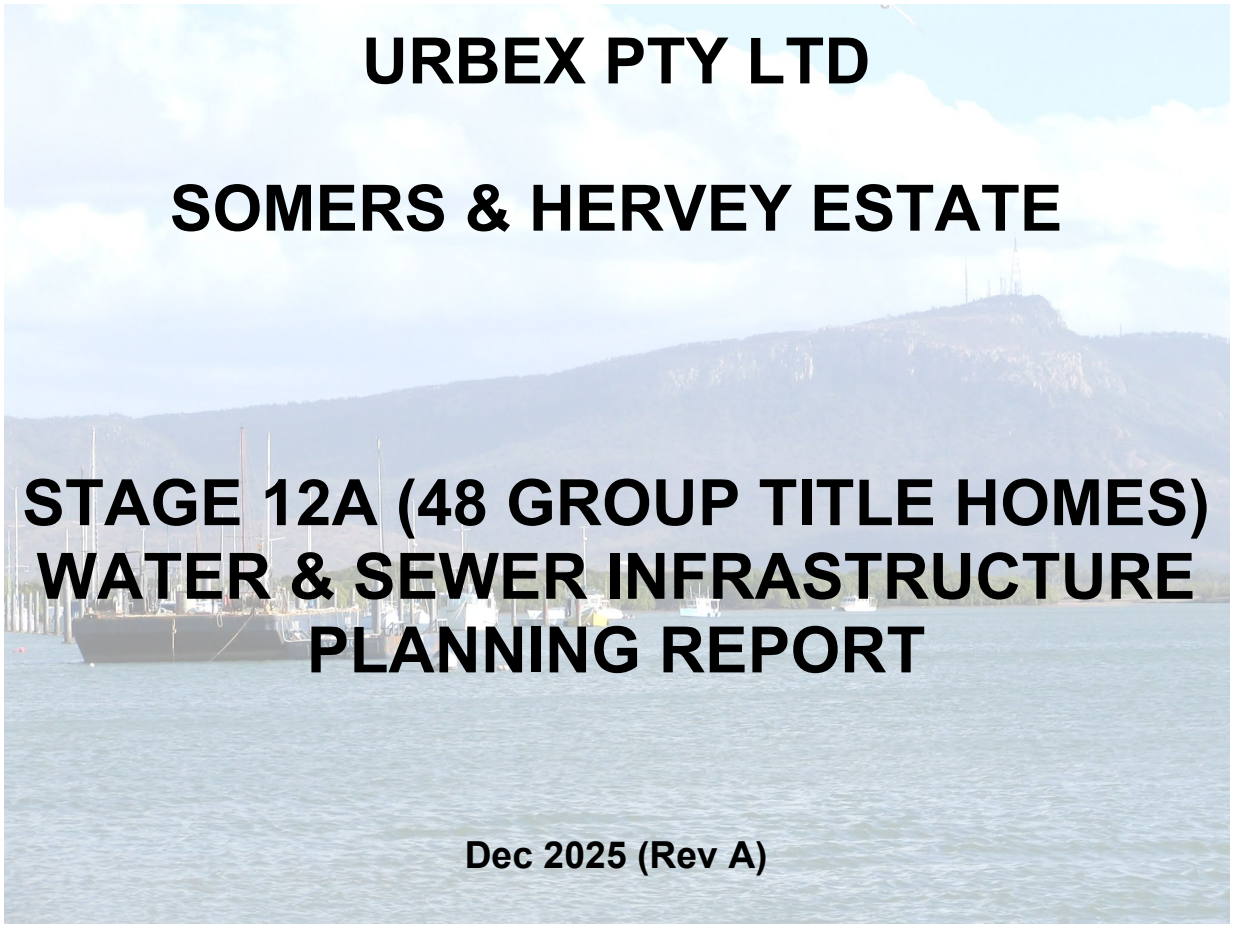
APPENDIX I

Water & Sewer Infrastructure Report prepared by DPM



URBEX PTY LTD

SOMERS & HERVEY ESTATE

STAGE 12A (48 GROUP TITLE HOMES) WATER & SEWER INFRASTRUCTURE PLANNING REPORT

Dec 2025 (Rev A)

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DOCUMENT STATUS

Revision	Purpose	Date
A	Initial Version	5/12/2025

DOCUMENT AUTHORISATION

AUTHOR DESMOND MOSELEY

Signature

1 INTRODUCTION

The Somers & Hervey Estate (formally Bluewattle Estate) is situated on the eastern side of South Beck Drv and to the west of Riverway Drv in Rasmussen. The southern boundary of the site is a combination of Allambie Lane, The Good Shepherd Catholic School and some existing residential lots while the northern boundary includes existing residential lots generally along Amber Ave. The previous Santal Park development is located in the central portion of the development site.

The development site was acquired by Urbex Pty Ltd in 2022 from Defense Housing Australia (DHA) who had developed a number of residential lots on both sides of Bluewattle Boulevard. Prior to DHA owning the site it was part of the Santal Park development.

The remaining undeveloped area of the Somers & Hervey Estate is expected to yield around 848 residential lots. The final development layout and yield will likely be adjusted over time as more detailed development planning is undertaken for future precincts. The recent "Somers & Hervey Estate – Overall Development & Precinct 1 Water & Sewer Infrastructure Planning Report (DPM Water – August 2024)" assesses the performance of the water & sewer system for the full development yield.

This report details the network modelling and infrastructure sizing for the proposed 48 Group Title Homes in Stage 12A of the Somers & Hervey area. The following image illustrates the proposed 48 Group Title Homes.

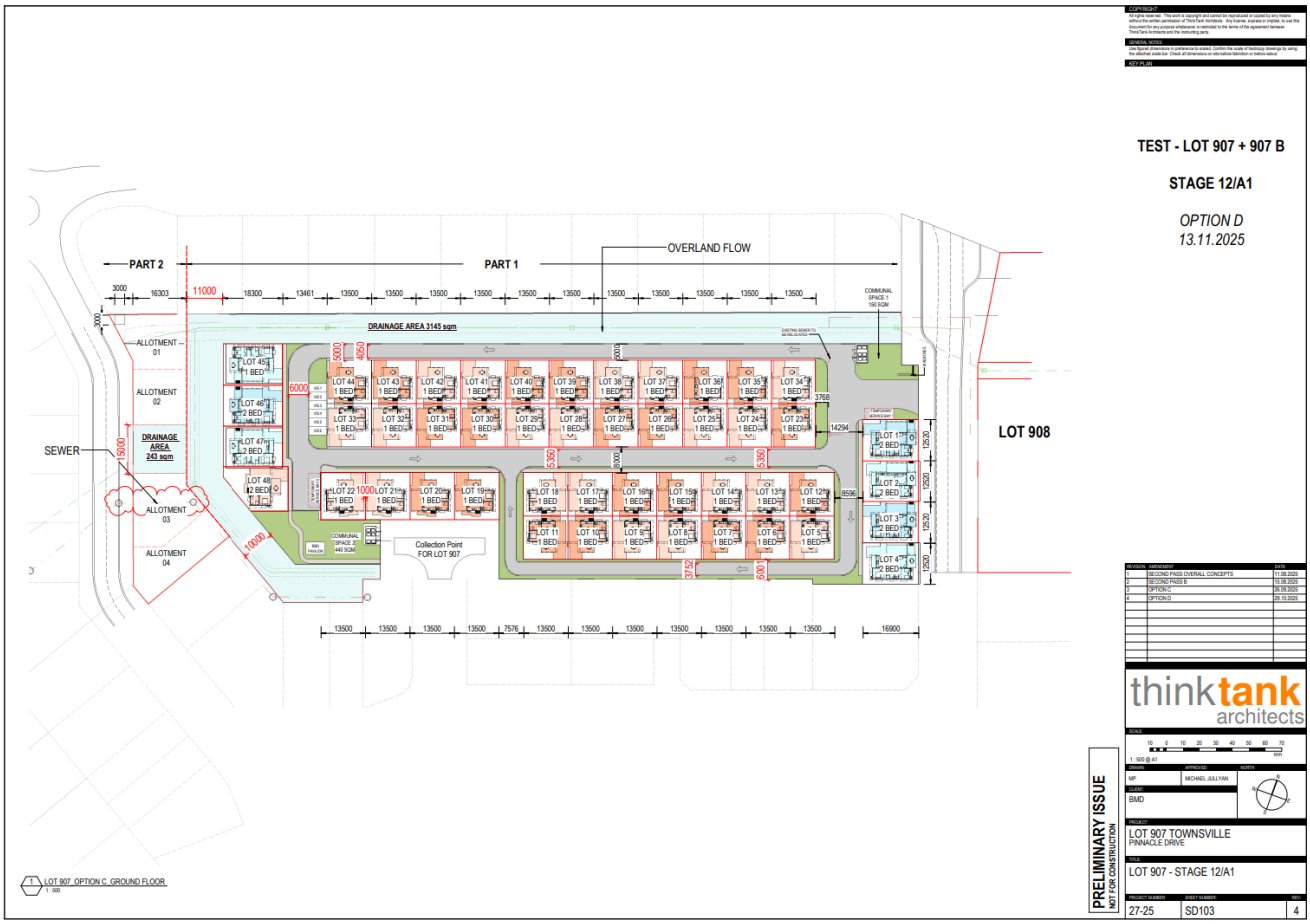


Figure 1 – Somers & Hervey Estate – Stage 12A

The following report sections detail the water & sewer system performance to service Stage 12A of the Somers & Hervey development.

2 POPULATION ASSESSMENT

The population assessment for the Stage 12A Group Title site along with the recent development lots in Precinct 2 of the Somers & Hervey estate is provided in Table 2.1 and 2.2 below.

Table 2.1 – Somers & Hervey Estate – Water Population Assessment

Precinct	Development Type	Loading Rate	EP
1	Residential – 117 lots	2.8 EP/lot	327.6 EP
2 (Stage 3C)	Residential – 28 lots	2.8 EP/lot	78.4 EP
2 (Stage 4A)	Residential – 48 group title homes	1.8 EP/lot	82.8 EP
2 (Stage 4B)	Residential – 21 lots	2.8 EP/lot	58.8 EP
2 (Stage 4C)	Residential – 9 lots	2.8 EP/lot	25.2 EP
2 (Stage 4D)	Commercial – 1 lot (3,116 m^2)	2.11 EP/100 m^2	65.7 EP
2 (Stage 4E)	Residential – 3 lots	2.8 EP/lot	8.4 EP
Stage 12A	Residential – 48 group title homes	1.8 EP/lot	86.4 EP
Riverstone (Precinct 1)	Residential – 171 lots	2.8 EP/lot	478.8 EP

Table 2.2 – Somers & Hervey Estate – Sewer Population Assessment

Precinct	Development Type	Loading Rate	EP
1	Residential – 117 lots	2.8 EP/lot	327.6 EP
2 (Stage 3C)	Residential – 28 lots	2.8 EP/lot	78.4 EP
2 (Stage 4A)	Residential – 48 group title homes	1.8 EP/lot	82.8 EP
2 (Stage 4B)	Residential – 21 lots	2.8 EP/lot	58.8 EP
2 (Stage 4C)	Residential – 9 lots	2.8 EP/lot	25.2 EP
2 (Stage 4D)	Commercial – 1 lot (3,116 m^2)	2.74 EP/100 m^2	85.4 EP
2 (Stage 4E)	Residential – 3 lots	2.8 EP/lot	8.4 EP
Stage 12A	Residential – 48 group title homes	1.8 EP/lot	86.4 EP
Riverstone (Precinct 1)	Residential – 171 lots	2.8 EP/lot	478.8 EP

The above equivalent population has been used to assess the performance of the existing water and sewer infrastructure that services the Upper Ross area and the expansion of the Somers & Hervey Estate, specifically the 48 group title homes proposed for Stage 12A.

In addition to the above, a residential development is underway on the western side of Beck Drv being the Riverstone development. The initial stages of the Riverstone development are under construction and will be serviced from the extension of the DN300 water main on Bluewattle Bvd. The 171 lots associated with the initial Precinct 1 of the Riverstone development has also been included in the water & sewer network modelling to confirm the existing and proposed infrastructure is able to service the expansion of the Somers & Hervey Estate site, specifically Stage 12A Group Title site, along with the Riverstone development.

3 WATER SUPPLY PLANNING

Water network modelling has been undertaken for the Kirwan and Upper Ross areas of Townsville, which includes the Somers & Hervey Estate. The water network modelling has been updated over a number of years as the development layout, lot yields and design standards have changed.

The existing water supply system that services the Somers & Hervey Estate and Upper Ross area is summarised below:

- The existing 2 x 16.5 ML Douglas No 2 & 3 reservoirs that are located on the foothills of Mt Stuart. These two reservoirs are supplied from the Douglas WTP and have a base level of 54mAHD and a top water level of 64mAHD.
- DN600 MSCL trunk water main outlet from the reservoir that extends along Angus Smith Drv and then along the northern boundary of the Douglas WTP to Ross River. The DN600 main crosses under Ross River from Douglas to Condon. A parallel DN375 main was taken out of service (damaged) in 2019 following the Townsville floods.
- A replacement DN750 PE water main was constructed under Ross River in 2022 and interconnected to the existing DN600 and DN300 water mains on the western side of Riverway Drv and to the existing DN900 MSCL water main on the eastern (Douglas WTP) side of the river.
- The existing DN300 AC water main on the western side of Riverway Drv extends to the south through to Allambie Lane and have several offtakes from it to service the existing residential areas.
- The existing DN600 DICL/AC water main on the western side of Riverway Drv extends to the intersection with Gouldian Ave and then extends to the west along Gouldian Ave to Pinnacle Drv (as a DN500 DI main). The DN600 AC main continues to the south along Riverway Drv but is the pumped main that supplies the Ponti Rd reservoir and the Kelso water supply area.
- A DN500/450/375 water main connects to the above DN500 DI main on Gouldian Ave and continues to the south along Pinnacle Drive and then Sorghum St to Bluewattle Boulevard. This trunk water main runs along the Sorghum St frontage of the proposed Stage 12A site.
- There is a short section of Pinnacle Drv/Sorghum St that has not yet been constructed which is the frontage of the development site. A short section of new DN150 water main will be constructed along this section of road (on the eastern side) and will service the proposed Stage 12A Group Title development site.
- A DN300 water main extends to the west along Santal Drive from Riverway Drive to its current temporary end of this road. This includes a connection to the existing DN375 main at the Pinnacle Drive intersection.
- A DN300 water main extends to the west along Bluewattle Boulevard from Riverway Drive through to South Beck Drv. A DN375 main then extends to the north along South Beck Drv to the entrance of the Riverstone residential development area.

The above illustrates the Upper Ross area and Somers & Hervey Estate is well serviced with a trunk water network including the proposed Stage 12A Group Title development site.

The performance of the existing water network to service Stage 12A of the Somers & Hervey Estate and the other existing developments in the Rasmussen area is provided in the following report sections.

3.1 Somers & Hervey Stage 12A Performance

Stage 12A of Somers & Hervey is located on the western side of the un-constructed section of road on the northern extension of Sorghum St through to the southern end of existing Pinnacle Drv. This section of planned road reserve already has a DN375 trunk water main along its western side.

To service the Stage 12A Group Title development area, the following water infrastructure will be required:

- DN150 PVC water main on the eastern side of Sorghum St extension. This will be a 100m long section of DN150 water main on the eastern side of Sorghum St extension and will connect to an existing DN150 PVC water main on the southern end and an existing DN150 AC water main on the northern end.
- This proposed DN150 PVC water main will link the reticulation network from the original stages of Somers & Hervey (formally Bluewattle Estate) to the original water network in the former Santal Park development area.
- The proposed DN150 PVC main on the eastern side of Sorghum St will also service some planned residential lots on the eastern side of the road extension. The capacity of the new water main to service these additional residential lots on the eastern side of Sorghum St will be included in a separate water assessment report.
- A new DN100 water main crossing under Sorghum St from the above DN150 PVC main. This DN100 water main crossing will deliver water to the entrance of the proposed Stage 12A Group Title site. It is understood that a direct connection off the existing DN375 PVC trunk water main along the frontage of the development site will not be allowed by TCC.

The existing and proposed water infrastructure to service Stage 12A is illustrates on the extract from Council's GIS below.

Figure 3.1 – Existing & Planned Water Mains

It is noted that there are a couple of streets that have current temporary ends onto the northern and southern sides of the Stage 12A Group Title site. These streets are expected to be formally ended with the existing water mains and DN63PE poly loops kept in place.

The performance of the existing water network in the Upper Ross area along with the additional water mains to service the 48 Group Title Houses in Stage 12A is summarised below and illustrated on the WaterGEMS model figure below and in Appendix B.

- The water pressures on the Sorghum St frontage of Stage 12A is 324 kPa. This is the water pressure on the end of the proposed DN100 water main crossing under Sorghum St to the Stage 12A entrance.
- The water pressures around the Stage 12A development area of Somers & Hervey Estate and in the Riverstone development area are all above 320 kPa for the peak hour demands. These are all above the minimum 220 kPa standard.
- The velocity and headloss gradient along the existing and proposed water mains in the surrounding area are up to 0.70 m/s and 0.003 m/m respectively. These both meet Council standards.
- With the inclusion of the 15 l/s fire flow on the end of the proposed DN100 water main crossing under Sorghum St and at the frontage of the 48 Lot Group Title House site (Stage 12A), the water pressures are reduced to around 290 kPa. This meets the 120 kPa minimum fire flow water pressures.
- The WaterGEMS network modelling results are provided in Appendix B.

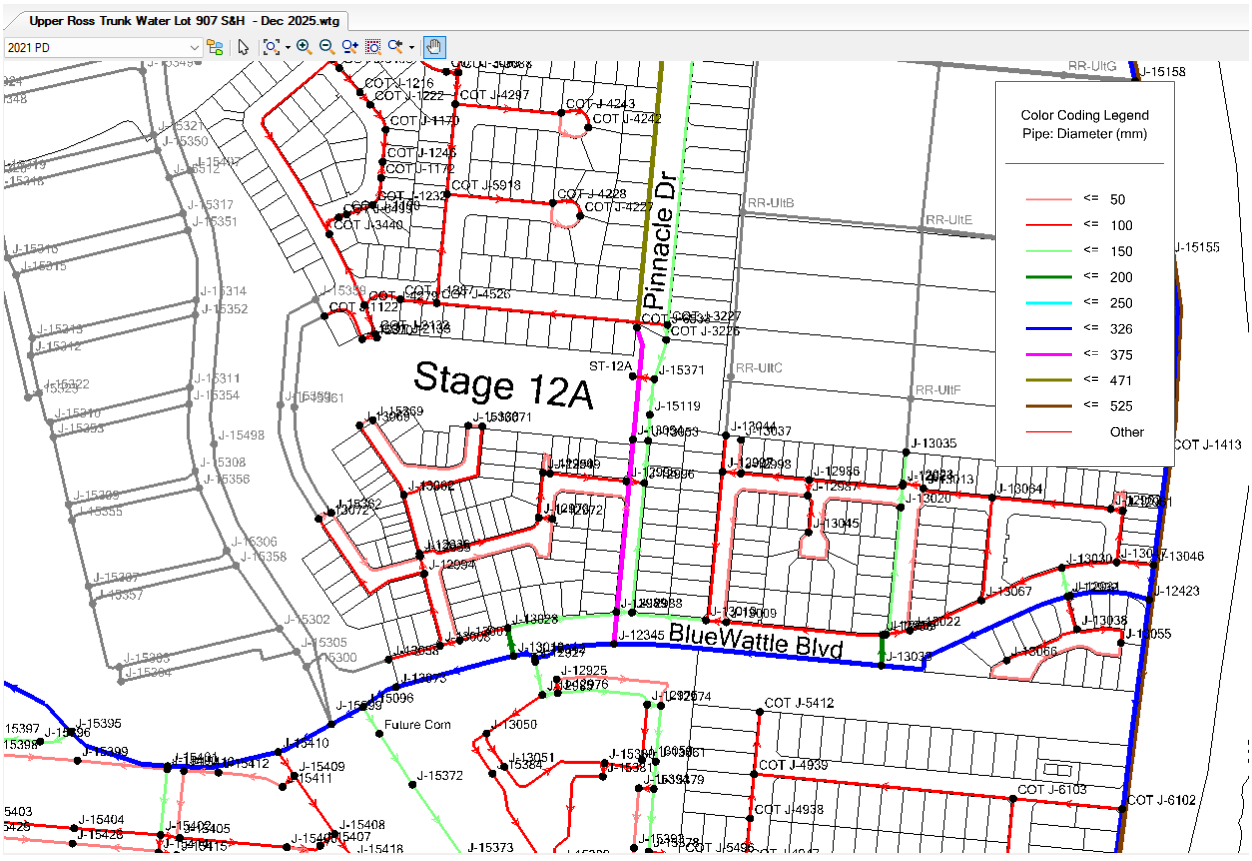


Figure 3.2 –Stage 12A WaterGEMS Mode

The above assessment and WaterGEMS network modelling shows that the Stage 12A Group Title development site is able to be serviced with a reticulated water supply to meet TCC standards.

4 SEWER INFRASTRUCTURE PLANNING

The Upper Ross area is currently serviced with a reticulated sewer system that is directed to the Condon STP, which is located on the western side of the Bohle River. The Upper Ross sewer area generally consists of the suburbs of Condon, Rasmussen and Kelso with the sewer area illustrated on Figure 1.1 from the "Upper Ross Sewer Infrastructure Planning Report (DPM Water, 2017)" below.

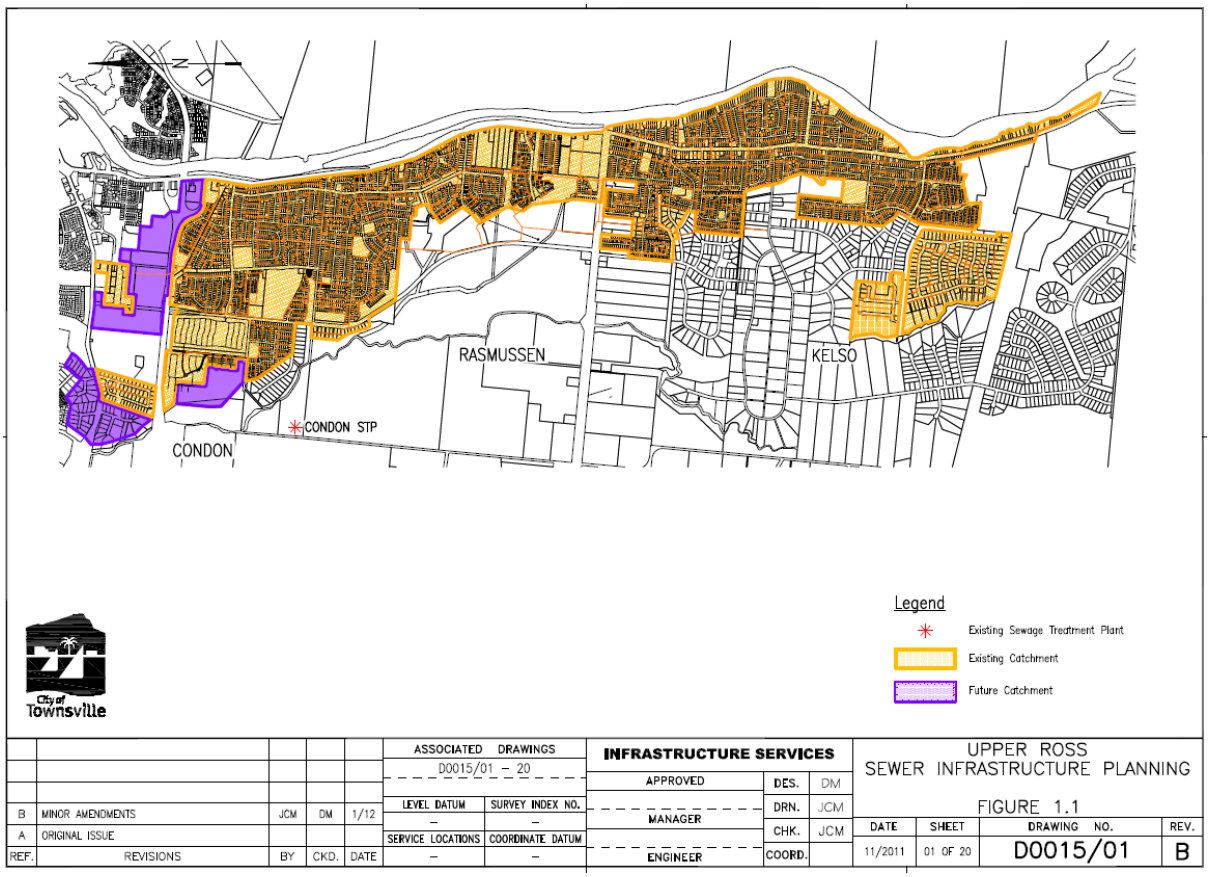


Figure 4.1 – Upper Ross Sewer Infrastructure Plan

The Upper Ross sewer system generally consists of the following trunk sewer infrastructure that services the Somers & Hervey Estate:

- PS C6B (Vickers Rd).
    - This pump station discharges sewage to the Condon STP via a DN450 pressure main and then a DN600 common pressure main with PS C36A (Bowhunters Rd).
    - It services the eastern area of Condon & Rasmussen. PS C6B has a large local gravity catchment but also receives pumped flows from PS C5C which discharges into the southern end of its DN525 gravity sewer.
- PS C5C (St Lucia Drv).
    - The pump station is located on the northern end of St Lucia Drv which is towards the north eastern end of the Somers & Hervey Estate. PS C5C pumps sewage to the north and into a DN525 gravity sewer in the PS C6B catchment.
    - A DN450 gravity sewer extends to the south from PS C5C through to Allambie Lane (ie from MH 0/C5C to MH 16/C5C).

- Sewage from the eastern half of Kelso used to be directed along the DN450 sewer into PS C5C but in 2007 a DN450 diversion sewer was constructed along Allambie Lane from MH 16A/C5C to MH 38A/WT. This diversion sewer directed flows into the Upper Ross DN600 western trunk sewer and onto PS C36A (Bowhunters Rd).
- The eastern portion of the Somers & Hervey Estate is (and will be) connected to this existing DN450 trunk sewer in the catchment of PS C5C. This includes Stage 12A.

- PS C36A (Bowhunters Rd).
  - This existing sewage pump station discharges sewage to the Condon STP via a DN600 common pressure main with PS C6B (Vickers Rd).
  - It services the western area of Condon & Rasmussen, along with all of the Kelso sewer area. PS C36A has a large local gravity catchment including a DN750/600 trunk sewer to the south that extends through the western portion of the Somers & Hervey development area.

The performance of the Upper Ross sewer system with the inclusion of the sewage loads from Stage 12A of the Somers & Hervey Estate is provided in the following report sections.

4.1 Somers & Hervey Stage 12A - Sewer Capacity Assessment

Stage 12A of Somers & Hervey Estate will be directed to the existing DN450 trunk sewer in the catchment of PS C5C (St Lucia Drv). The layout plans for Stage 12A are provided in Appendix A.

The SewerGEMS model was updated to include the additional sewage flows from the proposed 48 Group Title Lots in Stage 12A. The additional sewage flows were included in the SewerGEMS model onto existing MH 1/C5C10. This existing MH is located within the proposed Stage 12A development area with a DN150 AC sewer extending to the east and under the proposed Sorghum St extension to existing MH 10/C5C that is located on the existing DN450 trunk sewer. The extract from Council's GIS below illustrates the existing sewer infrastructure that will service Stage 12A.

Figure 4.1 – Existing Sewer Infrastructure for Stage 12A

With the inclusion of additional sewage flows the sewer system performance is as follows:

- There is no change to the current sewer performance for the DN600 and DN750 trunk sewer that services the western half of the Somers & Hervey Estate and is in the catchment of PS C36B, as Stage 12A development lots are not directed to this existing trunk sewer line.
- With Stage 12A flows and the previously approved lots in Precinct 2 of Somers & Hervey, the existing DN450 trunk sewer in the catchment of PS C5C flows up to 42% full.
- The existing DN150 gravity sewers within the Stage 12A Group Title site that have the additional sewage directed to them from Stage 12A flow up to 25% full.
- The existing reticulation and trunk gravity sewer system that will service Stage 12A & Precinct 2 of the Somers & Hervey Estate flows less than the CTM code requirement of a maximum of 75% full and therefore has capacity to service the additional residential lots.

The figure below from the SewerGEMS network model illustrates the performance of the existing gravity sewer system that will service the proposed 48 Group Title Houses in Stage 12A of the Somers & Hervey Estate. A larger version of this figure is provided in Appendix C.

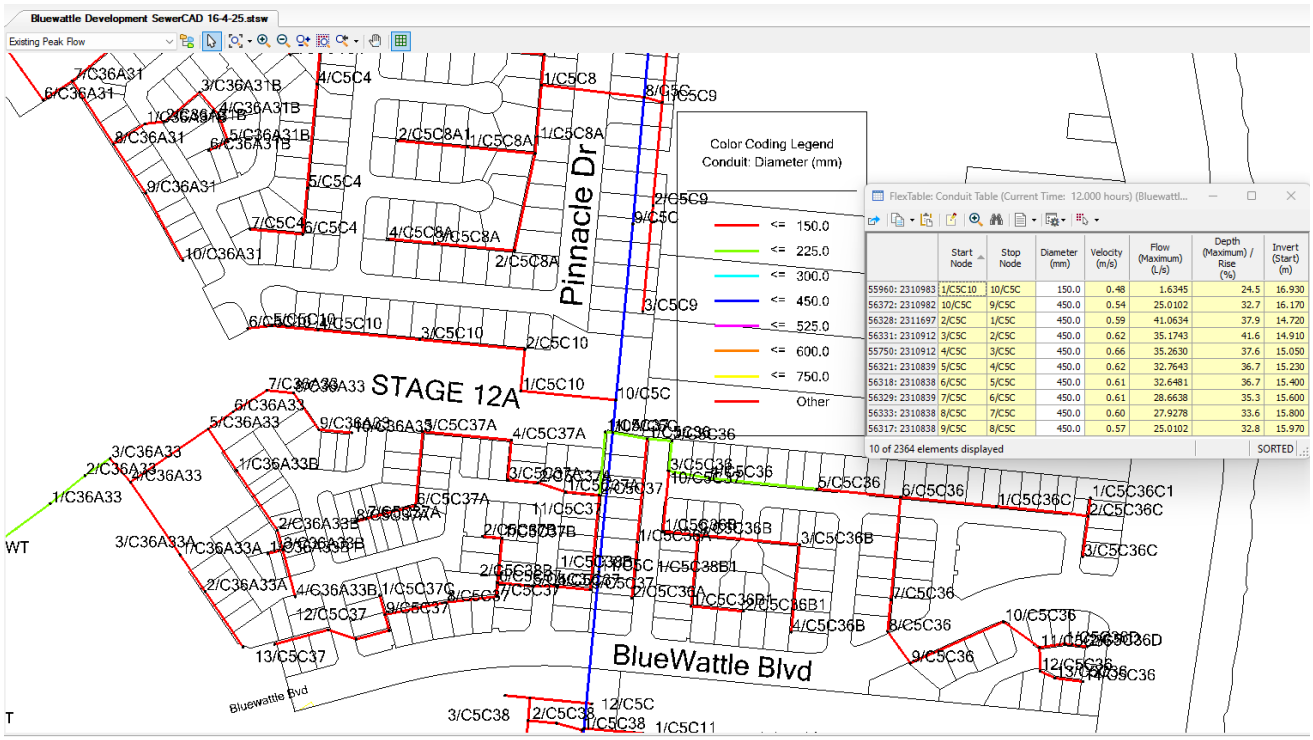


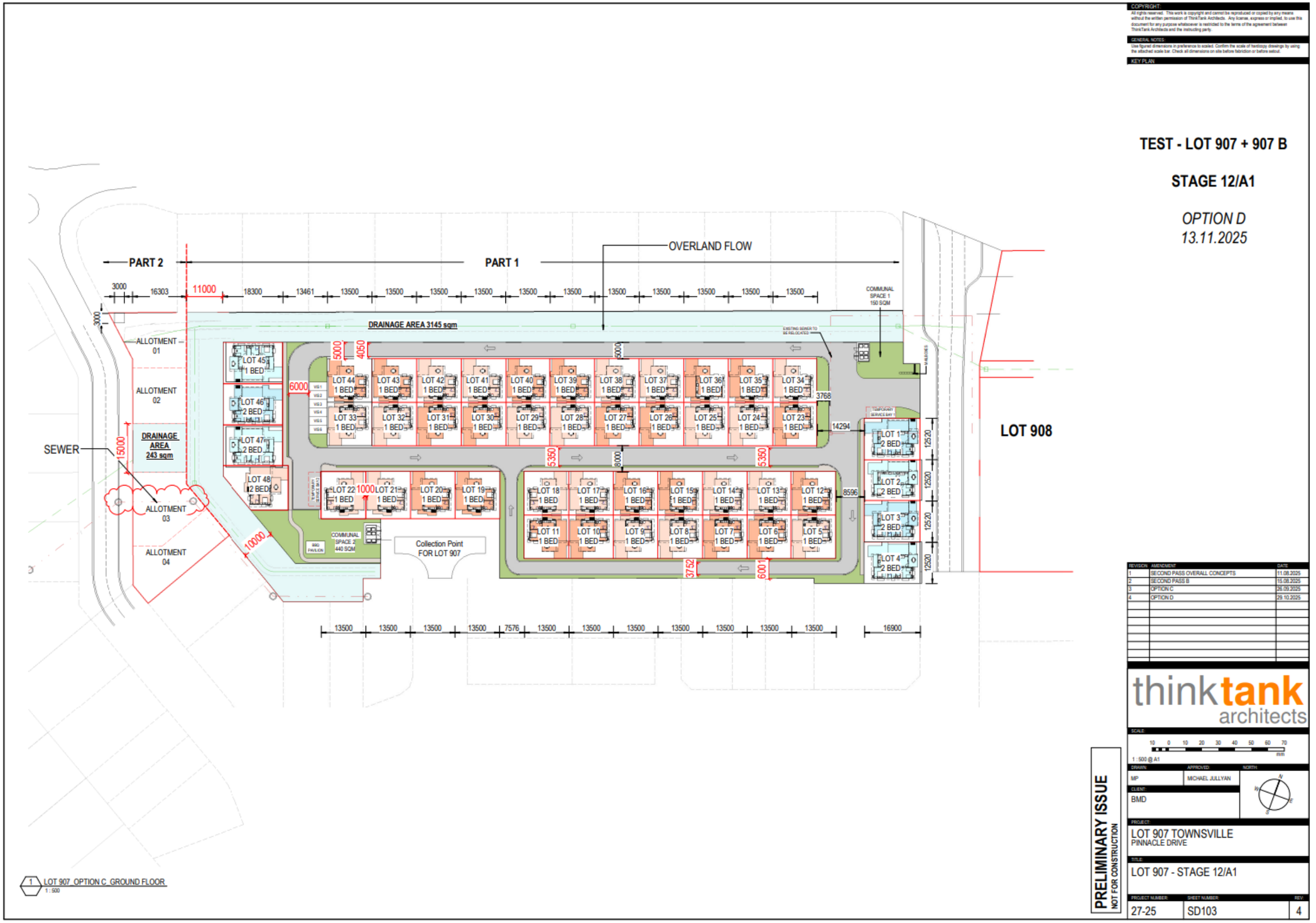
Figure 4.2 – Stage 12A – SewerGEMS Modelling Results

The SewerGEMS modelling illustrates that the existing sewer infrastructure is adequately sized to service Stage 12A of the Somers & Hervey development with no upgrades required.

APPENDIX A

SOMERS & HERVEY ESTATE

STAGE 12A - PRELIMINARY DEVELOPMENT FIGURES



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GENERAL NOTES:
Use figured dimensions in preference to scaled. Confirm the scale of hardcopy drawings by using the attached scale bar. Check all dimensions on site before fabrication or before setout.

KEY PLAN

TEST - LOT 907 + 907 B

STAGE 12/A1

OPTION D
13.11.2025

REVISION	AMENDMENT	DATE
1	SECOND PASS OVERALL CONCEPTS	11.08.2025
2	SECOND PASS B	15.08.2025
3	OPTION C	26.09.2025
4	OPTION D	29.10.2025

thinktank architects

SCALE: 1 : 500 @ A1

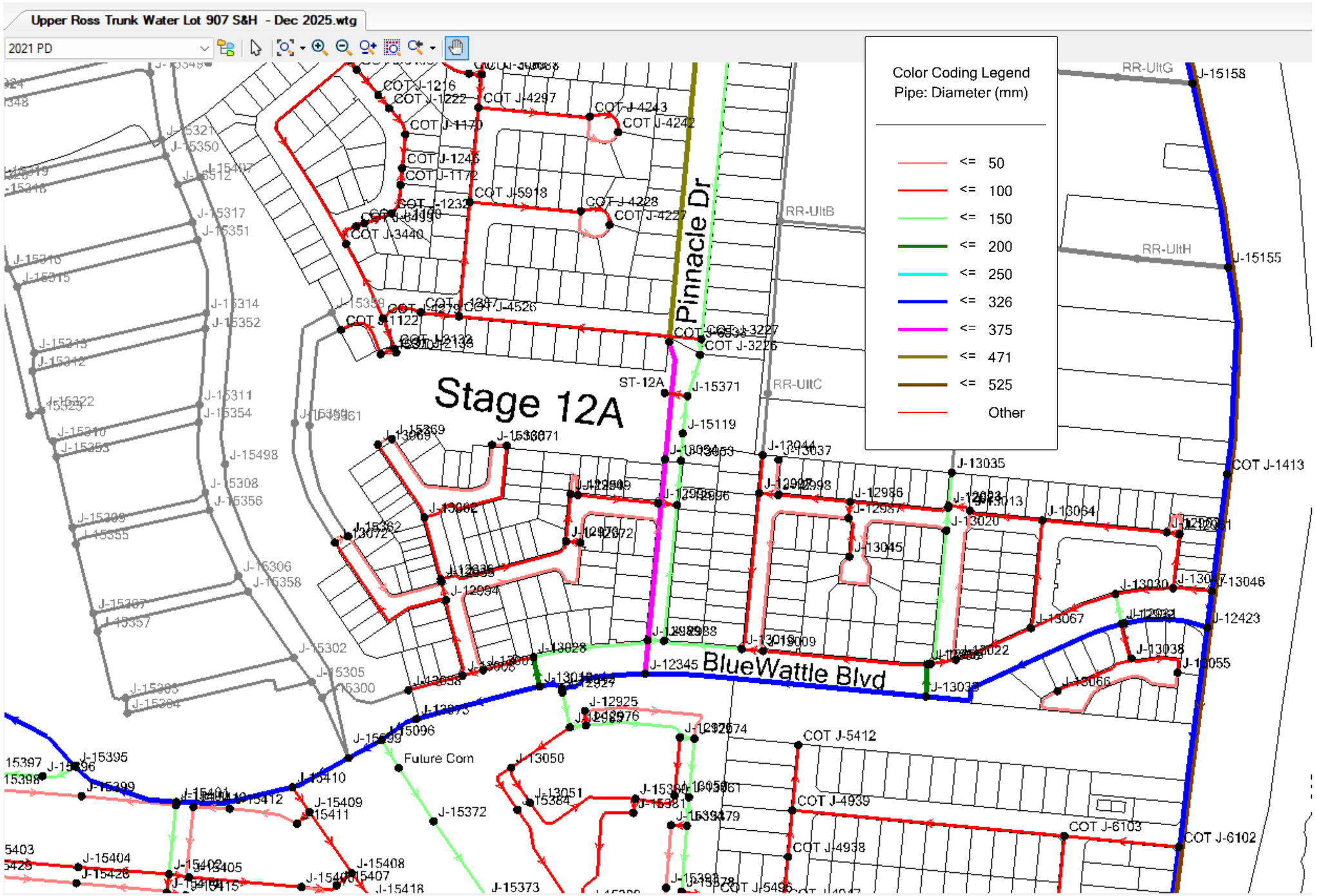
DRAWN: MP
APPROVED: MICHAEL JULLYAN
NORTH:
CLIENT: BMD
PROJECT: LOT 907 TOWNSVILLE
PINNACLE DRIVE
TITLE: LOT 907 - STAGE 12/A1
PROJECT NUMBER: 27-25
SHEET NUMBER: SD103
REV: 4

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

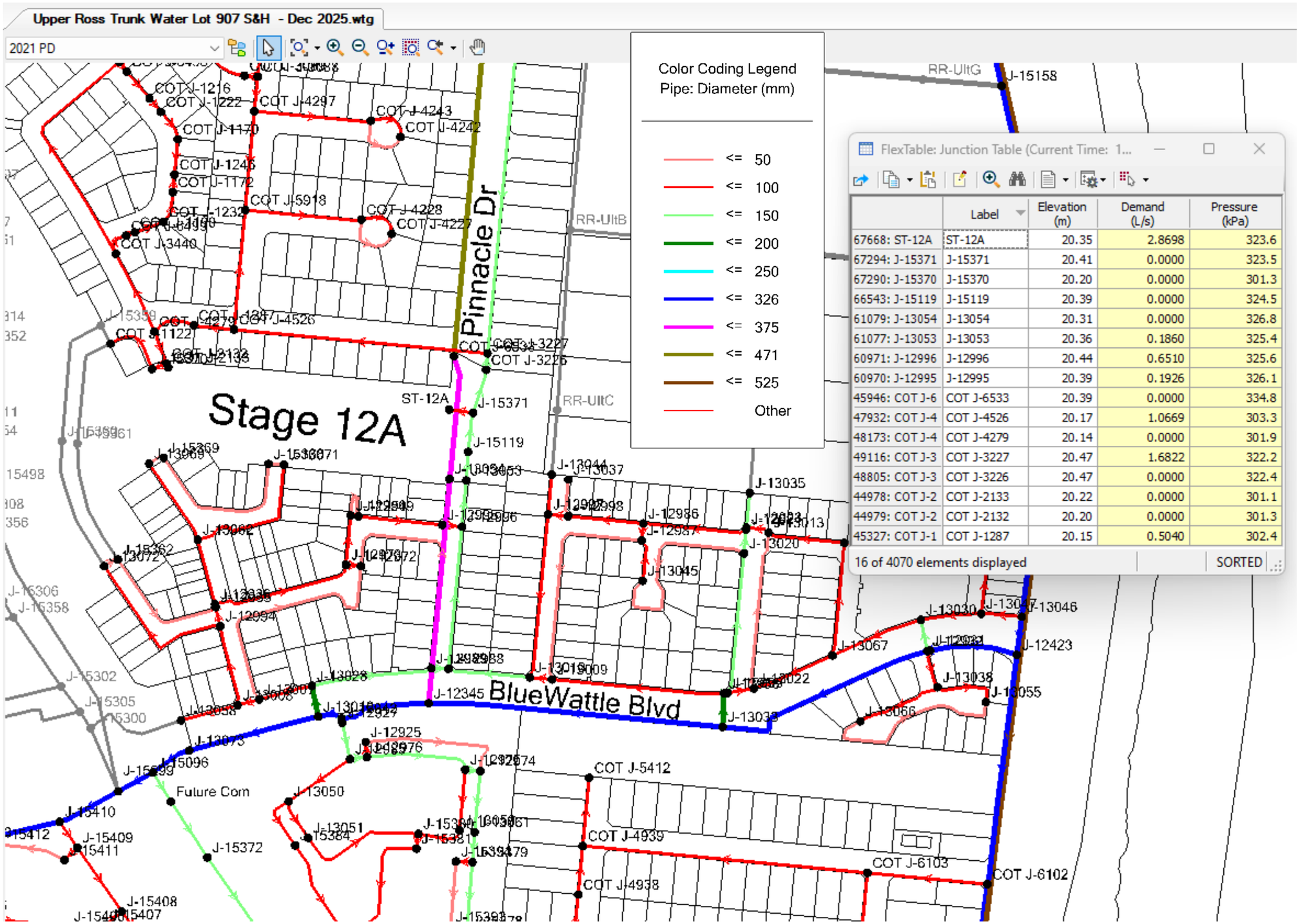
APPENDIX B

SOMERS & HERVEY ESTATE

STAGE 12A WATERGEMS MODELLING FIGURES & RESULTS



Somers & Hervey Estate Stage 12A - WaterGEMS Model Figure



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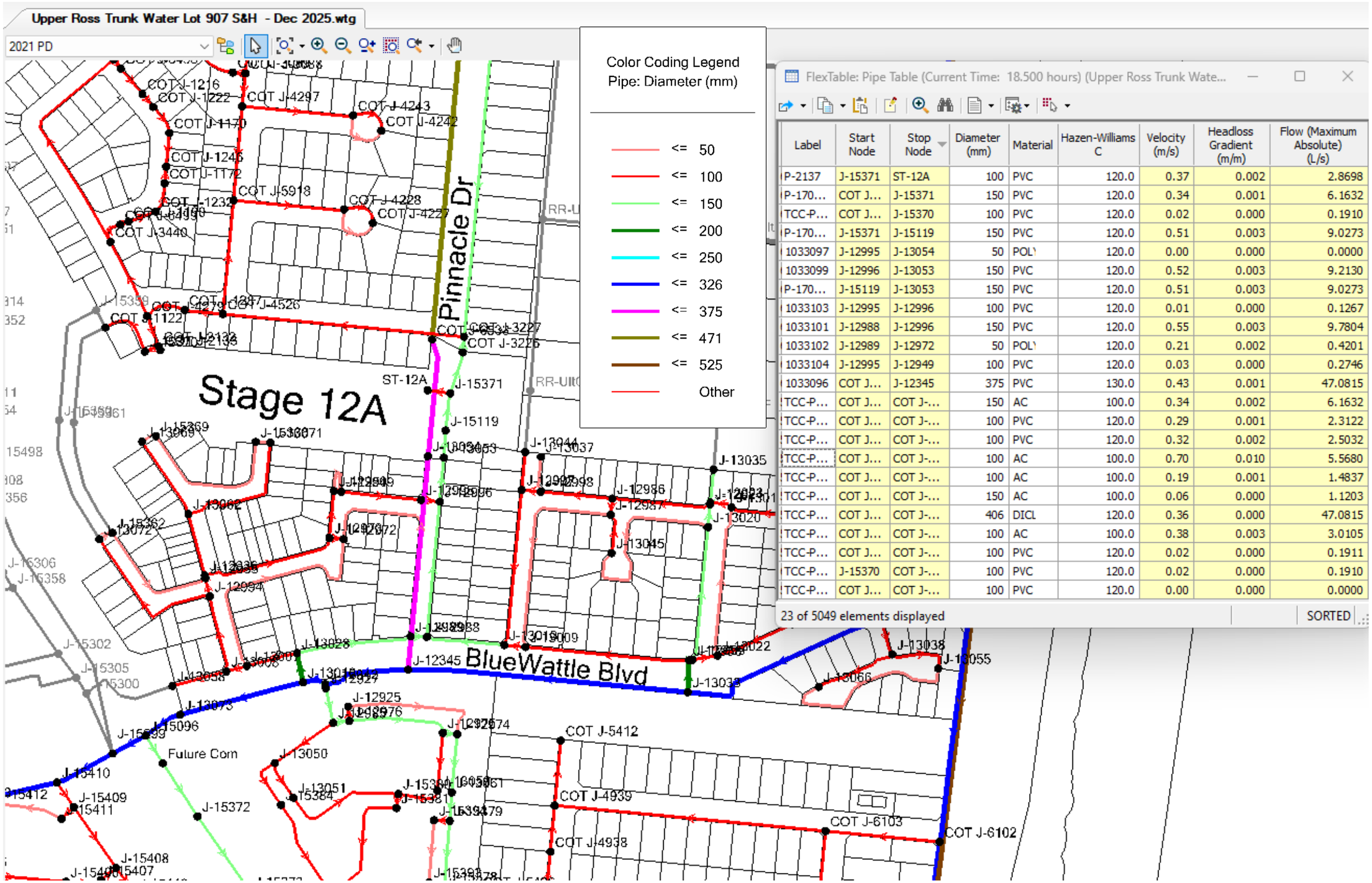
67290: J-15370	J-15370	20.20	0.0000	301.3
66543: J-15119	J-15119	20.39	0.0000	324.5
61079: J-13054	J-13054	20.31	0.0000	326.8
61077: J-13053	J-13053	20.36	0.1860	325.4
60971: J-12996	J-12996	20.44	0.6510	325.6
60970: J-12995	J-12995	20.39	0.1926	326.1
45946: COT J-6	COT J-6533	20.39	0.0000	334.8
47932: COT J-4	COT J-4526	20.17	1.0669	303.3
48173: COT J-4	COT J-4279	20.14	0.0000	301.9
49116: COT J-3	COT J-3227	20.47	1.6822	322.2
48805: COT J-3	COT J-3226	20.47	0.0000	322.4
44978: COT J-2	COT J-2133	20.22	0.0000	301.1
44979: COT J-2	COT J-2132	20.20	0.0000	301.3
45327: COT J-1	COT J-1287	20.15	0.5040	302.4

Somers & Hervey Stage 12A – Peak Hour Pressures



FlexTable: Pipe Table (Current Time: 18.500 hours) (Upper Ross Trunk Wate...

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P-2137	J-15371	ST-12A	100	PVC	120.0	0.37	0.002	2.8698
P-170...	COT J...	J-15371	150	PVC	120.0	0.34	0.001	6.1632
TCC-P...	COT J...	J-15370	100	PVC	120.0	0.02	0.000	0.1910
P-170...	J-15371	J-15119	150	PVC	120.0	0.51	0.003	9.0273
1033097	J-12995	J-13054	50	POLY	120.0	0.00	0.000	0.0000
1033099	J-12996	J-13053	150	PVC	120.0	0.52	0.003	9.2130
P-170...	J-15119	J-13053	150	PVC	120.0	0.51	0.003	9.0273
1033103	J-12995	J-12996	100	PVC	120.0	0.01	0.000	0.1267
1033101	J-12988	J-12996	150	PVC	120.0	0.55	0.003	9.7804
1033102	J-12989	J-12972	50	POLY	120.0	0.21	0.002	0.4201
1033104	J-12995	J-12949	100	PVC	120.0	0.03	0.000	0.2746
1033096	COT J...	J-12345	375	PVC	130.0	0.43	0.001	47.0815
TCC-P...	COT J...	COT J-...	150	AC	100.0	0.34	0.002	6.1632
TCC-P...	COT J...	COT J-...	100	PVC	120.0	0.29	0.001	2.3122
TCC-P...	COT J...	COT J-...	100	PVC	120.0	0.32	0.002	2.5032
TCC-P...	COT J...	COT J-...	100	AC	100.0	0.70	0.010	5.5680
TCC-P...	COT J...	COT J-...	100	AC	100.0	0.19	0.001	1.4837
TCC-P...	COT J...	COT J-...	150	AC	100.0	0.06	0.000	1.1203
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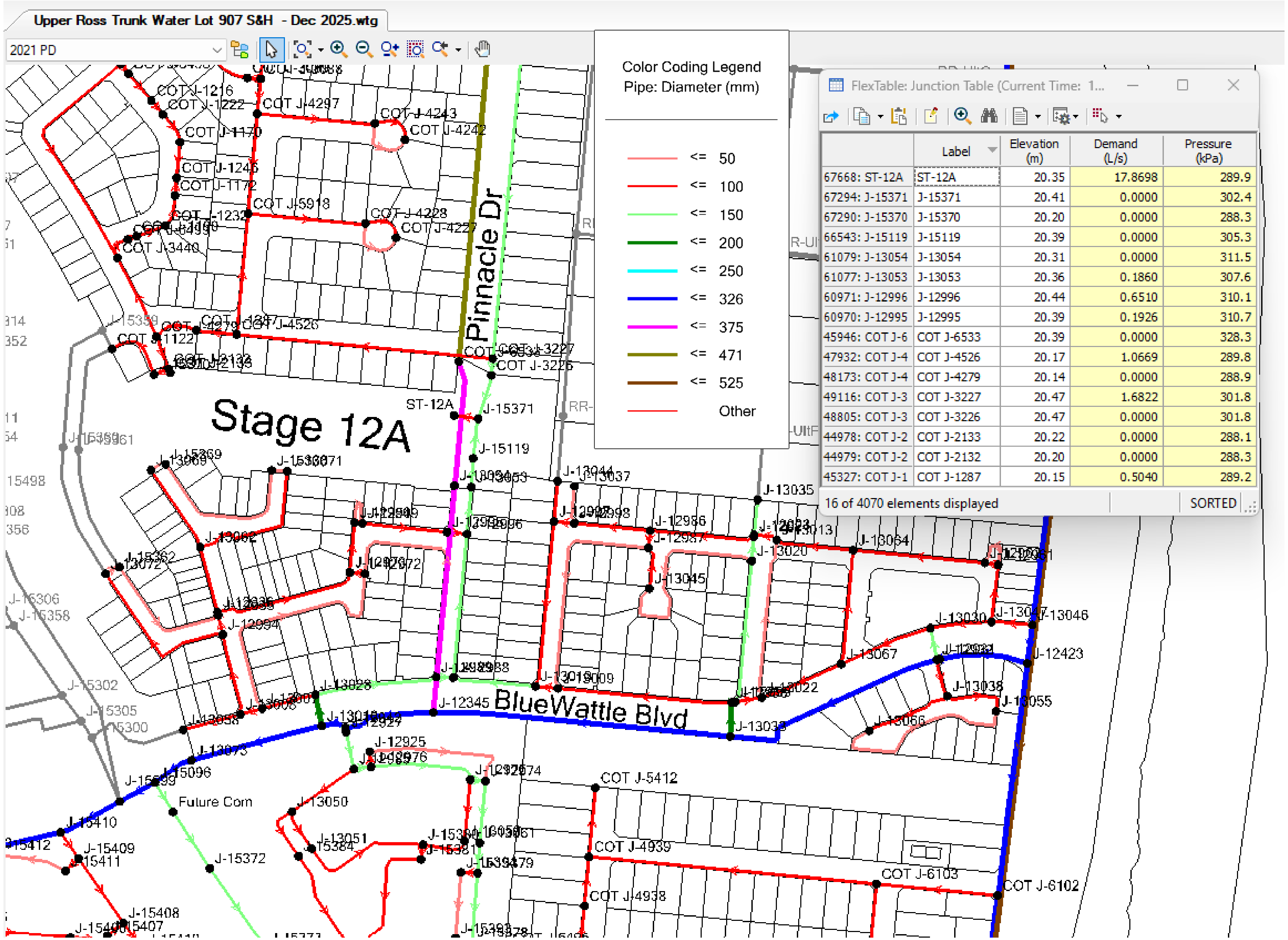
23 of 5049 elements displayed | SORTED

Somers & Hervey Stage 12A - Pipes Peak Hour



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67290: J-15370	J-15370	20.20	0.0000	288.3
66543: J-15119	J-15119	20.39	0.0000	305.3
61079: J-13054	J-13054	20.31	0.0000	311.5
61077: J-13053	J-13053	20.36	0.1860	307.6
60971: J-12996	J-12996	20.44	0.6510	310.1
60970: J-12995	J-12995	20.39	0.1926	310.7
45946: COT J-6	COT J-6533	20.39	0.0000	328.3
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44979: COT J-2	COT J-2132	20.20	0.0000	288.3
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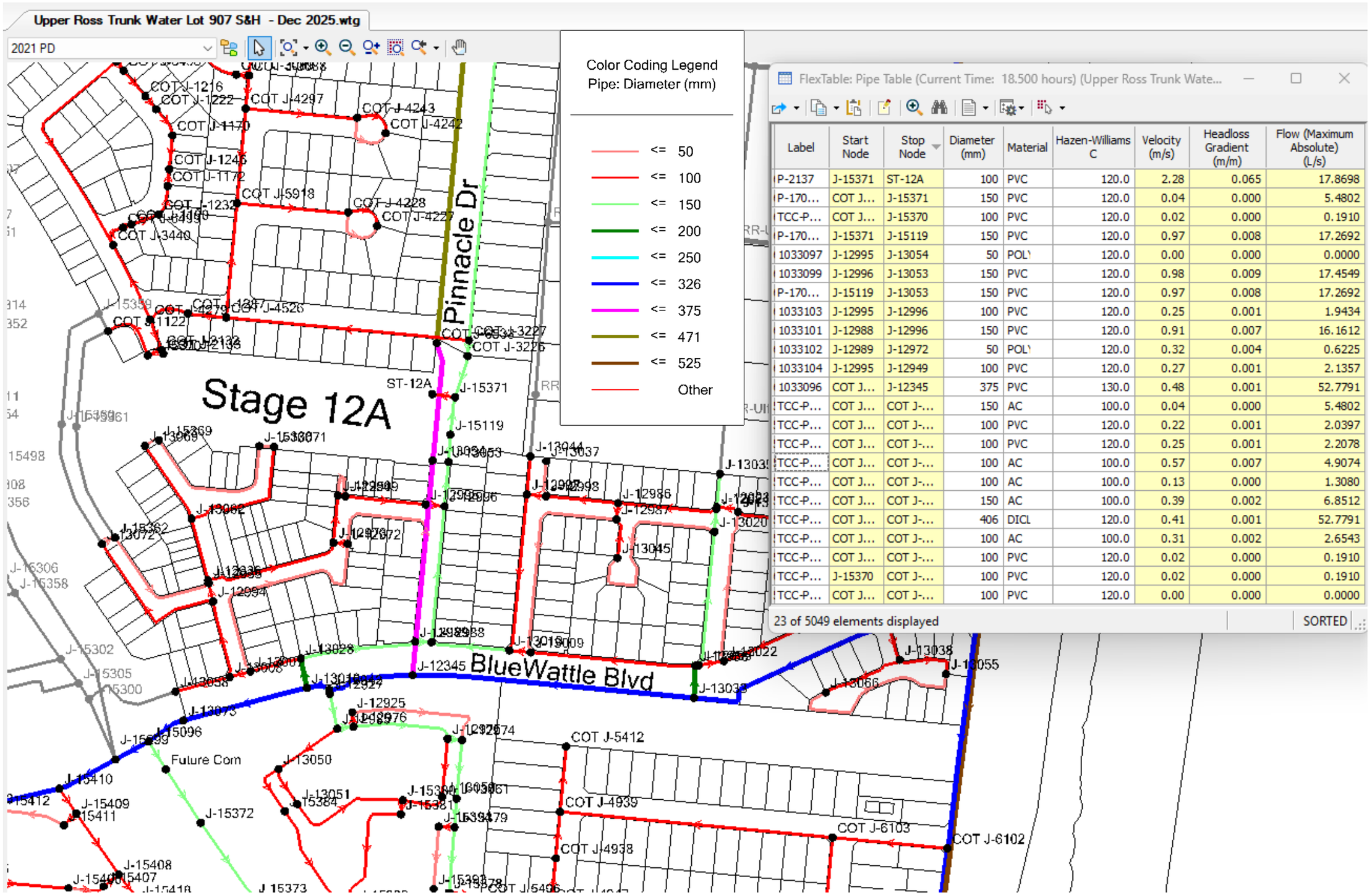
Somers & Hervey Stage 12A - Peak Hour Pressures & 15 l/s Fire Flow



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TCC-P...	COT J...	J-15370	100	PVC	120.0	0.02	0.000	0.1910
P-170...	J-15371	J-15119	150	PVC	120.0	0.97	0.008	17.2692
1033097	J-12995	J-13054	50	POLY	120.0	0.00	0.000	0.0000
1033099	J-12996	J-13053	150	PVC	120.0	0.98	0.009	17.4549
P-170...	J-15119	J-13053	150	PVC	120.0	0.97	0.008	17.2692
1033103	J-12995	J-12996	100	PVC	120.0	0.25	0.001	1.9434
1033101	J-12988	J-12996	150	PVC	120.0	0.91	0.007	16.1612
1033102	J-12989	J-12972	50	POLY	120.0	0.32	0.004	0.6225
1033104	J-12995	J-12949	100	PVC	120.0	0.27	0.001	2.1357
1033096	COT J...	J-12345	375	PVC	130.0	0.48	0.001	52.7791
TCC-P...	COT J...	COT J-...	150	AC	100.0	0.04	0.000	5.4802
TCC-P...	COT J...	COT J-...	100	PVC	120.0	0.22	0.001	2.0397
TCC-P...	COT J...	COT J-...	100	PVC	120.0	0.25	0.001	2.2078
TCC-P...	COT J...	COT J-...	100	AC	100.0	0.57	0.007	4.9074
TCC-P...	COT J...	COT J-...	100	AC	100.0	0.13	0.000	1.3080
TCC-P...	COT J...	COT J-...	150	AC	100.0	0.39	0.002	6.8512
TCC-P...	COT J...	COT J-...	406	DICL	120.0	0.41	0.001	52.7791
TCC-P...	COT J...	COT J-...	100	AC	100.0	0.31	0.002	2.6543
TCC-P...	COT J...	COT J-...	100	PVC	120.0	0.02	0.000	0.1910
TCC-P...	J-15370	COT J-...	100	PVC	120.0	0.02	0.000	0.1910
TCC-P...	COT J...	COT J-...	100	PVC	120.0	0.00	0.000	0.0000

23 of 5049 elements displayed | SORTED

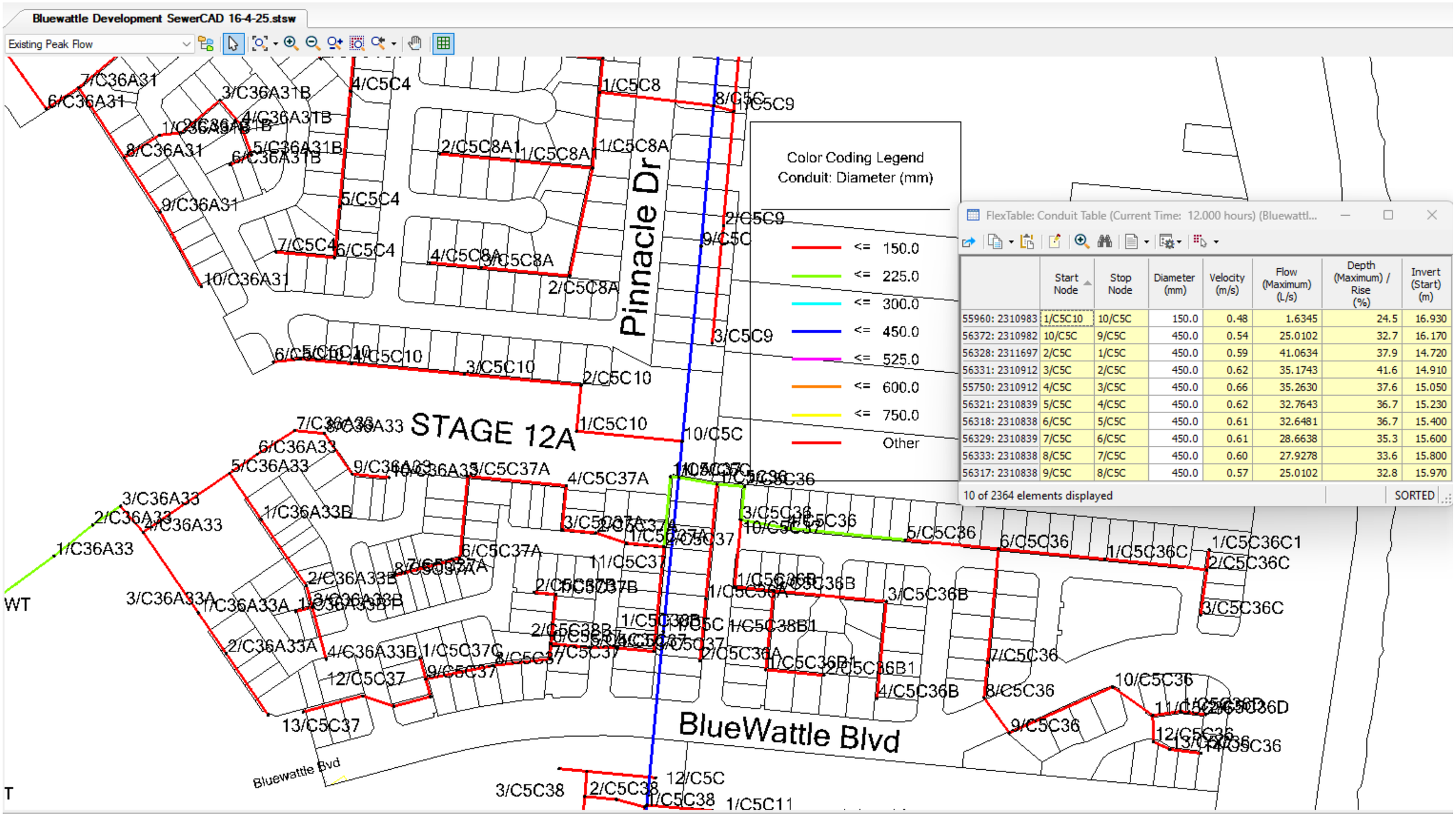
Somers & Hervey Stage 12A - Pipes Peak Hour & 15 l/s Fire Flow

APPENDIX C

SOMERS & HERVEY ESTATE

STAGE 12A SEWERGEMS MODELLING FIGURES & RESULTS

UPPER ROSS SEWERGEMS MODELLING FIGURE



	Start Node	Stop Node	Diameter (mm)	Velocity (m/s)	Flow (Maximum) (L/s)	Depth (Maximum) / Rise (%)	Invert (Start) (m)
55960: 2310983	1/C5C10	10/C5C	150.0	0.48	1.6345	24.5	16.930
56372: 2310982	10/C5C	9/C5C	450.0	0.54	25.0102	32.7	16.170
56328: 2311697	2/C5C	1/C5C	450.0	0.59	41.0634	37.9	14.720
56331: 2310912	3/C5C	2/C5C	450.0	0.62	35.1743	41.6	14.910
55750: 2310912	4/C5C	3/C5C	450.0	0.66	35.2630	37.6	15.050
56321: 2310839	5/C5C	4/C5C	450.0	0.62	32.7643	36.7	15.230
56318: 2310838	6/C5C	5/C5C	450.0	0.61	32.6481	36.7	15.400
56329: 2310839	7/C5C	6/C5C	450.0	0.61	28.6638	35.3	15.600
56333: 2310838	8/C5C	7/C5C	450.0	0.60	27.9278	33.6	15.800
56317: 2310838	9/C5C	8/C5C	450.0	0.57	25.0102	32.8	15.970

SOMERS & HERVEY – STAGE 12A – SEWERGEMS MODELLING RESULTS