



Hydraulic Services Due Diligence Report

Castle Ridge Retirement Village Redevelopment

350 Old Northern Road, Castle Hill NSW 2154

DUE DILIGENCE

PREPARED FOR

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DUE DILIGENCE REPORT

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1. EXISTING INFRASTRUCTURE

Northrop has performed non-invasive investigations in regards to the existing site conditions and additional loading from the proposed retirement village redevelopment onto the existing utility infrastructure available for connection to the site.

The purpose of this report is to;

- Identify utility confirmation for the subject site;
- Assist the client in determining the available infrastructure to support the loads from the proposed retirement village redevelopment;
- Provide a high level budget estimate for the development.

1.1 Limitations and Exclusions

The limitations and exclusions of this report are as follows:

- The following assessment is based upon review of Dial Before You Dig documentation, the Masterplan prepared by Architectus and visual inspection of the site infrastructure. The site inspection was conducted on the 5th February 2016;
- Underground routes have been determined with the use of information available from sources such as dial before you dig and the documentation provided by the client;
- The calculations found in this report are based on the conceptual plans provided by the client.

1.2 Approvals

- Northrop has not made any applications to authorities such as service connection applications;
- No liaison with the local fire brigade has been sought.

2. EXISTING UTILITY INFRASTRUCTURE

2.1 Sydney Water Sewer Infrastructure

The development has access to the following Sydney Water sewer mains:

- DN150 reticulation gravity sewer main traversing the site as depicted in Appendix A.

2.1.1 Sewage Generation

Preliminary sewage generation rates have been estimated in accordance with the Sewerage Code of Australia - Sydney Water Edition, WSA-02-2002 (2009).

Table 1.1.1 Equivalent Populations for Synchronous Discharges			
Classification	Unit	EP per Unit	Remarks
Commercial/ Special Cases			
Hospitals and Nursing Homes	Available Beds	3.4	Includes staff quarters.

Table 1.1.2 Sewage Generation Estimates for Study Area					
Lot Yield	EP ¹	ADWF (kL/d) ²	ADWF (L/s) ³	PDWF 'd' Factor ⁴	PDWF (L/s) ⁵
297	1009.8	181.76	2.12	2	4.24

Notes:

1. Based on 3.4 EP per room.
2. Average Dry Weather Flow (ADWF) based on 180 L/EP/day.
3. Based on 0.0021 L/s / EP.
4. Peak Dry Weather Flow (PDWF) from Figure B.1 of SW ed. WSA 02-2002-2.2.
5. ADWF x d Factor.

2.1.2 EP Capacity Limitations for Reticulation Sewers

Pipe Size (DN)	Maximum Allowable EP
150	600
225	1,600
300	3,200

2.2 Sydney Water Potable Water Infrastructure

The development has access to the following Sydney Water potable water mains:

- DN150 CICL distribution water main located within Old Northern Road;
- DN100 PVC-U distribution water main located within Palisander Place.

The following minimum infrastructure pipe diameters have been established by Sydney Water to ensure adequate flow rates and residual pressures. Given the expected height of a number of buildings being six stories in height, connection to the DN150 water main in Old Northern Road will be required.

Minimum Pipe Sizes for Particular Developments		
Zoning/Development	Zoning/Development	
	Cast Iron / Others	Steel and PE Only
Low and Medium Density Residential	100	125
High Density Residential (≥ 4 storeys)	150	180
Multiple Developments of High Density Residential (≥ 8 storeys)	200 or 225	250 or 280
Industrial or Commercial	150	180

2.2.1 Potable Water Demand

Preliminary water demand rates have been estimated in accordance with the Water Supply Code of Australia – Sydney Water Edition, WSA 03-2011-3.1 (2012).

Table 1.2.1 Area Based Default Demand Rates for Planning Water Supply Systems			
Zoning	Max Day Demand Rate	Ratio Max Hour / Max Day	Ratio Max Day / Average Day
Commercial/ Special Cases			
Hospitals and Nursing Homes	0.8 kL / Dwelling / Day	2.0	1.9

Table 4.1.3.1 Potable Water Demand Estimates for Study Area				
Lot Yield	Total Area (ha) ¹	PDD (kL/d) ²	ADD (kL/d) ³	PSD (L/s) ⁴
297	39.14	237.60	125.05	16.76

Notes:

1. Based on site survey information.
2. Peak Day Demand (PDD) based on 0.8 kL/dwelling/d for hospitals and nursing homes (Table 2.1 SW ed. WSA 03-2011-3.1).
3. Average Day Demand (ADD) based on Max day / Ave day = 1.9.
4. Probable Simultaneous Demand (PSD) based on Table 3.2.3 AS/NZS 3500.1.

2.2.2 Fire Services Demand

Fire Hydrant Service				
Largest Fire Compartment	Building Class	No. of Hydrants Operating Simultaneously	Flow Rate	Supply Size
Approx. 1,300m ²	9c (Aged Care)	2	20L/sec	Ø150

Fire Sprinkler Service

Largest Fire Compartment	Building Class	Hazard Classification	Flow Rate	Supply Size
Approx. 1,300m ²	9c (Aged Care)	Light Hazard	6L/sec	Ø100

- No discussions with relevant authorities have been conducted;
- Proposed retirement village redevelopment is subject to local authority requirements.

2.3 Jemena Natural Gas Infrastructure

The development has access to the following Jemena natural gas mains:

- DN32 210kPa natural gas main located within Palisander Place Road;
- DN50 210kPa natural gas main located within Old Northern Road;
- DN160 210kPa natural gas main located within Old Northern Road.

2.3.1 Natural Gas Demand

Natural Gas			
No. of Beds	Approx. Demand per Bed	Assumed Index Length	Supply Size Required
Hot water plant, kitchens, serveries etc.	2,000MJ/hr*	120m	Ø65

- No discussions with relevant authorities have been conducted;
- Proposed retirement village redevelopment is subject to local authority requirements.

3. RISK ASSESSMENT

3.1 Sewer Supply

Based on the demand calculations provided in Section 2, the existing sewer mains in close proximity to the site is anticipated to have sufficient capacity to service the proposed retirement village redevelopment. Based on the concept design sketches provided, relocation or concrete encasement of these sewer mains is anticipated due to the extent of sewer mains traversing the site. Refer to Appendix A for approximate location.

The final site servicing strategy will be subject to assessment and approval by Sydney Water through a Section 73 application.

3.2 Potable Cold Water Supply

Based on the demand calculations provided in Section 2, the existing DN150 water main within Old Northern Road is anticipated to have sufficient capacity to service the proposed retirement village development. Based on the concept design sketches provided, relocation, or upgrade works of these water mains is not anticipated as no utility water main assets have been identified as traversing the site.

The final site servicing strategy will be subject to assessment and approval by Sydney Water through a Section 73 application.

3.3 Fire Hydrant and Sprinkler Service

New fire hydrant and fire sprinkler systems will be installed to service the proposed retirement village development. Location of the brigade booster assembly is subject to achieving the following criteria:

- Located within sight of the nominated main entrance to the building;
- With direct and unrestricted access from the street;
- Within 8 meters of a hardstand/road – no dead end road permitted;
- Not less than 10 meters from any high voltage electrical distribution equipment i.e. transformers, substation etc.;
- Not obstructed by obstacles such as stored goods, vehicles, vegetation etc.;
- If within or affixed to a building, the booster assembly is to be separated by a fire rated wall with FRL 90/90/90 measuring 4.5 m wide x 4.02 m high.

Pressure pumps are anticipated, however, storage tank requirements are yet to be confirmed and are subject to further design development and assessment of current capacity of Sydney Water's infrastructure.

3.4 Natural Gas Supply

The existing natural gas mains located within Old Northern Road are anticipated to have sufficient capacity to service the proposed retirement village redevelopment.

The final site servicing strategy will be subject to assessment and approval by Jemena through a connection application.

4. BUDGET ESTIMATE

4.1 Use of Estimates and Budgetary Advice

This is a Class 5 estimate as described in AACE International Recommended Practice No. 18R-97: 'Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries'. An extract from 18R-97 follows:

ESTIMATE CLASS	Primary Characteristic	Secondary Characteristic			
	LEVEL OF PROJECT DEFINITION Expressed as % of complete definition	END USAGE Typical purpose of estimate	METHODOLOGY Typical estimating method	EXPECTED ACCURACY RANGE Typical variation in low and high ranges [a]	PREPARATION EFFORT Typical degree of effort relative to least cost index of 1 [b]
Class 5	0% to 2%	Concept Screening	Capacity Factored, Parametric Models, Judgment, or Analogy	L: -20% to -50% H: +30% to +100%	1
Class 4	1% to 15%	Study or Feasibility	Equipment Factored or Parametric Models	L: -15% to -30% H: +20% to +50%	2 to 4
Class 3	10% to 40%	Budget, Authorization, or Control	Semi-Detailed Unit Costs with Assembly Level Line Items	L: -10% to -20% H: +10% to +30%	3 to 10
Class 2	30% to 70%	Control or Bid/Tender	Detailed Unit Cost with Forced Detailed Take-Off	L: -5% to -15% H: +5% to +20%	4 to 20
Class 1	50% to 100%	Check Estimate or Bid/Tender	Detailed Unit Cost with Detailed Take-Off	L: -3% to -10% H: +3% to +15%	5 to 100

Notes: [a] The state of process technology and availability of applicable reference cost data affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.
[b] If the range index value of "1" represents 0.005% of project costs, then an index value of 100 represents 0.5%. Estimate preparation effort is highly dependent upon the size of the project and the quality of estimating data and tools.

In providing budgetary advice, Northrop Consulting Engineers has exercised the skill, care and diligence of a Consulting Engineer experienced in the relevant discipline. The advice given is for a specific project, by a specific client for a specific purpose. It is a condition of the use of this budgetary advice that it will not be used for any purpose other than the specified project, client and purpose as shown below:

Project Name:	Castle Ridge Retirement Village Redevelopment	Client:	Stockland
End Usage:	Concept Screening	Estimate Class:	5

Northrop Consulting Engineers does not provide Class 1 or Class 2 estimates. Where these classes of estimates are required, we recommend engagement of a specialist Quantity Surveyor with experience in the specific type of project.

Budget Estimate			
	Units	Rate	Amount
General Areas (Approximates)	sqm		
Carpark and General Areas	24,000	\$200.00	\$4,800,000.00
External / Landscape areas	2,500	\$50.00	\$125,000.00
Club	2,321	\$200.00	\$464,200.00
Independent Living Units	Quantity		
Independent Living Units	297	\$12,500.00	\$3,712,500.00
Other Areas	Quantity		
External	1	\$40,000.00	\$40,000.00
Decommissioning Works	1	\$80,000.00	\$80,000.00
Cold Water Supply Connection	1	\$20,000.00	\$20,000.00
Natural Gas Supply Connection	1	\$20,000.00	\$20,000.00
Sewer Drainage Connection	1	\$20,000.00	\$20,000.00
Hydrant/Sprinkler Booster Assembly	1	\$10,000.00	\$10,000.00
Fire Hydrant and Fire Sprinkler Pressure Pumpsets	2	\$40,000.00	\$80,000.00
Contingency			15%
Total			\$9,317,700.00

4.2 Disclaimer

- The above prices are based on industry knowledge, RLB's Rider Digest 2016, and Rawlinson's Australian Construction Handbook 2016, reflecting an objective view of industry prices. It should be noted that Northrop Consulting Engineers are not quantity surveyors;
- Allowances where otherwise unknown, have been extracted from documentation detailing typical allowances and requirements based on similar developments;
- Northrop Consulting Engineers reserves the right to adjust the above figures based on further developed documentation and information for the project;
- This budget estimate has been provided in assistance with the client to offer a broad understanding of the scope and cost of works at this stage. At no given time shall Northrop Consulting Engineers assume responsibility of market figures;
- The above figures shall be treated only as a guideline and is subject to change with further development of design;
- It is assumed that the above costs will be subject to tenderers and market value. These figures have been produced as a means of advice and not subject to cost comparison throughout any stage of this development;
- We understand the client and all relevant parties have read through the provided figures and information as part of this disclaimer and will not object the rights and responsibilities set out by Northrop Consulting Engineers.

Assumptions

- Assumed all buildings will be constructed in a single stage, no allowances have been made for staging/phasing of buildings.

Exclusions

- Sanitary fixtures and fittings;
- Professional fees;
- Local authority contributions;
- Escalation of construction prices from date of budget estimate to date of tender;
- Contingency;
- Builders works;
- GST;
- Authority fees and charges;
- Demolition works;
- Reinstatement of surfaces;
- Temporary services and connections;
- Latent conditions, unspecified heritage works and the like;
- Upgrade and/or augmentation of existing utility or private inground services;
- Special site conditions;
- Rock excavation;
- Services not included in the above budget estimate.

5. APPENDIX A – SYDNEY WATER INFRASTRUCTURE



