

Client Ref: Lendlease

05 September 2023

Lendlease
Kingsgate, Kings Street, 2 King Street
BOWEN HILLS, QLD 4006

Attention: Jack Trevillian

Dear Jack,

Yarrabilba – Water Supply and Sewerage Servicing Strategy/Solution for Revised Precinct 4G

The report 'Yarrabilba Precinct 5 Precinct Network Plan (PNP) – Water and Wastewater Infrastructure, January 2018' outlining the ultimate and interim water supply and service strategy for Yarrabilba was endorsed by Economic Development Queensland (EDQ) and Logan City Council (LCC) in 2018. Since the approval of this report, the precinct boundaries have been rearranged and Precinct 5 has essentially been amended to Precinct 4 (see Figure 1 below).

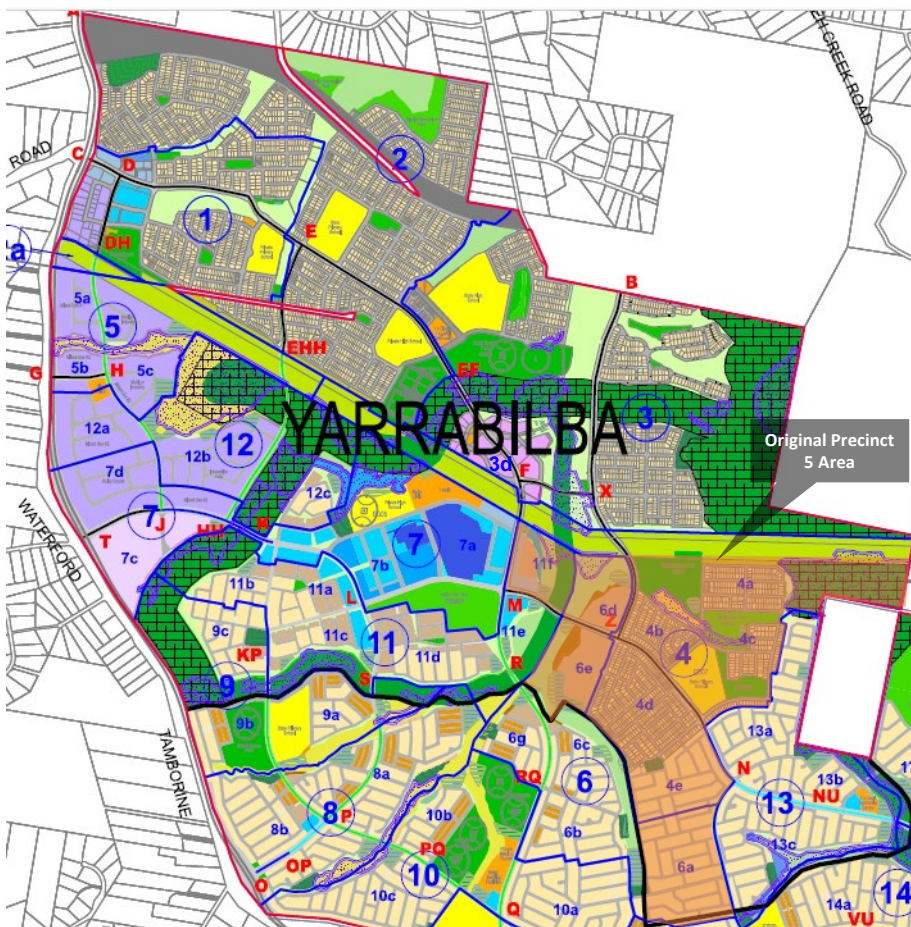


Figure 1 Revised Precinct 4 and 6 Villages Boundaries in Technical Memorandum (28/04/2022)

**PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL**

Approval no: DEV2023/1441

Date: 29 February 2024



Another technical memorandum, dated 28/04/2022 (2022 technical memorandum) and is provided as the Appendix A, documents the revision of the Precinct 5 village extents and renumbering along with the updated equivalent population (EP) projection, the outcomes of LCC water model operational checks and the revision of capacity assessment for the sewerage system.

Lendlease now intends to launch development application for the area Precinct 4G, which was originally named as 'Precinct 6E' in the above technical memorandum. The letter provides the revision of Precinct 4G contents and the revised population calculation (in terms of EP), as well as the water supply and sewerage collection strategy and detailed reticulation sizes proposed for the Precinct 4G.

1. Locality and Contents of Precinct 4G

The revised Precinct 4G (was named as Precinct 6E) is located to the south of Wentland Avenue and to the west of Diamond Drive in Yarrabilba. The area comprises of 5.8 ha or 116 lots of residential development and detention basin and parklands (shown in Figure 2)

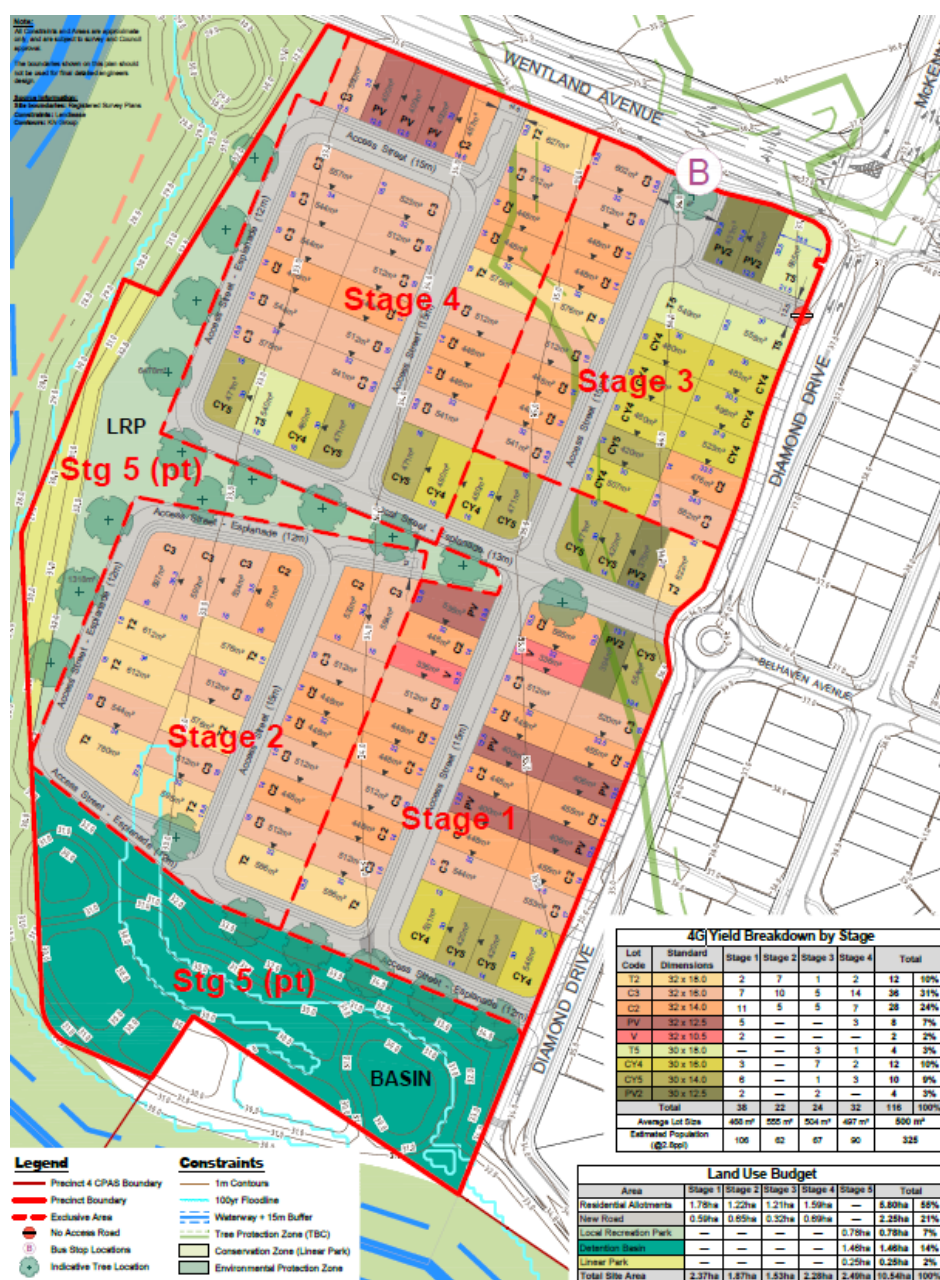


Figure 2 Locality and Development Contents of Precinct 4G

2. Revised Population and Timing

The 2022 technical memorandum assumed 107 attached residential lots or 190 EP in the Precinct 4G. The number was revised as 116 detached residential lots or 325 EP in the Precinct 4G application. Lendlease will launch the application now (September 2023) and anticipate the sale activities will start around the second half of 2024.

A summary of the population in Precincts 1 to 6 and Town Centre Stage 1 is provided in Table 1 and Table 2.

Table 1: Estimated 2026 Water EP for Precincts 1, 2, 3, 4, 5A, 6A, 6 ROL 1 and Precinct 4G

Precinct /Village	Residential Detached	Residential Attached	Commercial/Em ployment/Retail/ Community	Education	Total EP	Estimated 2026 EP*
1	1,658	110	375	101	2,244	2,244
2	5,432	320	0	392	6,144	6,144
3A	605	255	98	214	1,118	1,118
3B	1,249	59	0	0	1,308	1,308
3C	610	0	0	0	610	610
3D	0	0	317	0	317	317
4A	430	35	0	0	465	465
4B	405	33	0	133	571	571
4C	303	24	0	0	328	303
4E/6A	1,725	139	0	0	1,864	1,864
4D	1,021	82	0	0	1,104	1,104
5A MIBA North	0	0	393	0	393	393
4G (previously 6E)	325	0	0	0	325	325
6 ROL 1	1,492	52	0	0	1,544	1,544
Total	15,255	1,109	1,129	840	18,344	18,344

*: Based on development approvals up to and including 2026.

Table 2: Estimated 2022 Sewerage EP for Precincts 1, 2, 3, 4, 5A, 6A, 6 ROL 1 and Precinct 4G

Precinct	Residential Detached	Residential Attached	Commercial/Em ployment/Retail/ Community	Education	Total EP	Estimated 2026 EP*
1	1,658	110	460	101	2,329	2,329
2	5,432	320	0	392	6,144	6,144
3A	605	255	55	214	1,129	1,129
3B	1,249	59	0	0	1,308	1,308
3C	610	0	0	0	610	610
3D	0	0	390	0	390	390
4A	430	35	0	0	465	465
4B	405	33	0	133	571	571
4C	303	24	0	0	328	303
4E/6A	1,725	139	0	0	1,864	1,864
4D	1,021	82	0	0	1,104	1,104
5A MIBA North	0	0	393	0	393	393

Precinct	Residential Detached	Residential Attached	Commercial/Em ployment/Retail/ Community	Education	Total EP	Estimated 2026 EP*
4G (previously 6E)	325	0	0	0	325	325
6 ROL 1	1,492	52	0	0	1,544	1,544
Total	15,255	1,109	1,389	840	18,593	18,593

*: Based on development approvals up to and including 2026.

3. Water Service Strategy Revision and Revised Water Reticulation Network

The ultimate pressure management areas (PMA), network size and layout required for servicing entire Precinct 4G were approved in the 2018 endorsed report assessment. The interim water supply scenarios for Precinct 4G were also assessed by the Yarrabilba Precinct 6 ROL 1 Sub-Precinct Network plan – Water and Wastewater Infrastructure report dated August 2023 (P6 ROL 1 SPNP report). The interim solution was provided in section 4 of P6 ROL 1 SPNP report. These two assessments and outcomes are not included in this memorandum.

The revised water reticulation network is shown in Figure 3.



Figure 3 Water Reticulation Network for Precinct 4G

4. Sewerage Service Strategy Revision and Revised Water Reticulation Network

Sewage generated by the Precinct 4G development will be collected by the pumping station SPS153 network, then pumped to the pumping station SPS 084. Flow from SPS 084 is transferred to the Loganholme STP catchment via the Chambers Flat pumping station. The ultimate internal trunk and reticulation sewerage infrastructure within the Yarrabilba development boundary was approved in the 2018 endorsed report assessment and would not be accessed again in the letter.

The combined design flow for Precinct 4G are as follows:

- ADWF of 0.6 L/s; and
- PWWF of 3.8 L/s.

The interim sewerage service strategy for Precinct 4G was also addressed in Section 5.2 of the P6 ROL 1 SPNP report and is not included in this memorandum.

5. Conclusions

The revised Precinct 4G water and sewerage EP is increased 190 to 325 EP by comparing with the 2022 technical memorandum. The revised water supply reticulation network of Precinct 4G is provided as Figure 3.

The revised population and timing have been assessed by the P6 ROL 1 SPNP report, and both the ultimate and interim water and sewerage solutions were provided.

Please do not hesitate to contact the undersigned if you require any clarification on this assessment.

Yours sincerely

Henry Lin

Stantec Australia Pty Ltd

Appendix A – 2022 Technical Memorandum

Client Ref: Lendlease

28 April 2022

Lendlease
Kingsgate, Kings Street, 2 King Street
BOWEN HILLS, QLD 4006

Attention: John Kibble

Dear John,

Yarrabilba – Water Supply and Sewerage Servicing Strategy for Revised Precinct 4

The report 'Yarrabilba Precinct 5 Precinct Network Plan (PNP) – Water and Wastewater Infrastructure, January 2018' outlining the ultimate and interim water supply and service strategy for Yarrabilba was endorsed by Economic Development Queensland (EDQ) and Logan City Council (LCC) in 2018. Since the approval of this report, the precinct boundaries have been rearranged and Precinct 5 has essentially been amended to Precinct 4 (refer to Section 1 below). Lendlease now intends to launch development applications for the balance of the original Precinct 5 area in Q1 to Q2 of 2022.

This letter documents the revision of the Precinct 5 village extents and renumbering along with the updated equivalent population (EP) projection, the outcomes of LCC water model operational checks and the revision of capacity assessment for the sewerage system.

A meeting was held with EDQ and LCC on 16/02/2022 to confirm the scope, approaches / methodology for this assessment to ensure that the needs of all parties could be delivered.

1. Revision of Numbering for Precincts 3D, 4, 6 (Partial) and 11 (Partial)

Lendlease revised the numbering of Precincts and villages after endorsement of PNP report. The revised Precinct 3D, 4, 6 and 11 boundaries are shown in Figure 1.

The village numbering and land use changes (assuming 11.2% of residential lots are attached residential for the Precinct 4 villages and Precinct 6 Village A) as follows:

- Precinct 3
 - Precinct 3 Village D: 10.55 ha non-residential development.
 - This village was 10.2 ha non-residential development
- Precincts 4:
 - Precinct 4 Village A: 173 residential lots
 - This village was Precinct 5 Village A with 179 residential lots
 - Precinct 4 Village B: 163 residential lots, plus 133 EP for future state primary school (sourced from water reticulation model provided by LCC, node 'MPR-N1420')
 - This village was Precinct 5 Village B with 163 residential lots and 319 primary school EP
 - Precinct 4 Village C: 122 residential lots
 - This village was Precinct 5 Village C with 247 residential lots
 - Precinct 4 Village D: 411 residential lots
 - This village was Precinct 5 Village E with 433 residential lots
 - Precinct 4 Village E and Precinct 6 Village A: 694 residential lots
 - These two villages were Precinct 5 Village D with 746 residential lots

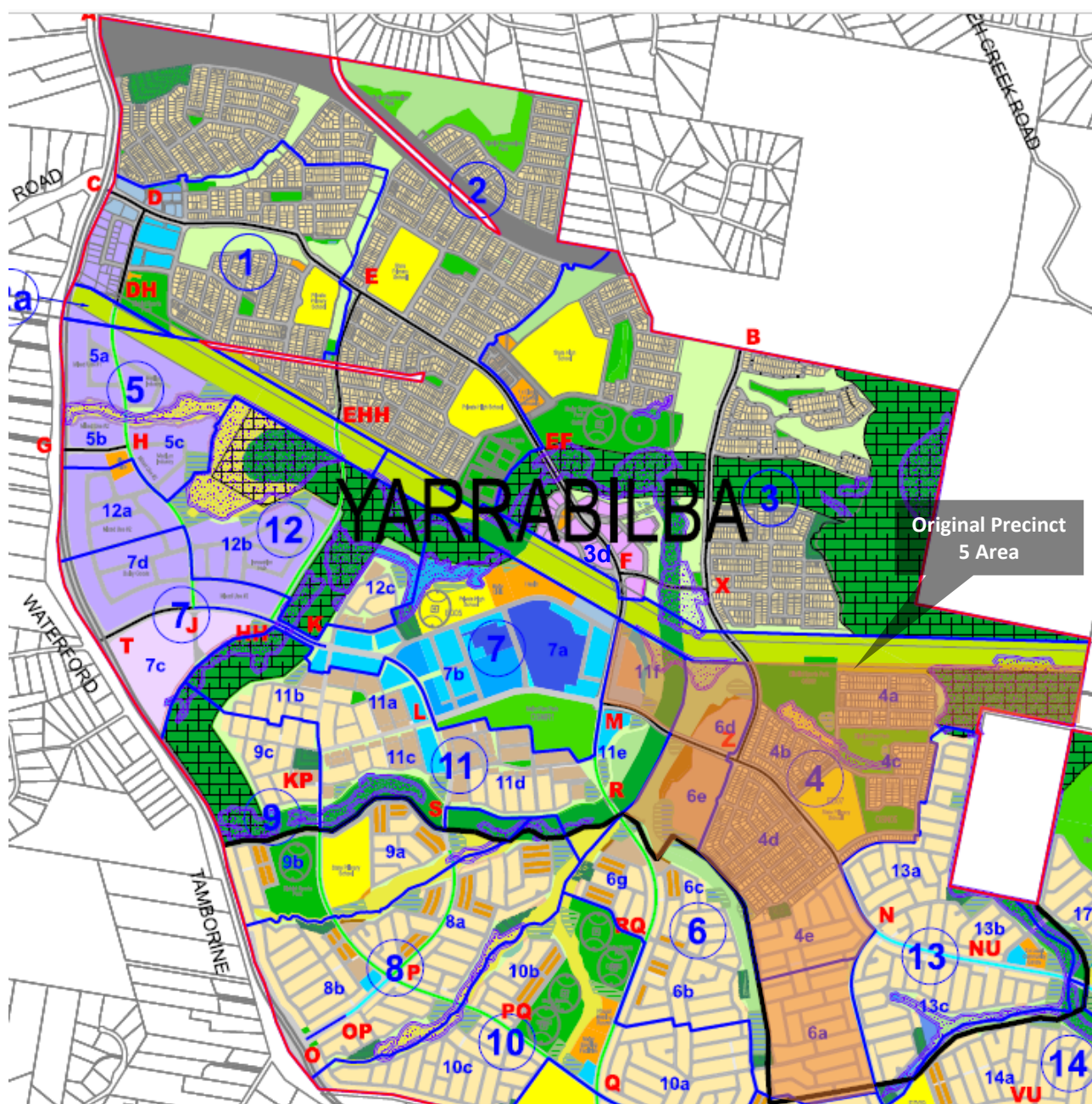


Figure 1 Revised Precinct 4, 6 and 11 and Villages Boundaries

- Precinct 6 (partial):
 - Precinct 6 Village D (near future town centre): 61 attached residential lots
 - This village was Precinct 5 Village H with 99 residential lots (11.2 % attached residential)
 - Precinct 6 Village E (near future town centre): 107 attached residential lots
 - This village was Precinct 5 Village F with 279 residential lots (11.2 % attached residential)
- Precinct 11 (partial):
 - Precinct 11 Village F (near future town centre): 77 attached residential lots
 - This village was Precinct 5 Village G with 77 residential lots (11.2 % attached residential)

A summary of the population in Precincts 1, 2, 3, 4, partial 6 and partial 11 is provided in Table 1 and Table 2. It is noted that the development applications of three villages near the future town centre (Village 6D, 6E and 11F) are scheduled after 2022.

Table 1: Estimated 2022 Water EP for Precincts 1, 2, 3, 4, 6 (partial) and 11 (partial) – Original Precinct 5 Area

Precinct /Village	Residential Detached	Residential Attached	Commercial/Em ployment/Retail/ Community	Education	Total EP	Estimated 2022 EP*
1	1,658	110	375	101	2,244	2,244
2	5,432	320	0	392	6,144	6,144
3A	605	369	98	214	2,087	1,127
3B	1,249	59	0	0	1,308	1,308
3C	625	29	0	0	653	653
3D	0	0	317	0	317	317
4A (previously 5A)	430	35	0	0	465	465
4B (previously 5B)	405	33	0	133	571	571
4C (previously 5C)	303	24	0	0	328	303
4E/6A (previously 5D)	1,725	139	0	0	1,864	1,864
4D (previously 5E)	1,021	82	0	0	1,104	1,104
6E (previously 5F)	0	190	0	0	190	0
11F (previously 5G)	0	137	0	0	137	0
6D (previously 5H)	0	109	0	0	109	0
Total	13,452	1,522	737	840	16,551	16,115

*: Based on development approvals up to and including 2022

Table 2: Estimated 2022 Sewerage EP for Precincts 1, 2, 3, 4, 6 (partial) and 11 (partial) -

Precinct	Residential Detached	Residential Attached	Commercial/Em ployment/Retail/ Community	Education	Total EP	Estimated 2022 EP*
1	1,658	110	460	101	2,329	2,329
2	5,432	320	0	392	6,144	6,144
3A	605	255	44	214	1,118	1,118
3B	1,249	59	0	0	1,308	1,308
3C	625	29	0	0	653	653
3D	0	0	390	0	390	390
4A(previously 5A)	43	35	0	0	465	465
4B(previously 5B)	405	33	0	133	571	571
4C(previously 5C)	303	24	0	0	328	303
4E/6A(previously 5D)	1,725	139	0	0	1,864	1,864
4D(previously 5E)	1,021	82	0	0	1,104	1,104
6E(previously 5F)	0	190	0	0	190	0
11F (previously 5G)	0	137	0	0	137	0
6D (previously 5H)	0	109	0	0	109	0
Total	13,452	1,522	905	840	16,719	16,283

*: Based on development approvals up to and including 2022

By comparing with the 2018 endorsed report, the total population within the original Precinct 5 area is reduced from 20,427 water EP to 16,551 water EP and 20,607 sewerage EP to 16,719 sewerage EP. These reductions are

caused by the change of school EP density by LCC (now 0.1 EP per student and staff), as well as the amended contents of Precinct 4, 6 and 11 villages.

2. Water Interim Solution Assessment Revision

The ultimate pressure management areas (PMA), network size and layout required for servicing Precinct 4 and partial Precinct 6 and 11 villages were approved in the 2018 endorsed report assessment and are not reviewed in this report. The 2018 endorsed report proposed two sub-regional trunk mains for construction by 2021:

- A 600 mm diameter trunk main between the Seqwater Southern Regional Water Pipeline (SRWP) and Travis Road reservoirs
- A 600 mm diameter trunk main from the Travis Road Reservoir outlet on Camp Cable Road to the development.

LCC used an operational model loaded with derived EP and demand patterns (LW_2022-01.mxd) to further review the actual needs of the identified network augmentations. It was agreed with LCC that the water model operational scenario 'OPER_MD' would be updated to include the 2022 connected village population (refer to Table 1), for assessment of the interim network performance (without the use of PMAs) and the need for the two sub-regional trunk mains. The following changes to the provided model were carried out:

- Pipelines and demands for the villages to be connected by 2022 were included. These are villages 3A, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 4E and 6A. It is noted that the demands of these villages were modelled as the EP presented in Table 1. The population of other developed villages in Precincts 1 and 2 were modelled as per the LCC's model.
- The 600 mm diameter trunk main in Precinct 1 along Yarrabilba Drive is included.
- No Yarrabilba PMA boundary valves are active in the operational scenarios.
- The two 600 mm diameter sub-regional trunk mains outlined above were not included.

The initial 'OPER_MD_YB_P4' scenario modelled outcomes show that the modelled nodes with high elevations fail to meet the 22 m minimum residual pressure requirement at 8am. Further investigations were undertaken, and it was found that the standpipe demands (HFP28 at the node WFH022306 and HFP01 at the node WFH020901) trigger the 8am modelled pressure failures. By removing demand at these two standpipes (scenario 'OPER_MD_YB_NO_HFB'), the modelled outcomes show that both the minimum pressure and fire-fighting residual pressure meet LCC's desire standards of service (DSOS). The details of modelled outcomes are provided in Appendix A and can be checked in the model 'LW_2022-01_YB_V01.mxd', which will be provided to LCC along with this letter.

Therefore it is confirmed that connecting Yarrabilba villages 3A, 3B, 3C, 3D, 4A, 4B, 4C, 4D, 4E and 6A to the existing network will not trigger the need to construct either of the 600 mm diameter trunk mains external to the development before the implementation of PMAs in the Yarrabilba development.

Regarding the two standpipe demands, it is recommended that LCC confirm the flow rates attributed to these two sites and take operational actions (e.g. introducing an orifice plate to mitigate flow at the site or time restrictions) to mitigate the impacts.

3. Sewerage Interim Solution Assessment Revision

Sewage generated by the Precinct 4 and partial Precincts 6 and 11 development will be collected by the pumping station PS3A network, then pumped to the pumping station PS1. Flow from PS1 is transferred to the Loganholme STP catchment via the Chambers Flat pumping station. The ultimate internal trunk and reticulation sewerage infrastructure within the Yarrabilba development boundary was approved in the 2018 endorsed report assessment and would not be accessed again in the letter.

In Section 5.1 of the 2018 endorsed report, it was agreed with LCC that pumping station PS1 along with the 2 ML storage and the downstream Logan Village/Chamber Flats trunk infrastructure can provide a total capacity of 12,729 EP for the Yarrabilba development. This capacity cap was revised by the 2021 LCC study 'Chambers Flat Road 2 SPS Strategy Review - IP0011'. LCC recently advised that the spare capacity for the Yarrabilba development between PS1 and the Chambers Flat 2 pumping station is between 20,420 EP and 25,000 EP assuming that a 2 EY event containment standard is adopted. This revised capacity cap is higher than the total sewerage EP of 16,719 EP from the Yarrabilba Precincts 1, 2, 3, 4 and partial Precincts 6 and 11. A summary of the recent LCC capacity assessment is provided in Appendix B.

In accordance with the endorsed report 'Yarrabilba Pumping Station PS3A Design Overview, June 2017', the installed dual pump capacity at PS3A is 92 L/s (equivalent to 7,949 EP). The population contributing to PS3A is 7,052 EP including villages 3A to 3D, village 4A to 4E and village 6A, but not including the three villages near future town centre, villages 6D, 6E and 11F. Therefore the existing PS3A pumping station has sufficient capacity to serve the proposed 2022 applications.

4. Conclusions

The water supply and sewerage ultimate infrastructure servicing strategy was approved in the 2018 Precinct 4 PNP report and was not re-assessed as part of this study. Based on the approaches and methodologies agreed with EDQ and LCC in the discussion meeting dated 16/02/2022, both the water supply and sewerage interim solutions were re-assessed. The outcomes of this assessment show that:

1. Development applications for the Yarrabilba Precinct 4 Village E and Precinct 6 Village A will be launched by the end of 2022 and the total Yarrabilba accumulated population will be 16,115 EP for water supply and 16,283 EP for sewerage. This forecast compares to the 2018 endorsed report is as below:

Population forecast	Water EP	Sewerage EP
2018 endorsed report (original Precinct 5 area)	20,427	20,607
Revised forecast and based on development approvals up to and including 2022	16,115	16,238
Revised forecast of original Precinct 5 area (including three future villages near town centre)	16,551	16,719

2. Based on assessment using the agreed methodology, the 2022 development applications (Precinct 4 Village E) and Precinct 6 Village A):
 - Will not trigger the 600 mm diameter Travis Road reservoir SRWP connection main or the 600 mm diameter Travis Road reservoir outlet main under the interim operation (i.e. PMAs not implemented).
 - Will not require any sewerage trunk augmentation works at PS3A or downstream of this station. The installed dual pump capacity of sewerage pumping station PS3A is 92 L/s (equivalent to 7,949 EP), which is sufficient for servicing Precincts 3 and 4, plus the Precinct 6 (village A) which have a total population of 7,052 EP.

Please do not hesitate to contact the undersigned or Henry Lin if you require any clarification on this assessment.

Yours sincerely

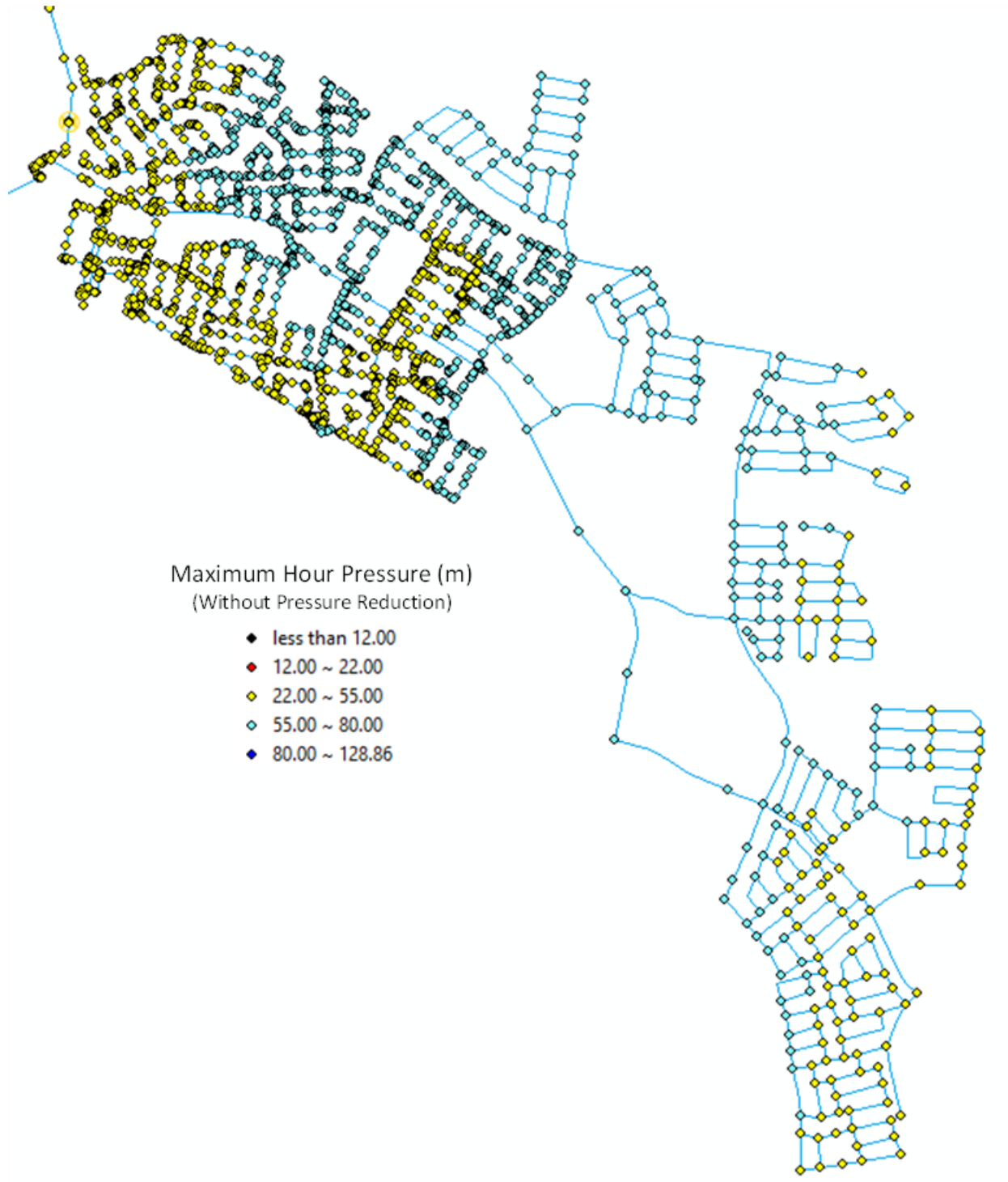


Shane O'Brien

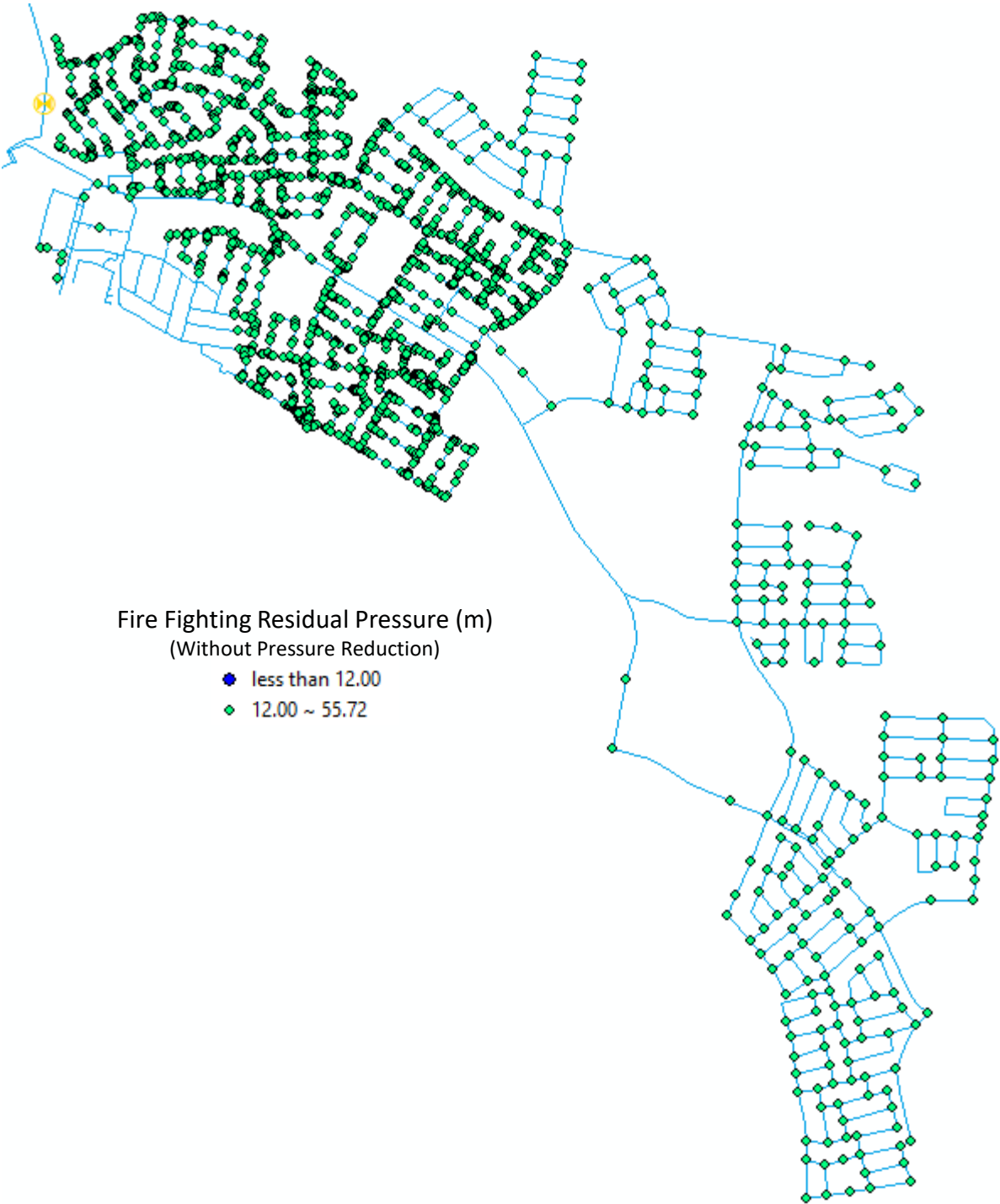
Stantec Australia Pty Ltd
RPEQ 9064

Appendix A – LCC Water Operational Scenario Assessment Outcomes

Maximum Day Operation Scenario (Interim Solution)



Maximum Day Operation Scenario (Interim Solution)



Appendix B – LCC Yarrabilba Sewerage Spare Capacity Assessment Summary

Lin, Henry

Subject: FW: Spare capacity for the Yarrabilba Development

From: Pollard, Matt <Matt.Pollard@wsp.com>

Sent: Wednesday, March 30, 2022 11:45 AM

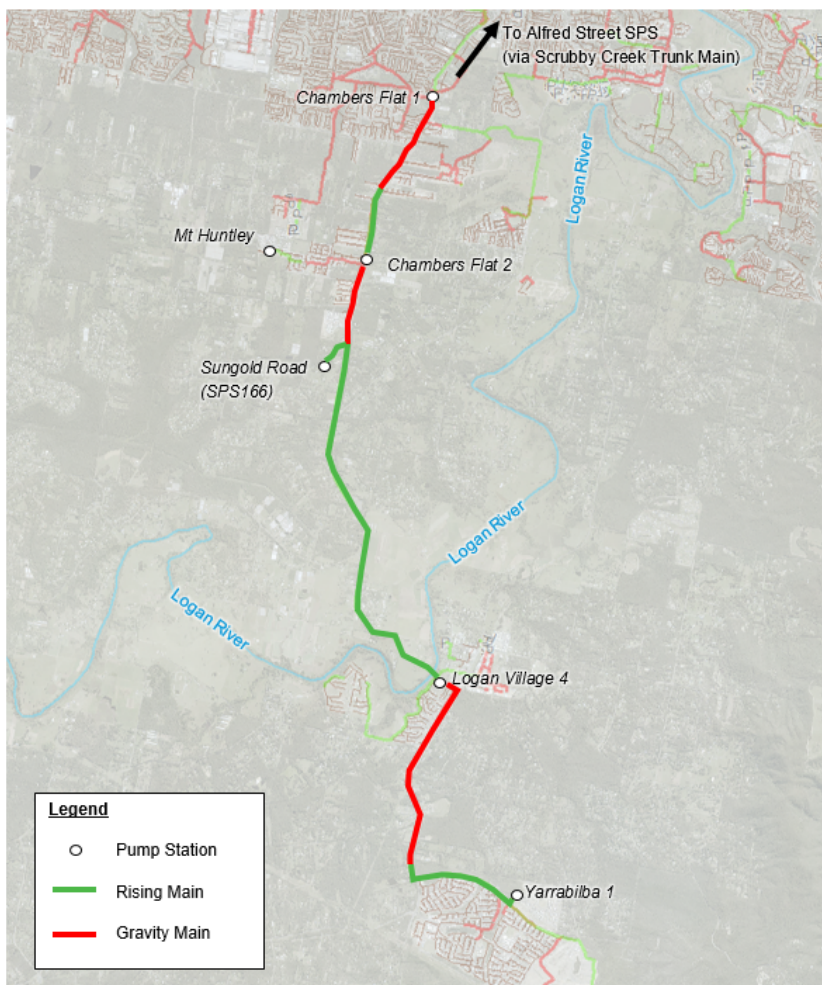
To: Lin, Henry <Henry.Lin@stantec.com>; Pollard, Matt <MattPollard@logan.qld.gov.au>

Cc: WaterDA <WaterDA@logan.qld.gov.au>; Daniel O'Brien <DanielO'Brien@logan.qld.gov.au>; Seymour, Michael <MichaelSeymour@logan.qld.gov.au>

Subject: RE: Spare capacity for the Yarrabilba Development

Hi Henry

A recent planning task undertaken by Logan Water (Chambers Flat Road 2 SPS Strategy Review - IP0011) has analysed the capacity of the existing system between Yarrabilba 1 and the Chambers Flat 2 SPS in detail. A map of this system is shown below:



The Task involved running the Loganholme calibrated model for this system for the 1EY and 2EY design storms. The model was calibrated based on flow data collected in 2019, which included 3 flow gauges within Yarrabilba. Conservative assumptions have been made for the wet weather response for future development / development not captured during the flow survey period.

For these runs, the adopted setting for the Yarrabilba 1 pump station was to limit pumped flows to 70 L/s at all times to minimise overflows in the downstream network and utilise the 2 ML storage. The outcomes for this assessment for different populations at Yarrabilba is shown in the following table.

		Option 2				
SPS		Yarrabilba (SPS084)			Logan Village 4 (SPS081)	Chambers Flat 2 (SPS082)
Yarrabilba Population	Event	Emergency Storage (% full)	Wet Weather Storage (% full)	Overflow Volume (m³)	Overflow Volume (m³)	Overflow Volume (m³)
25,000 EP	2 EY	100%	100%	173	0	0
	1 EY	100%	100%	2,553	0	0
20,420 EP	2 EY	76%	76%	0	0	0
	1 EY	100%	100%	375	0	0
15,500 EP	2 EY	50%	0%	0	0	0
	1 EY	95%	95%	0	0	0

Logan Water stakeholders have agreed that for the Yarrabilba storage, the appropriate containment standard is the 2EY event and therefore the Yarrabilba population that the existing system can cater for is somewhere between 20,420 EP and 25,000 EP.

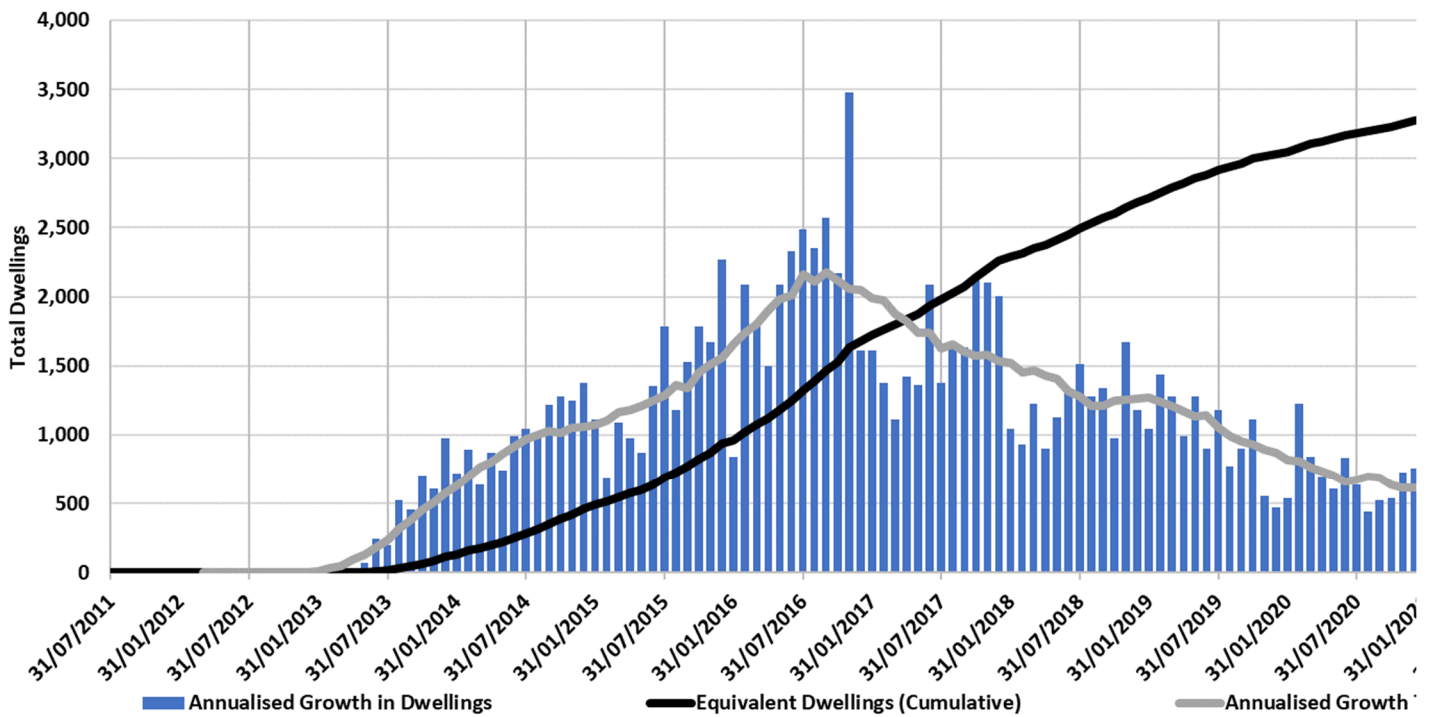
To achieve the performance outlined in the above table, works will be undertaken to upgrade the Chambers Flat 2 SPS. These works are included in the Subregional Infrastructure Program (SRIP).

Based on current growth rates, we expect that the existing system will have sufficient capacity to cater for Yarrabilba until sometime between 2033 and 2037 (refer graph below). If the recent increase in the rate of lot sales is sustained and converts to occupied dwellings that date may come forward.

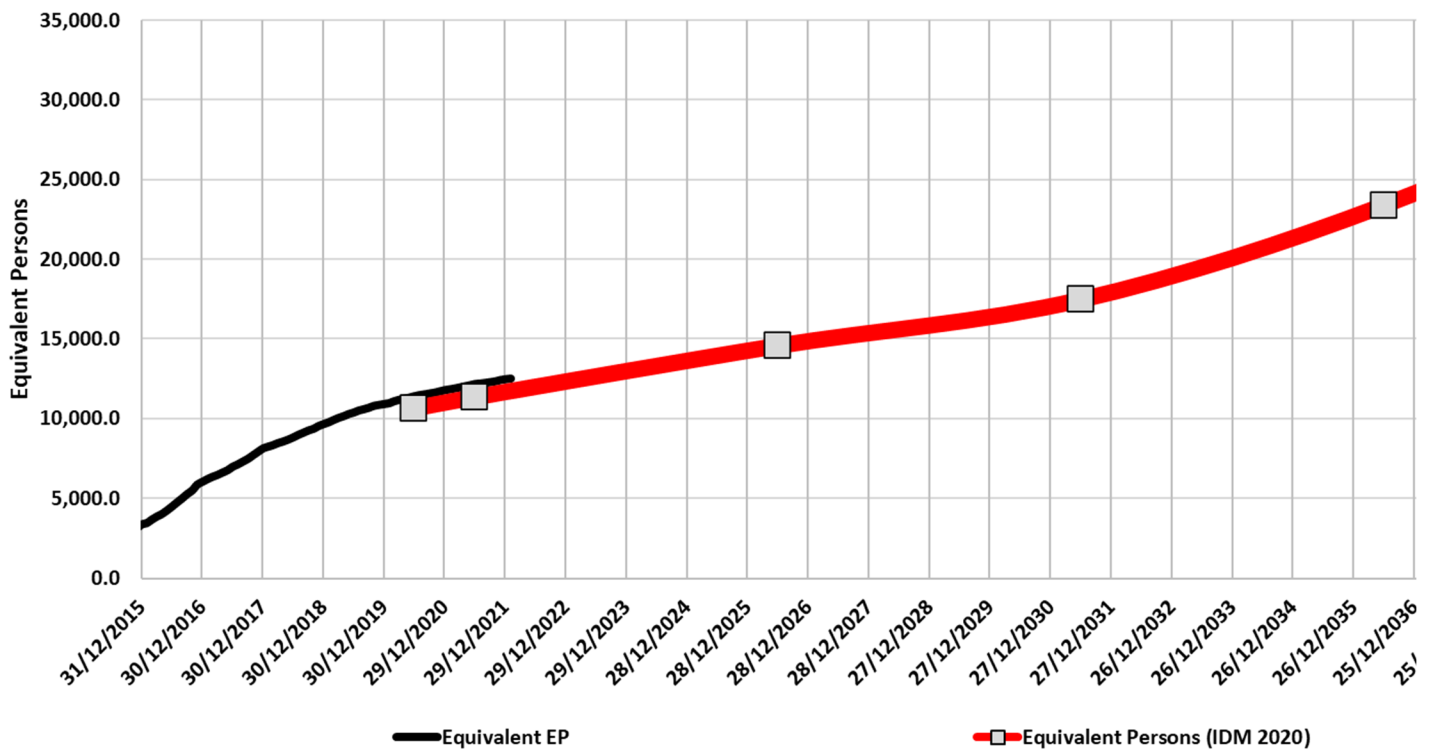
I note that as at the start of February 2022, we are still not seeing the increased lot sales translate into occupied dwellings. The charts below are taken from residential Bin data extracted from Councils data base on the 9th of February.

That aside, should the growth rates increase and be sustained, Council has already progressed planning for the Yarrabilba 3 regional / transfer pump station and the Chambers Flat WWTP so that the long term servicing solution can be brought forward if required.

Yarrabilba



Yarrabilba



Regards

Matthew Pollard
Principal Planning Engineer | Water Infrastructure Solutions

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Mattpollard@logan.qld.gov.au | 07 3412 0000 | 0420 755 900 | Teams [Call](#) / [Chat](#)

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*Logan City Council acknowledges the Traditional Custodians of the lands and waterways across the City of Logan.
We pay our respects to Elders past, present and emerging.*