Roxburgh Crescent Plan Change

Water and Wastewater Servicing Assessment

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Document Control

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Contents

1 Scope

This water and wastewater servicing assessment provides engineering information that underpins Proposed Plan Change E, for the Roxburgh Crescent development. This plan change is to transition the current industrial zone to residential, as shown in Figure 1. The change provides for residential growth for Palmerston North.

Figure 1: Study Area

Yield studies were completed for the area with up to 123 Lots, with a minimum size of 250m² (note the number of Lots was revised upwards from 92). The modelling assumes a variety of house sizes across the development.

This report assesses the current extent of water and wastewater networks for the proposed area and surrounds of Roxburgh Crescent, and the impact of servicing the ultimate additional number of dwellings, as a result of this proposed plan change.

2 Water Supply

2.1 Existing Network

The study area is within the Palmerston North water supply. The primary source for this supply is the Turitea Water Treatment Plant, which treats raw surface water from the Turitea Dams. This water supply is located on the southern side of the Manawatū River and supplies the area in question via trunk mains crossing the Fitzherbert Bridge. The supply is supplemented by bores on the northern side of the Manawatū River which activate during periods of high demand to maintain pressure and flow.

Roxburgh Crescent is currently supplied from a single 100 mm diameter concrete-lined steel (CLS) water main, which only services part of the land area in question. Roxburgh Crescent is off Ruahine Street, and the main described above is connected to a 150 mm diameter distribution main on the eastern side of Ruahine Street. The western side of Ruahine Street in this extent is served by a 50 mm diameter MDPE (Medium-Density Polyethylene) rider main fed by the same 150 mm distribution main.

2.2 Demand

2.2.1 Current

Currently, Roxburgh Crescent contains a moderate number of light industrial premises. The surrounding area is residential. There are no wet industries. The overall character of the study area is such that the sizing of water mains will be to achieve the desired levels of service for firefighting water supply. Consumption, even at peak flows, is expected to be less than this requirement.

2.2.2 Future

Future demand was calculated based on the development scenario outlined in Section 1 above.

Assumptions used in this exercise, from the PNCC Engineering Standards for Land Development, were:

- Average day demand = 290 L/person/day
- Household occupancy = 2.9 people/dwelling
- Peak Day Demand (over a 12-month period) = Average Day Demand x PF[1]
- PF = 2 for population below 2,000 people

2.3 Servicing Assessment

2.3.1 Background

Water network modelling was carried out internally at PNCC. Scenarios were run based on knowledge of the current network, with additional reticulation and water demand added for the growth study areas as per Section 1 & 2 above.

2.3.2 Capacity

There is adequate supply from the Turitea Dams, supplemented by bores within Palmerston North, to enable this development.

[1] Peaking Factor

2.3.3 Levels of Service

Relevant PNCC levels of service for water supply[2] are:

- Pressure of 350 kPa at the boundary.
- Firefighting water supply to meet FW2 in Table 2 of the New Zealand Fire Service. Firefighting Water Supplies Code of Practice[3] for residential or sprinklered buildings, or FW3 for commercial/industrial.

2.3.4 Modelling Results

Modelling showed that:

1. The PNCC level of service for pressure of 350 kPa at lot boundaries would be achieved for each of the 123 proposed lots during peak day demand.
2. The PNCC level of service for firefighting for residential properties, which is FW2 (see above), would be met.
3. No upgrades to the existing PNCC water supply network would be required to enable the proposed development.

2.4 Funding

Since there is no need to upgrade the PNCC water supply network to enable this development, no PNCC funding is required for water supply.

The internal reticulation needed to supply water to each new lot would need to be constructed by the developer(s) in accordance with the PNCC Engineering Standards for Land Development.

3 Wastewater

3.1 Existing Network

The existing network in Roxburgh crescent can be seen in Figure 2 below. This area forms part of the Hokowhitu catchment and the gravity wastewater network then follows the alignment indicated in yellow below, discharging into the Jickell Street pump station. The wastewater collected in this catchment drains to a 300 mm trunk main from Crewe Crescent, through to Albert Street, the Manawatū golf course and the old "Teachers College". The Jickell Street pump station then pumps the effluent into the Palmerston North gravity network, ultimately flowing to the Totara Road wastewater treatment plant.

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[2] Within our Water Supply Area, as defined in the Water Supply Bylaw. There are no guaranteed levels of service outside this area. [3] SNZ PAS 4509:2008

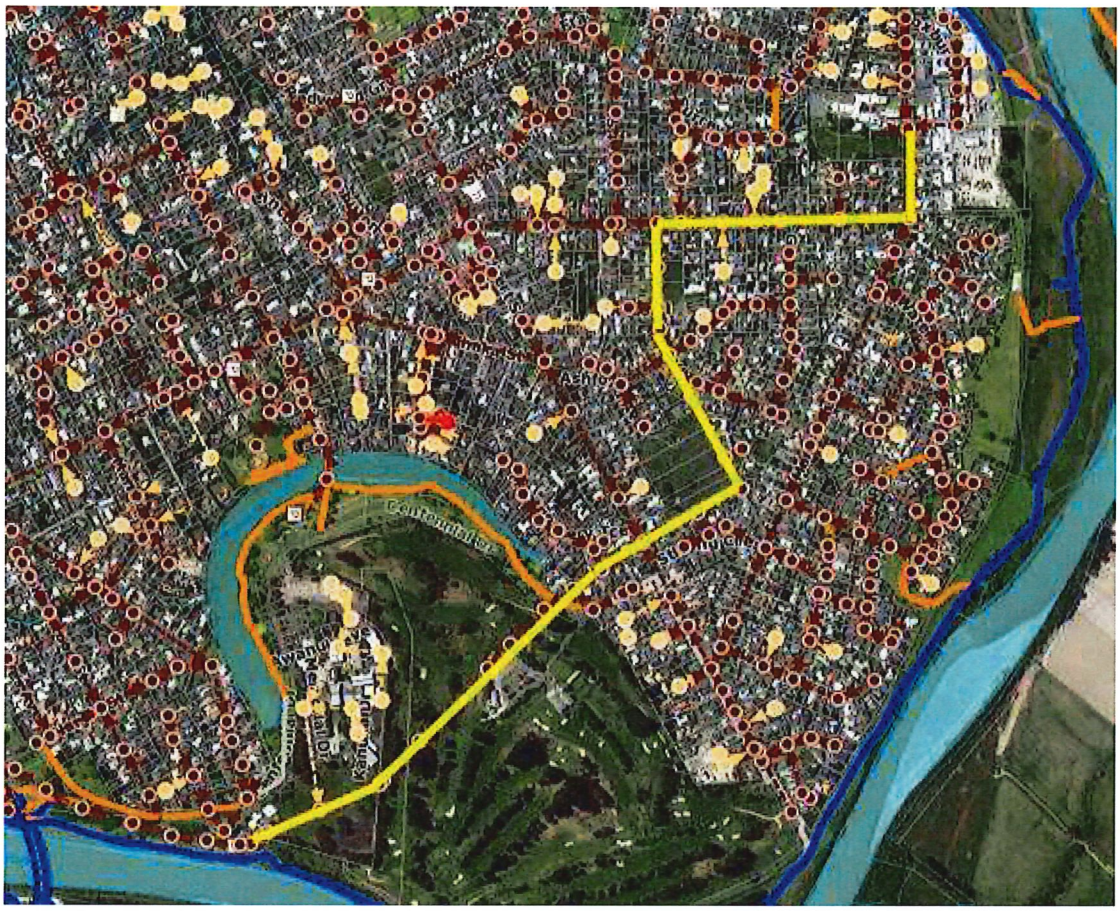

Figure 2: Wastewater network - Plan Change area to Jickell St pump station

Investigations will be required (e.g. geotechnical) to inform future upgrade options through the golf course, which are likely to result in some disruption.

3.2 Proposed Wastewater Upgrades

It was proposed that the development (123 units) will feed into the existing gravity network via Ruahine and Pahiatua Streets. The modelling indicates there will be no significant impacts on the immediate receiving network, as highlighted in Figure 3 below.

Figure 3: Immediate Wastewater network – Ruahine St

The modelling has indicated that the existing 300 mm main from Albert Street to the Jickell Street pump station is under capacity under peak wet weather condition. As mentioned earlier, the section from the Manawatū golf course/old teachers' college boundary to the Jickell Street pump station will be upgraded as part of a development. This can be seen in Figure 4, highlighted in yellow.

Figure 4: Upgraded section via development of "Teachers College"

Sections of the 300 mm wastewater mains are located in private property in the vicinity of Crewe Crescent. These sections will be difficult (or impossible, depending on several factors) to upgrade. The result is the most practicable solution to upgrade the 300mm main to improve capacity, lies within the Manawatū golf course. This can be seen in Figure 5 below. This would be approximately 460 m from the Centennial Drive side to the old teachers' college boundary.

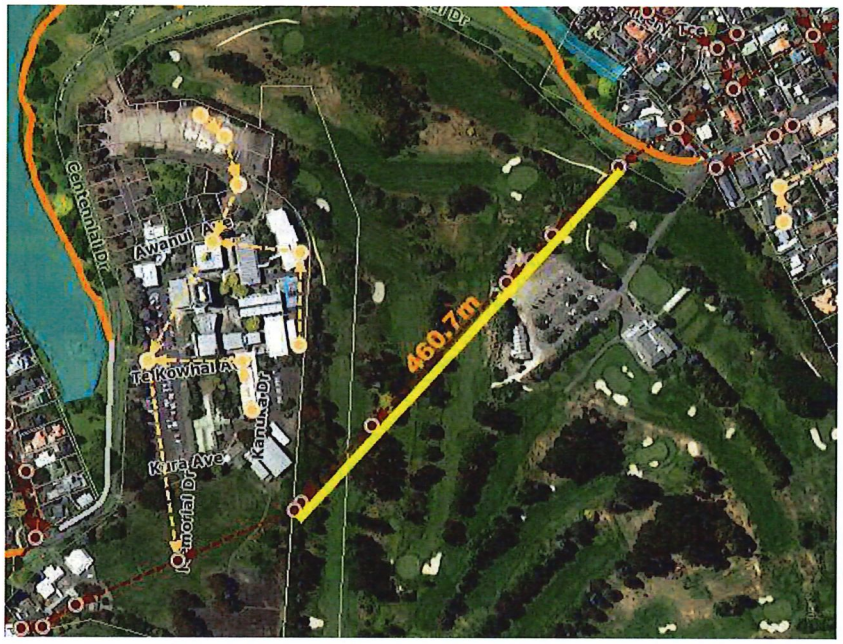

Figure 5: Existing 300 mm wastewater main to be upgraded

3.3 Funding

A high-level engineers estimate was done for work to upgrade the existing 460 m of 300 mm to 450 mm uPVC and replace the 4 existing manholes. A budget cost to complete the work (in 2023) is approximately $900,000.

Upgrading the existing 300 mm within the Manawatū golf course boundary cannot be directly linked to this specific development, as the wastewater main is recognised as already slightly under capacity. There are capital renewal and upgrade programmes in the Long-Term Plan (LTP) for the renewal of trunk mains. The proposed LTP budget for capital renewal and upgrades for this section of wastewater main is shown below in Table 1.

Table 1: Proposed LTP Budget

Wastewater Trunk Mains Renewals & Upgrades		
FYr	2025/26	2026/27
Renewal = 44%	$198k	$198k
Upgrade = 56%	$252k	$252k

4 Conclusions

4.1 Water Supply

Modelling the water supply for the proposed 123 lots and indicative layout has indicated that:

1. There are no constraints on the existing PNCC water supply network that present a barrier to the proposed development.
2. There is no anticipated need for PNCC to undertake upgrades to its network to enable this development.
3. PNCC levels of service for pressure and for firefighting water supply for residential properties would be met for this development.

4.2 Wastewater

It can be concluded that the proposed area would be able to connect to the existing gravity network. There are no significant risks to the DWF[3] levels of service, and the existing network would be able to cope. The existing network in the catchment is, however, already under capacity in significant wet weather events and to accommodate future developments PNCC would have to invest in upgrading some existing parts of the network.

It is recommended that:

1. Investigation of options and techniques to upsize sections of the existing 300mm pipe network (e.g. minimal disruption to section through the Manawatū Golf course).
2. Further modelling to determine the extent of required upgrades
3. Funding be identified in the Long-Term Plan.

[3] Dry Weather Flow

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