Figure 3.1 – Council GIS Plot

Theoretical water network modelling has been performed to assess the capacity of the existing reticulation network. The modelling was undertaken using the Council's WaterGEMS network model for both the peak hour demands and fire flows.

The WaterGEMS network modelling results with the inclusion of the water demands from the proposed development shows:

- The existing DN300 AC water main along Ross River Rd frontage of the development site is shown to be adequately sized to service the development with peak hour and fire flows.
- The peak hour pressures at 6:30 pm (ie the peak residential demand period) are reduced to 376 kPa. This meets the minimum pressure requirement of 220 kPa.
- The velocity along the DN300 PVC water main for peak hour demands is up to 0.37 m/s. This achieves the CTM Code standard of being less than 2.5 m/s. The headloss gradient along the existing DN300 PVC water main is up to 0.001 m/m. These meet the requirements of being less than 0.005 m/m.
- With the inclusion of the 15 l/s "Residential" fire flow the water pressures are reduced to 363 kPa within the water main. This is the pressure at 6:30 pm and is concurrent with the peak residential demand period and meets the minimum pressure requirement of 120 kPa.
- The velocity along the DN300 PVC reticulation main on the Ross River Rd frontage of the development site with the including of the 15 l/s residential fire flow is up to 0.52 m/s. This velocity is well within the CTM Code standard of a maximum of 4.0 m/s for fire flows.
- The WaterGEMS figure and results table are provided in Appendix B.

The above theoretical water network modelling shows that the proposed development is able to be serviced with a reticulated water supply that meets Council's standards with no upgrades required.

The following figure illustrates the peak hour demands and residual water pressure at the proposed residential unit development site.

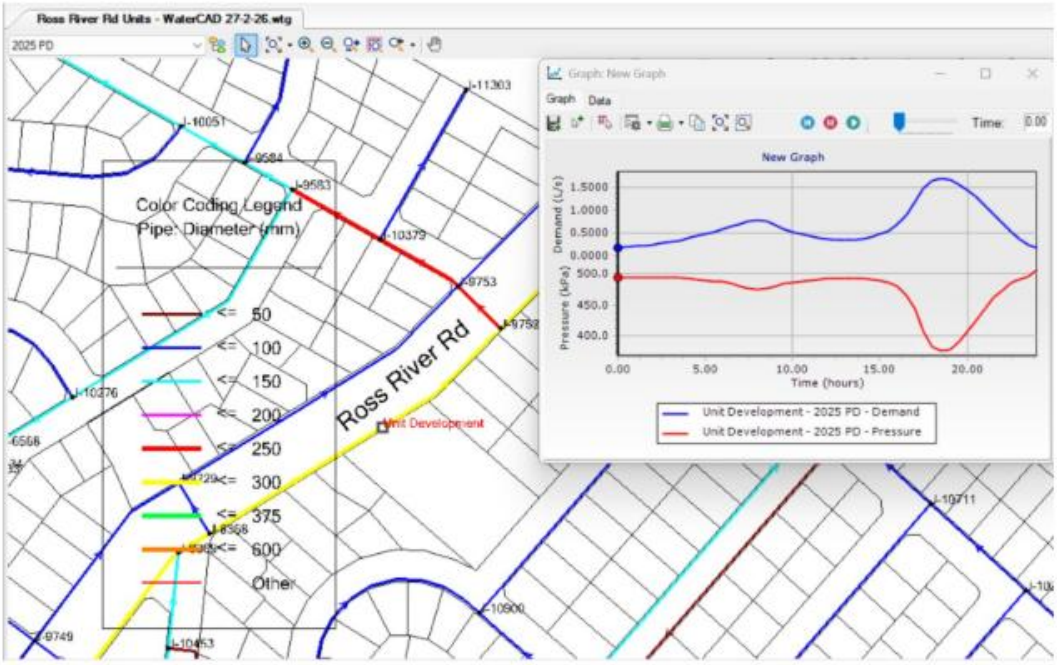


Figure 3.2 – Peak Hour Water Demand & Pressures

The following figure illustrates the water pressure at the development site with the inclusion of the 15 l/s residential fire flows.

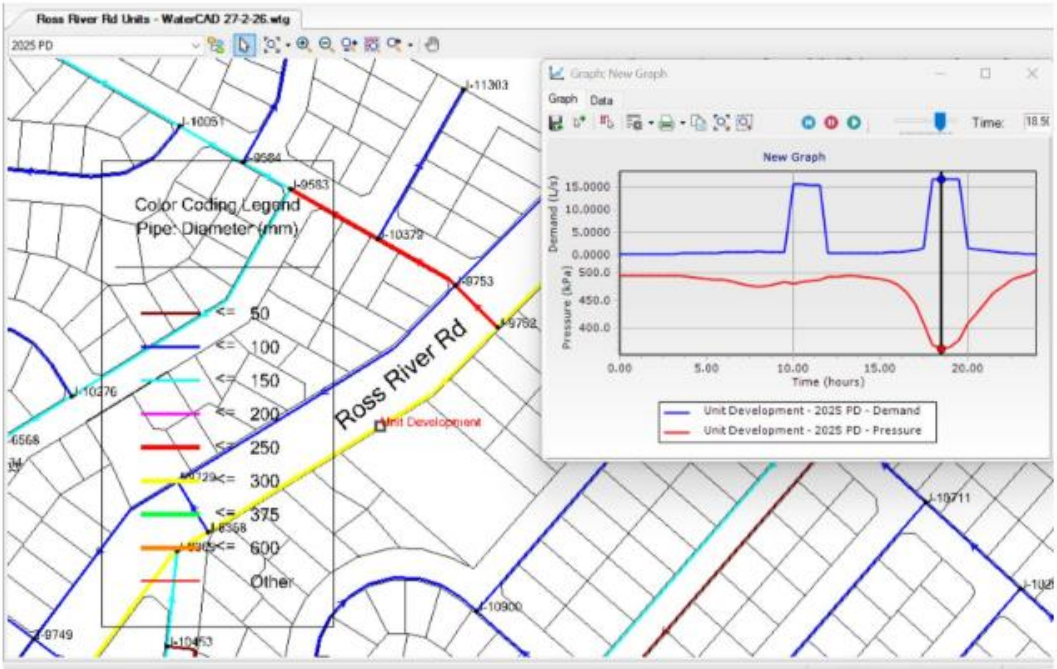


Figure 3.3 – Residential Fire Flow Water Demand & Pressures

4 SEWAGE SYSTEM PLANNING

The existing site for the proposed residential unit development is currently serviced with a reticulated gravity sewer system. The existing gravity sewer system consists of:

- A DN150 AC sewer is located on the north eastern boundary of the development site. Existing MH 3/L1A1C is located on the DN150 AC sewer and within the development site. The DN150 sewer extends to the north east to MH 5/L1A1.
- The sewer increases to a DN300 sewer which extends to the north east (parallel to Ross River Rd) through to PS L1A (Barellan) that is located opposite the intersection of Jandera St and Barellan St. PS L1A pumps sewage to the east to discharge into a trunk sewer in the catchment of PS L14A.

Figure 4.1 below is a plot from the Council GIS that illustrates the existing DN150 & DN300 sewer system that services the development site. The capacity of the existing sewer system is provided in the following report sections.

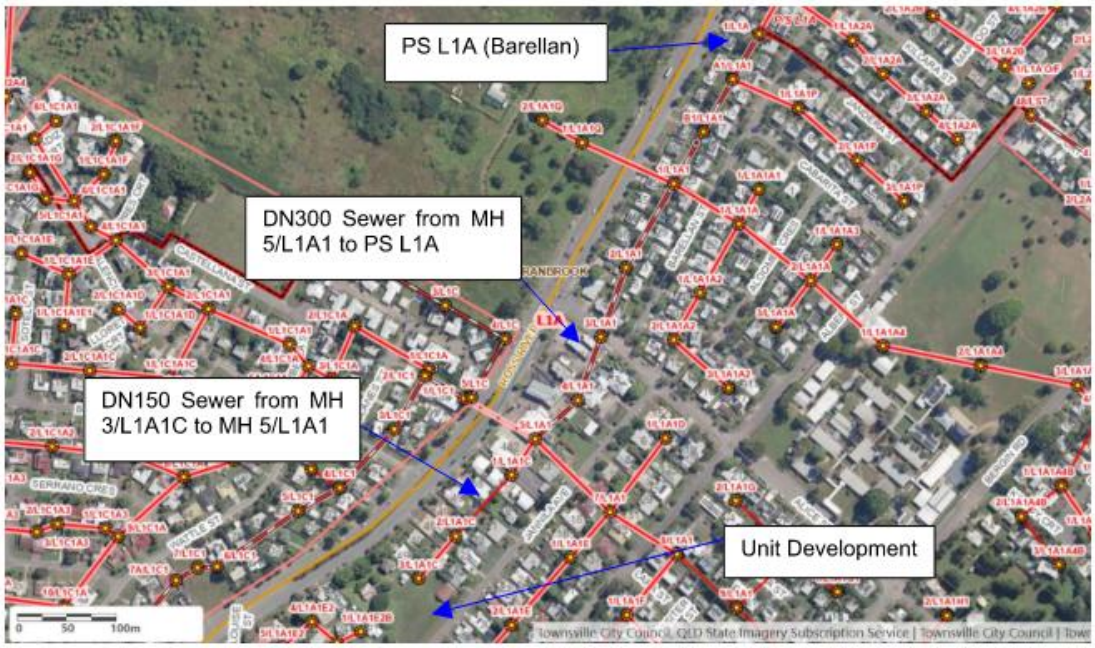


Figure 4.1 – GIS Plot of Existing Sewer System

The capacity and performance of the existing gravity sewer system to service the unit development is provided in the following section.

4.1 Sewage Infrastructure Capacity

The capacity of the existing gravity sewer system to cater for the proposed residential unit development was assessed using the SewerGEMS model developed for the Louisa suburbs of Townsville.

The SewerGEMS model includes the existing reticulation and trunk gravity sewer system from the development site through to existing PS L1A (Barellan St). The additional residential equivalent population has been added to MH 3/L1A1C which is located within the proposed development site.

The additional residential equivalent population loading on MH 3/L1A1C is illustrated in the extract from the SewerGEMS model on Figure 4.2 below.

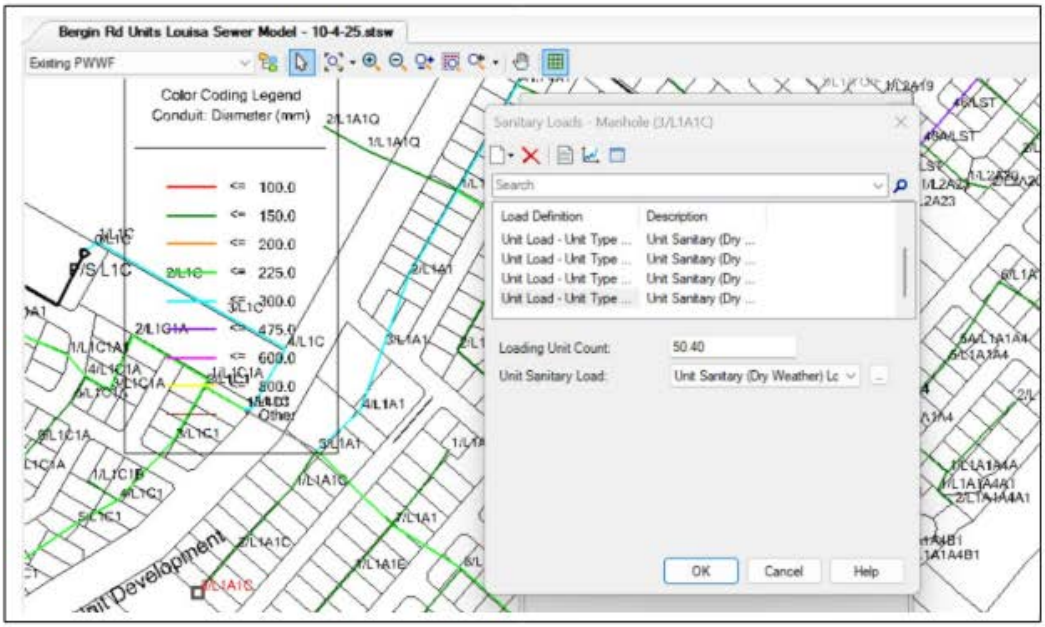


Figure 4.2 – Additional Residential Loading on MH 3/L1A1C

With the inclusion of the additional equivalent population loading on the existing gravity sewer system, the SewerGEMS model has illustrated:

- The existing DN150 sewer from MH 3/L1A1C to MH 5/L1A1 (being the reticulation gravity sewer that will service the development site) flows up to 21% full for the peak wet weather flows.
- The existing DN300 sewer from MH 5/L1A1 to MH 1/L1A (being the trunk sewer that runs to the north-east near Ross River Rd) flows up to 46% full for the peak wet weather flows.
- The final section is an existing DN300 trunk sewer that runs from MH 1/L1A into PS L1A flows up to 41% full for the peak wet weather flows.
- All the existing sewers easily flow less than 75% full which is the maximum value allowable in the CTM code.

The following Figure 4.3 provides the flows and performance of the existing gravity sewer system with the inclusion of the additional loading from the proposed residential unit development. A larger version of the modelling results is provided in Appendix C.

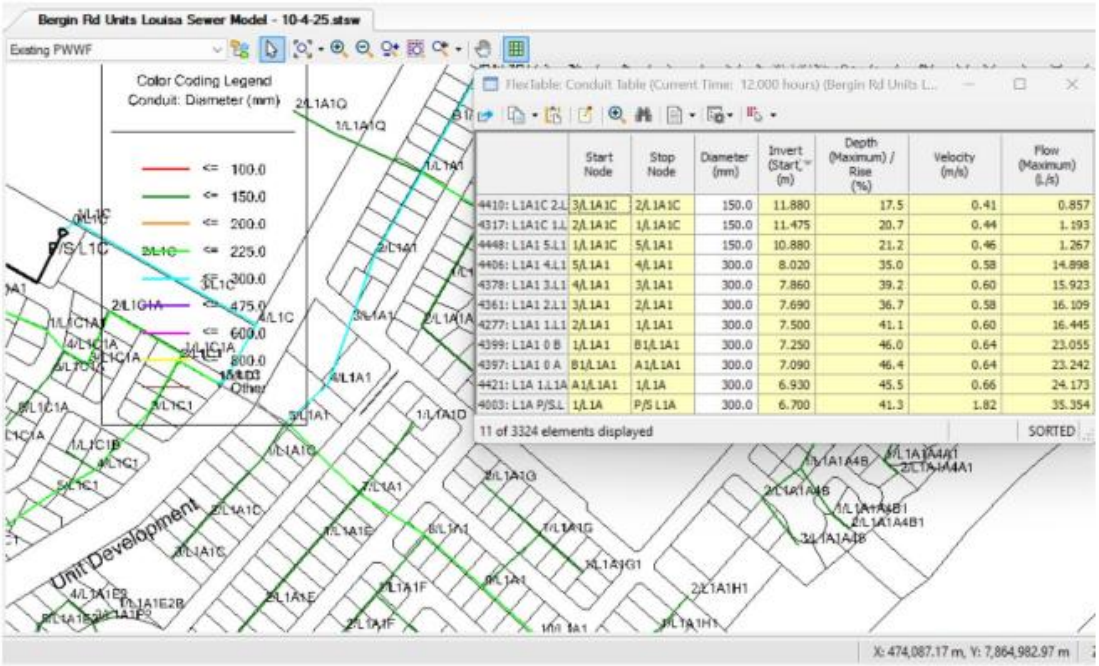


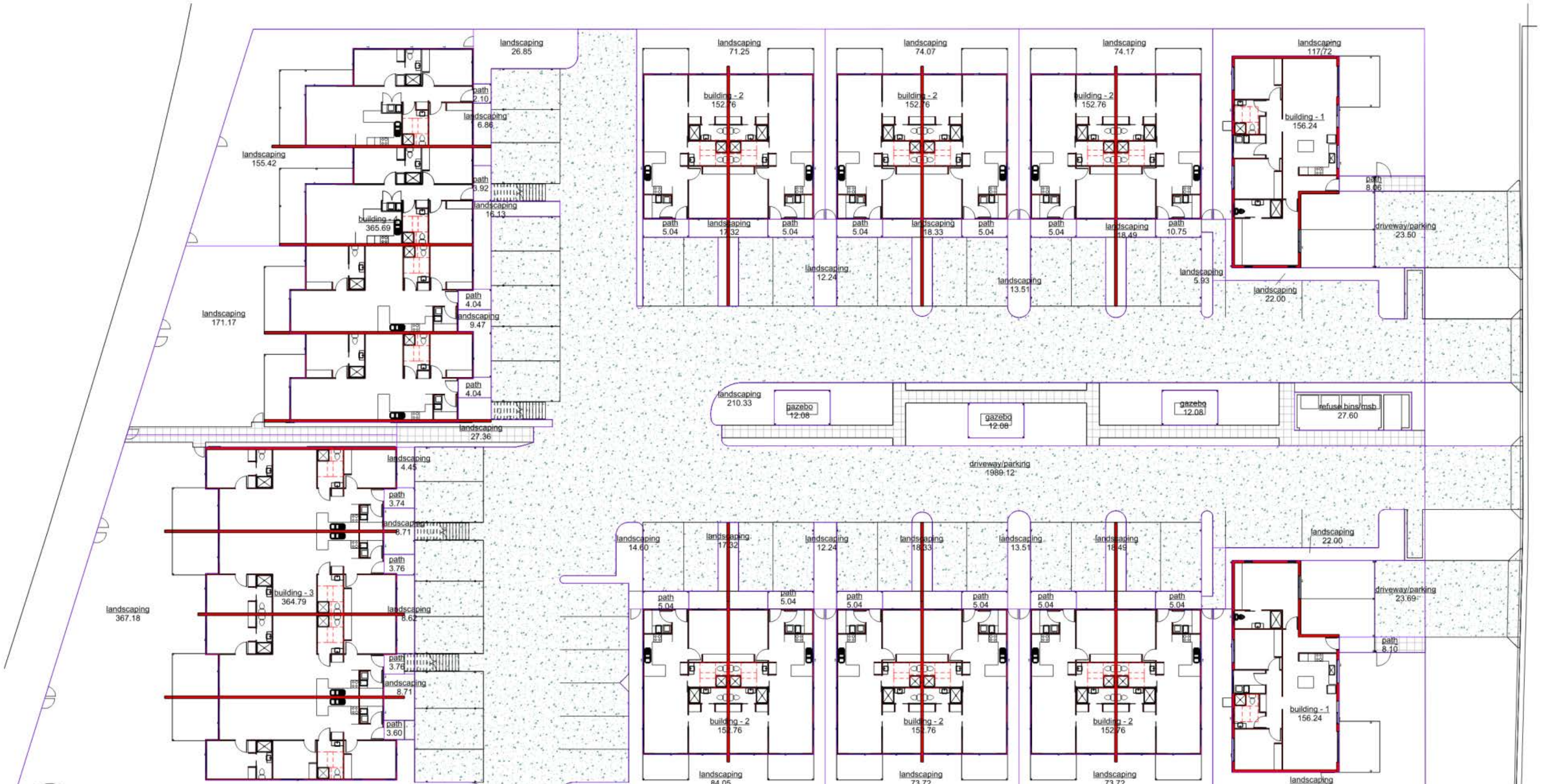
Figure 4.3 – SewerGEMS Modelling Results

The above assessment illustrates the existing gravity sewer system has sufficient capacity to cater for the proposed residential unit development at No 500 Ross River Rd, Cranbrook.

APPENDIX A
500 ROSS RIVER RD DEVELOPMENT PLANS

Gross Area Schedule

Count	Name	Area	%
building			
1	building - 1	156.24 m²	3%
1	building - 1	156.24 m²	3%
1	building - 2	152.76 m²	3%
1	building - 2	152.76 m²	3%
1	building - 2	152.76 m²	3%
1	building - 2	152.76 m²	3%
1	building - 2	152.76 m²	3%
1	building - 2	152.76 m²	3%
1	building - 3	364.79 m²	6%
1	building - 4	365.69 m²	6%
10		1959.52 m²	32%
hardstand			
1	driveway/parking	1989.12 m²	33%
1	driveway/parking	23.50 m²	0%
1	driveway/parking	23.69 m²	0%
1	path	4.04 m²	0%
1	path	4.04 m²	0%
1	path	2.10 m²	0%
1	path	5.04 m²	0%
1	path	5.04 m²	0%
1	path	5.04 m²	0%
1	path	8.06 m²	0%
1	path	5.04 m²	0%
1	path	3.60 m²	0%
1	path	3.76 m²	0%
1	path	3.76 m²	0%
1	path	3.74 m²	0%
1	path	3.92 m²	0%
1	path	5.04 m²	0%
1	path	5.04 m²	0%
1	path	5.04 m²	0%
1	path	5.04 m²	0%
1	path	5.04 m²	0%
1	path	10.75 m²	0%
1	path	5.04 m²	0%
1	path	5.04 m²	0%
1	path	8.10 m²	0%
1	refuse bins/msb	27.60 m²	0%
26		2175.22 m²	36%
landscape			
1	gazebo	12.08 m²	0%
1	gazebo	12.08 m²	0%
1	gazebo	12.08 m²	0%
1	landscaping	367.18 m²	6%
1	landscaping	171.17 m²	3%
1	landscaping	6.86 m²	0%
1	landscaping	16.13 m²	0%
1	landscaping	9.47 m²	0%
1	landscaping	27.36 m²	0%
1	landscaping	4.45 m²	0%
1	landscaping	8.71 m²	0%
1	landscaping	8.62 m²	0%
1	landscaping	8.71 m²	0%
1	landscaping	71.25 m²	1%
1	landscaping	74.07 m²	1%
1	landscaping	74.17 m²	1%
1	landscaping	117.72 m²	2%
1	landscaping	22.00 m²	0%
1	landscaping	18.49 m²	0%
1	landscaping	5.93 m²	0%
1	landscaping	13.51 m²	0%
1	landscaping	18.33 m²	0%
1	landscaping	12.24 m²	0%
1	landscaping	17.32 m²	0%
1	landscaping	210.33 m²	3%
1	landscaping	17.32 m²	0%
1	landscaping	14.60 m²	0%
1	landscaping	12.24 m²	0%
1	landscaping	18.33 m²	0%
1	landscaping	13.51 m²	0%
1	landscaping	18.49 m²	0%
1	landscaping	73.72 m²	1%
1	landscaping	73.72 m²	1%
1	landscaping	84.05 m²	1%
1	landscaping	117.71 m²	2%
1	landscaping	155.42 m²	3%
1	landscaping	26.85 m²	0%
1	landscaping	22.00 m²	0%
38		1968.23 m²	32%
74		6102.97 m²	100%



1 site area break down
1 : 150

sheet size = A1

Preliminary
not to be used for construction purposes

URBAN SPACE CONSULTING

RJG BUILDERS

NOTES:
THIS DRAWING IS ONLY INTENDED TO OBTAIN A LOCAL AUTHORITY BUILDING PERMIT.
COMPLY WITH ALL RELEVANT AUTHORITY REG. & BSA. FIGURED DIMENSIONS TO TAKE PRECEDENCE OVER SCALED MEASUREMENTS. VERIFY ALL ON SITE DIMENSIONS & LEVELS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.

Revision Schedule

No	Description	Date
1	revised site plans	23.07.20

concepts Building Design
tel: 07 4728 3228

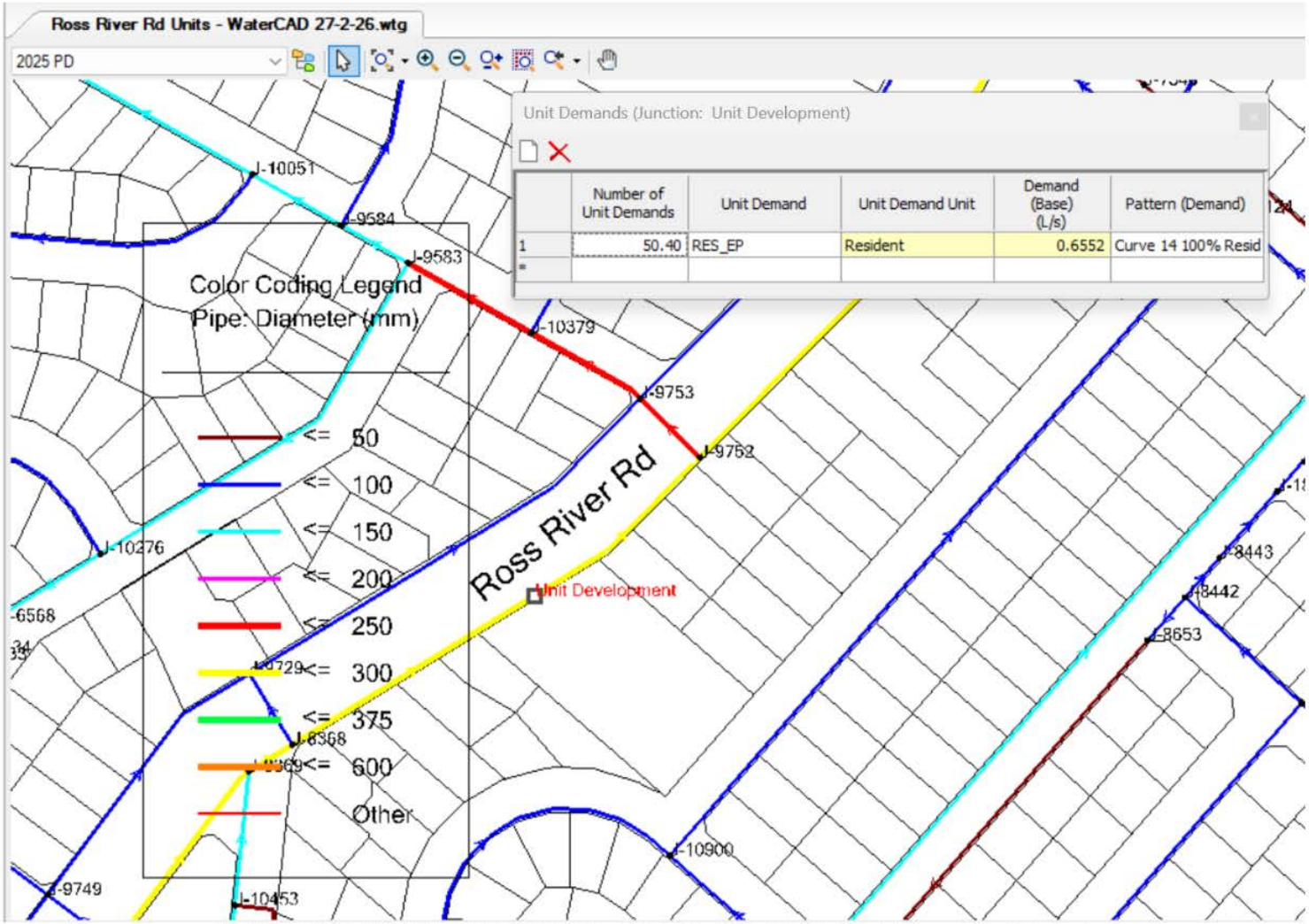
project:
Proposed Multiple Dwellings
for:
Kaenetto Invesments P/L
at:
500-505 Ross River Road
Cranbrook

Issue Date	11/20/07
Drawn	Author
scale	1 : 150
sheet	sk 03

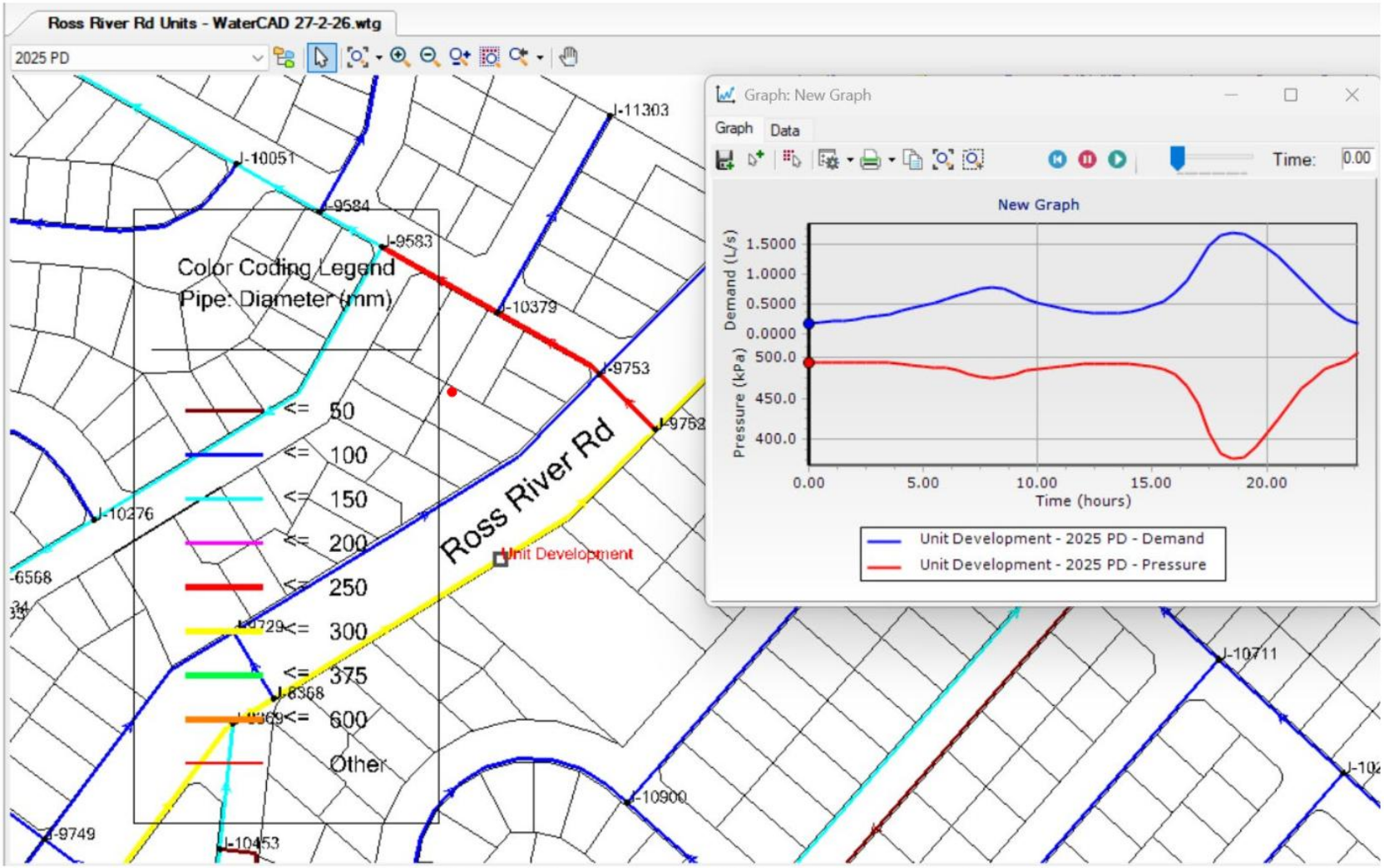
25-022

printed 9/02/2026 3:48:27 PM

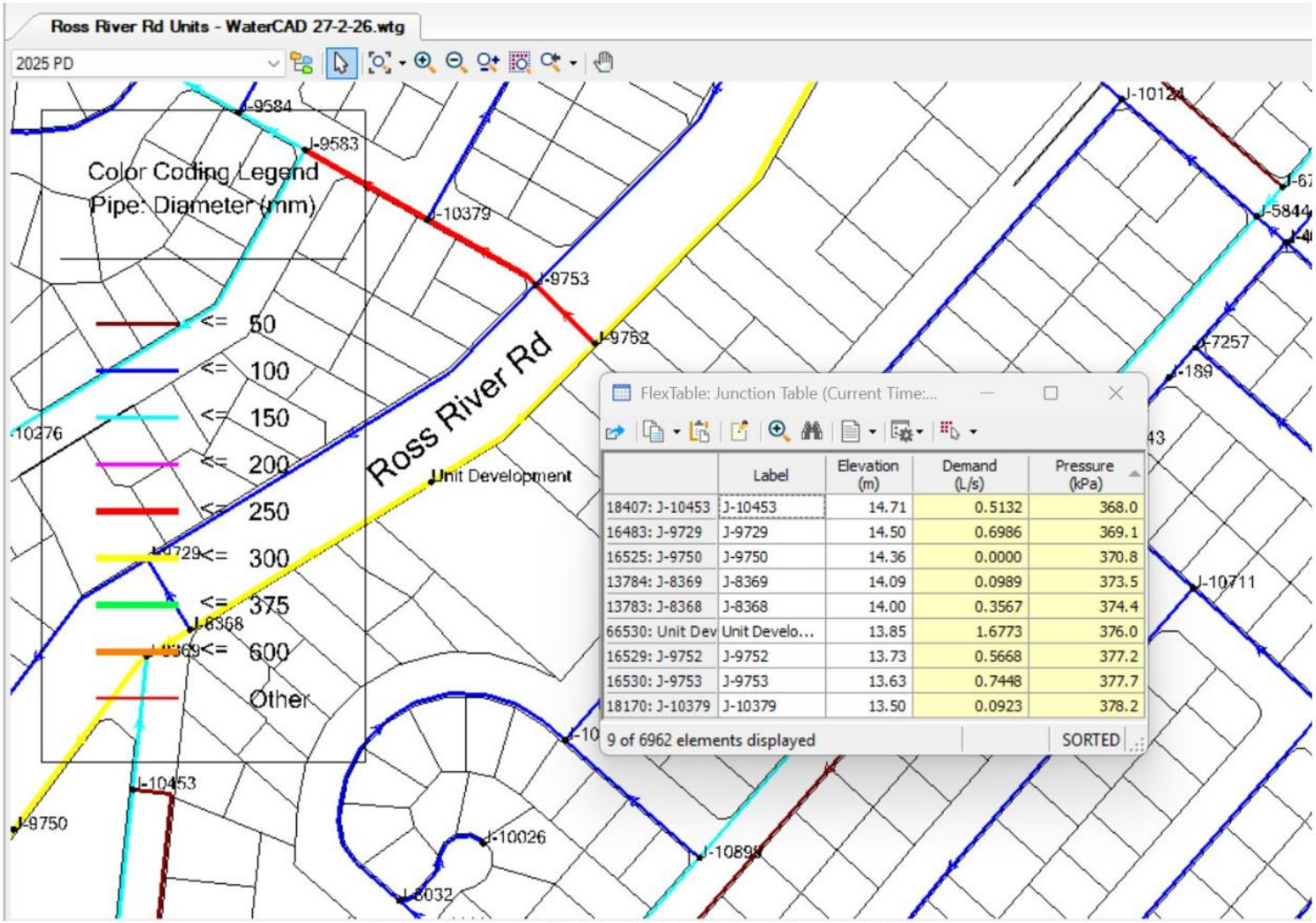
APPENDIX B
WATERGEMS MODELLING RESULTS



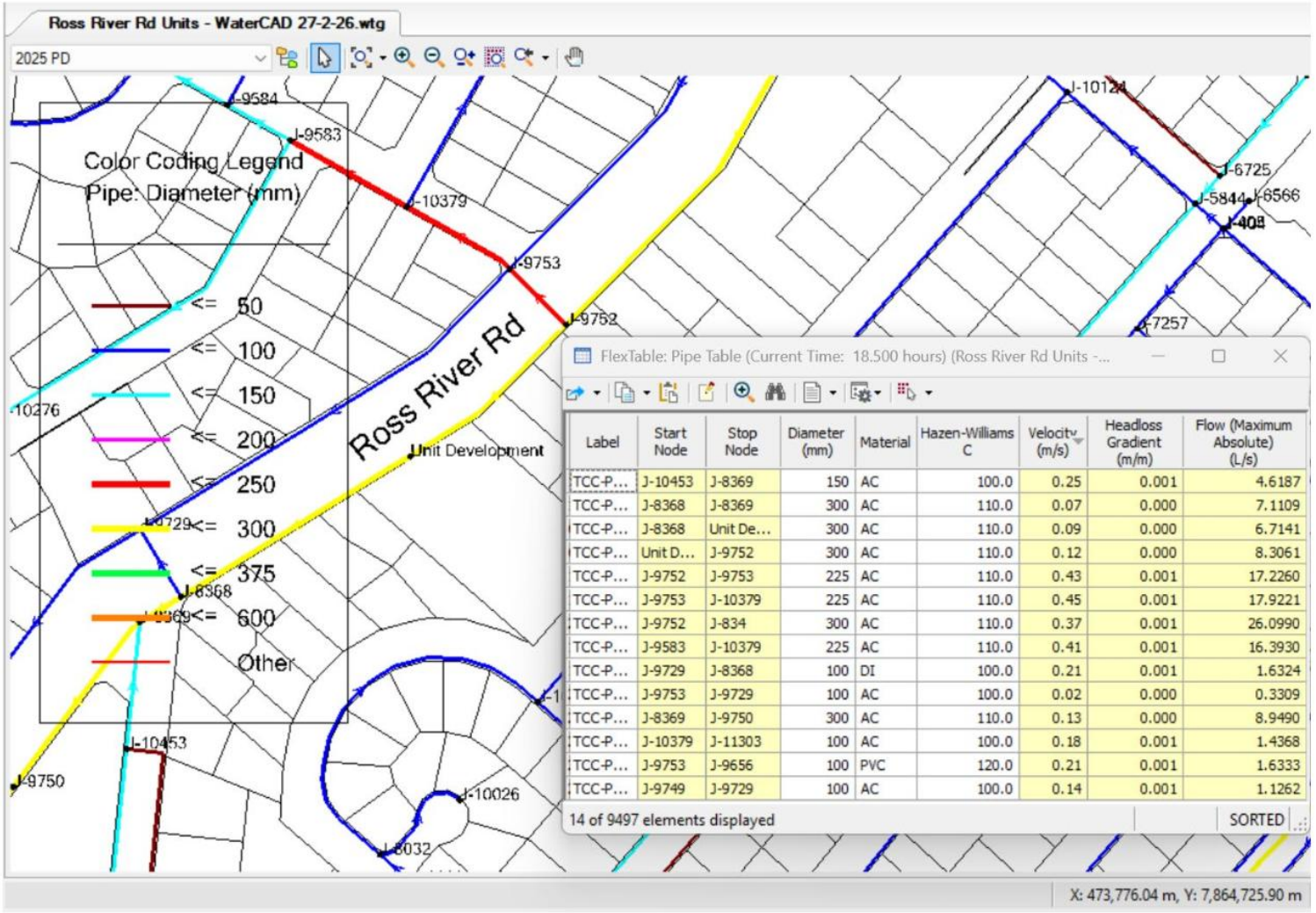
WATERGEMS Model With Residential Unit Water Demand Added



Peak Hour Pressure at Unit Development Node

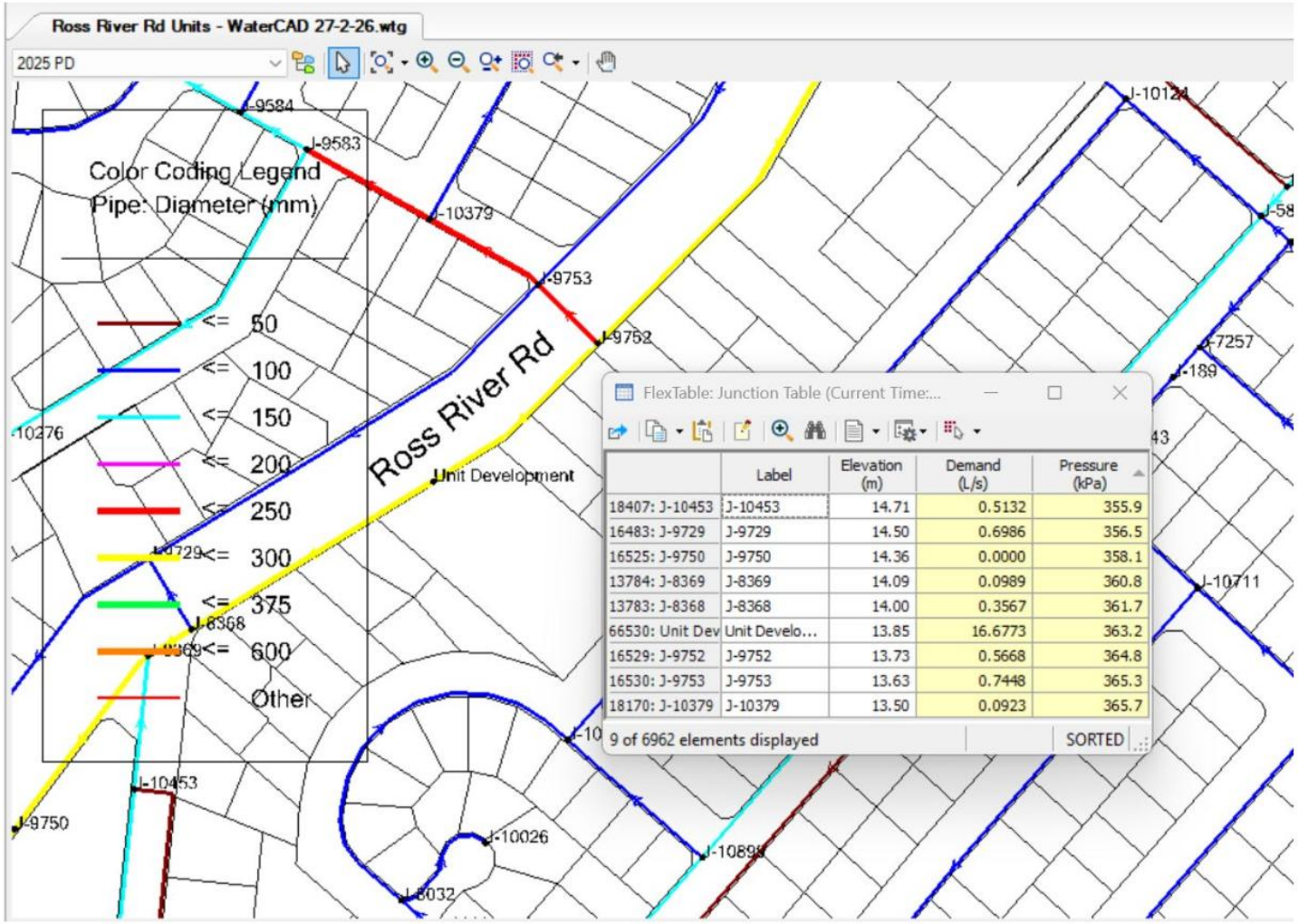


Peak Hour Node Modelling Results – 6:30 pm

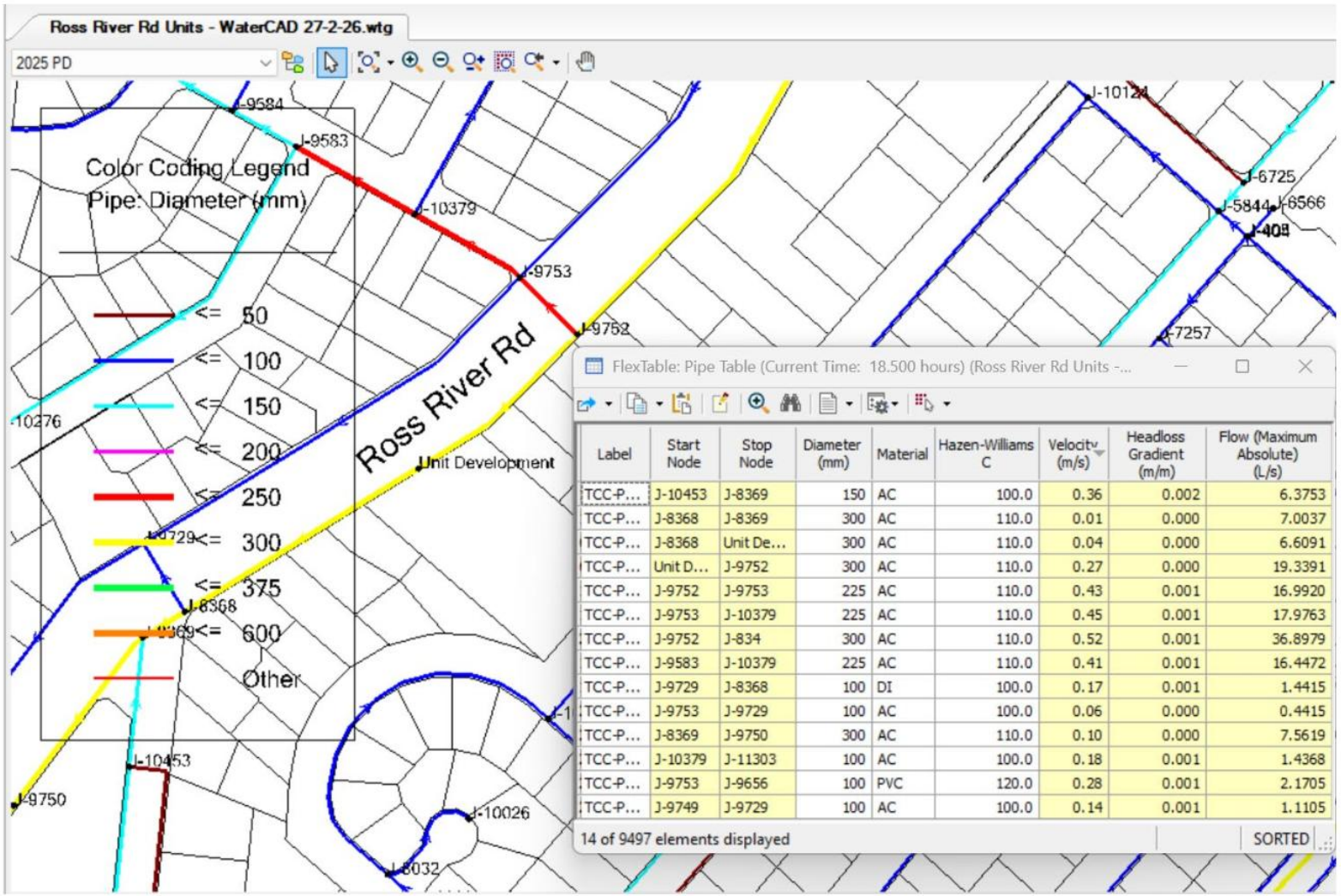


Label	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Velocity (m/s)	Headloss Gradient (m/m)	Flow (Maximum Absolute) (L/s)
TCC-P...	J-10453	J-8369	150	AC	100.0	0.25	0.001	4.6187
TCC-P...	J-8368	J-8369	300	AC	110.0	0.07	0.000	7.1109
TCC-P...	J-8368	Unit De...	300	AC	110.0	0.09	0.000	6.7141
TCC-P...	Unit D...	J-9752	300	AC	110.0	0.12	0.000	8.3061
TCC-P...	J-9752	J-9753	225	AC	110.0	0.43	0.001	17.2260
TCC-P...	J-9753	J-10379	225	AC	110.0	0.45	0.001	17.9221
TCC-P...	J-9752	J-834	300	AC	110.0	0.37	0.001	26.0990
TCC-P...	J-9583	J-10379	225	AC	110.0	0.41	0.001	16.3930
TCC-P...	J-9729	J-8368	100	DI	100.0	0.21	0.001	1.6324
TCC-P...	J-9753	J-9729	100	AC	100.0	0.02	0.000	0.3309
TCC-P...	J-8369	J-9750	300	AC	110.0	0.13	0.000	8.9490
TCC-P...	J-10379	J-11303	100	AC	100.0	0.18	0.001	1.4368
TCC-P...	J-9753	J-9656	100	PVC	120.0	0.21	0.001	1.6333
TCC-P...	J-9749	J-9729	100	AC	100.0	0.14	0.001	1.1262

Peak Hour Pipes Modelling Results – 6:30 pm



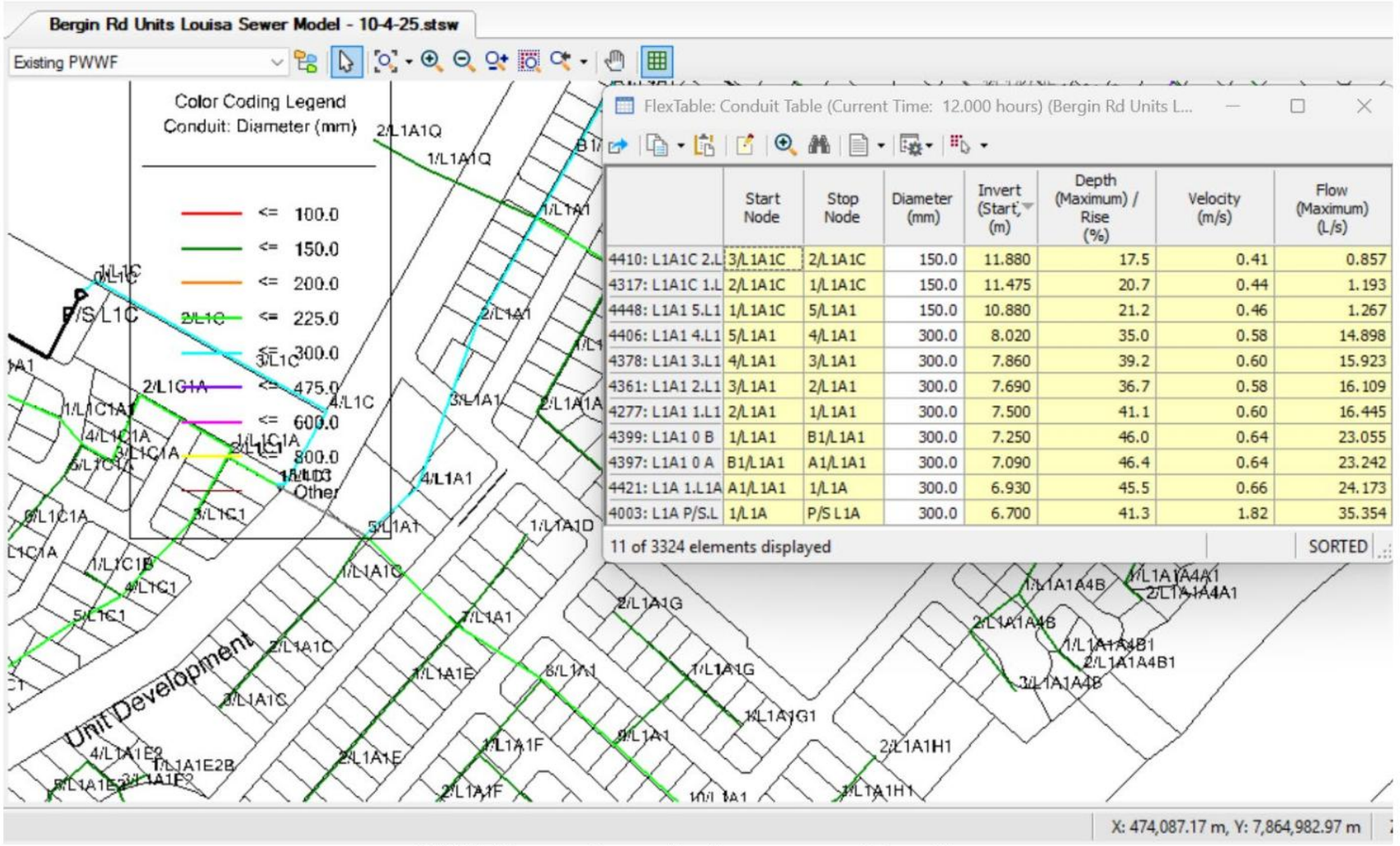
Peak Hour Node + 15 l/s Residential Fire Flow Results – 6:30 pm



Label	Start Node	Stop Node	Diameter (mm)	Material	Hazen-Williams C	Velocity (m/s)	Headloss Gradient (m/m)	Flow (Maximum Absolute) (L/s)
TCC-P...	J-10453	J-8369	150	AC	100.0	0.36	0.002	6.3753
TCC-P...	J-8368	J-8369	300	AC	110.0	0.01	0.000	7.0037
TCC-P...	J-8368	Unit De...	300	AC	110.0	0.04	0.000	6.6091
TCC-P...	Unit D...	J-9752	300	AC	110.0	0.27	0.000	19.3391
TCC-P...	J-9752	J-9753	225	AC	110.0	0.43	0.001	16.9920
TCC-P...	J-9753	J-10379	225	AC	110.0	0.45	0.001	17.9763
TCC-P...	J-9752	J-834	300	AC	110.0	0.52	0.001	36.8979
TCC-P...	J-9583	J-10379	225	AC	110.0	0.41	0.001	16.4472
TCC-P...	J-9729	J-8368	100	DI	100.0	0.17	0.001	1.4415
TCC-P...	J-9753	J-9729	100	AC	100.0	0.06	0.000	0.4415
TCC-P...	J-8369	J-9750	300	AC	110.0	0.10	0.000	7.5619
TCC-P...	J-10379	J-11303	100	AC	100.0	0.18	0.001	1.4368
TCC-P...	J-9753	J-9656	100	PVC	120.0	0.28	0.001	2.1705
TCC-P...	J-9749	J-9729	100	AC	100.0	0.14	0.001	1.1105

Peak Hour Pipes + 15 l/s Residential Fire Flow Modelling Results – 6:30 pm

APPENDIX C
SEWERGEMS MODELLING RESULTS & FIGURES



	Start Node	Stop Node	Diameter (mm)	Invert (Start, (m)	Depth (Maximum) / Rise (%)	Velocity (m/s)	Flow (Maximum) (L/s)
4410: L1A1C 2.L	3/L1A1C	2/L1A1C	150.0	11.880	17.5	0.41	0.857
4317: L1A1C 1.L	2/L1A1C	1/L1A1C	150.0	11.475	20.7	0.44	1.193
4448: L1A1 5.L1	1/L1A1C	5/L1A1	150.0	10.880	21.2	0.46	1.267
4406: L1A1 4.L1	5/L1A1	4/L1A1	300.0	8.020	35.0	0.58	14.898
4378: L1A1 3.L1	4/L1A1	3/L1A1	300.0	7.860	39.2	0.60	15.923
4361: L1A1 2.L1	3/L1A1	2/L1A1	300.0	7.690	36.7	0.58	16.109
4277: L1A1 1.L1	2/L1A1	1/L1A1	300.0	7.500	41.1	0.60	16.445
4399: L1A1 0 B	1/L1A1	B1/L1A1	300.0	7.250	46.0	0.64	23.055
4397: L1A1 0 A	B1/L1A1	A1/L1A1	300.0	7.090	46.4	0.64	23.242
4421: L1A 1.L1A	A1/L1A1	1/L1A	300.0	6.930	45.5	0.66	24.173
4003: L1A P/S.L	1/L1A	P/S L1A	300.0	6.700	41.3	1.82	35.354

PWWF Sewer Capacity Assessment Results

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