

APPENDIX 7. INVESTIGATIONS – INFRASTRUCTURE, STORMWATER AND SERVICES



ENGINEERING

Preliminary Infrastructure Assessment

Lockleys Development

JOB NUMBER:	S42360 - 276553
CLIENT:	Future Urban
SITE:	25 Pierson St, Lockleys
DATE:	31/7/2023
REVISION:	D

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your success.**

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Document Status

REV NO.	STATUS	AUTHOR	REVIEWER			APPROVED FOR ISSUE		
			NAME	SIGNATURE	DATE	NAME	SIGNATURE	DATE
A	Draft	Ghasem Ashtijou	Jordan Colbert		9.7.21	Jordan Colbert		9.7.21
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C	Updated (Code Amendment)	Ghasem Ashtijou	Jordan Colbert		28.7.21	Jordan Colbert		28.7.21
D	Revised to address new code amendment proposal	Ghasem Ashtijou	Jordan Colbert		31/7/2023	Jordan Colbert		31/7/2023

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Introduction

FMG Engineering (FMG) has been engaged by Future Urban to undertake a service infrastructure investigation to obtain preliminary, high level assessment of the existing infrastructure in the area to support a proposed code amendment.

This subject site is located at 25 Pierson St in Lockleys and covers an area of approximately 48,660 m², currently occupied by a large commercial office facility with off-street parking. The site is bound by Pierson Street on the south, the Torrens River on the north, and Residential dwellings on the east and west.

The subject site is currently leased by Westpac and it should be noted that it falls under the jurisdiction of City of West Torrens and is currently within the Employment Zone in the Planning and Design Code.

FMG Engineering has prepared this high-level infrastructure assessment by utilising information obtained via Dial-Before-You-Dig (DBYD), and discussion with the service authorities, wherever viable. FMG Engineering has attempted to contact the following service authorities for further information:

- City of West Torrens (Council)
- SA Water (water and wastewater utilities)
- South Australian Power Networks - SAPN (power authority)

The purpose of our investigation is to provide a desktop assessment of the infrastructure currently available to the subject site and to assess the current capacity of the existing infrastructure. We note that some authorities have not provided detailed feedback, however we have utilised our engineering judgement and relevant previous experience to provide context where appropriate.

Site understanding

The subject site is as shown in Figure 1 below.

Figure 1: Site location



A review of available LiDAR data suggests the subject land is relatively flat, with overall grade towards the north west, with access from Pierson street. The driveway passes through the site from Pierson street to the back of the office building near the Torrens River. There is a steep grading along the northern boundaries of the subject site towards the Torrens river from in the order of 6m elevation difference.

Anecdotal information supplied by Council, aligning with FMG's expectations, is that existing stormwater is discharged to the Torrens river via a large diameter stormwater pipe in the north western corner of the site.

Proposed Code Amendment

It is proposed to rezone the subject site from Employment Zone to the Urban Renewal Neighbourhood Zone to accommodate future residential development on the site at medium densities. We have based our high level assessment on a yield of approximately 350 dwellings comprising both apartments and detached/row dwellings. While it is understood that the 25 Pierson Street, Lockleys Code Amendment will result in lower yields than the previous Code Amendment sought, this suggests the infrastructure assessment remains valid as a lower yield would place a lower demand on the infrastructure, and as such, our previous assessment in this regard remains valid.

Services investigation

FMG has undertaken a Dial Before You Dig Investigation which has located the following utilities adjacent to the site:

- Stormwater
- APA
- NBN Co
- SA Power Networks
- SA Water
- Telstra

Stormwater

FMG Engineering had contacted Council to obtain information for the stormwater management required for the subject site. A phone discussion with Council's Stormwater Engineer Andrew King has been noted, with the following requirements deemed typical for a development within the City of West Torrens:

Stormwater detention measures will be required to be undertaken to limit the peak discharge rate for the site critical 20-year ARI storm event to equivalent to a predevelopment arrangement with a 0.25 runoff coefficient.

In calculating the stormwater detention requirements, runoff from any existing structures and buildings to be maintained must be taken into consideration.

Our understanding of the current site arrangements (anecdotally confirmed by Council) is that a large diameter pipe manages site discharge directly into the Torrens River.

The volume of detention storage required to comply with the standard requirement above will vary depending on future development outcomes for the site, however on the basis of a few assumptions (i.e. 75% impervious area for future development and runoff Coefficient equal to 0.25 for predevelopment 20 year storm event) it is anticipated that total site stormwater detention could sum to a total in the order of 500-550m³.

However, it is noted that the existing site is largely impervious, and the stated 0.25 runoff coefficient is very conservative. Our current estimate suggests the impact of future development greenery and landscaping would already reduce the peak flow by approximately 20%. Furthermore, as the site discharges directly into the Torrens River, there is little impact on Council infrastructure and anecdotal discussions with Council's engineer suggested detention requirements may be offset through higher achievement in other areas such as water quality, or stormwater reuse that could be incorporated into future development. On this basis, we would estimate detention requirements to be in the order of 200m³ or less.

If detention was required however, the future development could consider the integration of stormwater detention for the site which could involve strategy such as:

1. Detention storage – underground or above ground detention storage, likely in the north western corner of the development to allow for direct connection and discharge into the Torrens River
2. Implementation of Water Sensitive Urban Design (WSUD) principles such as raingarden and landscape, wherever possible

3. Upsizing of internal pipe network
4. Usage of permeable paving (which would increase water quality outcomes)

Any detention storage volume could be proportionally split if future development is delivered in stages.

In addition, Council also requires improvement to stormwater quality being discharged from the subject site based on the parameters stated in Table 1. Given the proximity to the Torrens River, the water quality targets are particularly critical, and will need to be achieved.

Table 1 Council stormwater target improvement for different parameters.

PARAMETER	TARGET REDUCTION
Reduction litter / gross pollutant	90%
Reduction in average annual total suspended solids (TSS)	80%
Reduction in average annual total phosphorous (TP)	60%
Reduction in average annual total nitrogen (TN)	45%

The quality of the runoff discharged from the site can be improved through the installation of proprietary water quality improvement devices or incorporation of biofiltration and raingardens within above ground stormwater basins – the preferred methodology by Council’s engineers.

A review of publicly available flood study data on the Waterconnect.sa.gov.au resource suggests the site is not subject to known flood risk and is sited above the 1 in 500 chance River Torrens Flood Study 1999. No further recent studies have been provided for this site.

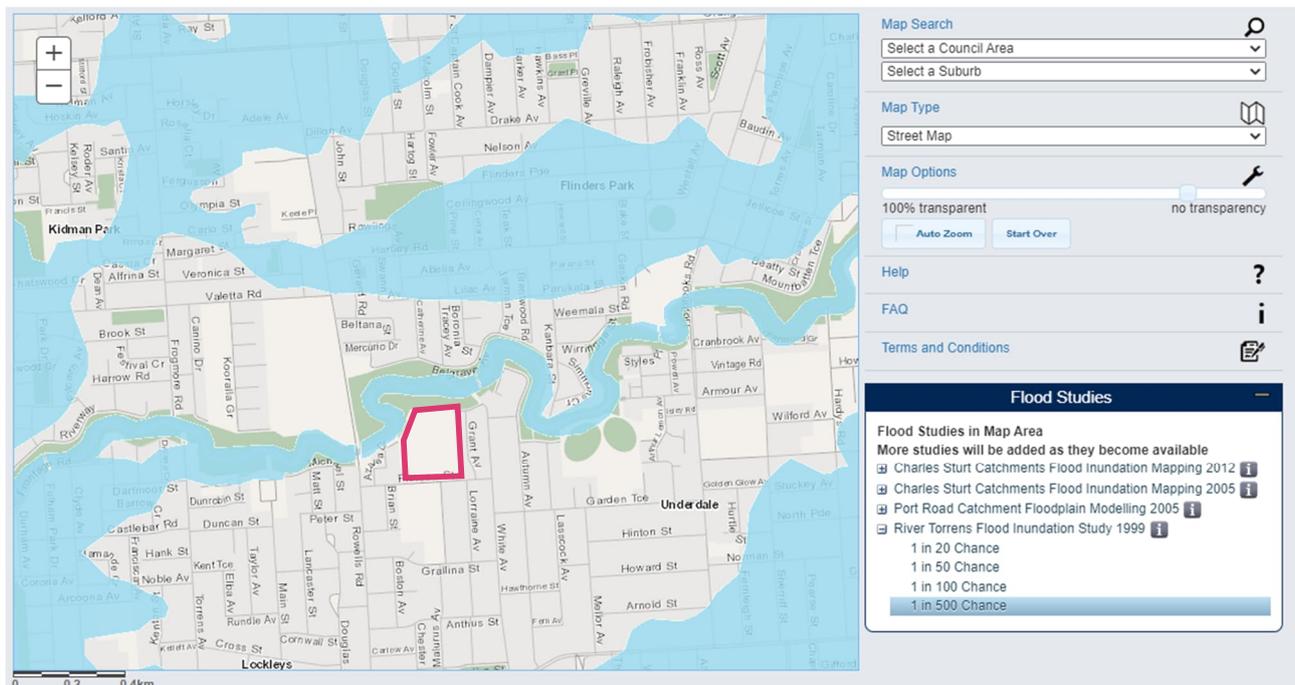


Figure 2 - Flood Hazard inundation Map

Water mains

A review of the Dial Before You Dig investigation indicates that the subject site is surrounded by water mains. A 100 to 150 mm diameter supply main pipe (CICL) is located at Pierson Street, and 100 mm diameter supply main pipe (100PVCU) on Azalea Drive.

Obtaining adequate capacity to service future development via Azalea Drive may be challenging considering the size of the water main, but the subject land is assumed to be currently supplied by the existing 150 mm water main on Pierson Street as there are water valves and water meter supply on this water main alignment.

It is possible that there will be a need for booster pumps to assist with the supply demand of water should multi-storey residential development (apartments) be considered. Future development will require new water mains circulation along all new internal roads, with water connections per dwelling or building. It is also noted that there may be additional costs / infrastructure to meet fire code requirements.

Future investigations to verify the capacity of the SA Water network at this location would include a flow test at the metered location.

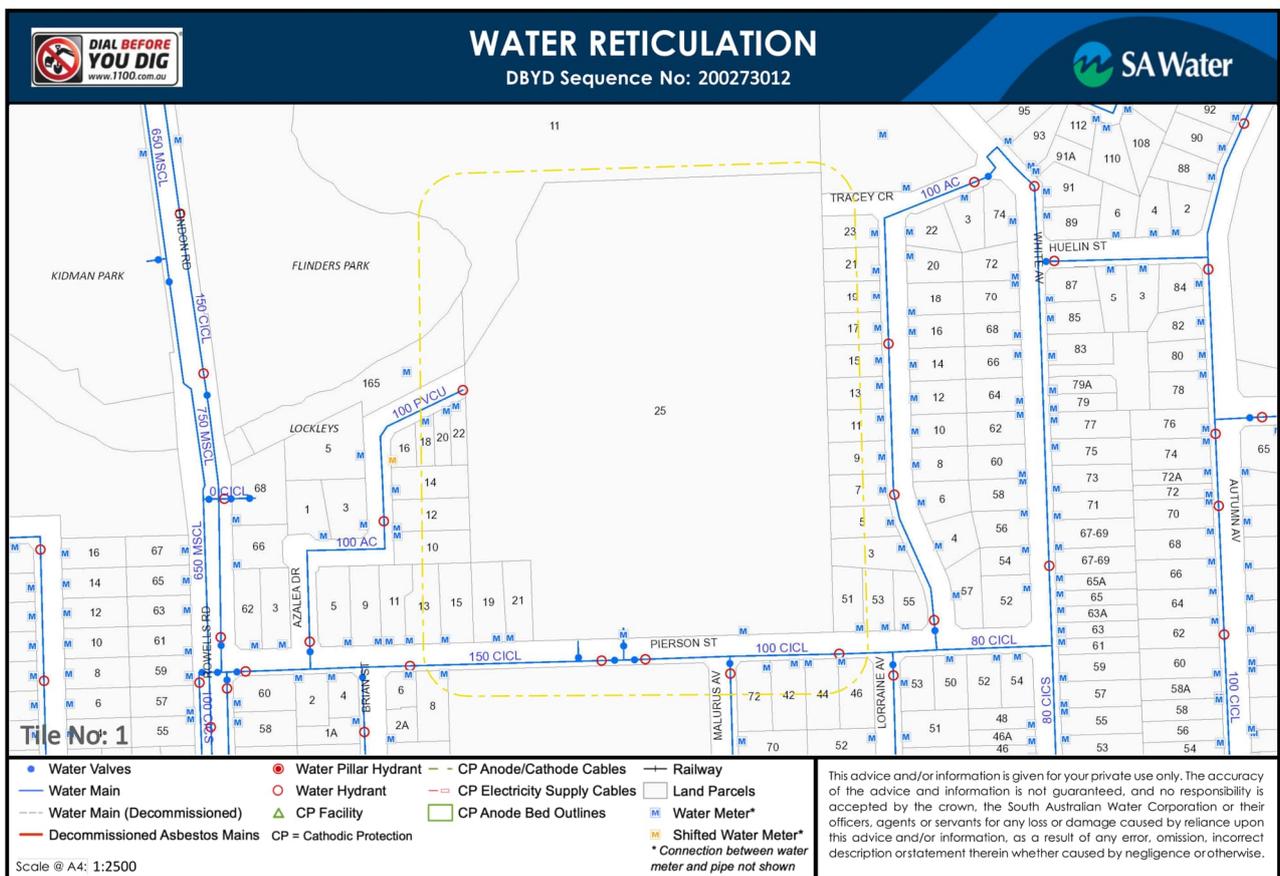


Figure 3 - SA water supply mains

FMG has contacted SA Water to obtain preliminary information on the anticipated augmentation works for the site based on anticipated future development. It has been advised that feedback will be provided by early August, however preliminary anecdotal advice suggested that some augmentation of existing mains along Pierson Street, from Rowells Road, may be required to achieve adequate service to the future development. All new internal potable water services within future proposed to service multi-storey development are likely also required to achieve a minimum 150mm diameter.

Sewer

Information obtained through SA Water indicated that there are 2 major sewer lines servicing the subject site. There is an existing 150 mm PVCU pipe along Azalea Drive and a 150 mm diameter VC (Vitrified Clay) sewer main on Pierson Street, as shown on Figure 5.

Future development will require new sewer mains circulation along all new roads, with sewer connections per dwelling or building. As per potable water discussions, we anticipate detailed SA Water feedback at the start of August. Our estimate would suggest Pierson street may need some augmentation to service future development.

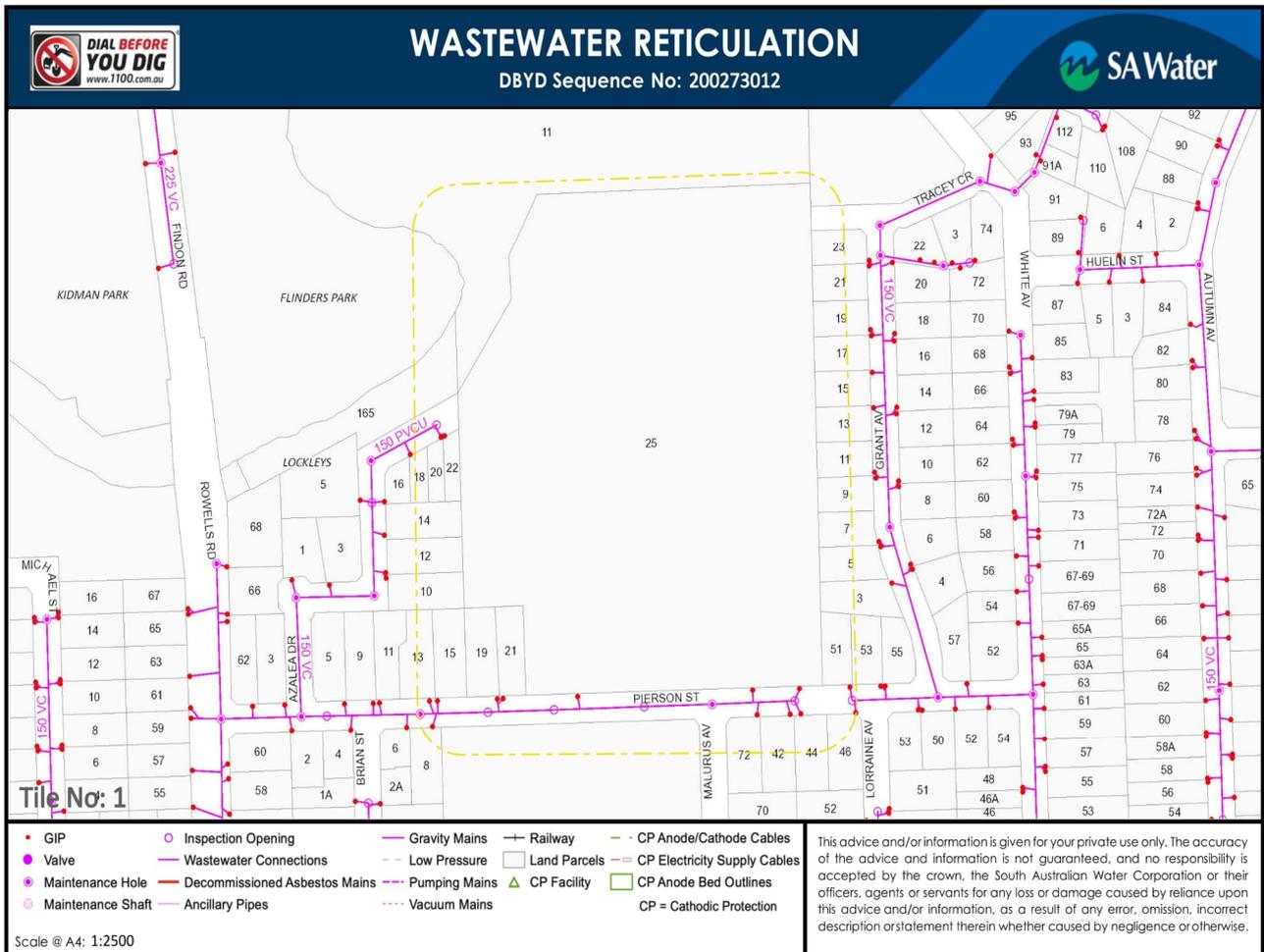


Figure 4 SA Water sewer mains

Electrical

The property is currently serviced by above ground power lines along Pierson street, which connect into existing transformers at the site frontage to Pierson street, in the eastern corner.

FMG have contacted SAPN regional manager Queenie Huang for further information on site loading requirements and whether it is likely that further augmentation will be required, however there is insufficient information at this stage for SAPN to provide an indication on the level of network augmentation required.

FMG Engineering does not provide electrical engineering services in house, however, has previously been supplied an approximation of 100VA/m² for commercial spaces, ~3-4kVA per apartment dwelling and ~10kVA per residential standalone dwelling. On this basis, the total estimated demand of the existing office space, and future development are within the same order of magnitude (1,000-2,000 kVA), hinting that the scale of any augmentation may not be as large when compared to development on other greenfield sites.

It is recommended that an electrical engineer be engaged prior to project inception to provide detailed informed advice on expected demands and liaise with SAPN to confirm site requirements.

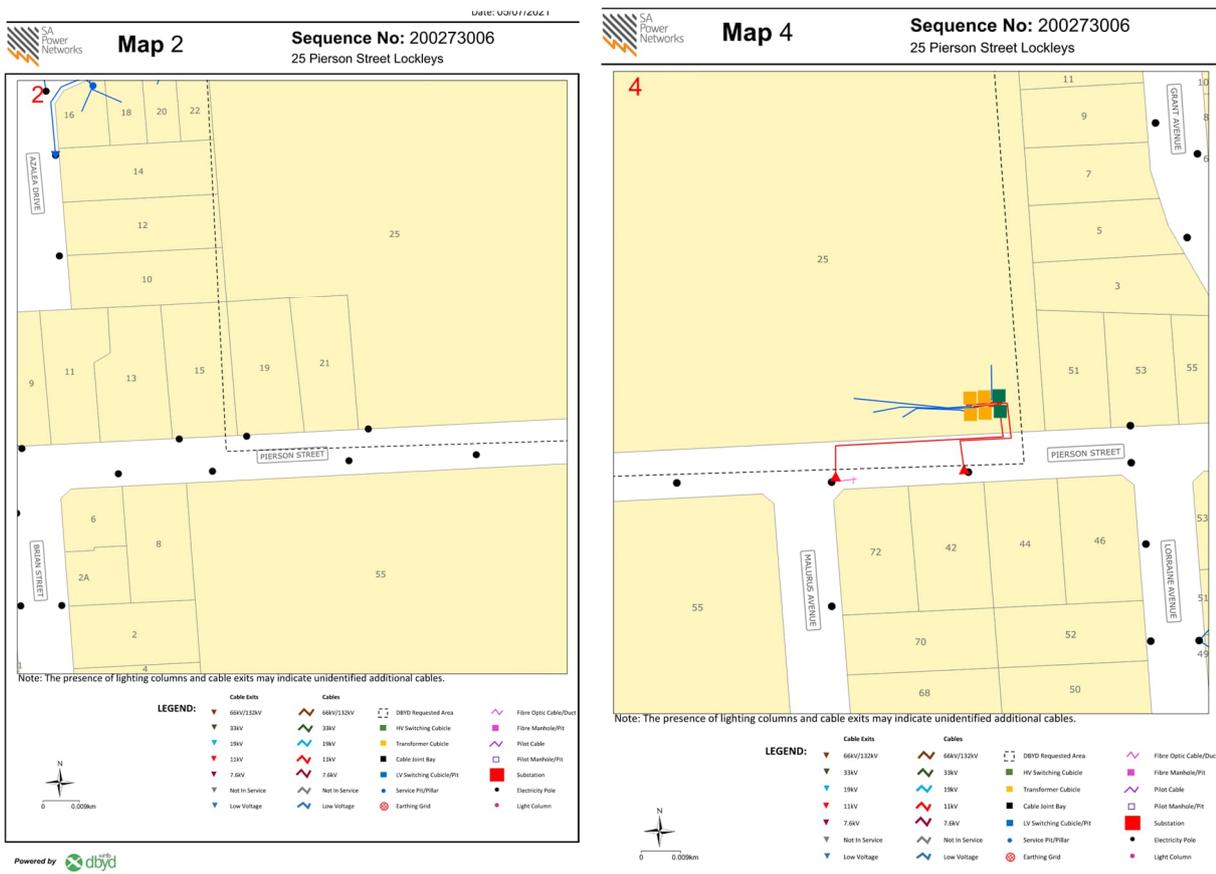


Figure 5 SAPN infrastructure on Pierson Street

Communications

A review of the Dial Before You Dig investigation shows that there is NBN infrastructure within the vicinity of the subject site as shown in Figure 6. We believe this can be connected to, with new pit and pipe design to supplement this system internally. As per electrical plans, given the current commercial use case of the site, we believe there will be sufficient capacity to service the proposal.

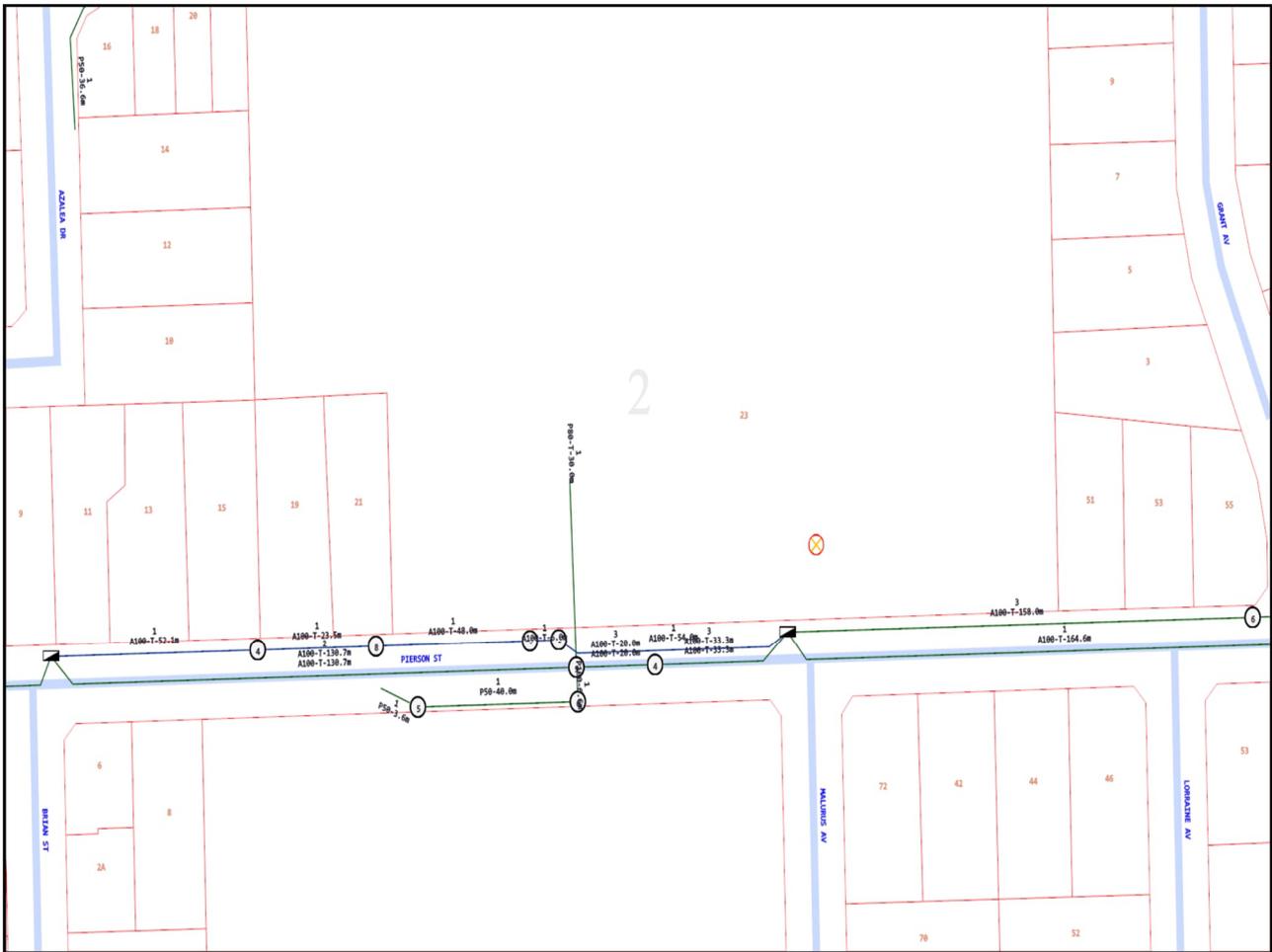
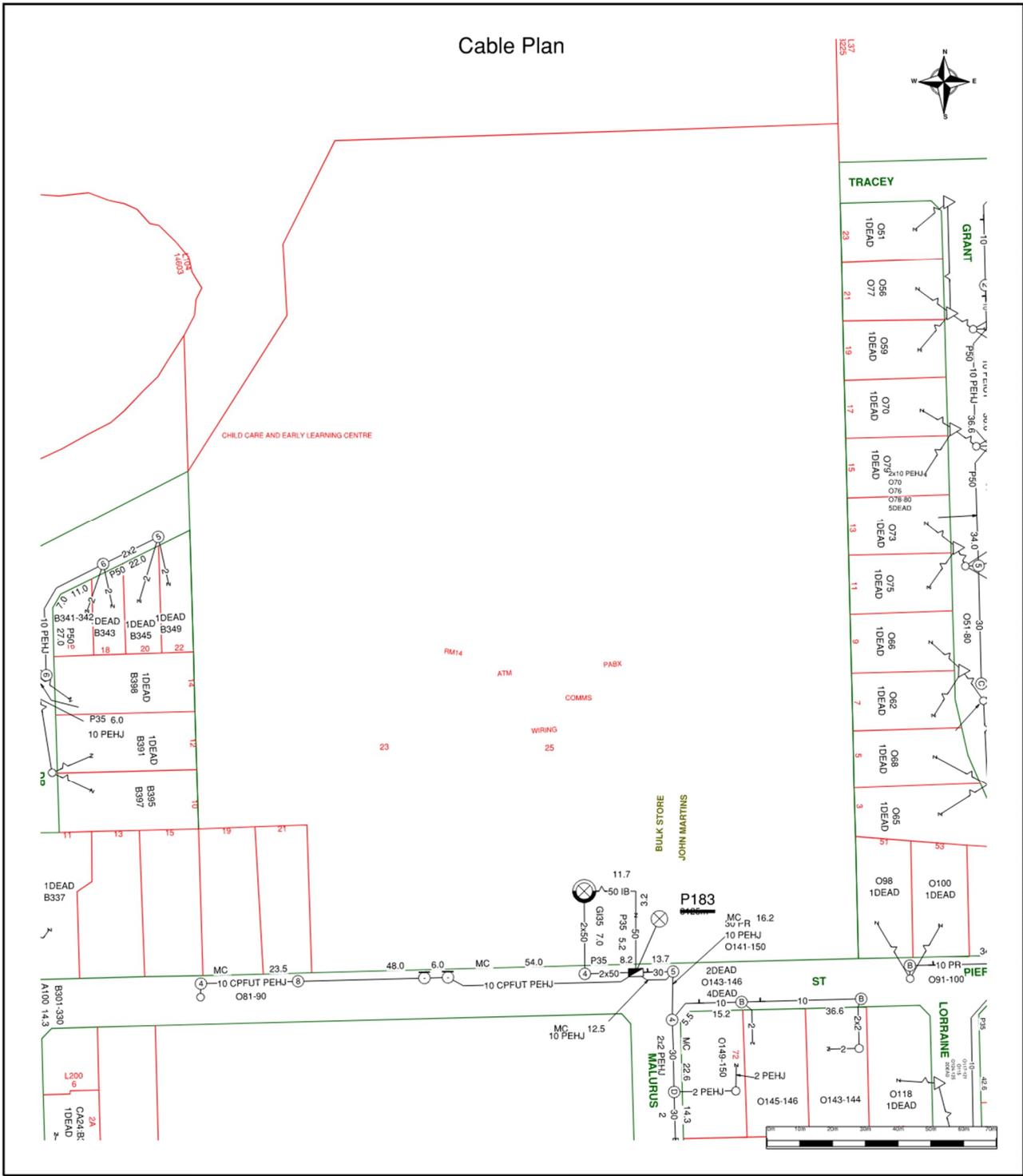


Figure 6 NBN network on Pierson Street

In addition to the NBN services on site, information obtained via DBYD indicated that there are Telstra information in the vicinity of the site as shown in Figure 7,8.



For all Telstra DBYD plan enquiries -
 email - Telstra.Plans@team.telstra.com
 For urgent onsite contact only - ph 1800 653 935 (bus hrs)

Sequence Number: 200273010

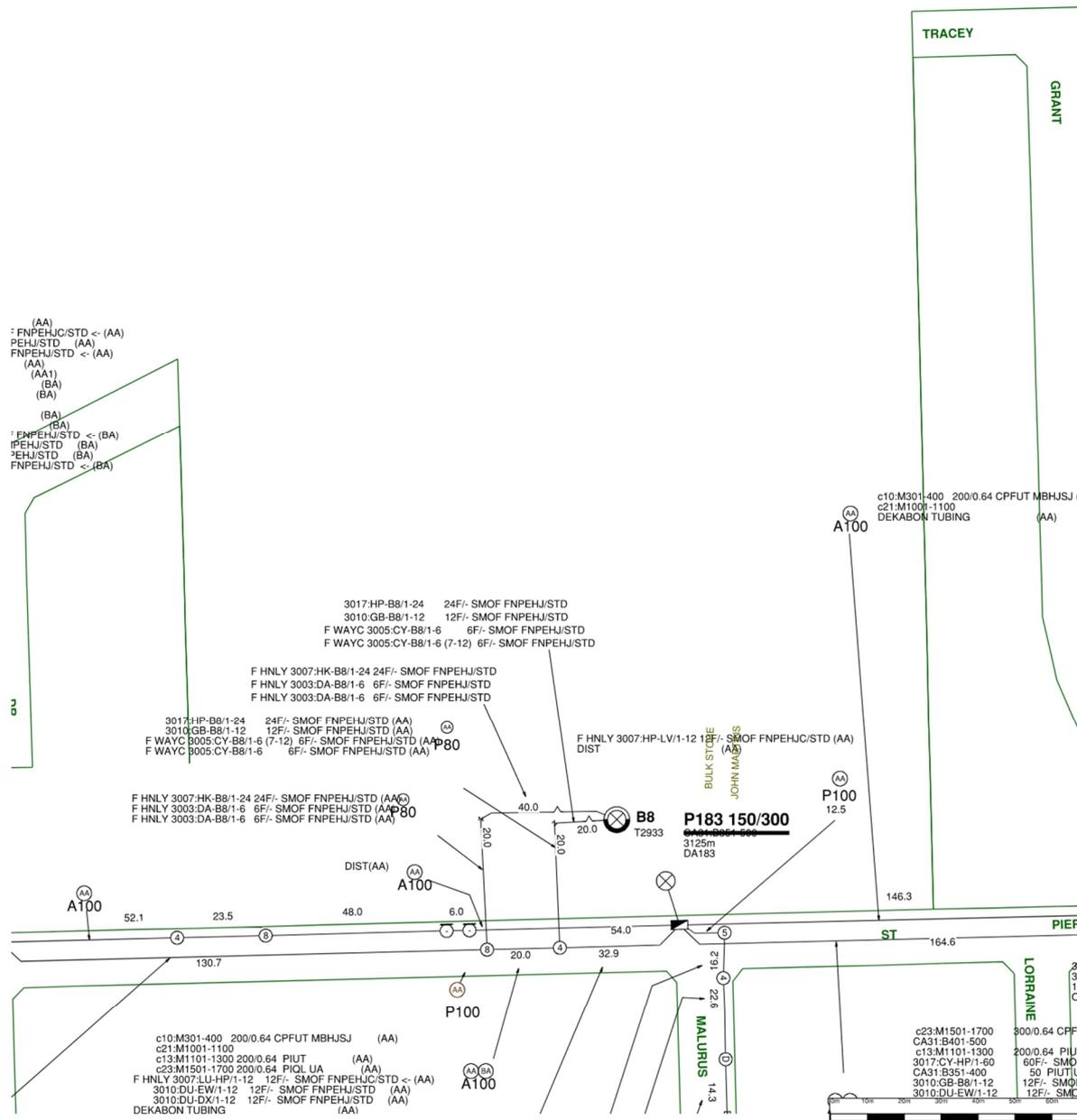
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Figure 7 Telstra infrastructure adjacent to the subject site

Mains Cable Plan



For all Telstra DBYD plan enquiries - email - Telstra.Plans@team.telstra.com
 For urgent onsite contact only - ph 1800 653 935 (bus hrs)

Sequence Number: 200273010
CAUTION: Fibre optic and/ or major network present in plot area. Please read the Duty of Care and contact Telstra Plan Services should you require any assistance.

TELSTRA CORPORATION LIMITED A.C.N. 051 775 556

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Figure 8 Telstra infrastructure adjacent to the subject site

Gas

Information obtained via DBYD indicated that there is existing medium pressure gas main (35-100kPa) within the vicinity of the site which could potentially be adequate to service the future development. The location of the gas mains is shown in Figures 9. Feedback provided by APA via email correspondence suggests that, at a high level, there wouldn't be an issue with gas supply to future development and there would be an opportunity for common trenching (common for developments of this nature), on the basis that compliant locations for the gas meters may need to be approved once detailed design is confirmed.

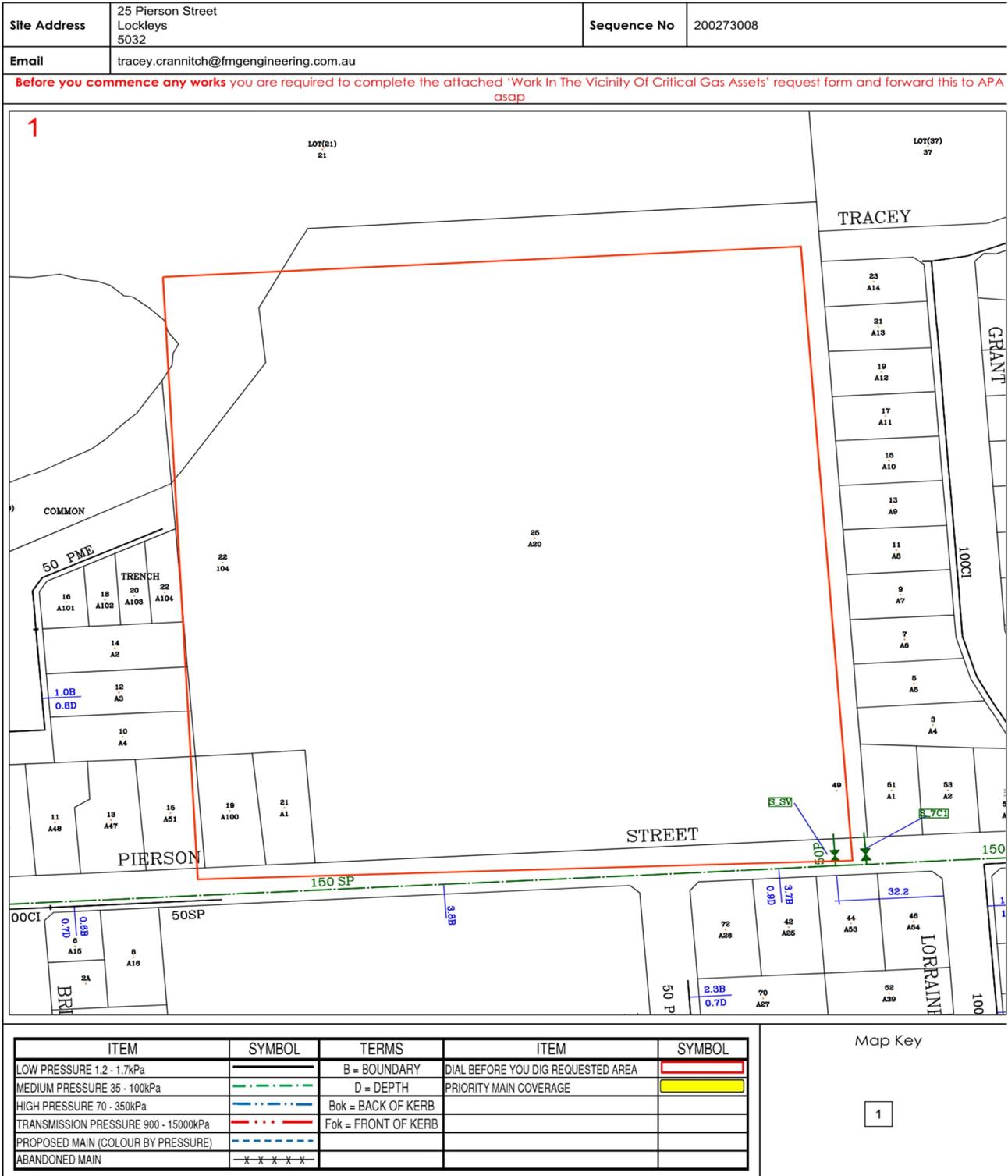


Figure 2 Location of medium pressure main on Pierson Street

Staging of Infrastructure Upgrades

FMG Engineering is not a qualified cost estimator, however has been requested to provide some industry advice on how costs may be divided amongst stages. Whilst indicative in nature, we can provide the following opinions on how costs may be apportioned between the relevant stages, with some supplementary notes;

Stormwater

- Provision of ~200 cubic metres of stormwater detention across entire site, split proportionally across each parcel if staged. (Note: this could be as large as 500m³ or as little as nil detention, however
- Above ground stormwater basin to be located in the north-western corner of the site, to facilitate drainage to the Torrens River. Total storage volume could be achieved over multiple basins if desired.
- Potential for underground storage tank options to be considered, however generally considered more costly and to be avoided if space permits.
- Construction of bio infiltration stormwater treatment (or proprietary filters), gross pollutant traps

Water mains

- Construction of new 150mm diameter internal reticulation main in new roads
- Booster/'s may be required to service multi storey buildings

Electrical

- No firm advice provided, however a high level approximation of demands suggest to be in a similar order of magnitude to the estimated load requirements of the existing office facility
- May require pad mounter transformers for each apartment.

Communications

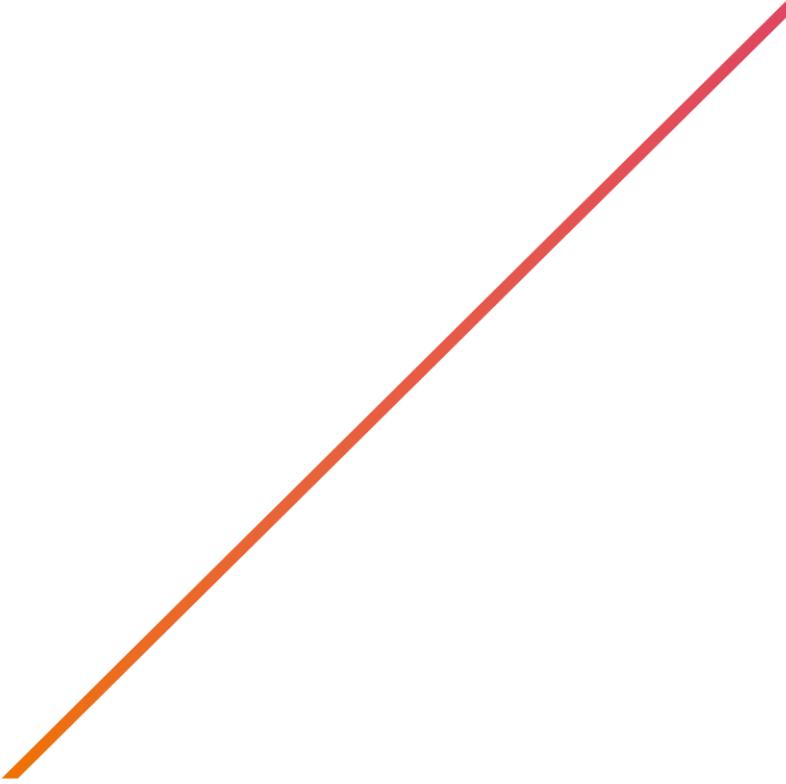
- Each stage will require individual NBN connections, it is not anticipated significant augmentation works will be required.

Gas

- No suspected concerns with supply of gas. Final internal routing and connection points to be confirmed during detailed design

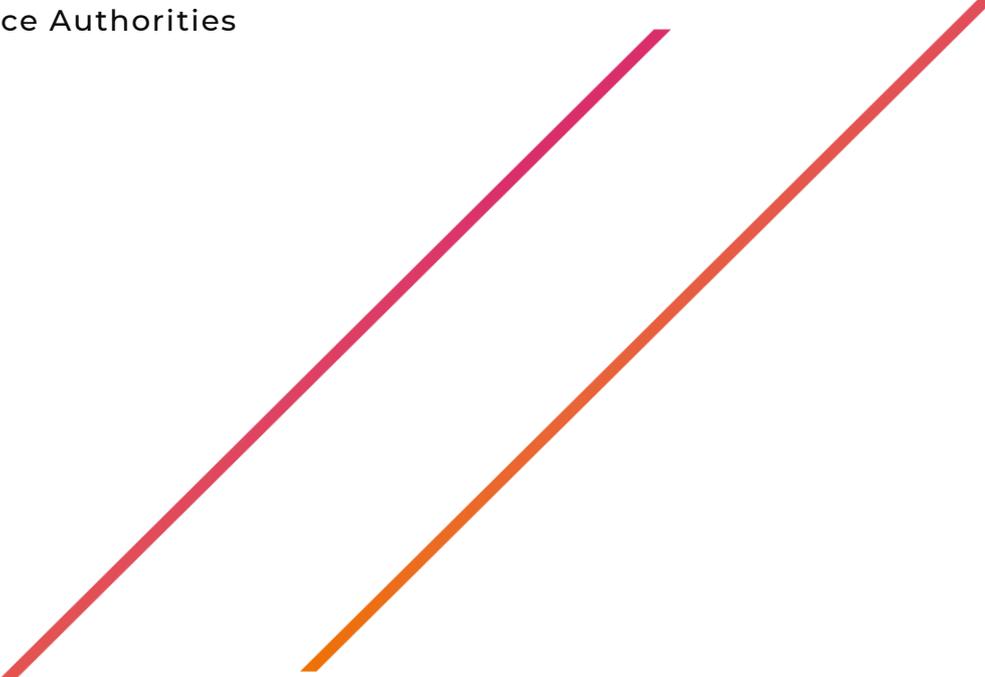
Summary

FMG Engineering had prepared this preliminary services assessment based on the information provided by Future Urban on the Code Amendment, anticipated future development and through desktop investigation (via DBYD, GIS and Aquamap) and discussion with Council and SA Water. At this stage, we believe there to be sufficient capacity in many of the services, however are awaiting final detailed feedback from SA Water and SAPN to verify these assumptions.



Appendix A

Correspondence from Service Authorities



Jordan Colbert

From: Keileigh.Marra@agig.com.au
Sent: Monday, 12 July 2021 3:36 PM
To: Ghasem Ashtijou
Cc: Jordan Colbert
Subject: RE: [EXTERNAL] Gas network assessment for development projects

Good Afternoon Ghasem,

At a high level there wouldn't be an issue with gas supply to either development. With the Lockleys site I'm sure there would be an opportunity for common trenching (common for developments of this nature).

Compliant locations for the gas meters will need to be approved, once you have further plans of the site we can evaluate and provide a Letter of Offer for each site which will outline the details of the connections.

If you have any other questions in the meantime please don't hesitate to contact me.

Kind Regards,

Keileigh Marra
Business Development Representative

M +61 418 853 508 **T** +61 8 8418 1167

E Keileigh.Marra@agig.com.au



330 Grange Road, Kidman Park, SA 5025

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From: Ghasem Ashtijou <ghasem.ashtijou@fmgengineering.com.au>
Sent: Thursday, 8 July 2021 5:04 PM
To: Keileigh Marra <Keileigh.Marra@agig.com.au>

Jordan Colbert

From: Stanway, Craig <Craig.Stanway@sawater.com.au>
Sent: Thursday, 8 July 2021 9:45 AM
To: Jordan Colbert
Cc: Ghasem Ashtijou
Subject: RE: Call back request - Lockleys Preliminary Inquiry

Hi Jordan,

No problem at all; this information will stay within SA Water only.

Unfortunately we don't have a high level response mechanism in place to enable a quick reply. This will need to be assessed as a Preliminary Inquiry by our systems planning area and will take minimum 4 weeks for a response to be formulated.

There are a lot of DN100 water mains around and any 4-7 storey buildings will need to be supplied by a DN150 main so that would be the first red flag after first glance.

I'll initiate an investigation shortly and will let you know as soon as I have a response.

Regards,

Craig Stanway

Senior Development Services Officer

craig.stanway@sawater.com.au • 7424 1837
250 Victoria Square/Tarntanyangga ADELAIDE SA 5000

From: Jordan Colbert <jordan.colbert@fmengineering.com.au>
Sent: Wednesday, 7 July 2021 1:47 PM
To: Stanway, Craig <Craig.Stanway@sawater.com.au>
Cc: Ghasem Ashtijou <ghasem.ashtijou@fmengineering.com.au>
Subject: RE: Call back request - Lockleys Preliminary Inquiry



External sender

Think before you click, open with caution

Hi Craig,

Nice to hear from you – hope you have been well. Thanks for getting in touch, feedback provided below. Please note this is a high level concept at this stage, and please treat this with a slight level of confidentiality.

We are attempting to finalise a concept infrastructure report for the planners over the next week or so, if there was a possibility to have a review from a high level and identify any major red flags or infrastructure costs / capacity concerns that would be greatly appreciated!

1. Name of Developer **TBC**
2. Start date for construction **2022-2023 assumed**

Jordan Colbert

From: Quyen Hoang <Quyen.Hoang@sapowernetworks.com.au>
Sent: Tuesday, 13 July 2021 4:10 PM
To: Jordan Colbert
Cc: Ghasem Ashtijou; Mitchell Ogilvy; Darren Marshall
Subject: RE: High level services assessment - Lockleys [REDACTED]

Hi Jordan

Thanks for contacting us.

Here are SA Power Networks' contacts for the two sites you have asked for a high level review on:

[REDACTED]
Darren Marshall – Lockley's Mortgage Centre

Also thanks for recognising that this exercise is fairly broad and without an actual load demand request from yourself, we would not be able to indicate the level of network augmentation required. i.e. both are large developments
When your electrical consultants are onboard and we do receive the electrical details, we can review this again based on the rules and regulations that apply.

Regards,

Queenie Hoang
Customer Solutions Manager Adelaide

From: Jordan Colbert <jordan.colbert@fmgengineering.com.au>
Sent: Tuesday, 13 July 2021 2:41 PM
To: Quyen Hoang <Quyen.Hoang@sapowernetworks.com.au>
Cc: Ghasem Ashtijou <ghasem.ashtijou@fmgengineering.com.au>
Subject: RE: High level services assessment - Lockleys [REDACTED]

External email! - Think before you click.

Hi Queenie,

Just touching base on this one, we are looking to finalise our reporting for a client and would greatly appreciate a high level review of any supply concerns for the below discussed developments.

Regards,

Jordan Colbert
BEng (Civil & Struct)
Civil Team Leader (SA)



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Adelaide | Melbourne | Sydney

P 08 8132 6600

D 08 8132 6661

M 0424 464 274

67 Greenhill Rd Wayville SA 5034

jordan.colbert@fmgenengineering.com.au

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From: Jordan Colbert

Sent: Friday, 2 July 2021 2:17 PM

To: queenie.hoang@sapowernetworks.com.au

Cc: Ghasem Ashtijou <ghasem.ashtijou@fmgenengineering.com.au>

Subject: High level services assessment - Lockleys [REDACTED]

Hi Queenie,

Thankyou for your time over the phone today, as discussed FMG has been engaged to prepare a high level services infrastructure assessment on the behalf of Future Urban (Planning Consultants). Both sites are somewhat confidential, however I can provide the attached sketches and commentary below for internal review;

Lockleys Mortgage Centre

Please refer to the concept plan '25 Pierson Street, Lockleys – Concept Plan_Option4' attached. The proposed development is for a medium density residential development including apartment buildings to the River Torrens boundary. Refer to page two of the attached document which outlines the allotment yield of 140 and 144-216 apartments. The site is currently occupied by the Westpac centre and suggest we could retain (where appropriate) any existing power infrastructure which would assist our power delivery requirements on this site.

Appreciate that at this stage any advice SAPN would provide would be high level, and subject to change in the future. Would be great to understand if you believe you have capacity in the area, or if current infrastructure suggests some augmentation may be required, and we can then flag this for further investigation in the planning phase by electrical consulting engineers liaising with SAPN. If we could please ask a small favour in a short response on each site by next week that would be hugely appreciated!

Enjoy the weekend!

Regards,

Jordan Colbert

BEng (Civil & Struct)

Civil Team Leader (SA)

Subject: RE: [EXTERNAL] Gas network assessment for development projects
 Date: 12/07/2021 3:36 PM
 From: "Keileigh.Marra@agig.com.au" <Keileigh.Marra@agig.com.au>
 To: "Ghasem Ashtijou" <ghasem.ashtijou@fmgengineering.com.au>
 Cc: "Jordan Colbert" <jordan.colbert@fmgengineering.com.au>

Good Afternoon Ghasem,

At a high level there wouldn't be an issue with gas supply to either development. With the Lockleys site I'm sure there would be an opportunity for common trenching (common for developments of this nature).

Compliant locations for the gas meters will need to be approved, once you have further plans of the site we can evaluate and provide a Letter of Offer for each site which will outline the details of the connections.

If you have any other questions in the meantime please don't hesitate to contact me.

Kind Regards,

Keileigh Marra
 Business Development Representative
 M +61 418 853 508 T +61 8 8418 1167
 E Keileigh.Marra@agig.com.au



330 Grange Road, Kidman Park, SA 5025

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Sent: Thursday, 8 July 2021 5:04 PM
To: Keileigh Marra <Keileigh.Marra@agig.com.au>
Cc: Jordan Colbert <jordan.colbert@fmgengineering.com.au>
Subject: [EXTERNAL] Gas network assessment for development projects

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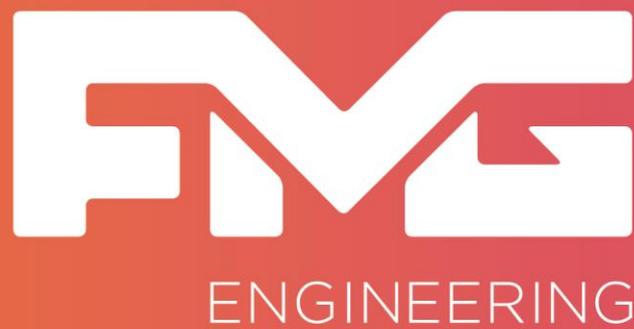
Hi Keileigh,

Nice to hear from you – hope you have been well. Thanks for getting in touch. Please note this is a high level concept at this stage, and please treat this with a slight level of confidentiality.

We are attempting to finalise a concept infrastructure report for 2 different land developments for the planners over the next week or so, if there was a possibility to have a review from a high level and identify any major red flags or **capacity concerns** / infrastructure costs that would be greatly appreciated!

1. **Address: 25 Pierson Street, Lockleys, SA**
 - details:

1. Name of Developer **TBC**
2. Start date for construction **2022-2023 assumed**
3. Type of Development – **Residential, mainly new council road infrastructure with Torrens titled dwellings (~140), with up to 6 apartment blocks consisting of 4-6 levels (totalling 140-220 units) – noting that these units would be on the northern side of the property, and would need to be serviced by new mains within the property.**
4. Maximum number of storeys including Ground Floor for any multi storey buildings **4-6 storeys**
5. Number of apartments within each building **total of 140-220 units split over 6 buildings – i.e. 6 units per storey applied over 4-6 storeys**

The logo for FNG Engineering features the letters 'FNG' in a large, bold, white, stylized font. Below the letters, the word 'ENGINEERING' is written in a smaller, white, sans-serif font. The background is a gradient of orange and pink, with diagonal stripes in the corners.

FNG

ENGINEERING

ADELAIDE

67 Greenhill Road
Wayville SA 5034
Ph: 08 8132 6600

MELBOURNE

2 Domville Ave
Hawthorn VIC 3122
Ph: 03 9815 7600

SYDNEY

Suite 28, 38 Ricketty St
Mascot NSW 2020
Ph: 1300 975 878

ABN: 58 083 071 185