

1.0 INTRODUCTION

Cardno were commissioned by Villa World Ltd to undertake a hydraulic analysis to determine the water supply infrastructure required to provide a satisfactory water supply to the proposed development on Lot 9, DP1039569 and part of Lot 2, DP1000385 Fraser Drive, Tweed Heads South, which consists of approximately 168 residential allotments and 66 integrated housing dwellings.

2.0 BACKGROUND

The proposed project is situated at Tweed Heads South adjacent to Fraser Drive (Refer Cardno Figure No DA01 in Appendix A).

The development is supplied with water from the Terranora Reservoir via a 600mm diameter trunk main that runs down the eastern side of Fraser Drive. There are also existing 50mm and 100mm diameter mains running along the western side of Fraser Drive past the northern end of the site. A 200mm diameter main also runs along the western side of Fraser Drive, stopping approximately 100m north of the site. The development will not connect directly into the existing trunk main, but to smaller existing lines running from the 600mm diameter trunk main shown on Cardno Figure No DA23 (Appendix A) and listed below:

- 150mm diameter main in Merlot Ct at the southern boundary
- 200mm diameter main in Fraser Dr, to the north of the site
- 100mm diameter main in Ocean Ave, at the western boundary
- 100mm diameter main in Hillcrest Avenue, at the western boundary

This servicing of the site is compliant with previous requests from council, with the exception of the Fraser Drive connection. Council's previous request was to connect the development into an existing watermain to the north of the site, but access to this connection is un-available due to new development in the area. Instead it is proposed to extend the existing 200mm diameter main south along Fraser Drive to connect into the northern end of the development.

3.0 DESIGN CRITERIA

The design criteria adopted for the study area are outlined below. The design criteria have been derived from the Tweed Shire Council's "Development Design Specification – D11" (Tweed Shire Council, 2004), NSW "Water Supply Investigation Manual" (NSW Public Works, 1986) and various communications with Tweed Shire Council Officers.

Unit Consumption and Peaking Factors

- | | |
|--|----------------|
| • Peak Daily Demand | = 850 L/EP/day |
| • Occupancy Ratio | = 3.2 EP/ET |
| • Peak Instantaneous Demand (PID)
(Based on developments < 1000 ET) | = 0.15 L/s/ET |

Fire Fighting

- Fire Flow 1 = 11 L/s
(for common residential buildings)
- Fire Flow 2 = 22 L/s
(for shops, restaurants, hotels and motels,
considered to include resorts)
- Minimum allowable pressure at fire flow and PID = 118 kPa (12 m)

Residential Pressures

- Minimum allowable pressure = 200 kPa (20 m)
- Maximum allowable pressure = 780 kPa (78 m)

Hazen-Williams Coefficient

The following Hazen Williams Roughness Coefficient were adopted for this study assuming all pipes were made of DICL.

Nominal Diameter (mm)	Roughness Coefficient (C)
100-150	100
>150-250	110

4.0 DEVELOPMENT POPULATION AND FLOW

The population and flow projections for the water supply investigation were developed from the total number of proposed allotments in the development (refer Cardno Figure No DA03, Appendix A). Each allotment has been assigned an ET value based on the land use (refer to Table 4.1 for adopted ET for each land use type).

TABLE 4.1 ET Adopted For each Land Use Type

Land Use Type	Adopted ET Ratio
Residential Allotment	1 ET/lot
Integrated Housing (3 Bedroom)	1 ET/dwelling

Table 4.2 illustrates the population projections in calculated ET's and projected flows. Refer to Appendix A for detailed demands.

TABLE 4.2 Estimated Development Population and Flow

Population (ET)	Residential Allotments	168
	Integrated Housing (3 bedroom)	66
Demand (L/S)	Peak Daily Demand (L/s) ₁	7.37
	Peak Daily Demand (kL/d) ₁	636
	Peak Instantaneous Demand (L/s) ₂	35.1

1 – derived from 850 L/EP/day and 3.2EP/ET from TSC's Development Specification D11

2 – derived from PID of 0.15 L/ET/s from TSC's Development Specification D11

5.0 WATER RETICULATION NETWORK

The proposed water reticulation mains within the area to be serviced are sized to provide a water supply to the proposed development meeting Tweed Shire Council's Standards of Services, including the relevant fire flow requirements.

The proposed reticulation mains within the study area will comprise 63mm, 100 mm and 150mm diameter water pipes, arranged in looped configurations where practical, to ensure pressures are relatively uniform throughout the areas serviced and to provide a cost effective network.

The proposed water main infrastructure is shown in Cardno Figure No DA23 in Appendix A. The proposed reticulation network had been sent to council for approval. As the proposed development is surrounded by a network of existing trunk water mains, it is envisaged that the site demand can be adequately catered for.

If requested by Council, a water analysis of the development will be carried out during the detailed design stage of the development.

APPENDIX A

FIGURES AND SKETCHES

Cardno Figure No DA01
Cardno Figure No DA03
Cardno Figure No DA23

Site Plan
Lot Layout and Stage Plan
Proposed Water Reticulation Network

