APPENDIX C

Water and Sewer Network Analysis Reports

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JFP URBAN CONSULTANTS

SEWER NETWORK ANAYLSIS REPORT

Proposed Manufactured Home Site (Harris Crossing) at
99 Hogarth Drive, Bohle Plains

TOWN PLANNING
URBAN DESIGN + MASTER PLANNING
SURVEYING + SPATIAL SERVICES
CIVIL + STORMWATER ENGINEERING
LANDSCAPE ARCHITECTURE
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SEWER NETWORK ANAYLSIS REPORT

Proposed Manufactured Home Site (Harris Crossing) at
99 Hogarth Drive, Bohle Plains
for
Ruby Developments Pty Ltd

M3248_SEW – Revision A
25th November 2024

JFP Urban Consultants Pty Ltd
Prepared by: Rowell Umale
Approved by: Haydn Watson (RPEQ 6200)

Revision History

Revision	Date	Details
A	25/11/2024	Issue for TCC Approval

TABLE OF CONTENTS

1 INTRODUCTION

JFP Urban Consultants Pty Ltd was engaged to carry out a sewer network analysis and prepare a report to accompany a Townsville City Council (TCC) Material Change of Use application (MCU24/0094) for a manufactured home site development at 99 Hogarth Drive, Bohle Plains (Lot 1002 SP340654). The manufactured home site comprises 291 home sites, 1 duplex site, 1 club house and 1 summer house.

In particular, the report has been prepared to address Information Request Item 3(a) as follows:
"The applicant is requested to provide water and sewer network analyses for the proposed development. The analyses are to identify demands associated with the development, demonstrate that adequate service can be provided and identify any external infrastructure upgrades required to accommodate the development."

The proposed development site is part of the wider Harris Crossing master planned residential estate. The site was planned as 183 residential allotments under the original Master Plan prior to being considered as a manufactured home site.

A Site Layout Plan of the proposed manufactured home site development is shown in Figure 1 below. A General Master Plan Drawing No. ***SK-005 REV F.2*** is attached in Appendix A.

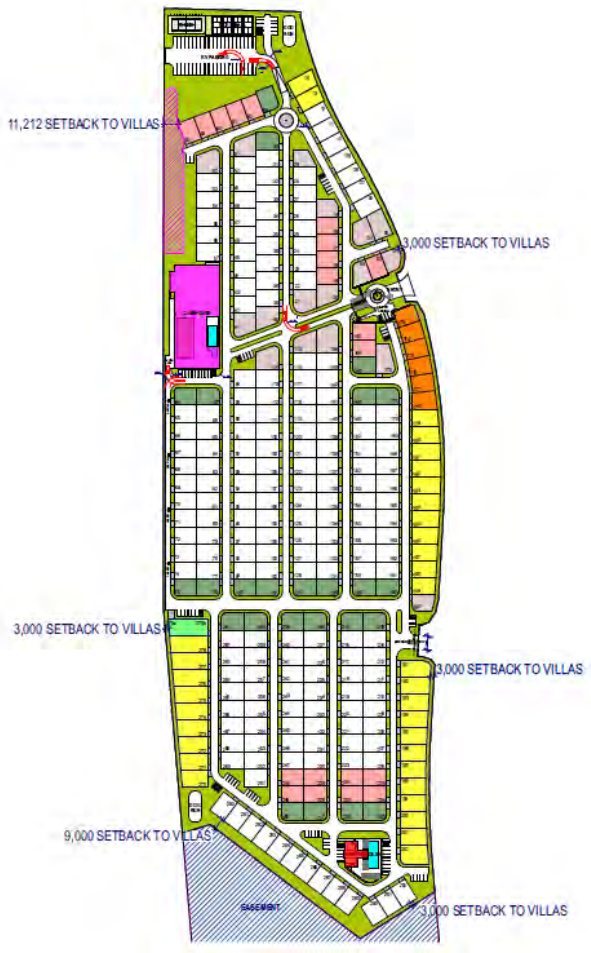


Figure 1: Proposed Manufactured Home Site Development Layout Plan

2 BACKGROUND

2.1 SITE LOCALITY

The proposed development site covers 13.6 ha and has a relatively flat grade ranging in elevation from 14m AHD to 15.5m AHD with an 11m AHD low point at the northern corner of the site. The existing site consists of vacant plains with moderate bushland in the northern corner. The site adjoins by bushland reserve to the north. The Ring Road is located to the west, Hogarth Drive to the east and bushland reserve/residential allotments to the south. The site is currently within a connection services area with the northern portion in the BP02 pump station catchment and the southern portion in the BP11 pump station catchment. Figure 2 shows the site locality and pump station catchment area mapping.

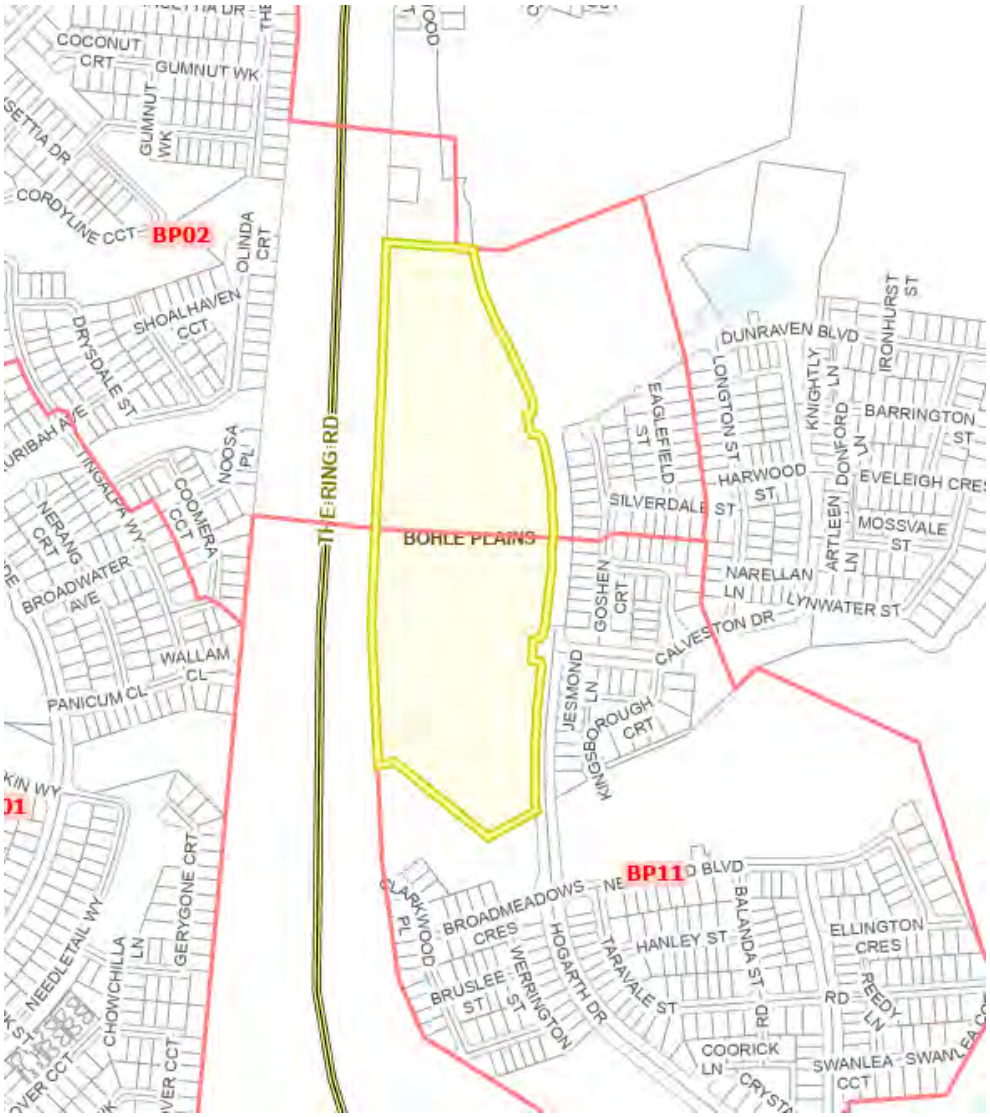


Figure 2: Proposed Manufactured Home Site and Pump Station Catchment Area Mapping

Figure 3 shows an aerial view of the site with contours.

Figure 3: Proposed Manufactured Home Site Aerial View with Contours

2.2 EXISTING SEWERAGE NETWORK & CONNECTION POINT

The proposed development is in the Mount St John Wastewater Treatment Plant (WWTP) Network catchment. The proposed development will gravitate via new gravity mains to PS BP02 and PS BP11 gravity catchments. Both SPS's pump into a common rising main to PS BP03 at Huntsman Crescent. PS BP03 pumps into a common rising main directly to the WWTP. The network is shown in Figure 4.

The proposed development northern portion will connect into a stub into existing DN225 gravity mains to PS BP02. The southern portion will connect into a stub into existing DN150 gravity mains to PS BP11. This is also shown on Figure 4.

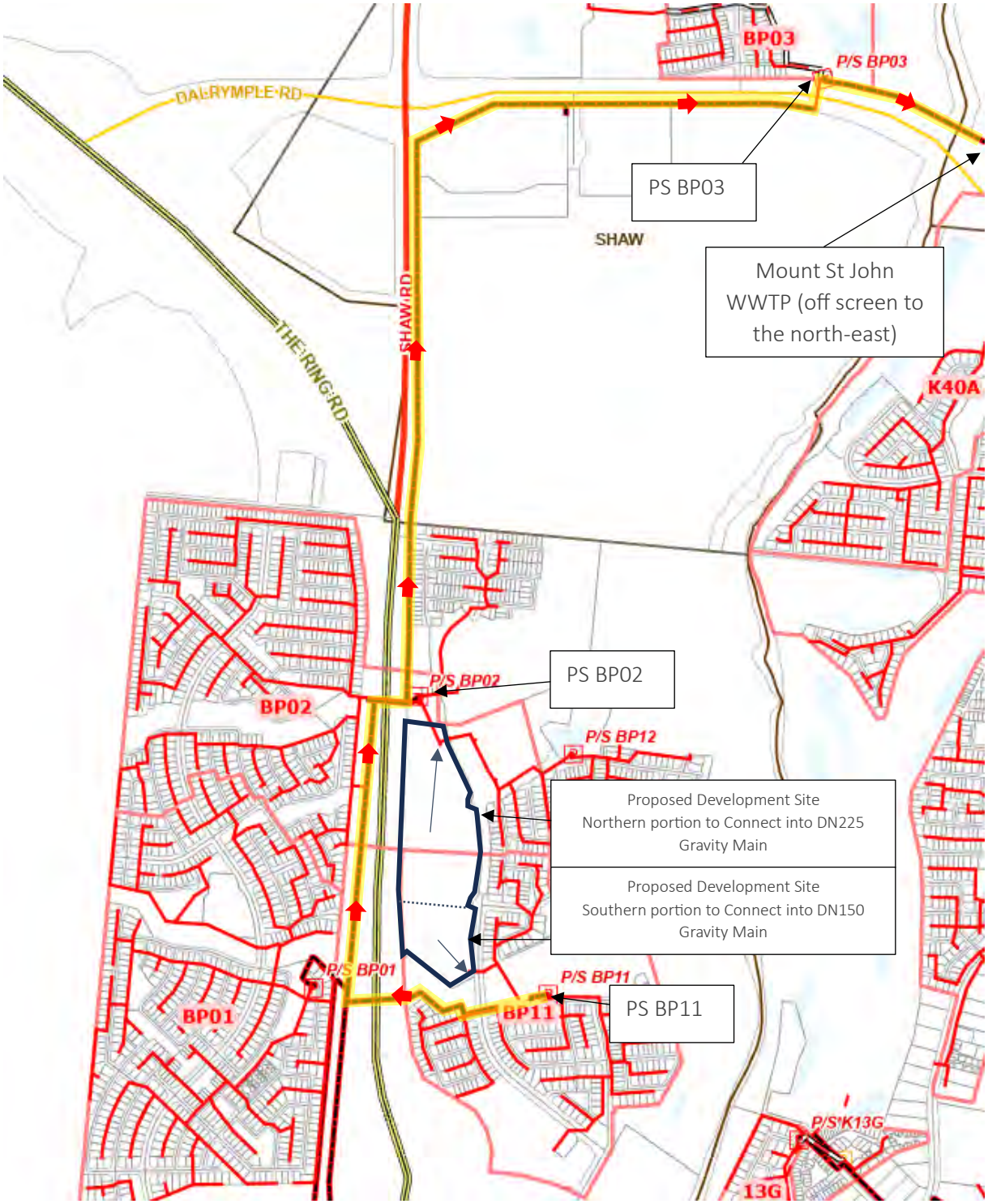


Figure 4: Mount St John WWTP Network – Downstream Flow Path from the Proposed Development Site to WWTP

2.3 PLANNED SEWERAGE NETWORK AUGMENTATIONS

TCC provided the following Sewer Planning Reports to establish the planning background of the area:

- *Harris Crossing, Hervy Rand Road – Engineering Report (UDP, 2015)*
- *Harris Crossing Residential Development Dunraven Street, Bohle Plains – SPS BP12 Design Report (Premise, 2021)*

The UDP 2015 Planning Report includes a sewerage servicing strategy for the wider Harris Crossing Development and allowed the proposed development site to be reconfigured int 183 residential allotments. 150 Lots (420 EP) were to gravitate towards BP02 and 33 Lots (92.4 EP) to gravitate towards PS BP11.

The following capacity and upgrade trigger was identified for PS BP02:

- PS BP02 existing pump capacity is 41l/s or 3,080 EP
- PS BP02 ultimate catchment includes Kalynda Chase Development 867 Lots (2,427.6 EP) + Harris Crossing Development 450 Lots (1,250 EP) = 1,317 lots (3,687.6 EP)
- PS BP02 existing pump capacity is lower than the ultimate catchment load and is to be upgraded after the first 230 Lots (Approximately 607.6 EP (3,687.6 EP – 3,080 EP)) of the Harris Crossing Development.
- PS BP02 pump capacity to be sized to ultimate 3,687.6 EP and pumps are to be determined at detailed design.

It is understood that the PS BP02 pump capacity upgrade has not yet occurred. The proposed development updated layout will now gravitate approximately 514 EP to PS BP02 rather than the previously planned 420 EP. Therefore, the ultimate pump capacity upgrade to PS BP02 will need to increase to accommodate the additional 94 EP (514 EP – 420 EP). The duty flow for the ultimate pump station design shall be 50.3l/s based on 3,781.6 EP.

PS BP11 was a new pump station designed to service an ultimate catchment of 300 Lots (840 EP). The proposed development updated layout will now gravitate approximately 263.3 EP to PSPB11 rather than the previously planned 92.4 EP. The installed pumps and wet well in PS BP11 will need to be assessed if they can accommodate the additional 170.9 EP (263.3 EP – 92.4 EP) and upgrade if required. This increase would account to 16.9% of the overall SPS catchment. The pump details for the pump station were not available at the time of this report to assess it's existing capacity.

3 SEWAGE LOAD ESTIMATE

Equivalent Persons (EPs) was used as the base unit to determine the expected sewage loading of the proposed development. The FNQROC Sewer Guidelines specifies the following EP conversion rates.

- 2.5 EP per Single Family Dwelling (<400m^2)
- 2.2 EP per Multi Unit Accommodation (3 bedrooms)
- 1 EP per 90m^2 GFA Shops / Offices

Table 1 below summaries the EP calculation for the proposed development based on the figures above.

Table 1: Summary of Proposed Development Sewage EP Estimate

Description	Yield	EP Rate	Type	EP				
				2021	2026	2031	2036	Ultimate
Home Site	291	2.5 EP per Home Site (Single Family Dwelling (<400m^2)	Res	727.5	727.5	727.5	727.5	727.5
Duplex	1	2 x 2.2 EP per Duplex Lot (3-bedroom multi-accommodation)	Res	4.4	4.4	4.4	4.4	4.4
Club House	3,117 m^2 GFA	1 EP per 90m^2 GFA (Shops/Offices)	Non-res	34.6	34.6	34.6	34.6	34.6
Summer House	970 m^2 GFA	1 EP per 90m^2 GFA (Shops/Offices)	Non-res	10.8	10.8	10.8	10.8	10.8
			Total Res EP	731.9	731.9	731.9	731.9	731.9
			Total Non-Res EP	45.4	45.4	45.4	45.4	45.4
			Total Proposed EP	**777.3**	**777.3**	**777.3**	**777.3**	**777.3**

Tables 2 and 3 show the division of proposed EP into PS BP02 and PS BP11, respectively.

Table 2: Summary of Proposed Development Discharging to PS BP 02

Description	Yield	EP Rate	Type	EP				
				2021	2026	2031	2036	Ultimate
Home Site	190	2.5 EP per Home Site (Single Family Dwelling (<400m^2)	Res	475	475	475	475	475
Duplex	1	2 x 2.2 EP per Duplex Lot (3-bedroom multi-accommodation)	Res	4.4	4.4	4.4	4.4	4.4
Club House	3,117 m^2 GFA	1 EP per 90m^2 GFA (Shops/Offices)	Non-res	34.6	34.6	34.6	34.6	34.6
			Total Res EP	479.4	479.4	479.4	479.4	479.4
			Total Non-Res EP	34.6	34.6	34.6	34.6	34.6
			Total Proposed EP	**514**	**514**	**514**	**514**	**514**

Table 3: Summary of Proposed Development Discharging to PS BP11

Description	Yield	EP Rate	Type	EP				
				2021	2026	2031	2036	Ultimate
Home Site	101	2.5 EP per Home Site (Single Family Dwelling (<400m^2)	Res	252.5	252.5	252.5	252.5	252.5
Summer House	970 m^2 GFA	1 EP per 90m^2 GFA (Shops/Offices)	Non-res	10.8	10.8	10.8	10.8	10.8
			Total Res EP	252.5	252.5	252.5	252.5	252.5
			Total Non-Res EP	10.8	10.8	10.8	10.8	10.8
			Total Proposed EP	**263.3**	**263.3**	**263.3**	**263.3**	**263.3**

4 SEWERAGE DESIGN PARAMETERS

The sewer network was modelled in accordance with the CTM Water Alliance Design and Construction Code design parameters as listed below:

- Average Dry Weather Flow (ADWF) = 230 L/EP/day
- Peak Dry Weather Flow (PDWF) = C_2 x ADWF
  Where $C_2 = 4.7 \times EP^{-0.105}$
- Peak Wet Weather Flow (PWWF) = 5 x ADWF
- Depth of flow at PWWF for new sewers = less than 0.75 of pipe diameter
- Minimum gravity main slope DN150 = 1:100m for the first 10 allotments
  = 1:180m remaining lengths
  DN225 = 1:300m
- Minimum velocity gravity mains at PWWF = 0.7 m/s
- Target velocity in rising main = 0.75 to 1.5 m/s
- Maximum velocity in rising mains = 2.5 m/s

The proposed development 777.3 EP represents the following flowrates based on 230 L/ EP/day:

Average Dry Weather Flow (ADWF) = 2.07 l/s
Peak Wet Weather Flow (PWWF) = 10.35 l/s

5 SEWERAGE HYDRAULIC MODELLING

The proposed development sewage load and connection point was created in a new InfoSWMM SA model. The receiving DN225/300/375 gravity mains to PS BP02 and DN150/225 gravity mains to PS BP11 were created based on TCC online GIS map data. The ultimate catchment and proposed development additional sewage loads were added to the model and run under PWWF conditions to simulate a 3-day to assess the capacity in the gravity mains. The pump stations were modelled as an outflow node to represent conveyance of all incoming flows as their upgrades have been identified earlier by planned network upgrades. Figures 5 and 6 show a model screenshot of the BP BP02 and PS BP11 receiving gravity mains, respectively.

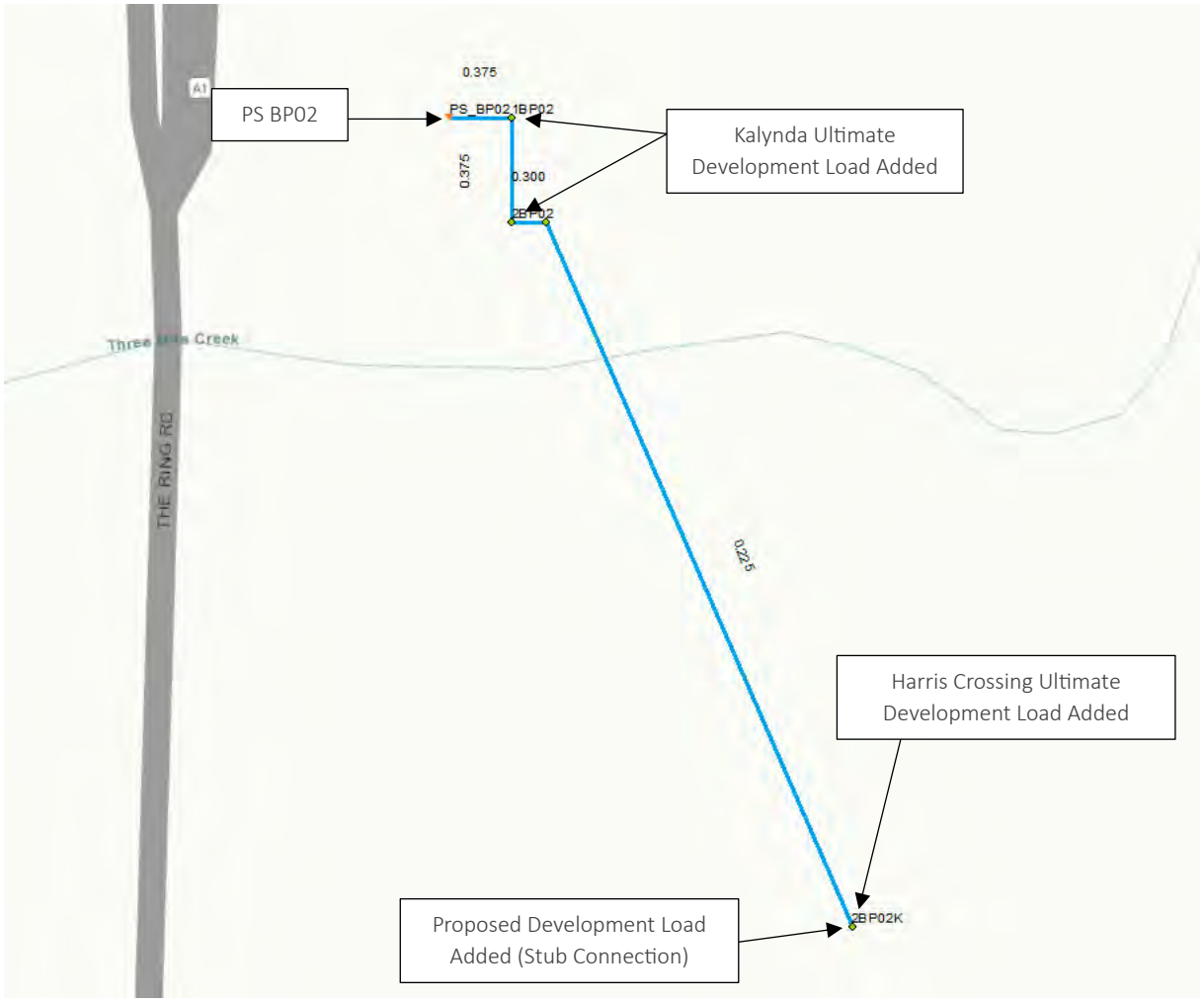


Figure 5: Model Screenshot – Receiving DN225/300/375 Gravity Mains from Development Connection to PS BP02

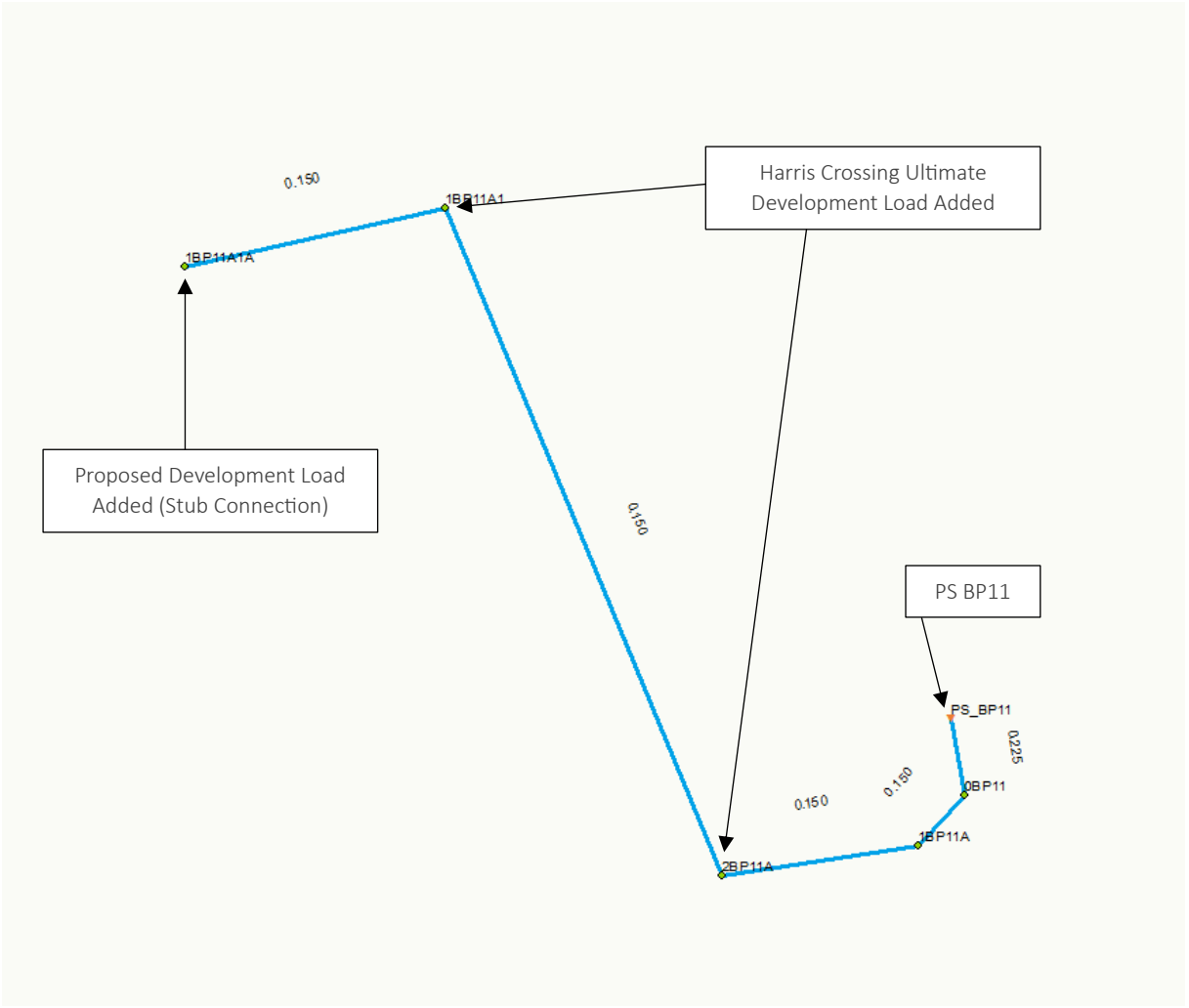


Figure 6: Model Screenshot – Receiving DN150/225 Gravity Mains from Development Connection to PS BP11

5.1 DN225/300/275 TO PS BP02 ULTIMATE MODELLING RESULTS

Figure 7 shows the maximum Hydraulic Grade Line (HGL) of the above line. All sections of pipe will have a flow depth less than 75% which is within acceptable design parameters. Table 4 shows the pipe maximum depths.

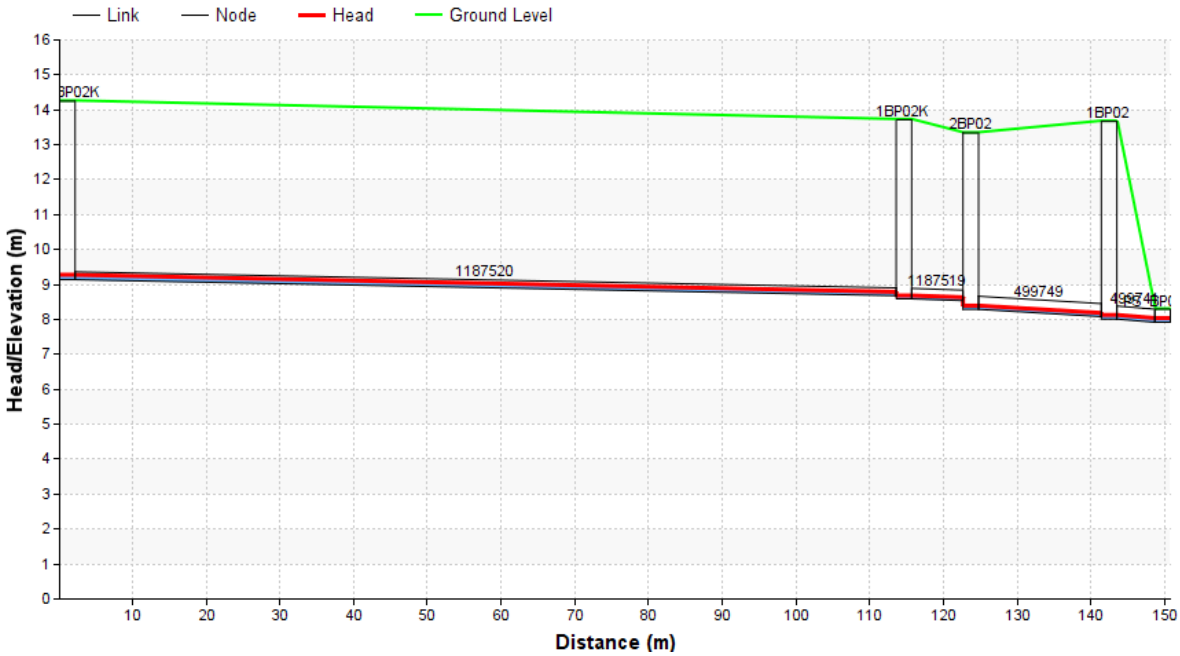


Figure 7: Maximum HGL – DN225/300/375 to PS BP02 – Ultimate PWWF Scenario – Development Added

Table 4: Pipe Maximum Depths – DN225/300/375 to PS BP02 – Ultimate PWWD Scenario – Development Added

ID	Full Depth (m)	Percent Slope (%)	Maximum Flow (L/s)	Max.Depth/Full Depth
1187520	0.225	0.384	17.855	0.556
1187519	0.3	0.667	17.855	0.323
499741	0.375	1.625	50.166	0.322
499749	0.375	1.172	34.011	0.287

5.2 DN150/225 TO PS BP11 ULTIMATE MODELLING RESULTS

Figure 8 shows the maximum Hydraulic Grade Line (HGL) of the above line. Two sections of pipe will flow at full and two sections of pipe will flow above 75% but not full. This is outside the acceptable design parameters. However, this is considered an acceptable operating condition for existing sections of network where mode than 1m freeboard is available at all manholes and there are no overflows. Table 5 shows the pipe maximum depths and Table 6 shows the manhole freeboard levels.

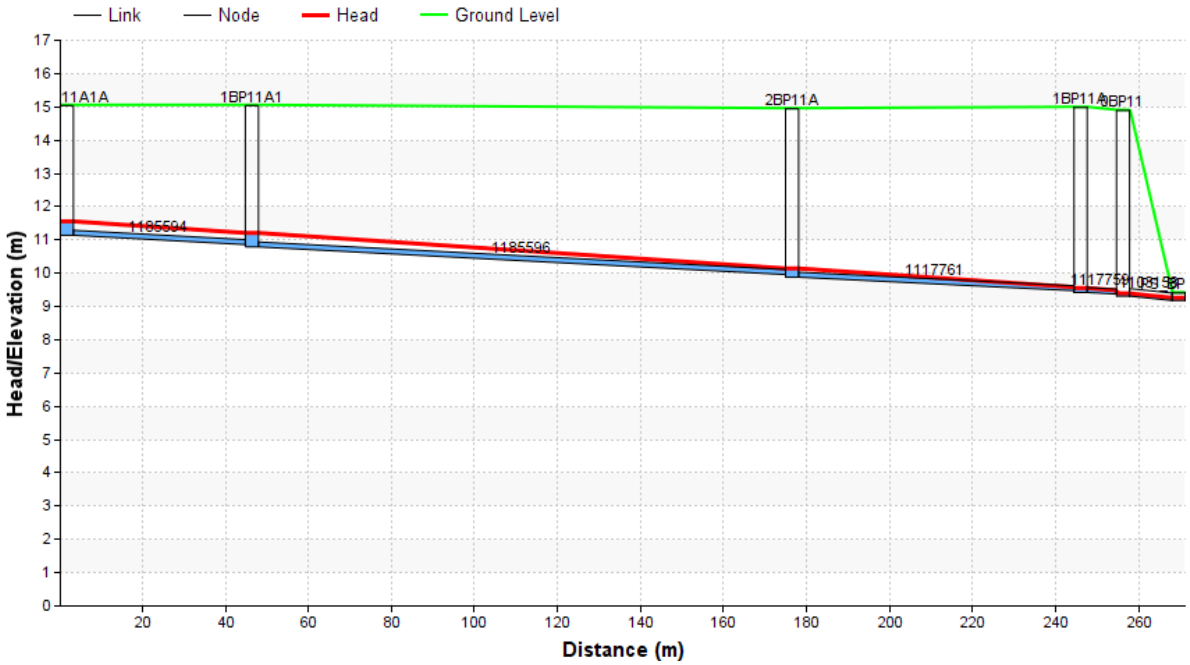


Figure 8: Maximum HGL – DN150/225 to PS BP11 – Ultimate PWWF Scenario – Development Added

Table 5: Pipe Maximum Depths – DN150/225 to PS BP02 – Ultimate PWWD Scenario – Development Added

ID	Full Depth (m)	Percent Slope (%)	Maximum Flow (L/s)	Max.Depth/Full Depth
1185594	0.15	0.628	13.575	1
1185596	0.15	0.607	13.59	1
1117761	0.15	0.569	13.455	0.858
1117759	0.15	0.618	13.455	0.808
1103158	0.225	1.2	13.455	0.357

Table 6: Manhole Freeboard levels – DN150/225 to PS BP02 – Ultimate PWWD Scenario – Development Added

ID	Maximum Depth (m)	Maximum HGL (m)	Freeboard (m)
1BP11A1A	0.422	11.562	3.478
1BP11A1	0.42	11.21	3.83
2BP11A	0.264	10.144	4.796
1BP11A	0.135	9.556	5.424
0BP11	0.082	9.392	5.498

5.3 EXTERNAL SEWERAGE NETWORK INFRASTRUCTURE REQUIREMENTS

Based on the sewer network analysis, there are no gravity main upgrades required in the network to cater for the proposed development connection.

The planned ultimate upgrade to PS BP02 existing pumps will need to account for the proposed development ultimate site load increase by 94 EP (from 420 EP to 514 EP).

PS BP11 existing pumps and wet well needs to be assessed for the proposed development ultimate site load increase from 92.4 EP to 263.3 EP.

6 CONCLUSIONS AND RECOMMENDATIONS

JFP Urban Consultants Pty Ltd was engaged to carry out a sewer network analysis and prepare a report to accompany a Townsville City Council (TCC) Material Change of Use application (MCU24/0094) for a manufactured home site development at 99 Hogarth Drive, Bohle Plains (Lot 1002 SP340654). The manufactured home site comprises 291 home sites, 1 duplex site, 1 club house and 1 summer house.

In particular, the report has been prepared to address Information Request Item 3(a).

The proposed development site is part of the wider Harris Crossing master planned residential estate. The site was planned as 183 residential allotments under the original Master Plan prior to being considered as a manufactured home site.

The conclusions and recommendations of the network analysis are listed below:

- The site is currently within a connection services area with the northern portion in the BP02 pump station catchment and the southern portion in the BP11 pump station catchment.

- The proposed development is in the Mount St John Wastewater Treatment Plant (WWTP) Network catchment. The proposed development will gravitate via new gravity mains to PS BP02 and PS BP11 gravity catchments. Both SPS's pump into a common rising main to PS BP03 at Huntsman Crescent. PS BP03 pumps into a common rising main directly to the WWTP.

  The proposed development northern portion will connect into a stub into existing DN225 gravity mains to PS BP02. The southern portion will connect into a stub into existing DN150 gravity mains to PS BP11.

- Equivalent Persons (EPs) was used as the base unit to determine the expected water demand of the proposed development. The proposed development represents a total 777.3 EP sewage loading.

- Based on the sewer network analysis, there are no gravity main upgrades required in the network to cater the proposed development connection.

- PS BP02 has a planned upgrade to existing pumps to cater the ultimate 3,687.6 EP load from the Kalynda Chase Development and wider Harris Crossing Development.

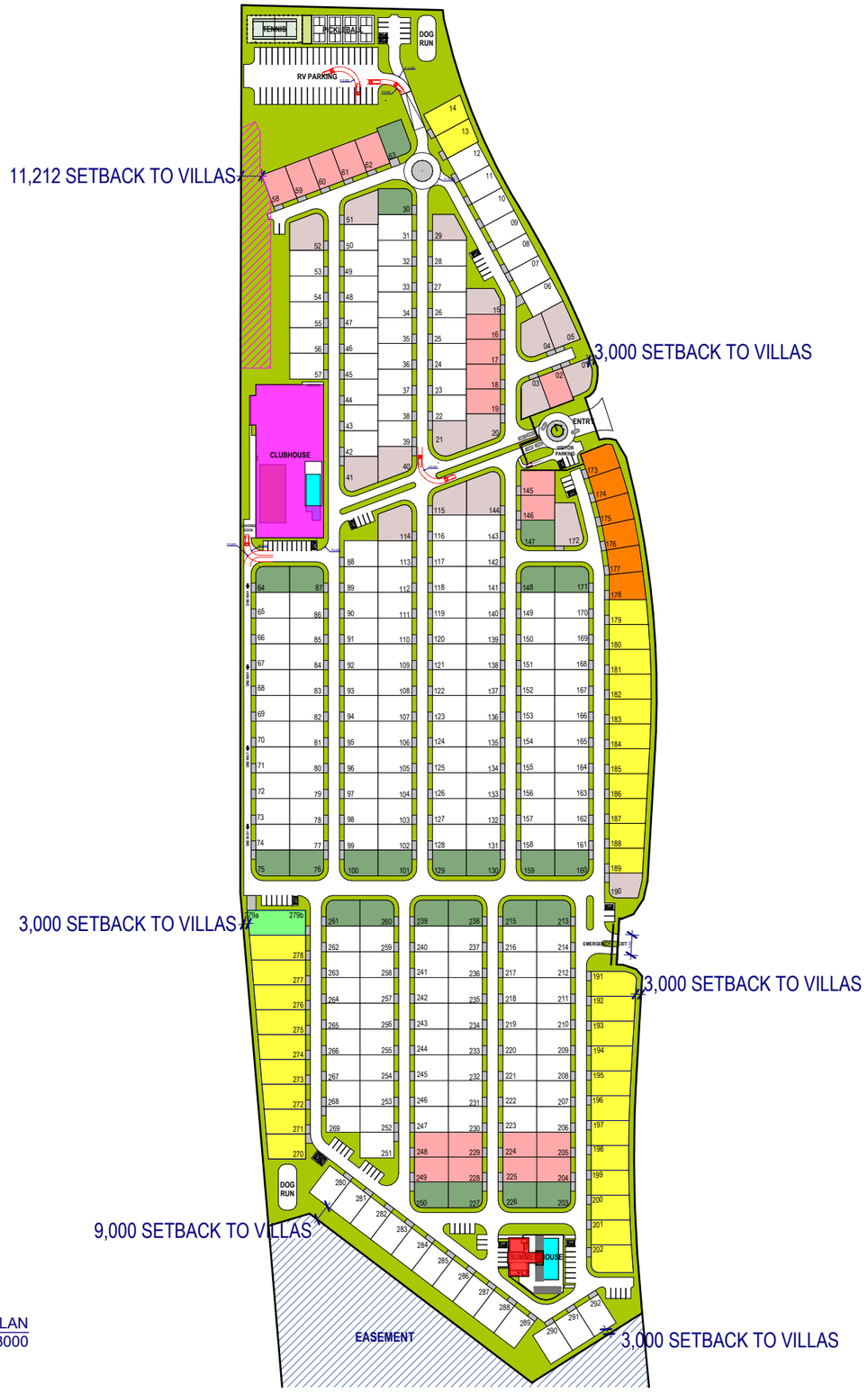
  This ultimate upgrade will need to increase by 94 EP to account for the updated ultimate EP load for the proposed development site (from 420 EP to 514 EP). The duty flow for the ultimate pump station design shall be 50.3l/s based on 3,781.6 EP.

- PS BP 11 existing pumps and wet well needs to be assessed for additional 170.9 EP loading to account for the updated ultimate EP load for the proposed development site (from 92.4 EP to 263.3 EP). This increase would account to 16.9% of the overall SPS catchment. The pump details for the pump station were not available at the time of this report to assess it's existing capacity.

It is recommended that the sewer connection application for the proposed development be approved based on the conclusions and recommendations of this sewer network analysis.

7 APPENDICES

7.1 APPENDIX A: DRAWING NO. SK-005 REV F.2



MASTERPLAN
1:3000

YIELD

TOTAL NUMBER OF LOTS	**292**
LOT SIZE	
14.0m x 21.0m STANDARD LOTS	191
13.5m x 21.0m STANDARD LOTS	20
13.5m x 21.0m+ VARIOUS LENGTH LOTS	34
14m x 21.0m CORNER VILLA LOTS	25
13.5m x 21.0m SPLAYED LOTS	6
SPECIAL LOTS	17
DUPLEX LOT (279a & 279b)	1

STATISTICS

VISITOR CAR PARKING	90
RV PARKING	42
SITE AREA	136,728 m2
SITE COVER	%
TOTAL SITE COVER (LOTS + ROADS + FACILITIES)	%
OPEN SPACE (MIN.DIMENSION OF 2m)	31,700 m^2
SITE PERIMETER	1.778 m^2

AREAS

CLUB HOUSE (UNDER ROOF)	3117m^2
SUMMER HOUSE (INCL. WORKSHOP)	970m^2
DOG RUN STRUCTURES	250m^2
ENTRY STATEMENT & GATE HOUSE	20m^2
TENNIS COURT	450m^2
PICKLEBALL COURT	495m^2

FOR APPROVAL
NOT FOR CONSTRUCTION

PROJECT NO.	HOA23-19
STATUS	CONCEPT
CLIENT	GEMLIFE
DRAWING TITLE :	GENERAL MASTERPLAN
SITE :	HARRIS CROSSING - MASTERPLAN LOT 908 & 1002 ON SP340654 TOWNSVILLE, QLD
REVISION NO.	REV F.2
SHEET SIZE.	A3
DRAWING NO.	SK-005
PLOT DATE:	30/07/2024

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JFP URBAN CONSULTANTS

WATER NETWORK ANALYSIS REPORT

Proposed Manufactured Home Site (Harris Crossing) at
99 Hogarth Drive, Bohle Plains

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M3248_WAT – Revision A
25th November 2024

JFP Urban Consultants Pty Ltd
Prepared by: Rowell Umale
Approved by: Haydn Watson (RPEQ 6200)

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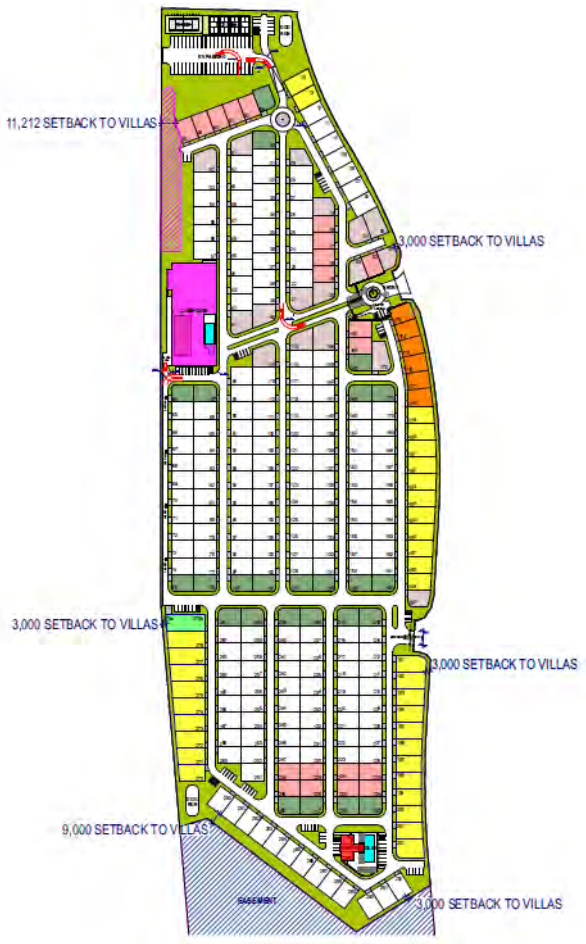

Figure 1: Proposed Manufactured Home Site Layout Plan

2 BACKGROUND

2.1 SITE LOCALITY

The proposed development site covers 13.6 ha and has a relatively flat grade ranging in elevation from 14m AHD to 15.5m AHD with an 11m AHD low point at the northern corner of the site. The existing site consists of vacant plains with moderate bushland in the northern corner. The site adjoins by bushland reserve to the north. The Ring Road is located to the west, Hogarth Drive to the east and bushland reserve/residential allotments to the south. The site is currently within a connection services area. Figure 2 shows the site locality.

Figure 2: Proposed Manufactured Home Site Locality

Figure 3 shows an aerial view of the site with contours.

Figure 3: Proposed Manufactured Home Site Aerial View with Contours

2.2 EXISTING WATER NETWORK & CONNECTION POINT

The proposed development site is in The Ring Road general servicing area which comprises the wider Harris Crossing residential development and the Kalynda Chase residential development. The area is fed via parallel DN 375/DN 300 trunk water mains from Shaw Road to the north and multiple links to a trunk DN375 water main in Hervey Range Road to the south. The network is shown in Figure 4.

Figure 4: The Ring Road General Servicing Area Water Network

Near the vicinity of the site there is a DN300 water main along Hogarth Drive. The TCC RFI included an Advice Note detailing the proposed development site water service to connect to this water main as shown in Figure 5. The Advice Note reads as follows:

"A DN150 water main is proposed to be installed as part of existing approval OPW24/0014 (Harris Crossing Stage 14) adjacent to the Hogarth Drive / Dunraven Boulevard roundabout, which will supply water to this development. At the time of writing this water main has not been constructed, and it would be prudent to confirm if this main is required to be upsized to accommodate the development before it is installed."

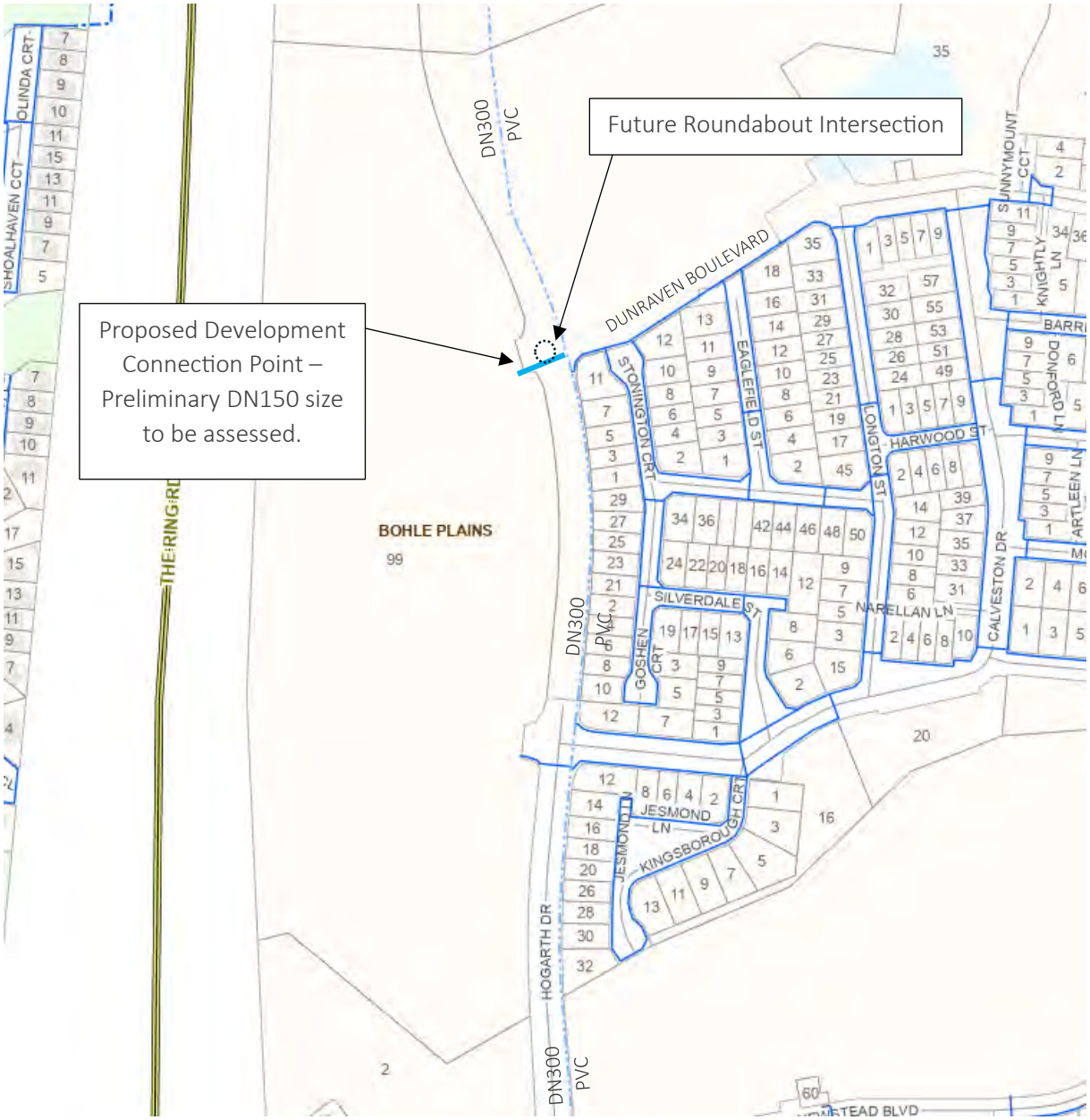

Figure 5: Water Network Mains near Proposed Development Site & Connection Point

A boundary conditions request was issued to TCC for critical boundary pressure at the connection point to the DN300 water main at Dunraven Boulevard to enable the network analysis. The boundary pressure to be adopted for the analysis was 456 kPa or 45.6m. A copy of the Boundy Condition Advice is attached in Appendix B.

3 WATER DEMAND ESTIMATE

Equivalent Persons (EPs) was used as the base unit to determine the expected water demand of the proposed development. The FNQROC Water Guidelines specifies the following EP conversion rates.

- 2.5 EP per Single Family Dwelling (<400m2)
- 2.2 EP per Multi Unit Accommodation (3 bedrooms)
- 1 EP per 90m^2 GFA

Table 1 summarises the EP calculation for the proposed development based on the figures above.

Table 1: Summary of Proposed Development Water EP Estimate

Description	Yield	EP Rate	Type	EP				
				2021	2026	2031	2036	Ultimate
Home Site	291	2.5 EP per Home Site (Single Family Dwelling (<400m^2)	Res	727.5	727.5	727.5	727.5	727.5
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Club House	3,117 m^2 GFA	1 EP per 90m^2 GFA (Shops/Offices)	Non-res	34.6	34.6	34.6	34.6	34.6
Summer House	970 m^2 GFA	1 EP per 90m^2 GFA (Shops/Offices)	Non-res	10.8	10.8	10.8	10.8	10.8
			Total Res EP	731.9	731.9	731.9	731.9	731.9
			Total Non-Res EP	45.4	45.4	45.4	45.4	45.4
			Total Proposed EP	**777.3**	**777.3**	**777.3**	**777.3**	**777.3**

4 WATER DESIGN PARAMETERS

The water network was modelled in accordance with the FNQROC CTM Water Alliance Design and Construction Code design parameters as listed below:

Peaking Factors

Average Day Demand (AD)	= 670 L/EP/day for residential
Peak Day (PD) to AD ratio	= 1.875
Peak Hour (PH) to AD ratio	= 4.15
Diurnal Pattern	= As listed in TCC LGIP Schedule SC6.4.11

Peak Hour Flow

Minimum Residual Pressure	= 22m
Maximum Pressure	= 80m
Maximum velocity in main	< 2.5 m/s
Maximum allowable headless	< 5m/km for DN<=150 < 2.5m/km for DN>=200
Hazen Williams Friction Factor	= 100 for <=150mm = 110 for >150mm

Fire Fighting (TCC Network)

Fire Flow at 2/3 PH Background	=30 l/s for commercial and industrial developments =15 l/s for residential developments = 7.5 l/s for rural residential developments
Minimum Residual Pressure at the hydrant	= 12m
Minimum Pressure elsewhere	= 6m
Maximum velocity in main	< 2.5 m/s

Fire Fighting (Internal Network – Plumbing)

Fire Flow Residential Class Buildings	= 10 l/s
Minimum Residual Pressure at the hydrant	= 20m
Fire Flow Commercial Class Buildings	= 20 l/s
Minimum Residual Pressure at the hydrant	= 20m

5 WATER HYDRAULIC MODELLING

The proposed development water connection point and a preliminary internal water main layout was created in a new InfoWater SA model to assess the development PD operational pressures and fire flow demand residual pressures. A DN150 external water main connection was created and a fixed-head reservoir was introduced to simulate the critical boundary pressure on the DN300 connection point at Dunraven Boulevard at 45.6m. Figure 6 shows a model screenshot of the nodes and pipes and Table 2 shows a summary of the node demands and elevations.

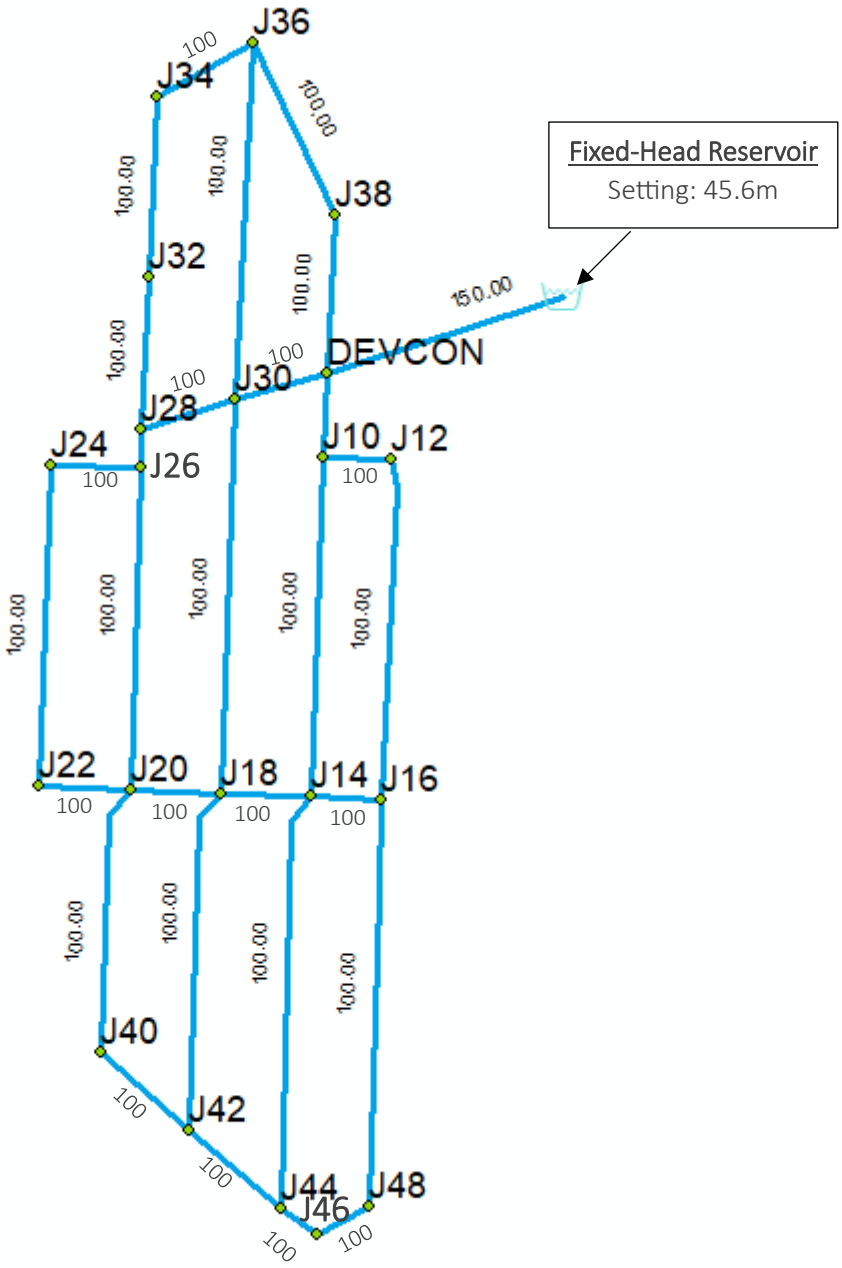


Figure 6: Model Screenshot Development Nodes and Preliminary Water Main Diameters

Table 2: Summary of Development Node Demands

Node ID	Water Demand			Elevation (m AHD)	Fire Flow Demand (l/s)
	Description	EP	Diurnal Pattern		
DEVCON	Nil	Nil	Nil	14.2	30
J28	3,117m GFA Club House	34.6	Commercial	13.3	20
J46	970m GFA Summer House	10.8	Commercial	14	20
J10	18 Home Site	45	Residential	14.1	10
J12	18 Home Site	45	Residential	14	10
J14	20 Home Site	50	Residential	14.1	10
J16	17 Home Site	42.5	Residential	13.6	10
J18	20 Home Site	50	Residential	14.2	10
J20	19 Home Site 1 Duplex	51.9	Residential	14.4	10
J22	6 Home Site	15	Residential	15	10
J24	6 Home Site	15	Residential	13.2	10
J26	13 Home Site	32.5	Residential	13.2	10
J30	24 Home Site	60	Residential	14.2	10
J32	10 Home Site	25	Residential	12.3	10
J34	11 Home Site	27.5	Residential	12.2	10
J36	21 Home Site	52.5	Residential	11.2	10
J38	14 Home Site	35	Residential	14	10
J40	12 Home Site	30	Residential	14.2	10
J42	18 Home Site	45	Residential	14.2	10
J44	21 Home Site	52.5	Residential	13.7	10
J48	23 Home Site	57.5	Residential	14.3	10
	Total	777.3			

5.1 WATER MODELLING RESULTS

Figure 7 shows the pressure profile for new junctions representing the proposed development during PD scenario with new demands added. The minimum PD operational pressure at the connection point will be 28.53m and internally pressures will range from 25.02m to 35.2m. This meets the minimum service requirements of 22m.

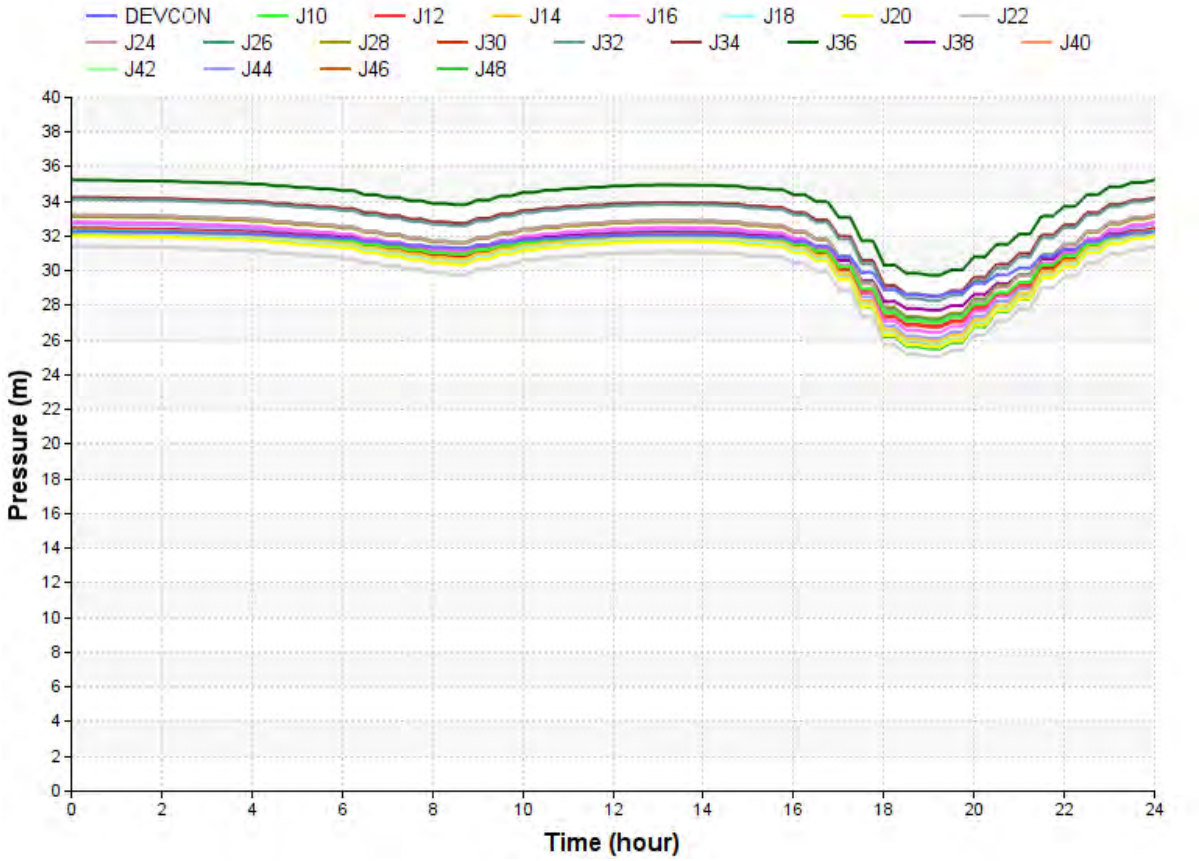


Figure 7: Operational Pressures – Proposed Development – PD Scenario

Table 3 shows the residual pressures for new junctions during a fire-fighting demand scenario at 2/3 background demand (6:00am). All nodes will have more than the minimum required 20m residual pressure under fire-fighting scenario.

Table 3: Residual Pressures – Proposed Development – PD Fire Flow Demand Scenario (6:00AM)

ID	Static Demand (L/s)	Fire-Flow Demand (L/s)	Residual Pressure (m)
DEVCON	0	30	25.2
J28 (Club House)	0.41	20	24.85
J46 (Summer House)	0.13	20	20.15
J22	0.18	10	27.01
J48	0.68	10	27.05
J40	0.35	10	27.42
J42	0.53	10	27.77
J44	0.62	10	28.15
J20	0.61	10	28.19
J18	0.59	10	28.51
J14	0.59	10	28.58
J12	0.53	10	28.63
J16	0.5	10	28.85
J24	0.18	10	28.87
J38	0.41	10	29.15
J10	0.53	10	29.18
J30	0.71	10	29.21
J26	0.38	10	29.53
J32	0.29	10	29.95
J34	0.32	10	30.14
J36	0.62	10	31.68

6 CONCLUSIONS AND RECOMMENDATIONS

JFP Urban Consultants Pty Ltd was engaged to carry out a water network analysis and prepare a report to accompany a Townsville City Council (TCC) Material Change of Use application (MCU24/0094) for a manufactured home site development at 99 Hogarth Drive, Bohle Plains (Lot 1002 SP340654). The manufactured home site comprises 291 home sites, 1 duplex site, 1 club house and 1 summer house.

In particular, the report has been prepared to address Information Request Item 3(a).

The proposed development site is part of the wider Harris Crossing master planned residential estate. The site was planned as 183 residential allotments under the original Master Plan prior to being considered as a manufactured home site.

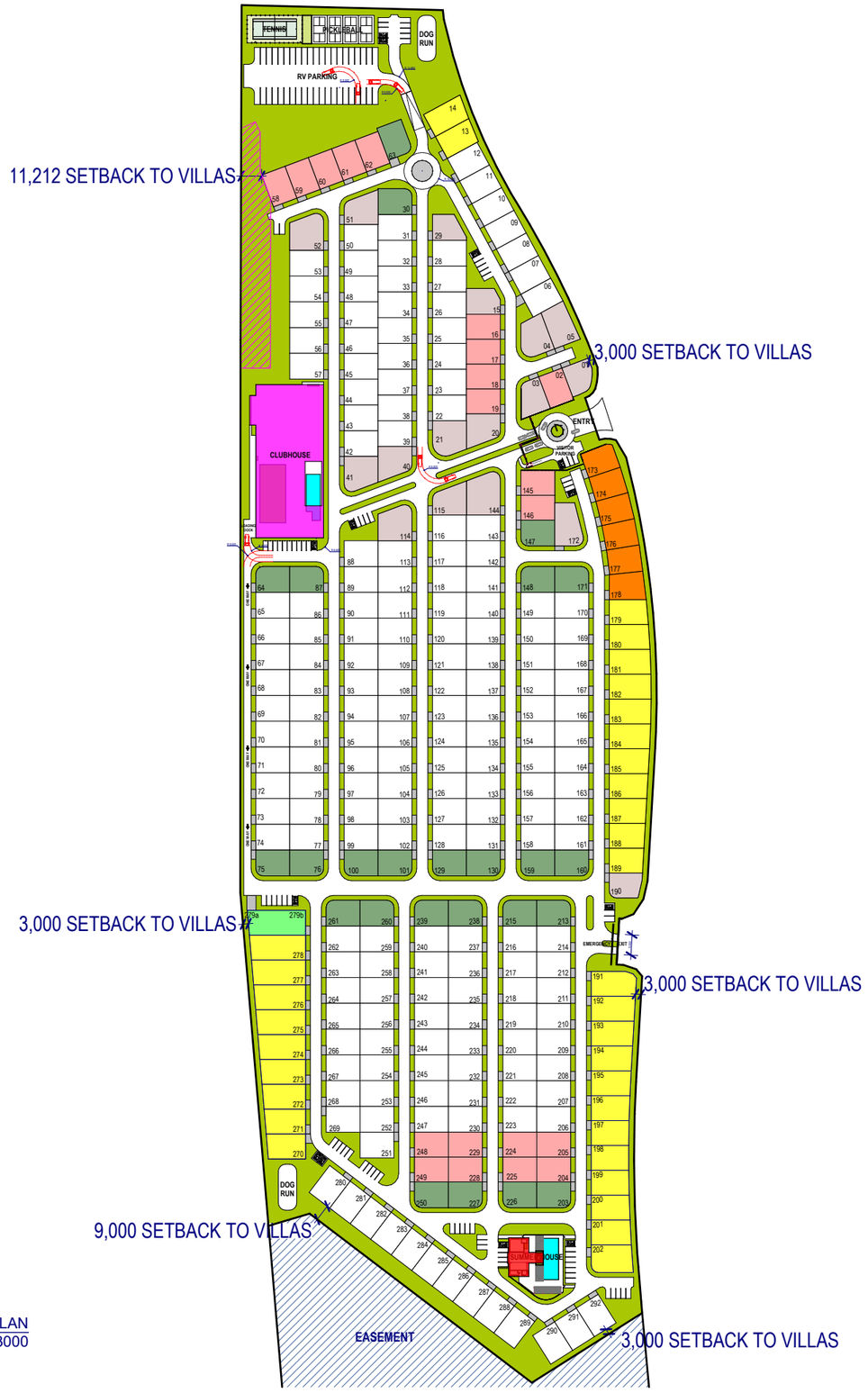
The conclusions and recommendations of the network analysis are listed below:

- The site is currently within a connection services area.
- The proposed development site is in The Ring Road general servicing area which comprises the wider Harris Crossing residential development and the Kalynda Chase residential development. The area is fed via parallel DN 375/DN 300 trunk water mains from Shaw Road to the north and multiple links to a trunk DN375 water main in Hervey Range Road to the south.
- Near the vicinity of the site there is a DN300 water main along Hogarth Drive. The TCC RFI included an Advice Note detailing the proposed development site water service to connect to this water main with a DN150 water main.
- A boundary conditions request was issued to TCC for critical boundary pressure at the connection point to the DN300 water main at Dunraven Boulevard to enable the network analysis. The boundary pressure to be adopted for the analysis was 456 kPa or 45.6m.
- Equivalent Persons (EPs) was used as the base unit to determine the expected water demand of the proposed development. The proposed development represents a total 777.3 EP water demand.
- Based on the water modelling results, there are no external water network augmentations required to cater the proposed development and the preliminary DN150 water connection is of adequate size to provide minimum Peak Day operational pressures and fire flow demand residual pressures at the development connection point and throughout the development internal water mains.

Is it recommended that TCC approve the connection application for the proposed development based on the conclusions and recommendations of this network analysis.

7 APPENDICES

7.1 APPENDIX A: DRAWING NO. SK-005 REV F.2



MASTERPLAN
1:3000

YIELD

TOTAL NUMBER OF LOTS	**292**
LOT SIZE	
14.0m x 21.0m STANDARD LOTS	191
13.5m x 21.0m STANDARD LOTS	20
13.5m x 21.0m+ VARIOUS LENGTH LOTS	34
14m x 21.0m CORNER VILLA LOTS	25
13.5m x 21.0m SPLAYED LOTS	6
SPECIAL LOTS	17
DUPLEX LOT (279a & 279b)	1

STATISTICS

VISITOR CAR PARKING	90
RV PARKING	42
SITE AREA	136,728 m2
SITE COVER	%
TOTAL SITE COVER (LOTS + ROADS + FACILITIES)	%
OPEN SPACE (MIN.DIMENSION OF 2m)	31,700 m^2
SITE PERIMETER	1.778 m^2

AREAS

CLUB HOUSE (UNDER ROOF)	3117m^2
SUMMER HOUSE (INCL. WORKSHOP)	970m^2
DOG RUN STRUCTURES	250m^2
ENTRY STATEMENT & GATE HOUSE	20m^2
TENNIS COURT	450m^2
PICKLEBALL COURT	495m^2

FOR APPROVAL
NOT FOR CONSTRUCTION

PROJECT NO.	HOA23-19
STATUS	CONCEPT
CLIENT	GEMLIFE
DRAWING TITLE :	GENERAL MASTERPLAN
SITE :	HARRIS CROSSING - MASTERPLAN LOT 908 & 1002 ON SP340654 TOWNSVILLE, QLD
REVISION NO.	REV F.2
SHEET SIZE.	A3
DRAWING NO.	SK-005
PLOT DATE:	30/07/2024

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QBCC 15 122 439
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PO Box 3080, Southport BC QLD 4215
+61 7 55602100
SOLISESTUDIO.COM.AU
SOLIS ESTUDIO

7.2 APPENDIX B: TCC NETWORK MODEL BOUNDARY CONDITIONS RESPOSNE

Appendix A Form for provision of Water Network Boundary Condition Advice

This form can be modified to suit individual applications. The form is for the provision of boundary condition advice by TCC in response to a request for boundary conditions by an external stakeholder via Form M1: Request for Network Modelling Information

Date: 12/11/2024 TCC Reference: **FM24/0019**

Application details:

Name:	**ROWELL UMALE** @ **JFP URBAN CONSULTANTS**
Contact No:	0433 952 999
Development name and address:	Relocatable Home Park, Harris Crossing, Bohle Plains
Development type:	MCU24/0094

Water boundary condition advice:
Townsville City Council will provide the peak hour boundary conditions. Any modelling and analysis will need to be completed by the applicant's engineering team.

Relocatable Home Park, Harris Crossing, Bohle Plains

Location:	J-AE-1879 Southeast of Hogarth Dr and Dunraven Blvd future roundabout
	Water pressure (kPa)
Peak hour	456 kPa
Peak hour fireflow	438 kPa @ 10L/s 429 kPa @ 15L/s 421 kPa @ 20L/s

Note: these are theoretical values and it is the responsibility of the applicant to verify values via flow and pressure test undertaken on site during peak hour at the closest point to the development.

Advice conditions:

- At no time does the supplying of theoretical data from the Townsville City Council hydraulic network model/s lessen the applicant's responsibility for the quality andintegrity of their analysis.
- Townsville City Council cannot guarantee water pressures and flows in excess of itspublished service standards.
- The information provided is based on the best available information at the time of publication and is subject to variation over time.
- Network models are verified with limited data and conditions in the field may vary from modelling assumptions.
- Field investigations and inspections should be undertaken to satisfy the user that the data is suitable for its intended purpose.

- Tests should also be undertaken during peak demand periods to verify existing conditions within the network.
- Users relying on hydraulic modelling information do so at their own risk.

Hydraulic designers shall also note:

- Pressure in the network can fluctuate due to a large number of factors:
  - Normal daily variations due to time of day water use patterns, tank water level fluctuations, hydraulic transients, valve operation, and cycling of pumps.
  - Short-term emergencies due to fires, pipe breaks, system components out of service for rehabilitation and repair, power outages, and flows from sprinklers to fight fires.
  - Long-term system changes due to water main construction, changes in pressure regulating valve settings, addition of new pumps, corrosion and scale in piping, and changes in pressure zone boundaries.
  - Long-term variations in water use patterns, including new users and changes in usage for existing users.

APPENDIX D

Updated Masterplan

HARRIS CROSSING DEVELOPMENT

HARRIS CROSSING - MASTERPLAN

LOT 908 & 1002 ON SP340654 TOWNSVILLE, QLD

TRANSMITTAL

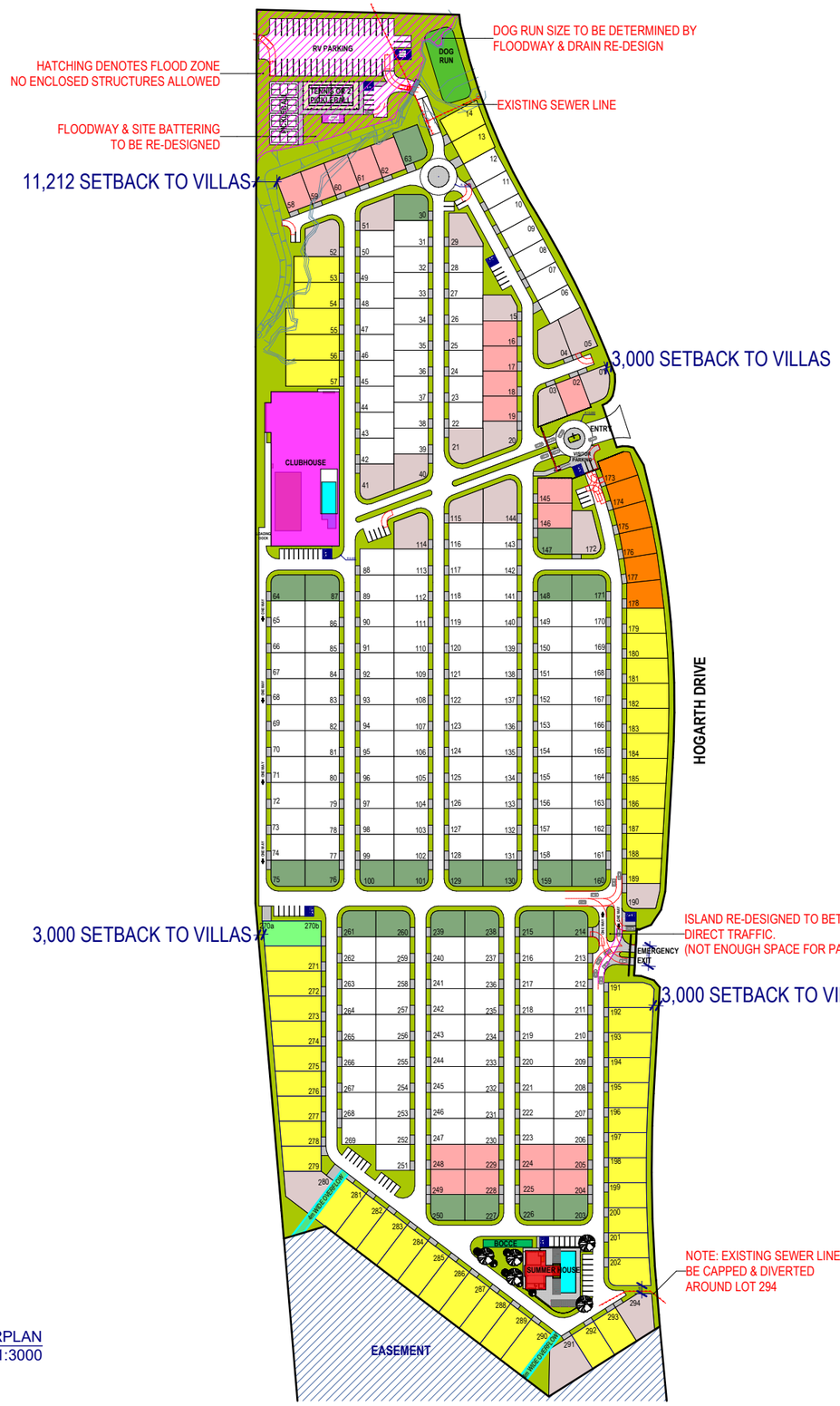
30/07/2024

SOLIS ESTUDIO

KEY **FA** - FOR APPROVAL **AP** - APPROVED **FC** - FOR CONSTRUCTION **FCO** - FOR COORDINATION **REV** - REVISION **TEN** - TENDER

DISTRIBUTION		CLIENT GEMLIFE	CERTIFIER	CIVIL	HYDRAULIC	LANDSCAPE	MECHANICAL	PLANNER	SERVICES	STRUCTURAL	CONTRACTOR	TRAFFIC	
26.06.24		FA											
04.07.24		FA	FA	FA		FA						FA	
24.07.24		FCO		FCO									
30.07.24		FCO		FCO									
09.08.24		FCO											
13.08.24		FCO										FA	
11.11.24		REV G											
12.11.24		REV G.1											
27.11.24		REV H											

REF	DRAWING TITLE	Revision
000	TRANSMITTAL	H
SK-005	MASTERPLAN	H
SK-006	MASTERPLAN + CONTOURS	H



YIELD

TOTAL NUMBER OF LOTS	**294**
LOT SIZE	
14.0m x 21.0m STANDARD LOTS	171
13.5m x 21.0m STANDARD LOTS	20
13.5m x 21.0m+ VARIOUS LENGTH LOTS	51
14m x 21.0m CORNER VILLA LOTS	25
13.5m x 21.0m SPLAYED LOTS	6
SPECIAL LOTS	20
DUPLEX LOT (279a & 279b)	1

STATISTICS

VISITOR CAR PARKING	72
RV PARKING	42
SITE AREA	136,728 m^2
SITE COVER	77%
TOTAL SITE COVER (LOTS + ROADS + FACILITIES)	104,880m^2
OPEN SPACE (MIN.DIMENSION OF 2m)	32,165 m^2
SITE PERIMETER	1.778 m^2

AREAS

CLUB HOUSE (UNDER ROOF)	3117m^2
SUMMER HOUSE (INCL. WORKSHOP)	970m^2
DOG RUN STRUCTURES	600m^2
ENTRY STATEMENT & GATE HOUSE	20m^2
TENNIS COURT	525m^2
PICKLEBALL COURT	450m^2

FOR APPROVAL

NOT FOR CONSTRUCTION

PROJECT NO.	HOA23-19
STATUS	CONCEPT
CLIENT	GEMLIFE
DRAWING TITLE :	GENERAL MASTERPLAN
SITE :	HARRIS CROSSING - MASTERPLAN LOT 908 & 1002 ON SP340654 TOWNSVILLE, QLD
REVISION NO.	REV H
SHEET SIZE.	A3
DRAWING NO.	SK-005
PLOT DATE:	27/11/2024

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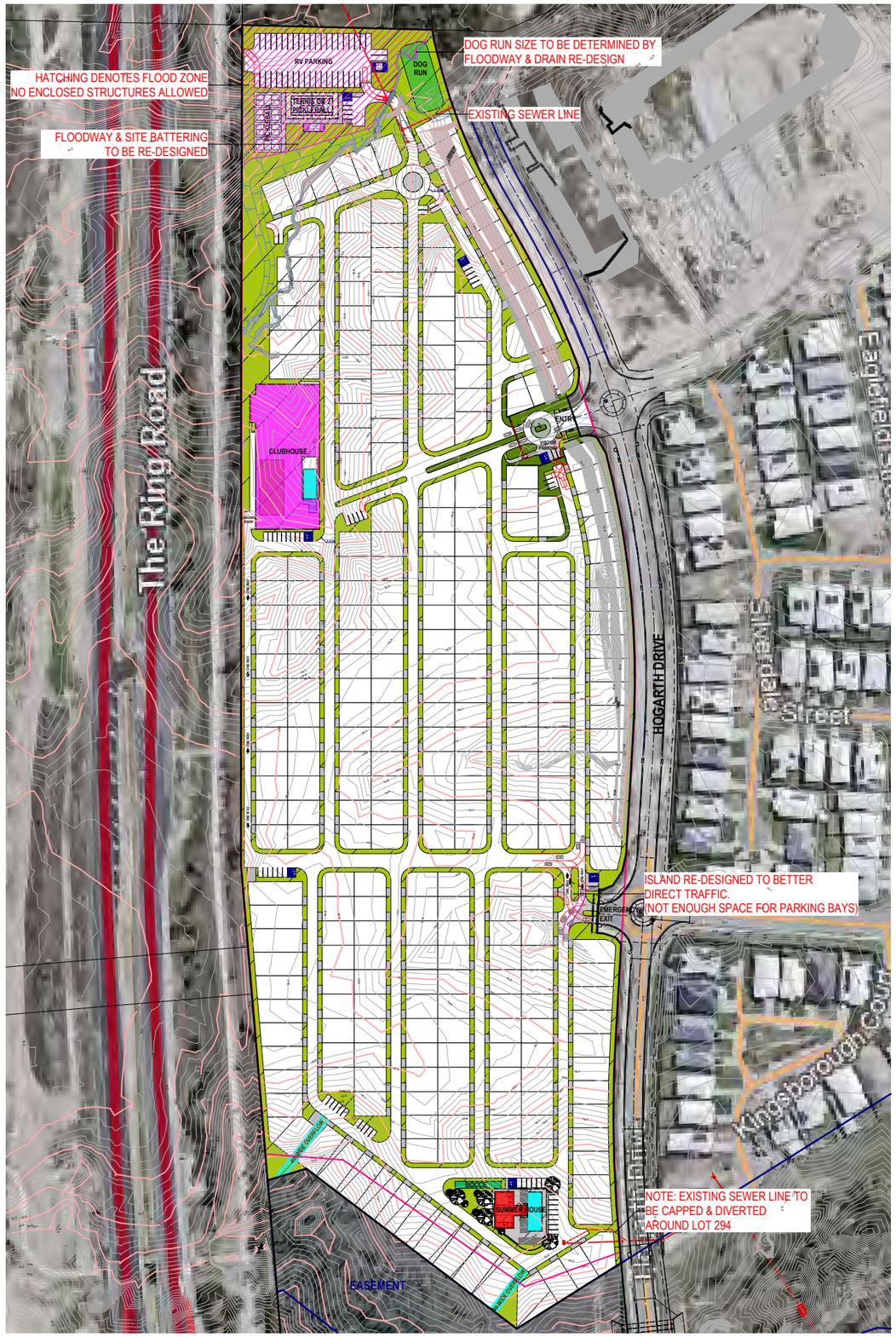

MASTERPLAN + CONTOURS
1:3000

FOR APPROVAL
NOT FOR CONSTRUCTION

PROJECT NO.	HOA23-19
STATUS	CONCEPT
CLIENT	GEMLIFE
DRAWING TITLE :	GENERAL MASTERPLAN + CONTOURS
SITE :	HARRIS CROSSING - MASTERPLAN LOT 908 & 1002 ON SP340654 TOWNSVILLE, QLD
REVISION NO.	REV H
DRAWING NO.	SK-006
SHEET SIZE.	A3
PLOT DATE:	27/11/2024

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