

SERVICING REPORT

43765 / ARVIDA MAITAHU VILLAGE, 7 RALPHINE WAY, NELSON
/ ARVIDA GROUP LTD

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QUALITY ASSURANCE

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Maitahi Village

Client: Arvida Group Ltd.

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1.0 INTRODUCTION

1.1 Purpose of Report

Davis Ogilvie & Partners Limited (DO) has been engaged by Arvida Group Limited (the client) to provide civil engineering consultancy services to support the relevant consent applications for the proposed Maitahi Village (the project).

The purpose of this report is to outline the servicing requirements to enable development of the site.

1.2 Existing Site Description

The existing site address is 7 Ralphine Way, Maitai, Nelson, which is located in the Kākā Valley, directly north of the Maitai River. The legal description of the site is Part Section 11 District of Brook Street and Maitai and Part Section 8 Square 23 comprised in Record of Title NL11A/1012 DP551852. The site has recently been re-zoned through Private Plan Change 28 (PPC28), with zoning now being for residential, open space and suburban commercial purposes, following the Structure Plan contained with Schedule X of the Nelson Resource Management Plan (NRMP).

Key features of the existing site are summarised as follows:

- The majority of the development site is well grazed farmland with small pockets of native bush.
- Existing farm buildings are located centrally on the site.
- The centre of the site is a semi-flat riverbank plateau with hill slopes on the western, northern, and eastern sides.
- The Kākā stream drains through the centre of the site before discharging to the Maitai River to the southwest.

1.3 Proposed Development Description

The wider site is being developed into a residential subdivision by CCKV MAITAI DEV CO LP (the Vendor), which the site will be developed within.

The site will be a retirement village comprising villas, townhouses, a care building, clubhouses, recreational areas, roading, carparking and landscaping.

As shown in Figure 1 below, the site will be constructed over two areas named Area A and Area B which have total areas of 7.342 ha and 2.563 ha respectively. The two areas are delineated by the proposed realignment of Kākā Stream which is being completed by the Vendor. The two areas will be linked via a shared path, when vehicular linkage will be via the proposed sub-collector road to the east of both areas.



Figure 1: Development Masterplan.

2.0 EARTHWORKS, LEVELS & GRADES

2.1 Proposed Earthworks

Bulk earthworks will be completed by the Vendor. Any earthworks completed by the Client are anticipated to be minor in respect to the scale of the development however regardless will be carried out in accordance with NZS4431:2022 and any other resource or subdivision consent conditions.

The extents of the batter slopes around the perimeter of the site have been dictated by flood modelling completed by Tonkin + Taylor Ltd. (T+T), where the extents have been maximised into the flood plain all while ensuring no off-site effects.

2.2 Site Levels & Grades

Proposed site levels and contours are shown on the provided plans. Accessibility has been a key driver in determining the proposed site levels, where grades have been restricted to 1 in 20 or flatter.

Area A generally grades to the west and Area B generally grades to the south. Given the significant elevation changes across both areas, batters and retaining walls have been incorporated into the design to achieve accessible grades. For where accessible grades are not achieved, ramps have been incorporated into the design.

3.0 POTABLE WATER

The site will be serviced by potable water reticulation, designed in accordance with the NTLDM, relative consent conditions and engineering best practice, as detailed within the potable water servicing plans.

Both Areas A and B will be serviced by independent networks. Suitably sized backflow preventers will be installed inside of the site at the point of supply for both networks.

The proposed watermain sizes will be confirmed during detailed design, to ensure minimum supply and hydrant pressures are achieved, maximum permitted head losses are not exceeded. Watermains and rider mains will be a minimum of DN150 and DN50 (ID), respectively. PE and uPVC will be considered options for the watermain material selection.

The reticulation for both areas will follow a ring-main layout with valves located at all junctions and wherever else deemed necessary to ensure adequate redundancy in design. To further improve the redundancy in design, additional connection points from Areas A and B to the wider network will be considered during detailed design.

The potable water reticulation will be designed to meet requirements of SNZ PAS 4509:2008. This includes ensuring hydrant locations comply with Section L4, and minimum hydrant and sprinkler demands can be achieved. Hydrants will be located at low points to allow flushing of the lines.

Appropriately sized submains will terminate near each cluster of buildings with a valve and temporary thrust block (if required). As the development is sequentially constructed, the submain and laterals will extend to service each building and will be designed in accordance with New Zealand Building Code (NZBC) G12 Water Supplies, and other applicable standards.

4.0 WASTEWATER

The site will be serviced by low-pressure sewer reticulation, designed in accordance with the NTLDM, relevant consent conditions and engineering best practice. As shown in the drainage servicing plans, low pressure pump chambers have been strategically positioned around the site, each servicing a cluster of buildings.

Flows from each building will drain to the low-pressure pump chambers by gravity reticulation, designed in accordance with NZBC Clause G13 Foul Water, and other applicable standards.

The low-pressure sewer network will be designed during detailed design by a Nelson City Council (NCC) approved designer & supplier. These low-pressure networks servicing Areas A and B will be independent of one another and will discharge to the wider network.

Sewer demands have been estimated in accordance with Section 6.5.2.1 of the NTLDM, however the dilution/infiltration factor has been set as 1.2, instead of 3.0 as per the NTLDM. This value has been adopted from the Water New Zealand Pressure Sewer National Guidelines – Feb 2020. A phone discussion with the client confirmed the following population assumptions, which align with Auckland Regional Council (ARC) Guideline Document 2021/006 (GD006):

- Average population of 1.0 for care units
- Average population of 1.3 for 1-bed units
- Average population of 2.0 for 1-bed units
- Maximum of 34 staff at any one time.

As per Table 18 of ARC GD006, the assumed daily demand per staff member is 50 l/per/day. The demand for the communal recreational buildings (i.e., bar, café, gym etc) has been estimated in accordance with Table 5.1.3 of Watercare COP-02 guidance document. As per this table, 80% of the gross floor area is assumed to be the net area, and for conservatism, the net area is assumed to be entirely wet retail, which has a demand of 15 l/day per m² of net floor space.

The estimated Average Dry Weather Flows (ADWF), Peak Dry Weather Flows (PDWF) and Peak Wet Weather Flows (PWWF) are summarised in Table 1 below.

Table 1: Summary of estimated wastewater flows from development

| Area | Flows (l/s) | | |
|--------------|---------------------|------------------|------------------|
| | Average Dry Weather | Peak Dry Weather | Peak Wet Weather |
| A | 1.2 | 2.5 | 3.0 |
| B | 0.5 | 0.9 | 1.1 |
| Total | 1.7 | 3.4 | 4.1 |

Flows from the site will discharge to the wider sewer network which will be designed with sufficient capacity for the demands from the Arvida site.

5.0 STORMWATER

5.1 Proposed Stormwater

The site will be serviced by stormwater reticulation, designed in accordance with the NTLDM, relative consent conditions, engineering best practice, and the Stormwater Management Plan (SMP) prepared by T+T, as detailed within the drainage servicing plans.

As per the SMP, no stormwater detention is required to be provided for the Arvida site.

Rainfall intensities will be taken from HIRDS V4 RCP 8.5 to 2081 – 2100.

5.2 Primary Reticulation

Runoff from roofs, and small courtyards and patios will be managed by reticulation designed in accordance with NZBC E1/AS1.

Runoff from all carriageways will be conveyed via kerb and channel before discharging into piped reticulation via roadside sumps, roof runoff will discharge via direct connections. This reticulation will be designed in accordance with the NTLDM with capacity for up to and including the 15-year ARI event.

The layout of the proposed reticulation is detailed on the design plans. The reticulation layout will be finalised during detailed design, along with the confirmation of pipe sizes, grades, and materials. Manholes will be constructed at any change in pipe size, grade, or direction apart from where designed in accordance with NZBC E1/AS1.

Self-cleansing flows, freeboards and maximum velocities will be assessed during detailed design.

5.3 Secondary Reticulation

Secondary flows throughout the site will be managed overland for up to and including the 100-year ARI event. At present, proposed secondary flows from the wider development are conveyed around the site. This will be reviewed at detailed design, and any secondary flows entering the site will be managed accordingly.

During the development of the masterplan, DO carried out high-level analysis of secondary flows throughout the site, highlighting where changes were required to the site layout. In-depth analysis will be carried out during detailed design to ensure secondary flows are safely conveyed through the site and comply with section 5.4.3.12 of the NTLDM.

Minimum acceptable floor levels have been adopted in accordance with NZBC E1/AS1 section 2.01. During detailed design, further analysis will be completed to confirm floor levels comply with NZBC E1/VM1 1.3.2.

Flood modelling from the Kākā Stream has been completed by T+T.

5.4 Stormwater Treatment

All runoff from contaminant generating surfaces from the site is required to be treated. Morphem Environmental Ltd. (Morphum) developed the Water Sensitive Design Report on behalf of the Vendor for the wider site. As detailed in the Morphem report, stormwater treatment will be provided for the wider site via wetlands. Where possible, these wetlands have been sized with sufficient capacity to treat the Arvida site. The entirety of Area A will receive stormwater treatments from the proposed wetlands mentioned above. As shown in Figure 2 below, Catchment A1 will discharge to the proposed “*Central Wetland*” when Catchments A2 and A3 will discharge to the proposed “*Southern Wetland*.”

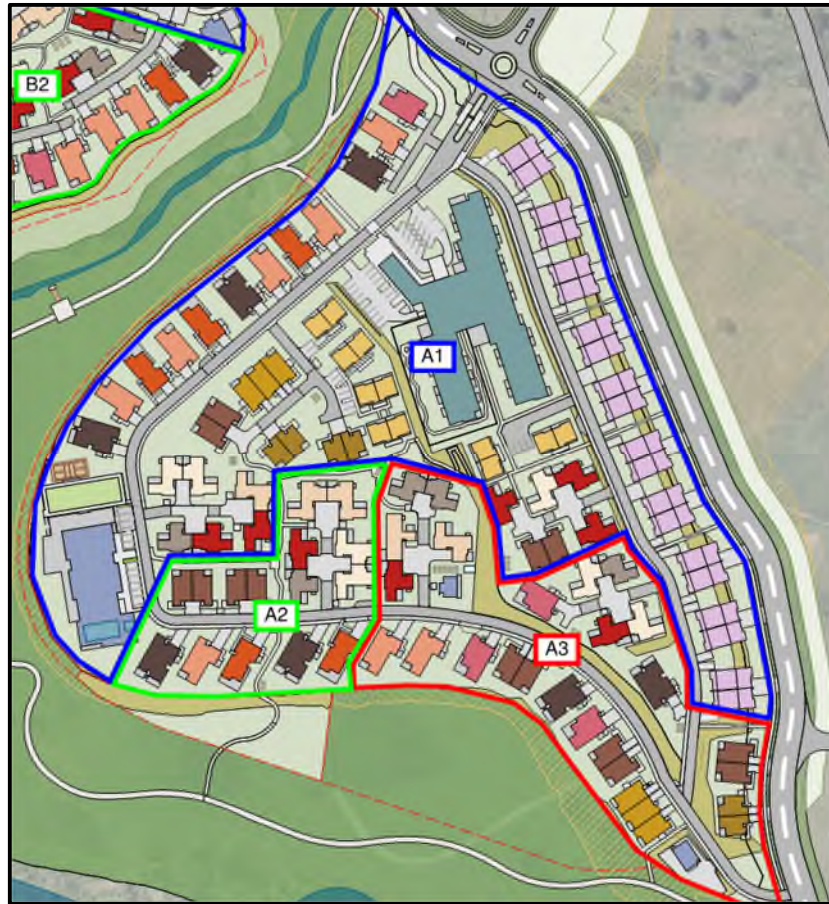


Figure 2: Area A Stormwater Catchments.

For Area B (Figure 3), stormwater runoff from Catchment B1 will be treated by the proposed “*Western Wetland*.” Due to capacity and site constraints, Catchments B2 and B3 are unable to be treated by the proposed wetlands servicing the wider site. Treatment for the Catchments B2 and B3 will be designed during detailed design and will likely comprise proprietary devices, rain gardens or an additional wetland, where the treatment performance will meet the requirements as set out in the SMP, and Schedule X of the Nelson Resource Management Plan.

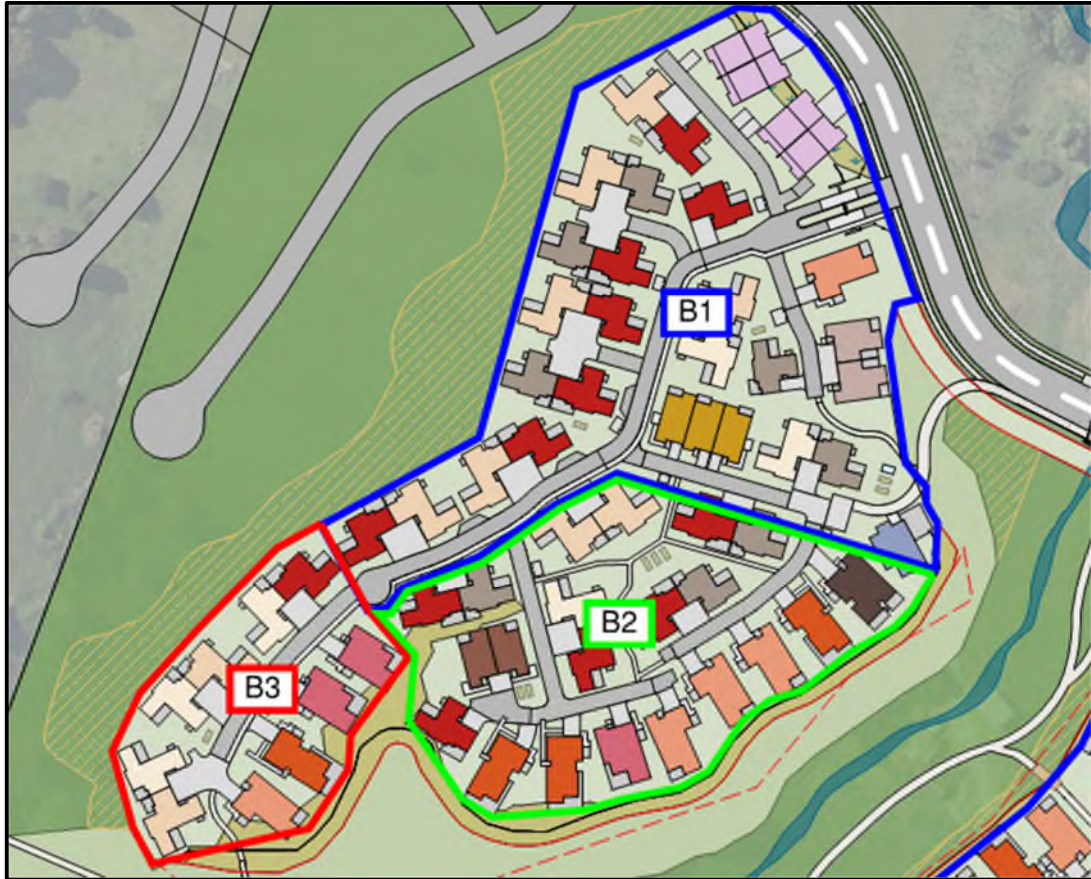


Figure 3: Area B Stormwater Catchments.

To summarise the above, stormwater runoff from Area A, as well as catchment B1 from Area B will be managed within wetlands constructed by the Vendor. The rest of Area B (catchments B2 and B3) will require its own stormwater treatment which will be designed during detailed design.

6.0 TRADE WASTE

Both liquid and solid trade waste will be produced by the development, primarily from the care building and facility buildings.

Liquid trade waste will be as a result of food production and will be directed to the sewer network via appropriately sized grease traps. Ongoing maintenance of these grease traps will be carried out on a regular basis to ensure maintenance requirements of the low-pressure sewer and wider network are not above the normal requirements.

Solid waste could include incontinence pads, medicinal waste, used needles and sharps, pharmaceuticals, swabs, and wound dressings. These wastes will be separated into tamper-proof containers and collected and disposed of by appropriately licenced entities. Solid waste has been considered to include liquid medicines, as they cannot be disposed of to the sewer.

7.0 POWER & TELECOMMUNICATIONS

Extensive upgrades will be required as part of the wider development to enable servicing of the site. Internal power and telecommunications designs will be carried out during detailed design, including the design of any necessary streetlighting.

8.0 ROADING

Roading geometrics will be designed in accordance with the NTLDM, NZBC D1 and specific requests of the client. As the development is private, deviations from the NTLDM are considered acceptable.

The roading network across the site will comprise of “Roads” and “Precinct Accesses.” Standard cross-sections are shown in Figure 4 below.

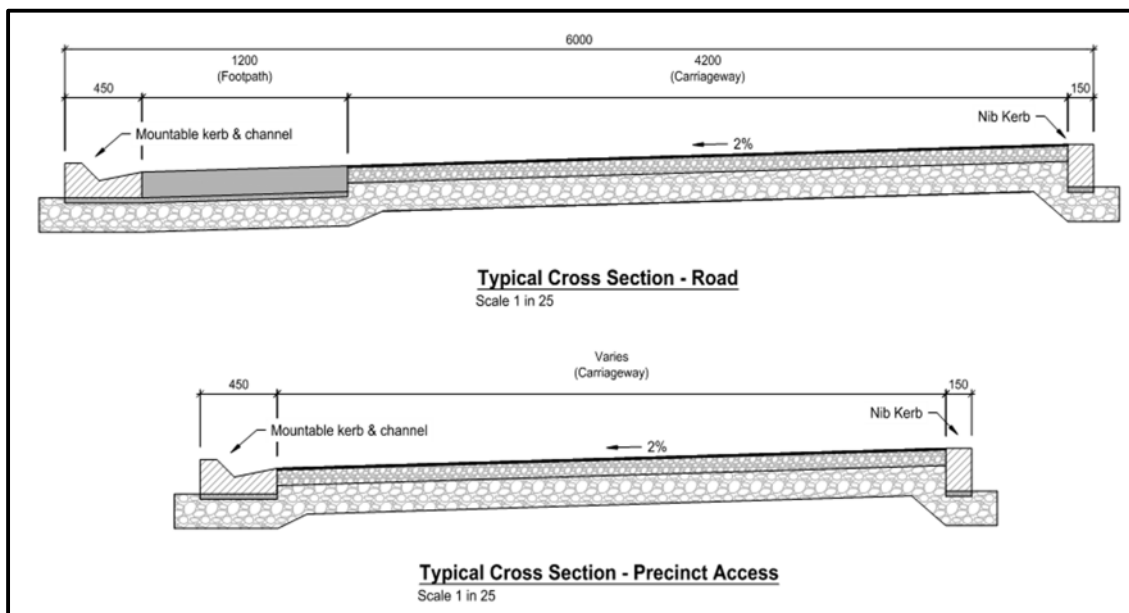


Figure 4: Typical Road Cross-Sections.

9.0 CONCLUSION

Davis Ogilvie & Partners Limited (DO) has been engaged by Arvida Group Limited (the client) to prepare a servicing report which outlines the servicing requirements to enable development of the site.

The site will be serviced by low-pressure sewer reticulation, potable water reticulation, and gravity stormwater reticulation, all of which will be designed in accordance with the Nelson Tasman Land Development Manual, New Zealand Building Code, relevant consent conditions, and engineering best practice. Stormwater treatment will be provided for all contaminant generating surfaces.

Internal power and telecommunications designs will be carried out during detailed design, including the design of any necessary streetlighting.