PARKSIDE ANNANDALE MASTERPLAN

WATER SUPPLY & SEWERAGE PLANNING REPORT

Date: 30 Oct 2024
(Revision A)

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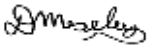
APPENDICES

REPORT AUTHORISATION				
Revision	**Revision Date**	**Details**	**Prepared by**	**Signature**
A	30/10/2024	Original Report	Desmond Moseley (RPEQ 7565)	

1 INTRODUCTION

An undeveloped land parcel is located on the northern side of the University Drv and western side of Stuart Drv in Annandale. The land parcel is located to the south of Gartrell Drv and east of Shanahan Drv. The extract from Council's GIS below illustrates the location of the Parkside Annandale development site. This site is the balance area of the original Annandale Gardens residential development.

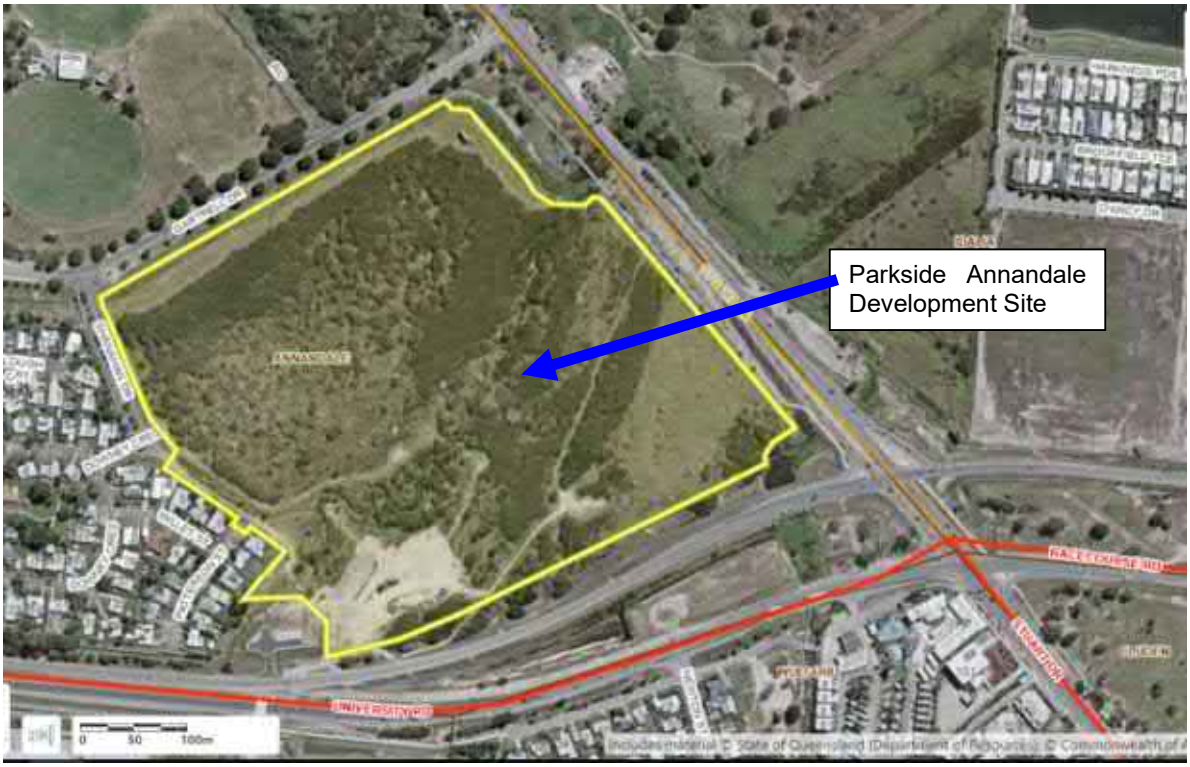


Figure 1.1 – Development Site Location

The initial stages of the proposed development are located along the southern (University Drv) side of the site and will include the following:

- Assisted/Independent Living area with a total of 154 units and a community site.
- Residential Aged Care Facility with a total of 96 beds.

The Figure 1.2 below illustrates the initial proposed development areas with a larger version of the proposed development provided in Appendix A.

Figure 1.2 – Initial Development Layout

To ensure the proposed development can be adequately serviced by with a potable water supply and sewage system in accordance with Council standards, an assessment of the system capacities have been undertaken. This report summarises the assessment of the existing water and sewerage network with this illustrating:

- The water network modelling shows the existing trunk and reticulation water mains that service the Annandale area are adequately sized to service the initial and full development of the site. DN100 and DN150 water main extensions will be required off the existing water mains on Patterson St and Shannahan Drv to service the initial aged care sites. A future DN150 water main extension along Gartrell Drv will be required to service the future residential development area. Any specific building/fire code requirements for the aged care facility will need to be addressed by the building designer.
- The existing DN375 trunk gravity sewer that is located at the south west corner of the residential aged care site will service the majority of the development. This trunk gravity sewer extends from MH 1/SC7A to the west and into PS SC7. PS SC7 was constructed in 2022. The existing DN150 gravity sewer from MH 6/SA7A to the south will also receive sewage flows from the future Allied Health facility and some of the future residential lots. The existing DN375 and DN150 gravity sewers along with PS SC7 have sufficient capacity to service the 5xADWF flows from the development site.

The water network modelling and sewer system capacity assessment undertaken for this development is summarised in the following report sections.

2 POPULATION ASSESSMENT

The following section provides the population assessment for the proposed Parkside Annandale Masterplan development. The population assessment includes the initial retirement village development area on the southern side of the site along with the future potential residential development area on the northern side of the site. The equivalent population assessment for the initial and full potential development of the site has been determined to ensure the water & sewer infrastructure is adequately sized for the ultimate site development. The image below generally illustrates the four main development areas.

Figure 2.1 – Parkside Annandale Development Areas

The equivalent population assessment has been developed based on the unit rates detailed in "Table 8.1 – Infrastructure Demand Unit Rates" of the Local Government Infrastructure Plan – DSS, Definitions & Demands (April 2017) that is extrinsic referenced material to the Townsville CityPlan.

The initial development area will involve:

- Lot 1 - Assisted/Independent Living with a total of 154 units and a community site.
- Lot 3 - Residential Aged Care Facility with a total of 96 beds.

The following Tables 2.1 and 2.2 detail the equivalent population for the initial aged care sites.

Table 2.1 – Aged Care Development - Water Equivalent Population Assessment

Development Site	Use Type	Number/Area	Rate	EP
Lot 1 – Independent Living Units	Independent Living Units	154	1.8 EP/unit	277.2 EP
	Community Site	2,400 m^2 GFA	1.35 EP/100m^2	32.4 EP

Lot 3 – Residential Aged Care Facility	Aged Care Beds	96	1.8 EP/bed	172.8 EP
Totals				**482.4 EP**

Table 2.2 – Aged Care Development - Sewer Equivalent Population Assessment

Development Site	Use Type	Number/Area	Rate	EP
Lot 1 – Independent Living Units	Independent Living Units Community Site	154 2,400 m^2 GFA	1.8 EP/unit 1.88 EP/100m^2	277.2 EP 45.1 EP
Lot 3 – Residential Aged Care Facility	Aged Care Beds	96	1.8 EP/bed	172.8 EP
Totals				**495.1 EP**

The adoption of the 1.8 EP/bed for the residential aged care facility accounts for the additional water demands and sewage generation that will occur from the staff and visitors to the facility.

The full development of the Parkside Annandale site will likely include a traditional residential subdivision on the northern side of the site (being to the south of Gartrell Drv) along with a future allied health facility on the western side of the site. The preliminary estimate of the future development areas is as follows:

- Lot 2 – Future residential subdivision with up to 120 lots.
- Lot 4 – An allied health facility with a gross floor area of around 3,500m^2.

The following Tables 2.3 and 2.4 detail the equivalent population for the future potential development areas on the Parkside Annandale site.

Table 2.3 – Future Development - Water Equivalent Population Assessment

Development Site	Use Type	Number/Area	Rate	EP
Lot 2 – Residential Subdivision	Residential Lots	120	2.8 EP/lot	336.0 EP
Lot 4 – Allied Health Facility	Commercial Site	3,500 m^2 GFA	1.35 EP/100m^2	47.3 EP
Totals				**383.3 EP**

Table 2.4 – Future Development - Sewer Equivalent Population Assessment

Development Site	Use Type	Number/Area	Rate	EP
Lot 2 – Residential Subdivision	Residential Lots	120	2.8 EP/lot	336.0 EP
Lot 4 – Allied Health Facility	Commercial Site	3,500 m^2 GFA	1.88 EP/100m^2	65.8 EP
Totals				**401.8 EP**

The above equivalent population assessment has been used in the water supply and sewer system capacity assessment for the proposed development.

3 WATER SUPPLY PLANNING

3.1 Water Demand

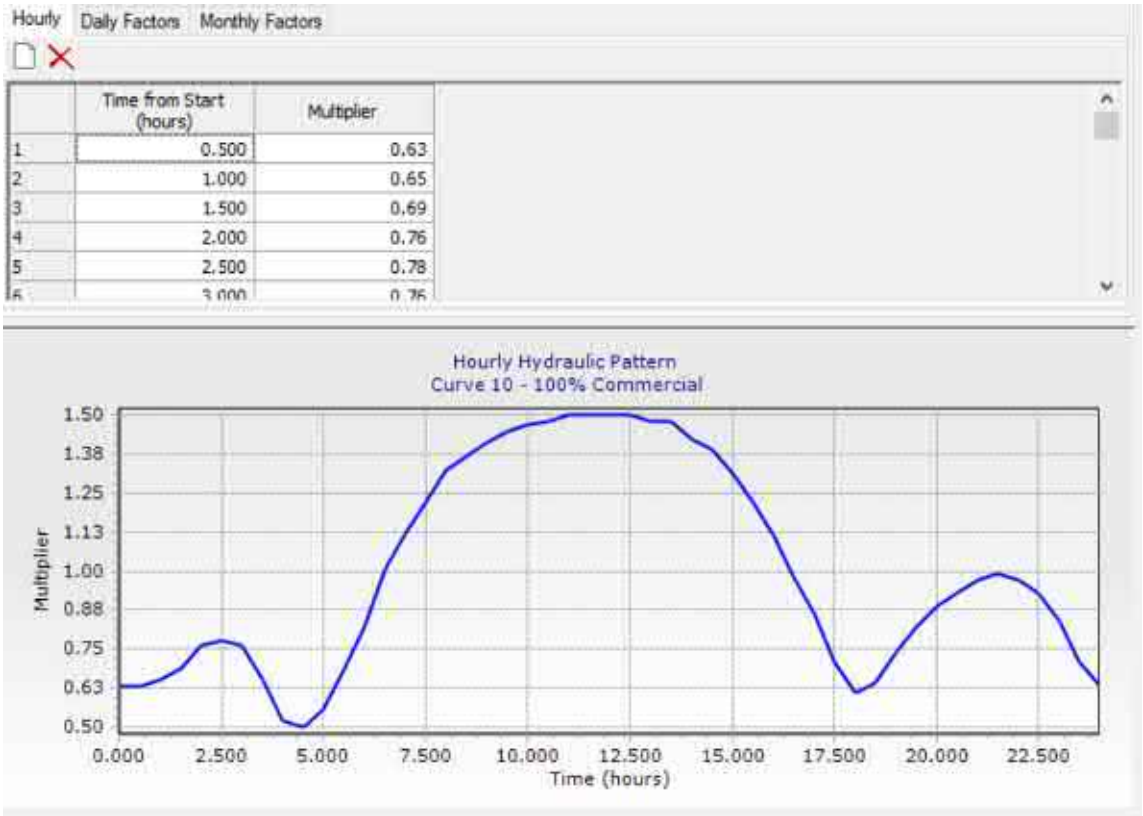
Water demands have been calculated in accordance with Townsville City Council planning scheme and CTM Code. The following table provides the “residential” water demand parameters for the Townsville Planning Scheme for each equivalent person (EP). The residential water demands and diurnal patterns have been applied to the independent living sites, the residential aged care facility and future residential lots.

Table SC6.4.3.21.2 Water supply unit demand parameters

Parameter	Unit Demand	Peaking Factor
Average Day (AD)	600 L/day/EP	
Mean Day Max Month (MDMM)	900 L/day/EP	1.5 AD
Peak Day (PD)	1125 L/day/EP	1.25 MDMM
Peak Hour (PH)	0.0333 L/s/EP	2.56 PD

The peak hour “residential” water demands have been applied to the development, giving a peak residential water demand of 786 EP x 0.0333 l/s/EP = 26.2 l/s.

Townsville Water also have diurnal water demand patterns that are applied to the non-residential uses. For the Parkside Annandale site there is expected to be some commercial type facilities including the future Allied Health site and the Community Facilities within the independent living site. The commercial demand diurnal pattern has a peaking factor of 1.5 and is illustrated on the Figure below from the WaterGEMS network model. The peak hour “commercial” water demands have been applied to the development, giving a peak commercial water demand of 79.7 EP x 0.0195 l/s/EP = 1.56 l/s.



Commercil Water Demand Diurnal Pattern

In addition to the above, as the development area has commercial uses, a 30 l/s fire flow is required in accordance with Council's design standards. This fire flow has been used to assess the theoretical performance of the water network. It is noted that the Building Code may require a 10 l/s @ 200 kPa fire flow depending on the actual building classification. This fire flow assessment has not specifically assessed the performance against the building code requirements. Additional fire hydrant testing may be required as part of the detailed hydraulic design of the facility.

3.2 Water Supply Assessment & Network Modelling

The existing site for the proposed independent living, residential aged care facility and future residential development area is located on the 19.6ha site in Annandale that is generally bounded by University Drv to the south, Abbott St to the east, Gartrell Drv to the north and the Annandale Gardens residential area to the west. The existing water infrastructure that services the site includes:

- Water is supplied from the Douglas No 1A/B reservoirs that are located on the northern foothills of Mt Stuart in Douglas. The Dougals No 1A/B reservoirs are 2 x 41 ML tanks.
- Water is delivered from the two reservoirs along a DN900 MSCL pipe on University Drv and Stuart Drv. The DN900 MSCL pipe is a bulk water main that delivers water to Sun Metals & Alligator Ck. This bulk water main is NOT able to be connected to.
- Water is also delivered from the Douglas reservoirs along a DN600 MSCL pipe on University Drv and Stuart Drv through to the intersection with Hynch St. The DN600 MSCL pipe is the bulk supply main to deliver water into the Wulguru reservoir. This water main is NOT able to be connected to.
- A DN375 AC trunk water main is also located along the southern side of University Drv. There are connections off this DN375 AC main to deliver water into the Annandale area.
- There are a couple of trunk outlet water mains from the Wulguru reservoir that is located on the north/eastern foothills of Mt Stuart. There is a DN450 DICL outlet main that generally runs along Powell St, Jenner St, Pasteur St and Watt St through to Stuart Drv. The DN450 DICL main then becomes a DN630 PE pipe (internal diameter of 500mm) that runs along Stuart Drv from Watt St to Racecourse Rd. A DN500 water main (DN630 PE and DN500 DICL pipe) used to extend to the north along Stuart Drv through to the intersection with Kokoda St. This water main has recently been replaced with a DN630 PE pipe as part of the DTMR's Stuart Drv upgrade project.
- There are a number of reticulation water main connections off the above trunk mains that service the Annandale residential area including the Annandale Gardens residential lots to the west of the proposed development site. These reticulation water mains include:
    - A DN150 water main crossing of University Drv to Patterson St. This main connects off the existing DN375 AC trunk main along the southern side of University Drv. This DN150 PVC main extends to the end of Patterson St being the western side of the development site.
    - A DN150 PVC main along Mervyn Crossman Drv connects to the existing DN630 PE trunk main on Stuart Drv to deliver water into the Annandale area from the east.
    - A DN150 PVC water main along the southern side of Gartrell Drv. This main connects to the above DN150 main on Mervyn Crossman Drv and extends to the east and into the north eastern corner of the Annandale Gardens residential area and reticulation network. This main is to the north west of the development site.

The image below from Council's GIS illustrates the existing water mains in the vicinity of the proposed development site.

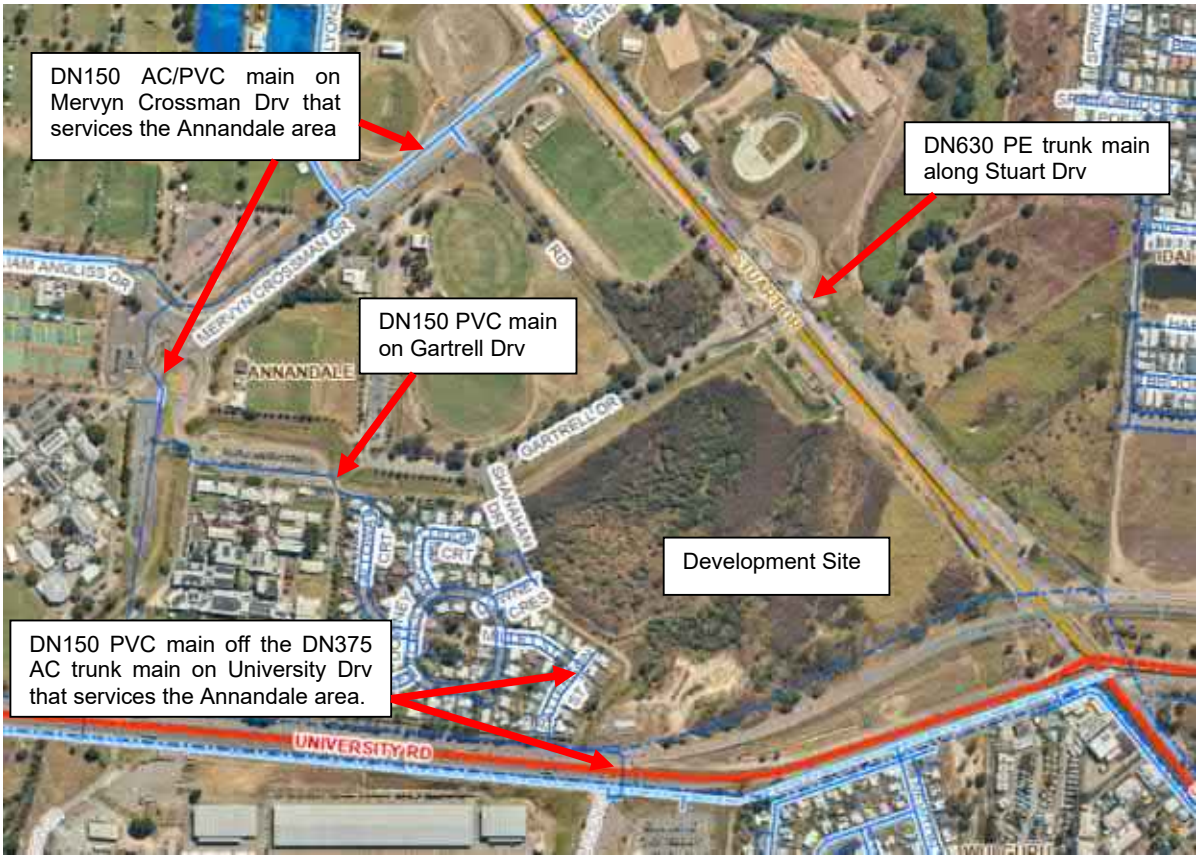


Figure 3.1 – Council GIS Plot of Water Infrastructure

Theoretical water network modelling has been undertaken to assess the capacity of the existing water network. The modelling was undertaken using the Council's WaterGems network model for both the peak hour demands and fire flows. To service the initial development site with reticulated water supply the following water infrastructure will be required:

- A connection to the end of the existing DN150 PVC water main at the northern end of Patterson St. This main will be extended to the east into the development site to the proposed internal development road.
- A connection to the existing DN100 PVC water main on Shannahan Drv at the intersection with Downey Cres. This is where the proposed new development road to the independent living and residential aged care sites will run from. An initial DN100 water main will be extended along this development road to service the independent living and aged care sites. This DN100 main will connect to the above DN150 water main extension off Patterson St.
- A DN150 main will then continue to the east and south along the new internal development road to service the independent living and aged care sites.
- There will be internal development water mains within the independent living development area. These mains have been sized to ensure sufficient water flows and pressures are provided to the residential lots and community centre.

The extract from the WaterGEMS model that illustrates the initial proposed water mains to service the independent living and residential aged care sites is provided in Figure 3.2 below.

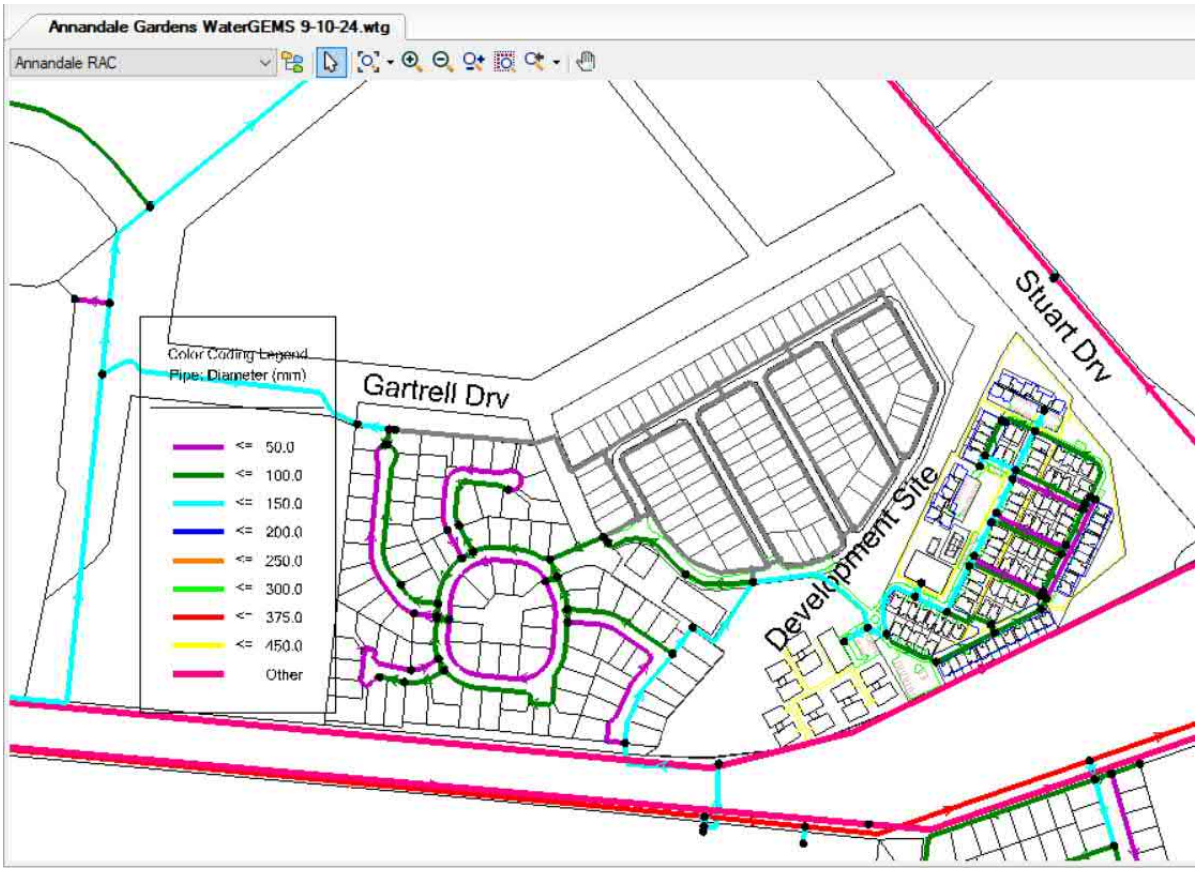


Figure 3.2 – Initial Water Mains to Service Aged Care Development

The theoretical WaterGEMS network modelling has been undertaken to confirm the sizing of the initial water mains required to service the residential aged care facility and independent living sites with a reticulated water supply. The WaterGEMS network modelling has shown:

- The existing trunk water mains along with the existing DN150 PVC mains that service the development site off University Drv/Patterson St and Gartrell Drv are adequately sized to service the initial development with peak hour and fire flows.
- The proposed DN150 PVC water main extension off the end of the DN150 main on Patterson St along with the proposed DN100 PVC water main extension off Shannahan Drv along the future development access road are also adequately sized for the initial development water demands.
- The peak hour pressures at 7 pm (ie the peak residential demand period) are reduced to 433 kPa within the development area. This meets the minimum pressure requirement of 220 kPa.
- The peak hour pressures at 12 noon (ie the peak commercial demand period) are reduced to 580 kPa within the development area. This is a higher pressure compared to the above peak residential demand period and is due to the large amount of residential development in the Annandale area.
- The headloss gradient along the existing and proposed water mains that service the development are generally up to 0.005 m/m with the pipe velocities up to 0.77 m/s. These both meet CTM design standards. There are a couple of water mains that exceed the recommended headloss gradient value but their velocity is only up to 1.02 m/s which is well within the CTM maximum velocity requirements of 2.5 m/s.

- With the inclusion of the 15 l/s residential fire flow at the eastern end of the independent living sites, the water pressure is reduced to 323 kPa. This achieves the minimum pressure requirement of 120 kPa.
- With the inclusion of the 30 l/s commercial fire flow for the proposed community centre within the independent living development area, the water pressure is reduced to 199 kPa. This achieves the minimum pressure requirement of 120 kPa.
- The flows along the existing and proposed development water mains with the inclusion of the fire flows is 2.2 m/s. This is less than the maximum allowable velocity of 4.0 m/s nominated in the CTM code for fire flows.
- The WaterGems figure and results table are provided in Appendix B. The Figure 3.3 below illustrates the water pressures at the eastern end of the independent living development area.

Figure 3.3 – Aged Care Development Peak Hour Water Pressures

To service the full development of the Parkside Annandale site including the future residential development area on the southern side of Gartrell Drv, additional water infrastructure will be required. The additional water infrastructure will include:

- A future extension of the DN150 PVC main along Gartrell Drv. This main will connect to the end of the existing DN150 main on Gartrell Drv and extend to the east to Shannahan Drv and then to the south along Shannahan Drv and into the future residential development area.
- Internal development DN150 and DN100 PVC mains and DN63 PE mains along the future residential development streets. The final location and sizing of the future residential development water mains will be determined as part of its detailed design and operational works approval.

Figure 4.3 below is an extract from the WaterGEMS model and illustrates the proposed water mains to service the full development area including the independent living sites, residential aged care facility, future Allied Health site and future residential lots.

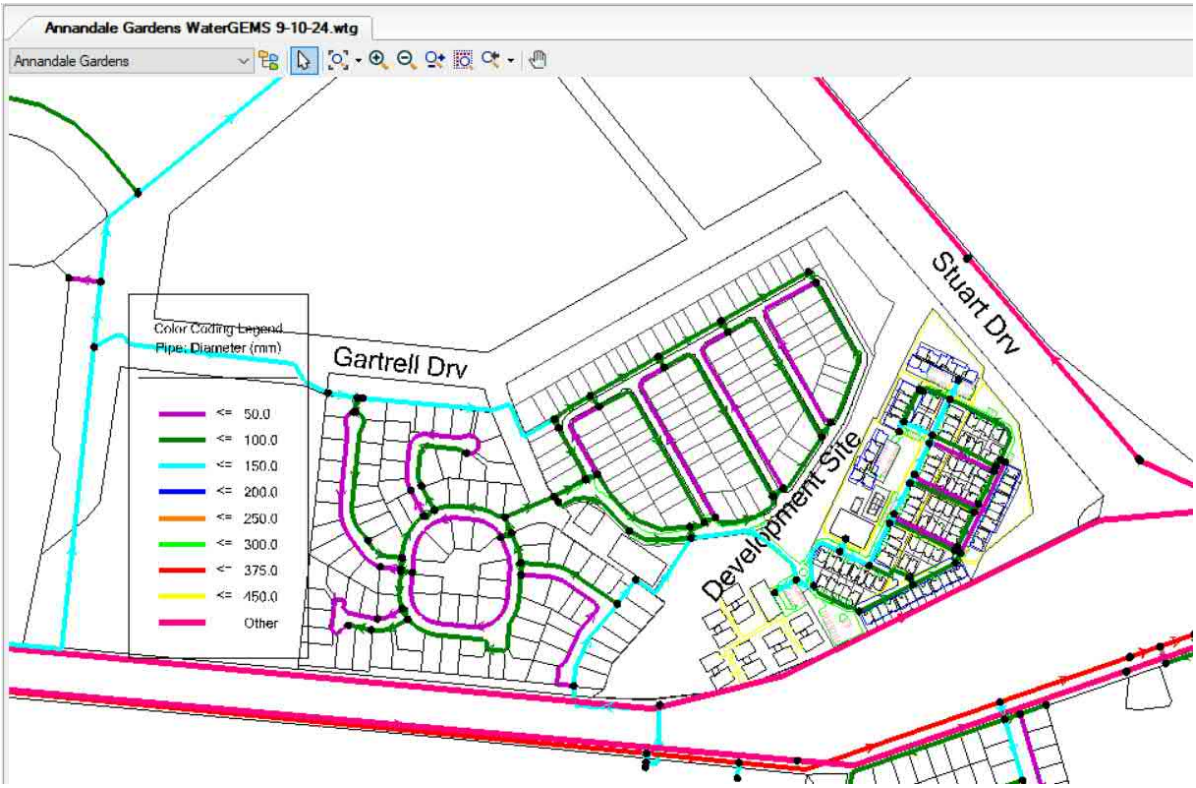


Figure 3.4 – Full Parkside Annandale Water Infrastructure

The theoretical WaterGems network modelling has been undertaken to determine the sizing of the full water mains required to service the Parkside Annandale development with a reticulated water supply. The WaterGEMS network modelling has shown:

- The existing trunk water mains along with the existing DN150 PVC mains that service the development site off University Drv/Patterson St and Gartrell Drv are adequately sized to service the full development with peak hour and fire flows.
- The proposed DN150 PVC water main extension to the east along Gartrell Drv to Shannahan Drv and into the future residential development area is required to service the full development of the site.
- The proposed DN150 PVC water main extension off the end of the DN150 main on Patterson St along with the proposed DN100 PVC water main extension off Shannahan Drv along the future development access road are also adequately sized for the full development water demands.
- The peak hour pressures at 7 pm (ie the peak residential demand period) are reduced to 419 kPa within the development area. This meets the minimum pressure requirement of 220 kPa.
- The peak hour pressures at 12 noon (ie the peak commercial demand period) are reduced to 573 kPa within the development area. This is a higher pressure compared to the above peak residential demand period and is due to the large amount of residential development in the Annandale area.
- The headloss gradient along the existing and proposed water mains that service the full development are generally up to 0.005 m/m with the pipe velocities up to 0.55 m/s. These both meet CTM design standards. There are a couple of water mains that exceed the recommended headloss gradient value but the velocity is only up to 1.23 m/s which is well within the CTM maximum velocity requirements of 2.5 m/s.

- With the inclusion of the 15 l/s residential fire flow at the eastern end of the independent living sites the water pressure is reduced to 317 kPa. This achieves the minimum pressure requirement of 120 kPa.
- With the inclusion of the 30 l/s commercial fire flow for the proposed community centre within the independent living development area the water pressure is reduced to 217 kPa. This achieves the minimum pressure requirement of 120 kPa.
- The flows along the existing and proposed development water mains with the inclusion of the fire flows is 2.23 m/s. This is less than the maximum allowable velocity of 4.0 m/s nominated in the CTM code for fire flows.
- The WaterGems figure and results table are provided in Appendix B.

The above theoretical water network modelling shows that the proposed initial and full development of the Parkside Annandale development is able to be serviced with a potable water supply that meets Council's standards.

It is noted that the fire flow WaterGEMS network modelling is to assess the proposed developments performance against Townsville Council planning standards. Based on the type/classification of the aged care facilities, the Building Code may require different fire flow and pressure standards, including a fire tank and booster pump system. This assessment has not specifically assessed the performance against the building code requirements.

4 SEWAGE SYSTEM PLANNING

The existing site for the proposed retirement village and future residential development area is able to be serviced with a reticulated gravity sewer system. The existing gravity sewer system that will service the development site consists of:

- The majority of the development site will be serviced off the recently constructed DN375 trunk gravity sewer system to PS SC7. PS SC7 is located to the west of the retirement village site and on the northern side of University Drv. The PS SC7 site was originally part of the Parkside land but was acquired by Council in 2021.
- A DN450 PE gravity sewer (internal diameter of 387mm) was constructed under University Drv from MH 2/SC7A to MH 1/SC7A. MH 1/SC7A is located on the northern side of University Drv and at the south west corner of the proposed residential aged care buildings. A DN375 PVC trunk sewer extends to the west from MH 1/SC7A and onto PS SC7. PS SC7 pumps the sewage to then north and into the DN600 common pressure main system to the Cleveland Bay STP.
- An existing DN150 gravity sewer extends to the north from the recently constructed PS SC7. The DN150 sewer connects to the existing MH 6/SA7A that is located at the eastern corner of No 13 Patterson St. The existing sewer system from the Annandale Gardens residential development used to extend to the east from MH 6/SA7A to existing PS SA7. Former PS SA7 was located towards the south east of the development site (where the independent living units are proposed). PS SA7 and the gravity sewer from the former pump station to MH 6/SA7A was decommissioned and removed as part of the new PS SC7 works in 2022.
- The existing DN150 gravity sewer from existing MH 6/SA7A extends to the north and west to service the existing Annandale Gardens residential development area.

Figure 4.1 below is a plot from the Council GIS that illustrates the gravity sewers that service the development site. The capacity of the existing sewer system is provided in the following report sections. It is noted that the GIS still shows the DN150 sewer from MH 6/SA7A to PS SA7 as being in operation but it was decommissioned and removed as part of the PS SC7 works in 2022.

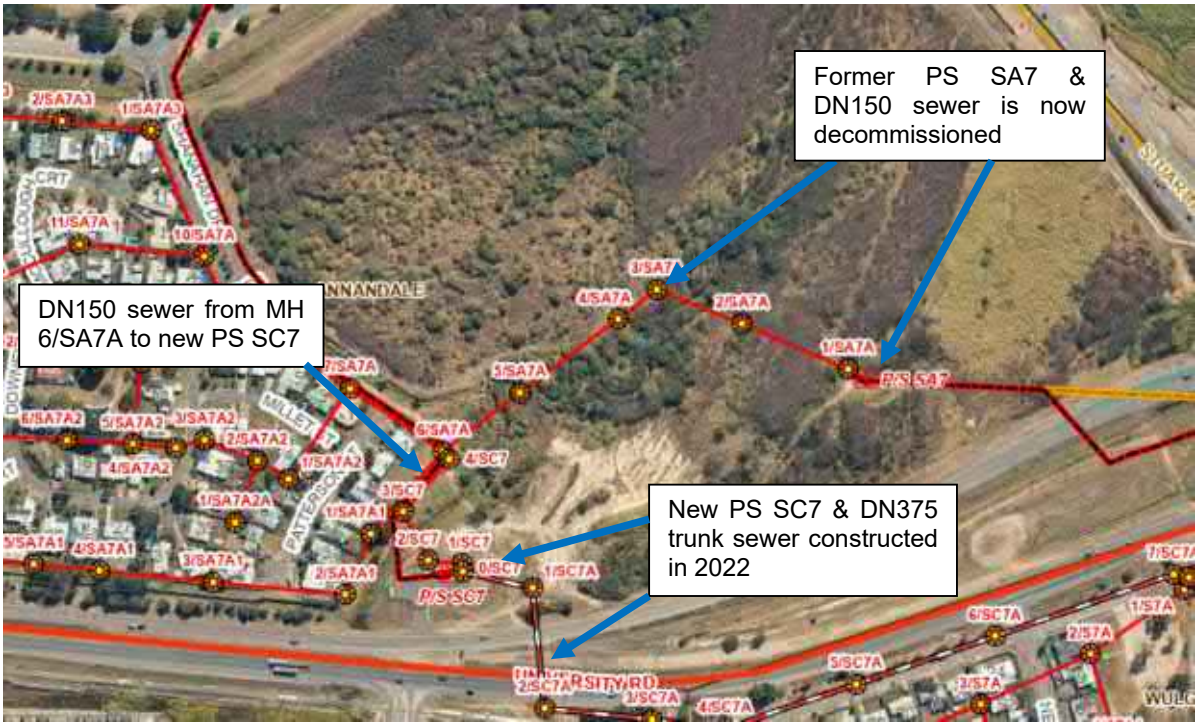


Figure 4.1 – GIS Plot of Existing Sewer System

4.1 Sewage Infrastructure Capacity

The capacity of the existing gravity sewer system to cater for the proposed retirement village development and future potential residential development was assessed using the SewerGEMS model developed for the Southern Suburbs Sewer System and the design of PS SC7.

The SewerGEMS model includes the existing reticulation and trunk gravity sewer system from the development site through to the recently constructed PS SC7. The SewerGEMS model was updated to include the preliminary gravity sewer alignment and grading to service all the proposed residential aged care buildings, the independent living sites along with the future potential residential development area. The additional equivalent population has been added to the various future sewer maintenance holes that will be constructed throughout the future development area. The preliminary gravity sewer system layout that has been included in the SewerGEMS model is illustrated on Figure 4.2 below. It is noted that this layout is only preliminary and was developed to confirm the general size of the future sewer system and to confirm that the proposed independent living units and future residential lots can be serviced off the existing gravity sewer system.

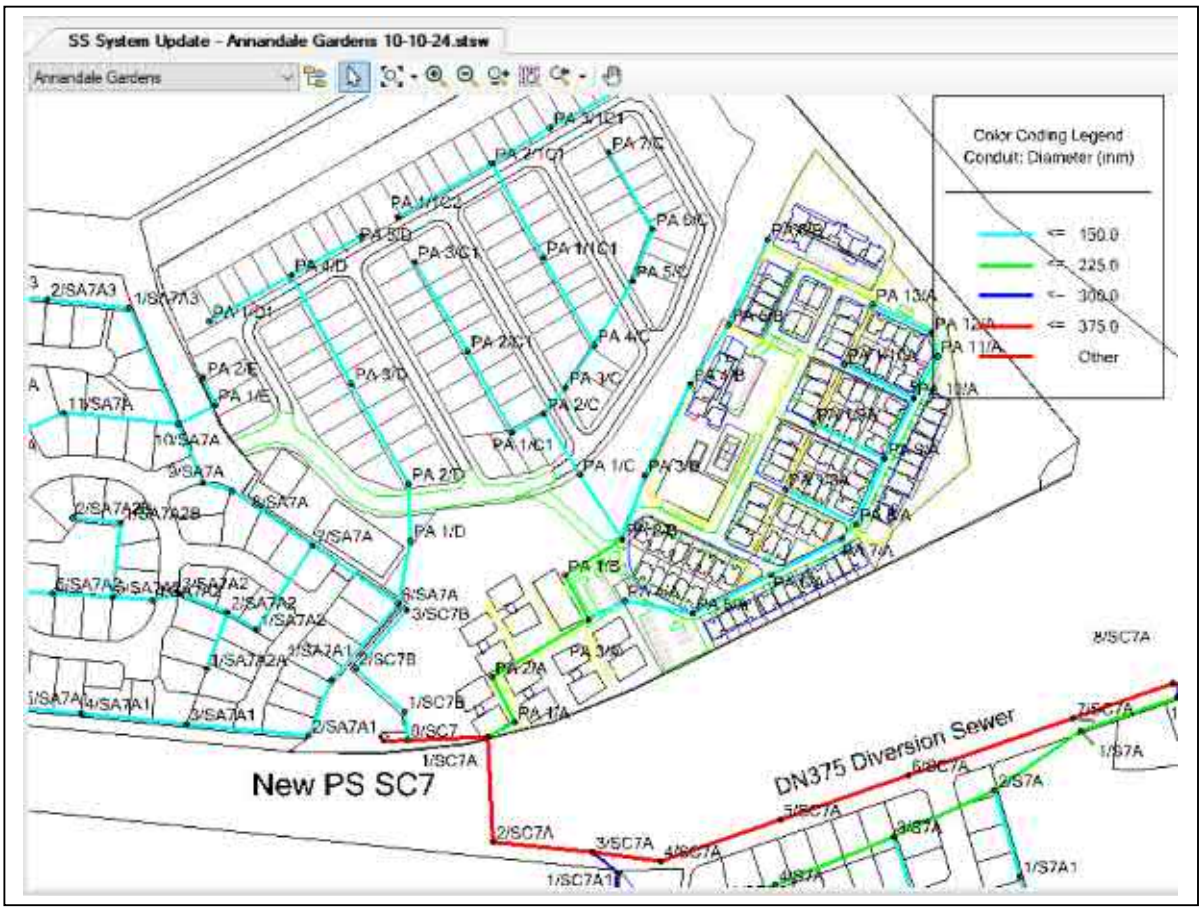


Figure 4.2 – Preliminary Retirement Village Development Sewer Layout

The above Figure 4.2 illustrates the preliminary sewer layout to service the proposed residential aged care sites, independent living sites along with the future residential development area. The actual layout and grading of the future gravity sewer system will be determined as part of the detailed design and operational works approval. The following is noted with the preliminary gravity sewer layout and sizing:

- A DN225 gravity sewer is proposed/required to extend from existing MH 1/SC7A to the north east to service most of the proposed development area. The DN225 sewer will

service the residential aged care site, the independent living sites along with the majority of the future proposed residential development area.

- The proposed DN225 sewer will then split into a couple of DN150 gravity sewers to service the various portions of the development area.
- It is expected that the future Allied Health facility and some of the future residential lots will be serviced of the existing DN150 gravity sewer line that services the Annandale Gardens residential development. This would have a new DN150 sewer extending off existing MH 6/SA7A to service the future Allied Health facility and residential lots.

With the inclusion of the preliminary gravity sewer system in the SewerGEMS model as noted above, along with the inclusion of the additional equivalent population loading, the SewerGEMS model has illustrated:

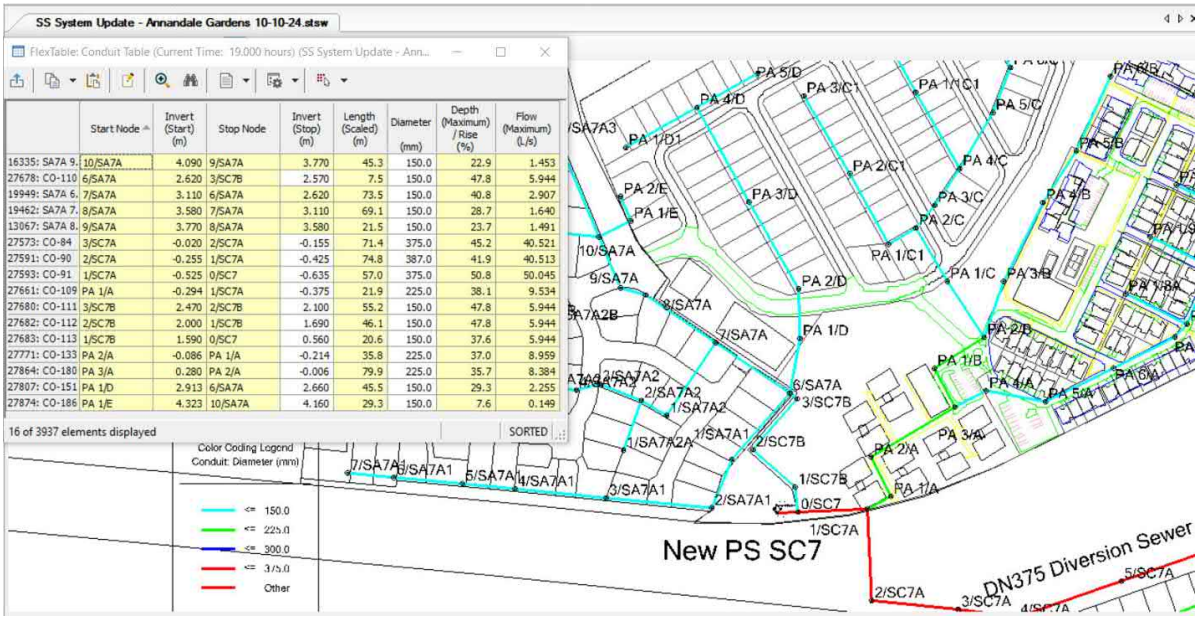
- The existing DN375 trunk gravity sewer system to PS SC7 that will service the proposed development site flows up to 51% full for the current 5xADWF.
- The proposed DN225 and DN150 gravity sewers that will service the residential aged care buildings, the independent living units and future residential development area are adequately sized. The final sections of the proposed DN225 gravity sewer flows up to 38% full, while the proposed DN150 gravity sewers flow up to 34% full.
- The existing DN150 sewer from existing MH 10/SA7A (western side of Shannahan Drv and proposed to service a few future residential lots) through to MH 6/SA7A (located to the south of the proposed Allied Health facility) flows up to 41% full.
- The existing (newly constructed in 2022) DN150 gravity sewer from MH 6/SA7A through to PS SC7 flows up to 48% full. This sewer line services the existing Annandale Gardens residential development area and will likely also service the proposed Allied Health facility and some of the future residential development lots.
- All the existing sewers flow less than 75% full which is the maximum value allowable in the CTM code.
- Existing PS SC7 is able to pump the sewage from the proposed development through to the common pressure main system and onto the Cleveland Bay STP.

The above assessment illustrates the existing gravity sewer system and PS SC7 has sufficient capacity to cater for the 5xADWF flows from the proposed full development of the Parkside Annandale development area and its existing catchment.

The existing PS SC7 and DN375 gravity sewer system that services Wulguru has current capacity issues due to the high amounts of infiltration and inflow that occurs into the existing old gravity sewers and maintenance holes. In the past two wet seasons there have been sewage overflows occurring from the existing gravity sewer system. It is understood that Council is undertaking investigations and renewal/rectification works to reduce the amount of infiltration/inflow into the sewer system so that the overflows do not occur.

Notwithstanding this, PS SC7 was designed to allow for larger sewage pumps to be installed as development expands and sewage flows increase in its catchment. The power supply to the pump station was sized to allow for the larger pumps to be installed. To have the larger pumps installed the existing electrical/control switchboard at PS SC7 will need to be replaced along with the purchase and installation of larger sewage pumps. Townsville City Council should consider the upgrade of the PS SC7 pumps when the initial stages of the Parkside Annandale independent living and residential aged care sites are being constructed.

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 full development area. A larger version of the modelling results is provided in Appendix C.



	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Diameter (mm)	Depth (Maximum) / Rise (%)	Flow (Maximum) (L/s)
16335: SA7A 9.	10/SA7A	4.090	9/SA7A	3.770	45.3	150.0	22.9	1.453
27678: CO-110	6/SA7A	2.620	3/SC7B	2.570	7.5	150.0	47.8	5.944
19949: SA7A 6.	7/SA7A	3.110	6/SA7A	2.620	73.5	150.0	40.8	2.907
19462: SA7A 7.	8/SA7A	3.580	7/SA7A	3.110	69.1	150.0	28.7	1.640
13067: SA7A 8.	9/SA7A	3.770	8/SA7A	3.580	21.5	150.0	23.7	1.491
27573: CO-84	3/SC7A	-0.020	2/SC7A	-0.155	71.4	375.0	45.2	40.521
27591: CO-90	2/SC7A	-0.255	1/SC7A	-0.425	74.8	387.0	41.9	40.513
27593: CO-91	1/SC7A	-0.525	0/SC7	-0.635	57.0	375.0	50.8	50.045
27661: CO-109	PA 1/A	-0.294	1/SC7A	-0.375	21.9	225.0	38.1	9.534
27680: CO-111	3/SC7B	2.470	2/SC7B	2.100	55.2	150.0	47.8	5.944
27682: CO-112	2/SC7B	2.000	1/SC7B	1.690	46.1	150.0	47.8	5.944
27683: CO-113	1/SC7B	1.590	0/SC7	0.560	20.6	150.0	37.6	5.944
27771: CO-133	PA 2/A	-0.086	PA 1/A	-0.214	35.8	225.0	37.0	8.959
27864: CO-180	PA 3/A	0.280	PA 2/A	-0.006	79.9	225.0	35.7	8.384
27807: CO-151	PA 1/D	2.913	6/SA7A	2.660	45.5	150.0	29.3	2.255
27874: CO-186	PA 1/E	4.323	10/SA7A	4.160	29.3	150.0	7.6	0.149

Figure 4.3 – SewerGEMS Modelling Results

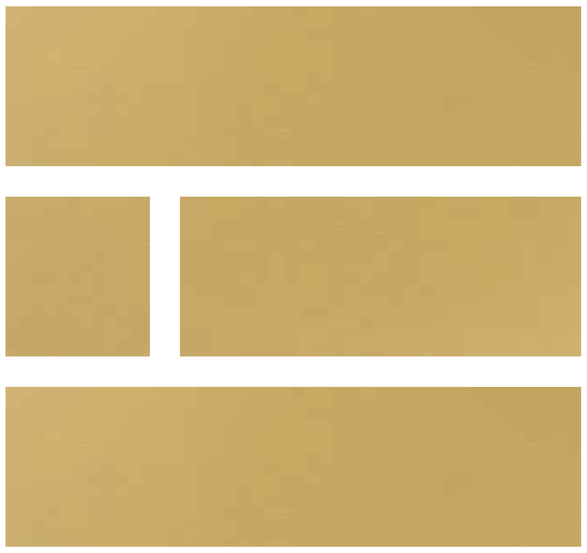
APPENDIX A
PARKSIDE ANNANDALE MASTERPLAN DEVELOPMENT PLANS

COTTEEPARKER

Parkside Annandale Masterplan

33 UNIVERSITY ROAD, ANNANDALE

7309 19/03/2024



DEVELOPMENT SUMMARY

Aged Care						
Option	**Type**	**Storeys**	**Qty**	**GFA (m^2)**	**Lot Size (m^2)**	**Car No.**
Option 1A	Small House Design	1	96	5,200 m2	13,600 m2	TBC*
Option 1B	Traditional Format	2	96-120	8,600 m2		
Option 1C	Household Wings	2	96	7,200 m2		

Assisted/Independent Living						
Configuration	**Type**	**Storeys**	**Qty**	**GFA (m^2)**	**Lot Size (m^2)**	**Car No.^**
Villa - Standard	2 Bed / 1 Bath / 1 Car	1	41	110 m2	190 m2	41
	3 Bed / 2 Bath / 1 Car		22	127 m2	250 m2	22
			63	**7,620 m2**		**63**
Villa - Deluxe	2 Bed / 1 Bath / 1 Car	1	22	130 m2	210 m2	22
	3 Bed / 2 Bath / 1 Car		9	178 m2	300 m2	18
			31	**4,470 m2**		**40**
Apartment - West	2 Bed / 2 Bath / 1 Car	3	15	120 m2	2,700 m2	15
	3 Bed / 2 Bath / 1 Car		11	140 m2		11
			26	**5,675 m2**	**2,700 m2**	**26**
Apartment - North	2 Bed / 2 Bath / 1 Car	3	23	120 m2	3,100 m2	23
	3 Bed / 2 Bath / 1 Car		11	140 m2		11
			34	**7,135 m2**	**3,100 m2**	**34**
			154	**24,900 m2**	**45,650 m2**	**232** *

Communal Facilities						
		Storeys	**Qty**	**GFA (m^2)**	**Lot Size (m^2)**	**Car No.**
Communal Facilities		2	1	2,400 m2	5,300 m2	15 *

* Carparking numbers to be confirmed by a Traffic Engineer
^ ILU car numbers represents number of dedicated carparks/garages. On driveway and on-road parking also available

Total Lot Size includes roadways. Total GFA is approximate only.

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PARKSIDE GROUP

Parkside Annandale Masterplan

33 UNIVERSITY ROAD, ANNANDALE
CLIENT - PARKSIDE DEVELOPMENTS PTY LTD

DRAWING TITLE
DEVELOPMENT SUMMARY

JOB No	DRAWING No	ISSUE
7309	**MP-0002**	**B**

GARTRELL DRIVE

SHANAHAN DRIVE

STANDARD RESIDENTIAL

STORMWATER RETENTION BASIN

2.80

ALLIED HEALTH

POTENTIAL CONNECTION

UNIVERSITY ROAD

SEWER PUMP STATION (50m BUFFER ZONE)

COMMINITY

AGED CARE

ADMIN

EXISTING DIRT ROAD - UPGRADE TO EMERGENCY ACCESS

COMMUNAL FACILITIES
1,207.60 m²

APARTMENT
3 STOREYS

APARTMENT
3 STOREYS

PARK / BBQ

PARK

FOOT PATH

FOOT PATH

ASSISTED LIVING / INDEPENDENT VILLAS

STORMWATER RETENTION BASIN

PERIMETER TO BE CHECKED AGAINST FLOOD MODELLING

BIKE PATH

STUART DRIVE

BRUCE HWY

Aged Care			
	Type	Storeys	Qty
Option 1A	Small House Design	1	96
Option 1B	Traditional Model	2	96-120
Option 1C	Household Wings	2	96

Assisted/Independent Living			
Type	Storeys	Type	Qty
Villa - Standard	1	2 Bed / 1 Bath / 1 Car	41
		3 Bed / 2 Bath / 1 Car	22
		Total Standard Villas	**63**
Villa - Deluxe	1	2 Bed / 2 Bath / 1 Car	22
		3 Bed / 2 Bath / 2 Car	9
		Total Deluxe Villas	**31**
Apartment	3	2 Bed / 2 Bath / 1 Car	38
		3 Bed / 2 Bath / 1 Car	22
		Total Apartments	**60**
Total Number of Independent Living Units			**154**

1 / - MASTERPLAN
SCALE 1:1000 @ A1
SCALE 1:2000 @ A3

0 10 20 30 40 50 60 70 80 90 100
SCALE 1: 1000 @ A1
SCALE 1: 2000 @ A3

N

SEWER PUMP STATION BUFFER ZONE
SECURE ZONE
BOUNDARY
WATER - 10m BUFFER ZONE
APROX. TOP OF BANK

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Parkside Annandale Masterplan

33 UNIVERSITY ROAD, ANNANDALE
CLIENT - PARKSIDE DEVELOPMENTS PTY LTD

DRAWING TITLE
MASTERPLAN

JOB No	DRAWING No	ISSUE
7309	MP-1001	C

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PARKSIDE GROUP

96 BEDS
1 STOREY

BASED ON SMALL HOUSE MODEL

1 - AGED CARE - OPTION 1A
SCALE 1:750 @ A1
SCALE 1:1500 @ A3

96-120 BEDS
2 STOREYS

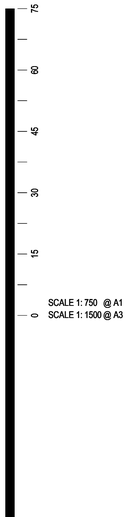
BASED ON TRADITIONAL CENTRAL COURTYARD MODEL

2 - AGED CARE - OPTION 1B
SCALE 1:750 @ A1
SCALE 1:1500 @ A3

96 BEDS
2 STOREYS

BASED ON CENTRALISED HOUSEHOLD WING MODEL

3 - AGED CARE - OPTION 1C
SCALE 1:750 @ A1
SCALE 1:1500 @ A3



Aged Care			
	Type	Storeys	Qty
Option 1A	Small House Design	1	96
Option 1B	Traditional Model	2	96-120
Option 1C	Household Wings	2	96

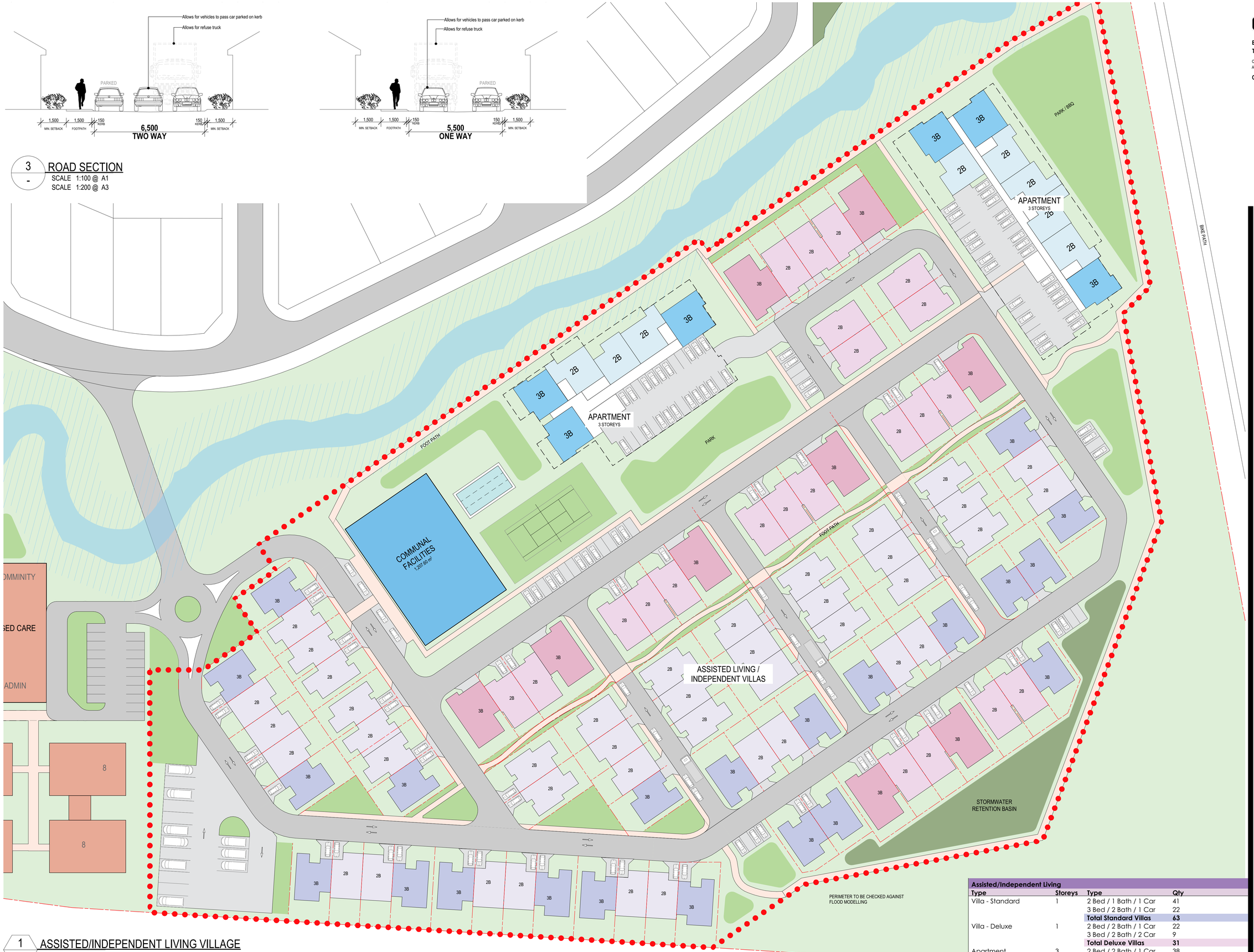
Parkside Annandale Masterplan

33 UNIVERSITY ROAD, ANNANDALE
CLIENT - PARKSIDE DEVELOPMENTS PTY LTD

DRAWING TITLE
AGED CARE OPTIONS

JOB No **7309** | DRAWING No **MP-1002** | ISSUE **C**

3
-
ROAD SECTION
SCALE 1:100 @ A1
SCALE 1:200 @ A3



1
-
ASSISTED/INDEPENDENT LIVING VILLAGE
SCALE 1:500 @ A1
SCALE 1:1000 @ A3

Assisted/Independent Living			
Type	**Storeys**	**Type**	**Qty**
Villa - Standard	1	2 Bed / 1 Bath / 1 Car	41
		3 Bed / 2 Bath / 1 Car	22
		Total Standard Villas	**63**
Villa - Deluxe	1	2 Bed / 2 Bath / 1 Car	22
		3 Bed / 2 Bath / 2 Car	9
		Total Deluxe Villas	**31**
Apartment	3	2 Bed / 2 Bath / 1 Car	38
		3 Bed / 2 Bath / 1 Car	22
		Total Apartments	**60**
Total Number of Independent Living Units			**154**

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PARKSIDE GROUP

0 1 2 3 4 5 6 7 8 9 10

SCALE 1: 100 @ A1
SCALE 1: 200 @ A3

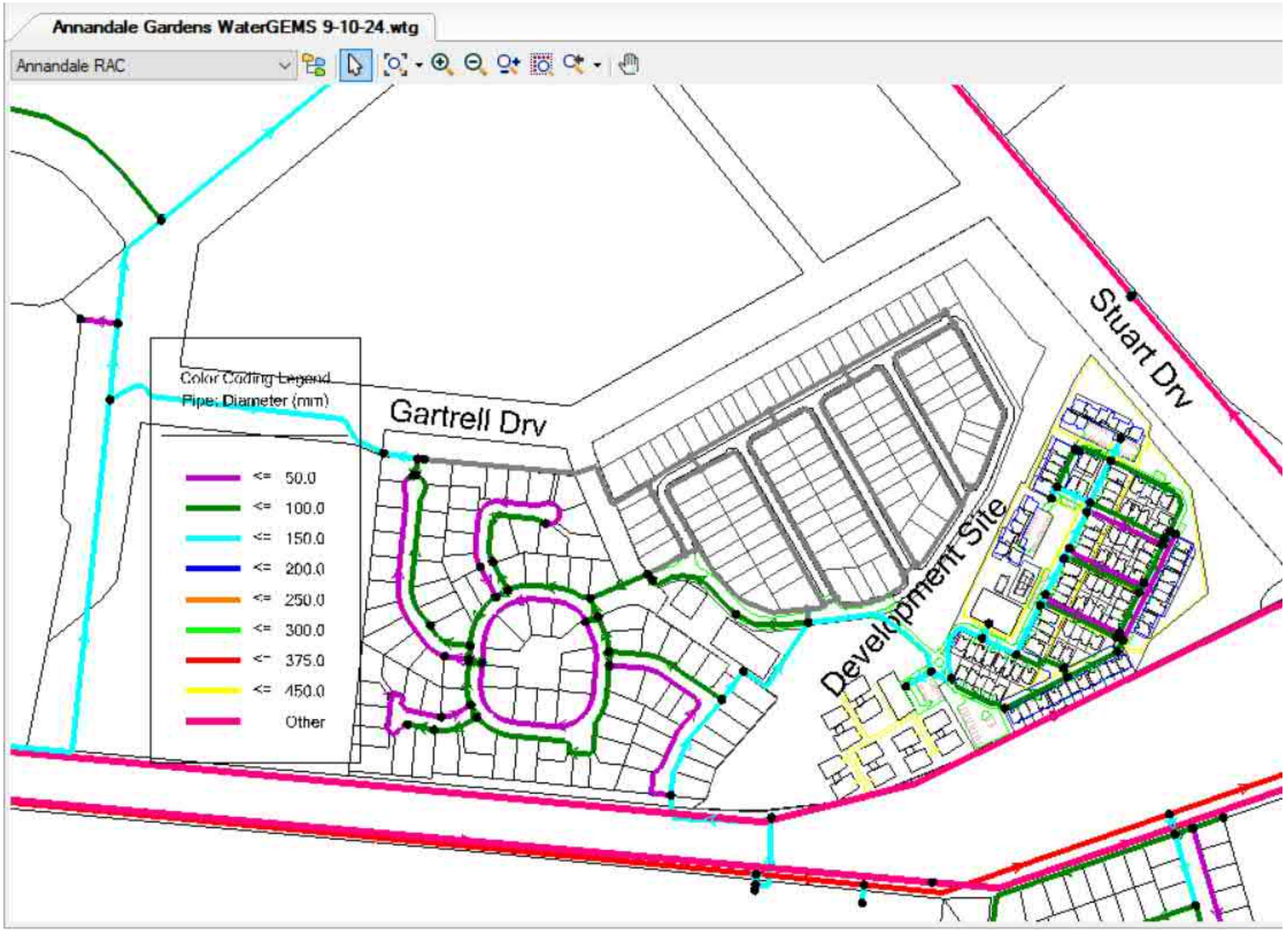
Parkside Annandale Masterplan

33 UNIVERSITY ROAD, ANNANDALE
CLIENT - PARKSIDE DEVELOPMENTS PTY LTD

DRAWING TITLE
ASSISTED/INDEPENDENT LIVING VILLAGE

JOB No	DRAWING No	ISSUE
7309	MP-1003	C

APPENDIX B
WATERGEMS MODELLING RESULTS



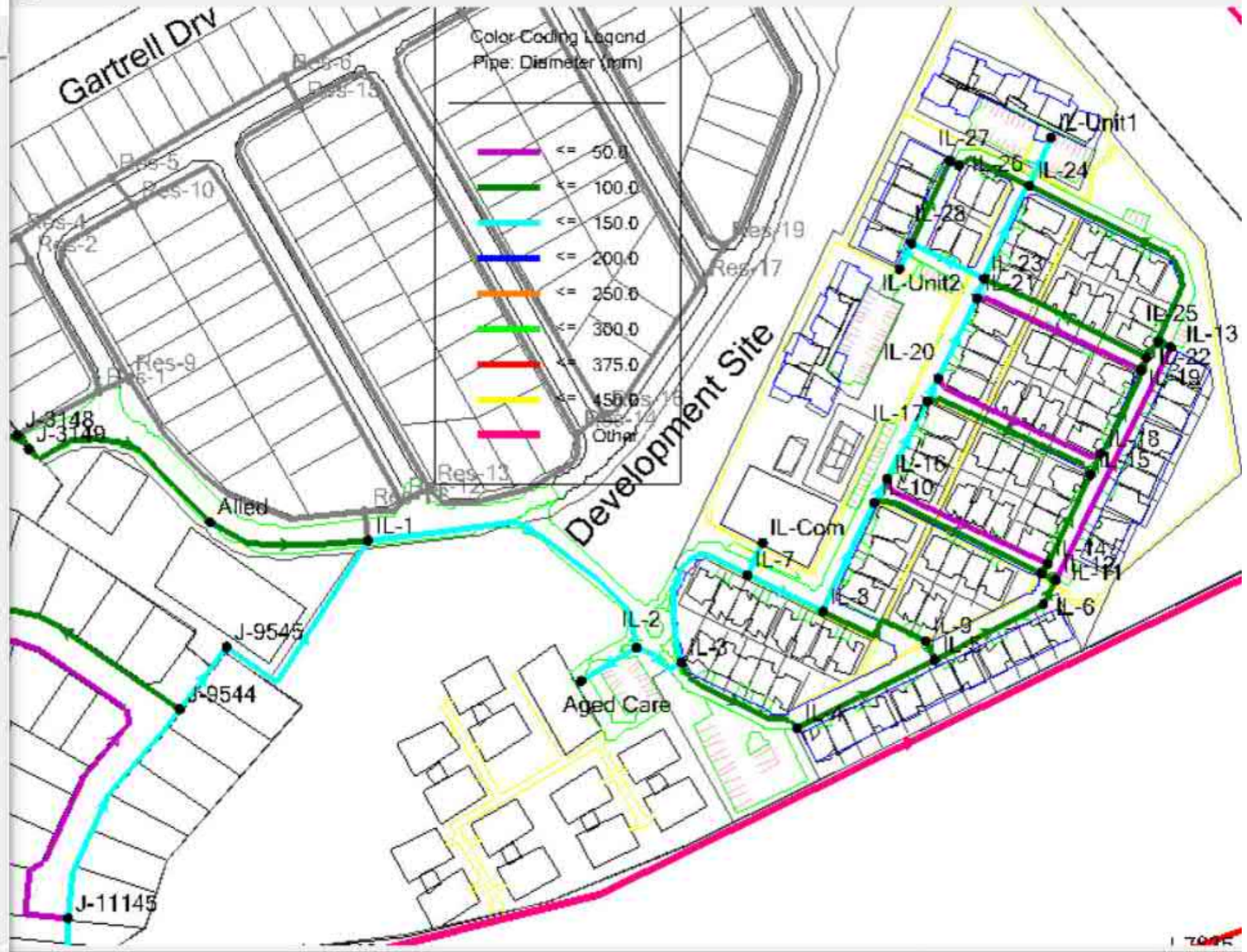
Initial Aged Care Development – WaterGEMS Figure

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Junction Table (Current Time: 19.0...

	Label	Demand (L/s)	Elevation (m)	Pressure (m H2O)
60580: Aged Ca	Aged Care	5.69	6.00	44.4
60574: IL-1	IL-1	0.00	6.50	44.9
60578: IL-2	IL-2	0.00	6.00	44.5
60582: IL-3	IL-3	0.30	6.00	44.4
60584: IL-4	IL-4	0.30	6.00	44.3
60625: IL-5	IL-5	0.12	6.00	44.2
60586: IL-6	IL-6	0.24	6.00	44.2
60650: IL-7	IL-7	0.24	6.00	44.3
60609: IL-8	IL-8	0.24	6.00	44.2
60623: IL-9	IL-9	0.18	6.00	44.2
60611: IL-10	IL-10	0.18	6.00	44.2
60629: IL-11	IL-11	0.24	6.00	44.2
60631: IL-12	IL-12	0.24	6.00	44.2
60588: IL-13	IL-13	0.30	6.00	44.1
60635: IL-14	IL-14	0.24	6.00	44.2
60641: IL-15	IL-15	0.24	6.00	44.2
60637: IL-16	IL-16	0.18	6.00	44.2
60613: IL-17	IL-17	0.18	6.00	44.2
60644: IL-18	IL-18	0.24	6.00	44.1
60620: IL-19	IL-19	0.24	6.00	44.1
60615: IL-20	IL-20	0.18	6.00	44.1
60617: IL-21	IL-21	0.18	6.00	44.1
60606: IL-22	IL-22	0.18	6.00	44.1
60603: IL-23	IL-23	0.18	6.00	44.1
60592: IL-24	IL-24	0.24	6.00	44.1
60590: IL-25	IL-25	0.18	6.00	44.1
60594: IL-26	IL-26	0.24	6.00	44.1
60596: IL-27	IL-27	0.18	6.00	44.1
60600: IL-28	IL-28	0.12	6.00	44.1
60653: IL-Com	IL-Com	0.33	6.00	44.3
60648: IL-Unit1	IL-Unit1	1.78	6.00	44.1
60598: IL-Unit2	IL-Unit2	1.78	6.00	44.1
5015: J-3148	J-3148	0.00	6.28	45.3
5016: J-3149	J-3149	0.00	6.31	45.2
12412: J-7607	J-7607	0.28	6.57	45.0
16071: J-9544	J-9544	0.66	6.06	46.1
16072: J-9545	J-9545	0.00	5.91	46.0

37 of 7629 elements displayed | SORTED



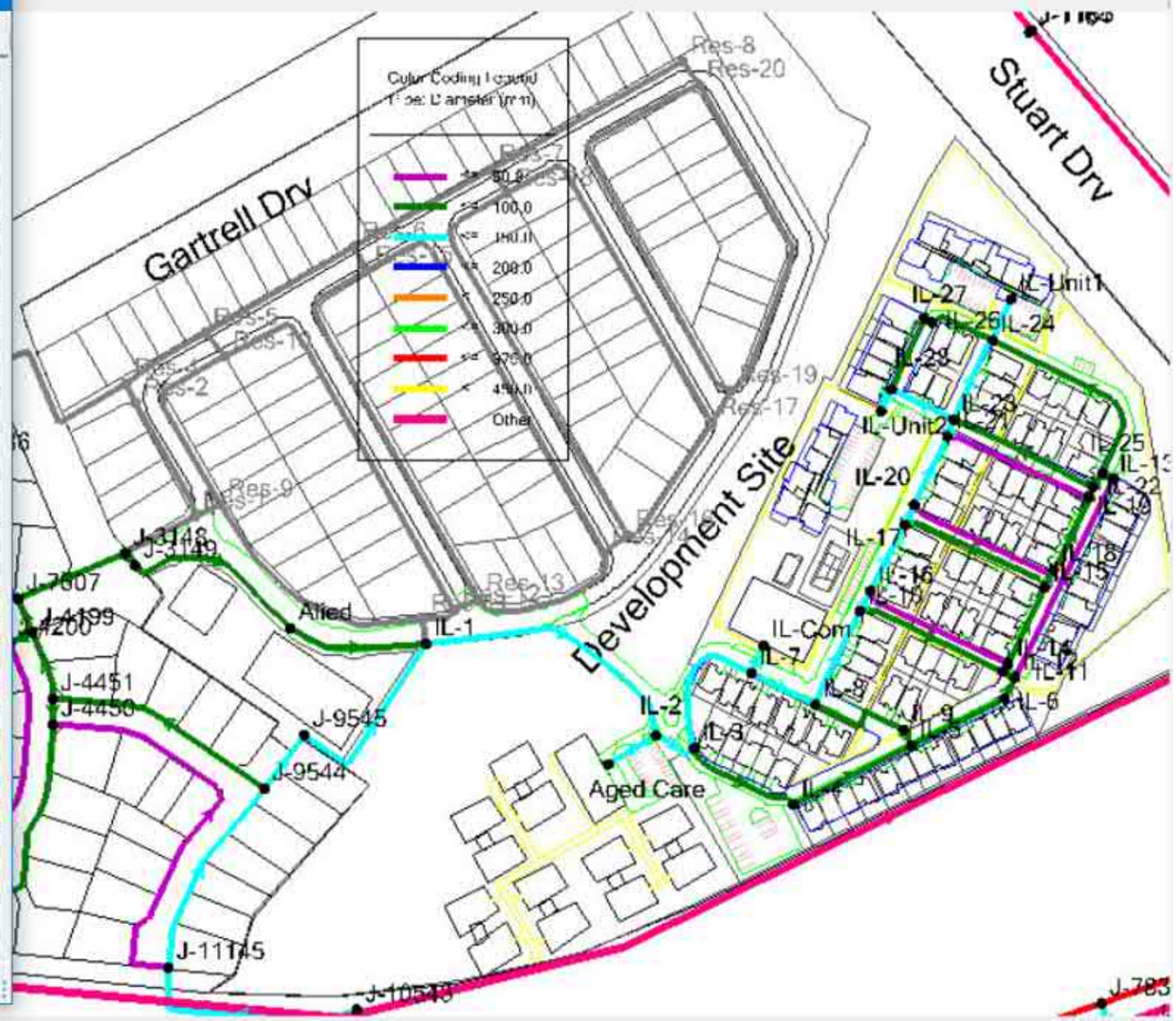
Initial Development - Peak Hour Node Modelling Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Pipe Table (Current Time: 19.000 hours) (Annandale Gardens WaterG...

	Start Node	Stop Node	Length (Scaled) (m)	Diameter (mm)	Material	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Hazen-Williams C
5014: 28768	J-3148	J-3149	7.78	100.0	PVC	1.93	0.25	0.001	120.0
60663: P-806	J-3149	Allied	96.02	100.0	PVC	1.93	0.25	0.001	120.0
18267: 28765	J-7607	J-3148	58.29	100.0	PVC	1.93	0.25	0.001	120.0
16070: 27083	J-9544	J-9545	33.50	150.0	PVC	13.65	0.77	0.005	120.0
21690: 26845	J-9544	J-11145	104.29	150.0	PVC	18.04	1.02	0.009	120.0
60575: P-764	J-9545	IL-1	98.60	150.0	PVC	13.65	0.77	0.005	120.0
60720: P-830	IL-1	IL-2	142.22	150.0	PVC	15.09	0.85	0.007	120.0
60581: P-767	IL-2	Aged C...	27.77	150.0	PVC	5.69	0.32	0.001	120.0
60583: P-768	IL-2	IL-3	23.36	150.0	PVC	9.40	0.53	0.003	120.0
60585: P-769	IL-3	IL-4	59.94	100.0	PVC	2.28	0.29	0.001	120.0
60651: P-781(1)	IL-3	IL-7	73.98	150.0	PVC	6.82	0.39	0.002	120.0
60626: P-770(1)	IL-4	IL-5	66.03	100.0	PVC	1.99	0.25	0.001	120.0
60593: P-773	IL-25	IL-24	107.95	100.0	PVC	0.41	0.05	0.000	120.0
60595: P-774	IL-24	IL-26	33.89	100.0	PVC	0.22	0.03	0.000	120.0
60649: P-800	IL-24	IL-Unit1	22.67	150.0	PVC	1.78	0.10	0.000	120.0
60597: P-775	IL-26	IL-27	4.45	100.0	PVC	0.02	0.00	0.000	120.0
60601: P-776(1)	IL-27	IL-28	38.92	100.0	PVC	0.20	0.03	0.000	120.0
60602: P-776(2)	IL-28	IL-Unit2	12.25	150.0	PVC	1.78	0.10	0.000	120.0
60604: P-777	IL-28	IL-23	34.49	150.0	PVC	2.10	0.12	0.000	120.0
60605: P-778	IL-23	IL-24	44.54	150.0	PVC	1.82	0.10	0.000	120.0
60607: P-779	IL-23	IL-22	77.70	100.0	PVC	0.25	0.03	0.000	120.0
60612: P-782	IL-8	IL-10	51.70	150.0	PVC	5.79	0.33	0.001	120.0
60624: P-789	IL-8	IL-9	53.59	100.0	PVC	0.23	0.03	0.000	120.0
60630: P-791	IL-10	IL-11	78.82	100.0	PVC	0.64	0.08	0.000	120.0
60618: P-785	IL-20	IL-21	38.07	150.0	PVC	4.04	0.23	0.001	120.0
60647: P-799	IL-19	IL-18	40.34	100.0	PVC	1.30	0.17	0.001	120.0
60628: P-790	IL-9	IL-5	9.00	100.0	PVC	0.05	0.01	0.000	120.0
60627: P-770(2)	IL-5	IL-6	52.40	100.0	PVC	1.92	0.24	0.001	120.0
60642: P-795	IL-14	IL-15	42.38	100.0	PVC	1.45	0.18	0.001	120.0
60639: P-783(2)	IL-16	IL-17	37.54	150.0	PVC	4.73	0.27	0.001	120.0
60643: P-796	IL-15	IL-17	78.86	100.0	PVC	0.28	0.04	0.000	120.0
60652: P-781(2)	IL-7	IL-8	35.92	150.0	PVC	6.26	0.35	0.001	120.0
60654: P-801	IL-7	IL-Com	15.18	150.0	PVC	0.33	0.02	0.000	120.0
60664: P-807	Allied	IL-1	70.34	100.0	PVC	1.45	0.18	0.001	120.0

34 of 10235 elements displayed | SORTED



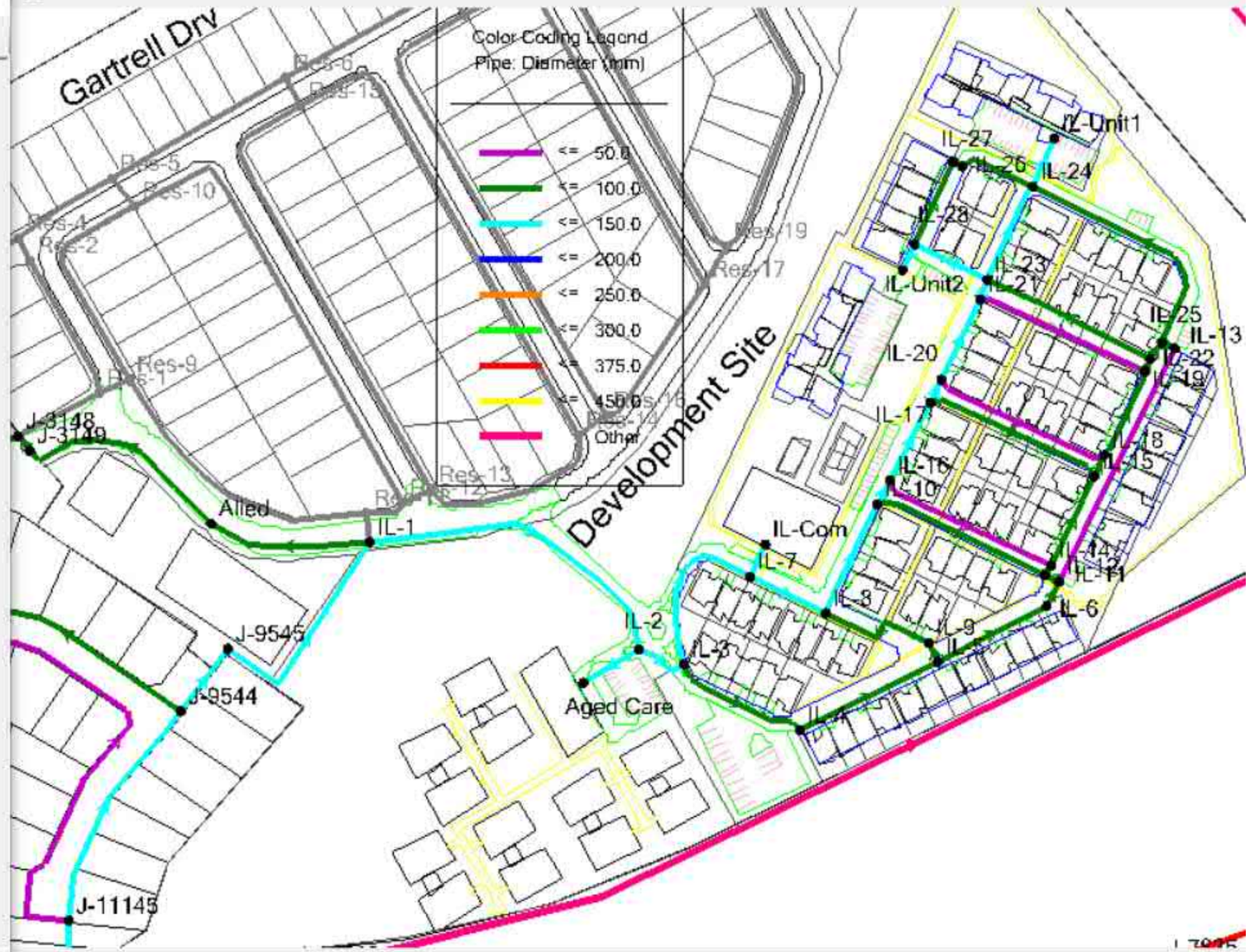
Initial Development - Peak Hour Pipes Modelling Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Junction Table (Current Time: 12.0...

	Label	Demand (L/s)	Elevation (m)	Pressure (m H2O)
60580: Aged Ca	Aged Care	1.25	6.00	59.1
60574: IL-1	IL-1	0.00	6.50	58.7
60578: IL-2	IL-2	0.00	6.00	59.1
60582: IL-3	IL-3	0.07	6.00	59.1
60584: IL-4	IL-4	0.07	6.00	59.1
60625: IL-5	IL-5	0.03	6.00	59.1
60586: IL-6	IL-6	0.05	6.00	59.1
60650: IL-7	IL-7	0.05	6.00	59.1
60609: IL-8	IL-8	0.05	6.00	59.1
60623: IL-9	IL-9	0.04	6.00	59.1
60611: IL-10	IL-10	0.04	6.00	59.1
60629: IL-11	IL-11	0.05	6.00	59.1
60631: IL-12	IL-12	0.05	6.00	59.1
60588: IL-13	IL-13	0.07	6.00	59.1
60635: IL-14	IL-14	0.05	6.00	59.1
60641: IL-15	IL-15	0.05	6.00	59.1
60637: IL-16	IL-16	0.04	6.00	59.1
60613: IL-17	IL-17	0.04	6.00	59.1
60644: IL-18	IL-18	0.05	6.00	59.1
60620: IL-19	IL-19	0.05	6.00	59.1
60615: IL-20	IL-20	0.04	6.00	59.1
60617: IL-21	IL-21	0.04	6.00	59.1
60606: IL-22	IL-22	0.04	6.00	59.1
60603: IL-23	IL-23	0.04	6.00	59.1
60592: IL-24	IL-24	0.05	6.00	59.1
60590: IL-25	IL-25	0.04	6.00	59.1
60594: IL-26	IL-26	0.05	6.00	59.1
60596: IL-27	IL-27	0.04	6.00	59.1
60600: IL-28	IL-28	0.03	6.00	59.1
60653: IL-Com	IL-Com	0.63	6.00	59.1
60648: IL-Unit1	IL-Unit1	0.39	6.00	59.1
60598: IL-Unit2	IL-Unit2	0.39	6.00	59.1
5015: J-3148	J-3148	0.00	6.28	58.8
5016: J-3149	J-3149	0.00	6.31	58.8
12412: J-7607	J-7607	0.06	6.57	58.5
16071: J-9544	J-9544	0.15	6.06	59.3
16072: J-9545	J-9545	0.00	5.91	59.4

37 of 7629 elements displayed | SORTED



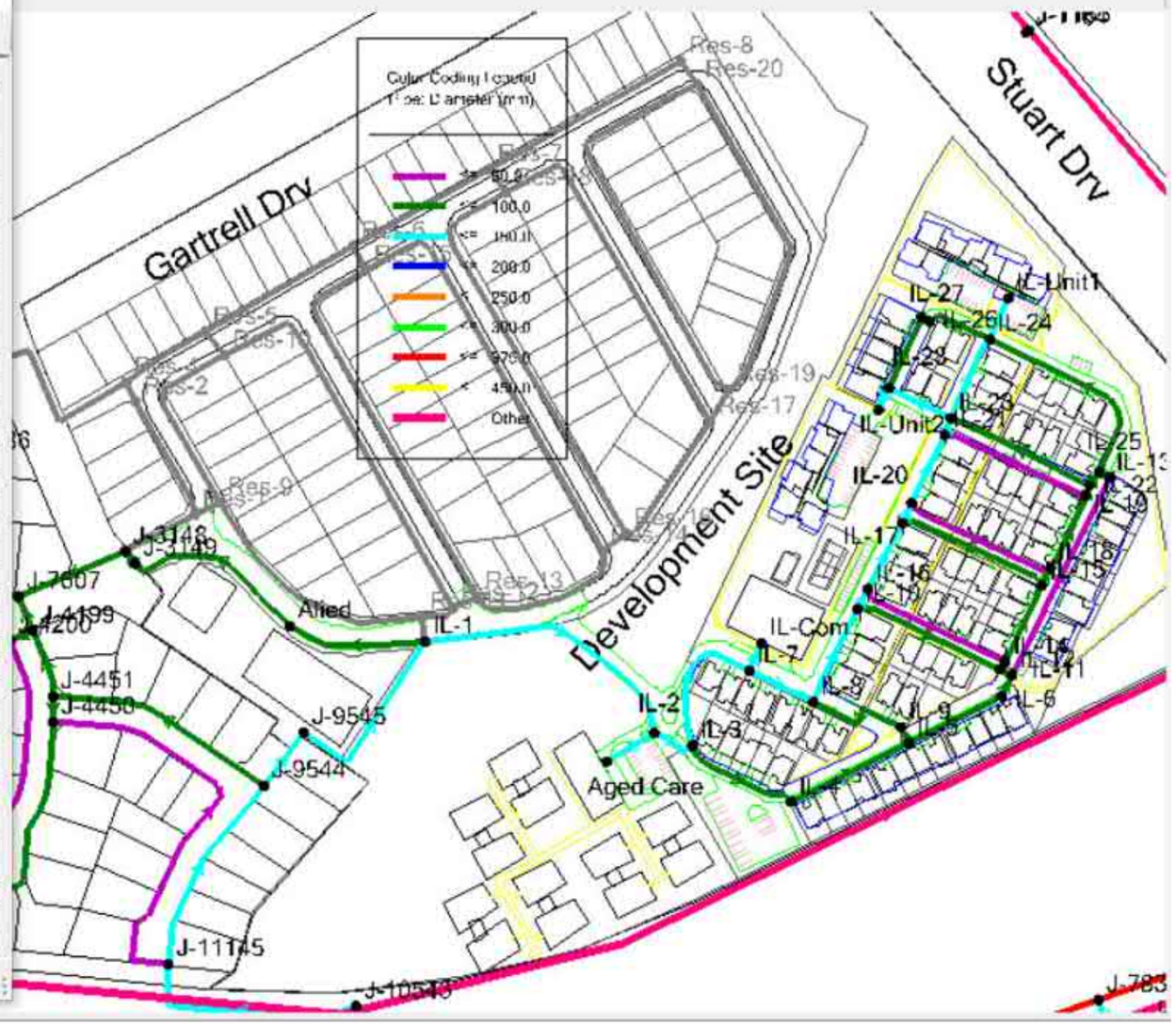
Initial Development - Peak Hour Node Modelling Results – 12 noon

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Pipe Table (Current Time: 12.000 hours) (Annandale Gardens WaterG...

	Start Node	Stop Node	Length (Scaled) (m)	Diameter (mm)	Material	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Hazen-Williams C
5014: 28768	J-3148	J-3149	7.78	100.0	PVC	1.21	0.15	0.000	120.0
60663: P-806	J-3149	Allied	96.02	100.0	PVC	1.21	0.15	0.000	120.0
18267: 28765	J-7607	J-3148	58.29	100.0	PVC	1.21	0.15	0.000	120.0
16070: 27083	J-9544	J-9545	33.50	150.0	PVC	6.01	0.34	0.001	120.0
21690: 26845	J-9544	J-11145	104.29	150.0	PVC	9.18	0.52	0.003	120.0
60575: P-764	J-9545	IL-1	98.60	150.0	PVC	6.01	0.34	0.001	120.0
60720: P-830	IL-1	IL-2	142.22	150.0	PVC	3.87	0.22	0.001	120.0
60581: P-767	IL-2	Aged C...	27.77	150.0	PVC	1.25	0.07	0.000	120.0
60583: P-768	IL-2	IL-3	23.36	150.0	PVC	2.62	0.15	0.000	120.0
60585: P-769	IL-3	IL-4	59.94	100.0	PVC	0.60	0.08	0.000	120.0
60651: P-781(1)	IL-3	IL-7	73.98	150.0	PVC	1.96	0.11	0.000	120.0
60626: P-770(1)	IL-4	IL-5	66.03	100.0	PVC	0.53	0.07	0.000	120.0
60593: P-773	IL-25	IL-24	107.95	100.0	PVC	0.09	0.01	0.000	120.0
60595: P-774	IL-24	IL-26	33.89	100.0	PVC	0.05	0.01	0.000	120.0
60649: P-800	IL-24	IL-Unit1	22.67	150.0	PVC	0.39	0.02	0.000	120.0
60597: P-775	IL-26	IL-27	4.45	100.0	PVC	0.00	0.00	0.000	120.0
60601: P-776(1)	IL-27	IL-28	38.92	100.0	PVC	0.04	0.01	0.000	120.0
60602: P-776(2)	IL-28	IL-Unit2	12.25	150.0	PVC	0.39	0.02	0.000	120.0
60604: P-777	IL-28	IL-23	34.49	150.0	PVC	0.46	0.03	0.000	120.0
60605: P-778	IL-23	IL-24	44.54	150.0	PVC	0.40	0.02	0.000	120.0
60607: P-779	IL-23	IL-22	77.70	100.0	PVC	0.06	0.01	0.000	120.0
60612: P-782	IL-8	IL-10	51.70	150.0	PVC	1.27	0.07	0.000	120.0
60624: P-789	IL-8	IL-9	53.59	100.0	PVC	0.04	0.01	0.000	120.0
60630: P-791	IL-10	IL-11	78.82	100.0	PVC	0.14	0.02	0.000	120.0
60618: P-785	IL-20	IL-21	38.07	150.0	PVC	0.89	0.05	0.000	120.0
60647: P-799	IL-19	IL-18	40.34	100.0	PVC	0.29	0.04	0.000	120.0
60628: P-790	IL-9	IL-5	9.00	100.0	PVC	0.08	0.01	0.000	120.0
60627: P-770(2)	IL-5	IL-6	52.40	100.0	PVC	0.43	0.05	0.000	120.0
60642: P-795	IL-14	IL-15	42.38	100.0	PVC	0.32	0.04	0.000	120.0
60639: P-783(2)	IL-16	IL-17	37.54	150.0	PVC	1.04	0.06	0.000	120.0
60643: P-796	IL-15	IL-17	78.86	100.0	PVC	0.06	0.01	0.000	120.0
60652: P-781(2)	IL-7	IL-8	35.92	150.0	PVC	1.28	0.07	0.000	120.0
60654: P-801	IL-7	IL-Com	15.18	150.0	PVC	0.63	0.04	0.000	120.0
60664: P-807	Allied	IL-1	70.34	100.0	PVC	2.14	0.27	0.001	120.0

34 of 10235 elements displayed | SORTED



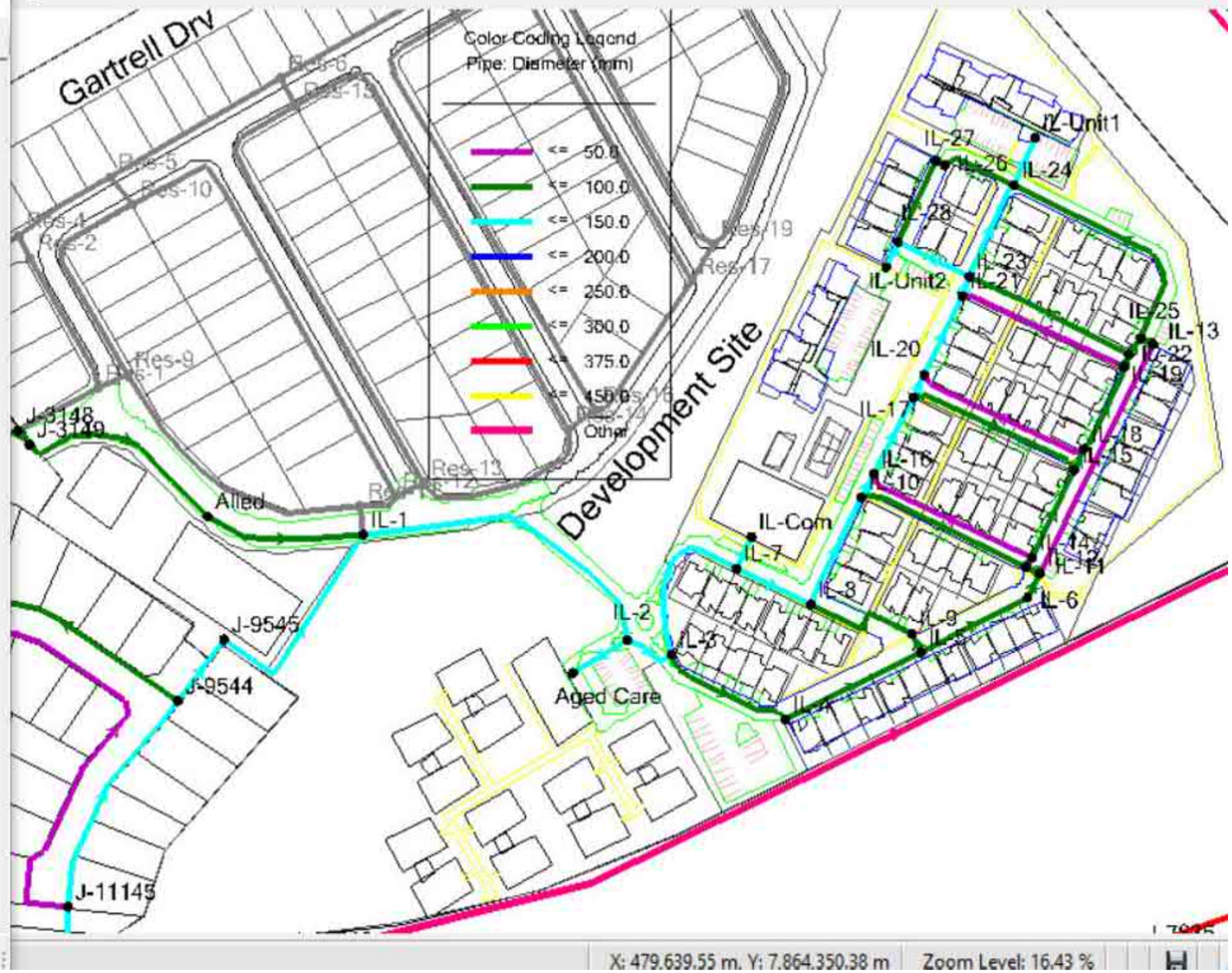
Initial Development - Peak Hour Pipes Modelling Results – 12 noon

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Junction Table (Current Time: 19.0...

	Label	Demand (L/s)	Elevation (m)	Pressure (m H2O)
60580: Aged Ca	Aged Care	5.69	6.00	35.7
60574: IL-1	IL-1	0.00	6.50	38.6
60578: IL-2	IL-2	0.00	6.00	35.8
60582: IL-3	IL-3	0.30	6.00	35.4
60584: IL-4	IL-4	0.30	6.00	34.9
60625: IL-5	IL-5	0.12	6.00	34.4
60586: IL-6	IL-6	0.24	6.00	34.0
60650: IL-7	IL-7	0.24	6.00	34.7
60609: IL-8	IL-8	0.24	6.00	34.4
60623: IL-9	IL-9	0.18	6.00	34.4
60611: IL-10	IL-10	0.18	6.00	33.9
60629: IL-11	IL-11	0.24	6.00	33.9
60631: IL-12	IL-12	0.24	6.00	33.9
60588: IL-13	IL-13	0.30	6.00	33.3
60635: IL-14	IL-14	0.24	6.00	33.9
60641: IL-15	IL-15	0.24	6.00	33.6
60637: IL-16	IL-16	0.18	6.00	33.9
60613: IL-17	IL-17	0.18	6.00	33.6
60644: IL-18	IL-18	0.24	6.00	33.5
60620: IL-19	IL-19	0.24	6.00	33.3
60615: IL-20	IL-20	0.18	6.00	33.5
60617: IL-21	IL-21	0.18	6.00	33.3
60606: IL-22	IL-22	0.18	6.00	33.3
60603: IL-23	IL-23	0.18	6.00	33.2
60592: IL-24	IL-24	0.24	6.00	33.0
60590: IL-25	IL-25	0.18	6.00	33.3
60594: IL-26	IL-26	0.24	6.00	33.1
60596: IL-27	IL-27	0.18	6.00	33.1
60600: IL-28	IL-28	0.12	6.00	33.2
60653: IL-Com	IL-Com	0.33	6.00	34.7
60648: IL-Unit1	IL-Unit1	16.78	6.00	32.9
60598: IL-Unit2	IL-Unit2	1.78	6.00	33.2
5015: J-3148	J-3148	0.00	6.28	40.1
5016: J-3149	J-3149	0.00	6.31	40.0
12412: J-7607	J-7607	0.28	6.57	40.3
16071: J-9544	J-9544	0.66	6.06	41.2
16072: J-9545	J-9545	0.00	5.91	40.8

37 of 7629 elements displayed | SORTED



X: 479,639.55 m, Y: 7,864,350.38 m | Zoom Level: 16.43 %

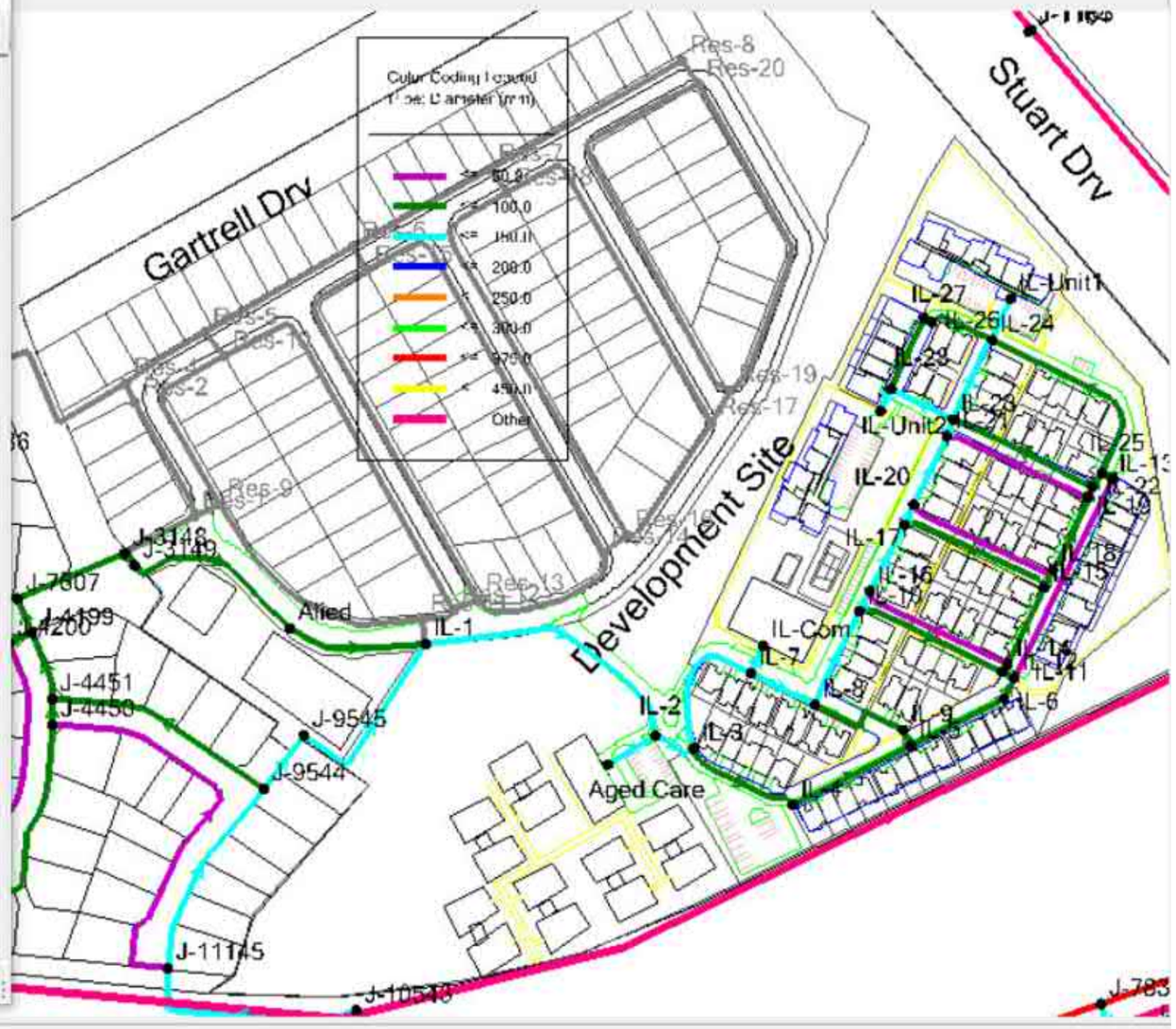
Initial Development - Peak Hour Node + 15 l/s Residential Fire Flow Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Pipe Table (Current Time: 19.000 hours) (Annandale Gardens WaterG...

	Start Node	Stop Node	Length (Scaled) (m)	Diameter (mm)	Material	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Hazen-Williams C
5014: 28768	J-3148	J-3149	7.78	100.0	PVC	5.78	0.74	0.008	120.0
60663: P-806	J-3149	Alied	96.02	100.0	PVC	5.78	0.74	0.008	120.0
18267: 28765	J-7607	J-3148	58.29	100.0	PVC	5.78	0.74	0.008	120.0
16070: 27083	J-9544	J-9545	33.50	150.0	PVC	24.79	1.40	0.016	120.0
21690: 26845	J-9544	J-11145	104.29	150.0	PVC	28.11	1.59	0.021	120.0
60575: P-764	J-9545	IL-1	98.60	150.0	PVC	24.79	1.40	0.016	120.0
60720: P-830	IL-1	IL-2	142.22	150.0	PVC	30.09	1.70	0.024	120.0
60581: P-767	IL-2	Aged C...	27.77	150.0	PVC	5.69	0.32	0.001	120.0
60583: P-768	IL-2	IL-3	23.36	150.0	PVC	24.40	1.38	0.016	120.0
60585: P-769	IL-3	IL-4	59.94	100.0	PVC	5.91	0.75	0.008	120.0
60651: P-781(1)	IL-3	IL-7	73.98	150.0	PVC	18.19	1.03	0.009	120.0
60626: P-770(1)	IL-4	IL-5	66.03	100.0	PVC	5.62	0.72	0.008	120.0
60593: P-773	IL-25	IL-24	107.95	100.0	PVC	2.82	0.36	0.002	120.0
60595: P-774	IL-24	IL-26	33.89	100.0	PVC	2.51	0.32	0.002	120.0
60649: P-800	IL-24	IL-Unit1	22.67	150.0	PVC	16.78	0.95	0.008	120.0
60597: P-775	IL-26	IL-27	4.45	100.0	PVC	2.74	0.35	0.002	120.0
60601: P-776(1)	IL-27	IL-28	38.92	100.0	PVC	2.92	0.37	0.002	120.0
60602: P-776(2)	IL-28	IL-Unit2	12.25	150.0	PVC	1.78	0.10	0.000	120.0
60604: P-777	IL-28	IL-23	34.49	150.0	PVC	4.82	0.27	0.001	120.0
60605: P-778	IL-23	IL-24	44.54	150.0	PVC	11.69	0.66	0.004	120.0
60607: P-779	IL-23	IL-22	77.70	100.0	PVC	1.66	0.21	0.001	120.0
60612: P-782	IL-8	IL-10	51.70	150.0	PVC	17.27	0.98	0.008	120.0
60624: P-789	IL-8	IL-9	53.59	100.0	PVC	0.11	0.01	0.000	120.0
60630: P-791	IL-10	IL-11	78.82	100.0	PVC	1.40	0.18	0.001	120.0
60618: P-785	IL-20	IL-21	38.07	150.0	PVC	15.02	0.85	0.007	120.0
60647: P-799	IL-19	IL-18	40.34	100.0	PVC	4.76	0.61	0.006	120.0
60628: P-790	IL-9	IL-5	9.00	100.0	PVC	0.06	0.01	0.000	120.0
60627: P-770(2)	IL-5	IL-6	52.40	100.0	PVC	5.43	0.69	0.007	120.0
60642: P-795	IL-14	IL-15	42.38	100.0	PVC	5.05	0.64	0.006	120.0
60639: P-783(2)	IL-16	IL-17	37.54	150.0	PVC	15.56	0.88	0.007	120.0
60643: P-796	IL-15	IL-17	78.86	100.0	PVC	0.26	0.03	0.000	120.0
60652: P-781(2)	IL-7	IL-8	35.92	150.0	PVC	17.63	1.00	0.009	120.0
60654: P-801	IL-7	IL-Com	15.18	150.0	PVC	0.33	0.02	0.000	120.0
60664: P-807	Alied	IL-1	70.34	100.0	PVC	5.30	0.67	0.007	120.0

34 of 10235 elements displayed | SORTED



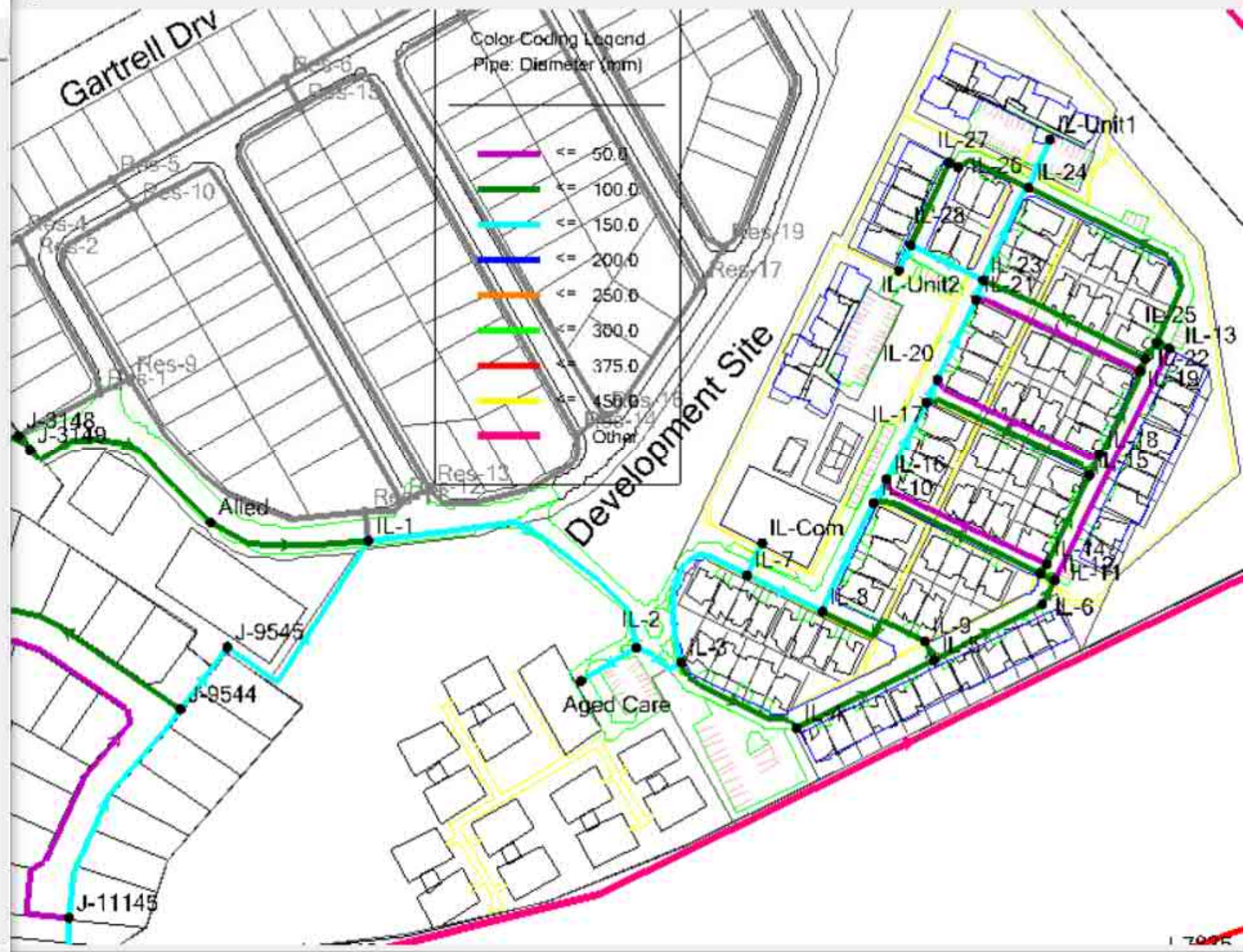
Initial Development - Peak Hour Pipes + 15 l/s Residential Fire Flow Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Junction Table (Current Time: 19.0...

	Label	Demand (L/s)	Elevation (m)	Pressure (m H2O)
60580: Aged Ca	Aged Care	5.69	6.00	23.4
60574: IL-1	IL-1	0.00	6.50	30.1
60578: IL-2	IL-2	0.00	6.00	23.5
60582: IL-3	IL-3	0.30	6.00	22.6
60584: IL-4	IL-4	0.30	6.00	21.7
60625: IL-5	IL-5	0.12	6.00	20.9
60586: IL-6	IL-6	0.24	6.00	20.7
60650: IL-7	IL-7	0.24	6.00	20.7
60609: IL-8	IL-8	0.24	6.00	20.7
60623: IL-9	IL-9	0.18	6.00	20.9
60611: IL-10	IL-10	0.18	6.00	20.7
60629: IL-11	IL-11	0.24	6.00	20.7
60631: IL-12	IL-12	0.24	6.00	20.7
60588: IL-13	IL-13	0.30	6.00	20.6
60635: IL-14	IL-14	0.24	6.00	20.7
60641: IL-15	IL-15	0.24	6.00	20.6
60637: IL-16	IL-16	0.18	6.00	20.7
60613: IL-17	IL-17	0.18	6.00	20.6
60644: IL-18	IL-18	0.24	6.00	20.6
60620: IL-19	IL-19	0.24	6.00	20.6
60615: IL-20	IL-20	0.18	6.00	20.6
60617: IL-21	IL-21	0.18	6.00	20.6
60606: IL-22	IL-22	0.18	6.00	20.6
60603: IL-23	IL-23	0.18	6.00	20.6
60592: IL-24	IL-24	0.24	6.00	20.6
60590: IL-25	IL-25	0.18	6.00	20.6
60594: IL-26	IL-26	0.24	6.00	20.6
60596: IL-27	IL-27	0.18	6.00	20.6
60600: IL-28	IL-28	0.12	6.00	20.6
60653: IL-Com	IL-Com	30.33	6.00	20.3
60648: IL-Unit1	IL-Unit1	1.78	6.00	20.6
60598: IL-Unit2	IL-Unit2	1.78	6.00	20.6
5015: J-3148	J-3148	0.00	6.28	33.4
5016: J-3149	J-3149	0.00	6.31	33.2
12412: J-7607	J-7607	0.28	6.57	34.1
16071: J-9544	J-9544	0.66	6.06	35.0
16072: J-9545	J-9545	0.00	5.91	34.0

37 of 7629 elements displayed | SORTED



X: 479,701.66 m, Y: 7,864,352.45 m | Zoom Level: 16.43 %

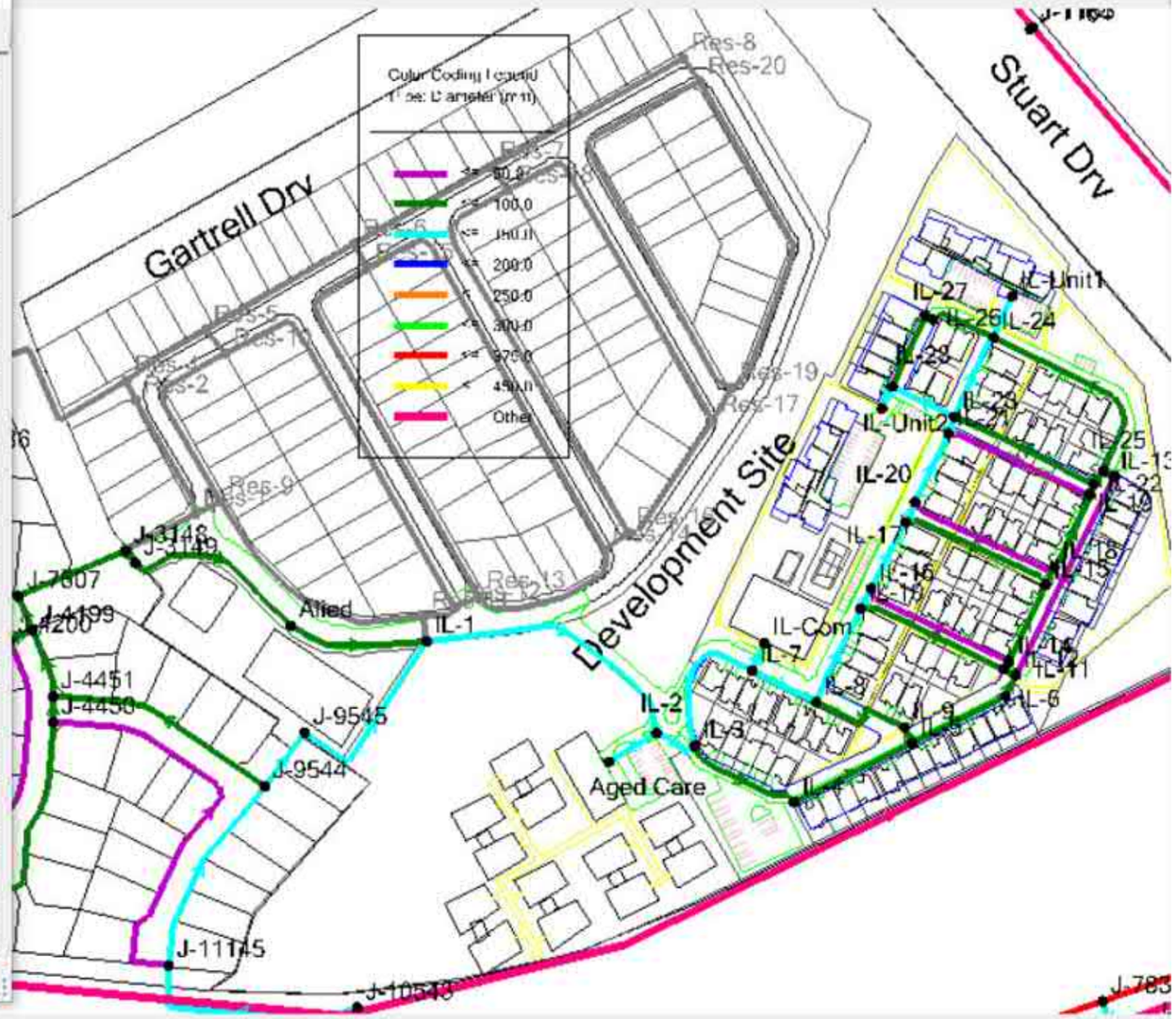
Initial Development - Peak Hour Node + 30 l/s Commercial Fire Flow Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

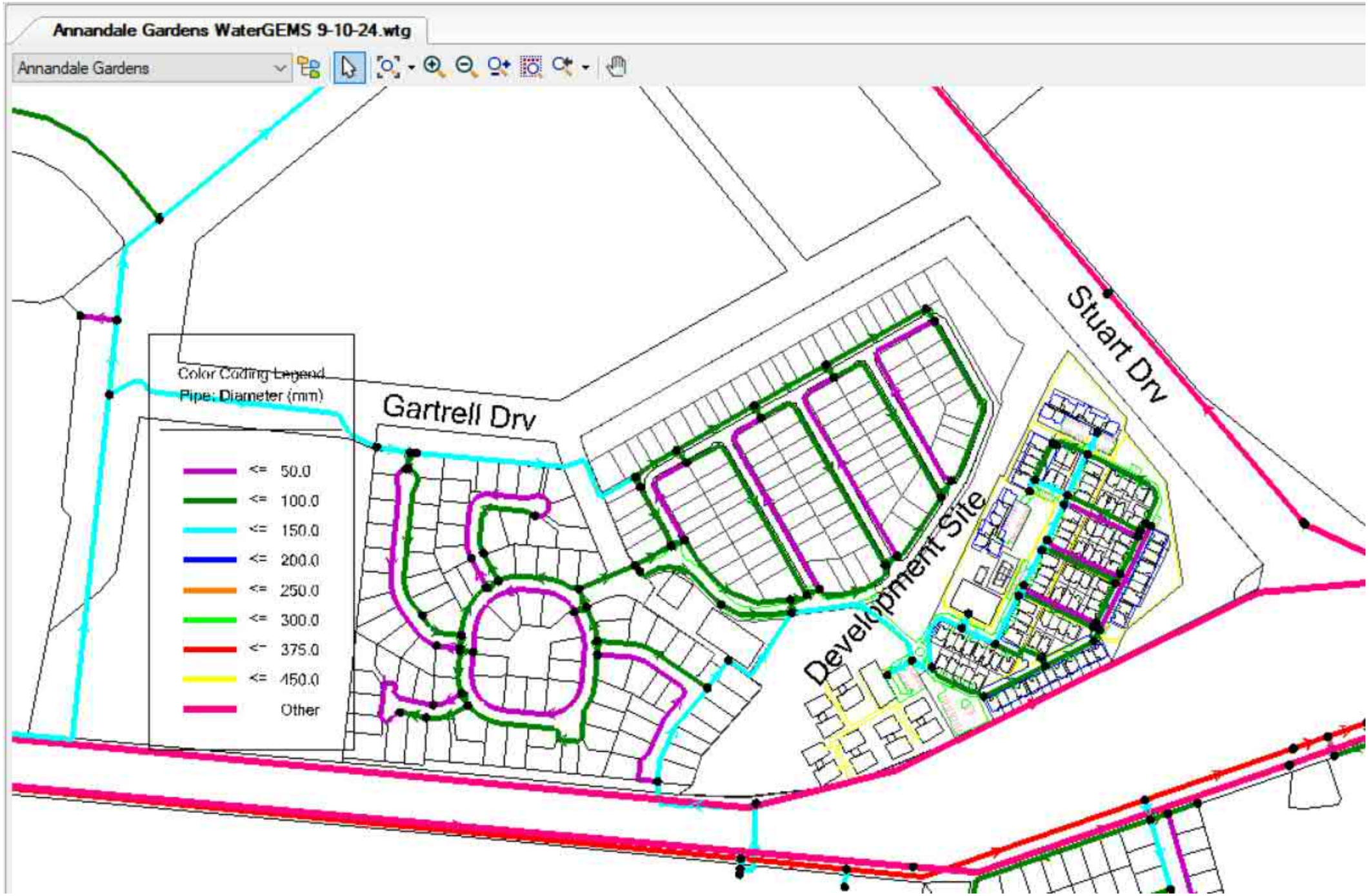
FlexTable: Pipe Table (Current Time: 19.000 hours) (Annandale Gardens WaterG...

	Start Node	Stop Node	Length (Scaled) (m)	Diameter (mm)	Material	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Hazen-Williams C
5014: 28768	J-3148	J-3149	7.78	100.0	PVC	9.07	1.15	0.018	120.0
60663: P-806	J-3149	Alied	96.02	100.0	PVC	9.07	1.15	0.018	120.0
18267: 28765	J-7607	J-3148	58.29	100.0	PVC	9.07	1.15	0.018	120.0
16070: 27083	J-9544	J-9545	33.50	150.0	PVC	36.51	2.07	0.034	120.0
21690: 26845	J-9544	J-11145	104.29	150.0	PVC	38.35	2.17	0.037	120.0
60575: P-764	J-9545	IL-1	98.60	150.0	PVC	36.51	2.07	0.034	120.0
60720: P-830	IL-1	IL-2	142.22	150.0	PVC	45.09	2.55	0.050	120.0
60581: P-767	IL-2	Aged C...	27.77	150.0	PVC	5.69	0.32	0.001	120.0
60583: P-768	IL-2	IL-3	23.36	150.0	PVC	39.40	2.23	0.039	120.0
60585: P-769	IL-3	IL-4	59.94	100.0	PVC	7.76	0.99	0.014	120.0
60651: P-781(1)	IL-3	IL-7	73.98	150.0	PVC	31.34	1.77	0.025	120.0
60626: P-770(1)	IL-4	IL-5	66.03	100.0	PVC	7.46	0.95	0.013	120.0
60593: P-773	IL-25	IL-24	107.95	100.0	PVC	0.43	0.05	0.000	120.0
60595: P-774	IL-24	IL-26	33.89	100.0	PVC	0.22	0.03	0.000	120.0
60649: P-800	IL-24	IL-Unit1	22.67	150.0	PVC	1.78	0.10	0.000	120.0
60597: P-775	IL-26	IL-27	4.45	100.0	PVC	0.02	0.00	0.000	120.0
60601: P-776(1)	IL-27	IL-28	38.92	100.0	PVC	0.19	0.02	0.000	120.0
60602: P-776(2)	IL-28	IL-Unit2	12.25	150.0	PVC	1.78	0.10	0.000	120.0
60604: P-777	IL-28	IL-23	34.49	150.0	PVC	2.09	0.12	0.000	120.0
60605: P-778	IL-23	IL-24	44.54	150.0	PVC	1.81	0.10	0.000	120.0
60607: P-779	IL-23	IL-22	77.70	100.0	PVC	0.28	0.04	0.000	120.0
60612: P-782	IL-8	IL-10	51.70	150.0	PVC	4.08	0.23	0.001	120.0
60624: P-789	IL-8	IL-9	53.59	100.0	PVC	3.54	0.45	0.003	120.0
60630: P-791	IL-10	IL-11	78.82	100.0	PVC	0.58	0.07	0.000	120.0
60618: P-785	IL-20	IL-21	38.07	150.0	PVC	3.98	0.23	0.001	120.0
60647: P-799	IL-19	IL-18	40.34	100.0	PVC	1.32	0.17	0.001	120.0
60628: P-790	IL-9	IL-5	9.00	100.0	PVC	3.72	0.47	0.004	120.0
60627: P-770(2)	IL-5	IL-6	52.40	100.0	PVC	3.62	0.46	0.003	120.0
60642: P-795	IL-14	IL-15	42.38	100.0	PVC	1.73	0.22	0.001	120.0
60639: P-783(2)	IL-16	IL-17	37.54	150.0	PVC	4.41	0.25	0.001	120.0
60643: P-796	IL-15	IL-17	78.86	100.0	PVC	0.05	0.01	0.000	120.0
60652: P-781(2)	IL-7	IL-8	35.92	150.0	PVC	0.78	0.04	0.000	120.0
60654: P-801	IL-7	IL-Com	15.18	150.0	PVC	30.33	1.72	0.024	120.0
60664: P-807	Alied	IL-1	70.34	100.0	PVC	8.59	1.09	0.017	120.0

34 of 10235 elements displayed | SORTED



Initial Development - Peak Hour Pipes + 30 l/s Commercial Fire Flow Results – 7 pm



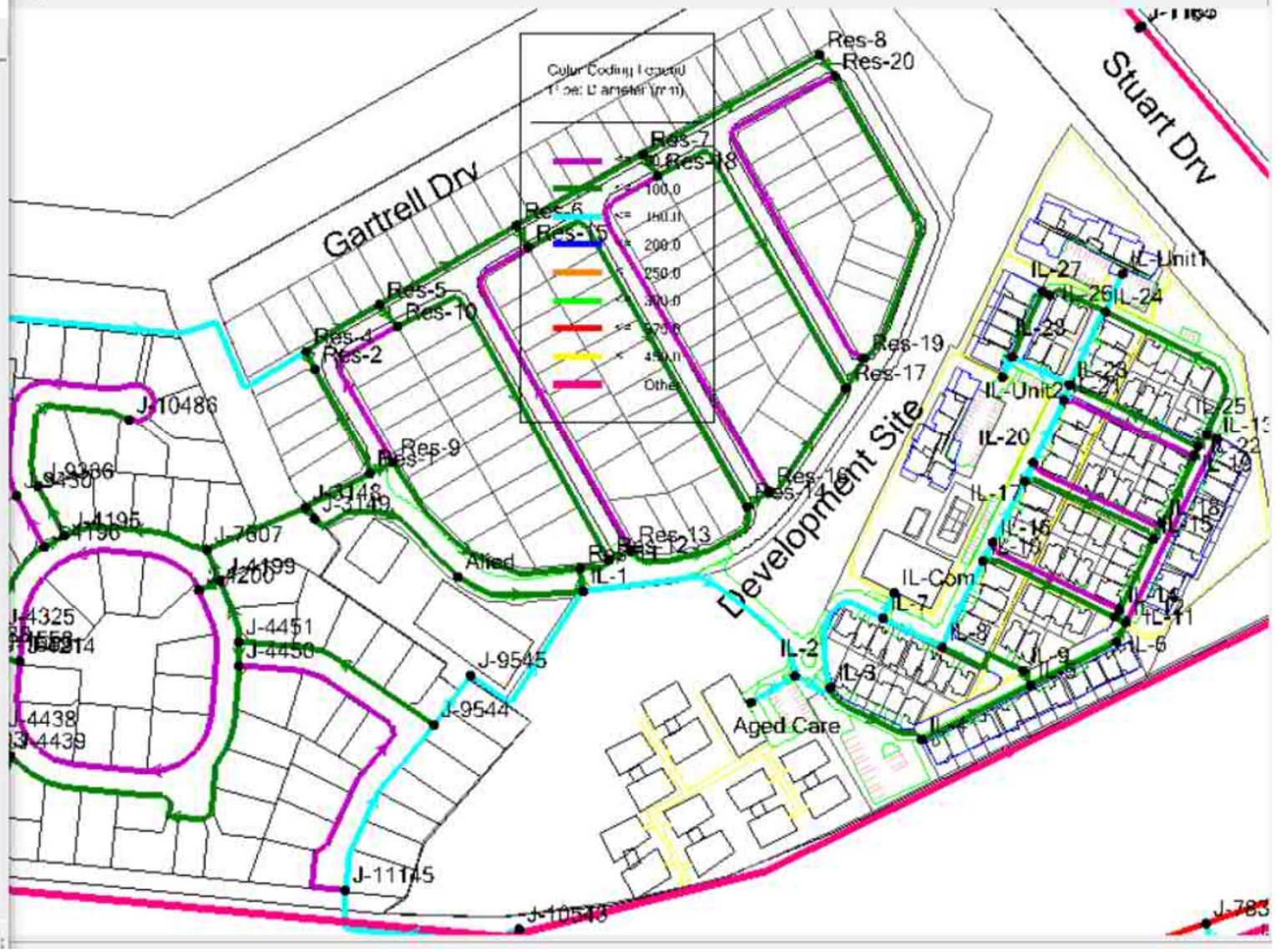
Full Parkside Annandale Development – WaterGEMS Figure

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Junction Table (Current Time: 19.0...

	Label	Demand (L/s)	Elevation (m)	Pressure (m H2O)
60580: Aged Ca	Aged Care	5.69	6.00	42.6
60662: Alied	Alied	0.48	6.50	43.1
60574: IL-1	IL-1	0.00	6.50	43.1
60578: IL-2	IL-2	0.00	6.00	42.6
60582: IL-3	IL-3	0.30	6.00	42.6
60584: IL-4	IL-4	0.30	6.00	42.5
60650: IL-7	IL-7	0.24	6.00	42.5
60609: IL-8	IL-8	0.24	6.00	42.4
60631: IL-12	IL-12	0.24	6.00	42.3
60637: IL-16	IL-16	0.18	6.00	42.3
60613: IL-17	IL-17	0.18	6.00	42.3
60644: IL-18	IL-18	0.24	6.00	42.3
60615: IL-20	IL-20	0.18	6.00	42.3
60617: IL-21	IL-21	0.18	6.00	42.3
60603: IL-23	IL-23	0.18	6.00	42.3
60592: IL-24	IL-24	0.24	6.00	42.3
60590: IL-25	IL-25	0.18	6.00	42.3
60596: IL-27	IL-27	0.18	6.00	42.3
60600: IL-28	IL-28	0.12	6.00	42.3
60653: IL-Com	IL-Com	0.33	6.00	42.5
60648: IL-Unit1	IL-Unit1	1.78	6.00	42.3
60598: IL-Unit2	IL-Unit2	1.78	6.00	42.3
5015: J-3148	J-3148	0.00	6.28	43.4
16071: J-9544	J-9544	0.66	6.06	44.5
16072: J-9545	J-9545	0.00	5.91	44.4
60655: Res-1	Res-1	0.18	6.50	43.2
60712: Res-2	Res-2	0.18	6.50	43.2
60665: Res-4	Res-4	0.37	6.50	43.2
60706: Res-5	Res-5	0.37	6.50	43.0
60698: Res-6	Res-6	0.55	6.50	42.8
60690: Res-7	Res-7	0.55	6.50	42.7
60667: Res-8	Res-8	0.37	6.50	42.7
60659: Res-11	Res-11	0.37	6.50	43.0
60681: Res-13	Res-13	0.65	6.50	43.0
60679: Res-14	Res-14	0.65	6.50	42.8
60677: Res-16	Res-16	0.55	6.50	42.8
60687: Res-18	Res-18	0.74	6.50	42.7
60673: Res-19	Res-19	0.65	6.50	42.7
60671: Res-20	Res-20	0.65	6.50	42.7

39 of 7629 elements displayed | SORTED



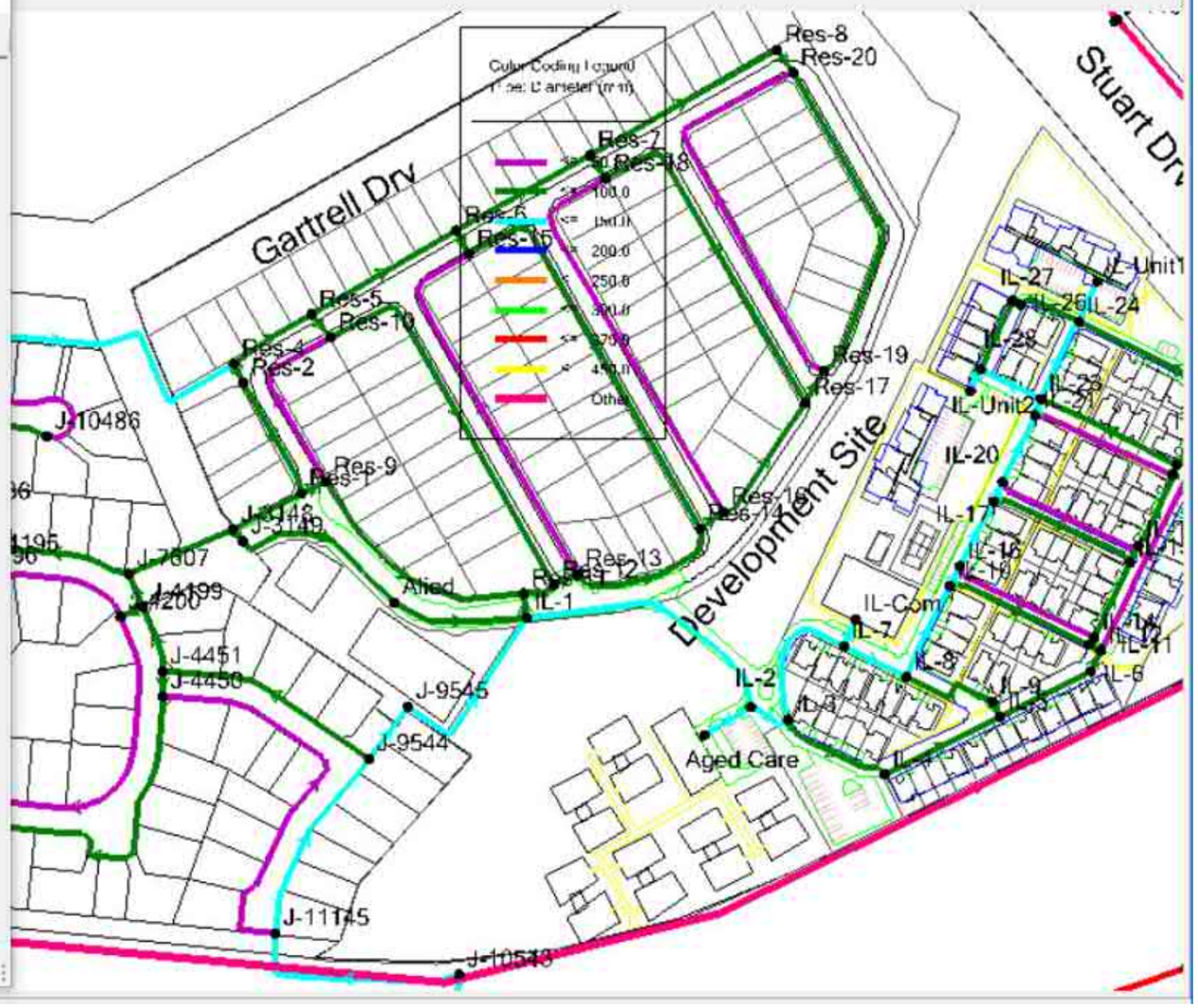
Full Development - Peak Hour Node Modelling Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Pipe Table (Current Time: 19.000 hours) (Annandale Gardens WaterG...

	Start Node	Stop Node	Length (Scaled) (m)	Diameter (mm)	Material	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Hazen-Williams C
60726: P-833	J-2941	Res-4	240.71	150.0	PVC	6.90	0.39	0.002	120.0
60656: P-802	J-3148	Res-1	39.57	100.0	PVC	0.53	0.07	0.000	120.0
60663: P-806	J-3149	Alied	96.02	100.0	PVC	1.52	0.19	0.001	120.0
18267: 28765	J-7607	J-3148	58.29	100.0	PVC	2.05	0.26	0.001	120.0
16070: 27083	J-9544	J-9545	33.50	150.0	PVC	16.21	0.92	0.008	120.0
21690: 26845	J-9544	J-11145	104.29	150.0	PVC	21.74	1.23	0.013	120.0
60575: P-764	J-9545	IL-1	98.60	150.0	PVC	16.21	0.92	0.008	120.0
60720: P-830	IL-1	IL-2	142.22	150.0	PVC	15.09	0.85	0.007	120.0
60581: P-767	IL-2	Aged C...	27.77	150.0	PVC	5.69	0.32	0.001	120.0
60583: P-768	IL-2	IL-3	23.36	150.0	PVC	9.40	0.53	0.003	120.0
60585: P-769	IL-3	IL-4	59.94	100.0	PVC	2.28	0.29	0.001	120.0
60651: P-781(1)	IL-3	IL-7	73.98	150.0	PVC	6.82	0.39	0.002	120.0
60626: P-770(1)	IL-4	IL-5	66.03	100.0	PVC	1.99	0.25	0.001	120.0
60593: P-773	IL-25	IL-24	107.95	100.0	PVC	0.41	0.05	0.000	120.0
60649: P-800	IL-24	IL-Unit1	22.67	150.0	PVC	1.78	0.10	0.000	120.0
60602: P-776(2)	IL-28	IL-Unit2	12.25	150.0	PVC	1.78	0.10	0.000	120.0
60604: P-777	IL-28	IL-23	34.49	150.0	PVC	2.10	0.12	0.000	120.0
60605: P-778	IL-23	IL-24	44.54	150.0	PVC	1.82	0.10	0.000	120.0
60607: P-779	IL-23	IL-22	77.70	100.0	PVC	0.25	0.03	0.000	120.0
60612: P-782	IL-8	IL-10	51.70	150.0	PVC	5.79	0.33	0.001	120.0
60618: P-785	IL-20	IL-21	38.07	150.0	PVC	4.04	0.23	0.001	120.0
60647: P-799	IL-19	IL-18	40.34	100.0	PVC	1.30	0.17	0.001	120.0
60627: P-770(2)	IL-5	IL-6	52.40	100.0	PVC	1.92	0.24	0.001	120.0
60642: P-795	IL-14	IL-15	42.38	100.0	PVC	1.45	0.18	0.001	120.0
60639: P-783(2)	IL-16	IL-17	37.54	150.0	PVC	4.73	0.27	0.001	120.0
60652: P-781(2)	IL-7	IL-8	35.92	150.0	PVC	6.26	0.35	0.001	120.0
60654: P-801	IL-7	IL-Com	15.18	150.0	PVC	0.33	0.02	0.000	120.0
60713: P-808(1)	Res-1	Res-2	64.42	100.0	PVC	2.04	0.26	0.001	120.0
60660: P-804	Res-9	Res-11	127.31	100.0	PVC	1.51	0.19	0.001	120.0
60664: P-807	Alied	IL-1	70.34	100.0	PVC	1.04	0.13	0.000	120.0
60707: P-809(1)	Res-4	Res-5	47.42	100.0	PVC	4.31	0.55	0.005	120.0
60674: P-812	Res-20	Res-19	173.39	100.0	PVC	0.33	0.04	0.000	120.0
60678: P-814	Res-17	Res-16	71.95	100.0	PVC	1.55	0.20	0.001	120.0
60682: P-816	Res-14	Res-13	81.27	100.0	PVC	2.69	0.34	0.002	120.0
60704: P-825(1)	Res-12	Res-10	202.28	100.0	PVC	0.57	0.07	0.000	120.0
60692: P-809(2)	Res-7	Res-8	110.21	100.0	PVC	0.63	0.08	0.000	120.0
60708: P-809(1)	Res-5	Res-6	85.82	100.0	PVC	3.14	0.40	0.003	120.0

37 of 10235 elements displayed | SORTED



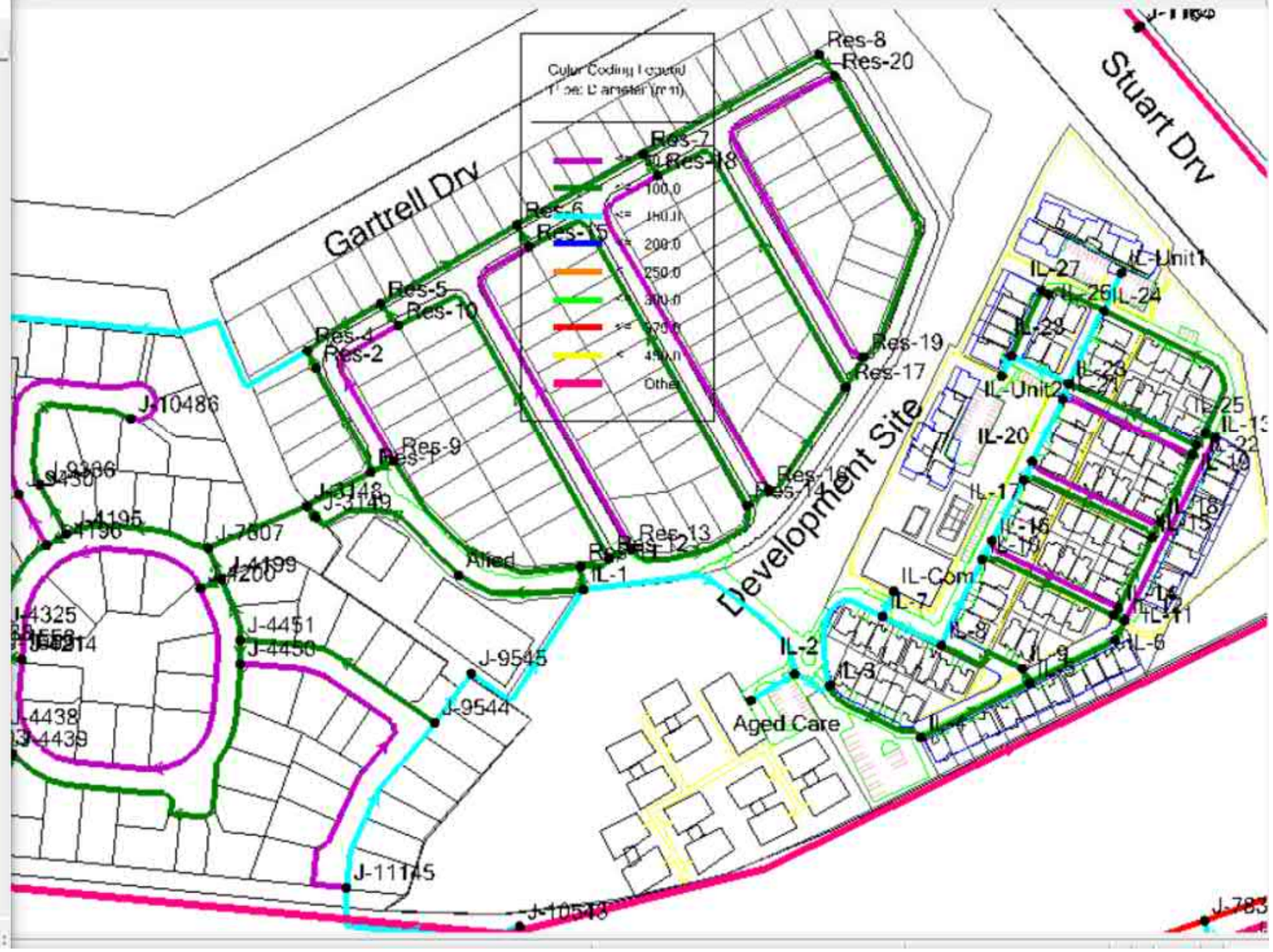
Full Development - Peak Hour Pipes Modelling Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Junction Table (Current Time: 12.0...

	Label	Demand (L/s)	Elevation (m)	Pressure (m H2O)
60580: Aged Ca	Aged Care	1.25	6.00	58.9
60662: Alied	Alied	0.92	6.50	58.4
60574: IL-1	IL-1	0.00	6.50	58.5
60578: IL-2	IL-2	0.00	6.00	58.9
60582: IL-3	IL-3	0.07	6.00	58.9
60584: IL-4	IL-4	0.07	6.00	58.9
60650: IL-7	IL-7	0.05	6.00	58.9
60609: IL-8	IL-8	0.05	6.00	58.9
60631: IL-12	IL-12	0.05	6.00	58.9
60637: IL-16	IL-16	0.04	6.00	58.9
60613: IL-17	IL-17	0.04	6.00	58.9
60644: IL-18	IL-18	0.05	6.00	58.9
60615: IL-20	IL-20	0.04	6.00	58.9
60617: IL-21	IL-21	0.04	6.00	58.9
60603: IL-23	IL-23	0.04	6.00	58.9
60592: IL-24	IL-24	0.05	6.00	58.9
60590: IL-25	IL-25	0.04	6.00	58.9
60596: IL-27	IL-27	0.04	6.00	58.9
60600: IL-28	IL-28	0.03	6.00	58.9
60653: IL-Com	IL-Com	0.63	6.00	58.9
60648: IL-Unit1	IL-Unit1	0.39	6.00	58.9
60598: IL-Unit2	IL-Unit2	0.39	6.00	58.9
5015: J-3148	J-3148	0.00	6.28	58.6
16071: J-9544	J-9544	0.15	6.06	59.2
16072: J-9545	J-9545	0.00	5.91	59.3
60655: Res-1	Res-1	0.04	6.50	58.4
60712: Res-2	Res-2	0.04	6.50	58.4
60665: Res-4	Res-4	0.08	6.50	58.4
60706: Res-5	Res-5	0.08	6.50	58.4
60698: Res-6	Res-6	0.12	6.50	58.4
60690: Res-7	Res-7	0.12	6.50	58.4
60667: Res-8	Res-8	0.08	6.50	58.4
60659: Res-11	Res-11	0.08	6.50	58.4
60681: Res-13	Res-13	0.14	6.50	58.4
60679: Res-14	Res-14	0.14	6.50	58.4
60677: Res-16	Res-16	0.12	6.50	58.4
60687: Res-18	Res-18	0.16	6.50	58.4
60673: Res-19	Res-19	0.14	6.50	58.4
60671: Res-20	Res-20	0.14	6.50	58.4

39 of 7629 elements displayed | SORTED



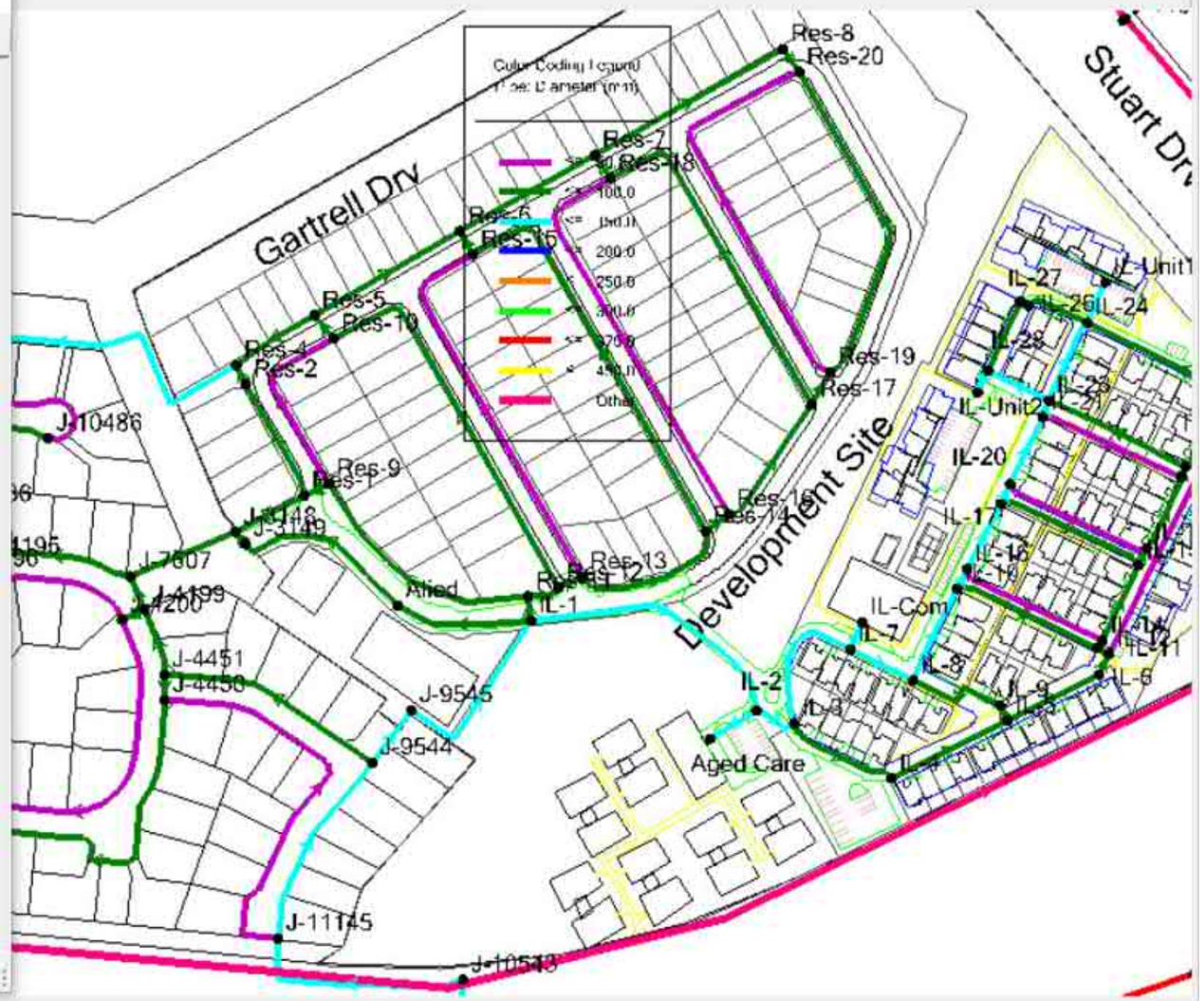
Full Development - Peak Hour Node Modelling Results – 12 noon

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Pipe Table (Current Time: 12.000 hours) (Annandale Gardens WaterG...

	Start Node	Stop Node	Length (Scaled) (m)	Diameter (mm)	Material	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Hazen-Williams C
60726: P-833	J-2941	Res-4	240.71	150.0	PVC	2.20	0.12	0.000	120.0
60656: P-802	J-3148	Res-1	39.57	100.0	PVC	1.12	0.14	0.000	120.0
60663: P-806	J-3149	Alied	96.02	100.0	PVC	0.44	0.06	0.000	120.0
18267: 28765	J-7607	J-3148	58.29	100.0	PVC	0.68	0.09	0.000	120.0
16070: 27083	J-9544	J-9545	33.50	150.0	PVC	8.42	0.48	0.002	120.0
21690: 26845	J-9544	J-11145	104.29	150.0	PVC	11.50	0.65	0.004	120.0
60575: P-764	J-9545	IL-1	98.60	150.0	PVC	8.42	0.48	0.002	120.0
60720: P-830	IL-1	IL-2	142.22	150.0	PVC	3.87	0.22	0.001	120.0
60581: P-767	IL-2	Aged C...	27.77	150.0	PVC	1.25	0.07	0.000	120.0
60583: P-768	IL-2	IL-3	23.36	150.0	PVC	2.62	0.15	0.000	120.0
60585: P-769	IL-3	IL-4	59.94	100.0	PVC	0.60	0.08	0.000	120.0
60651: P-781(1)	IL-3	IL-7	73.98	150.0	PVC	1.96	0.11	0.000	120.0
60626: P-770(1)	IL-4	IL-5	66.03	100.0	PVC	0.53	0.07	0.000	120.0
60593: P-773	IL-25	IL-24	107.95	100.0	PVC	0.09	0.01	0.000	120.0
60649: P-800	IL-24	IL-Unit1	22.67	150.0	PVC	0.39	0.02	0.000	120.0
60602: P-776(2)	IL-28	IL-Unit2	12.25	150.0	PVC	0.39	0.02	0.000	120.0
60604: P-777	IL-28	IL-23	34.49	150.0	PVC	0.46	0.03	0.000	120.0
60605: P-778	IL-23	IL-24	44.54	150.0	PVC	0.40	0.02	0.000	120.0
60607: P-779	IL-23	IL-22	77.70	100.0	PVC	0.06	0.01	0.000	120.0
60612: P-782	IL-8	IL-10	51.70	150.0	PVC	1.27	0.07	0.000	120.0
60618: P-785	IL-20	IL-21	38.07	150.0	PVC	0.89	0.05	0.000	120.0
60647: P-799	IL-19	IL-18	40.34	100.0	PVC	0.29	0.04	0.000	120.0
60627: P-770(2)	IL-5	IL-6	52.40	100.0	PVC	0.43	0.05	0.000	120.0
60642: P-795	IL-14	IL-15	42.38	100.0	PVC	0.32	0.04	0.000	120.0
60639: P-783(2)	IL-16	IL-17	37.54	150.0	PVC	1.04	0.06	0.000	120.0
60652: P-781(2)	IL-7	IL-8	35.92	150.0	PVC	1.28	0.07	0.000	120.0
60654: P-801	IL-7	IL-Com	15.18	150.0	PVC	0.63	0.04	0.000	120.0
60713: P-808(1)	Res-1	Res-2	64.42	100.0	PVC	1.58	0.20	0.001	120.0
60660: P-804	Res-9	Res-11	127.31	100.0	PVC	0.81	0.10	0.000	120.0
60664: P-807	Alied	IL-1	70.34	100.0	PVC	1.37	0.17	0.001	120.0
60707: P-809(1)	Res-4	Res-5	47.42	100.0	PVC	0.74	0.09	0.000	120.0
60674: P-812	Res-20	Res-19	173.39	100.0	PVC	0.11	0.01	0.000	120.0
60678: P-814	Res-17	Res-16	71.95	100.0	PVC	0.51	0.06	0.000	120.0
60682: P-816	Res-14	Res-13	81.27	100.0	PVC	1.14	0.14	0.000	120.0
60704: P-825(1)	Res-12	Res-10	202.28	100.0	PVC	0.82	0.10	0.000	120.0
60692: P-809(2)	Res-7	Res-8	110.21	100.0	PVC	0.09	0.01	0.000	120.0
60708: P-809(1)	Res-5	Res-6	85.82	100.0	PVC	0.07	0.01	0.000	120.0

37 of 10235 elements displayed SORTED



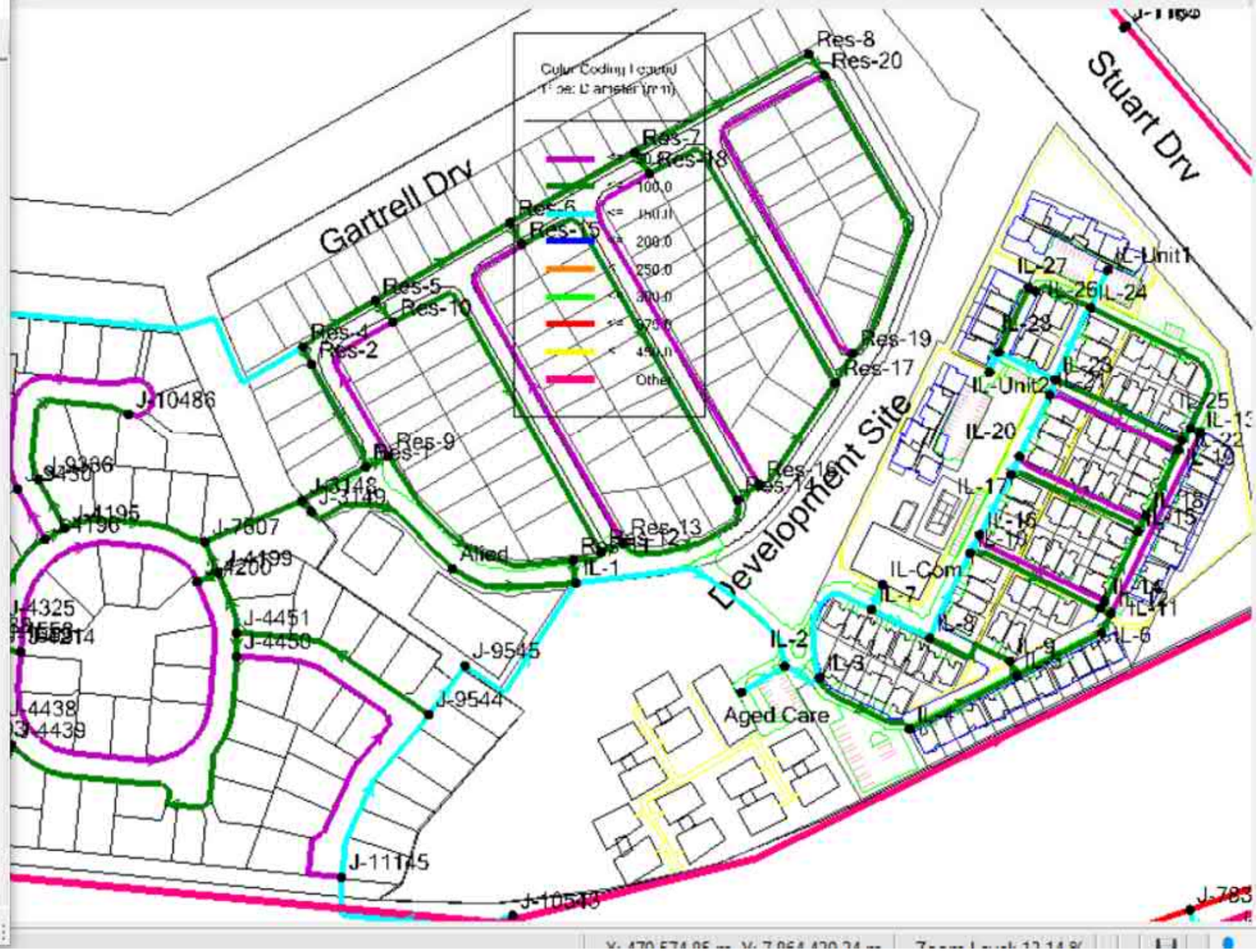
Full Development - Peak Hour Pipes Modelling Results – 12 noon

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Junction Table (Current Time: 19.0...

	Label	Demand (L/s)	Elevation (m)	Pressure (m H2O)
60580: Aged Ca	Aged Care	5.69	6.00	35.2
60662: Allied	Allied	0.48	6.50	38.2
60574: IL-1	IL-1	0.00	6.50	38.0
60578: IL-2	IL-2	0.00	6.00	35.2
60582: IL-3	IL-3	0.30	6.00	34.8
60584: IL-4	IL-4	0.30	6.00	34.3
60650: IL-7	IL-7	0.24	6.00	34.1
60609: IL-8	IL-8	0.24	6.00	33.8
60631: IL-12	IL-12	0.24	6.00	33.4
60637: IL-16	IL-16	0.18	6.00	33.3
60613: IL-17	IL-17	0.18	6.00	33.0
60644: IL-18	IL-18	0.24	6.00	33.0
60615: IL-20	IL-20	0.18	6.00	33.0
60617: IL-21	IL-21	0.18	6.00	32.7
60603: IL-23	IL-23	0.18	6.00	32.7
60592: IL-24	IL-24	0.24	6.00	32.5
60590: IL-25	IL-25	0.18	6.00	32.7
60596: IL-27	IL-27	0.18	6.00	32.5
60600: IL-28	IL-28	0.12	6.00	32.6
60653: IL-Com	IL-Com	0.33	6.00	34.1
60648: IL-Unit1	IL-Unit1	16.78	6.00	32.3
60598: IL-Unit2	IL-Unit2	1.78	6.00	32.6
5015: J-3148	J-3148	0.00	6.28	38.9
16071: J-9544	J-9544	0.66	6.06	40.4
16072: J-9545	J-9545	0.00	5.91	40.1
60655: Res-1	Res-1	0.18	6.50	38.6
60712: Res-2	Res-2	0.18	6.50	38.9
60665: Res-4	Res-4	0.37	6.50	39.0
60706: Res-5	Res-5	0.37	6.50	38.4
60698: Res-6	Res-6	0.55	6.50	38.0
60690: Res-7	Res-7	0.55	6.50	37.9
60667: Res-8	Res-8	0.37	6.50	37.9
60659: Res-11	Res-11	0.37	6.50	38.1
60681: Res-13	Res-13	0.65	6.50	38.0
60679: Res-14	Res-14	0.65	6.50	38.0
60677: Res-16	Res-16	0.55	6.50	38.0
60687: Res-18	Res-18	0.74	6.50	37.9
60673: Res-19	Res-19	0.65	6.50	37.9
60671: Res-20	Res-20	0.65	6.50	37.9

39 of 7629 elements displayed | SORTED



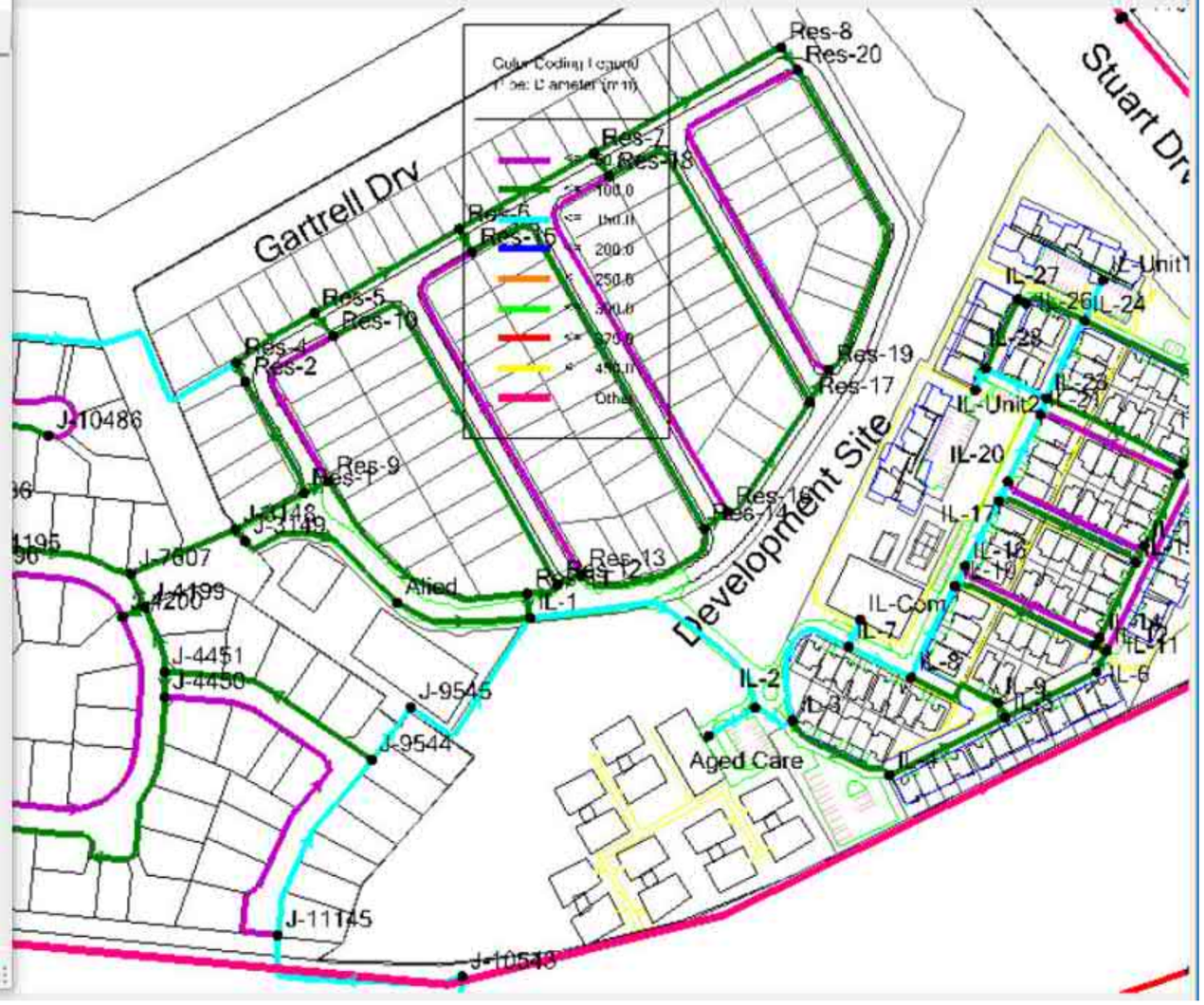
Full Development - Peak Hour Node + 15 l/s Residential Fire Flow Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Pipe Table (Current Time: 19.000 hours) (Annandale Gardens WaterG...

	Start Node	Stop Node	Length (Scaled) (m)	Diameter (mm)	Material	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Hazen-Williams C
60726: P-833	J-2941	Res-4	240.71	150.0	PVC	11.99	0.68	0.004	120.0
60656: P-802	J-3148	Res-1	39.57	100.0	PVC	0.78	0.10	0.000	120.0
60663: P-806	J-3149	Allied	96.02	100.0	PVC	3.90	0.50	0.004	120.0
18267: 28765	J-7607	J-3148	58.29	100.0	PVC	4.68	0.60	0.005	120.0
16070: 27083	J-9544	J-9545	33.50	150.0	PVC	23.49	1.33	0.015	120.0
21690: 26845	J-9544	J-11145	104.29	150.0	PVC	29.46	1.67	0.023	120.0
60575: P-764	J-9545	IL-1	98.60	150.0	PVC	23.49	1.33	0.015	120.0
60720: P-830	IL-1	IL-2	142.22	150.0	PVC	30.09	1.70	0.024	120.0
60581: P-767	IL-2	Aged C...	27.77	150.0	PVC	5.69	0.32	0.001	120.0
60583: P-768	IL-2	IL-3	23.36	150.0	PVC	24.40	1.38	0.016	120.0
60585: P-769	IL-3	IL-4	59.94	100.0	PVC	5.91	0.75	0.008	120.0
60651: P-781(1)	IL-3	IL-7	73.98	150.0	PVC	18.19	1.03	0.009	120.0
60626: P-770(1)	IL-4	IL-5	66.03	100.0	PVC	5.62	0.72	0.008	120.0
60593: P-773	IL-25	IL-24	107.95	100.0	PVC	2.82	0.36	0.002	120.0
60649: P-800	IL-24	IL-Unit1	22.67	150.0	PVC	16.78	0.95	0.008	120.0
60602: P-776(2)	IL-28	IL-Unit2	12.25	150.0	PVC	1.78	0.10	0.000	120.0
60604: P-777	IL-28	IL-23	34.49	150.0	PVC	4.82	0.27	0.001	120.0
60605: P-778	IL-23	IL-24	44.54	150.0	PVC	11.69	0.66	0.004	120.0
60607: P-779	IL-23	IL-22	77.70	100.0	PVC	1.66	0.21	0.001	120.0
60612: P-782	IL-8	IL-10	51.70	150.0	PVC	17.27	0.98	0.008	120.0
60618: P-785	IL-20	IL-21	38.07	150.0	PVC	15.02	0.85	0.007	120.0
60647: P-799	IL-19	IL-18	40.34	100.0	PVC	4.76	0.61	0.006	120.0
60627: P-770(2)	IL-5	IL-6	52.40	100.0	PVC	5.43	0.69	0.007	120.0
60642: P-795	IL-14	IL-15	42.38	100.0	PVC	5.05	0.64	0.006	120.0
60639: P-783(2)	IL-16	IL-17	37.54	150.0	PVC	15.56	0.88	0.007	120.0
60652: P-781(2)	IL-7	IL-8	35.92	150.0	PVC	17.63	1.00	0.009	120.0
60654: P-801	IL-7	IL-Com	15.18	150.0	PVC	0.33	0.02	0.000	120.0
60713: P-808(1)	Res-1	Res-2	64.42	100.0	PVC	4.26	0.54	0.005	120.0
60660: P-804	Res-9	Res-11	127.31	100.0	PVC	3.90	0.50	0.004	120.0
60664: P-807	Allied	IL-1	70.34	100.0	PVC	3.42	0.44	0.003	120.0
60707: P-809(1)	Res-4	Res-5	47.42	100.0	PVC	7.19	0.91	0.012	120.0
60674: P-812	Res-20	Res-19	173.39	100.0	PVC	0.28	0.04	0.000	120.0
60678: P-814	Res-17	Res-16	71.95	100.0	PVC	1.27	0.16	0.000	120.0
60682: P-816	Res-14	Res-13	81.27	100.0	PVC	1.75	0.22	0.001	120.0
60704: P-825(1)	Res-12	Res-10	202.28	100.0	PVC	2.42	0.31	0.002	120.0
60692: P-809(2)	Res-7	Res-8	110.21	100.0	PVC	0.70	0.09	0.000	120.0
60708: P-809(1)	Res-5	Res-6	85.82	100.0	PVC	4.24	0.54	0.005	120.0

37 of 10235 elements displayed SORTED



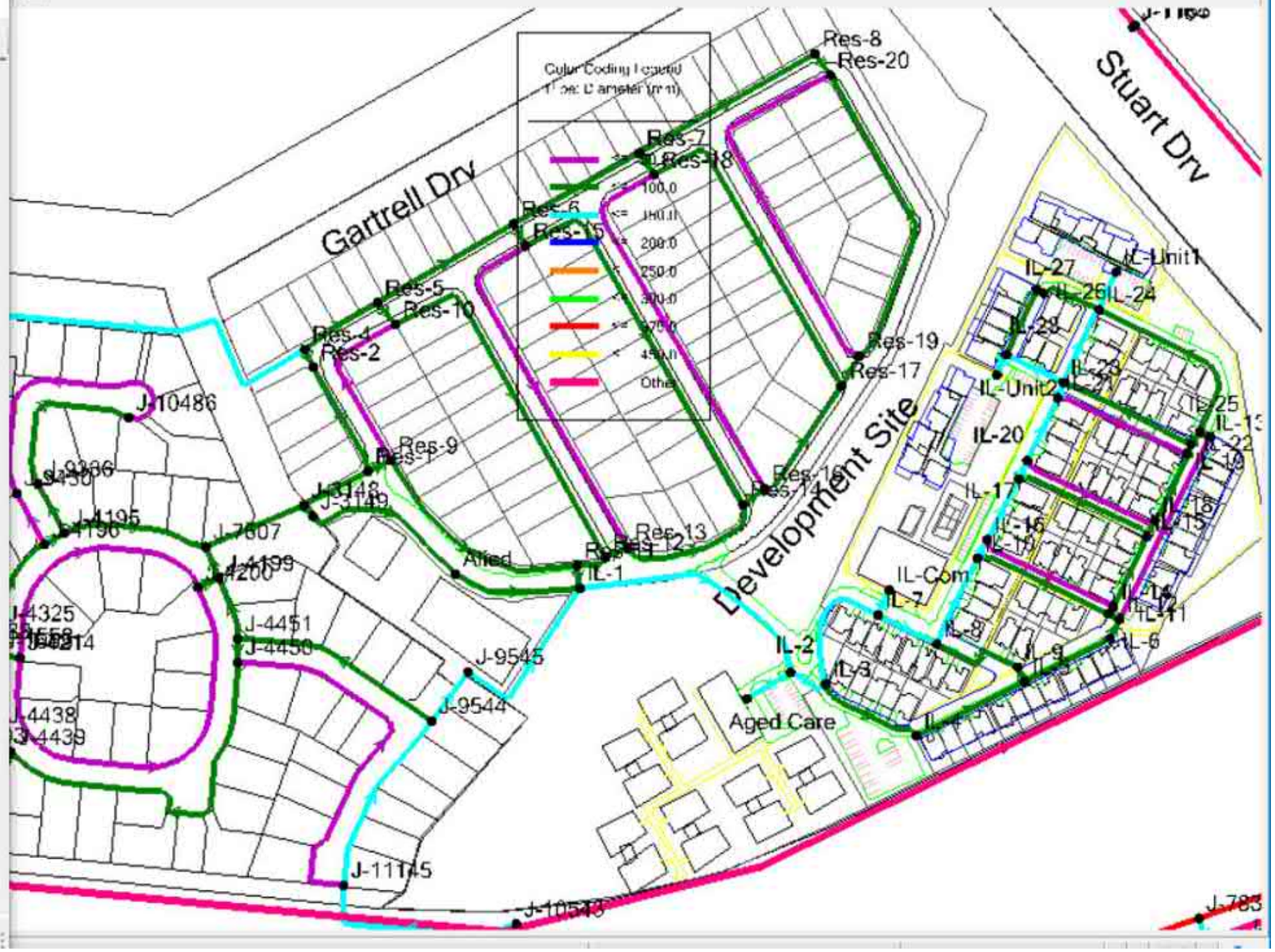
Full Development - Peak Hour Pipes + 15 l/s Residential Fire Flow Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Junction Table (Current Time: 19.0...

	Label	Demand (L/s)	Elevation (m)	Pressure (m H2O)
60580: Aged Ca	Aged Care	5.69	6.00	25.2
60662: Allied	Allied	0.48	6.50	32.4
60574: IL-1	IL-1	0.00	6.50	31.8
60578: IL-2	IL-2	0.00	6.00	25.3
60582: IL-3	IL-3	0.30	6.00	24.4
60584: IL-4	IL-4	0.30	6.00	23.5
60650: IL-7	IL-7	0.24	6.00	22.5
60609: IL-8	IL-8	0.24	6.00	22.5
60631: IL-12	IL-12	0.24	6.00	22.5
60637: IL-16	IL-16	0.18	6.00	22.4
60613: IL-17	IL-17	0.18	6.00	22.4
60644: IL-18	IL-18	0.24	6.00	22.4
60615: IL-20	IL-20	0.18	6.00	22.4
60617: IL-21	IL-21	0.18	6.00	22.4
60603: IL-23	IL-23	0.18	6.00	22.4
60592: IL-24	IL-24	0.24	6.00	22.4
60590: IL-25	IL-25	0.18	6.00	22.4
60596: IL-27	IL-27	0.18	6.00	22.4
60600: IL-28	IL-28	0.12	6.00	22.4
60653: IL-Com	IL-Com	30.33	6.00	22.1
60648: IL-Unit1	IL-Unit1	1.78	6.00	22.4
60598: IL-Unit2	IL-Unit2	1.78	6.00	22.4
5015: J-3148	J-3148	0.00	6.28	33.5
16071: J-9544	J-9544	0.66	6.06	35.6
16072: J-9545	J-9545	0.00	5.91	34.9
60655: Res-1	Res-1	0.18	6.50	33.3
60712: Res-2	Res-2	0.18	6.50	33.9
60665: Res-4	Res-4	0.37	6.50	34.0
60706: Res-5	Res-5	0.37	6.50	32.9
60698: Res-6	Res-6	0.55	6.50	32.2
60690: Res-7	Res-7	0.55	6.50	32.1
60667: Res-8	Res-8	0.37	6.50	32.0
60659: Res-11	Res-11	0.37	6.50	32.0
60681: Res-13	Res-13	0.65	6.50	32.1
60679: Res-14	Res-14	0.65	6.50	32.1
60677: Res-16	Res-16	0.55	6.50	32.1
60687: Res-18	Res-18	0.74	6.50	32.1
60673: Res-19	Res-19	0.65	6.50	32.0
60671: Res-20	Res-20	0.65	6.50	32.0

39 of 7629 elements displayed SORTED



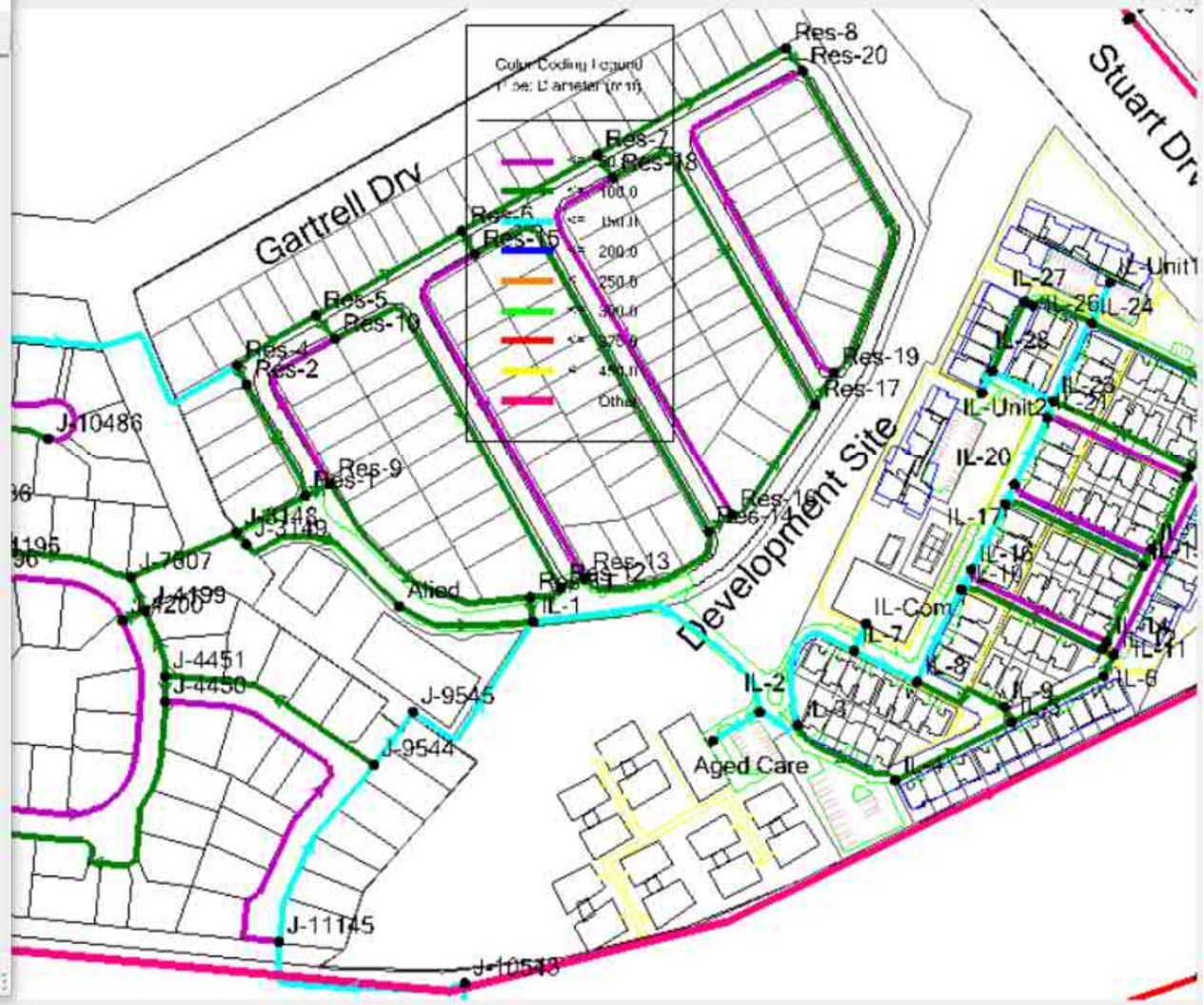
Full Development - Peak Hour Node + 30 l/s Commercial Fire Flow Results – 7 pm

Annandale Gardens WaterGEMS 9-10-24.wtg

FlexTable: Pipe Table (Current Time: 19.000 hours) (Annandale Gardens WaterG...

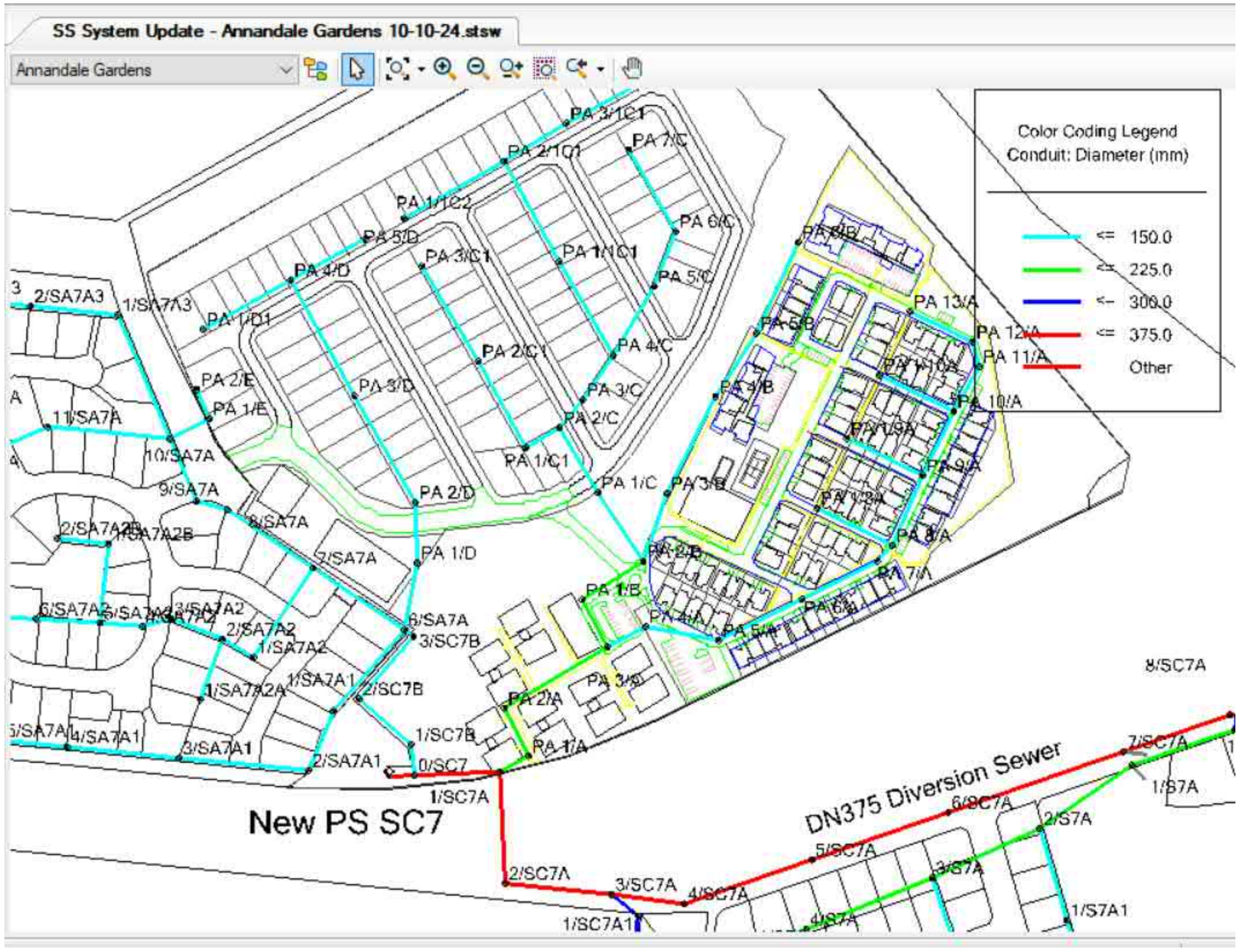
	Start Node	Stop Node	Length (Scaled) (m)	Diameter (mm)	Material	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss Gradient (m/m)	Hazen-Williams C
60726: P-833	J-2941	Res-4	240.71	150.0	PVC	17.11	0.97	0.008	120.0
60656: P-802	J-3148	Res-1	39.57	100.0	PVC	0.87	0.11	0.000	120.0
60663: P-806	J-3149	Alied	96.02	100.0	PVC	6.12	0.78	0.009	120.0
18267: 28765	J-7607	J-3148	58.29	100.0	PVC	6.99	0.89	0.011	120.0
16070: 27083	J-9544	J-9545	33.50	150.0	PVC	31.06	1.76	0.025	120.0
21690: 26845	J-9544	J-11145	104.29	150.0	PVC	37.13	2.10	0.035	120.0
60575: P-764	J-9545	IL-1	98.60	150.0	PVC	31.06	1.76	0.025	120.0
60720: P-830	IL-1	IL-2	142.22	150.0	PVC	45.09	2.55	0.050	120.0
60581: P-767	IL-2	Aged C...	27.77	150.0	PVC	5.69	0.32	0.001	120.0
60583: P-768	IL-2	IL-3	23.36	150.0	PVC	39.40	2.23	0.039	120.0
60585: P-769	IL-3	IL-4	59.94	100.0	PVC	7.76	0.99	0.014	120.0
60651: P-781(1)	IL-3	IL-7	73.98	150.0	PVC	31.34	1.77	0.025	120.0
60626: P-770(1)	IL-4	IL-5	66.03	100.0	PVC	7.46	0.95	0.013	120.0
60593: P-773	IL-25	IL-24	107.95	100.0	PVC	0.43	0.05	0.000	120.0
60649: P-800	IL-24	IL-Unit1	22.67	150.0	PVC	1.78	0.10	0.000	120.0
60602: P-776(2)	IL-28	IL-Unit2	12.25	150.0	PVC	1.78	0.10	0.000	120.0
60604: P-777	IL-28	IL-23	34.49	150.0	PVC	2.09	0.12	0.000	120.0
60605: P-778	IL-23	IL-24	44.54	150.0	PVC	1.81	0.10	0.000	120.0
60607: P-779	IL-23	IL-22	77.70	100.0	PVC	0.28	0.04	0.000	120.0
60612: P-782	IL-8	IL-10	51.70	150.0	PVC	4.08	0.23	0.001	120.0
60618: P-785	IL-20	IL-21	38.07	150.0	PVC	3.98	0.23	0.001	120.0
60647: P-799	IL-19	IL-18	40.34	100.0	PVC	1.32	0.17	0.001	120.0
60627: P-770(2)	IL-5	IL-6	52.40	100.0	PVC	3.62	0.46	0.003	120.0
60642: P-795	IL-14	IL-15	42.38	100.0	PVC	1.73	0.22	0.001	120.0
60639: P-783(2)	IL-16	IL-17	37.54	150.0	PVC	4.41	0.25	0.001	120.0
60652: P-781(2)	IL-7	IL-8	35.92	150.0	PVC	0.78	0.04	0.000	120.0
60654: P-801	IL-7	IL-Com	15.18	150.0	PVC	30.33	1.72	0.024	120.0
60713: P-808(1)	Res-1	Res-2	64.42	100.0	PVC	6.36	0.81	0.010	120.0
60660: P-804	Res-9	Res-11	127.31	100.0	PVC	5.99	0.76	0.009	120.0
60664: P-807	Alied	IL-1	70.34	100.0	PVC	5.64	0.72	0.008	120.0
60707: P-809(1)	Res-4	Res-5	47.42	100.0	PVC	10.19	1.30	0.023	120.0
60674: P-812	Res-20	Res-19	173.39	100.0	PVC	0.11	0.01	0.000	120.0
60678: P-814	Res-17	Res-16	71.95	100.0	PVC	0.79	0.10	0.000	120.0
60682: P-816	Res-14	Res-13	81.27	100.0	PVC	0.48	0.06	0.000	120.0
60704: P-825(1)	Res-12	Res-10	202.28	100.0	PVC	3.93	0.50	0.004	120.0
60692: P-809(2)	Res-7	Res-8	110.21	100.0	PVC	0.89	0.11	0.000	120.0
60708: P-809(1)	Res-5	Res-6	85.82	100.0	PVC	5.85	0.74	0.008	120.0

37 of 10235 elements displayed | SORTED



Full Development - Peak Hour Pipes + 30 l/s Commercial Fire Flow Results – 7 pm

APPENDIX C
SEWERGEMS MODELLING RESULTS & FIGURES



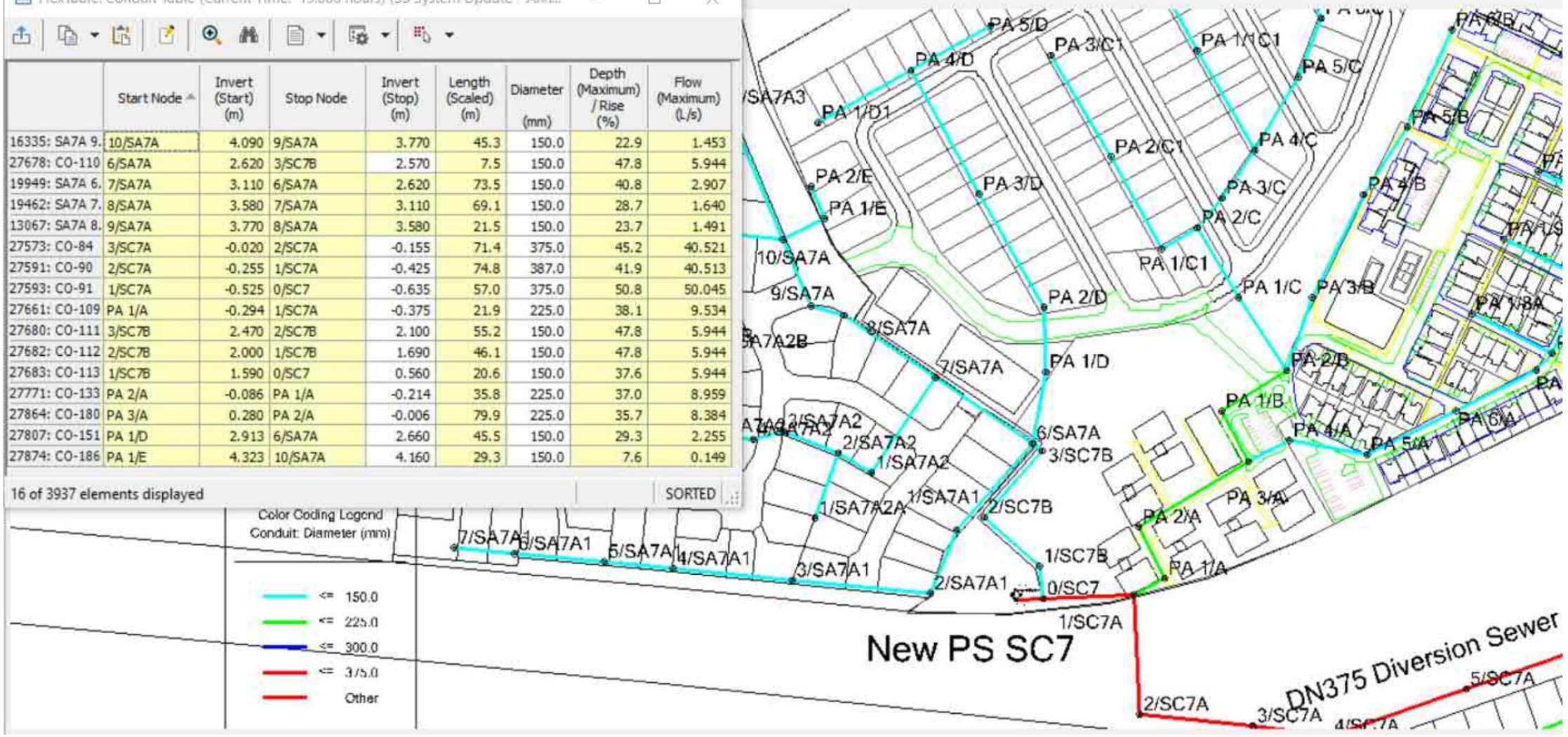
SEWERGEMS Modelling Figure

SS System Update - Annandale Gardens 10-10-24.stsw

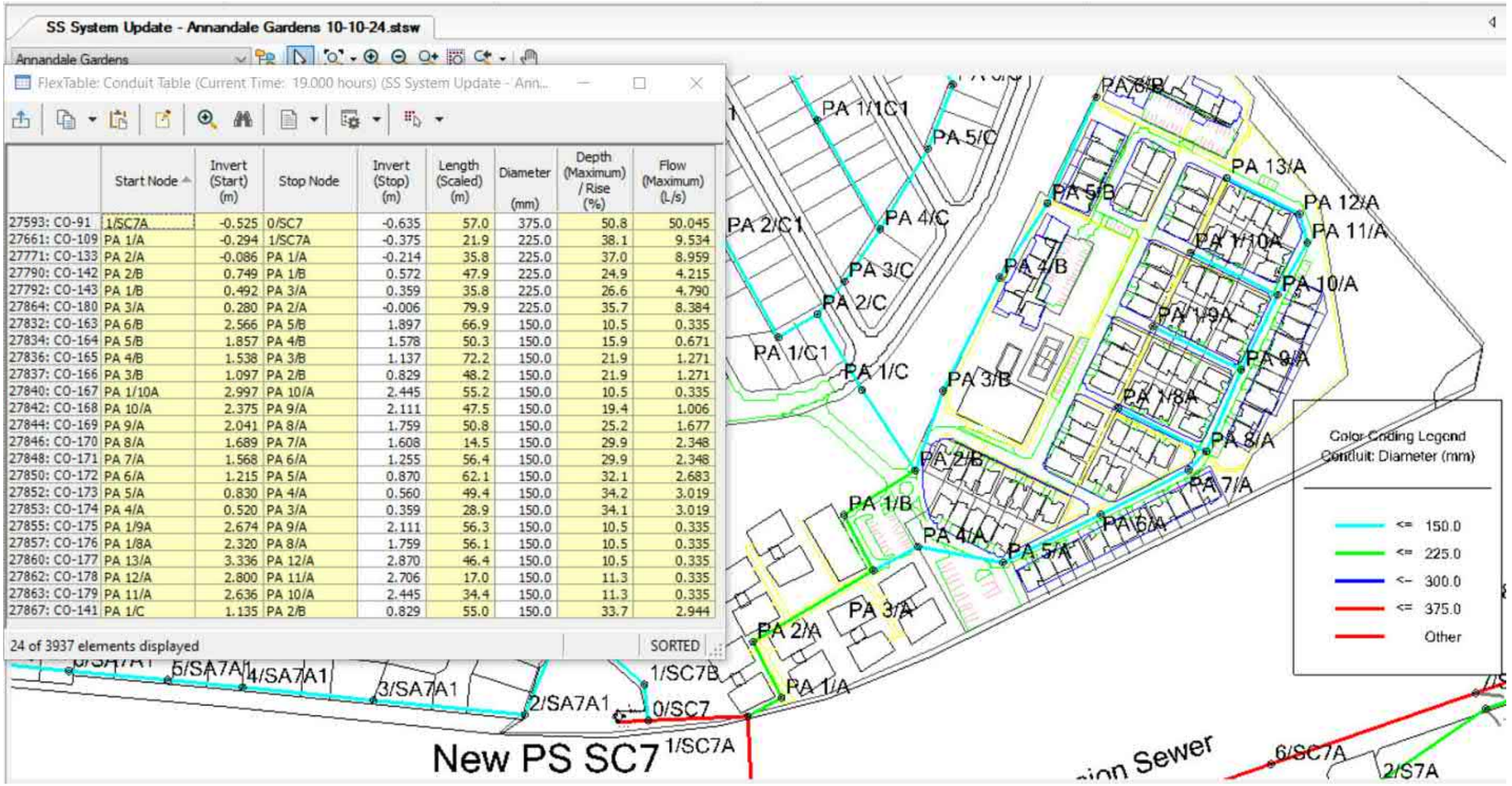
FlexTable: Conduit Table (Current Time: 19.000 hours) (SS System Update - Ann...

	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Diameter (mm)	Depth (Maximum) / Rise (%)	Flow (Maximum) (L/s)
16335: SA7A 9.	10/SA7A	4.090	9/SA7A	3.770	45.3	150.0	22.9	1.453
27678: CO-110	6/SA7A	2.620	3/SC7B	2.570	7.5	150.0	47.8	5.944
19949: SA7A 6.	7/SA7A	3.110	6/SA7A	2.620	73.5	150.0	40.8	2.907
19462: SA7A 7.	8/SA7A	3.580	7/SA7A	3.110	69.1	150.0	28.7	1.640
13067: SA7A 8.	9/SA7A	3.770	8/SA7A	3.580	21.5	150.0	23.7	1.491
27573: CO-84	3/SC7A	-0.020	2/SC7A	-0.155	71.4	375.0	45.2	40.521
27591: CO-90	2/SC7A	-0.255	1/SC7A	-0.425	74.8	387.0	41.9	40.513
27593: CO-91	1/SC7A	-0.525	0/SC7	-0.635	57.0	375.0	50.8	50.045
27661: CO-109	PA 1/A	-0.294	1/SC7A	-0.375	21.9	225.0	38.1	9.534
27680: CO-111	3/SC7B	2.470	2/SC7B	2.100	55.2	150.0	47.8	5.944
27682: CO-112	2/SC7B	2.000	1/SC7B	1.690	46.1	150.0	47.8	5.944
27683: CO-113	1/SC7B	1.590	0/SC7	0.560	20.6	150.0	37.6	5.944
27771: CO-133	PA 2/A	-0.086	PA 1/A	-0.214	35.8	225.0	37.0	8.959
27864: CO-180	PA 3/A	0.280	PA 2/A	-0.006	79.9	225.0	35.7	8.384
27807: CO-151	PA 1/D	2.913	6/SA7A	2.660	45.5	150.0	29.3	2.255
27874: CO-186	PA 1/E	4.323	10/SA7A	4.160	29.3	150.0	7.6	0.149

16 of 3937 elements displayed SORTED



PWWF Sewer Capacity Assessment Results (Existing Sewers)



	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Diameter (mm)	Depth (Maximum) / Rise (%)	Flow (Maximum) (L/s)
27593: CO-91	1/SC7A	-0.525	0/SC7	-0.635	57.0	375.0	50.8	50.045
27661: CO-109	PA 1/A	-0.294	1/SC7A	-0.375	21.9	225.0	38.1	9.534
27771: CO-133	PA 2/A	-0.086	PA 1/A	-0.214	35.8	225.0	37.0	8.959
27790: CO-142	PA 2/B	0.749	PA 1/B	0.572	47.9	225.0	24.9	4.215
27792: CO-143	PA 1/B	0.492	PA 3/A	0.359	35.8	225.0	26.6	4.790
27864: CO-180	PA 3/A	0.280	PA 2/A	-0.006	79.9	225.0	35.7	8.384
27832: CO-163	PA 6/B	2.566	PA 5/B	1.897	66.9	150.0	10.5	0.335
27834: CO-164	PA 5/B	1.857	PA 4/B	1.578	50.3	150.0	15.9	0.671
27836: CO-165	PA 4/B	1.538	PA 3/B	1.137	72.2	150.0	21.9	1.271
27837: CO-166	PA 3/B	1.097	PA 2/B	0.829	48.2	150.0	21.9	1.271
27840: CO-167	PA 1/10A	2.997	PA 10/A	2.445	55.2	150.0	10.5	0.335
27842: CO-168	PA 10/A	2.375	PA 9/A	2.111	47.5	150.0	19.4	1.006
27844: CO-169	PA 9/A	2.041	PA 8/A	1.759	50.8	150.0	25.2	1.677
27846: CO-170	PA 8/A	1.689	PA 7/A	1.608	14.5	150.0	29.9	2.348
27848: CO-171	PA 7/A	1.568	PA 6/A	1.255	56.4	150.0	29.9	2.348
27850: CO-172	PA 6/A	1.215	PA 5/A	0.870	62.1	150.0	32.1	2.683
27852: CO-173	PA 5/A	0.830	PA 4/A	0.560	49.4	150.0	34.2	3.019
27853: CO-174	PA 4/A	0.520	PA 3/A	0.359	28.9	150.0	34.1	3.019
27855: CO-175	PA 1/9A	2.674	PA 9/A	2.111	56.3	150.0	10.5	0.335
27857: CO-176	PA 1/8A	2.320	PA 8/A	1.759	56.1	150.0	10.5	0.335
27860: CO-177	PA 13/A	3.336	PA 12/A	2.870	46.4	150.0	10.5	0.335
27862: CO-178	PA 12/A	2.800	PA 11/A	2.706	17.0	150.0	11.3	0.335
27863: CO-179	PA 11/A	2.636	PA 10/A	2.445	34.4	150.0	11.3	0.335
27867: CO-141	PA 1/C	1.135	PA 2/B	0.829	55.0	150.0	33.7	2.944

PWWF Sewer Capacity Assessment Results (Independent Living Sewers)

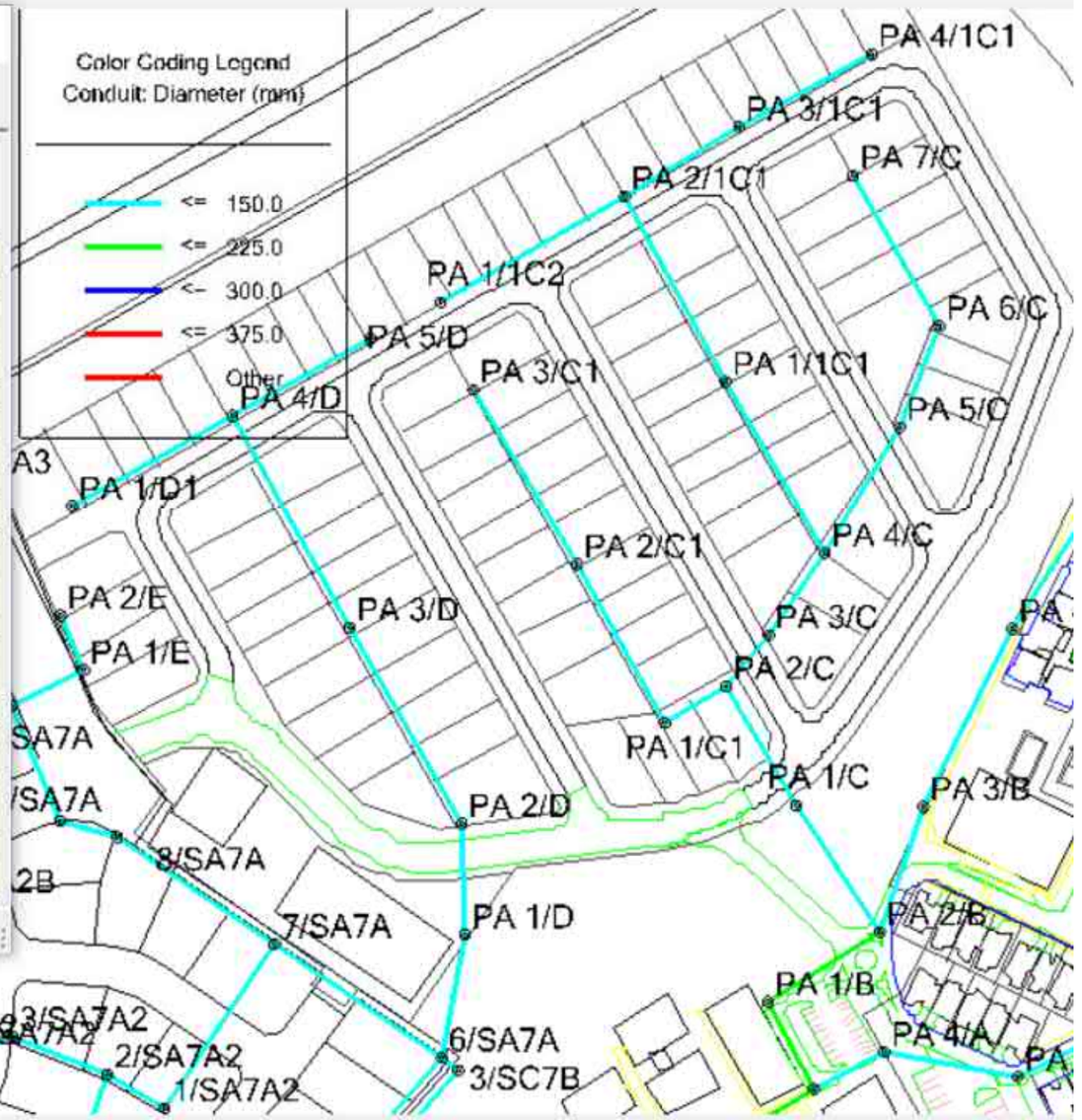
SS System Update - Annandale Gardens 10-10-24.stsw

Annandale Gardens

FlexTable: Conduit Table (Current Time: 19.000 hours) (SS System Update - Ann...

	Start Node	Invert (Start) (m)	Stop Node	Invert (Stop) (m)	Length (Scaled) (m)	Diameter (mm)	Depth (Maximum) / Rise (%)	Flow (Maximum) (L/s)
27774: CO-134	PA 4/1C1	3.774	PA 3/1C1	3.225	54.9	150.0	9.9	0.298
27776: CO-135	PA 3/1C1	3.185	PA 2/1C1	2.915	48.6	150.0	12.4	0.410
27870: CO-183	PA 2/1C1	2.835	PA 1/1C1	2.410	76.5	150.0	17.6	0.820
27782: CO-138	PA 1/1C1	2.370	PA 4/C	1.970	72.0	150.0	20.5	1.118
27784: CO-139	PA 4/C	1.900	PA 3/C	1.699	36.1	150.0	27.4	1.975
27786: CO-140	PA 3/C	1.659	PA 2/C	1.525	24.2	150.0	28.1	2.087
27866: CO-141	PA 2/C	1.455	PA 1/C	1.175	50.4	150.0	33.7	2.944
27798: CO-146	PA 1/D1	4.830	PA 4/D	4.272	67.0	150.0	10.1	0.298
27868: CO-181	PA 4/D	4.202	PA 3/D	3.712	88.2	150.0	15.9	0.671
27804: CO-149	PA 3/D	3.672	PA 2/D	3.217	81.9	150.0	19.8	1.044
27806: CO-150	PA 2/D	3.177	PA 1/D	2.953	40.4	150.0	22.8	1.379
27807: CO-151	PA 1/D	2.913	6/SA7A	2.660	45.5	150.0	29.3	2.255
27809: CO-152	PA 5/D	4.750	PA 4/D	4.272	57.3	150.0	9.5	0.261
27872: CO-185	PA 1/1C2	3.686	PA 2/1C1	2.915	77.1	150.0	9.9	0.298
27869: CO-182	PA 3/C1	2.894	PA 2/C1	2.155	73.9	150.0	8.6	0.224
27820: CO-157	PA 2/C1	2.115	PA 1/C1	1.749	65.8	150.0	14.0	0.522
27821: CO-158	PA 1/C1	1.669	PA 2/C	1.525	25.9	150.0	17.1	0.783
27871: CO-184	PA 7/C	3.225	PA 6/C	2.595	63.0	150.0	8.6	0.224
27828: CO-161	PA 6/C	2.525	PA 5/C	2.306	39.5	150.0	11.9	0.373
27829: CO-162	PA 5/C	2.266	PA 4/C	1.970	53.3	150.0	14.0	0.522
27867: CO-141	PA 1/C	1.135	PA 2/B	0.829	55.0	150.0	33.7	2.944
27874: CO-186	PA 1/E	4.323	10/SA7A	4.160	29.3	150.0	7.6	0.149
27876: CO-187	PA 2/E	4.582	PA 1/E	4.403	21.5	150.0	5.1	0.075

23 of 3937 elements displayed SORTED



PWWF Sewer Capacity Assessment Results (Future Residential Area Sewers)