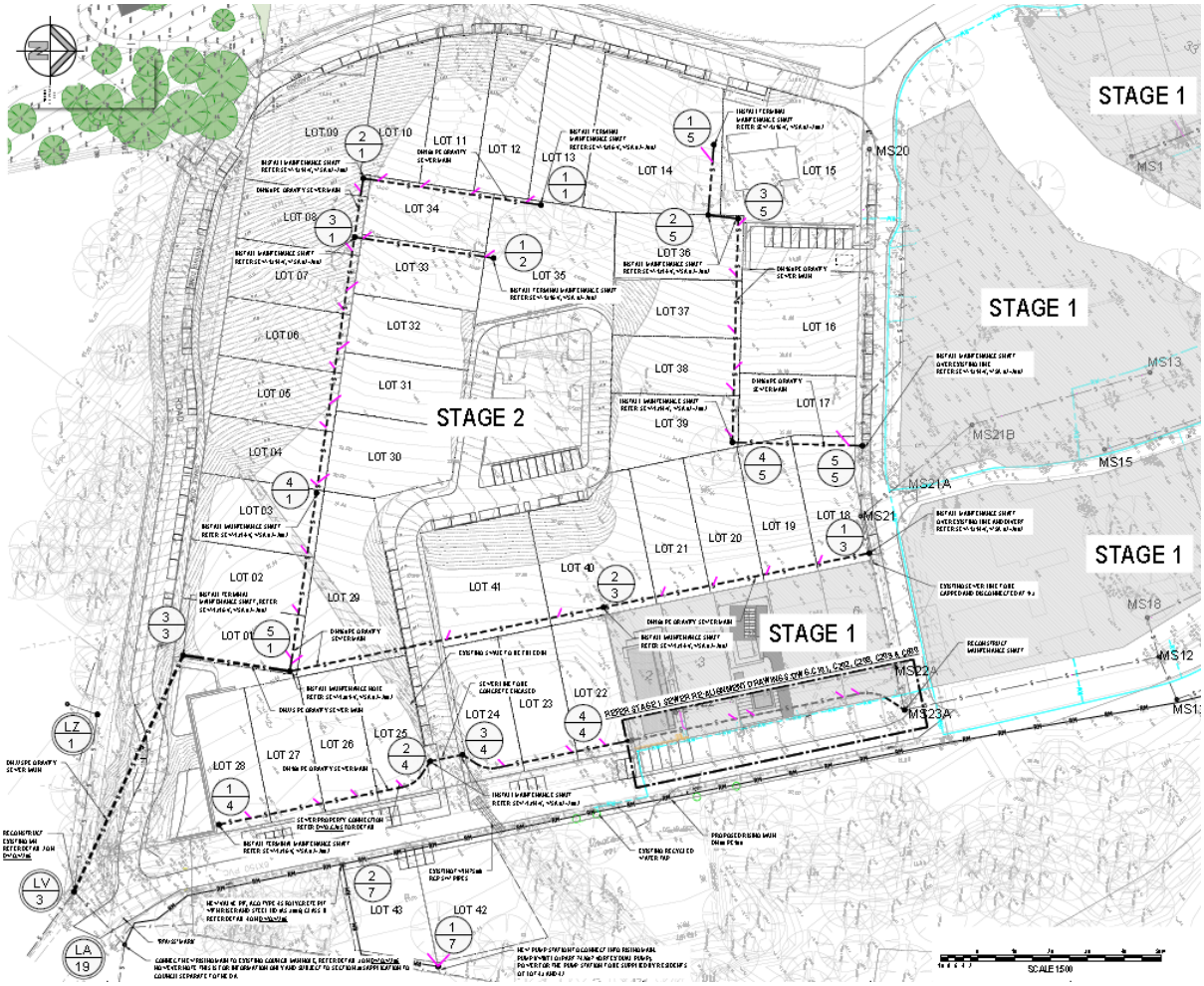

Figure 6 – Proposed sewer network for base scenario

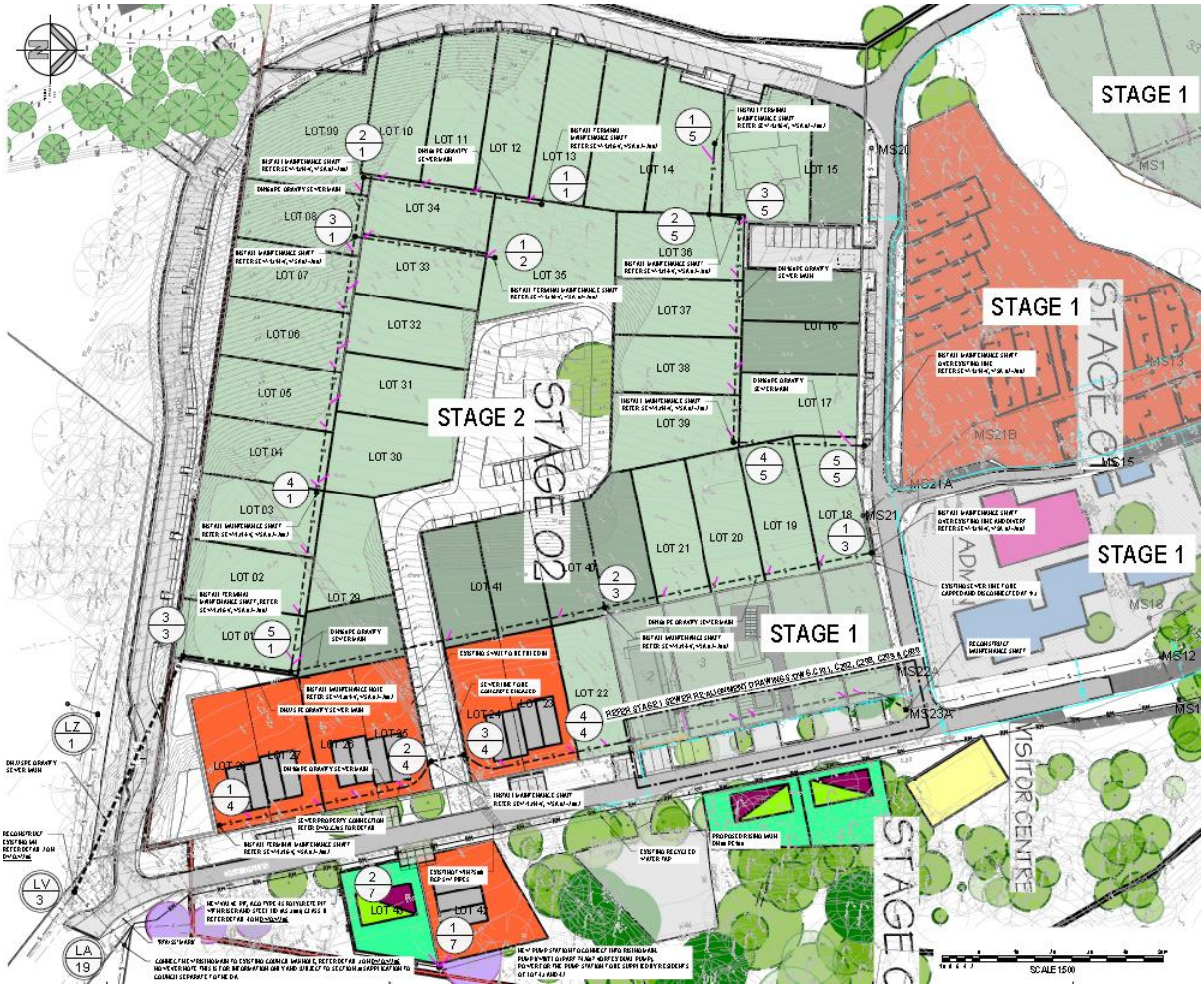

Figure 7 – Proposed sewer network for proposed scenario