



1 PROPOSED ELEVATION 1
1 : 100 AT A3 SHEET SIZE



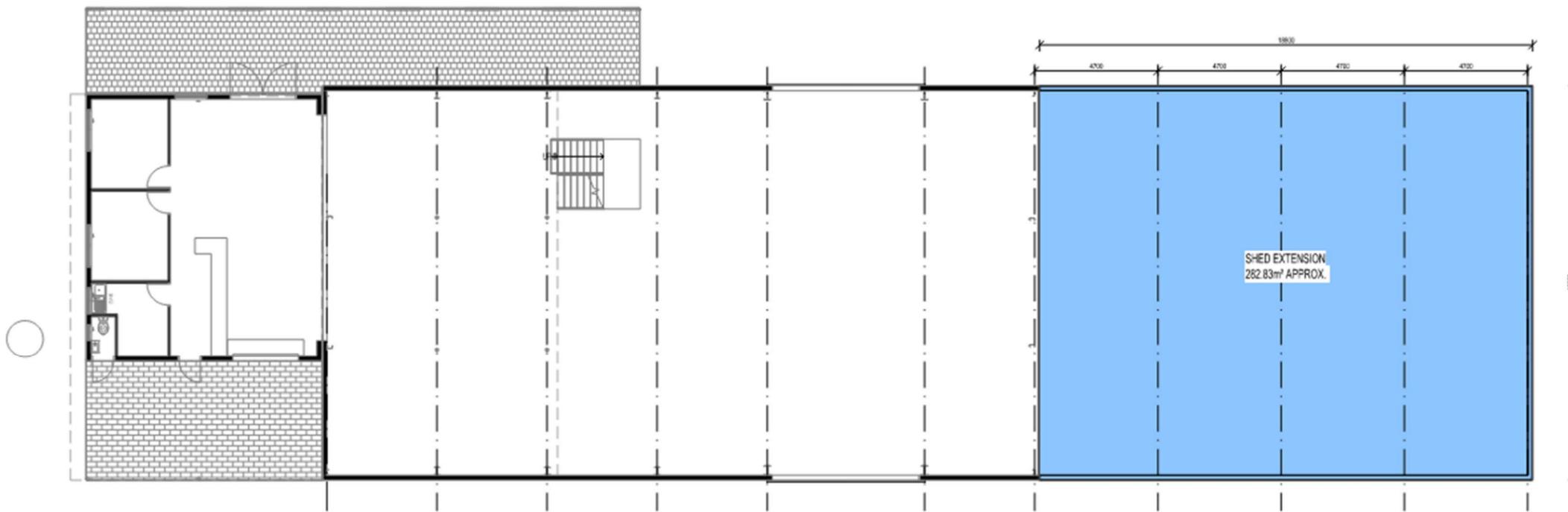
2 PROPOSED ELEVATION 2
1 : 100 AT A3 SHEET SIZE



4 PROPOSED ELEVATION 4
1 : 100 AT A3 SHEET SIZE



3 PROPOSED ELEVATION 3
1 : 100 AT A3 SHEET SIZE



PROPOSED FLOOR PLAN - RETAIL/SHED
1 : 100

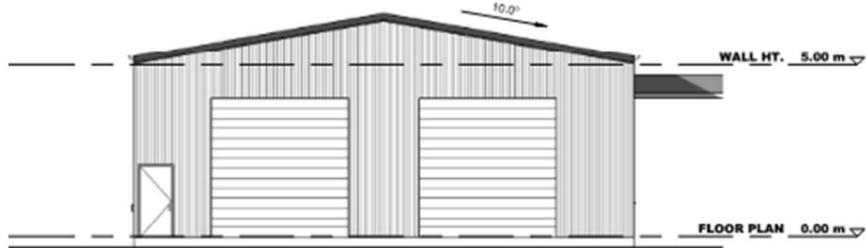
PROJECT DESCRIPTION:
PS - PRELIMINARY ISSUE - 20/04/2025

PRELIMINARY

NOTES:



1 ELEVATION 1
1 : 100 AT A3 SHEET SIZE



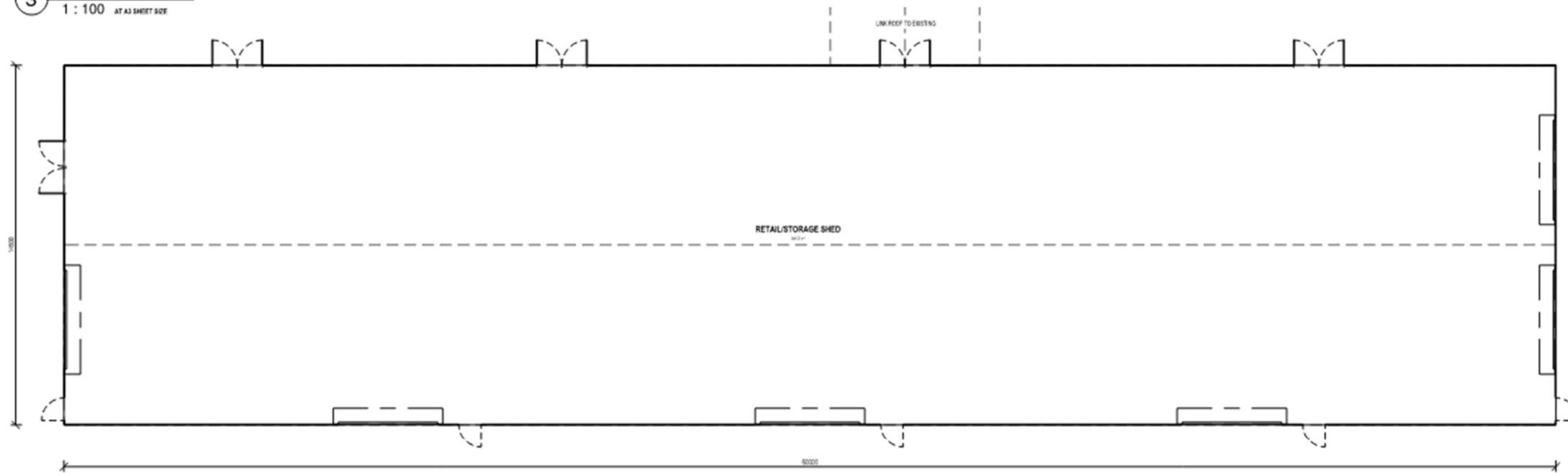
2 ELEVATION 2
1 : 100 AT A3 SHEET SIZE



4 ELEVATION 4
1 : 100 AT A3 SHEET SIZE



3 ELEVATION 3
1 : 100 AT A3 SHEET SIZE



FLOOR PLAN
1 : 100

AREAS	
RETAIL/STORAGE SHED	876.80 m ²
TOTAL	876.80 m ²

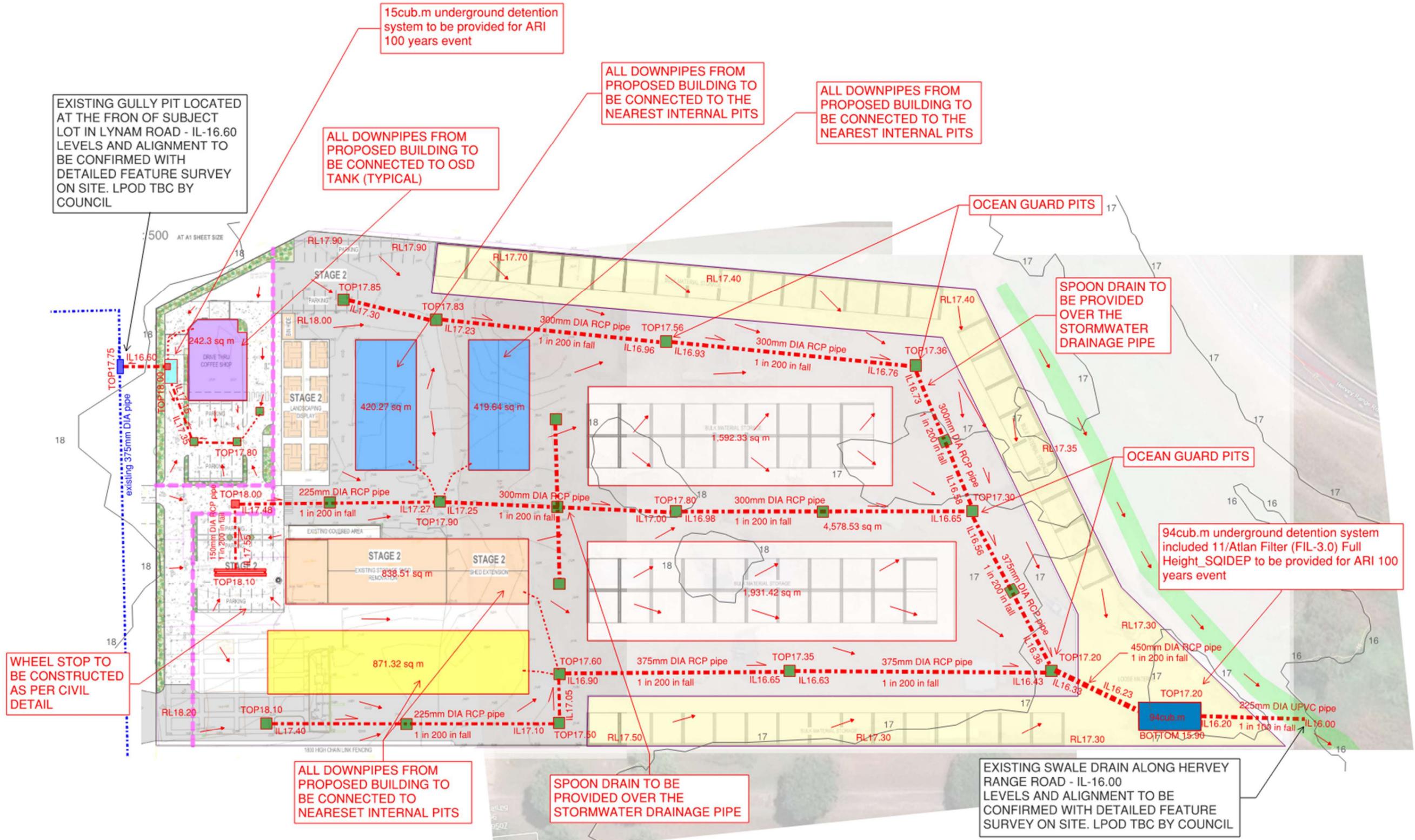
PROJECT SHEET DESCRIPTION
PS - PRELIMINARY ISSUE - 08-04-2025

PRELIMINARY
NOTES:
IF THE SHED IS TO BE BUILT BY OTHER PARTY, PLEASE CONTACT THE ARCHITECT FOR MORE DETAILS.



PROJECT:
NEW RETAIL/STP
CLIENT:
P. FORTINI

9. APPENDIX B – Preliminary Engineering Services Drawing



10. APPENDIX C – Water Supply & Sewerage Planning Report



LYNAM ROAD COFFEE SHOP 13 LYNAM ROAD, GUMLOW

WATER SUPPLY & SEWERAGE PLANNING REPORT

**Date: 6 Jan 2026
(Revision A)**

TABLE OF CONTENTS

1	INTRODUCTION	1
2	POPULATION ASSESSMENT	3
3	WATER SUPPLY PLANNING	5
3.1	Water Demand	5
3.2	Water Supply Assessment & Network Modelling.....	6
4	SEWER SYSTEM PLANNING.....	10
4.1	Package Pump Station Design Flows.....	11
4.2	Package Pump Station SewerGEMS Modelling	13

APPENDICES

Appendix A	Development Plans
Appendix B	WaterGEMS Modelling & Results
Appendix C	SewerGEMS Modelling & Results

REPORT AUTHORISATION				
Revision	Revision Date	Details	Prepared by	Signature
1	06/01/2026	Original Report	Desmond Moseley (RPEQ 7565)	

The sewer system assessment detailed in this report has illustrated:

- The Bedrock site is not currently serviced with a reticulated sewer system. It is understood that the site currently has a private on-site sewer system. The existing sewer system for the renewed Bedrock Landscaping Supplies site will remain as is.
- The TCC information request for the coffee shop development advised “Sewage demands associated with the development to be identified, and the footprint of required disposal area to be shown on plan. Disposal area to comply with relevant standards and achieve required setback”. The assessment of the sizing of the on-site sewage treatment system is to be undertaken by others and is NOT included in this report.
- An option has been considered in this report to have a private package sewage pump station to service the proposed coffee shop site. The sewage pump station option would involve:
 - A private package pump station (Aquatec or similar package PS) located within the coffee shop development site. The pump station would have 2 x submersible grinder type pumps, control board and alarm system. The preliminary pump duty would be 0.61 l/s @ 40m head.
 - A DN40 PE sewer pressure main from the pump station to the east to connect to the existing DN200 PVC sewer pressure main that is located on the eastern boundary of the Bedrock site and on the boundary of The Ring Road offramp to Hervey Range Rd. The alignment of this private pressure main could be within the Bedrock Landscaping Supplies site (in an easement) or along Hervey Range Rd.
- The sewer assessment shows that a private package pump station is a viable option for the provision of a sewage service to the proposed coffee shop development.

The following Figure 1.2 is an extract from the Council GIS which illustrates the location of Bedrock Landscaping Supplies site and the existing water & sewer infrastructure.



Figure 1.2 – GIS Extract of Existing Water & Sewer Infrastructure

2 POPULATION ASSESSMENT

Three methods have been used to estimate the equivalent population for the proposed coffee shop development at No 13 Lynam Rd, Gumlow. These three methods are summarised below.

Method 1 – Infrastructure Demand Unit Rates

The following table provides the population assessment for the proposed drive through Coffee Shop development on the corner of Lynam Rd and Hervey Range Rd in Gumlow. 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 GFA’s for the proposed coffee shop development are detailed on the figures in Appendix A with the following table providing a summary of the GFA’s and loading rates.

Table 2.1 – Water Equivalent Population Assessment

	Area	Loading Rate	EP
Coffee Shop (Retail)	247 m ² GFA	2.11 EP/100m ²	5.2 EP
Totals			5.2 EP

Table 2.2 – Sewage Equivalent Population Assessment

	Area	Rate	EP
Coffee Shop (Retail)	247 m ² GFA	2.74 EP/100m ²	6.8 EP
Totals			6.8 EP

Method 2 – Planning Scheme Loading Rates

An alternative method to assess the equivalent population of the drive through coffee shop is to apply the broad loading rates from “Table SC3.1.6a - Planned demand generation rate for a trunk infrastructure network” from Townsville’s planning scheme. It is noted that the zoning on this site is “Rural” however that actual proposed use is more consistent with the “Neighbourhood Centre” zoning in the planning scheme.

The water & sewer equivalent population is provided in Table 2.3 & Table 2.4 below.

Table 2.3 – Water Equivalent Population Assessment

	Area	Loading Rate	EP
Coffee Shop (Neighbourhood Centre)	1,284 m ² Site Area	63.5 EP/ha	8.2 EP

Table 2.4 – Sewage Equivalent Population Assessment

	Area	Rate	EP
--	-------------	-------------	-----------

Toms Tavern Development (Major Centre)	1,284 m ² Site Area	80.5 EP/ha	10.3 EP
---	--------------------------------	------------	----------------

Method 3 – Fixture Units

This method compares the number of plumbing fixture units within the proposed coffee shop development to the number of plumbing fixture units in an average residential house. This is then above to be converted to an equivalent population.

The proposed development plans in Appendix A illustrate that proposed coffee shop development will include the flowing plumbing fixtures. The plumbing fixtures have been converted to fixture units based on the plumbing & drainage code (AS3500). The summary of the fixture units for the proposed development is provided in Table 2.5 below.

Table 2.5 Fixture Unit Assessment

Fixture Unit Type	Fixture Unit Rating	Number	Total Fixture Units
Toilets (WC)	6 units	3	18 units
Hand basins	1 unit	3	3 units
Urinal	1 unit	1	1 unit
Kitchen Sink (Commercial)	5 units	2	10 units
Dishwasher	3 units	2	6 units
Total			38 units

A standard house generally contains 24 fixture units so the development would be equivalent to $38 / 24 = 1.58$ houses. Based on TCC occupant rate of 2.8 EP/lot this would give $1.58 \times 2.8 = 4.4$ EP.

The higher estimated equivalent populations from the above three methods have been used in the water and sewer capacity assessment for the proposed coffee shop development. This has the water equivalent population loading of 8.2 EP and sewer equivalent population loading of 10.3 EP.

3 WATER SUPPLY PLANNING

3.1 Water Demand

Water demands have been calculated in accordance with Townsville City Council planning scheme and the CTM Code. The following table provides the “residential” water demand parameters from the CTM Code for each equivalent person (EP).

Table 3.1 – Water 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

Townsville Water also have diurnal water demand patterns that are applied to the various water uses. The commercial demand diurnal pattern will be applied for the proposed Lynam Rd coffee shop development. The commercial demand diurnal pattern has a peaking factor of 1.5, instead of the 2.56 peaking factor provided in the above table for residential water demands. The commercial diurnal pattern is illustrated below.

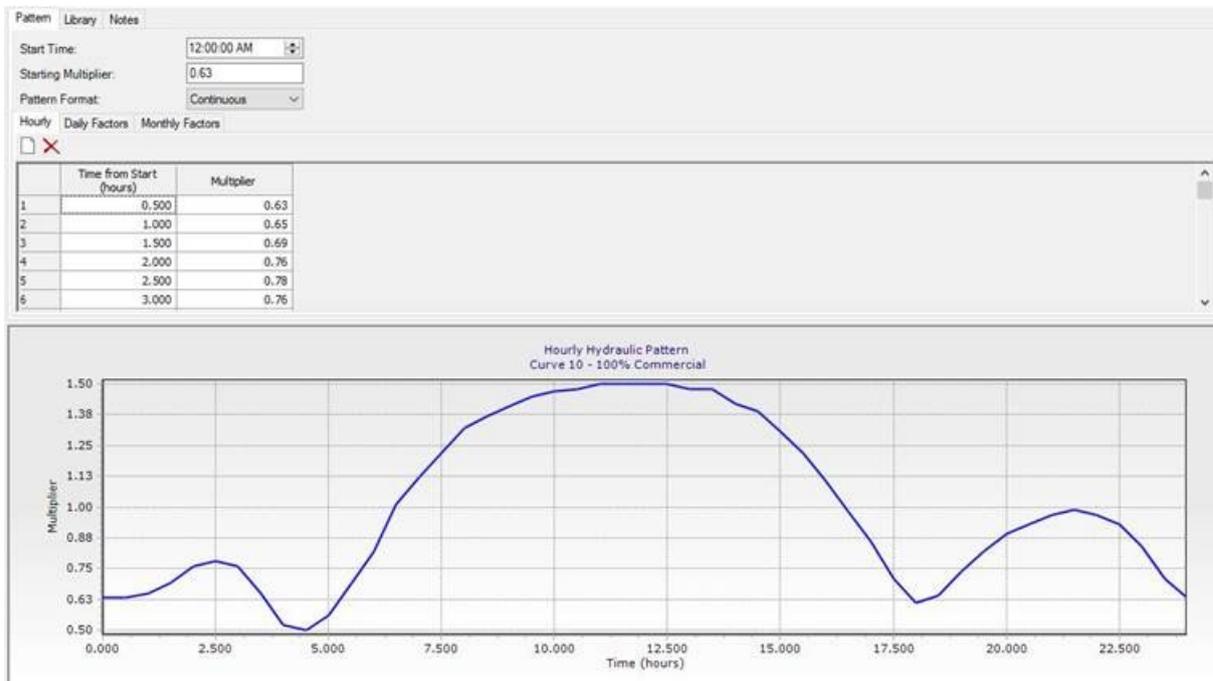


Figure 3.1 – Commercial Water Demand Diurnal Pattern

Based on an equivalent population of 8.2 EP, for the Lynam Rd drive through Coffee Shop development, the peak water demand is:

$$\begin{aligned}
 &= 8.2 \text{ EP} \times 1125 \text{ L/day/EP} \times 1.5 \text{ (commercial peaking factor)} \\
 &= 8.2 \times (1125 / (24 \times 3600)) \times 1.5 \\
 &= 0.16 \text{ l/s}
 \end{aligned}$$

In addition to the above, as the development is commercial a 30 l/s fire flow is required in accordance with Council’s design standards. The standards allow for the fire flow to be provided from up to three hydrants. The water network modelling results for the proposed coffee shop development on Lynam Rd is detailed in the following report sections.

The following Figure 3.2 from the WaterGEMS network model illustrates the inclusion of the equivalent population in the model for the drive through coffee shop site.

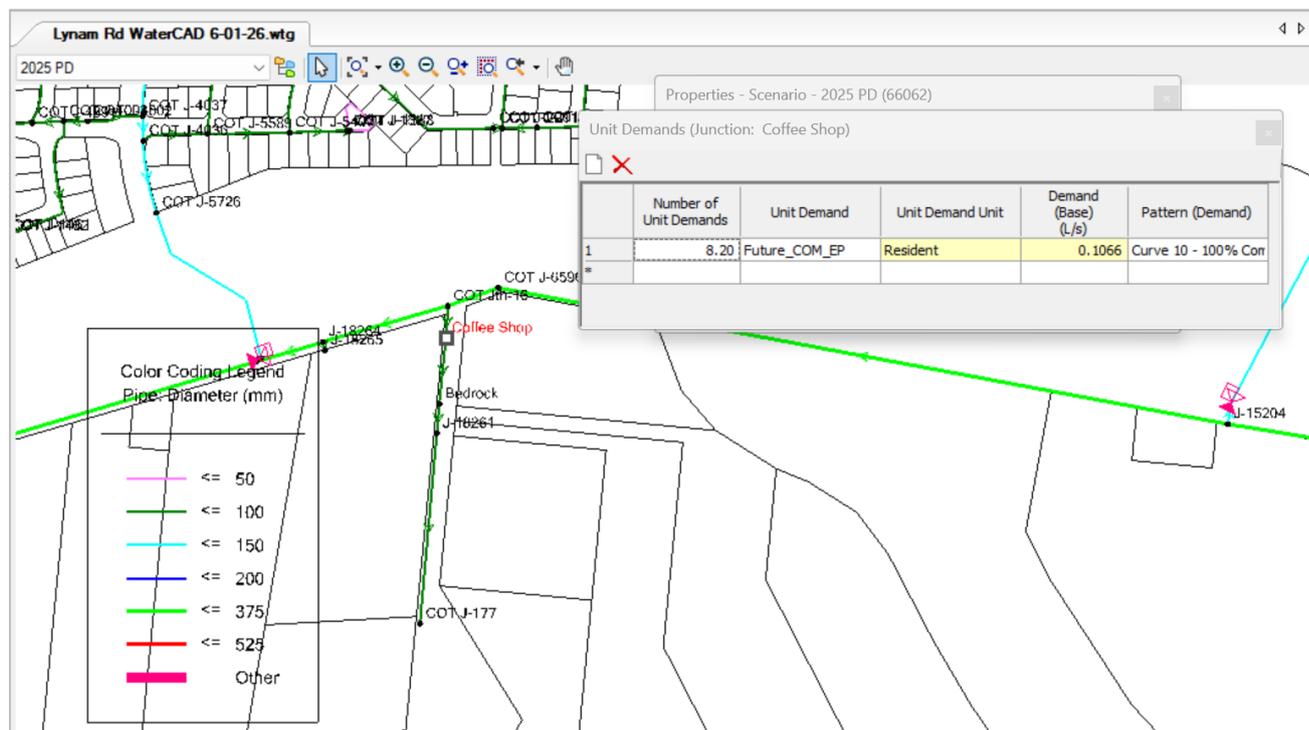


Figure 3.2 – Water Demand for Lynam Rd Coffee Shop

3.2 Water Supply Assessment & Network Modelling

The proposed Coffee Shop development is to be located on the eastern side Lynam Rd and at the intersection with Hervey Range Rd. The existing water infrastructure that services the site includes:

- The DN100 PVC reticulation water main along the western side of Lynam Rd will service the development site. A new 20mm water service and meter will be connected off the existing water main, under Lynam Rd to the frontage of the coffee shop site.
- The DN100 PVC main on Lynam Rd connects to the DN375 AC trunk water main on the southern side of Hervey Range Rd. The DN375 AC main is the pumped main from the Mt Margaret Water Booster Pump Station to the Mt Margaret water supply system and reservoir.
- The Mt Margaret water booster pump station is located on the southern side of Hervey Range Rd in Condon (within the Shalom College site). The pump station draws water from the Dougals to Louisa DN1085 MSCL bulk water main that is located to the east and along North Beck Drv and the open drain/Powerlink easement in Kirwan.
- Water in the DN1085 MSCL bulk water main is sourced either from the Dougals WTP (when the delivery pumps are running) or from the Mt Louisa reservoirs (back flow along the pipeline).

The water pressures along the Mt Margaret DN375 AC trunk water main on Hervey Range Rd are high and variable. The pressures are up to around 130mHGL (pressure of around 110 kPa) when the Mt Margaret pumps are in operation. The pressures are lowered to around 88mHGL (pressure of around 690 kPa) when the pumps are not running, with this being the pressure from the Mt Louisa reservoirs.

The following extract from the Council GIS illustrates the existing water infrastructure that services the proposed coffee shop site on Lynam Rd in Gumlow.



Figure 3.3 – Council GIS Water Plot

Water network modelling has been performed to assess the capacity of the existing reticulation network to service the proposed coffee shop development site. The modelling was undertaken using the Council's WaterGEMS network model for both the peak hour demands and fire flows.

The WaterGEMS network modelling results with the inclusion of the water demand from the proposed coffee shop development off Lynam Rd is as follows:

- The minimum water pressure on the existing DN100 PVC water main on the offtake for the coffee shop site was 677 kPa. This pressure was at 12 noon when the Mt Margaret water booster pumps were not in operation. This achieves the minimum water pressure of 220 kPa.
- The minimum water pressure on the southern end of the existing DN100 PVC water main on Lynam Rd is 681 kPa. This higher pressure is due to the lower ground elevations on the southern end of Lynam Rd.
- The velocity and headloss gradient along the existing DN100 PVC water main along Lynam Rd are up to 0.09 m/s and below 0.001 m/m respectively. The velocity and headloss gradient are well within the TCC standard of 2.5 m/s and 0.005 m/m.

- With the inclusion of a 30 l/s fire flow (commercial) on the existing DN100 PVC water main on Lynam Rd, the water pressures are reduced to 496 kPa in the water mains. This pressure was at 12 noon when the Mt Margaret water booster pumps were not in operation. The 30 l/s fire flow was applied at the fire hydrant opposite the Bedrock Landscaping Supplies water service offtake as the Bedrock site will also require the 30 l/s fire flow standard. This modelled water pressure achieves the minimum water pressure of 120 kPa. This is the theoretical water pressure in the DN100 water main and does not account for losses through the hydrant tee and standpipe. The 30 l/s fire flow to the site can be provided from up to 3 hydrants running concurrently.
- The velocity along the existing DN100 PVC water main with the inclusion of the 30 l/s fire flow was up to 3.9 m/s which is within the 4.0 m/s maximum allowable velocity in the CTM Code.
- The modelling results for the water network with the inclusion of the additional water demands from the proposed coffee shop on Lynam Rd are provided in Appendix B.

It is noted that due to the high water pressures in the existing TCC reticulation network, the development will need to have a pressure limiter installed on the water meter/service to reduce the pressures to below 500 kPa in accordance with the Plumbing & Drainage Code.

The following Figure 3.3 illustrates the peak hour demands and residual water pressure at the Lynam Rd coffee shop offtake from the existing DN100 PVC main. Figure 3.4 illustrates the peak hour and 30 l/s commercial fire flow pressures.

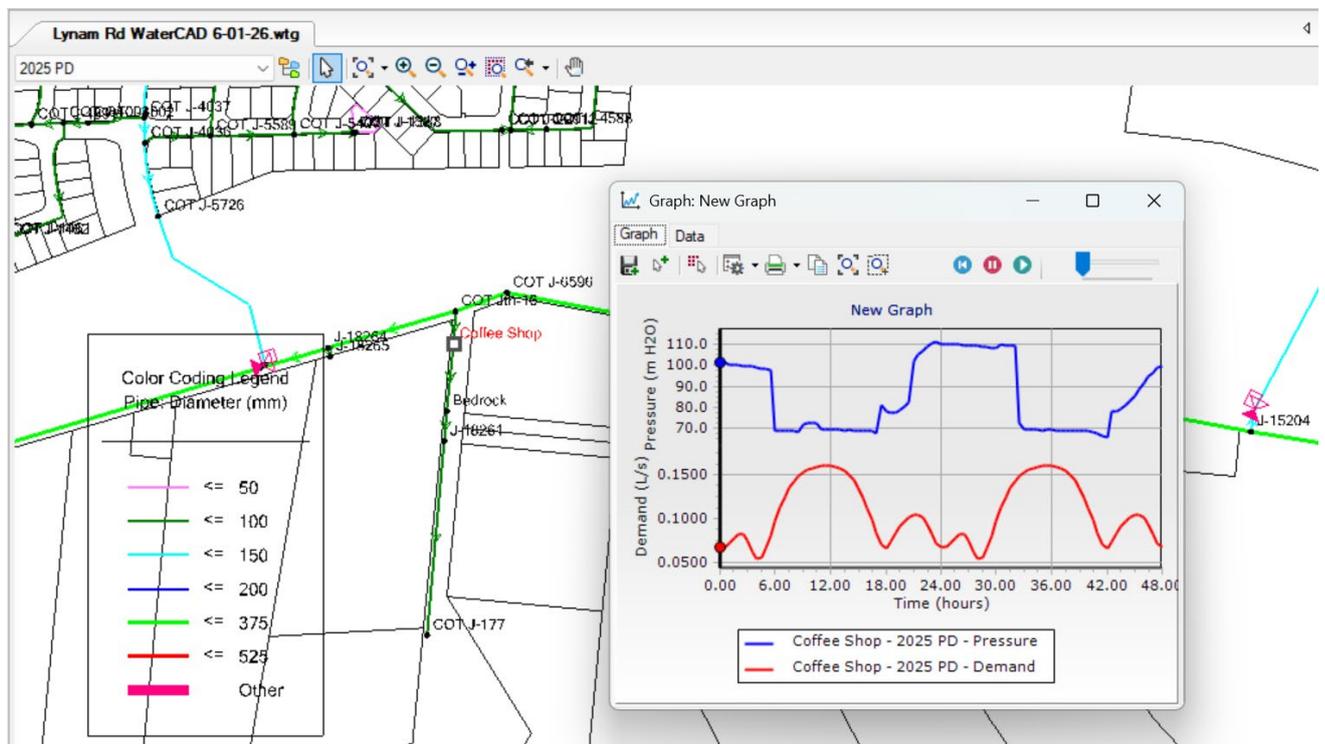


Figure 3.3 – Peak Hour Water Demand & Pressures

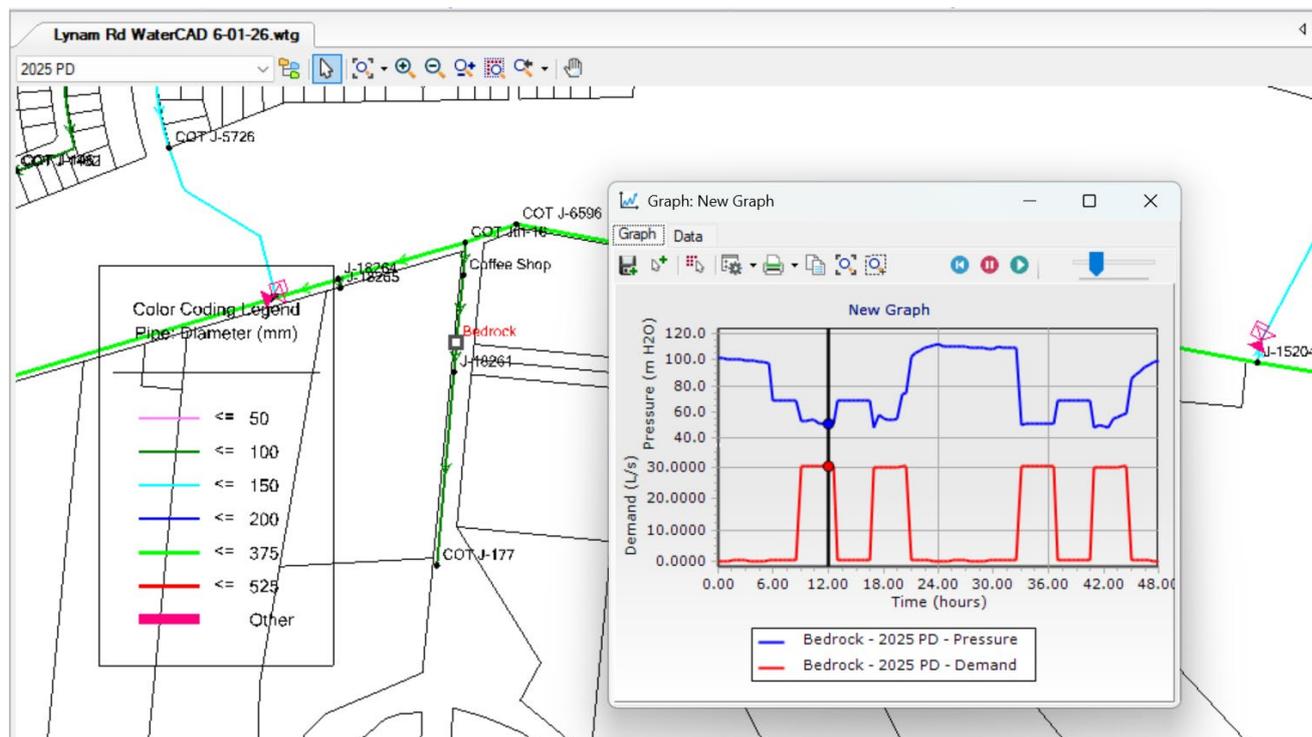


Figure 3.4 – Fire Flow Water Demand & Pressures

The above theoretical water network modelling shows:

- The proposed coffee shop on Lynam Rd can be serviced with a reticulated water supply from the existing DN100 PVC water main without adversely impacting on its performance/capacity.
- No water infrastructure upgrades are required.

4 SEWER SYSTEM PLANNING

The existing Bedrock Landscape Supplies site has a private on-site sewage system and is not connected to the Townsville reticulated sewer network. The existing sewer system for the renewed Bedrock Landscaping Supplies site is understood to be remaining as is.

The TCC information request for the coffee shop development advised “Sewage demands associated with the development to be identified, and the footprint of required disposal area to be shown on plan. Disposal area to comply with relevant standards and achieve required setback”. If the proposed coffee shop development is to be serviced by an on-site sewage treatment and disposal system this will be assessed and sized by others and has NOT been included as part of this report.

An option has been considered in this report to have a private package sewage pump station to service the proposed coffee shop site. The sewage pump station option would involve:

- A private package pump station (Aquatec or similar package PS) located within the coffee shop development site. The pump station would have 2 x submersible grinder type pumps, control board and alarm system. Figure 4.1 below is an extract from the Aquatec brochure for a package sewage pump station. The full brochure is provided in Appendix C.

Aquatec’s Pressure Sewer chambers are engineered with a domed base forcing solids into the cutter of the pump, eliminating the potential for solids build up in dead zones and associated odour issues.

Product Range

Models	Litres*	Diameter	Depth	Depth to Inlet (max)
PS5000	500	1.2m	1.45m	0.9m
PS5950	950	1.1m	1.65m	1.0m
PS51000	1100	1.0m	1.6m	1.1m
PS53500	1500	1.0m	2.3m	1.7m
PS53000	3000	1.5m	2.3m	1.7m
PS55000	5000	1.5m	3.0m	2.4m
PS57000	7500	1.85m	3.0m	2.4m
PS510000	10000	2.3m	3.0m	2.4m
PS515000	15000	2.5m	3.5m	2.9m

* - Nominal

Enviroplex

A unique shallow base for adaptability across adverse ground conditions and rocky terrains. LDPE (Low Density Polyethylene) roto moulded from high-grade virgin polyethylene.



Duplex

A dual pump system for multiple residential, industrial or commercial applications. LDPE or fibreglass dependent on daily volume requirements.



Triplex

Fibreglass chamber engineered on a case-by-case basis for multiple commercial and industrial applications where greater storage and depth is required.



Figure 4.1 – Aquatec package Pump Station Image

- A DN40 PE sewer pressure main from the pump station to the east to connect to the existing DN200 PVC sewer pressure main that is located on the eastern boundary of the Bedrock site and on the boundary of The Ring Road off-ramp to Hervey Range Rd. The alignment of this private pressure main could be within the Bedrock Landscaping Supplies site (in an easement) or along Hervey Range Rd. This would be assessed as part of the detailed design if this option was adopted.

The following Figure 4.2 is an extract from the Council GIS which illustrates the location of proposed Coffee Shop development site. The figure illustrates the existing sewer infrastructure along with the potential private package sewage pump station option for the coffee shop development.

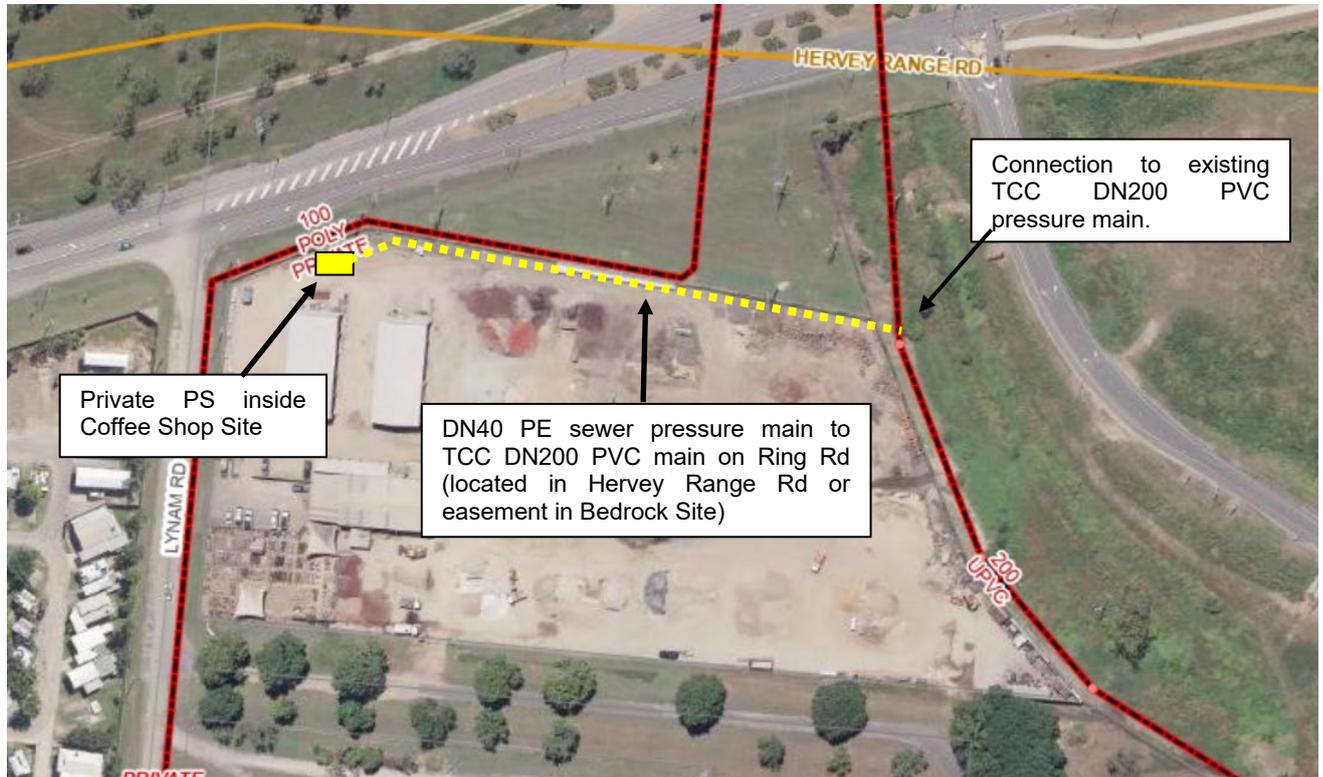


Figure 4.2 – Lynam Rd Coffee Shop Sewer PS Option Figure

The preliminary sizing and viability of the private package sewage pump station to service the coffee shop development on Lynam Rd is detailed in the following sections of this report.

4.1 Package Pump Station Design Flows

The sewage flows to the private package pump station have been calculated in accordance with Townsville City Council sewage pump station design standards. The pump station would be expected to have two same sized pump that will operate in duty/standby arrangement to provide full pumping redundancy.

The required design flows and minimum pumping capacity based on Townsville Council pump station design criteria is as follows:

- Duty pump to have a pump rate to meet the following criteria:
 - $C1 \times \text{ADWF}$, where $C1 = 15 \times (\text{EP})^{-0.1587}$
 - Minimum velocity of 0.75 m/s.
- Duty pump capacity (for duty/standby arrangement) to also meet:
 - $5 \times \text{ADWF}$ or $C1 \times \text{ADWF}$, whichever is greater.
 - Minimum velocity of 0.75 m/s.

Based on the above criteria the pump design flows are as follows.

$$\text{ADWF} = \text{EP} \times 230 \text{ l/EP/day}$$

$$\begin{aligned} &= 10.3 \times 230 \\ &= 2,369 \text{ l/day} \\ &= 0.027 \text{ l/s} \end{aligned}$$

$$\begin{aligned} \text{C1 Factor} &= 15 \times (\text{EP})^{-0.1587} \\ &= 15 \times (10.3)^{-0.1587} \\ &= 15 \times 0.6907 \\ &= 10.4 \end{aligned}$$

$$\begin{aligned} \text{Single Pump Capacity (Qspc)} &= \text{C1} \times \text{ADWF} \\ &= 10.4 \times 0.027 \text{ l/s} \\ &= 0.28 \text{ l/s} \end{aligned}$$

$$\begin{aligned} \text{PWWF (5xADWF)} &= 5 \times \text{ADWF} \\ &= 5 \times 0.027 \text{ l/s} \\ &= 0.14 \text{ l/s} \end{aligned}$$

The above calculations show that the C1 peaking factor is well above 5, being 10.4. The design standards require the total pump capacity to be 5 x ADWF or C1 x ADWF, whichever is greater.

As noted above, the pump setup for the coffee shop site private package pump station is expected to have two pumps operating as duty/standby so each pump will individually need to pump the higher “Single Pump Capacity” value of 0.28 l/s.

The preliminary sizing of the sewer pressure main from the coffee shop package pump station to the DN200 PVC on The Ring Rd is a DN40 PE100 SDR11 (PN16) pipe. This preliminary pipe sizing would have an internal diameter of 32mm. The TCC standards require the minimum velocity in a sewer pressure main to be 0.75 m/s. The require flow rate to achieve this minimum velocity in the preliminary DN40 PE pressure main is 0.61 l/s.

Based on the above the initial assessment of the private package pump station option for the coffee shop development is based on:

- A private package pump station (Aquatec or equivalent) with two submersible grinder pumps.
- A DN40 PE100 SDR11 (PN16) sewer pressure main with internal diameter of 32mm.
- Minimum pump rate of 0.61 l/s to achieve the 0.75 m/s velocity in the pressure main.
- Connection to the existing DN200 PVC sewer pressure main on the Ring Rd on the eastern boundary of the Bedrock Landscape site.

The initial SewerGEMS network modelling for the potential connection of the Lynam Rd coffee shop development to the existing TCC sewer pressure main on the Ring Rd is provided in the following section.

4.2 Package Pump Station SewerGEMS Modelling

The SewerGEMS model for the Bohle Plains sewer system has been used to assess the potential connection of a private package pump station for the Lynam Rd coffee shop to the existing TCC sewer system. Figure 4.3 below is an extract from the SewerGEMS model that illustrates the existing sewer infrastructure in the Bohle Plains along with the proposed package pump station for the Lynam Rd Coffee Shop development site.

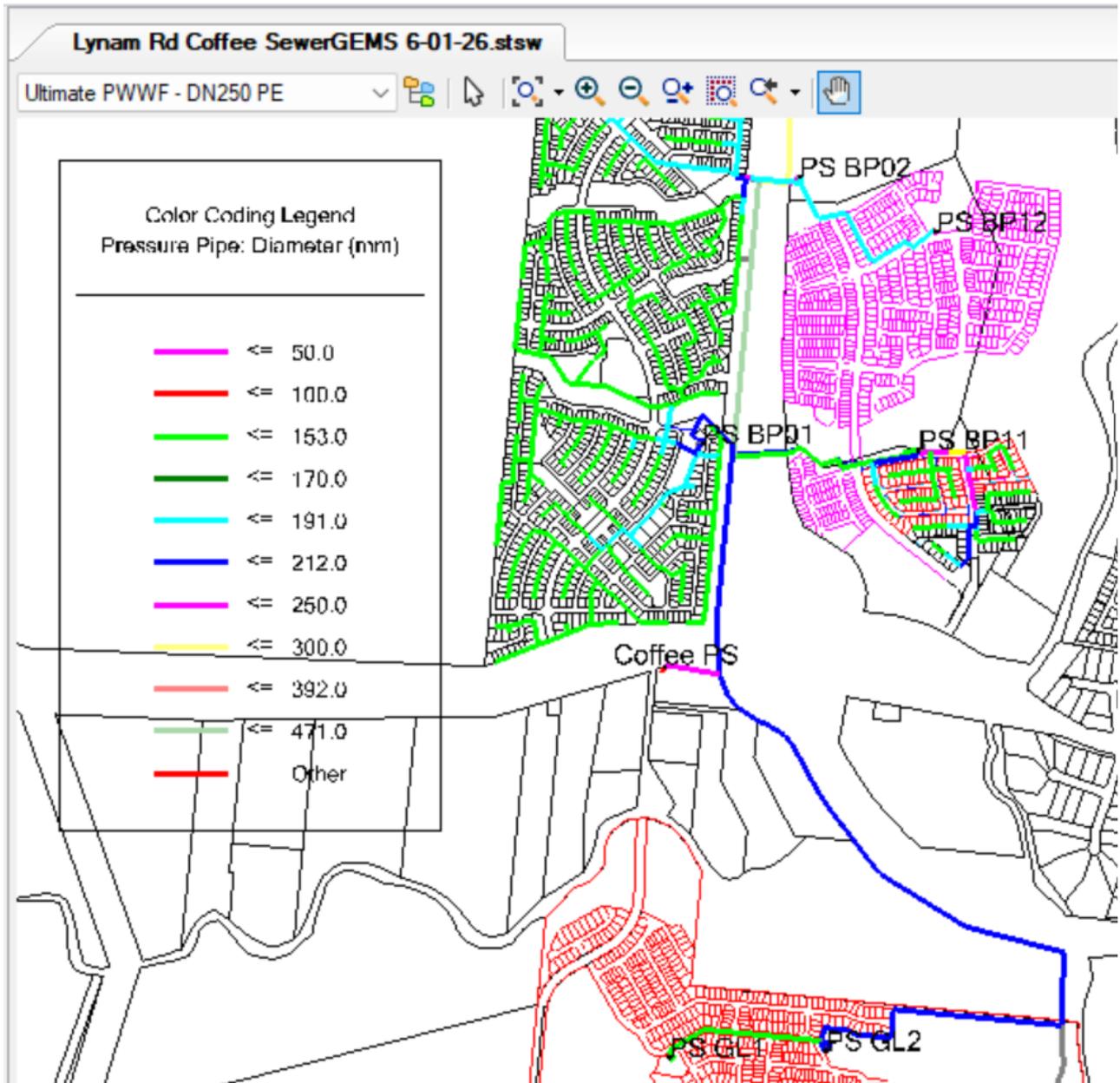


Figure 4.3 – SewerGEMS Model for the Bohle Plains Area

The existing sewer system is summarised below:

- The existing DN200 PVC sewer pressure main on the Ring Rd and eastern boundary of the Bedrock Landscaping Supplies site was originally the pressure main that directed sewage flows from the initial stages of the Kalynda Chase development to the Condon STP.
- With the construction of the Wastewater Upgrade Project in 2011, sewage from the Kalynda Chase development was directed to major PS BP03 (Greater Ascot) via a common pressure

main along the Ring Rd to the north. Major PS BP03 (Greater Ascot) pumps sewage to the Mt St John STP.

- The existing DN200 PVC pressure main on the Ring Rd and eastern boundary of the Bedrock Landscaping Supplies site was taken out of normal operation post 2011. The pressure main was left in-place to provide an emergency backup to potentially pump sewage back to the Condon STP.
- The approved McKinnon Reach residential development to the south along Lynam Rd will have new submersible pump stations constructed. These pump stations will have a DN250 PE pressure main constructed through the McKinnon Reach development site to the east to connect to the existing DN200 PVC pressure main. Sewage from the McKinnon Reach development will therefore be pumped along the existing DN200 PVC pressure main on the Ring Rd and then along the common pressure main system to major PS BP03.
- The existing DN200 PVC pressure main on the Ring Rd and eastern boundary of the Bedrock Landscaping Supplies site is a live/operational TCC sewage pressure main.

The SewerGEMS network model that was developed by DPM Water Pty Ltd for the McKinnon Reach development has been used to assess the potential private package PS for the Lynam Rd coffee shop development to be connected to the existing DN200 PVC pressure main. The SewerGEMS modelling and results are provided below:

- The preliminary sizing of the private package pump station was included in the SewerGEMS network model. This was based on the sewer house drain from the coffee shop being around 1.5m deep.
- It is noted that the actual design and sizing of the private package pump station will be confirmed as part of the development's detailed design and associated plumbing and drainage application (if this option is selected and approved by TCC).
- The modelling was based on the following:
 - Two x submersible grinder pumps with each pump able to discharge the design sewage flows (ie full pumping redundancy).
 - The modelled sewage pump sizing is 0.61 l/s @ 40 m head. Figure 4.4 below from the SewerGEMS model illustrates the modelled pump duty for the Coffee Shop private package pump station.
 - The pump station will discharge along a DN40 PE100 PN16 pressure main to the east over a length of around 170m. This pressure main would have an internal diameter of 32mm. The velocity in the private pressure main would be 0.75 m/s to meet CTM Code standards.
 - The pressure main alignment would be either along the southern boundary of Hervey Range Rd (subject to DTMR approvals) or within the Bedrock Landscaping Supplies site (in an easement or some other form of agreement).
 - The pressure main would connect to the existing DN200 PVC pressure main on the western boundary of the Ring Rd. The connection would be a live tapping.

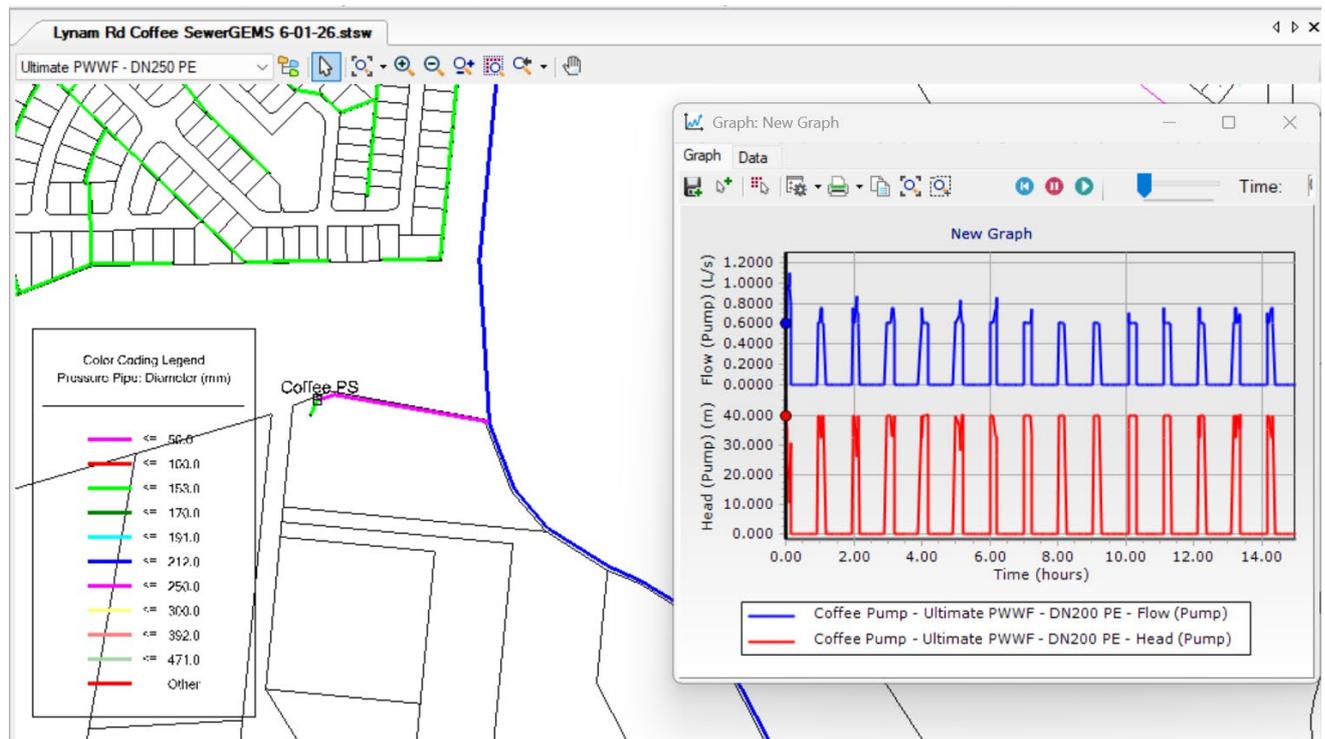


Figure 4.4 - Coffee Shop Private PS – SewerGEMS Preliminary Pump Duty

- The SewerGEMS modelling was undertaken based on the full development of the McKinnon Reach residential development site along with the full development of Kalynda Chase and Harris Crossing development sites. The modelling illustrated:
 - The flow along the DN200 PVC pressure main from the McKinnon Reach development will be 26.5 l/s. This flow is required to meet the minimum 0.75 m/s in the proposed DN250 PE pressure main from the McKinnon Reach ultimate pump station.
 - The modelled hydraulic grade line in the connection point to the DN200 PVC common pressure main without the Coffee Shop pump station flows was modelled at 50.58 mHGL. This is the full development HGL in the DN200 PVC pressure main without the coffee shop pumped flows. Figure 4.5 below illustrates the HGL on the DN200 common pressure main without the coffee shop pumped flows.
 - The additional 0.61 l/s flow from the proposed Coffee Shop pump station into the DN200 PVC common pressure main is only a 2% increase in the sewage flows along the DN200 PVC section of pressure main. With the inclusion of the 0.61 l/s from the Coffee Shop private package pump station the hydraulic grade line was marginally increased to 50.83mHGL. Figure 4.6 below illustrates the HGL on the DN200 common pressure main with the coffee shop pumped flows.
 - The SewerGEMS modelling shows there is only a minimal increase in the HGL of 0.25m with the additional sewage flows from the coffee shop development. This minor increase in the HGL is within the accuracy of the network modelling and associated assumptions on the friction coefficients and actual performance of the various submersible sewage pumps on the common pressure main.

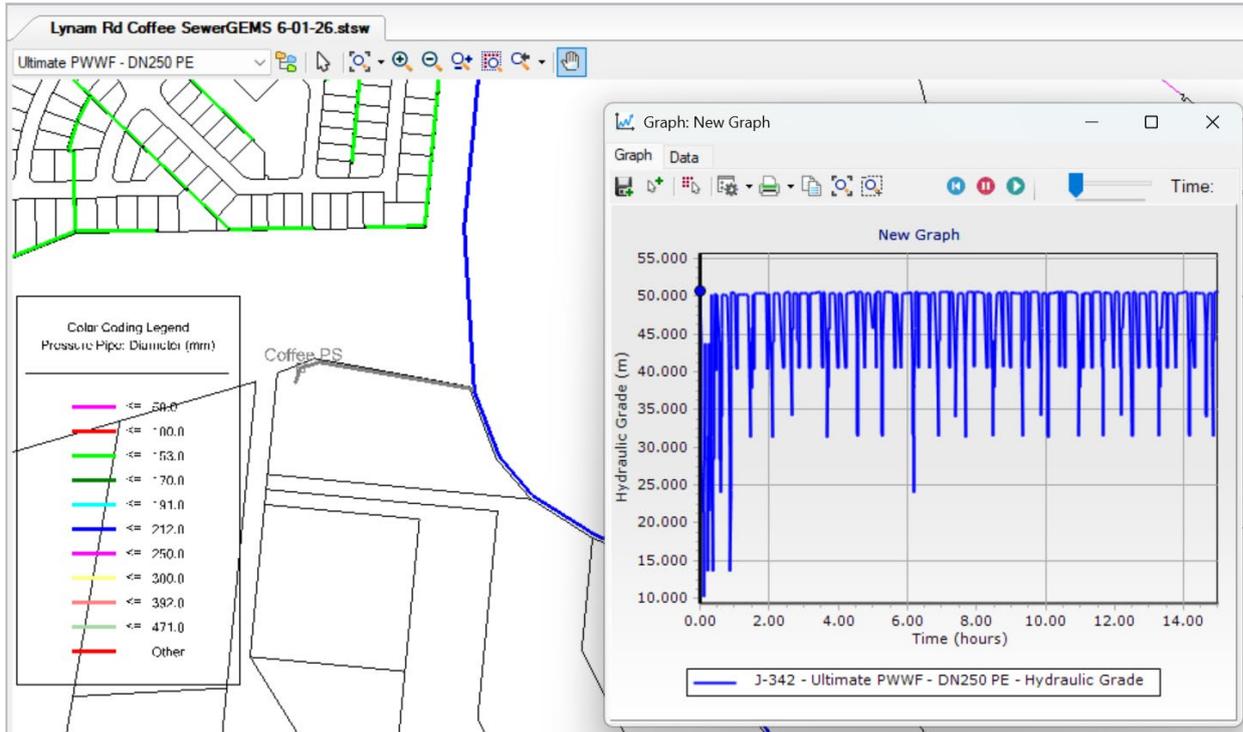


Figure 4.5 – SewerGEMS HGL in DN200 Pressure Main – No Coffee Shop Pump Station

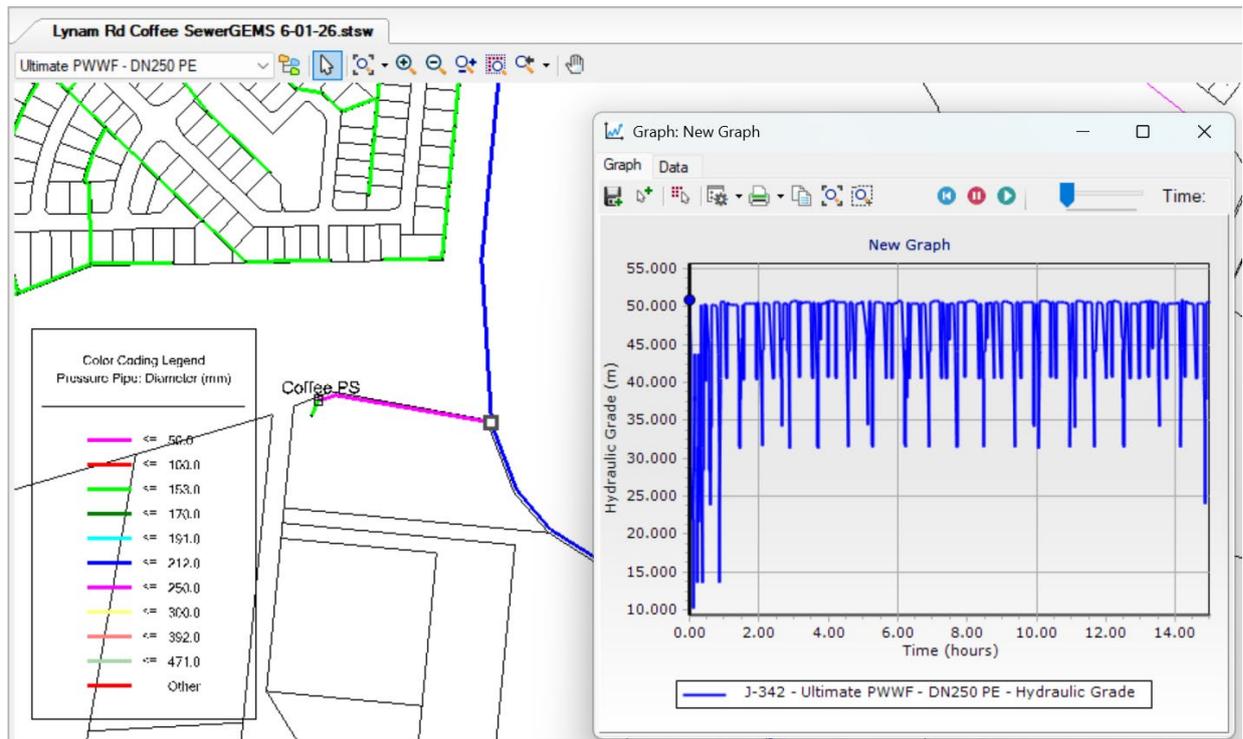


Figure 4.6 – SewerGEMS HGL in DN200 Pressure Main – With Coffee Shop Pump Station

The above assessment therefore shows that the private package pump station option for the Lynam Rd Coffee Shop development is viable and would have essentially no impact on the operation and performance of the Bohle Plains common pressure main system.

The final sizing of the private package sewage pump station would be undertaken as part of the development detailed design and hydraulic services approvals if this option is selected and approved by TCC.

APPENDIX A DEVELOPMENT PLANS

COFFEE SHOP

FOR:
P. FORTINI

AT:
**13 LYNAM ROAD
BOHLE PLAINS
TOWNSVILLE**

DRAWING SCHEDULE

- 0 COVER SHEET
- 1 EXISTING SITE PLAN
- 2 EXISTING SITE SURVEY PLAN
- 3 PROPOSED SITE PLAN - OVERALL
- 4 PROPOSED SITE PLAN - PART
- 5 STAGING PLANS
- 6 PROPOSED SUB-DIVISION
- 7 COFFEE SHOP FLOOR PLAN & ELEVATIONS
- 8 EXISTING SHED FLOOR PLAN & ELEVATIONS
- 9 SHED RENOVATION FLOOR PLAN & ELEVATIONS
- 10 PROPOSED SHED FLOOR PLAN & ELEVATIONS





1 EXISTING SITE PLAN - LOCALITY

1 : 500 AT A1 SHEET SIZE

PROJECT ISSUE & DESCRIPTION
P5 - PRELIMINARY ISSUE - 30-04-2025

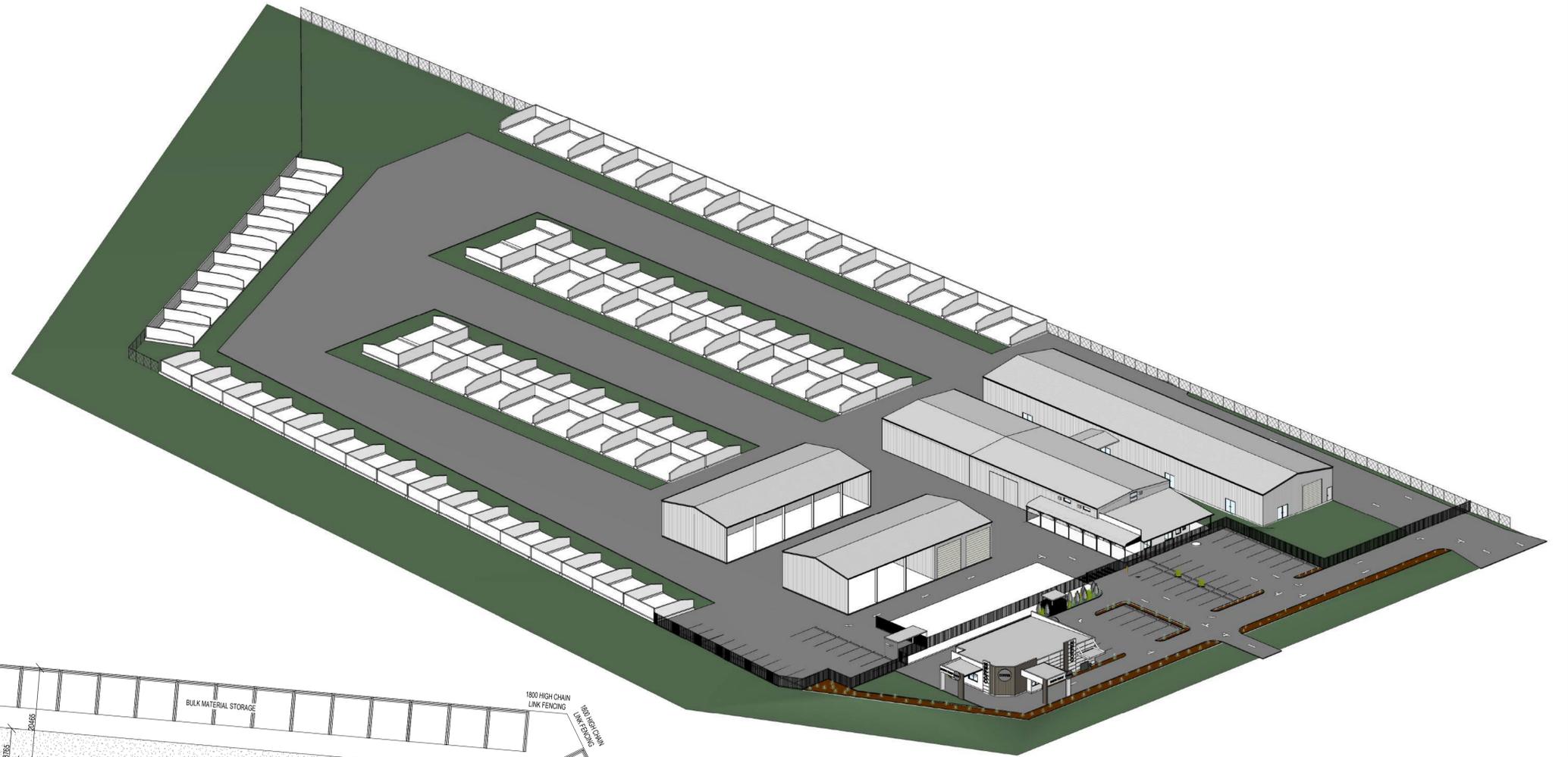
PRELIMINARY

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

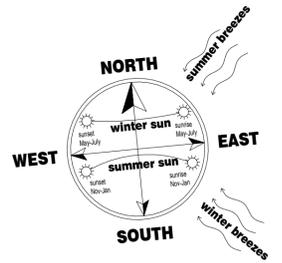
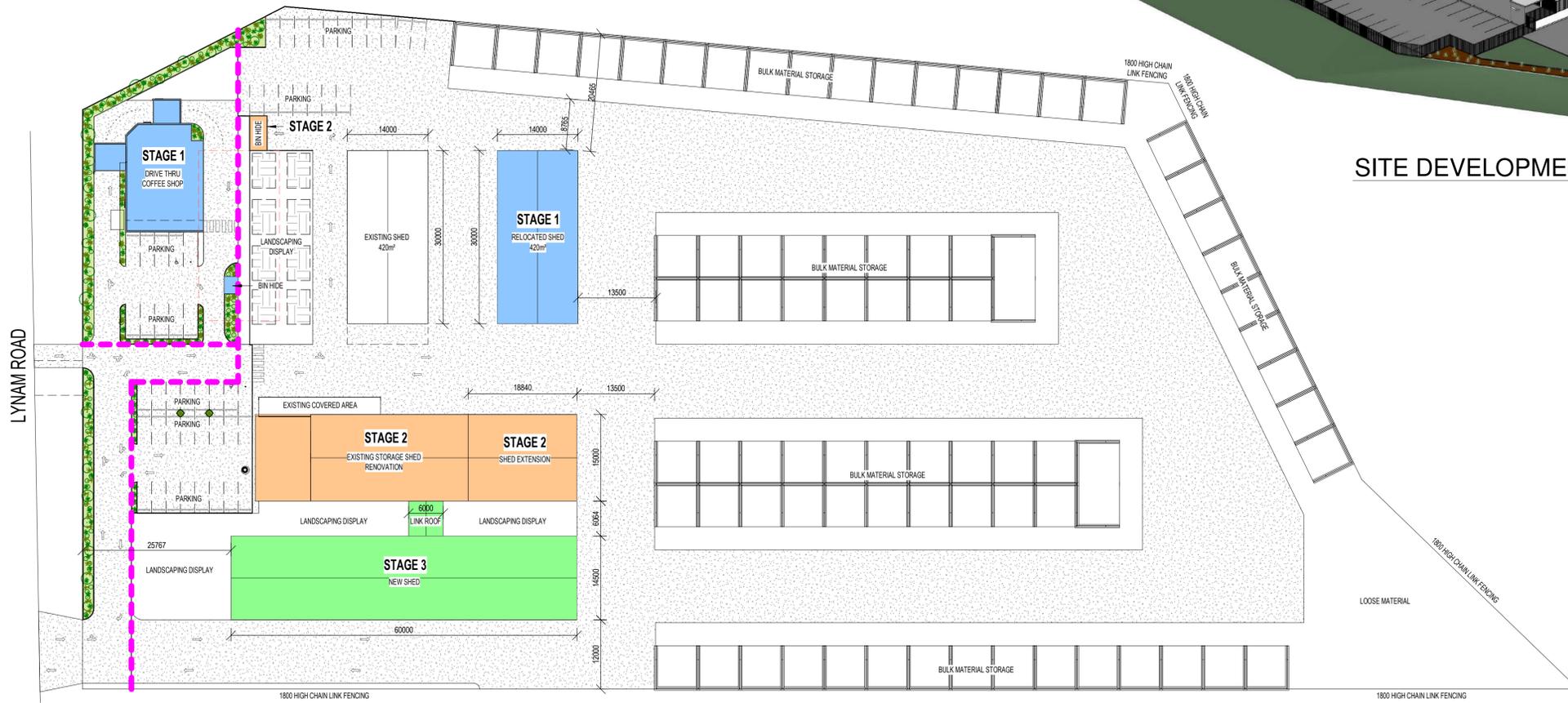
CB
DESIGNS
BUILDING DESIGN & DRAFTING
ABN: 112 627 297
Licence No. 572298
66 Baywater Road, Hyde Park QLD 4812
PO Box 4527, Vincent QLD 4814
Tel: (07) 4778 4199

PROJECT:
COFFEE SHOP
CLIENT:
P. FORTINI
SITE:
13 LYNAM ROAD
BOHLE PLAINS
TOWNSVILLE

BUILDER:		DATE:	30/04/2025 1:08:30 PM	JOB NO.:	24-389
DRAWN:	B.W.	SCALE:	1 : 500		
SHEET No.:	1	CLIENT JOB No.:			



SITE DEVELOPMENT 3D



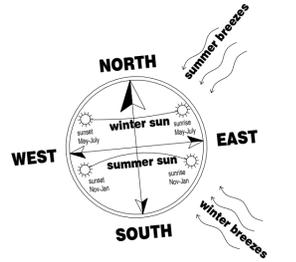
1 PROPOSED SITE PLAN - OVERALL
1 : 500 AT A1 SHEET SIZE

<p>PROJECT ISSUE & DESCRIPTION</p> <p>P5 - PRELIMINARY ISSUE - 30-04-2025</p>	<p>PRELIMINARY</p> <p>NOTES:</p> <p>THIS DRAWING IS ONLY INTENDED TO OBTAIN A LOCAL AUTHORITY BUILDING PERMIT. COMPY WITH ALL RELEVANT AUTHORITY REQS. & S.A. FIGURED DIMENSIONS TO TAKE PRECEDENCE OVER SCALED MEASUREMENTS. VERIFY ALL ON-SITE DIMENSIONS & LEVELS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.</p>	<p>CB</p> <p>DESIGNS</p> <p>BUILDING DESIGN & DRAFTING</p> <p>ABN: 112 827 297 Licence No: 5722298 66 Baywater Road, Hyde Park QLD 4812 PO Box 4527, Vincent QLD 4814 Tel: (07) 4778 4199</p>	<p>PROJECT: COFFEE SHOP</p> <p>CLIENT: P. FORTINI</p> <p>SITE: 13 LYNAM ROAD BOHLE PLAINS TOWNSVILLE</p>	<p>BUILDER:</p> <table border="1"> <tr> <td>DATE:</td> <td>30/04/2025 1:09:02 PM</td> <td>JOB NO.:</td> <td>24-389</td> </tr> <tr> <td>DRAWN:</td> <td>B.W.</td> <td>SCALE:</td> <td>As indicated</td> </tr> <tr> <td>SHEET No.:</td> <td>3</td> <td>CLIENT JOB NO.:</td> <td></td> </tr> </table>	DATE:	30/04/2025 1:09:02 PM	JOB NO.:	24-389	DRAWN:	B.W.	SCALE:	As indicated	SHEET No.:	3	CLIENT JOB NO.:	
DATE:	30/04/2025 1:09:02 PM	JOB NO.:	24-389													
DRAWN:	B.W.	SCALE:	As indicated													
SHEET No.:	3	CLIENT JOB NO.:														

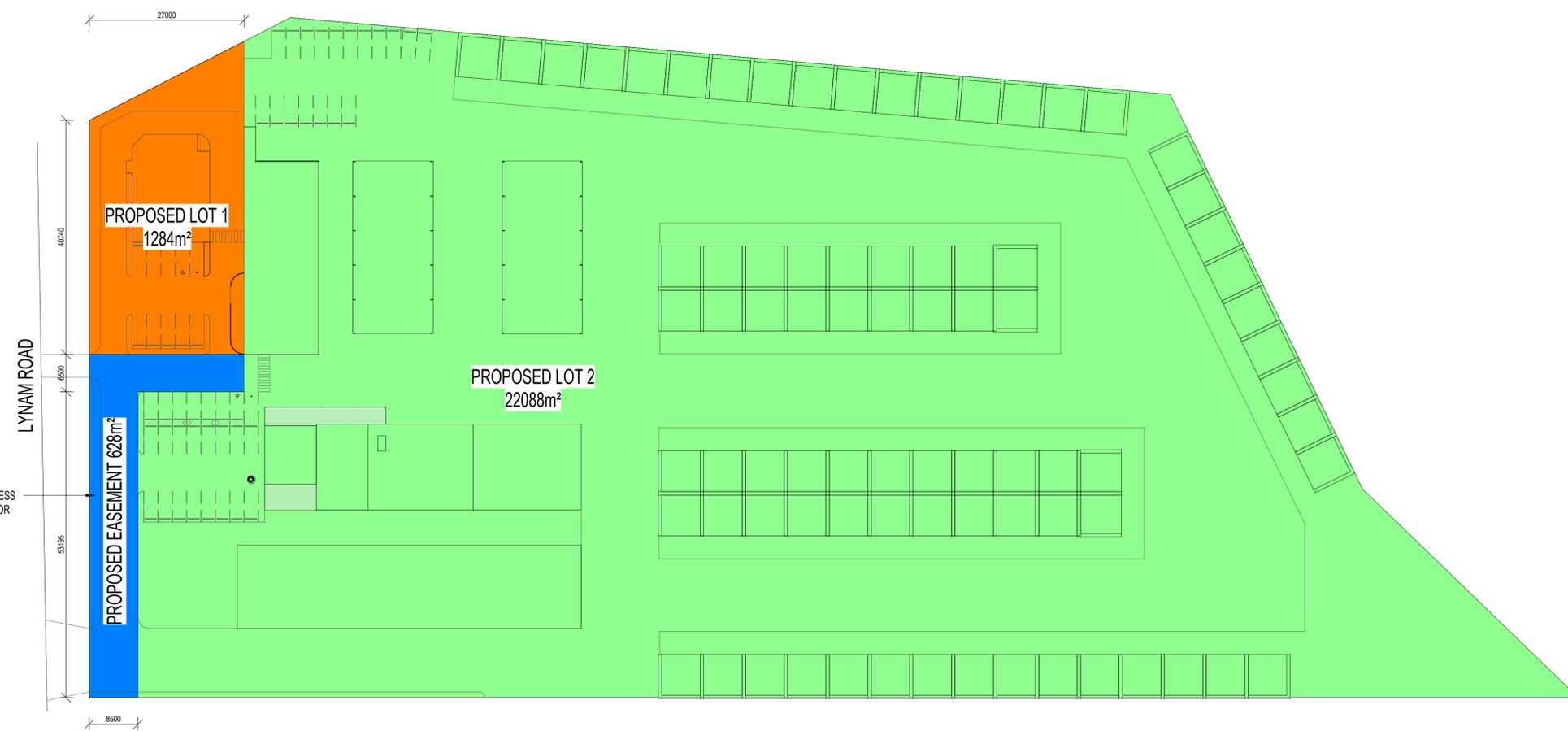
LYNAM ROAD



1 PROPOSED SITE PLAN - PART
1 : 250 AT A1 SHEET SIZE



<p>PROJECT ISSUE & DESCRIPTION P5 - PRELIMINARY ISSUE - 30-04-2025</p>	<p>PRELIMINARY</p> <p>NOTES: THIS DRAWING IS ONLY INTENDED TO OBTAIN A LOCAL AUTHORITY BUILDING PERMIT. COMPLY WITH ALL RELEVANT AUTHORITY REGS. & S.A. FIGURED DIMENSIONS TO TAKE PRECEDENCE OVER SCALED MEASUREMENTS. VERIFY ALL ON-SITE DIMENSIONS & LEVELS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.</p>	<p>CB DESIGNS BUILDING DESIGN & DRAFTING ABN: 112 837 297 Licence No.: 572298 66 Baywater Road, Hyde Park QLD 4812 PO Box 4527, Inwood QLD 4814 Tel: (07) 4778 4199</p>	<p>PROJECT: COFFEE SHOP</p> <p>CLIENT: P. FORTINI</p> <p>SITE: 13 LYNAM ROAD BOHLE PLAINS TOWNSVILLE</p>	<p>BUILDER:</p>
<p>DATE: 30/04/2025 1:09:10 PM</p> <p>DRAWN: B.W.</p> <p>SCALE: As indicated</p> <p>SHEET No: 4</p>	<p>JOB NO: 24-389</p> <p>CLIENT JOB NO:</p>			



1 PROPOSED SUB-DIVISION
1 : 500 AT A1 SHEET SIZE

PROJECT ISSUE & DESCRIPTION
P5 - PRELIMINARY ISSUE - 30-04-2025

PRELIMINARY

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

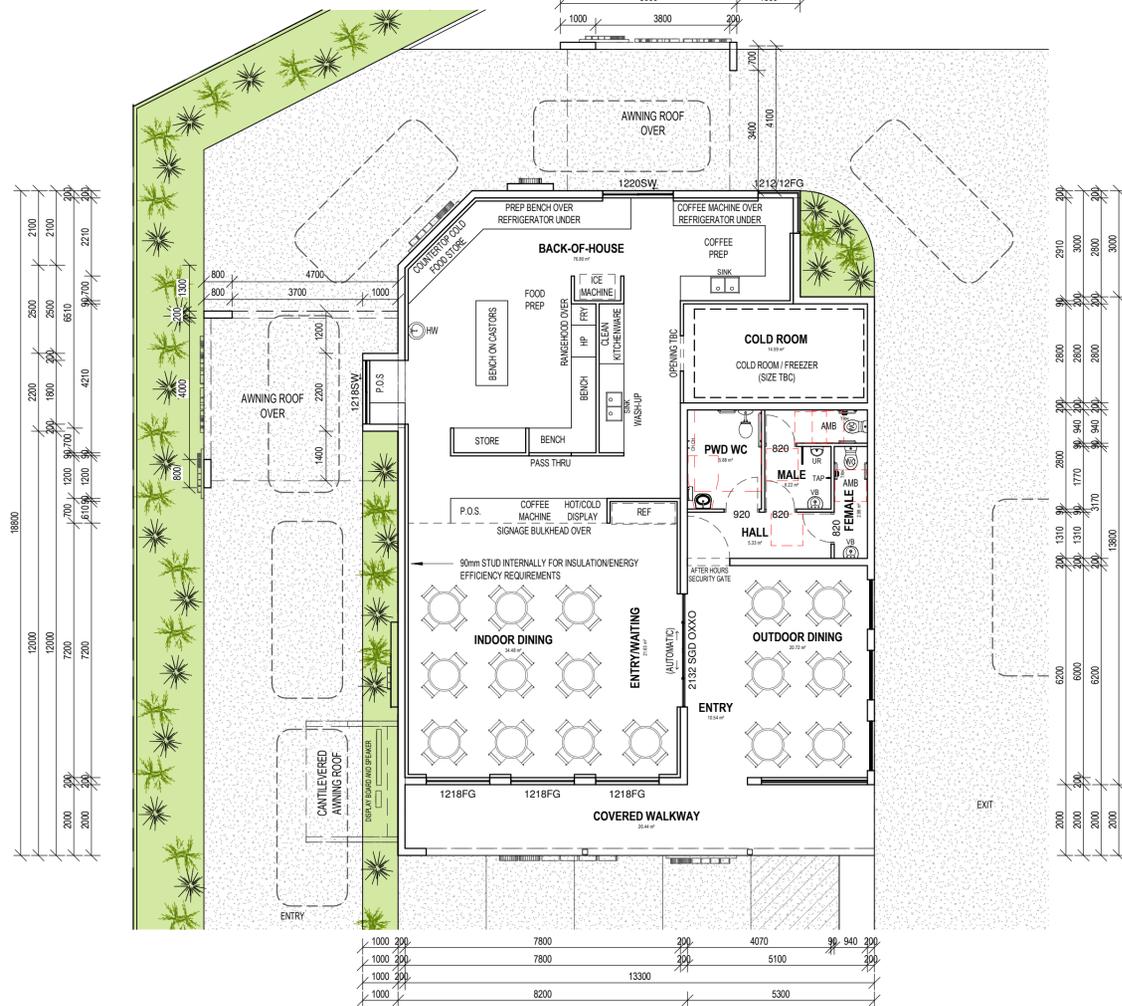
CB DESIGNS
BUILDING DESIGN & DRAFTING
ABN: 112 837 297
Licence No. 572298
66 Baywater Road, Hyde Park QLD 4812
PO Box 4327, Ingham QLD 4814
Tel: (07) 4779 4199

PROJECT: COFFEE SHOP
CLIENT: P. FORTINI
SITE: 13 LYNAM ROAD
BOHLE PLAINS
TOWNSVILLE

BUILDER:	
DATE: 29/05/2025 3:44:39 PM	JOB NO. 24-389
DRAWN: Author	
SCALE: 1 : 500	
SHEET No: 6	CLIENT JOB NO.

- AMENITIES
- COVERED WALKWAY
- DINING
- ENTRY
- FOOD PREP
- STORE

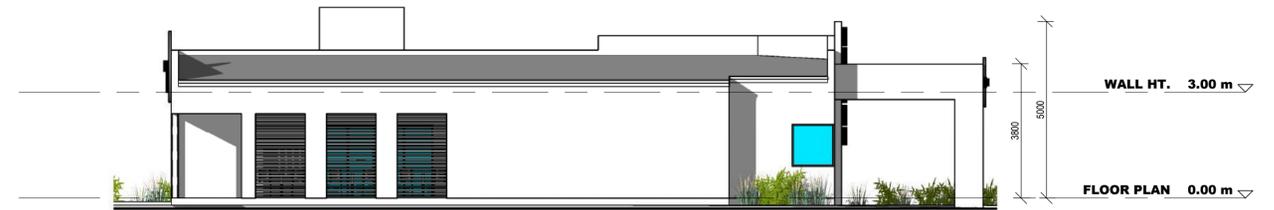
AREA USAGE PLAN
1 : 100



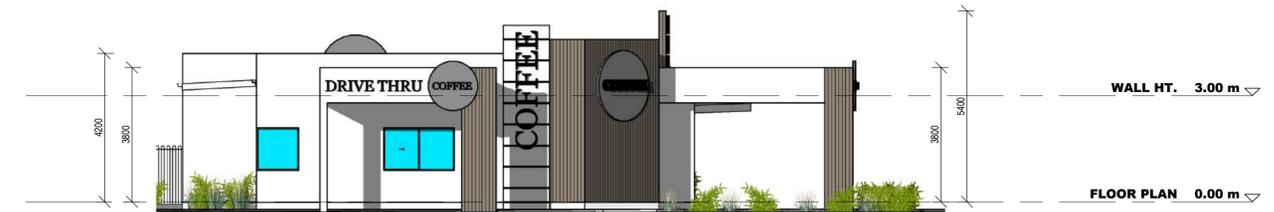
FLOOR PLAN - COFFEE SHOP
1 : 100



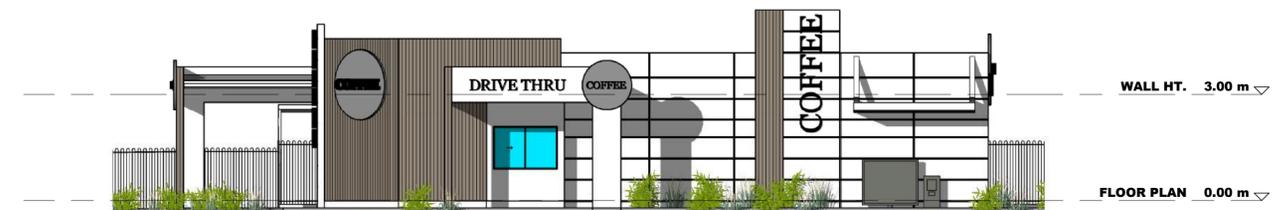
1 ELEVATION 1 - COFFEE SHOP
1 : 100 AT A1 SHEET SIZE



2 ELEVATION 2 - COFFEE SHOP
1 : 100 AT A1 SHEET SIZE



3 ELEVATION 3 - COFFEE SHOP
1 : 100 AT A1 SHEET SIZE



4 ELEVATION 4 - COFFEE SHOP
1 : 100 AT A1 SHEET SIZE

AREAS	AREA
BACK OF HOUSE	87.01 m ²
INDOOR DINING	60.62 m ²
OUTDOOR DINING	32.74 m ²
COVERED WALKWAY	27.07 m ²
AMENITIES	24.32 m ²
COLD STORE	15.53 m ²
TOTAL	247.27 m ²



PROJECT ISSUE & DESCRIPTION
PS - PRELIMINARY ISSUE - 30-04-2025

PRELIMINARY

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

DESIGNS
BUILDING DESIGN & DRAFTING

ABN: 112 837 299
Licence No. 1072298
68 Baywater Road, Ipswich QLD 4712
PO Box 4257, Ipswich QLD 4714
Tel: (07) 4779 4199

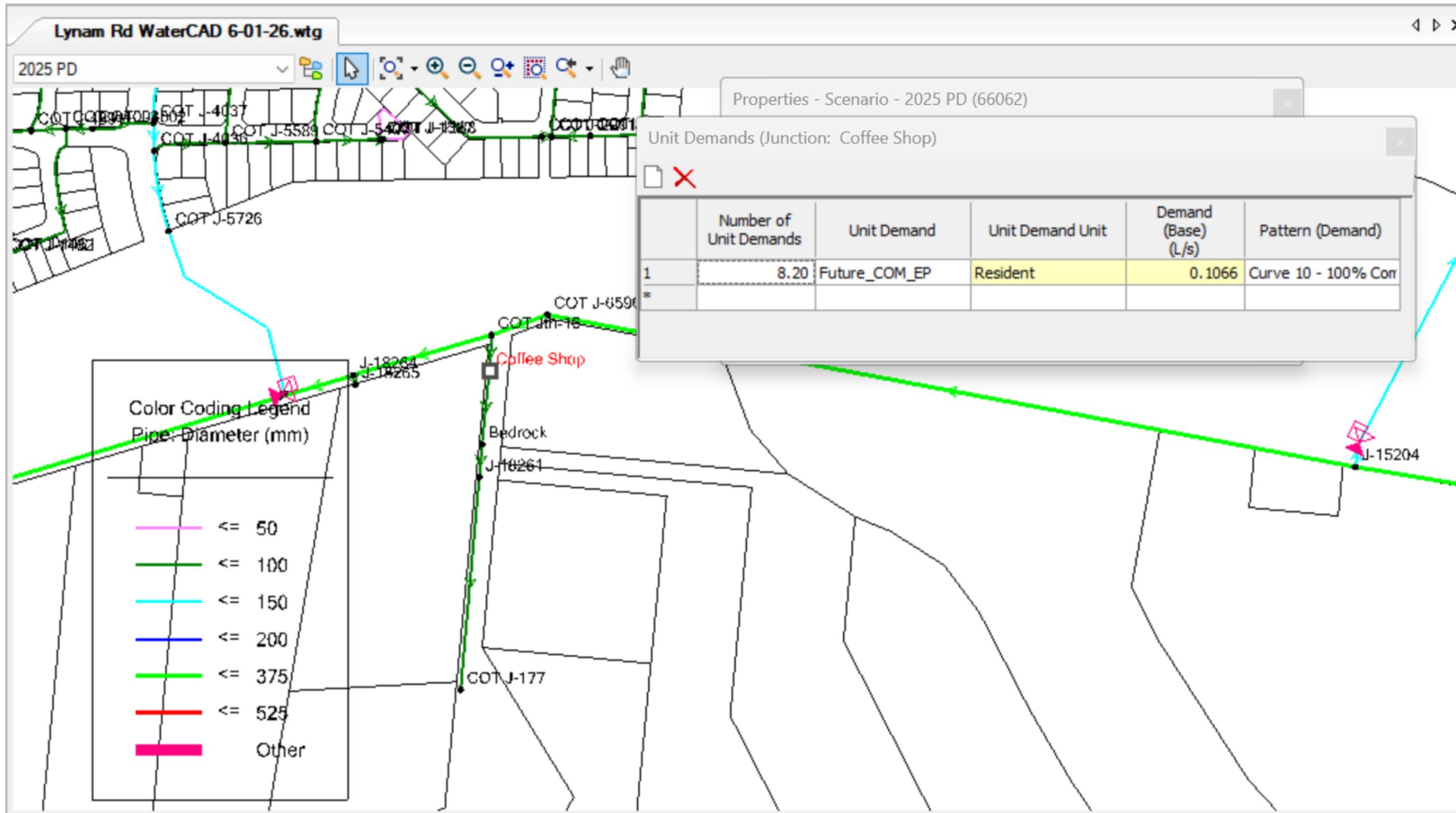
PROJECT:
COFFEE SHOP

CLIENT:
P. FORTINI

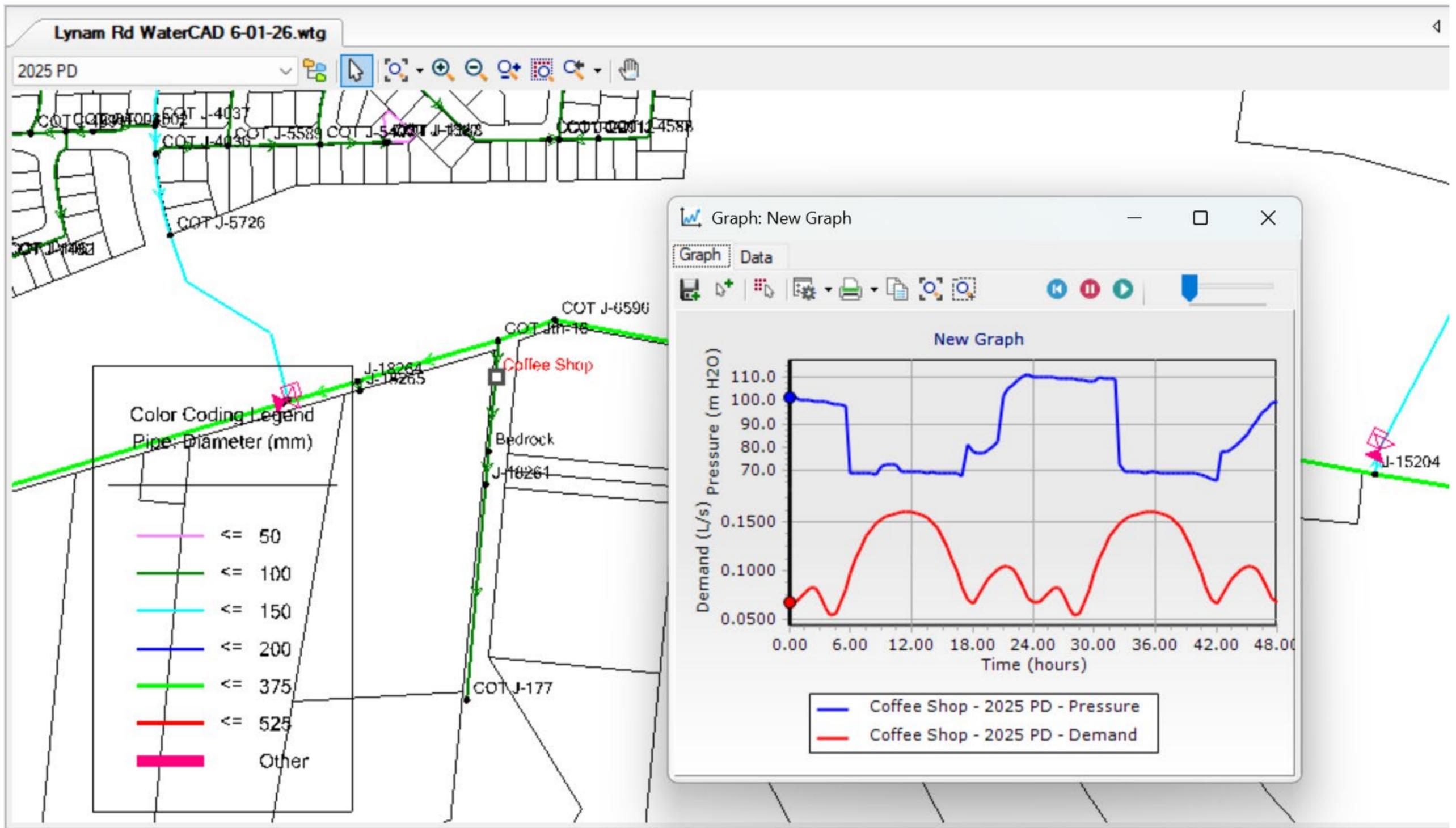
SITE:
13 LYNAM ROAD
BOHLE PLAINS
TOWNSVILLE

DATE	30/04/2025 1:10:29 PM	JOB NO.
DRAWN	B.W.	24-389
SCALE	1 : 100	
SHEET No.	7	CLIENT JOB NO.

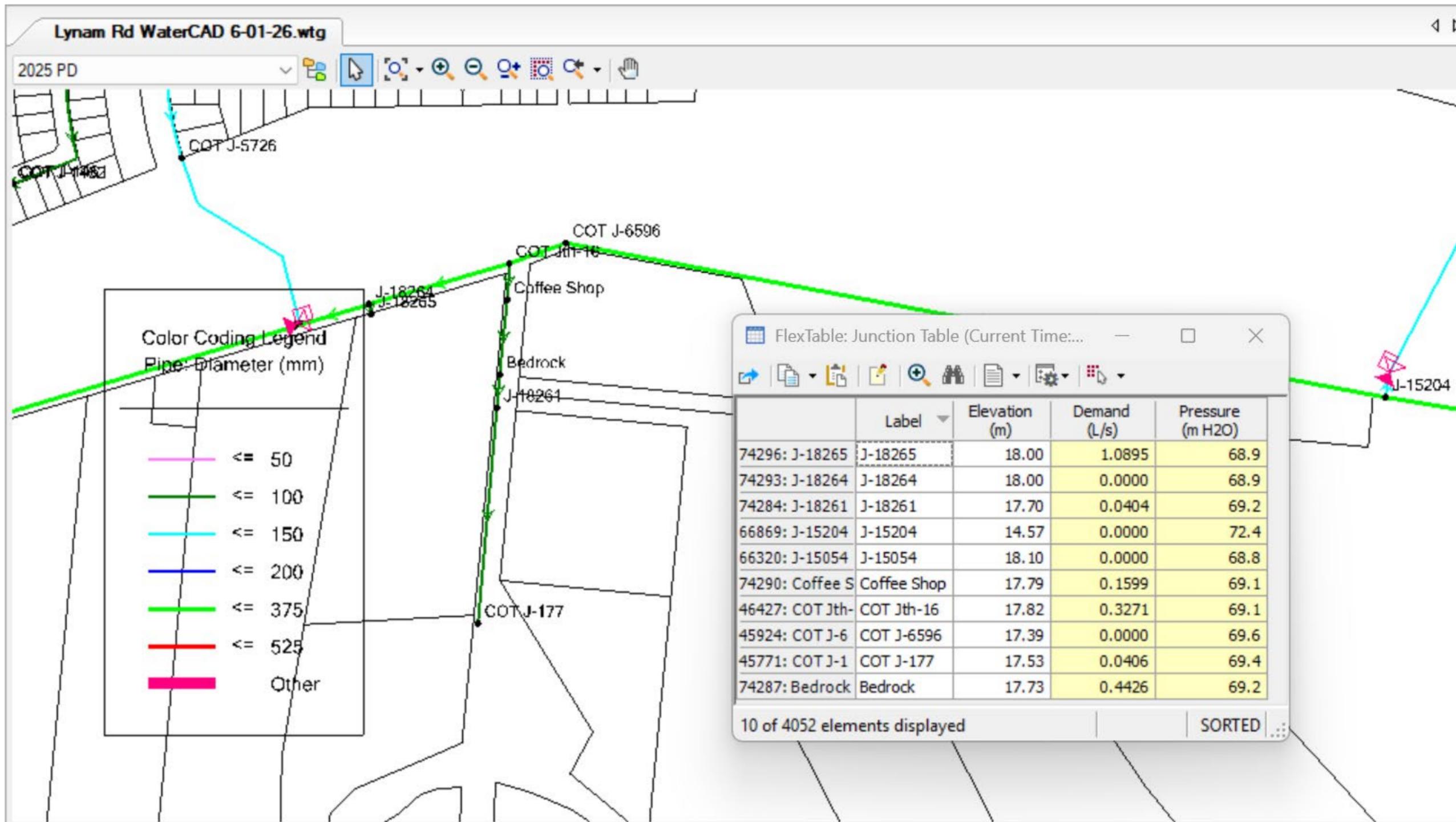
APPENDIX B WATERGEMS MODELLING & RESULTS



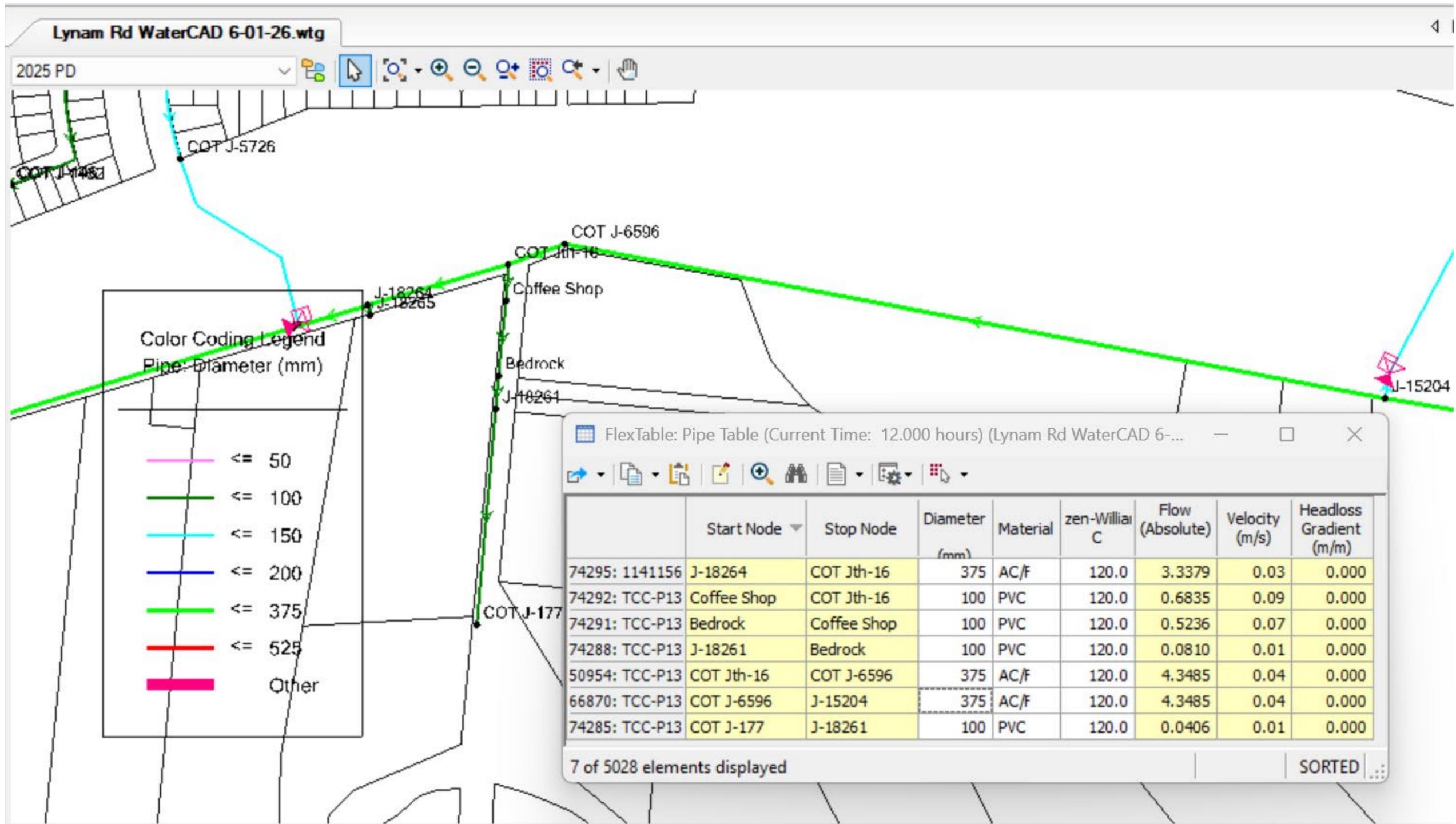
Lynam Rd Coffee Shop – WaterGEMS Model & Demands



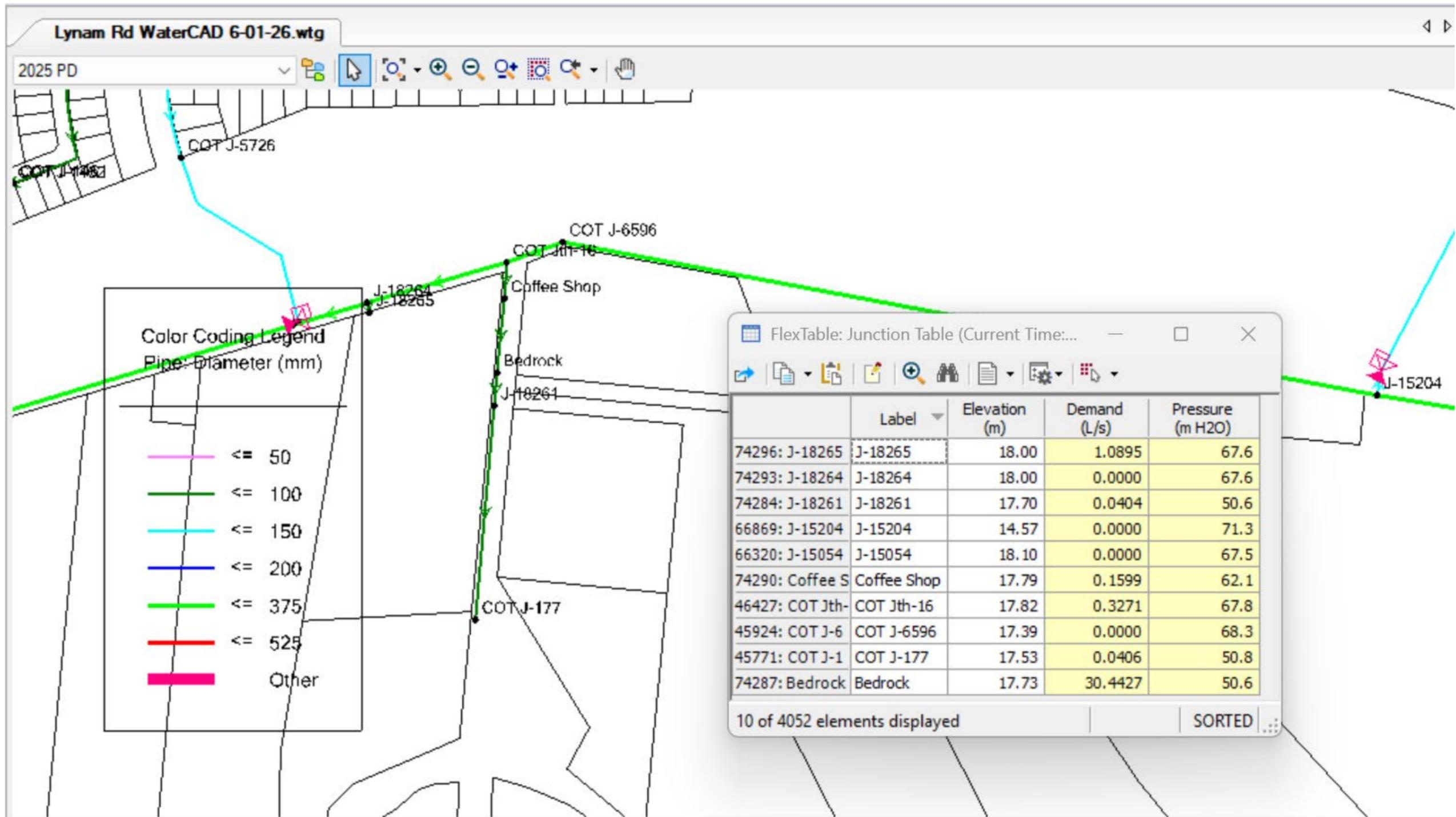
Lynam Rd Coffee Shop – Water Demands & Pressures



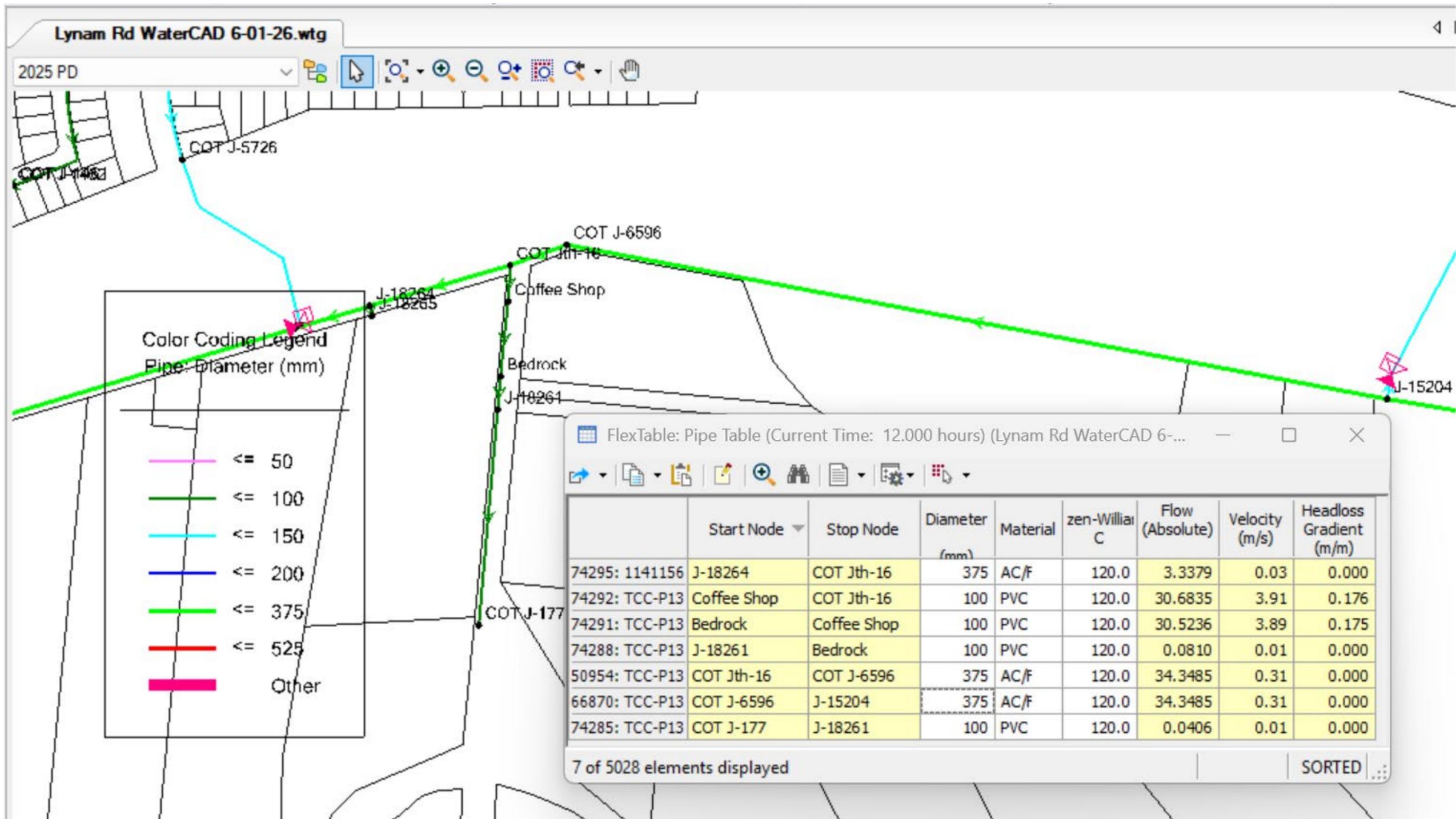
Lynam Rd Coffee Shop - Peak Hour Node Modelling Results



Lynam Rd Coffee Shop - Peak Hour Pipes Modelling Results



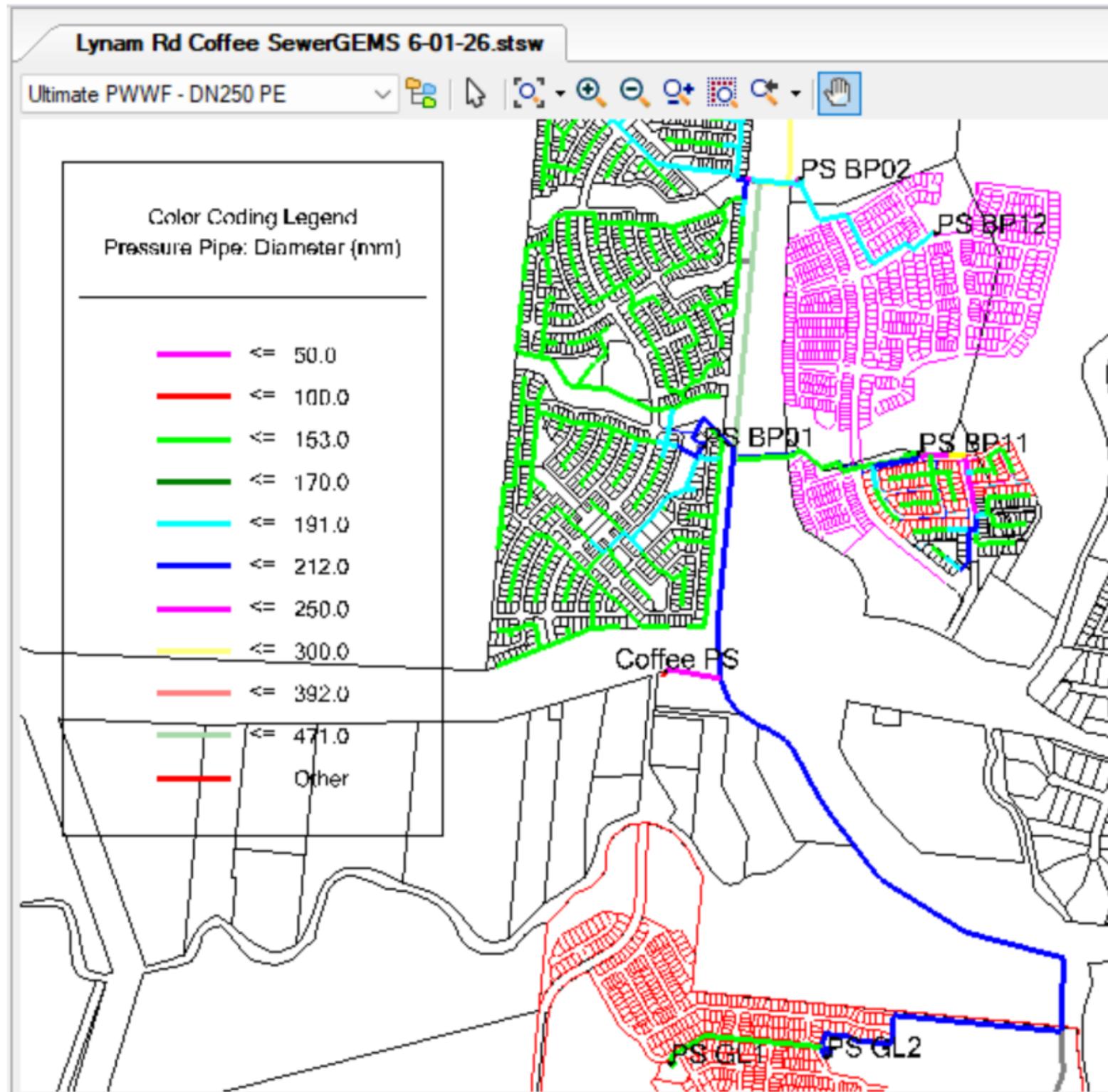
Lynam Rd Coffee Shop – Peak Hour & 30 l/s Fire Flow Node Modelling Results



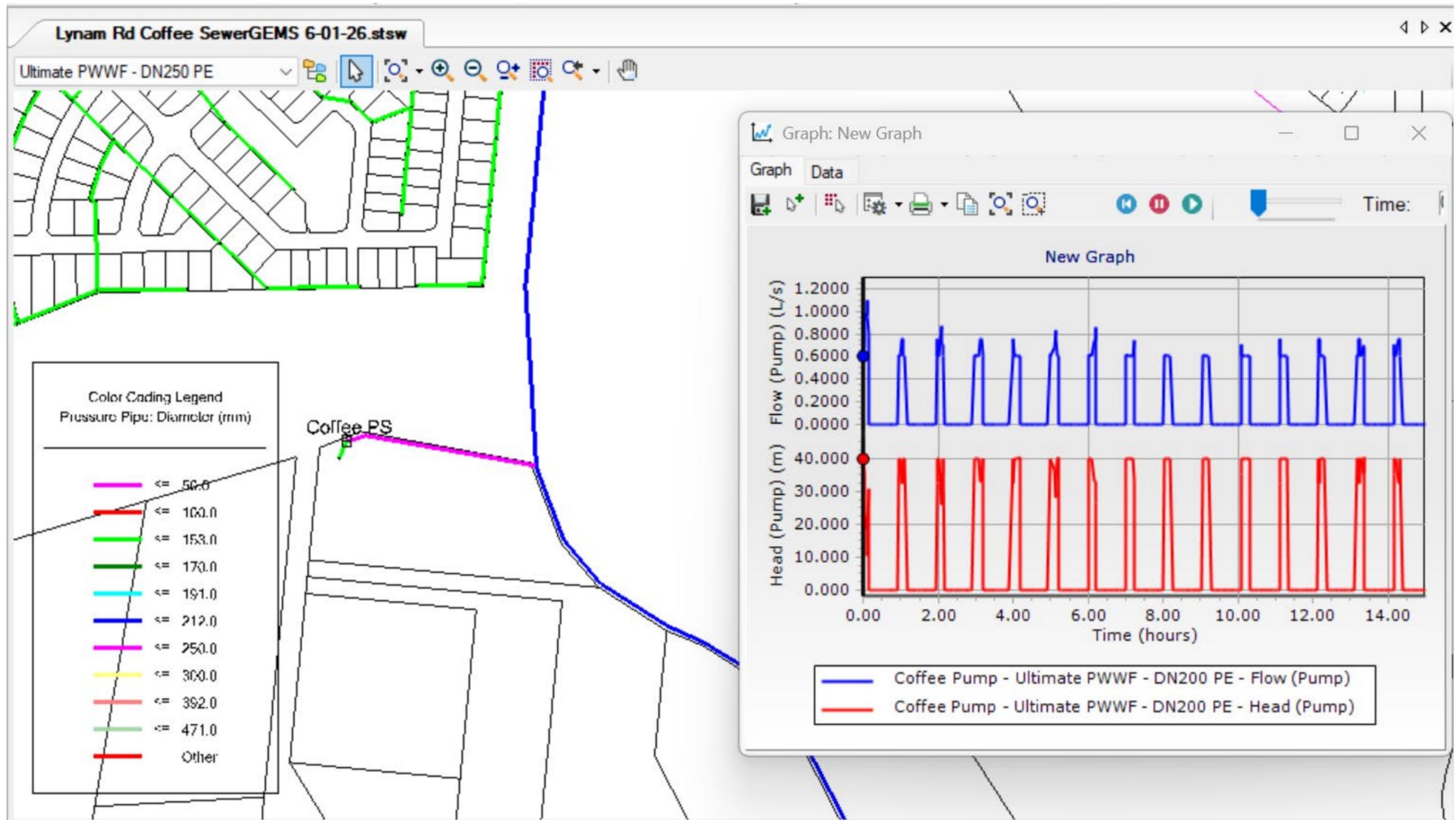
Lynam Rd Coffee Shop – Peak Hour & 30 l/s Fire Flow Pipe Modelling Results

APPENDIX C

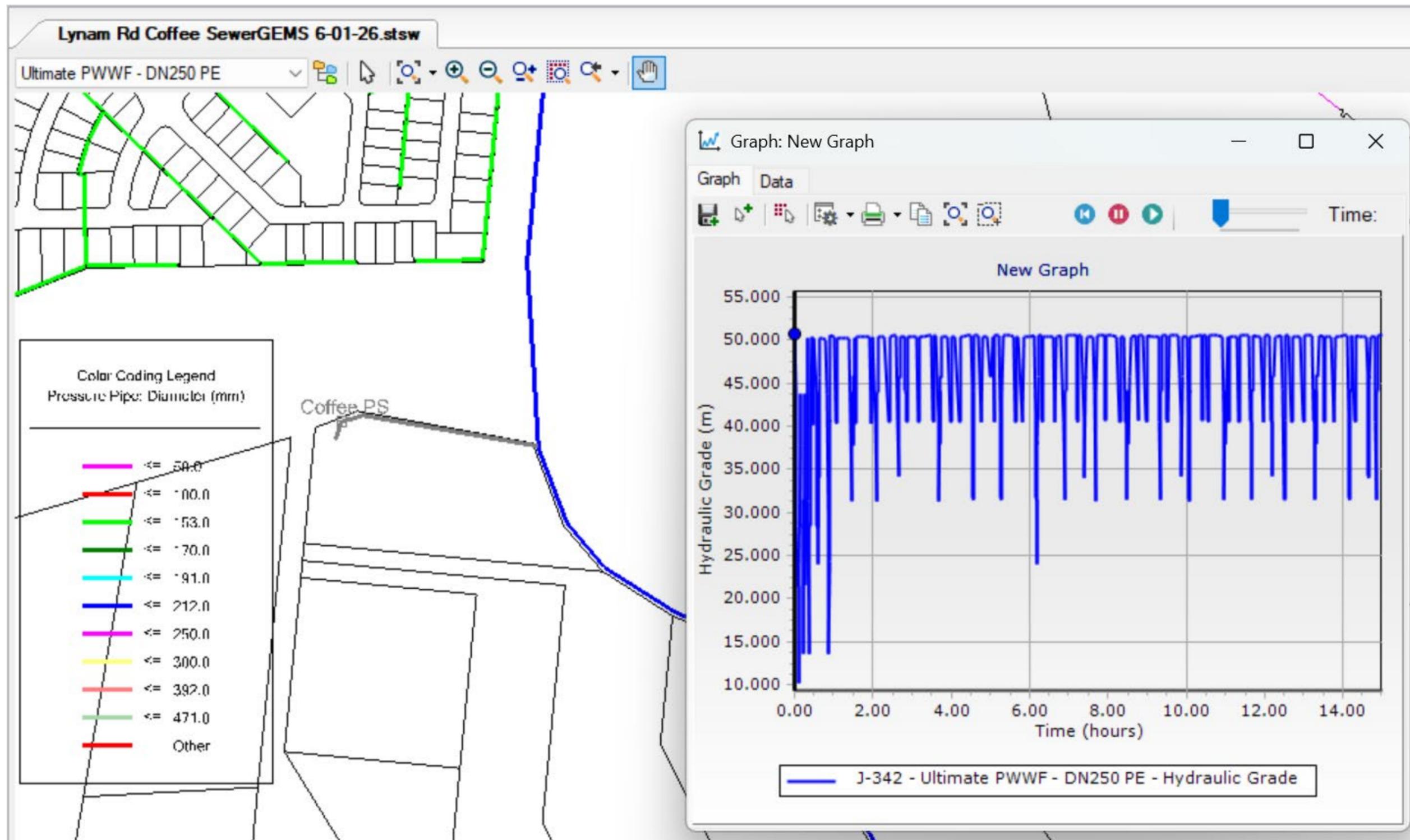
SEWERGEMS MODELLING RESULTS



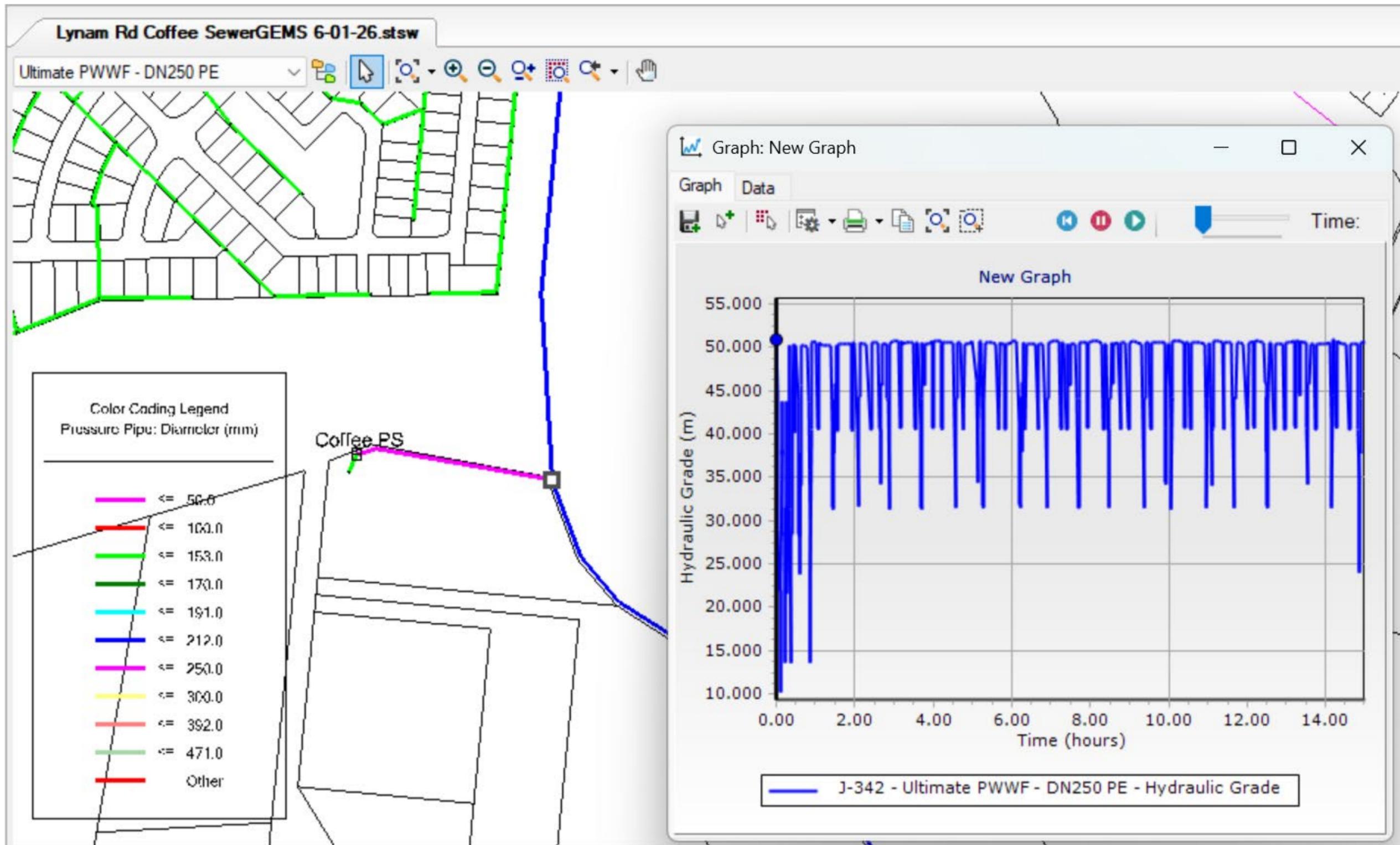
Lynam Rd Coffee Shop - SewerGEMS Modelling Figure



Lynam Rd Coffee Shop – SewerGEMS Modelling Preliminary Pump Duty



Lynam Rd Coffee Shop – SewerGEMS HGL Without Coffee Shop PS



Lynam Rd Coffee Shop – SewerGEMS HGL With Coffee Shop PS



Pressure Sewer Systems

Built under ISO9001
Quality Management System
Built to WSA Standards
Certified by BSI to NSF/ANSI46



What is a pressure sewer system?

A pressure sewer system is a network of fully sealed sewer pipes, which are fed by a grinder pump at each property. The pump grinds the solids present in the wastewater to a fine "slurry", which is then pumped through a small diameter pipeline from the house to the main, and the main to the treatment facility.

Pressure Sewer Systems

Aquatec Pressure Sewer Systems are one of the most adaptable, economical and environmentally friendly sewerage systems on the market today.

Aquatec is Australasia's number one provider of customised end-to-end pressure sewer systems.

Aquatec is at the forefront of the wastewater revolution. We want more innovative systems and smarter responses without extra costs or excessive time involvement.

Aquatec takes a customised approach to the design of Pressure Sewer Systems based on practical requirements and site conditions. Single, dual and other pump options meet changing demands across domestic, commercial and industrial applications.

Manufacturing Process

Aquatec holds JAS-ANZ third party accreditation, and our Pressure Sewer Systems are manufactured in a controlled factory environment under strict ISO 9001:2015 quality standards.

Proprietary chamber designs are pre-moulded to exact specifications, stringently tested and certified prior to delivery.



ISO9001: 2015 Accreditation
 Designed to comply with AS/NZS1546.1:2008
 NSW Health Certificate of Accreditation
 NT Government Department of Health and Families
 SA Health Certificate of Accreditation

Chambers

Aquatec's Pressure Sewer chambers are engineered with a domed base forcing solids into the cutter of the pump, eliminating the potential for solids build up in dead zones and associated odour issues.

Product Range

Models	Litres*	Diameter	Depth	Depth to inlet (max)
PSS900	900	1.2m	1.45m	0.9m
PSS950	950	1.1m	1.65m	1.0m
PSS1100	1100	1.0m	1.6m	1.1m
PSS1500	1500	1.0m	2.2m	1.7m
PSS3000	3000	1.5m	2.2m	1.7m
PSS5000	5000	1.5m	3.0m	2.4m
PSS7500	7500	1.85m	3.0m	2.4m
PSS10000	10000	2.2m	3.0m	2.4m
PSS15000	15000	2.5m	3.5m	2.9m

* - Nominal

Enviroplex

A unique shallow base for adaptability across adverse ground conditions and rocky terrains.

LDPE (Low Density Polyethylene) roto moulded from high-grade virgin polyethylene.



Duplex

A dual pump system for multiple residential, industrial or commercial applications.

LDPE or fibreglass dependent on daily volume requirements.



Triplex

Fibreglass chamber engineered on a case-by-case basis for multiple commercial and industrial applications where greater storage and depth is required.



Enduraplex

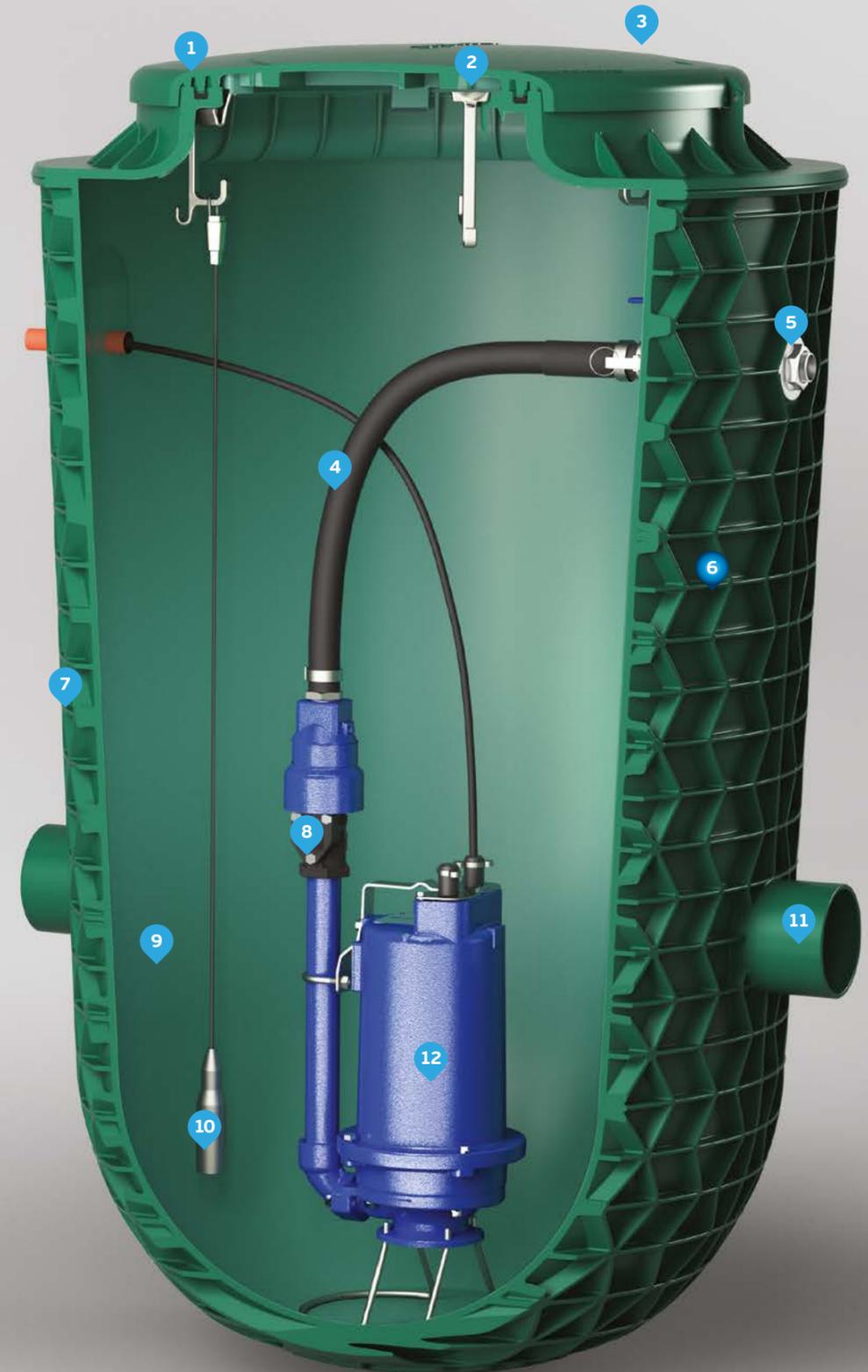
A world class injection moulded single pump system designed to endure the most rigorous conditions.

- 1 Self venting lid, with provision for optional profile seal for flood prone areas.
- 2 Heavy duty glass filled polypropylene cable hooks.
- 3 Child safe one bolt cover for ease of removal, with pad lockable option.
- 4 Specially manufactured PN16 wire enforced rubber discharge hose.
- 5 316 S/S outlet, valve & disconnection coupling
- 6 Honeycomb inspired rib design to provide maximum strength whilst remaining lightweight.
- 7 High strength injection moulded HDPE** tank designed for 50 year life.
- 8 Anti-siphon valve and tank flush.
- 9 Smooth tank interior minimising solids build up.
- 10 Pressure transducer providing incremental control and measurement of tank level.
- 11 Moulded inlet stubs to ensure no leakage to the environment.
- 12 OGT Omni Grind Turbine pump providing peace of mind grinding and 20 year design life*.

*Tested for the equivalent of 20 years usage for domestic sewer applications.

** High Density Polyethylene.

Compliant with WSA-07



Pumps

Aquatec's pumps hold the highest levels of protection on the market today, being continuously rated to IP68 and fully submersible to depths of up to 9 metres.

Omni Grind Turbine - OGT

- New innovation technology
- Low amp turbine technology
- Residential, industrial and commercial applications
- Smaller cutter radius for greater ability to grind fibrous materials
- Special Aerospace Industry coating to prevent wear from abrasive products
- Non-contact pumping assembly with minimal wearing parts
- Flows up to 1.2l/s giving higher scouring velocities
- Capable and tested to operate at 80m continuously giving greater flexibility for network design
- Certified by BSI to NSF/ANS146
- Class F motor insulation
- Highest cutting force of any pressure sewer pump



Omni Grind Plus - OGP

- For commercial, industrial and large scale residential applications
- Recessed vortex impellers for higher flows with reduced wear
- Flows up to 1.75l/s
- Capable and tested to operate at 60m
- 1.5kw motor
- Available in single or three phase
- Hydraulically balanced
- Class F motor insulation



Optional Accessories

Aquatec offers a wide range of Optional Accessories to meet or improve on your project specifications. Our Technical Consultants make recommendations for enhancements to your Pressure Sewer System based on budgets and the unique demands of your application.

Key Optional Accessories include:

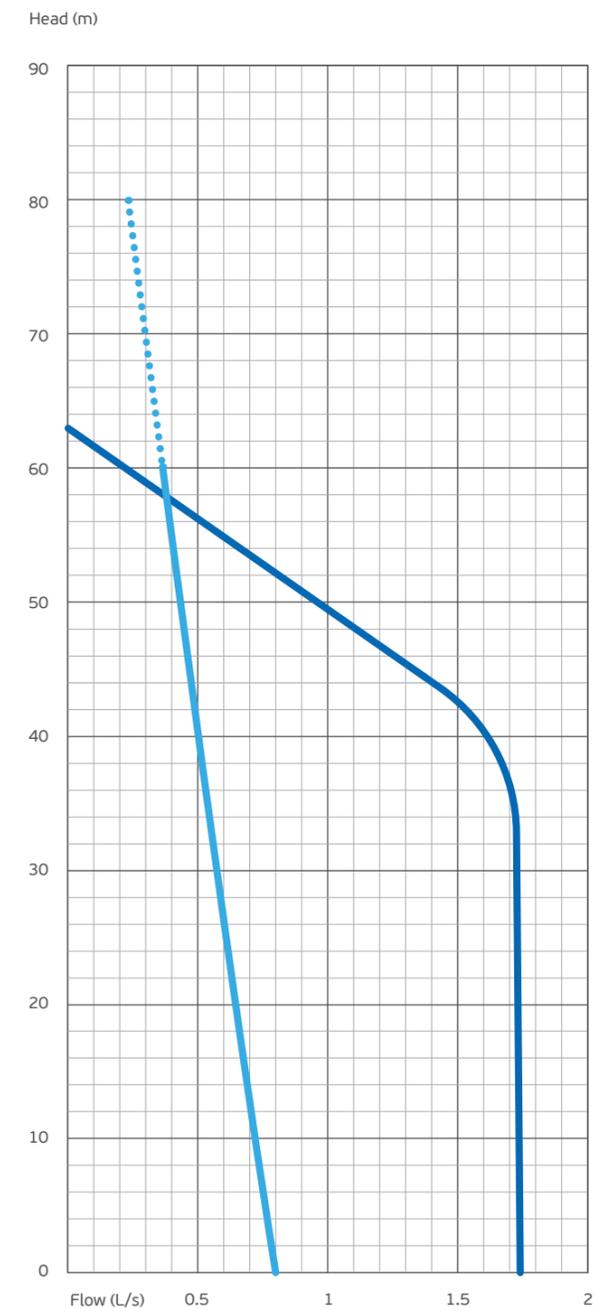
- Full Range of Custom Chambers
- External Storage Vessels
- Service trailers and equipment
- Access Covers
- Odour Controls
- Swiftlift Pump Trolley

Pump Upgrades

Upgrade kits with new components purpose-built for existing networks are designed to retrofit into your existing system for trouble free operation.

Grinder Pump Performance

- OGT Regenerative Turbine
- OGP 2 Stage Centrifugal



Level Controls

Aquatec offers a variety of methods for level control, from simple level monitoring and control to remote real level display and operation.

Hydrostatic Transducer

Aquatec's Hydrostatic Transducers deliver offsite monitoring and control of liquid levels with pinpoint accuracy via desktop or smartphone, providing a superior level of reliability and precision over solid state sensors.

- Provides incremental liquid level via signal output
- Compact design
- Wholly protected sensor body
- Industry Standard IP68 submergence rating
- Flush diaphragm to withstand chemicals, fats and grime
- Designed to function continuously in challenging conditions



Float Switches

Aquatec's Float Switches are capable of operating pumps or alarms either integral with the pump or wired directly to the control panel connection.

- Consistent and reliable long life performance
- Double liquid and raw sewerage proof chamber protecting the internal mechanism
- Smooth, circular shape ideal for Pressure Sewer applications
- Simple and proven operation



Accessories

Aquatec's Reticulation Valve Kits introduce a range of mechanisms throughout the network for preventative pressure management, automatic cleaning and scheduled maintenance. All reticulation kits are 316 SS.

From isolating individual properties or lines within the network, to periodic cleaning or pressure reduction, Aquatec's Reticulation Valve Kits are available in kit form inclusive of all parts for immediate installation.

Boundary Connection Kits

Aquatec's Boundary Connection Kits provide a means of isolation at the property boundary. Each kit includes a full bore isolation valve, a non-return valve, inspection tee and an optional flushing point mounted inside a polycarbonate or concrete valve box marked 'Pressure Sewer.'

Lid Ratings

- Class A
- Class B
- Class D



Isolation Valve Kits

Available with extension spindles for ease of operation, Aquatec's Isolation Valve Kits provide line isolation throughout the reticulation for scheduled maintenance. Each kit includes a flanged, resilient seated isolation valve, polyethylene connection stubs with backing rings, gaskets and bolts, and a cast iron twist lock inspection cover with concrete surround.



Flushing Point Kits

Aquatec's Flushing Point Kits provide a means of ejection or introduction of high volumes of liquid for periodic scouring of a pressure sewer main. Each kit includes a double acting pipework, full bore lockable isolation valve and camlock connection all mounted inside an underground chamber.

Lid Ratings

- Class B
- Class D



Air Valve Kits

Aquatec's Air Valve Kits provide a means of air release for high sections of the network, and as a siphon break for descending mains. Each kit includes a double acting sewerage combination air valve, isolation valve and interconnecting pipework, mounted inside a heavy duty, underground chamber.

Lid Ratings

- Class B
- Class D



OmniSmart Controller

The OmniSmart controller is a fully automated pre-programmed device that accurately controls flows within your reticulation systems, prioritising pump operation to optimise your pressure sewer network. The OmniSmart is capable of operating single pump units and multiple pumps.

Aquatec's OmniSmart controller thinks outside the box, by:

- Integrating your system into the surrounding sewer connections;
- Providing the ability to retrofit to upgrade existing pressure sewer installations
- Optimising the whole network by analysing usage and flow to iron out the peaks and troughs.

This optimisation:

- Increases the life of your whole network;
- Self-scouring rising mains by creating daily 'flushing waves';
- Prioritises operation after power failure based on effluent levels in each tank;
- Improves flow and minimises retention issues;
- Reduces both capital and operation expenditure;
- Reduces additional infrastructure/maintenance requirements; and
- Reduces whole of life costs by increasing the life expectancy of existing assets.

Features	500	1000A	1000B	6000A	6000B	6000C
Certified to all Australian and New Zealand Standards	•	•	•	•	•	•
Key lockable IP66 polycarbonate enclosure (316 S/S for OmniSmart)	•	•	•	•	•	•
Backing plate for easy mounting on wall or post	•	•	•	•	•	•
90Db audible alarm with automatic mute	•	•	•	•	•	•
External mute button for audible alarm	•	•	•	•	•	•
Single Pump Control	•	•	•	•	•	•
High-level alarm (low voltage) LED strobe light	•	•	•	•	•	•
Automatic and manual pump modes	•	•	•	•	•	•
Microprocessor based operation with upgradeable firmware	•	•	•	•	•	•
LED system status indication	•	•	•	•	•	•
Compatible with level switches or hydrostatic transducer	+	•	•	•	•	•
Back up high level switch compatible	•	•	•	•	•	•
Adjustable Over Pressure Protection	•	•	•	•	•	•
Motor current monitoring and protection for both low and high amps	+	•	•	•	•	•
Brown out/Low voltage protection	•	•	•	•	•	•
High voltage protection	•	•	•	•	•	•
Real time Clock (date and time)	•	•	•	•	•	•
Pump protection from Anti-seize, excessive run time and motor starts	•	•	•	•	•	•
Adjustable pump and alarm activation points	•	•	•	•	•	•
Adjustable Alarm delays	•	•	•	•	•	•
Internal memory with status history (last 4000+ events including motor state, adjustable fluid levels granularity, configurational changes and alarms)	•	•	•	•	•	•
USB Plug and Play administration interface and history	•	•	•	•	•	•
SCOP Compatible for improved system health and diurnal curve flattening.	•	•	•	•	•	•
Controller behaviour and activation based on time of day	•	•	•	•	•	•
Adjustable start delay after power failure based on fluid levels	•	•	•	•	•	•
Automatic scouring, time delay, and storage modes	•	•	•	•	•	•
Output to control external devices	•	•	•	•	•	•
Battery Backup for Alarms, fluid levels, history, and telemetry/SMS.	•	•	•	•	•	•
Hours run and pump start counter *	•	•	•	•	•	•
Backlit LCD screen for system status, diagnostics and liquid level	•	•	•	•	•	•
Telemetry/SCADA RS485 and RS232 MODBUS	•	•	•	•	•	•
Telemetry/SCADA 4G Cellular and DNP3	•	•	•	•	•	•
Telemetry/SCADA WiFi/Ethernet and DNP3	•	•	•	•	•	•
SMS notifications, remote diagnostics, pump control and set point control/adjustment	•	•	•	•	•	•
Email Alarm notifications	•	•	•	•	•	•
FTP support of historical event data transfer	•	•	•	•	•	•
LPWAN/IoT Integration	•	•	•	•	•	•

Note: Designed for use with most technology manufacturers' equipment (retrofitable)

- Standard
- Optional
- * Available via USB on 1000A
- + Level switches and high amp protection only



Remote Capabilities

SCADA

The standard OmniSmart Controller has inbuilt smarts for localised analysis and decision making. It is easily upgradable to become an edge device within your SCADA network by simply inserting a plug in module. This has the benefits of reducing demand on both your network and SCADA servers, improving response times, while still giving you real time operational and management capabilities. As an edge device, the OmniSmart also continues to give you all the benefits of an optimised reticulation network even during loss of communication or SCADA system outages.

SMS/Email

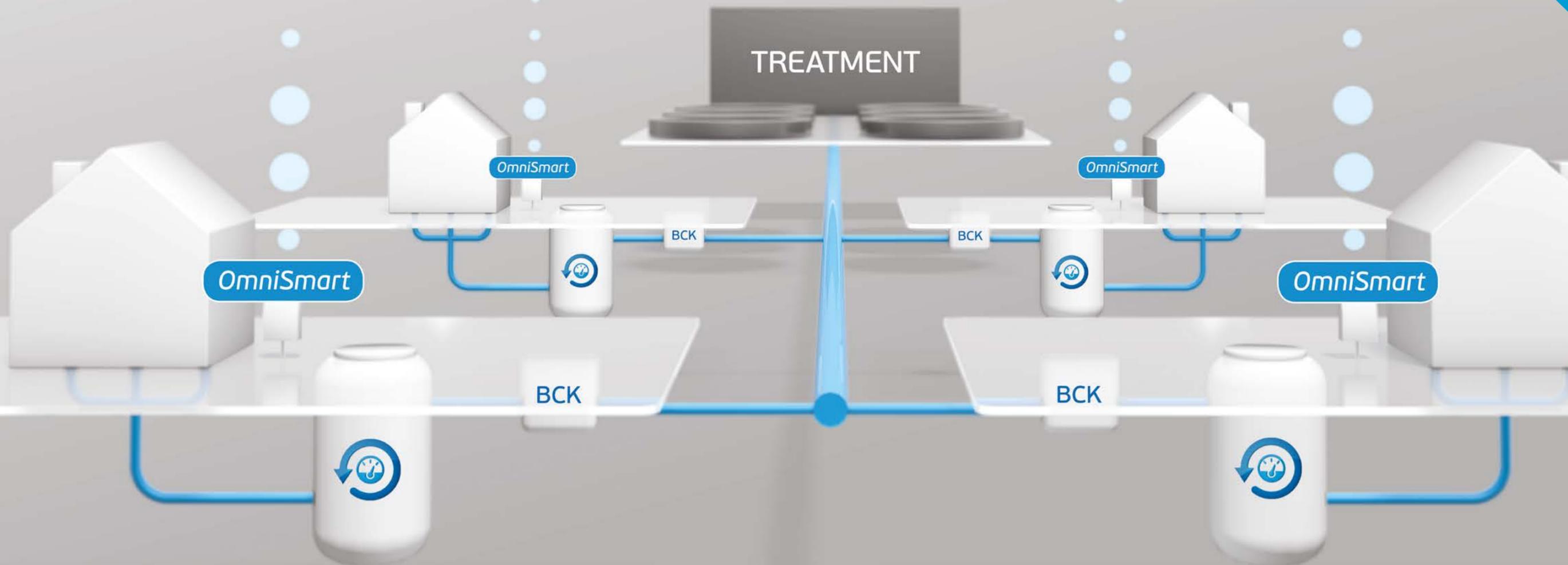
The OmniSmart supports two way SMS communication for fault notification along with remote diagnostics, adjustment and rectification. It can also email faults directly to your job management system to automate ticket issuing and prioritisation. The OmniSmart also has the ability to produce nightly historical exports via email for in-depth reporting and analytics.

File Transfer Protocol (FTP)

The OmniSmart transfers historical events to your FTP site at defined intervals, for automated phasing into your data warehouse. This gives you near real time data for reporting and analytics without the need of a SCADA system. OmniSmart supports CSV, tab delimited, and XML data file formats.

Internet of Things (IoT)

The OmniSmart can connect to a LPWAN (Low Powered Wide Area Network) base station many kilometres away, to send notifications of fluid level changes and/or issues onsite. This data is then on-forwarded to a secure IoT platform in the cloud, which can be fed into your SCADA system via DNP3 as if it were a traditional RTU.



After Sales Service

Maintenance Training

Aquatec's Maintenance Training caters for existing personnel in need of additional assistance or new personnel unfamiliar with the operational and maintenance requirements of our Pressure Sewer Systems.

Technical & Product Support

Aquatec's Technical and Product Support Service responds to any product or technical enquiry, including recommendations on safe-use of our products.

Service Warranty

Aquatec are committed to providing full after sales service, support and long term warranty on all components and workmanship.

HEADQUARTERS

2 Provincial Crescent,
Shepparton VIC 3630

Australia 1300 088 555
New Zealand 0800 756 543

info@aquatecenviro.com
aquatecenviro.com

SHEPPARTON

MELBOURNE

SYDNEY

NEWCASTLE

BRISBANE

ADELAIDE

PERTH

CHRISTCHURCH

Water Innovation Partners

BRISBANE

Level 3, 451 St Pauls Terrace
Fortitude Valley QLD 4006
P. 07 3539 8300
E. trevor@stpconsultants.com.au

TOWNSVILLE

Level 3, 382 Sturt Street
Townsville QLD 4810
PO Box 1777
Townsville QLD 4810
P. 07 3539 8350
E. anthony@stpconsultants.com.au

CAIRNS

Suite 2, 111 Spence Street
Cairns City QLD 4870
P. 07 3539 8380
E. adrien@stpconsultants.com.au

MACKAY

Suite 2, 25 River Street
Mackay QLD 4740
P. 07 3539 8390
E. brian@stpconsultants.com.au

ROCKHAMPTON

Level 3, 36 East Street
Rockhampton QLD 4700
P. 07 3539 8344
E. cameron@stpconsultants.com.au

WHITSUNDAYS

230 Shute Harbour Road
Cannonvale QLD 4802
P. 07 3539 8399
E. brian@stpconsultants.com.au



Attachment 5

Traffic Impact Assessment

13 Lynam Road, Bohle Plains
Proposed Development



Document Information

Prepared for Bedrock Landscape Supplies	Job Reference MOD25056QLD
--	----------------------------------

Document Control

Version	Date	Description of Revision	Prepared by	Approved By
A	14/03/26	DRAFT	LH	BF
B	18/03/26	FINAL	LH	BF

RPEQ Certification

Harj Singh
Executive Director
RPEQ 22364

HSingh

MODUS TRANSPORT & TRAFFIC ENGINEERING

ABN 49 668 863 269

310 Edward Street
Brisbane City QLD 4000

P 1300 606 408
E info@moduseng.com.au

Modus has expanded its capabilities and assembled its systems, capital, and resources to drive value for customers via the delivery of a full suite of traffic engineering services.

Here at Modus, we are a team of engineers with extensive knowledge and experience providing quality service to both public and private sectors, from large contractors and developers to state and local governments.

Whether your project is a small residential development, mixed use development, a large commercial precinct or anything in between, our experienced traffic engineers will apply sound and practical traffic engineering principles to achieve an outstanding outcome for your project.

For more information about our company and the services we provide, please visit www.modusengineering.com.au

The information contained in this document is intended solely for the use of the client identified on the report cover for the purpose for which it has been prepared and no representation is made or is to be implied as being made to any third party. Other than for the exclusive use of our client, no part of this report may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior written permission of Modus.

Contents

1	Introduction.....	- 3 -
1.1	Overview.....	- 3 -
2	Proposed Development.....	- 3 -
2.1	Overview.....	- 3 -
3	Traffic and Transport Review	- 4 -
3.1	Access Design.....	- 4 -
3.1.1	Driveway Design	- 4 -
3.1.2	Driveway Location.....	- 4 -
3.1.3	Vehicle Sight Distance.....	- 4 -
3.2	Car Parking Provisions.....	- 5 -
3.3	Car Parking Design	- 6 -
3.3.1	Car Parking Layout.....	- 6 -
3.3.2	Queueing Provisions.....	- 7 -
3.4	Servicing Requirements.....	- 7 -
4	Traffic Impact Assessment Assumptions	- 8 -
4.1	Study Intersections	- 8 -
4.2	Background Traffic Volumes	- 8 -
4.3	Traffic Growth.....	- 9 -
4.4	Adjacent Traffic Volumes	- 9 -
4.5	Development Traffic Generation.....	- 10 -
4.5.1	Construction Phase.....	- 10 -
4.5.2	Operational Phase.....	- 10 -
4.6	Coffee Shop Drop In Trips.....	- 11 -
4.7	Inbound / Outbound Directional Movements.....	- 11 -
4.8	External Directional Distributions.....	- 11 -
5	Traffic Impact Assessment Criteria	- 12 -
5.1	Assessment Scenarios	- 12 -
5.2	Assessment Intersection Performance Thresholds.....	- 12 -
6	Traffic Impact Operational Assessment	- 13 -
6.1	The Ring Road On-Ramp / The Ring Road Off-Ramp / Hervey Range Road Intersection	- 13 -
6.2	Hervey Range Road / Lynam Road Intersection	- 14 -
6.3	Lynam Road / Site Access Intersection (Entry).....	- 15 -
6.4	Lynam Road / Site Access Intersection (Two Way).....	- 16 -
7	Intersection Delay Assessment.....	- 17 -
8	Summary	- 18 -

1 Introduction

1.1 Overview

Modus has been commissioned by Bedrock Landscape Supplies, care of Northpoint Planning, to provide traffic and transport advice in relation to the proposed development located at 13 Lynam Road, Bohle Plains.

This Traffic Impact Assessment has been produced by Modus to assess the traffic and transport engineering items in support of the proposed development and in response to Item 5 of the City of Townsville (CoT) Information Request.

Modus has completed this Traffic Impact Assessment in accordance with the usual care and thoroughness of the consulting profession. The assessment is based on accepted traffic engineering practices and standards applicable at the time of undertaking the assessment. Modus disclaims responsibility for any changes to project planning or road conditions that may occur after completion of the assessment.

2 Proposed Development

2.1 Overview

The proposed development will comprise a Food & Drink Outlet (Coffee Shop) as well as alterations to an existing Bulk Landscape Supplies and Garden Centre on-site.

The proposed development yields are as follows:

- ▶ Food & Drink Outlet (Coffee Shop): 147.5 sq.m GFA with a drive through facility,
- ▶ Bulk Landscape Supplies and Garden Centre: Approximate GFA of 4,200 sq.m and TUA of approximately 11,540 sq.m.

As part of the proposed development, access is proposed on the following basis:

- ▶ A 4.0m wide entry only crossover,
- ▶ A 11.0m wide two-way movement crossover.

Furthermore, a total of 50 car parking spaces will be made available for the proposed development.

A copy of the development plans are provided at **Appendix A**.

3 Traffic and Transport Review

3.1 Access Design

3.1.1 Driveway Design

In accordance with Australian Standards 2890.1, the minimum driveway requirements for the proposed development are outlined in Table 3-1.

Table 3-1 Driveway Design Compliance

Road Frontage	AS2890.1 Driveway Design Compliance	Access Conditions
Lynam Road	Site Conditions	Minor Road Frontage User Class 2 25-100 Spaces
	Access Facility Category	2
	Required Driveway Widths	Minimum 3.0m (One Way) Minimum 6.0m – 9.0m (Two Way)
	Proposed Driveway Width	4.0m Wide Entry Only 11.0m Two-Way Movement

Therefore, the proposed driveway widths comply with Australian Standards 2890.1.

3.1.2 Driveway Location

In accordance with Australian Standards 2890.1, development accesses with a Class 2 Access Facility Category are to achieve a 6.0m separation to any formal intersections.

Provided that the proposed access location is not located within a 6.0m distance to any formal intersections, the proposed access location is considered acceptable.

3.1.3 Vehicle Sight Distance

The straight horizontal and vertical road alignment of Lynam Road north and south of the site allows a minimum vehicle sight distance of 65.0m to be accommodated as per Australian Standards 2890.1.

Therefore, the vehicle sight distance provisions are considered acceptable.

3.2 Car Parking Provisions

In accordance with the CoT City Plan, the minimum car parking requirements are outlined in Table 3-2.

Table 3-2 Minimum Car Parking Requirements

Land Use	Car Parking Rate	Yield	Car Parking Required	Car Parking Provided
Food & Drink Outlet	1 space per 10 sq.m GFA for Public Dining 1 space per 50 sq.m GFA for Food Preparation 1 space per 100 sq.m GFA for Storage	97 sq.m GFA for Public Dining 77 sq.m GFA for Food Preparation 14.5 sq.m GFA for Storage	13 Spaces	50 Spaces
Bulk Landscape Supplies / Garden Centre	1 space per 100 sq.m TUA	11,540 sq.m TUA	116 spaces	

Therefore, the proposed car parking provisions are not strictly in accordance with the CoT City Plan.

However, the proposed car parking provisions are considered acceptable on the following basis:

- ▶ The Food & Drink Outlet (Coffee Shop) use accommodates a drive-through facility with provision to accommodate up to 10 cars queueing, of which is anticipated to cater for a reasonable proportion of patron trips,
- ▶ The Bulk Landscape Supplies / Garden Centre will accommodate significant areas of GFA and TUA that will be utilised for hardstand and / or storage, and hence will not practically generate a car parking demand. Furthermore, the proposed internal road layout provides significant capability for informal car parking in aisle to be accommodated where necessary.

On this basis, the proposed car parking provisions are considered acceptable based on the intended use of the proposed development.

3.3 Car Parking Design

3.3.1 Car Parking Layout

Modus has conducted a design review of the car parking layout against the design guidelines within Australian Standards 2890.1 and Australian Standards 2890.2, of which is summarised below in Table 3-3.

Table 3-3 Car Parking Layout Design Review

Design Criteria	AS2890 Requirement	Proposed Design	Compliant
Parking Spaces			
Car Space Length - General	Min 5.4m	Min 5.4m	✓
Car Space Length - PWD Space	Min 5.4m	Min 5.4m	✓
Car Space Width – Resident / Employee	Min 2.4m	Min 2.4m	✓
Car Space Width – Visitors / Medium Turnover	Min 2.5m	Min 2.5m	✓
Car Space Width - PWD Space	Min 2.4m plus adjacent 2.4m shared zone	Min 2.4m plus adjacent 2.4m shared zone	✓
Parallel Space Width - General	Min 2.1m plus 0.3m door opening clearance	Min 2.1m plus 0.3m door opening clearance	✓
Car Parking Door Opening Clearances	Min 0.3m	Min 0.3m	✓
Car Parking Manoeuvring Clearances	Min 0.3m measured 0.75m back from car space entry	Min 0.3m measured 0.75m back from car space entry	✓
Roadways and Parking Aisles			
Minimum One-Way Circulation Roadway	Min 3.0m	Min 3.0m	✓
Minimum Two-Way Circulation Roadway	Min 5.5m	Min 5.5m	✓
Minimum Car Parking Aisle Width	Min 5.8m	Min 5.8m	✓
Service Vehicle Provisions			
Minimum One-Way Circulation Roadway	Min 3.5m	Min 3.5m	✓
Minimum Two-Way Circulation Roadway	Min 6.5m	Min 6.5m	✓

Therefore, the proposed car parking layout is designed in accordance with Australian Standards 2890.1 and Australian Standards 2890.2.

As such, the proposed car parking layout is considered acceptable.

3.3.2 Queueing Provisions

In accordance with Australian Standards 2890.1, the minimum vehicle queueing requirement from the property boundary to the first parking space is two (2) vehicles, equivalent to a length of 12.0m.

However, provided that the proposed development provides two (2) inbound crossovers, this queueing requirement is evenly split between these two (2) crossovers, resulting in a queueing requirement of 6.0m at each crossover.

The proposed parking layout accommodates a minimum length of 10.0m at each crossover and hence is considered acceptable.

Furthermore, the proposed Food & Drink Outlet drive-through facility accommodates a minimum queueing provision of 10 vehicles, with three (3) vehicles provided prior to the order point without impacting the circulation roadway to the Bulk Landscape Supplies / Garden Centre component.

Additionally, as detailed within the Trip Generation Drive Thru Coffee Outlets-Data and Analysis Report document produced by Bitzios Consulting, the average queueing length based on 10 surveyed sites was 6.7 vehicles, indicating the provision of at least 10 vehicles queueing is acceptable.

As such, the proposed queueing provisions are considered acceptable.

3.4 Servicing Requirements

The nature and scale of the proposed development is anticipated to warrant servicing on the following basis:

- ▶ Food & Drink Outlet (Coffee Shop): VAN / B99 design vehicle
- ▶ Bulk Landscape Supplies and Garden Centre: HRV

On this basis, Modus has undertaken a swept path assessment (provided at **Appendix B**) which confirms the following:

- ▶ A B99 design vehicle is able to safely and efficiently manoeuvre to and from one of the general parking spaces, in which servicing for the Food & Drink Outlet (Coffee Shop) is anticipated to occur within general parking spaces outside of business hours,
- ▶ A HRV design vehicle is able to safely and efficiently manoeuvre to, within and from the site ensuring a minimum 0.3m clearance to any obstructions.

Therefore, the proposed development servicing arrangements are considered acceptable.

4 Traffic Impact Assessment Assumptions

4.1 Study Intersections

The study intersections for the assessment herein are outlined on Figure 4-1 and are detailed in Table 4-1.

Figure 4-1 Study Intersections



Table 4-1 Study Intersections

Intersection ID	Intersection	Formation
1	The Ring Road On-Ramp / The Ring Road Off-Ramp / Hervey Range Road Intersection	Signalised
2	Hervey Range Road / Lynam Road Intersection	Signalised
3	Lynam Road / Site Access Intersection (Entry)	Priority Controlled
4	Lynam Road / Site Access Intersection (Two Way)	Priority Controlled

4.2 Background Traffic Volumes

To understand the background traffic conditions at the study intersections, traffic volume surveys were obtained from Trans Traffic on the 5th of February 2026 at Intersection ID 1 and 2. Furthermore, the observed network peak hour periods are summarised in Table 4-2.

Table 4-2 Network Peak Hour Periods

Network Peak Hour Periods	
AM Peak	PM Peak
7:30 AM – 8:30 AM	3:15 PM – 4:15 PM

A copy of the background traffic volume surveys are provided at **Appendix C**.

4.3 Traffic Growth

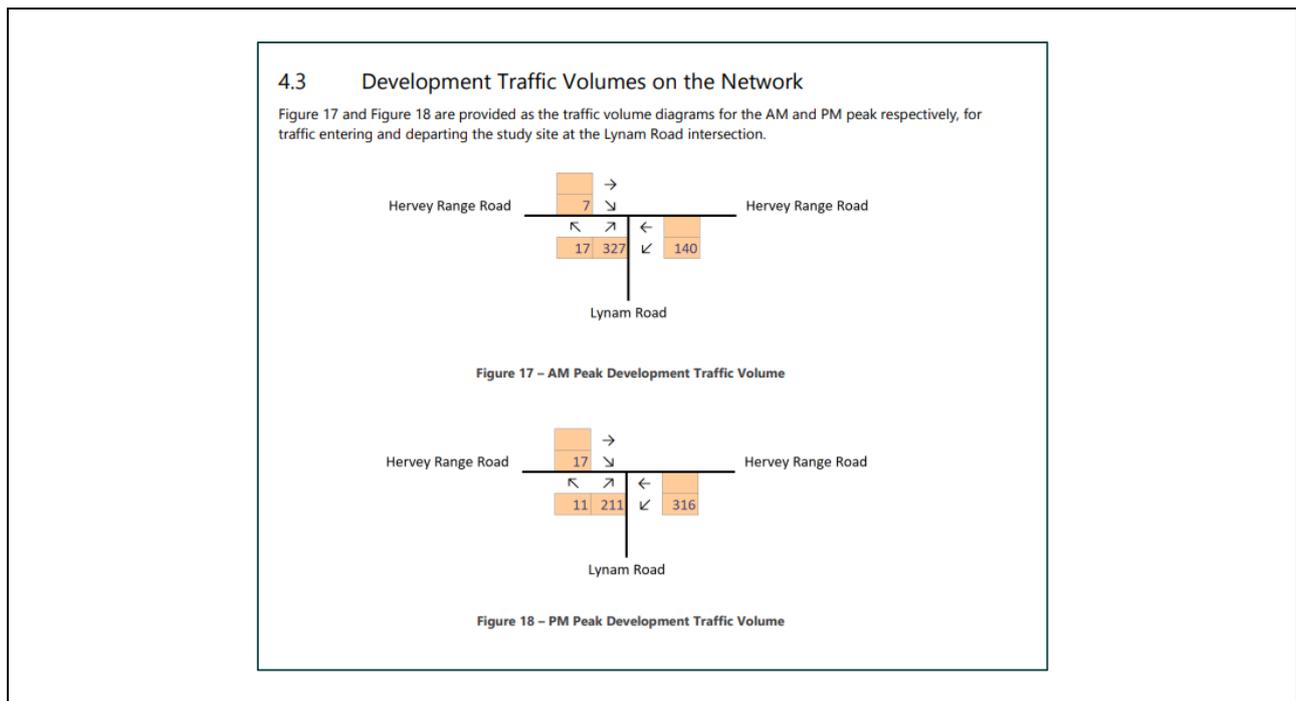
To ensure a conservative assessment and consistent with other developments in the area (such as the development located at 55 Lynam Road, Gumlow - Development Application Reference MCU23/0031), Modus has adopted an average linear growth rate of 2.0% p.a. to inform the theoretical future volumes on the surrounding external road network.

4.4 Adjacent Traffic Volumes

Furthermore, Modus notes that a previous Development Application (MCU23/0031) was approved by CoT for a Residential Subdivision located at 55 Lynam Road, Gumlow.

As part of the Approved Development, a Traffic Impact Assessment has been produced by Premise outlining the peak hour development volumes at the Hervey Range Road / Lynam Road intersection, as illustrated on Figure 4-2.

Figure 4-2 55 Lynam Road, Gumlow Traffic Volumes at the Hervey Range Road / Lynam Road Intersection



For the purposes of the assessment herein, Modus has referenced these volumes to inform the future background volumes at the Hervey Range Road / Lynam Road intersection.

4.5 Development Traffic Generation

4.5.1 Construction Phase

Modus notes that the light and heavy vehicle traffic generation volumes associated with the construction stage of the proposed development may vary based on the future construction project team, project timeline and associated personnel required.

Nevertheless, Modus has made general assumptions pertaining to the light and heavy vehicle traffic generation during the construction stage to inform the assessment herein. These assumptions are outlined in Table 4-3.

Table 4-3 Construction Traffic Generation Volumes Assumptions

Light Vehicle Traffic Volumes	Heavy Vehicle Traffic Volumes
20 – 25 Personnel	2 x Excavator 2 x Dump Truck 2 x Grader 2 x Concrete Truck Mixer 2 x Compactor
TOTAL: 25 Light Vehicles	TOTAL: 10 Heavy Vehicles

Therefore, for the purposes of the assessment herein, Modus has assumed a total of 25 light vehicles and ten (10) heavy vehicles per day.

4.5.2 Operational Phase

In accordance with the NSW Guide to Transport Impact Assessment (2024) document, the peak hour traffic generating potential of the existing use and proposed development is outlined in Table 4-4.

Table 4-4 Existing Use and Proposed Development Traffic Generation Volumes

Scenario	Land Use	Yield	Peak Hour Traffic Generation Rates		Peak Hour Traffic Generation Volumes	
			AM Peak	PM Peak	AM Peak	PM Peak
Existing	Bulky Goods Store	1,500 sq.m GFA	2.92 trips per 100 sq.m GFA	1.51 trips per 100 sq.m GFA	44 vehicles	23 vehicles
Proposed		2,700 sq.m GFA			35 vehicles	18 vehicles
Proposed	Coffee Shop	One (1) Shop	110 vehicles per hour	17 vehicles per hour	110 vehicles	17 vehicles
NET INCREASE:					+ 101 vehicles	+12 vehicles

4.6 Coffee Shop Drop In Trips

Furthermore, it is noted that the volumes associated with the proposed Coffee Shop will not exclusively be new trips, where the nature of the use will warrant a number of background vehicles 'dropping into' the site.

In accordance with the NSW Guide to Transport Impact Assessment (2024) document, as well as the Trip Generation Drive Through Coffee Outlets Data And Analysis Report (2015), a drop in reduction of up to 83% is recommended for use.

However, to allow for a conservative assessment, Modus has adopted a drop in trip reduction of 50%.

Additionally, these drop in trip reductions have been applied at the Hervey Range Road / Lynam Road intersection, where 50% of the development volumes that would typically travel throughbound will turn left / right into the site via Lynam Road. This is illustrated on the Traffic Network Flow Diagrams provided at **Appendix D**.

4.7 Inbound / Outbound Directional Movements

Table 4-5 outlines the peak hour traffic directional splits for the proposed development land use.

Table 4-5 Inbound / Outbound Development Traffic Generation Distributions

Land Use	AM Peak Hour		PM Peak Hour	
	IN	OUT	IN	OUT
Coffee Shop	50%	50%	50%	50%
Bulky Goods Store	50%	50%	50%	50%

4.8 External Directional Distributions

The surrounding road network and attractors have been assessed, in conjunction with the observed directional distributions within the traffic survey data, to determine the external distributions for development traffic.

The external distributions are illustrated on the Traffic Network Flow Diagrams provided at **Appendix D**.

5 Traffic Impact Assessment Criteria

5.1 Assessment Scenarios

To determine the impact of the development on the existing road network, each study intersection has been analysed for the AM and PM peak periods, assessing the development related traffic outlined in the previous report section. In accordance with the TMR Guide to Traffic Impact Assessments (GTIA), the impact assessment year for the site access should be the year of opening and 10 years after the year of opening. All other intersections are only to consider the year of the opening impact assessment.

For the assessment herein, Modus has assumed that the proposed development will be operational in Year 2030 and, therefore, indicates a 10-year design horizon in Year 2040. Additionally, it is assumed the major construction will occur in Year 2028.

Furthermore, Modus has included traffic generation from an adjacent development comprising 720 dwellings located at 55 Lynam Road, Gumlow (MCU23/0031) as part of the background scenario for both the year of opening and the 10-year design horizon.

Table 5-1 summarises the impact assessment scenarios.

Table 5-1 Assessment Scenarios

Assessment Year	Study Intersection ID
Construction 2028	1, 2, 3, 4
Background 2030	1, 2, 3, 4
Background 2030 + Development Volumes	1, 2, 3, 4
Background 2040 (Design Horizon)	3, 4
Background 2040 (Design Horizon) + Development Volumes	3, 4

5.2 Assessment Intersection Performance Thresholds

The performance of each study intersection has been analysed using SIDRA Intersection 9.1 (SIDRA). SIDRA is the primary industry modelling software that estimates the capacity and performance of intersections SIDRA analyses an intersection's Degree of Saturation (DOS), queues and delays.

The GTIA also recognises where the average peak hour delays for any movement exceed 42 seconds, a priority controlled or roundabout intersection should be upgraded for safety reasons.

Table 5-2 provides the intersection performance thresholds used in this assessment herein.

Table 5-2 Adopted Intersection Performance Thresholds

Intersection Formation	Intersection Performance Threshold
Priority Controlled	DOS less than 0.80, Average Delay less than 42.0 seconds
Signalised	DOS less than 0.90

6 Traffic Impact Operational Assessment

6.1 The Ring Road On-Ramp / The Ring Road Off-Ramp / Hervey Range Road Intersection

The Ring Road On-Ramp / The Ring Road Off-Ramp / Hervey Range Road intersection comprises a signalised formation, where Hervey Range Road is the Major Road. Figure 6-1 illustrates the existing intersection formation and SIDRA layout for this study intersection.

Figure 6-1 The Ring Road On-Ramp / The Ring Road Off-Ramp / Hervey Range Road Intersection Aerial and SIDRA Layout



Table 6-1 outlines the SIDRA Assessment results for this study intersection. The SIDRA results and layouts are provided in **Appendix E**.

Table 6-1 The Ring Road On-Ramp / The Ring Road Off-Ramp / Hervey Range Road Intersection - SIDRA Results

Scenario	DOS	Average Delay	95th %ile Queue	Critical Movement
AM Peak Period (90 Seconds Cycle Time)				
2028 Construction	0.563	14.3 sec	122.3 m	Hervey Range Road (W)
2030 BG	0.570	14.5 sec	124.9 m	Hervey Range Road (W)
2030 BG + DEV	0.601	14.7 sec	135.5m	Hervey Range Road (W)
2040 BG	0.683	16.0 sec	167.5 m	Hervey Range Road (W)
2040 BG + DEV	0.714	16.3 sec	181.1 m	Hervey Range Road (W)
PM Peak Period (90 Seconds Cycle Time)				
2028 Construction	0.583	21.4 sec	121.8 m	The Ring Road Off-Ramp (S)
2030 BG	0.589	21.5 sec	123.5 m	The Ring Road Off-Ramp (S)
2030 BG + DEV	0.592	21.5 sec	124.6 m	The Ring Road Off-Ramp (S)
2040 BG	0.674	22.4 sec	149.8 m	The Ring Road Off-Ramp (S)
2040 BG + DEV	0.679	22.5 sec	151.7 m	The Ring Road Off-Ramp (S)

Therefore, the Ring Road On-Ramp / The Ring Road Off-Ramp / Hervey Range Road intersection will operate within acceptable performance thresholds for the assessment scenarios.

6.2 Hervey Range Road / Lynam Road Intersection

The Hervey Range Road / Lynam Road intersection will comprise a signalised formation, where Hervey Range Road is the Major Road. Figure 6-2 illustrates the existing intersection formation and SIDRA layout for this study intersection.

Figure 6-2 Hervey Range Road / Lynam Road Intersection Aerial and SIDRA Layout

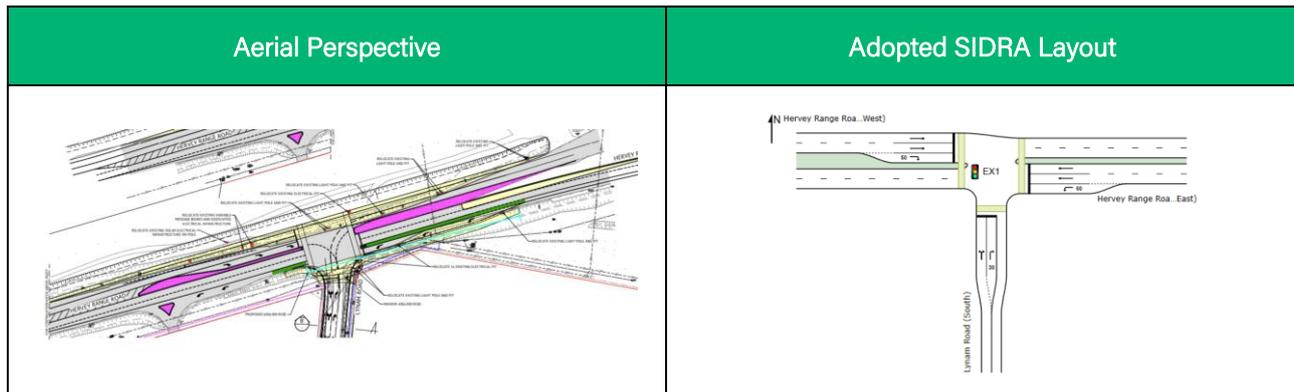


Table 6-2 outlines the SIDRA Assessment results for this study intersection. The SIDRA results and layouts are provided in **Appendix E**.

Table 6-2 Hervey Range Road / Lynam Road Intersection - SIDRA Results

Scenario	DOS	Average Delay	95th %ile Queue	Critical Movement
AM Peak Period (90 Seconds Cycle Time)				
2028 Construction	0.769	32.0 sec	174.0 m	Hervey Range Road (W)
2030 BG	0.791	31.2 sec	184.9 m	Hervey Range Road (W)
2030 BG + DEV	0.830	36.9 sec	203.7m	Lynam Road (S)
2040 BG	0.937	45.0 sec	303.1 m	Hervey Range Road (W)
2040 BG + DEV	0.959	52.9 sec	333.1 m	Lynam Road (S)
PM Peak Period (90 Seconds Cycle Time)				
2028 Construction	0.749	24.8 sec	164.6 m	Hervey Range Road (E)
2030 BG	0.780	25.8 sec	179.6 m	Hervey Range Road (E)
2030 BG + DEV	0.783	25.9 sec	181.0 m	Hervey Range Road (E)
2040 BG	0.948	41.2 sec	317.5 m	Hervey Range Road (E)
2040 BG + DEV	0.951	41.6 sec	322.1 m	Hervey Range Road (E)

Therefore, the Hervey Range Road / Lynam Road intersection will operate within acceptable performance thresholds for the year of opening though will not perform within acceptable performance thresholds for the 10 year design horizon.

However, it is noted that the intersection exceeds performance thresholds in the background scenario in the 10 year design horizon, and hence the development volumes in isolation do not result in the intersection exceeding performance thresholds.

6.3 Lynam Road / Site Access Intersection (Entry)

The Lynam Road / Site Access (Entry) intersection comprises a priority-controlled formation, where Lynam Road is the major road.

Figure 6-3 illustrates the existing intersection formation and SIDRA layout for this study intersection.

Figure 6-3 Lynam Road / Site Access Intersection Aerial and SIDRA Layout

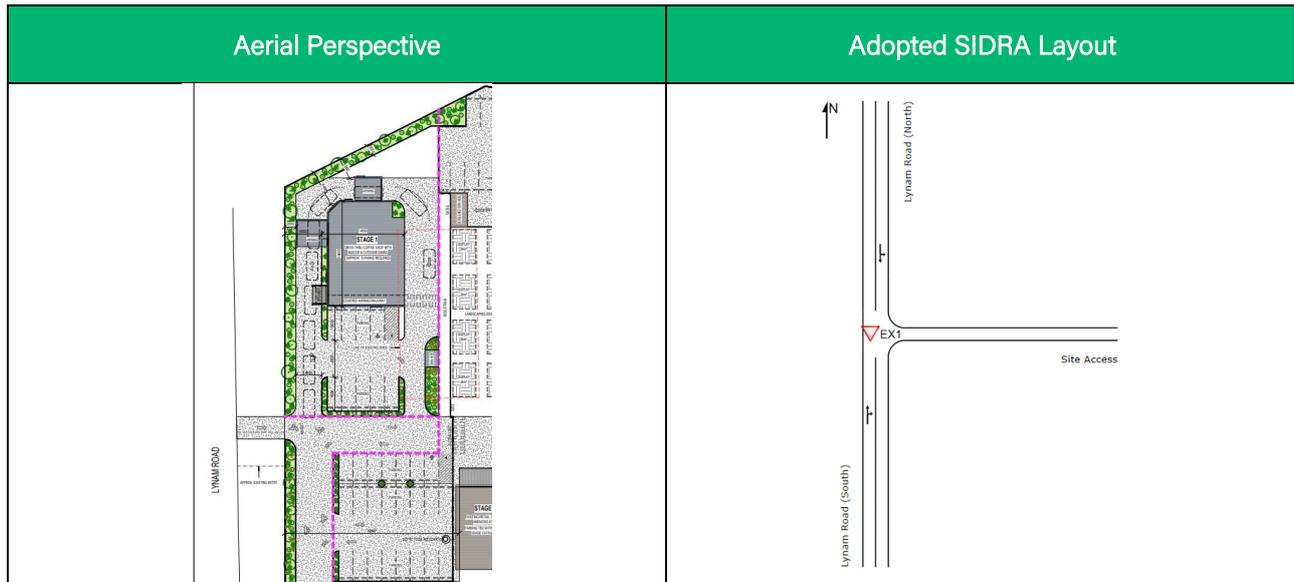


Table 6-3 outlines the SIDRA Assessment results for this study intersection. The SIDRA results and layouts are provided in **Appendix E**.

Table 6-3 Lynam Road / Site Access (Entry) Intersection - SIDRA Results

Scenario	DOS	Average Delay	95th %ile Queue	Critical Movement
AM Peak Period				
2028 Construction	0.228	5.5 sec	0.1 m	Lynam Road (S)
2030 BG	0.208	5.8 sec	0.1 m	Lynam Road (S)
2030 BG + DEV	0.249	5.8 sec	0.1 m	Lynam Road (S)
2040 BG	0.209	5.8 sec	0.1 m	Lynam Road (S)
2040 BG + DEV	0.249	5.8 sec	0.1 m	Lynam Road (S)
PM Peak Period				
2028 Construction	0.210	6.0 sec	0.1 m	Lynam Road (N)
2030 BG	0.200	6.0 sec	0.1 m	Lynam Road (N)
2030 BG + DEV	0.205	6.0 sec	0.1 m	Lynam Road (N)
2040 BG	0.202	6.0 sec	0.1 m	Lynam Road (N)
2040 BG + DEV	0.207	6.0 sec	0.1 m	Lynam Road (N)

Therefore, the Lynam Road / Site Access intersection will operate within acceptable performance thresholds for the assessment scenarios.

6.4 Lynam Road / Site Access Intersection (Two Way)

The Lynam Road / Site Access intersection comprises a priority-controlled formation, where Lynam Road is the major road.

Figure 6-4 illustrates the existing intersection formation and SIDRA layout for this study intersection.

Figure 6-4 Lynam Road / Site Access (Two Way) Intersection Aerial and SIDRA Layout

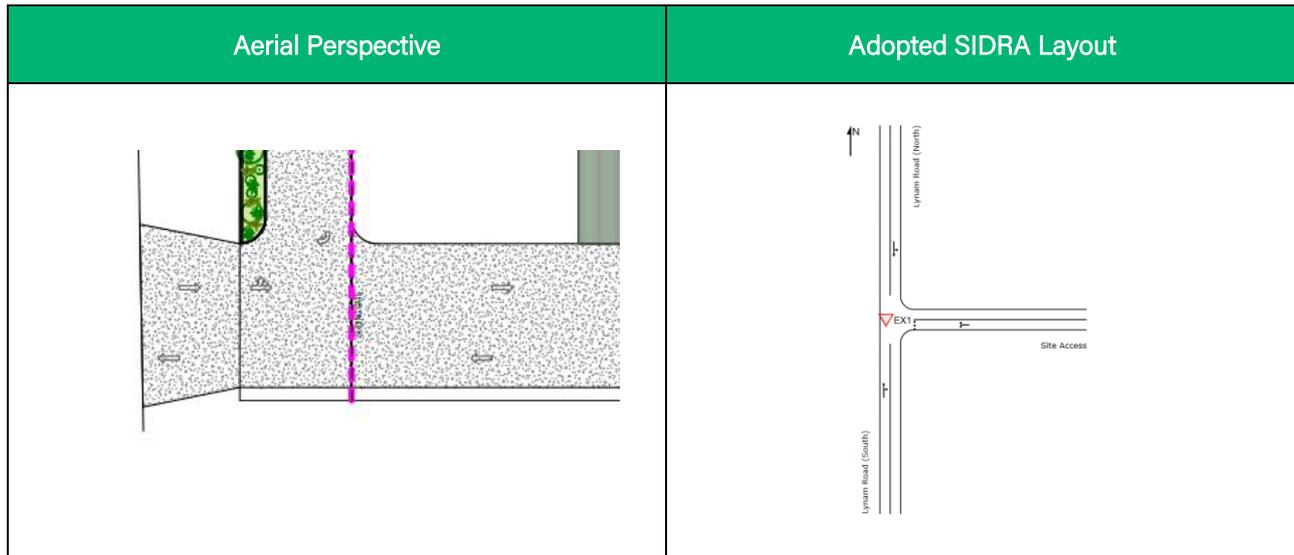


Table 6-4 outlines the SIDRA Assessment results for this study intersection. The SIDRA results and layouts are provided in **Appendix E**.

Table 6-4 Lynam Road / Site Access (Two Way) Intersection - SIDRA Results

Scenario	DOS	Average Delay	95th %ile Queue	Critical Movement
AM Peak Period				
2028 Construction	0.196	5.5 sec	2.0 m	Lynam Road (S)
2030 BG	0.196	5.6 sec	0.8 m	Lynam Road (S)
2030 BG + DEV	0.196	5.7 sec	3.4 m	Lynam Road (S)
2040 BG	0.197	5.5 sec	0.8 m	Lynam Road (S)
2040 BG + DEV	0.197	5.7 sec	3.4 m	Lynam Road (S)
PM Peak Period				
2028 Construction	0.204	5.8 sec	1.7 m	Lynam Road (N)
2030 BG	0.194	5.8 sec	0.4 m	Lynam Road (N)
2030 BG + DEV	0.199	5.8 sec	1.1 m	Lynam Road (N)
2040 BG	0.196	5.8 sec	0.4 m	Lynam Road (N)
2040 BG + DEV	0.200	5.8 sec	1.1 m	Lynam Road (N)

Therefore, the Lynam Road / Site Access intersection will operate within acceptable performance thresholds for the assessment scenarios.

7 Intersection Delay Assessment

In accordance with the GTIA requirements for no net worsening to baseline road network operations, this assessment has investigated the delay impact of the development traffic on the network at the following intersections:

- ▶ The Ring Road On-Ramp / The Ring Road Off-Ramp / Hervey Range Road Intersection,
- ▶ Hervey Range Road / Lynam Road.

The assessment has reviewed whether the increase in average delay at the intersections exceeds 5%. The average delay has been calculated in accordance with the GTIA by taking the aggregate average delay across the intersections for both the baseline scenario (Background 2030) and the With Development scenario (Background 2030 + Development Volumes) as illustrated on Figure 7-1.

Figure 7-1 GTIA Aggregate Average Delay Equation

$$ID = \sum_{i=1}^n WD - \sum_{i=1}^n BC$$

where:

ID is aggregate intersection-delay impact vehicle-minutes.

WD is 'with development' intersection vehicle-minutes for design peak periods. This is calculated by multiplying the 'with development' average delay by movement to the base case volume on each movement, thus not counting the impact as delays to development traffic, only to pre-existing traffic that is affected by these additional delays.

BC is base case intersection vehicle-minutes for design peak periods

n is the number of intersections in the impact assessment area

i is each intersection within the impact assessment area.

The results of the aggregate average delay assessment for both intersections are detailed in Table 7-1.

Table 7-1 Development Delay Assessment

Assessment Scenario	Aggregate Delay (veh-min)	
	AM Peak Hour	PM Peak Hour
Background 2030	1,545	1,751
Background 2030 + Development Volumes	1,694	1,752
Difference (Dev Impact)	+149	+2
Dev Delay Impact (%)	9.60%	0.10%
Average Delay Impact (%)	4.86%	

Therefore, the aggregate average delay assessment indicates the average delay impact is 4.86% which is below the 5% delay threshold stipulated in the GTIA and therefore does not trigger mitigation upgrades for the intersection.

8 Summary

Therefore, Modus is of the opinion that the proposed development is acceptable from a traffic engineering perspective and will not have a substantial impact on the safety or efficiency of the external road network.

Should there be any issue with the above, please contact the undersigned.

Yours sincerely,

HSingh

MODUS TRANSPORT AND TRAFFIC ENGINEERING

Harj Singh
Executive Director (RPEQ 22364)

APPENDIX A

Development Plans

COFFEE SHOP

FOR:
P. FORTINI

AT:
**13 LYNAM ROAD
BOHLE PLAINS
TOWNSVILLE**

DRAWING SCHEDULE

- 0 COVER SHEET
- 1 EXISTING SITE PLAN
- 2 EXISTING SITE SURVEY PLAN
- 3 PROPOSED SITE PLAN - OVERALL
- 4 PROPOSED SITE PLAN - PART
- 5 STAGING PLANS
- 6 PROPOSED SUB-DIVISION
- 7 COFFEE SHOP FLOOR PLAN & ELEVATIONS
- 8 EXISTING SHED FLOOR PLAN & ELEVATIONS
- 9 SHED RENOVATION FLOOR PLAN & ELEVATIONS
- 10 PROPOSED SHED FLOOR PLAN & ELEVATIONS





1 EXISTING SITE PLAN - LOCALITY

1 : 500 AT A1 SHEET SIZE

PROJECT ISSUE & DESCRIPTION
P5 - PRELIMINARY ISSUE - 30-04-2025

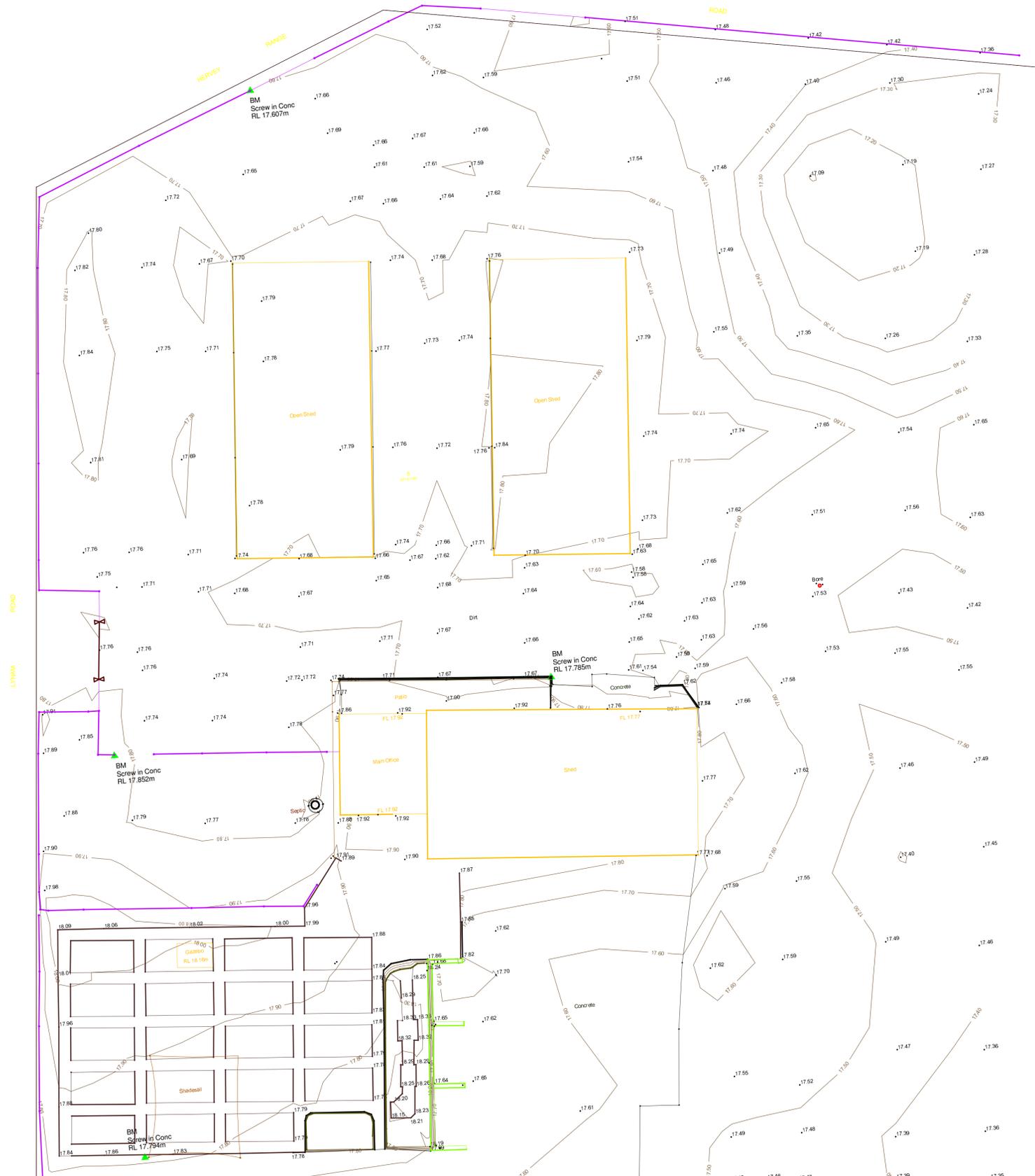
PRELIMINARY

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

CB
DESIGNS
BUILDING DESIGN & DRAFTING
ABN: 112 627 297
Licence No.: 572298
66 Baywater Road, Hyde Park QLD 4812
PO Box 4527, Vincent QLD 4814
Tel: (07) 4778 4199

PROJECT:
COFFEE SHOP
CLIENT:
P. FORTINI
SITE:
13 LYNAM ROAD
BOHLE PLAINS
TOWNSVILLE

BUILDER:		DATE:	30/04/2025 1:08:30 PM	JOB NO.:	24-389
DRAWN:	B.W.	SCALE:	1 : 500		
SHEET No.:	1	CLIENT JOB No.:			



1 EXISTING SITE SURVEY PLAN
1 : 250 AT A1 SHEET SIZE

PROJECT ISSUE & DESCRIPTION P5 - PRELIMINARY ISSUE - 30-04-2025		PRELIMINARY		 BUILDING DESIGN & DRAFTING <small>ABN 112 827 297 Licence No. 572298 66 Baywater Road, Hyde Park QLD 4812 PO Box 4327, Ingham QLD 4814 Tel: (07) 4778 4199</small>		PROJECT: COFFEE SHOP CLIENT: P. FORTINI SITE: 13 LYNAM ROAD BOHLE PLAINS TOWNSVILLE		BUILDER: <table border="1"> <tr> <td>DATE:</td> <td>30/04/2025 1:08:32 PM</td> <td>JOB NO.:</td> <td>24-389</td> </tr> <tr> <td>DRAWN:</td> <td>B.W.</td> <td></td> <td></td> </tr> <tr> <td>SCALE:</td> <td>1 : 250</td> <td></td> <td></td> </tr> <tr> <td>SHEET No.:</td> <td>2</td> <td>CLIENT JOB NO.:</td> <td></td> </tr> </table>		DATE:	30/04/2025 1:08:32 PM	JOB NO.:	24-389	DRAWN:	B.W.			SCALE:	1 : 250			SHEET No.:	2	CLIENT JOB NO.:	
DATE:	30/04/2025 1:08:32 PM	JOB NO.:	24-389																						
DRAWN:	B.W.																								
SCALE:	1 : 250																								
SHEET No.:	2	CLIENT JOB NO.:																							
NOTES: THIS DRAWING IS ONLY INTENDED TO OBTAIN A LOCAL AUTHORITY BUILDING PERMIT. COMPLY WITH ALL RELEVANT AUTHORITY REQS. & S.A. FIGURED DIMENSIONS TO TAKE PRECEDENCE OVER SCALED MEASUREMENTS. VERIFY ALL ON-SITE DIMENSIONS & LEVELS PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION.																									