

ADW JOHNSON PTY LIMITED
ABN 62 129 445 398

Sydney
Level 35 One International Towers
100 Barangaroo Avenue
Sydney NSW 2000
02 8046 7411
sydney@adwjohnson.com.au

Central Coast
5 Pioneer Avenue
Tuggerah NSW 2259
02 4305 4300

coast@adwjohnson.com.au

Hunter Region
7/335 Hillsborough Road
Warners Bay NSW 2282
02 4978 5100

hunter@adwjohnson.com.au

Utility Services Report

To accompany a Concept Development
Application for the Ivanhoe Estate Masterplan
a State Significant Development

Property:

The land currently comprising Ivanhoe Estate,
Herring Road, Macquarie Park as well as a portion of
Shrimptons Creek and part of Lot 1 in DP 859537

Applicant:

Aspire Consortium on behalf of
NSW Land and Housing Corporation

Date:

6th September 2019

Project Management • Town Planning • Engineering • Surveying
Visualisation • Economic Analysis • Social Impact • Urban Planning

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Document Control Sheet

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C	Minor Amendment	5 th December 2017	BM	MO
D	Minor Amendment	13 th December 2017	BM	MO
E	Layout Amendment	6 th September 2019	BM	MO
F	Minor wording	6 th September 2019	BM	MO

Limitations Statement

This report has been prepared in accordance with and for the purposes outlined in the scope of services agreed between ADW Johnson Pty Ltd and the Client. It has been prepared based on the information supplied by the Client, as well as investigation undertaken by ADW Johnson and the sub-consultants engaged by the Client for the project.

Unless otherwise specified in this report, information and advice received from external parties during the course of this project was not independently verified. However, any such information was, in our opinion, deemed to be current and relevant prior to its use. Whilst all reasonable skill, diligence and care have been taken to provide accurate information and appropriate recommendations, it is not warranted or guaranteed and no responsibility or liability for any information, opinion or commentary contained herein or for any consequences of its use will be accepted by ADW Johnson or by any person involved in the preparation of this assessment and report.

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Executive Summary

ADW Johnson Pty Limited (ADW Johnson) has been commissioned by Aspire Consortium to liaise with the relevant utility service authorities to determine their ability to service the proposed overall development of Lots 8-20 in DP861433, Lots 5-7 in DP740753 and Lot 100 in DP1223787 known as The Ivanhoe Estate, Ivanhoe Place, Macquarie Park NSW (the Site).

Approval for the overall development is to be sought via consent to a masterplan development application that seeks approval for the maximum building envelopes for future stages of development, the maximum gross floor area (GFA) and land uses for the development. Specifically:

- A mixed-use development involving a maximum of GFA of 268,000m², including:
 - Residential flat buildings comprising private, social and affordable housing;
 - Seniors housing comprising residential care facilities and self-contained dwellings;
 - A new school;
 - Child care centres;
 - Minor retail development;
 - Community uses.

In order to support the proposed overall development, a number of utility services will be required to be delivered to the future premises. These utility services and their relevant authorities, include:

- Potable Water Supply – Sydney Water Corporation (SWC);
- Recycled Water Supply – SWC;
- Sewerage Infrastructure – SWC;
- Electricity Infrastructure – Ausgrid;
- Telecommunications Infrastructure – NBN Co; and
- Gas Infrastructure – Jemena.

All of the abovementioned authorities were contacted to determine their ability to service the proposed overall development and to advise of extent of any likely lead-in infrastructure and/or major upgrades required.

All authorities have advised that they can service the proposed overall development, albeit in some cases, with upgrades to the existing network required. A summary of the capacity of each utility service to service the proposed overall development is provided in Table 1 overleaf.

Table 1: Summary of Existing Utility Services Infrastructure and Upgrades Required

UTILITY SERVICE	UTILITY AUTHORITY CONTACTED	CAN PROPOSED OVERALL DEVELOPMENT BE SERVICED BY EXISTING TRUNK NETWORK? *	DESCRIPTION OF TRUNK UPGRADE WORKS REQUIRED TO SERVICE WHOLE DEVELOPMENT	ARE THE WORKS DEVELOPER FUNDED?	ESTIMATE COST OF DEVELOPER FUNDED WORKS
Potable Water Supply	Sydney Water Corporation	Yes	No upgrades required.	TBC**	TBC**
Recycled Water Supply	Sydney Water Corporation	N/A	N/A	N/A	N/A
Sewerage Infrastructure	Sydney Water Corporation	Yes	No upgrades required.	TBC**	TBC**
Electricity Infrastructure	Ausgrid	No	Three (3) new high voltage feeders required to service the site.	Yes	TBC**
Tele-communications Infrastructure	NBN Co (& Opticomm)	No	New trunk main required to service the site.	Yes**	TBC**
Gas Infrastructure	Jemena	Yes	No upgrades required.	TBC**	TBC**

* Existing capacity and servicing requirements to be re-confirmed with each utility authority as project progresses and in conjunction with detailed design work.

** To be confirmed post obtainment of development consent

The developer has advised that any developer funded works are not likely to present an impediment to the delivery of this project and ongoing consultation will be made with each utility authority to ensure their timely delivery.

Following the delivery of the trunk upgrade works (as identified in Table 1 above) or completion of connections into the existing trunk network, the internal utility services network is expected to be able to be delivered in accordance with the proposed development staging. Addendums to this Utility Services Report will be prepared and submitted as part of future development applications for each stage. These addendums will provide additional servicing advice in relation to each stage, as well as identifying any temporary works required. More detailed information will be provided in conjunction with Construction Certificate documentation for each proposed stage of the development.

Based upon discussions and information provided by the relevant service providers, the provision of utility services is unlikely to pose a constraint to the development of the site.

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1.0 Introduction

This report supports a Concept Development Application for the Ivanhoe Estate Masterplan, a State Significant Development (SSD) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). It has been prepared for Aspire Consortium on behalf of NSW Land and Housing Corporation.

The purpose of this report is to provide a high-level summary of utility services currently within and surrounding the site, as well as their capacity to service the proposed overall development and a broad description of any upgrade works required.

Further utility servicing details will be provided as addendums to this report, on a stage by stage basis, in conjunction with future **Development Applications (DA's)**.

1.1 BACKGROUND

In September 2015 the Ivanhoe Estate was rezoned by the Department of Planning and Environment as part of the Macquarie University Station (Herring Road) Priority Precinct, to transform the area into a vibrant centre that benefits from the available transport infrastructure and the precinct's proximity to jobs, retail and education opportunities within the Macquarie Park corridor.

The Ivanhoe Estate is currently owned by NSW Land and Housing Corporation and comprises 259 social housing dwellings. The redevelopment of the Ivanhoe Estate is part of the NSW Government Communities Plus program, which seeks to deliver new communities where social housing blends with private and affordable housing, with good access to transport, employment, improved community facilities and open space.

The Communities Plus program seeks to leverage the expertise and capacity of the private and non-government sectors. As part of this program, Aspire Consortium, comprising Frasers Property Australia, Citta Property Group and Mission Australia Housing, was selected as the successful proponent to develop the site in July 2017.

The Masterplan DA is the first step of the planned redevelopment of the Ivanhoe Estate and will create an integrated neighbourhood including social housing mixed with affordable and private housing, as well as seniors housing, a new school, child care centres, community facilities and retail development.

2.0 Site Description

The Ivanhoe Estate site is located in Macquarie Park near the corner of Epping Road and Herring Road within the Ryde Local Government Area (LGA). The site is approximately 8.2 hectares and currently accommodates 259 social housing dwellings, comprising a mix of townhouse and four (4) storey apartment buildings set around a cul-de-sac street layout. An aerial photo of the site is provided at Figure 2.1 below.

Immediately to the north of the site are a series of four (4) storey residential apartment buildings. On the north-western boundary, the site fronts Herring Road and a lot which is currently occupied by four (4) former student accommodation buildings and is likely to be subject to redevelopment. Epping Road runs along the south-western boundary of the site and Shrimptons Creek, an area of public open space, runs along the south-eastern boundary. Vehicle access to the site is via Herring Road.

The site is comprised of 17 individual lots and a part lot and are owned and managed by Land and Housing Corporation. The Masterplan site also incorporates adjoining land, being a portion of Shrimptons Creek and part of the commercial site at 2-4 Lyonpark Road. This land is included to facilitate a bridge crossing and road connection to Lyonpark Road.



Figure 2.1 - Ivanhoe Estate Site

3.0 Proposed Development

The proposed Masterplan is a Concept DA (in accordance with Section 83B of the EP&A Act), which sets out the concept proposal for the development of the site. The concept contained in the Masterplan DA establishes the planning and development framework, which will form the basis for the detailed design of the future buildings and against which the future detailed DAs will be assessed.

The Masterplan DA seeks approval for the maximum building envelopes for future stages of development, the maximum gross floor area (GFA) and land uses for the development. Specifically:

- A mixed-use development involving a maximum of GFA of 268,000m², including:
 - Residential flat buildings comprising private, social and affordable housing;
 - Seniors housing comprising residential care facilities and self-contained dwellings;
 - A new school;
 - Child care centres;
 - Minor retail development;
 - Community uses;
- Maximum building heights and GFA for each development block;
- Public domain landscape concept, including parks, streets and pedestrian connections;
- Provision of the Ivanhoe Estate Design Guidelines to guide the detailed design of the future buildings; and
- Vehicular and intersection upgrades.

The development will deliver an integrated infrastructure solution via 'Real Utilities'. This will consist of a private embedded electrical and hot water network to supply all users across the development. Details of the integrated infrastructure solution are contained within the Ivanhoe Sustainability Report which can be found in **Appendix A**.

An image of the Masterplan DA is provided at Figure 3.1 below, whilst a large version is contained within **Appendix B**.



Figure 3.1 - Ivanhoe Estate Masterplan

4.0 Potable Water Supply

4.1 EXISTING INFRASTRUCTURE

A Dial Before You Dig (DB4YD) search was undertaken and it was found that there are trunk and reticulated water mains surrounding the site within Herring Road and Epping Road, as well as internal reticulation within Ivanhoe Place, Wilcannia, Nyngan, Narromine and Cobar Way. The internal potable water mains currently service the existing dwellings.

The sites current water supply is from a DN500 CICL trunk main and a DN250 PVC Main which run along Herring Road running in a north-easterly direction. From this trunk main, a DN150 DICL reticulated water main extends along the north-eastern side of Ivanhoe Place with DN100 DICL branches supplying Wilcannia, Nyngan, Narromine and Cobar Way. A DN250 CICL water main (Part DN250 uPVC across Lot 1 in DP880284) runs in a south-easterly direction along the north-eastern side of Epping Road. On the south-western side of Epping road there is a DN100/DN150 CICL reticulated water main.

The water supply for Lot 1 in DP859537 is through a connection off the DN250 CICL water main running along Epping Road through a DN150 CICL main which runs through Lot 511 DP1153119 (Optus Drive) then up the south-eastern side of Lyonpark Road with a connection line across Lyonpark road to the subject property.

A visual depiction of the abovementioned trunk and reticulation infrastructure is shown below in Figure 4.1, whilst a larger version is contained within Appendix C.

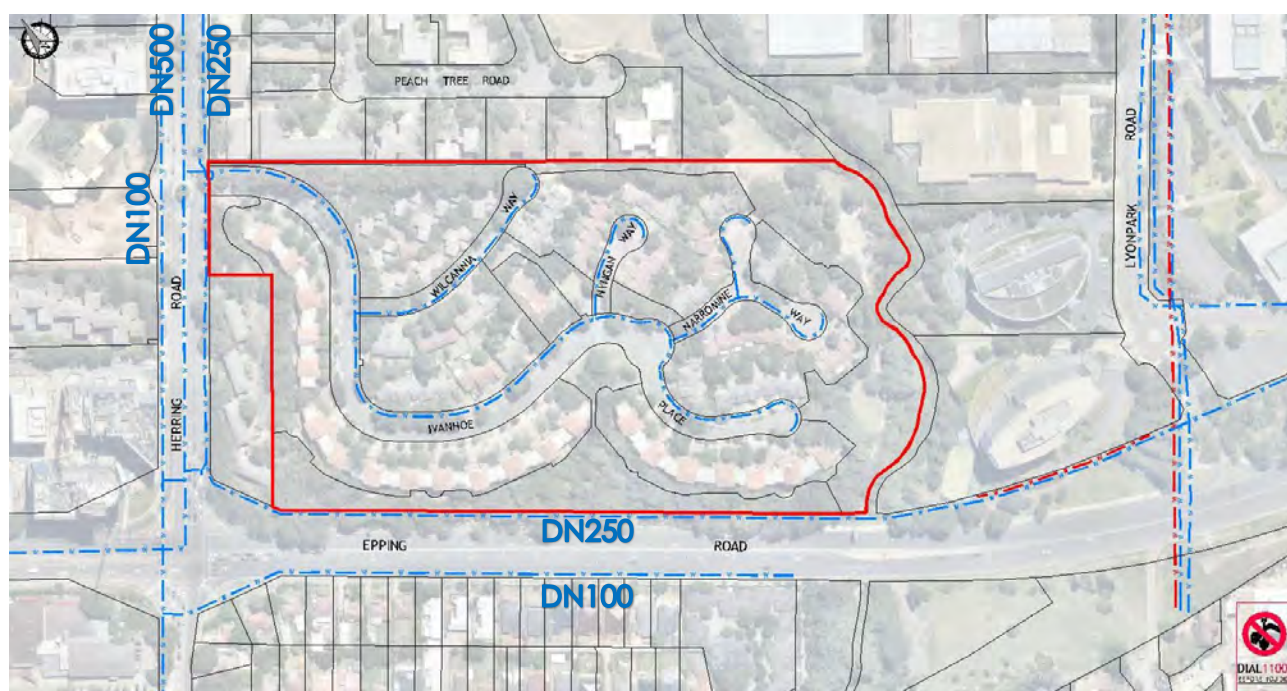


Figure 4.1 – Existing Potable Water Infrastructure

4.2 FEASIBILITY APPLICATION

A feasibility application was lodged with Sydney Water Corporation (SWC) on 16th June 2017. A response was received on 3rd August 2017 which can be seen in Appendix D. It is noted that the advice issued by SWC is a guide only and a definitive statement of requirements cannot be obtained until after development consent is issued by the consent authority.

In the response to the feasibility application, SWC indicated that the proposed site is located within the Marsfield water supply zone boundary. There is an existing DN500 trunk water main along Herring Road which has capacity to service the proposed development.

Following development consent, a detailed planning study is to be carried out to determine whether augmentation of existing water infrastructure within the Macquarie University growth precinct is required.

4.3 LEAD IN WORKS

Based upon SWC's advice contained within the response to the feasibility application, the only lead in work likely to be required to facilitate the overall development is a connection into the existing DN500 trunk main located within Herring Road. It is currently envisaged that this connection would be made within the vicinity of the proposed main site intersection and be constructed in conjunction with the upgrading of the existing intersection into Ivanhoe Place.

A secondary connection into the existing DN250 trunk main located within Epping Road would be required to ensure security of supply in the event of a failure of the main line.

It is noted that an existing band of vegetation is present along the Epping Road boundary, which includes an area of Sydney Turpentine – Ironbark forest, an Endangered Ecological Community (EEC). The alignment of the connection to Epping Road will be designed to ensure there is no impact on the EEC with an underbore a potential option to limit the impact on other vegetation in the area.

4.4 INTERNAL WORKS

As part of the development, the existing internal infrastructure is to be removed and likely replaced by new DN200 mains, fed from the trunk mains in Herring Road.

An indicative internal water reticulation layout, prepared by Rose Atkins Rimmer (RAR) (accredited Water Service Coordinators (WSC's) with SWC), is shown overleaf in Figure 4.2.

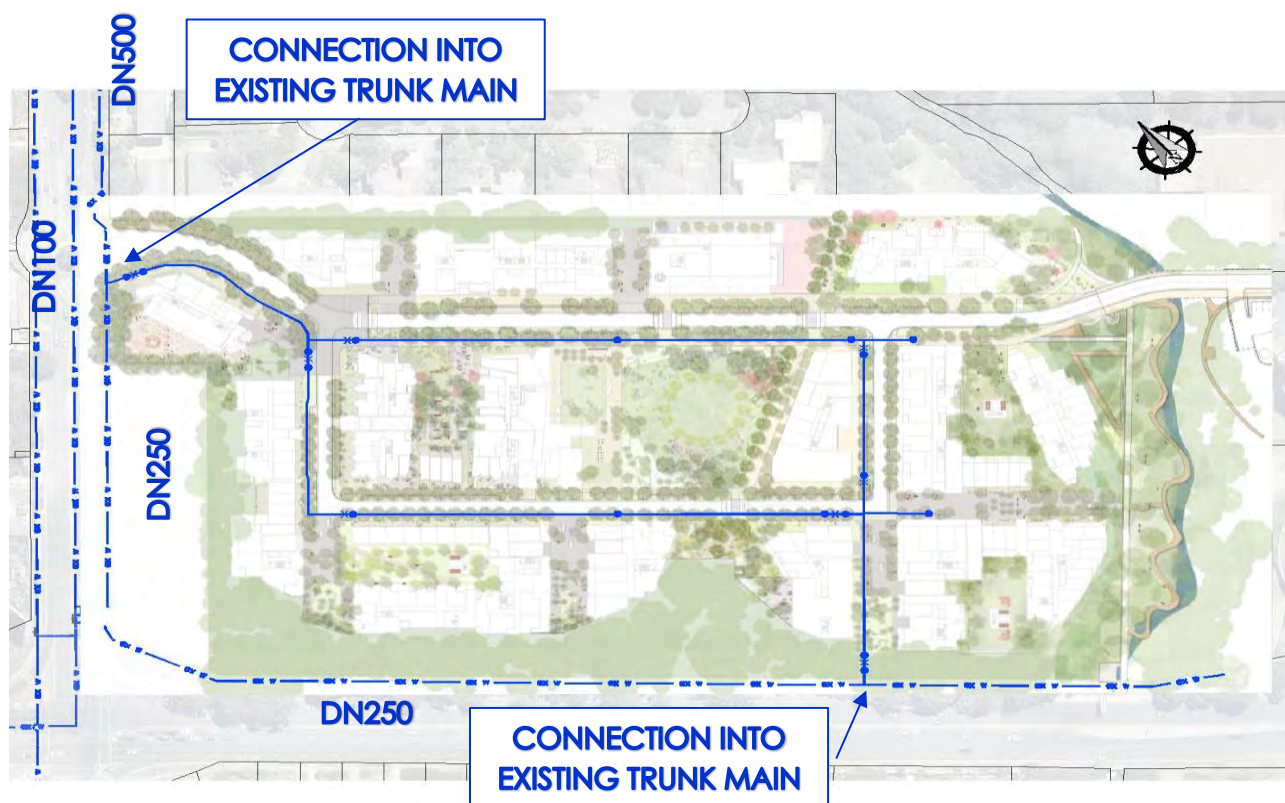


Figure 4.2 – Concept Proposed Water Reticulation Network Design

4.5 POTABLE WATER SUPPLY CONCLUSION

Based upon advice received from SWC, there is capacity within the existing trunk potable water network to service the proposed overall development.

The future internal potable water network should be readily connected into the existing trunk network immediately adjacent to/or within the footprint of the proposed main site intersection off Herring Road. Accordingly, the provision of potable water is not considered to present a constraint to the project.

5.0 Recycled Water Infrastructure

5.1 EXISTING INFRASTRUCTURE

A DB4YD search was undertaken and it was found that there are no recycled water mains located adjacent to or within the site.

5.2 FEASIBILITY APPLICATION

A feasibility application was lodged with Sydney Water Corporation (SWC) on 16th June 2017. A response was received on 3rd August 2017 which can be seen in Appendix D. It is noted that the advice issued by SWC is a guide only and a definitive statement of requirements cannot be obtained until after development consent is issued by the consent authority.

Within the SWC's response to the feasibility application, there was no reference to recycled water and any requirement to provide this service within the proposed development. This is not unexpected as SWC typically no longer support the provision of recycled water infrastructure within their network as it is generally not financially viable. The developer then typically satisfies BASIX requirements through delivery of the proposed built form i.e. within the private lot area, through delivery of rainwater tanks or similar.

5.3 LEAD IN WORKS

Given there is no requirement from SWC to provide recycled water reticulation within the development, no lead-in works are envisaged.

5.4 INTERNAL WORKS

It is noted that whilst SWC has no requirement to provide recycled water infrastructure within the proposed development, the developer may still opt to provide a private reticulation network within buildings for sustainability purposes. If this is proposed for the development, further details will be provided with Construction Certificate documentation for each of the proposed stages.

5.5 RECYCLED WATER INFRASTRUCTURE CONCLUSION

There is no requirement from SWC for the provision of recycled water reticulation to the proposed development. Should the developer opt to provide a privatised recycled water solution for the development, then details will be provided as part of construction certificate documentation for each of the proposed stages.

6.0 Sewerage Infrastructure

6.1 EXISTING INFRASTRUCTURE

A DB4YD search was undertaken and it was found that both trunk and reticulated sewer mains are located adjacent to and within the site.

The DB4YD search shows a DN600 Reinforced Concrete trunk wastewater main running from the southern side of Epping Road, then underneath the road, after which point it enters the site and travels in a north-easterly direction, generally following the alignment of the western boundary of Shrimptons Creek.

Internal reticulation within the site consists of two (2) DN225 Vitrified Clay sewer lines with DN150 Vitrified Clay lines generally connecting the individual dwellings.

A visual depiction of the abovementioned trunk infrastructure is shown below in Figure 6.1, whilst a larger version is contained within Appendix C.

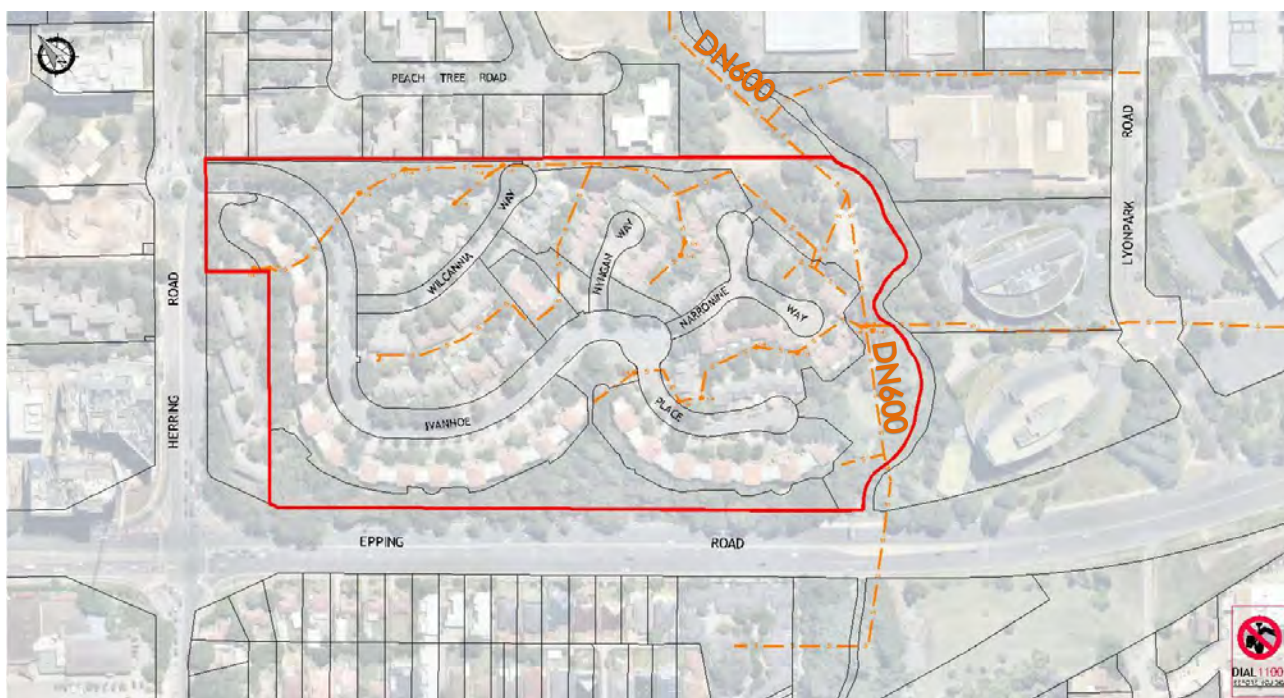


Figure 6.1 – Existing Trunk Sewerage Infrastructure

6.2 FEASIBILITY APPLICATION

A feasibility application was lodged with Sydney Water Corporation (SWC) on 16th June 2017. A response was received on 3rd August 2017 which can be seen in Appendix D. It is noted that the advice issued by SWC is a guide only and a definitive statement of requirements cannot be obtained until after development consent is issued by the consent authority.

The feasibility application indicated that the proposed development can drain into the existing North Head system via the existing DN600 Reinforced Concrete trunk wastewater main, located within the site along its frontage to Shrimptons Creek. SWC have advised that this DN600 trunk main has capacity to service the development.

SWC have further advised that, post obtainment of development consent, a detailed planning study is to be carried out to determine whether augmentation of existing water infrastructure within the Macquarie University growth precinct is required.

6.3 LEAD IN WORKS

In accordance with the SWC's advice in their response to the feasibility application, there are no lead-in works required to service the proposed development.

The only works required are to connect the development into the existing DN600 trunk main as required.

6.4 INTERNAL WORKS

As part of the development, the existing internal infrastructure is to be removed and likely replaced by new DN150 to DN300 mains, which will connect into the DN600 main adjacent to Shrimptons Creek. The sizing of the new internal mains will be determined following obtainment of development consent and will be based upon the grade of the proposed main, together with the number of dwellings to be serviced.

An indicative internal sewerage reticulation layout, prepared by Rose Atkins Rimmer (RAR) (accredited Water Service Coordinators (WSC's) with SWC), is shown below in Figure 6.2.

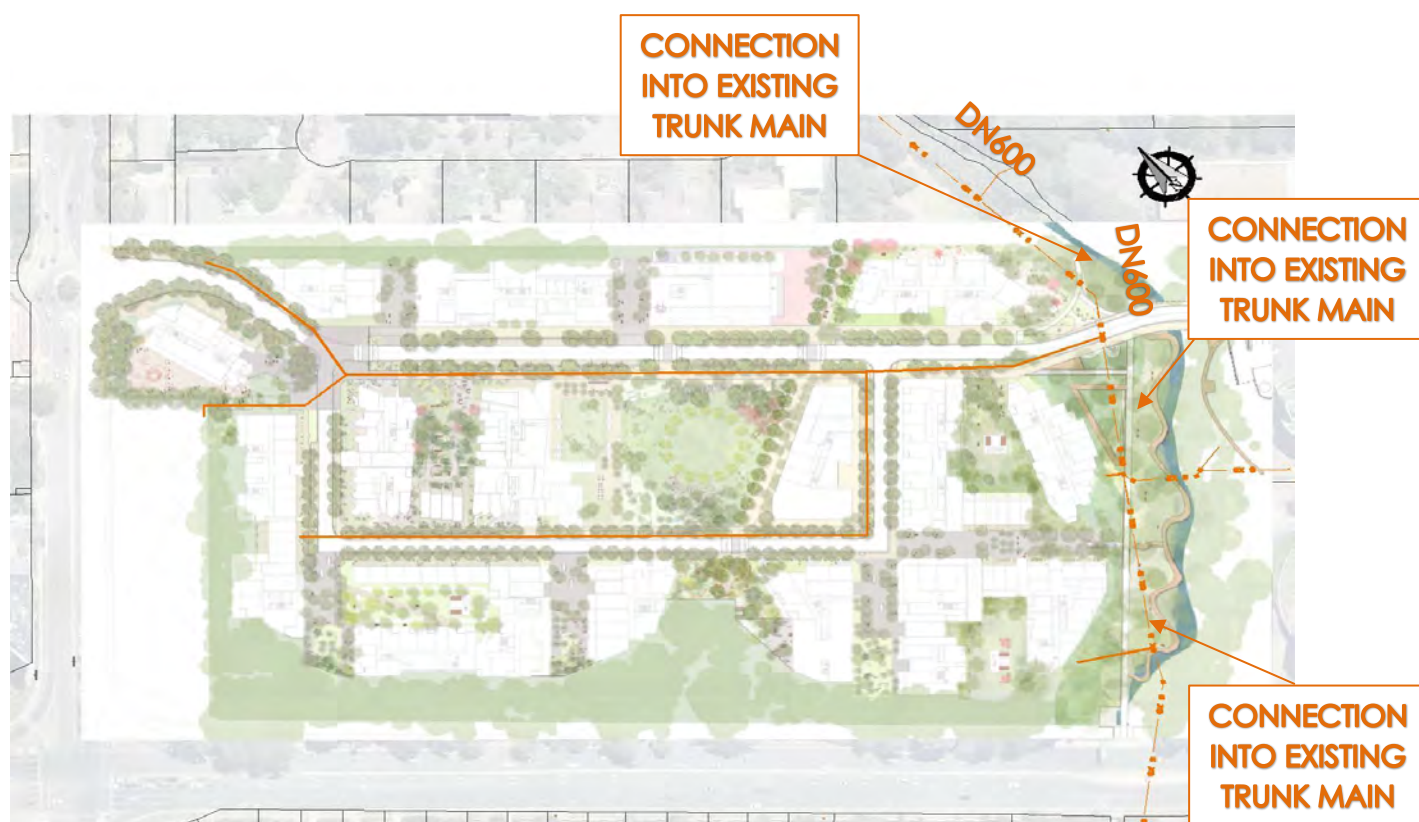


Figure 6.2 – Concept Proposed Sewerage Design

6.5 SEWERAGE INFRASTRUCTURE CONCLUSION

Based upon advice received from SWC, there is capacity within the existing trunk sewerage network to service the proposed overall development.

The future internal sewerage network should be readily connected into the existing trunk network that traverses through the site, generally adjacent to the western boundary of Shrimptons Creek. Accordingly, the provision of sewerage is not considered to present a constraint to the project.

7.0 Electricity Infrastructure

7.1 EXISTING INFRASTRUCTURE

A DB4YD search and review of aerial imagery was undertaken and it was found that both high and low voltage, above and below ground, infrastructure exist within the road reserves adjacent to the site. Within the site, high and low voltage infrastructure exists, however it is located entirely underground.

Based upon review of the DB4YD plans and visual inspections, the site is currently serviced from underground high and low voltage infrastructure, which runs off the existing trunk network within Herring Road. The internal network runs along both verges of Ivanhoe Place, with two (2) existing electrical kiosks existing on the site.

Lot 1 in DP859537 (on the eastern side of Shrimptons Creek, where the proposed road extension to LPR is to be located) is serviced from High Voltage underground cables located within the northern verge of Lyonpark Road. Two (2) electrical kiosks exist within the front eastern corner of the subject property (within the footprint of the proposed road reserve) which provide the property with a low voltage supply via underground cables.

Within the northern verge of Epping Road, the low voltage network and street lighting cables are located above ground.

A visual depiction of the abovementioned trunk infrastructure is shown below in Figure 7.1, whilst a larger version is contained within Appendix C.

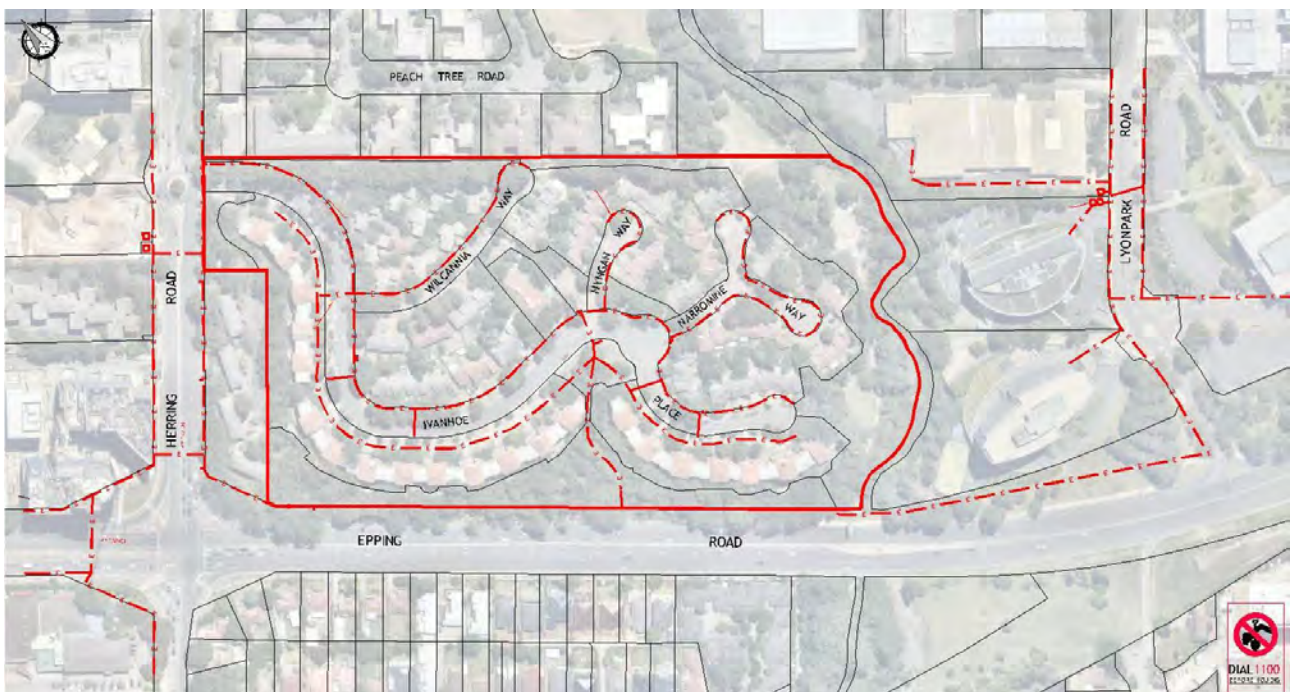


Figure 7.1 – Existing Electricity Infrastructure

7.2 FEASIBILITY APPLICATION

A feasibility application was lodged with Ausgrid on 6th June 2017, with a response being received on 2nd August 2017. A copy of this response is contained within Appendix E.

From investigations made by Ausgrid it was confirmed that there are several 11Kv feeders that run past the site which are connected to either Macquarie Park Zone or Epping Zone but these feeders cannot support the requested load without a considerable and uneconomic upgrade of the existing network.

Ausgrid suggested that three (3) additional HV feeders will be required to support the load of the overall proposed development and provided two (2) lead-in route options, which are summarised in Section 7.3 below.

7.3 LEAD IN WORKS

In their response to the feasibility application, Ausgrid proposed two (2) route options for the three (3) HV feeders required to service the overall proposed development. Both of these options are summarised below.

7.3.1 Option 1 – Install New Conduits – Epping Zone

This option is for a complete new cable run and installation of bank of 4x150mm conduits from the Epping Zone substation to the site. Three (3) new 500mm² Al XLPE HV cables are proposed to be installed for the entire run. The conduits may require installation in Thermal Stable Backfill in some areas, which has not been included as part of the cost. Four (4) existing feeders will require consolidation to allow for connection at the zone.

Figure 7.2.1 below shows the alignment of this route, whilst a larger version is provided in Appendix E.

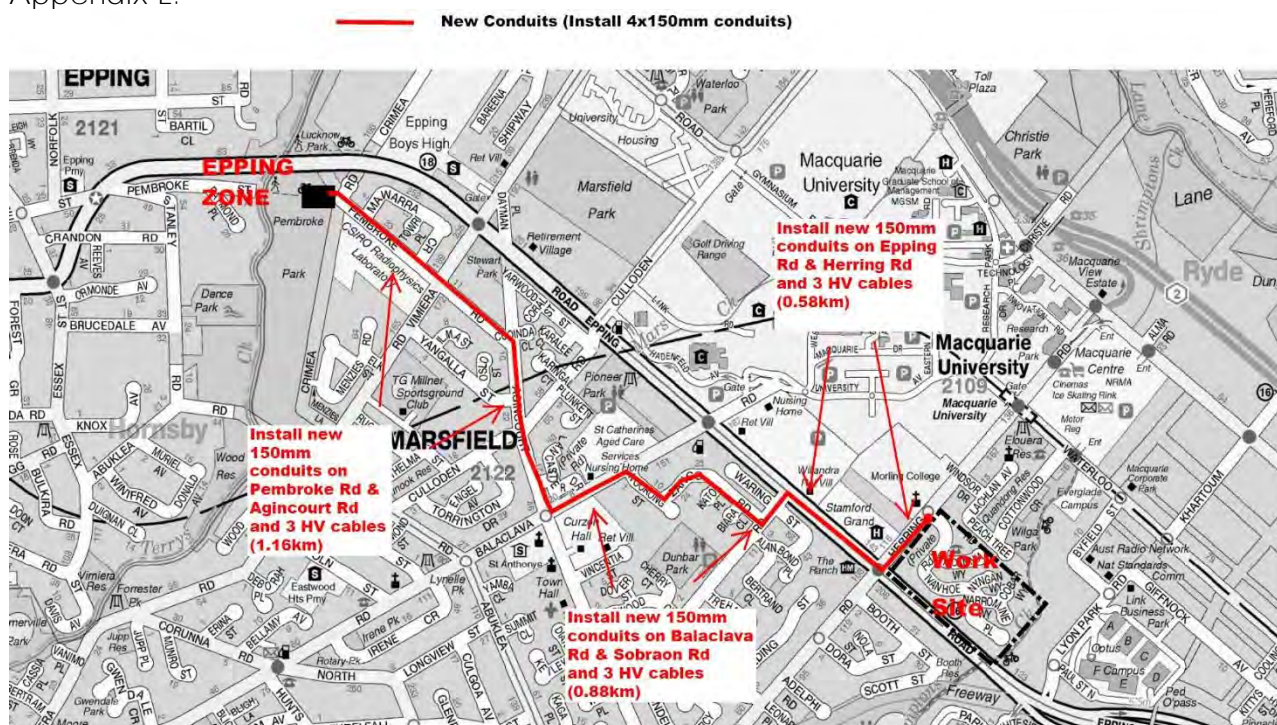


Figure 7.2.1 – Concept Proposed Electrical Design
(image provided by Ausgrid)

Benefit: This is the cheapest option available. It also provides an absolute cost of the final project and uses an alternate route along a non-RMS roads.

Distance: 2.62km

7.3.2 Option 2 – Use Existing Conduits Where Possible – Top Ryde Zone

This option looks at running three (3) new 500mm² Al XLPE cables from the Top Ryde Zone substation to the site. The cables are proposed to be installed using some existing conduits and some new conduits as shown on the attached PDF.

Figure 7.2.2 below shows the alignment of this route, whilst a larger version is provided in Appendix E.

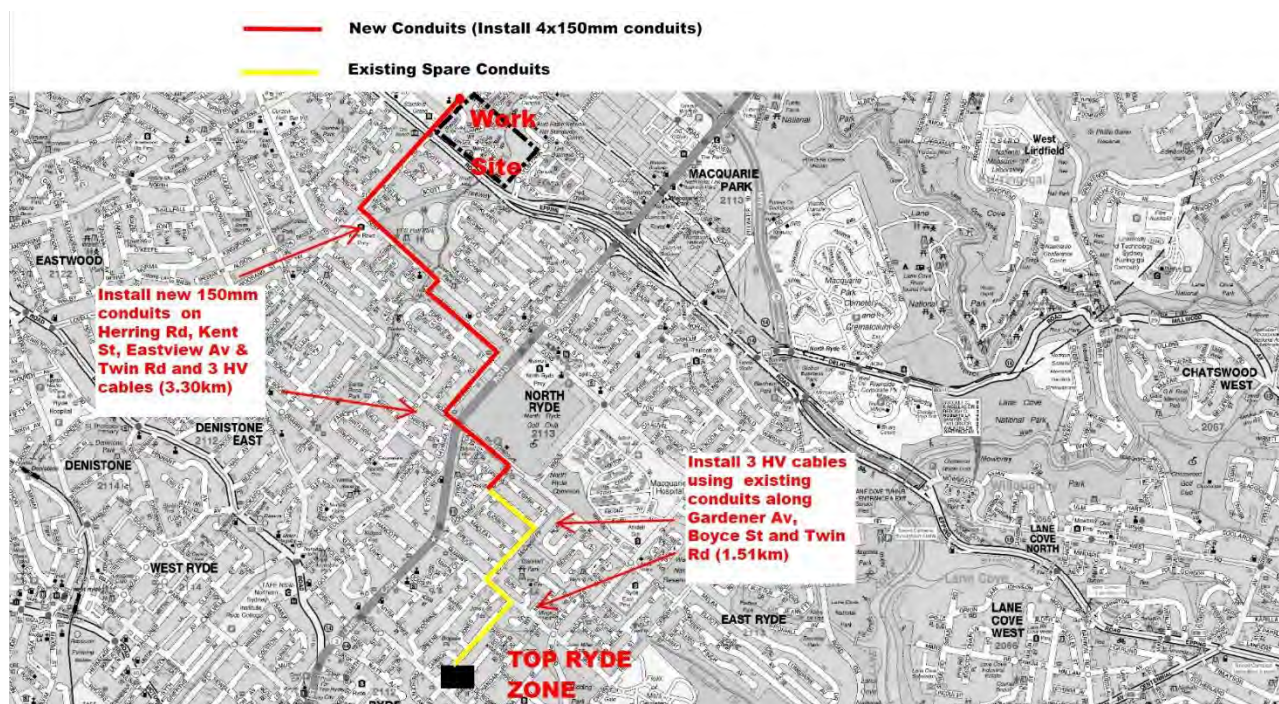


Figure 7.2.2 – Concept Proposed Electrical Design
(image provided by Ausgrid)

Benefit: This is a contingency option in the event that the Epping Zone substation does not have capacity available. It also provides an absolute cost of the final project and uses an alternate route along non-RMS roads.

Distance: 4.81km

7.4 INTERNAL WORKS

As part of the development, the existing internal infrastructure is to be demolished and replaced with a new high voltage network, including mini chamber substations to be installed throughout the site. These mini chamber substations will then feed a low voltage supply to the proposed dwellings and street light network. Sheldermidines (electrical engineers) have prepared a high-level concept overall masterplan electrical design, which is shown below in Figure 7.4.

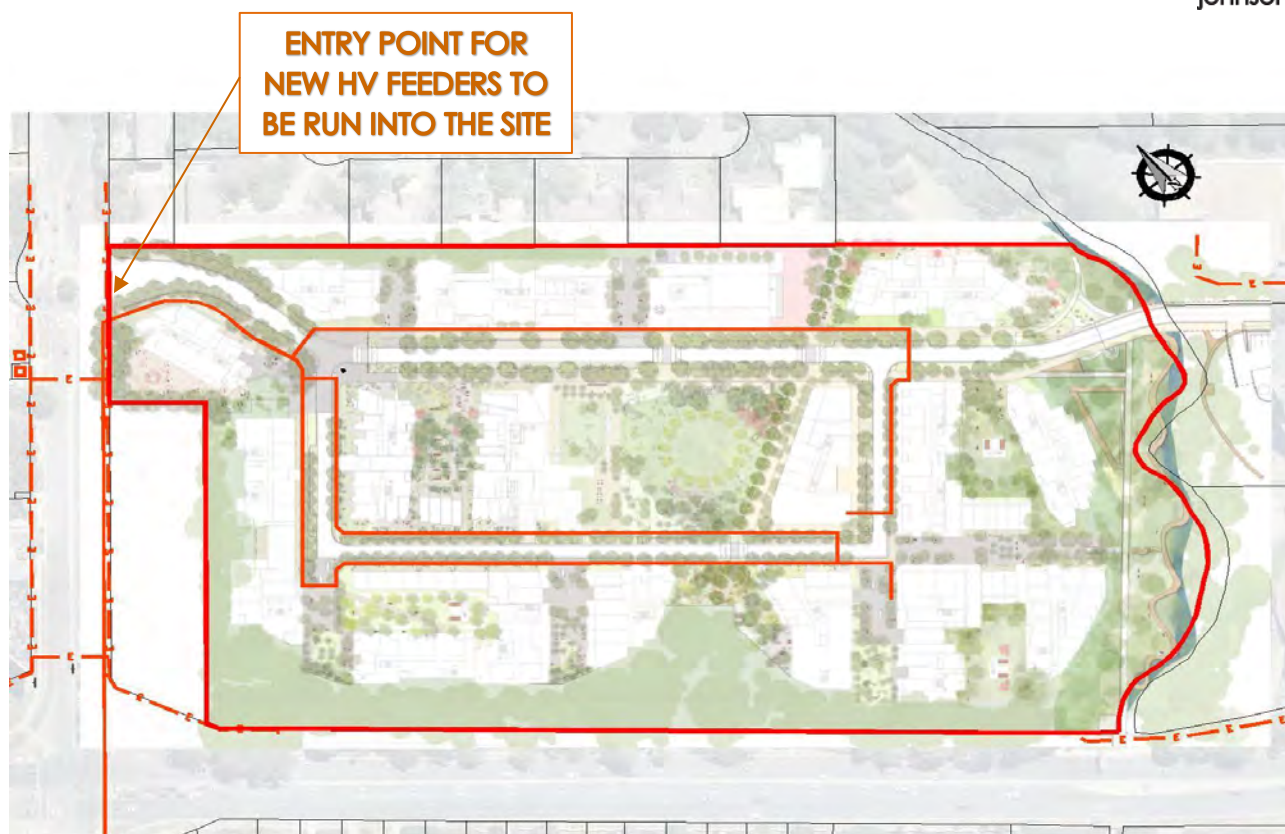


Figure 7.4 – Concept Proposed Electrical Design

7.5 ELECTRICITY INFRASTRUCTURE CONCLUSION

Based upon correspondence with Ausgrid, it is anticipated that there will not be capacity within the existing electrical network to service the proposed development. Ausgrid have advised that three (3) new feeders will be required to service the proposed overall development and have provided two (2) alternate route options for this infrastructure.

The existing electricity network can be upgraded to facilitate the proposed development and is not likely to present a significant constraint to the project. The developer has incorporated timing and cost allowances for this lead-in infrastructure into its development program to coordinate timely project delivery.

8.0 Telecommunications Infrastructure

8.1 EXISTING INFRASTRUCTURE

A DB4YD search was undertaken and it was found that the site is currently surrounded by multiple telecommunication companies including:

- AAPT (Lyonpark Road);
- AARNET (Epping Road and Lyonpark Road);
- NBNCO (Herring Road and Lyonpark Road);
- Nextgen (Epping Road and Lyonpark Road);
- Optus/Uecomm (Epping Road, Herring Road and Lyonpark Road);
- Pipe Networks (Herring Road and Lyonpark Road);
- Telstra local and main network (Herring Road, Lyonpark Road and all internal roads feeding to dwellings);
- Verizon (Lyonpark Road);
- Vocus (Lyonpark Road).

The existing telecommunications infrastructure located adjacent to and within the site is summarised in Figure 8.1 below, whilst a larger version is contained within Appendix C.



Figure 8.1 – Existing Communications Infrastructure

8.2 FEASIBILITY REQUEST / PRELIMINARY SERVICING ADVICE/LEAD-IN WORKS

8.2.1 OPTICOMM

A request for preliminary advice was submitted to OptiComm on 10th October 2017, with a response being received on 17th October 2017. A copy of this response is contained within Appendix F.

OptiComm has conducted a desktop study of the site and determined that the site can be serviced with superfast Fibre-optic Telecommunications Infrastructure and Services.

Opticomm have suggested that a number of lead-in routes exist for servicing the site, with the further details to be provided as design work progresses on the project (post development consent being obtained).

Opticomm confirmed that regardless of the final route, there will be no backhaul construction cost to be funded by the developer.

Opticomm also informed that following construction of lead-in works to the site, they would be able to supply an internal telecommunication service to the development.

8.2.2 NBN Co

A feasibility request was lodged with NBN Co on 10th October 2017, with a response being received on 25th October 2017. A copy of this response is contained within Appendix F.

NBN Co advised that backhaul lead-in works are required to service the site due to there being insufficient capacity within the existing surrounding network. The lead-in route proposed is from an NBN Co exchange, some 5.2km's away. The alignment of this route is shown in Figure 8.2.2.1 below.

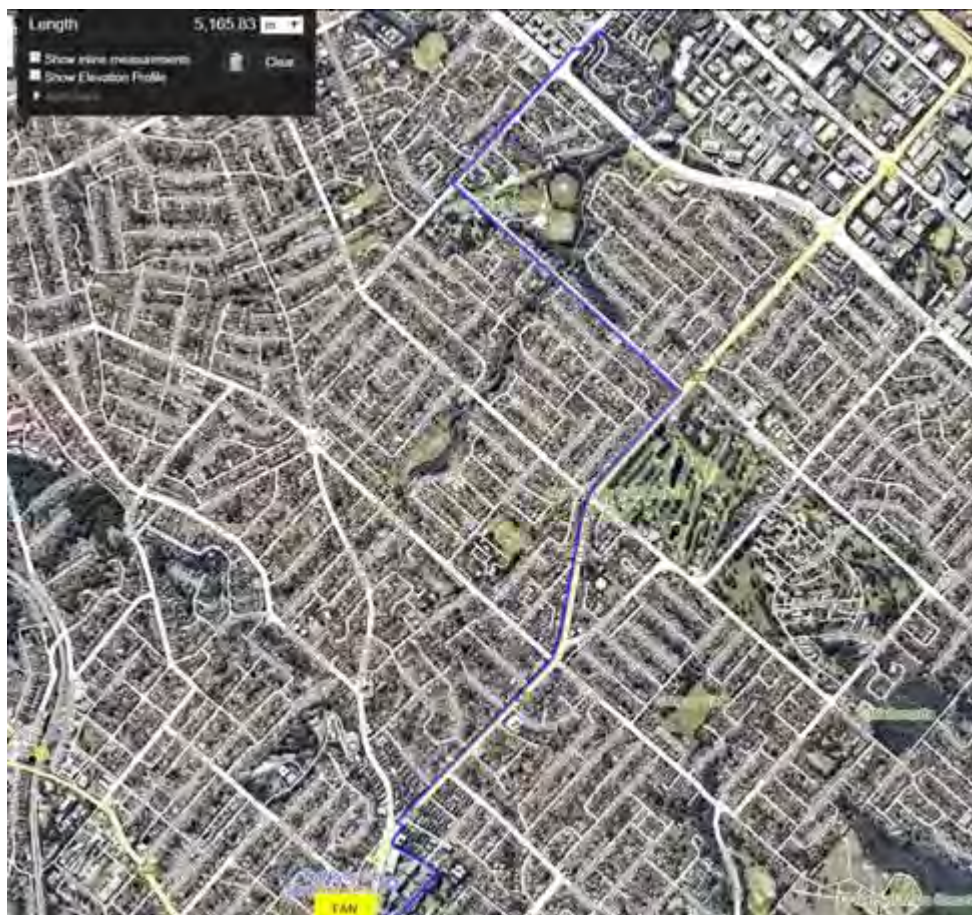


Figure 8.2.2.1 – Preliminary NBN Co Backhaul Lead-In Route
(image provided by NBN Co)

NBN Co advised that developer contributions will be required to assist in funding the backhaul lead-in works, however, the exact amount is subject to confirmation once the developer agrees to enter into a Master Developer Agreement with NBN Co.

NBN Co confirmed that following the construction of lead-in works to the site, they would be able to supply an internal telecommunication service to the development.

8.3 INTERNAL WORKS

Internal telecommunications infrastructure will be generally located within the public road verges or basement car parks/buildings, with necessary easements created. Further details of the internal telecommunications network will be submitted as part of construction certificate documentation with each proposed stage of the development.

8.4 TELECOMMUNICATIONS INFRASTRUCTURE CONCLUSION

Based upon the advice received from both Opticomm and NBN Co, the provision of telecommunication services to the site is not envisaged to present a significant constraint to the project. Both service providers have confirmed that telecommunication services can be provided to the development, with necessary lead-in works coordinated with proposed development delivery timeframes.

The developer will select a preferred telecommunications provider as part of future work on the project, but confirms that the indicative developer funded backhaul fees provided by NBN Co will not significantly impact on the feasibility, or their ability to deliver, the project.

The internal telecommunications network will be incorporated in future design work on the project, post obtainment of development consent.

9.0 Gas Infrastructure

9.1 EXISTING INFRASTRUCTURE

A DB4YD search was undertaken and it was found that gas infrastructure exists in and around the site.

The DB4YD plans show a DN200 pressure secondary main and a low pressure DN110 nylon gas main running along Herring Road. A low pressure DN110 Nylon main extends off the network in Herring Road and runs along the northern verge of Ivanhoe Place, providing the main internal reticulation main within the existing estate. From this main, DN50 low pressure offshoots extend into Wilcannia Way, Nyngan Way, Narrowmine Way and Cobar Way and service existing dwellings.

A visual depiction of the abovementioned trunk infrastructure is shown below in Figure 9.1, whilst a larger version is contained within Appendix C.

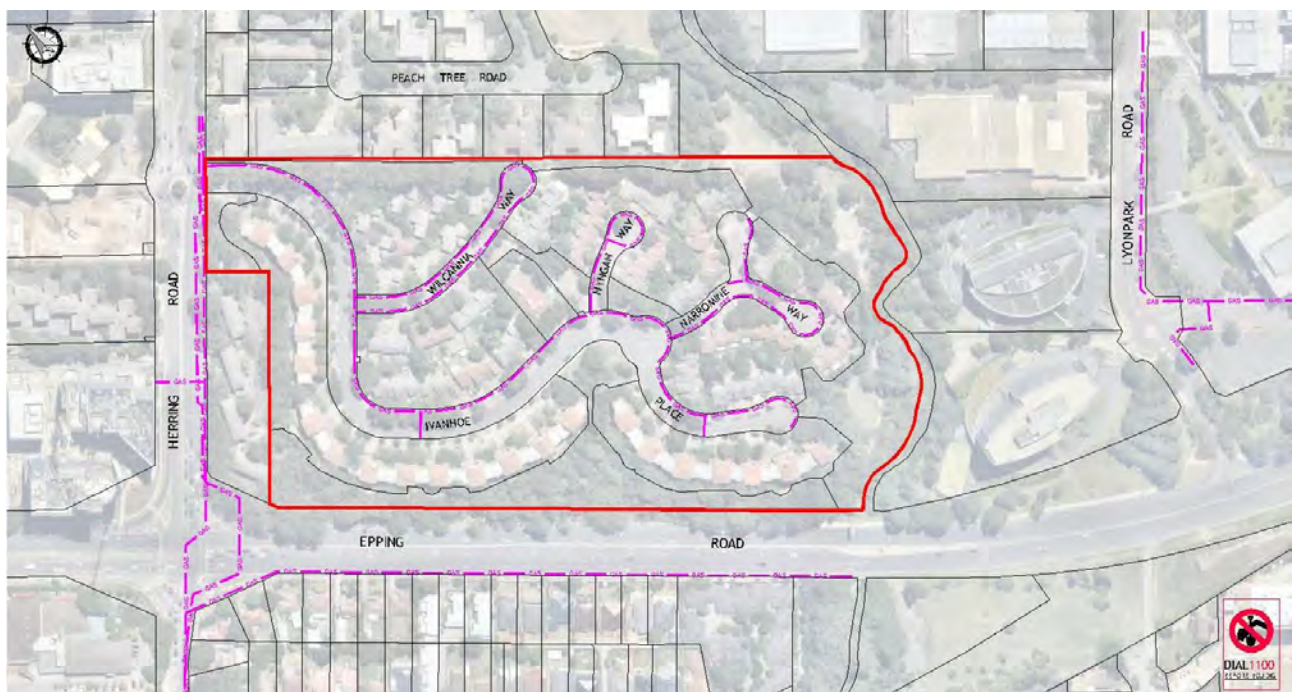


Figure 9.1 – Existing Gas Infrastructure

9.2 PRELIMINARY SERVICING ADVICE

A request for preliminary servicing advice was submitted to Jemena on 10th October 2017, with a response being received on that same day. A copy of this response is contained within Appendix G.

The response from Jemena indicates that the existing 210kPa main in Herring Road could be extended through the proposed overall development to service the future premises. Jemena advised that their ability to extend the existing network into the site will be subject to a commercial viability assessment, which would be undertaken post obtainment of development consent and in conjunction with future design work on the project. However, should the site prove commercially viable to Jemena, then it is expected that the developer will supply open trenching and restorations during the construction phase.

It is noted that the advice received from Jemena is typical to that received on other projects, in that Jemena will not commit to the development until after consent to the DA is achieved. Based upon our experience working on similar projects and review of Jemena's preliminary advice, it is our opinion that the provision of gas services is unlikely to present a significant constraint to the development.

9.3 LEAD IN WORKS

Lead-in works are likely to be limited to connection into the existing 210kPa main located within Herring Road. It is noted that this is subject to confirmation from Jemena as part of a future commercial viability assessment to be undertaken once development consent is obtained.

9.4 INTERNAL WORKS

Should Jemena determine that the development satisfies their commercial criteria, it is expected that an internal gas reticulation network would be located within the service allocations within the proposed public road reserves, with any infrastructure within private land covered by suitable easements.

Jemena have initially advised that the main spine of an internal gas network is likely to be a 210kPa secondary gas main.

9.5 GAS INFRASTRUCTURE CONCLUSION

Based upon the advice received from Jemena, the provision of gas reticulation to the site is not envisaged to present a significant constraint to the project, with existing mains located adjacent to the property in Herring Road being capable of feeding the overall proposed development.

The internal reticulation network is likely to be underpinned by a 210kPa secondary main network, which will typically be located within the service allocation within the public road reserve.

10.0 Conclusion

Based upon discussions and information provided by the relevant service providers, the provision of utility services is not envisaged to pose a significant constraint to the development of the site.

The relevant authorities responsible for Water, Recycled Water, Sewer, Electrical, Telecommunications and Gas have been consulted to provide preliminary servicing advice in regards to servicing the proposed overall development.

All authorities have advised that they can service the proposed overall development, albeit in some cases, with upgrades to the existing network required. A summary of the capacity of each utility service to service the proposed overall development is provided in Table 10.1 below.

Table 10.1: Summary of Existing Utility Services Infrastructure and Upgrades Required

UTILITY SERVICE	UTILITY AUTHORITY CONTACTED	CAN PROPOSED OVERALL DEVELOPMENT BE SERVICED BY EXISTING TRUNK NETWORK? *	DESCRIPTION OF TRUNK UPGRADE WORKS REQUIRED TO SERVICE WHOLE DEVELOPMENT	ARE THE WORKS DEVELOPER FUNDED?	ESTIMATE COST OF DEVELOPER FUNDED WORKS
Potable Water Supply	Sydney Water Corporation	Yes	No upgrades required.	TBC**	TBC**
Recycled Water Supply	Sydney Water Corporation	N/A	N/A	TBC**	TBC**
Sewerage Infrastructure	Sydney Water Corporation	Yes	No upgrades required.	N/A	N/A
Electricity Infrastructure	Ausgrid	No	Three (3) new high voltage feeders required to service the site.	Yes	TBC**
Tele-communications Infrastructure	NBN Co (& Opticomm)	No	New trunk main required to service the site.	Yes**	TBC**
Gas Infrastructure	Jemena	Yes	No upgrades required.	TBC**	TBC**

* Existing capacity and servicing requirements to be re-confirmed with each utility authority as project progresses and in conjunction with detailed design work.

** To be confirmed post obtainment of development consent

The developer has advised that any developer funded works are not likely to present an impediment to the delivery of this project and ongoing consultation will be made with each utility authority to ensure their timely delivery.

Following the delivery of the trunk upgrade works (as identified in Table 10.1 above) or completion of connections into the existing trunk network, the internal utility services network is expected to be able to be delivered in accordance with the proposed development staging. Addendums to this Utility Services Report will be prepared and submitted as part of future development applications for each stage. These addendums will provide additional servicing advice in relation to each stage, as well as identifying any temporary works required.

More detailed information will be provided in conjunction with Construction Certificate documentation for each proposed stage of the development.

Appendix A

IVANHOE SUSTAINABILITY REPORT

IVANHOE SUSTAINABILITY REPORT

DECEMBER 2017

Rory Martin
Sustainability Manager, Residential

1 INTRODUCTION

This report supports a Concept Development Application for the Ivanhoe Estate Masterplan, a State Significant Development (SSD) submitted to the Department of Planning and Environment (DPE) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). It has been prepared for Aspire Consortium on behalf of NSW Land and Housing Corporation.

Background

In September 2015 the Ivanhoe Estate was rezoned by the Department of Planning and Environment as part of the Macquarie University Station (Herring Road) Priority Precinct, to transform the area into a vibrant centre that benefits from the available transport infrastructure and the precinct's proximity to jobs, retail and education opportunities within the Macquarie Park corridor.

The Ivanhoe Estate is currently owned by NSW Land and Housing Corporation and comprises 259 social housing dwellings. The redevelopment of the Ivanhoe Estate is part of the NSW Government Communities Plus program, which seeks to deliver new communities where social housing blends with private and affordable housing, with good access to transport, employment, improved community facilities and open space.

The Communities Plus program seeks to leverage the expertise and capacity of the private and non-government sectors. As part of this program, Aspire Consortium, comprising Fraser's Property Australia, Citta Property Group and Mission Australia Housing, was selected as the successful proponent to develop the site in July 2017.

The Masterplan DA is the first step of the planned redevelopment of the Ivanhoe Estate and will create an integrated neighbourhood including social housing mixed with affordable and private housing, as well as seniors housing, a new school, child care centres, community facilities and retail development.

Site Description

The Ivanhoe Estate site is located in Macquarie Park near the corner of Epping Road and Herring Road within the Ryde Local Government Area (LGA). The site is approximately 8.2 hectares and currently accommodates 259 social housing dwellings, comprising a mix of townhouse and four storey apartment buildings set around a cul-de-sac street layout. An aerial photo of the site is provided at **Figure 1** below.

Immediately to the north of the site are a series of four storey residential apartment buildings. On the north-western boundary, the site fronts Herring Road and a lot which is currently occupied by four former student accommodation buildings and is likely to be subject to redevelopment. Epping Road runs along the south-western boundary of the site and Shrimptons Creek, an area of public open space, runs along the south-eastern boundary. Vehicle access to the site is via Herring Road.

The site is comprised of 17 individual lots and a part lot and are owned and managed by Land and Housing Corporation. The Masterplan site also incorporates adjoining land, being a portion of Shrimptons Creek and part of the commercial site at 2-4 Lyonpark Road. This land is included to facilitate a bridge crossing and road connection to Lyonpark Road.



Figure 1- Ivanhoe Estate site

Overview of the Proposed Development

The proposed Masterplan is a Concept DA (in accordance with Section 83B of the EP&A Act), which sets out the concept proposal for the development of the site. The concept contained in the Masterplan DA establishes the planning and development framework, which will form the basis for the detailed design of the future buildings and against which the future detailed DAs will be assessed.

The Masterplan DA seeks approval for the maximum building envelopes for future stages of development, the maximum gross floor area (GFA) and land uses for the development. Specifically:

- A mixed use development involving a maximum of GFA of 281,905m², including:
 - residential flat buildings comprising private, social and affordable housing
 - seniors housing comprising residential care facilities and self-contained dwellings
 - a new high school
 - child care centres
 - minor retail development
 - community uses
- maximum building heights and GFA for each development block;
- public domain landscape concept, including parks, streets and pedestrian connections;
- provision of the Ivanhoe Estate Design Guidelines to guide the detailed design of the future buildings; and
- vehicular and intersection upgrades.

An image of the Masterplan DA is provided at Figure 2 below.



Figure 2- Ivanhoe Estate Masterplan

Aspire Sustainability Commitments

The three key sustainability commitments for Ivanhoe are:

- Deliver 5 Star Green Star Design & As Built v1.1 minimum for all buildings
- Deliver 6 Star Green Star Communities v1 for the Ivanhoe precinct
- Deliver an integrated infrastructure solution via Real Utilities

The individual commitments identified within Aspire's Form 7 of the bid submission are captured within at least one of the above key commitments so that the sustainability vision from the original proposal is maintained throughout the life of the development from conception to completion. How the original commitments fit within these three key headings is outlined further.

Regarding Aspire's Green Star commitments, this plan has been developed to allow maximum flexibility in achieving the above ratings, regardless of any potential changes to Green Star or its rating system over the life of this project. It has been designed to cater for the potentially different building designs and variables that may materialise in the realisation of the development, yet still achieve the high levels of outcomes envisioned for the precinct.

NSW Secretary's Environmental Assessment Requirements (SEARS)

The Aspire sustainability commitments incorporate the principles of ecologically sustainable development as defined by the EP&A Regulation 2000, namely:

- Application of the precautionary principle and assessment of risk-weighted consequences of options
- Intergenerational equity and conservation of biological diversity and ecological integrity
- Improved valuation, pricing and incentive mechanisms including life cycle costs, use of natural resources and waste disposal
- Establishment of environmental goals and associated mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problem

2 FRASERS PROPERTY SUSTAINABILITY PHILOSOPHY AND APPROACH

Philosophy

At Frasers Property Australia, we believe that Sustainability isn't just about the environment. It's about creating communities and places that help real people live, play, shop and work in better ways. It's about being a resilient and responsible business, creating more diverse opportunities for our employees and customers, efficient spaces that allow businesses to thrive, and communities that genuinely serve the needs of residents - as well as the planet. It's about minimising our environmental impact in everything we do, and maximising the social and economic benefits for all.

This philosophy is underpinned by **A Different Way+** (Refer Appendix 6B), our sustainability strategy launched in 2016. A Different Way is our real commitment to creating places where resources are reused, recycled and restored, where new ideas are fostered for everyone's benefit, and where people can lead better, healthier lives.

Approach

Our approach for Ivanhoe addresses the broader definition of sustainability. It acknowledges that a sustainable organisation not only addresses its environmental impact, but also addresses the communities it develops and interacts with, its people and the marketplace. We believe we are well placed to design and deliver an exemplary community that will achieve in a range of leading sustainability performance indicators. Our recent sustainability achievements include:

- **Nine Registered Green Star Communities projects, the most of any organisation.** These include the Fairwater community in Blacktown NSW, which is on track to be one of Australia's most sustainable master planned communities and has already received UDIA and Green Globe awards.
- Developing approximately **1.3 million m2** of buildings that are certified or registered under **Green Star**.
- **86,000 people** live, work and shop in our **Green Star Buildings and Communities**
- Over **18,000 homes** that will be **Green Star Certified** or located within Green Star Certified Communities
- Ongoing commitment to supporting the environment and disadvantaged youth through the **Fraser's Property Foundation**. Turning 10 years old this year, the Foundation provides a bank of 500 staff volunteering days per annum and is matched with a donation budget of approximately \$150,000 per annum to identify and support charities and activities in which staff can participate.
- Industry support . Frasers Property has supported the Green Building Council of Australia through involvement in technical and advisory groups as well as **sponsorship of several Green Star rating tools**. We are also represented on the GBCA's Green Star Steering Committee and Property Council of Australia's National Sustainability Roundtable.
- Frasers Property is undertaking the **Living Building Challenge** for the Burwood East Brickworks Retail Centre VIC which, when completed, will be the world's most sustainable retail centre.
- Frasers Property **benchmarks all community projects against the Green Star Communities** tool with a minimum internal target of 5 stars.

As recognition of our leadership in sustainability and demonstrated ability to implement sustainability principles, Frasers Property has been named a **Regional Sector Leader in the 2017 Global Real Estate Sustainability Benchmark (GRESB) Survey**, the international property market's most prestigious and credible measure of commitment to sustainability performance.

3 SUSTAINABILITY BENCHMARK 1

Commitment: Deliver 5 Star Green Star Design & As Built minimum for all buildings

Method: Using the Green Building Council of Australia's current rating tool "Green Star – Design & As Built v1.1" and subsequent releases as appropriate

Our built environment is currently the world's single largest contributor to greenhouse gas emissions, and also consumes around a third of our water, and generates 40 per cent of our waste. From individual buildings to entire communities, Green Star is transforming the way our built environment is designed, constructed and operated. Launched by the Green Building Council of Australia in 2003, Green Star is Australia's only national and voluntary rating system for buildings and communities. Green Star is helping to improve environmental efficiencies in our buildings, while boosting productivity, creating jobs and improving the health and well-being of our communities.

Green Star . Design & As Built assesses the sustainability outcomes from the design and construction of new buildings or major refurbishments, across nine holistic impact categories.

Ivanhoe Estate aims to set new Benchmarks in Sustainability under these categories as follows (Note; further commitment details are listed after):

Management

Ivanhoe Estate will utilise practices and processes that support best practice sustainability outcomes throughout the different phases of a project's design, construction and ongoing operation. These practices will include exploring amongst others:

- A comprehensive Occupants User Manual
- Building Operations . namely Performance, Commissioning and Tuning
- Building Specific Climate Resilience Strategies

Indoor Environmental Quality

Through initiatives that enhance the comfort and well-being of occupants Ivanhoe Estate will look to address issues such as air quality, thermal comfort and acoustic comfort. Areas of comfort being investigated include:

- Thermal comfort via NatHERS and BASIX commitments
- Visual comfort via extensive landscaping and visual connection
- Indoor Air Quality via ventilation and the provision of outdoor air to apartments

Energy

Built Form at Ivanhoe Estate will be designed and constructed to reduce overall greenhouse emissions from operations by addressing energy demand reduction, use efficiency and generation from alternative sources. Multiple proposed initiatives will be investigated to address this including, but not limited to:

- Bid commitments around NatHERS and BASIX targets
- Inclusion of an integrated infrastructure solution (Real Utilities)
- Efficient building systems and Carbon Neutrality in operations

Transport

Ivanhoe Estate will look to reduce the dependency of private car use as an important means of reducing overall greenhouse gas emissions, as well as encouraging the provision of alternative forms of transportation. Some of the initiatives being explored include:

- Provision of MoGoGet+car sharing facilities for residents
- Extensive end of trip facilities for residents
- Electric Vehicle infrastructure

Water

Built form at Ivanhoe Estate will aim to reduce the consumption of potable water through measures such as the incorporation of water efficient fixtures and building systems and water re-use. Some of these initiatives maybe achieved through;

- Bid commitments around NABERS and BASIX targets
- 5 Star WELS appliances and fixtures
- Rainwater Harvesting

Materials

Ivanhoe Estate will aim to address the consumption of resources for the project, by encouraging the selection of low-impact materials. Areas of investigation to support this include:

- Utilisation of sustainable materials
- LCA Modelling
- 1% construction waste to landfill

Land Use and Ecology

A key focus of Ivanhoe Estate is to reduce the negative impacts on the sites' ecological value as a result of the development. We aim to minimise harm and enhance the quality of local ecology, particularly around the Turpentine Ironbark Forest along Shrimptons Creek. Initiatives to enable this currently include:

- Protecting the existing Turpentine Ironbark Forest
- Maintaining functional connection to Shrimptons Creek riparian habitat

Emissions

Ivanhoe Estate aims to reduce its environmental impacts from 'point source' pollution and reduce their effects on the atmosphere, watercourse and native animals. We are currently exploring a number of enablers for this including:

- Ensuring WSUD (Water Sensitive Urban Design) principles are applied throughout the precinct
- Reducing the impacts of light pollution from up-lighting

Innovation

Implementation of innovative practices, processes and strategies that promote sustainability in the built environment will occur throughout the lifetime of the development ensuring that Ivanhoe Estate is recognised as one of the most progressive projects in the country. A number of innovative concepts currently being explored on the project include;

- Transparent financial reporting on sustainability initiatives
- Nominal to no cost heating for social housing residents
- Carbon Neutral buildings in operations
- A strong focus on community health and wellbeing

As part of Aspire's Sustainability Benchmark 1 we will look to incorporate the following initiatives;

5 Star Green Star Design and As Built Rating Targets	
5 Star Green Star Design & As Built v1.1 for all buildings (including building by other within precinct) including:	
Process	Develop a comprehensive occupant's manual including user-friendly information on environmental features of the systems, building and facilities and advice on how to optimise performance and running costs.
Energy and Green House Gas Emissions	BASIX 45 energy ratings (on average across the development)
	6 star natHERS ratings (on average across the development)
	BASIX 45 water rating (on average across the development)
	Energy efficient equipment, lighting and appliances to be best practice (5-star energy ratings, LED lighting)
	Gas-boosted solar hot water or heat pumps for all domestic hot water needs
	Optimised integrated infrastructure solution
	Carbon Neutral in operation
	Reduction in embodied carbon (aligned with the materials commitments below and subject to LCA modelling)
Water	1.5MW Solar PV system covering approximately 50% of site roof space. The balance of roof space will be green roof and open space.
	BASIX Water 45 for all apartments (on average across the development)
	NABERS 5-star Water for all commercial buildings (where applicable)
	Water fixtures 5-star WELS
	Water appliances 5-star WELS
	Maximise the use of non-potable water for irrigation and car washing (Rainwater from building rooftops will be collected and reused on site)
Transport and Connectivity	Optimised integrated infrastructure solution
	Provision of 50 GoGet spaces
	A connected and permeable site to encourage active transport and use of public transport
	At least one bicycle parking space to be provided for each dwelling (>3,500) and at least 200 provided for visitors
	Electric vehicle ready
	End of trip facilities for non-residential buildings
Materials and Waste	Future proofing for autonomous vehicles (designing for potential alternate use of basements and street parking)
	15-20% Supplementary Cementitious Material (SCM) average in concrete mixes across site
	20% Recycle Asphalt Pavement (RAP) warm-mix asphalt
	ASI sustainable steel
	Recycled concrete in place of crushed rock where available
	Best environmental practice PVC
	FSC certified timber
	Embodied carbon reduction target
	Life cycle assessment will be used during detailed design to optimise for low carbon design. The project will target a substantial reduction in embodied GHG emissions through design and material selection.
	Carbon offsets will be purchased to meet the target if required
	Maximum 1% construction waste to landfill

4 SUSTAINABILITY BENCHMARK 2

Commitment: Deliver 6 Star Green Star Communities for the Ivanhoe precinct

Method: Using the Green Building Council of Australia's current rating tool "Green Star – Communities v1.1" and subsequent releases as appropriate

Green Star . Communities assesses the planning, design and construction of large scale development projects at a precinct, neighbourhood and/or community scale. It provides a rigorous and holistic rating across five impact categories.

Ivanhoe Estate aims to set new Benchmarks in Sustainability under these categories as follows (Note; further commitment details are listed after):

Governance

Ivanhoe Estate will look to demonstrate leadership within the industry by establishing and maintaining strong governance practices. This will occur through engagement, transparency, as well as community and industry capacity building. We will look to ensure that the Ivanhoe Estate development is resilient to a changing climate. Some of the initiatives being explored include:

- Transparency via design reviews with independent sustainability experts
- Inclusive and comprehensive stakeholder engagement process
- Site Specific Climate Resilience Strategies

Liveability

We aim to deliver a safe, accessible and culturally rich community at Ivanhoe Estate. Accordingly we will focus on the development of healthy and active lifestyles, and look to create a community with a high level of amenity, activity, and inclusiveness. Areas of investigation currently include:

- Health and Fitness classes for all residents
- A safe, walkable and accessible community
- Dedicated Community Development Managers

Economic Prosperity

Ivanhoe Estate will look to promote prosperity and productivity through the creation of equitable living and housing, through investment in education and skills development, and through community capacity building. Current initiatives being explored include:

- Provision of digital infrastructure
- On site energy generation
- Community infrastructure investment

Environment

Reducing the impact of urban development on the local ecosystem is an important objective for Ivanhoe Estate. Resource management and efficiency will be carefully considered through promoting infrastructure, transport, and buildings that have reduced ecological footprints. Accordingly, we will seek to reduce the impacts of this project on the local land and aquatic environments. Ideas currently under consideration include:

- Ensuring WSUD (Water Sensitive Urban Design) principles are applied throughout the precinct
- Urban Heat Island reduction and mitigation strategies
- Waste management strategies

- Life Cycle impacts analyses of materials used on site
- Maximising the ecological value of site to be close to or exceeding existing

Innovation

Implementation of innovative practices, processes and strategies that promote sustainability in the built environment will occur throughout the lifetime of the development ensuring that Ivanhoe Estate is recognised as one of the most progressive projects in the country. A number of innovative concepts are being currently explored on this project including;

- Transparent financial reporting on sustainability initiatives
- Contractor education on sustainability
- Innovative use of technology through an integrated infrastructure solution (Real Utilities)

As part of Aspire's Sustainability Benchmark 2 we will look to incorporate the following initiatives;

6 Star Communities Rating Targets	
6 Star Green Star Communities v1.1 including:	
Sustainable Site	Maximise the ecological value of site to be close to or exceeding existing (biodiversity, permeable surfaces, urban greening) 1. Protect the existing Turpentine Ironbark Forest 2. Maintain its functional connection to Shrimptons Creek riparian habitat through the site and with fauna crossings at road intersections. 3. Mitigating the urban heat island effect with extensive landscaped public domain, green roofs, low-SRI roofs and solar PV.
	Mitigating the urban heat island effect with extensive landscaped public domain, light coloured roofs, green roofs and solar PV.
	Employ Water Sensitive Urban Design Manage stormwater 1. Manage urban stormwater with water sensitive urban design including rainwater tanks, gross pollutant traps, underground detention tanks, swales/permeable detention basins/bio-filters as appropriate
Transport & Connectivity	A connected and permeable site to encourage active transport and use of public transport
	At least one bicycle parking space to be provided for each dwelling (>3,500) and at least 200 provided for visitors
	Provision of 50 GoGet spaces
	Electric vehicle ready
	End of trip facilities for non-residential buildings
Community Health and Happiness	To fully quantify and track tangible health and well-being metrics through programs and partnerships including Live Life Get Active and Mission Australia's Strengthening Communities amongst others.
	Public domain that encourages social interaction, has activated street frontages, is adaptable and comfortable, and is pedestrian-oriented
	We also commit to a minimum 200 volunteer hours on various community activities specifically for Ivanhoe Estate.
Living Costs	Development reduces average living costs for households, and average operating costs for businesses, compared with business as usual
	Whole of life affordability strategy considering: 1. Housing 2. Utilities 3. Food 4. Transit
	The CCAP Precinct report indicates in excess of a 40% reduction in living costs.
Local Economy	Integrate commercial opportunities within precinct, including spaces suitable for small business or home business operations and / or work from- home 1. Community Hub . fitted out with offices and session rooms for the delivery of MA's tenant support programs and also drop-in offices for the delivery of community services 2. Social Enterprise Space . opportunities for social enterprise development in conjunction with the community.
	The Strengthening Communities program will deliver opportunities that MA and MAH can create through the operation of the residential community such as: 1. Landscaping 2. Common area maintenance 3. Administration of the Community Hub 4. Live Work Dwellings are incorporated in buildings along the main street which will be suitable for small business or home business

5 SUSTAINABILITY BENCHMARK 3

Commitment: Deliver an integrated infrastructure solution via 'Real Utilities'

Method: Aspire will develop and deliver a private embedded electrical and hot water network to supply all users across the precinct. On the back these embedded networks we will improve their efficiencies by incorporating the following strategies:

1. Installation of solar PV to reduce electrical peak demand and greenhouse emissions;
2. Use of high efficiency centralised hot water;
3. Installation of smart metering technology to allow efficient demand management;
4. Minimise use of onsite gas;
5. Provision of low-cost heating to the social housing;
6. Acquire certified carbon offsets (if required) to ensure that 100% of energy supplied through Real Utilities is NCOS carbon neutral certified.

Community Energy Networks

Private or embedded energy networks are increasingly commonplace on new retail, residential and mixed-use developments in Australia. While the distinguishing feature of a Private Network is the establishment of a gate or parent meter that separates energy users within a new development from the external grid, Private Networks come in many flavours.

Traditional providers of energy have a clear profit motive – the more energy consumed, the more revenue they receive – with little attention to energy efficiency. Increasingly they are participating in the Private Network market, but with little benefit to end-users.

Fraser's Property Community Energy Network

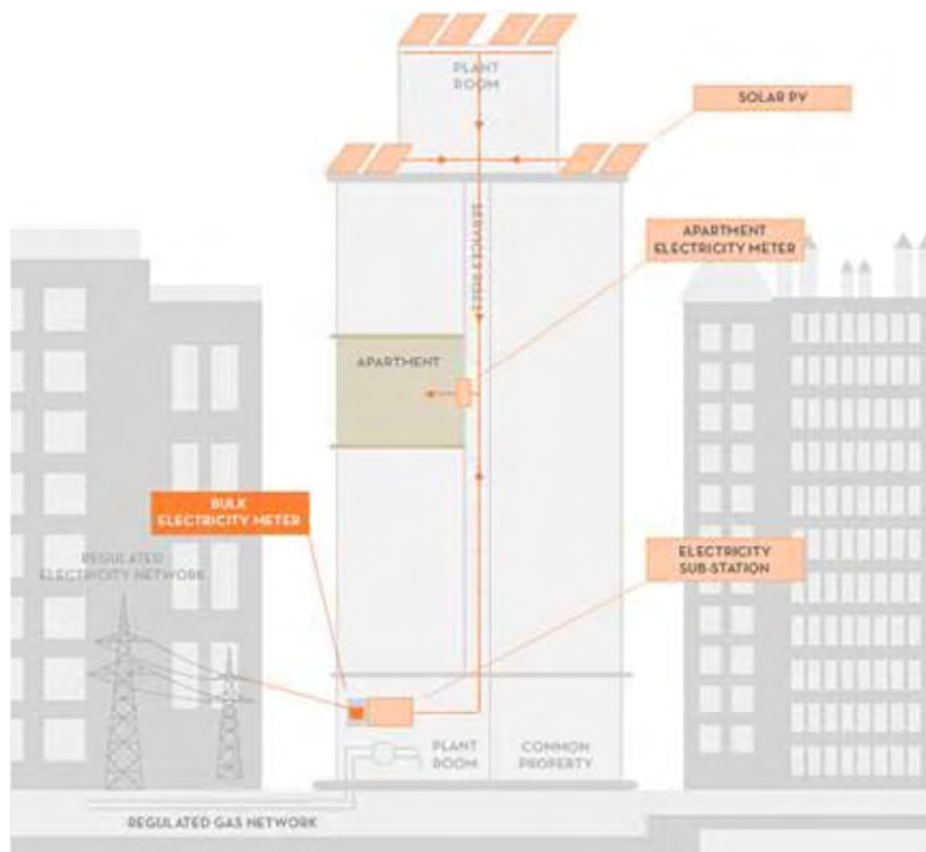
In recently establishing an embedded network division, Real Utilities, Fraser's Property has the ambition to be the leading provider of energy on new developments in Australia. In addition to a commitment to establishing Private Networks on all its new retail, residential and mixed-use developments, Real Utilities is also in the process of obtaining a Retail Electricity license.

This capability will allow Fraser's Property to provide a real difference on the Ivanhoe Estate development with the potential for the following benefits to the people who live and work in those developments to be realised:

- **Lower cost energy.** Real Utilities will match or better the lowest prices of the major electricity retailers. Moreover, it will ensure this is an enduring benefit by constantly resetting prices to be below the best discounted tariff of the three major electricity retailers in the area, without lock-in contracts or honeymoon periods
- **Carbon neutral power.** Fraser's property and Real Utilities will supply certified carbon neutral power through maximising solar PV installation to the available roof-space, and acquiring certified carbon offsets for 100% of the grid sourced electricity and greenhouse gas emissions within its Private Networks. The power will be certified carbon neutral under the Australian Government's National Carbon Offset Standard (NCOS)

- **Greater demand management by end-users.** Fraser's Property and Real Utilities will install the latest smart meter technology within its Private Networks to provide residents with usable access to their energy consumption data and to time of use energy tariffs

These benefits will have greatest impact on reducing energy demand and the costs of energy consumed will contribute to a reduction in the financial stress that underlies utility disconnections.



KEY

 PRIVATE ELECTRICAL ASSET	 DISTRIBUTION NETWORK ELECTRICAL ASSET
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As part of Aspire's Sustainability Benchmark 3 we will look to incorporate the following initiatives;

Integrated Infrastructure Solution (Real Utilities) Targets	
Provide an optimised integrated infrastructure solution	
Private wire electricity supply	<p>Real Utilities will establish the precinct with one or more private wire networks by installing gate meters</p> <p>These private networks allow for:</p> <ol style="list-style-type: none"> 1. The purchase of grid electricity at bulk, with savings passed on to the residents and businesses 2. The optimal integration of renewable energy generation on site 3. Implementation of energy efficiency measures at scale 4. 100% of power supplied by Real Utilities will be NCOS carbon neutral certified 5. Continued Government concessions and subsidies to Social housing residents by Real Utilities
Smart metering and energy monitoring	<p>Without charge to any of the precincts residents, Frasers Property and Real Utilities will install the latest smart meter technology which will give residents access to:</p> <ol style="list-style-type: none"> 1. Time of use energy tariffs 2. Their energy consumption data so they may make better energy use decisions
On-site renewable energy	<p>Ensure that on-site renewable energy generation from Solar PV is maximised wherever possible</p> <p>Based on the current site density and restricted roof space available, this is estimated to be near 1,500 kW, which will be increased wherever feasible</p>
100% Carbon Neutral power	<p>Without charge to any of the precinct's residents, Real Utilities will supply 100% certified carbon neutral power. The energy will be certified under the Australian Government's National Carbon Offset Standard</p> <p>Based on current projected energy loads Frasers Community Utilities will procure offset certificates for the precinct's approximately 12,000 tonnes of CO2 emissions each year</p> <p>To ensure the durability of this feature, Frasers will acquire at least the first 5 years worth of certificates at or prior to completion of each building</p>
Affordability	<p>Real Utilities will provide all residents with electricity cost savings, at tariffs which better those of the 3 major electricity retailers in the area.</p> <p>The benefit delivered by Real Utilities will be achieved by constantly resetting prices at below the best discounted rate of the major electricity retailers, without lock-in contracts or honeymoon periods.</p> <p>Real Utilities will provide affordable heating to the social housing residents via a radiant heating system, & will be provided at a nominal to zero cost</p>
Centralised hot water	<p>Frasers Property will provide residents with centralised hot water</p> <p>The energy component of hot water will be invoiced Real Utilities, while the water component of the hot water will be invoiced by the water provider</p> <p>Hot water tariffs will set at below standard tariffs</p>
Electric/ induction cooktops	<p>Frasers Property will provide electric / induction cooktops for residents</p> <p>Electric cooktops are preferred by Frasers Property's social housing bid partner</p>
Energy efficient cooling and heating	<p>Frasers Property will procure energy efficient split air-conditioning systems for the non-Social housing dwellings</p> <p>The base solution for Social housing residents is ceiling fans and provisions for future split system air conditioners</p> <p>Heating will be provided to social housing residents via a radiant heating system, which will be provided at a nominal to zero cost</p>

APPENDICES

A. EXPERT SUSTAINABILITY CERTIFIER SUPPORT LETTER



Our ref: PS107138-171211-PR-SUSTAINABILITY LETTER.docx

By email
Rory.Martin@frasersproperty.com.au

11 December 2017

Rory Martin
Sustainability Manager - Residential
Fraser's Property Australia
Level 9, 484 St Kilda Road, Melbourne, VIC, 3004

Dear Rory

Ivanhoe Estate | Sustainability Statement

This letter provides a certificate of review for the Ivanhoe Sustainability Report (November 2017) against the Sustainability Benchmarks identified within the Ivanhoe PDA.

The benchmarks are:

1. **Commitment 1:** Deliver 5 Star Green Star Design & As Built minimum for all buildings using the Green Building Council of Australia's current rating tool "Green Star – Design & As Built v1.1" and subsequent releases as appropriate
2. **Commitment 2:** Deliver 6 Star Green Star Communities for the Ivanhoe precinct using the Green Building Council of Australia's current rating tool "Green Star – Communities v1.1" and subsequent releases as appropriate
3. **Commitment 3:** Deliver an integrated infrastructure solution via 'Real Utilities' with the development and delivery of a private embedded electrical and hot water network to supply all users across the precinct. On the back these embedded networks we will improve their efficiencies by incorporating the following strategies:
 - Installation of solar PV to reduce electrical peak demand and greenhouse emissions;
 - Use of high efficiency centralised hot water;
 - Installation of smart metering technology to allow efficient demand management;
 - Minimise use of onsite gas;
 - Provision of low-cost heating to the social housing;
 - Acquire certified carbon offsets (if required) to ensure that 100% of energy supplied through Real Utilities is NCOS carbon neutral certified.

Level 27, 650 George Street
Sydney NSW 2000
GPO Box 5394
Sydney NSW 2001

Tel: +61 2 9272 5100
Fax: +61 2 9272 5101
www.wsp.com

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The Sustainability Report demonstrates the approach to compliance for each of these benchmarks, supported by the associated reports for the planning submission and the following documents:

- Green Star D&AB Scorecard;
- Green Star Communities Scorecard;
- Real Utilities Proposal.

Subject to the implementation of the stated initiatives that correspond with these scorecards, over the course of the design and delivery phases of the project, the benchmark commitments can be considered to achieved for this stage of design.

Kind regards

Richard Palmer
Director - Sustainability

B. GREEN STAR COMMUNITIES INDICATIVE SCORECARD

Green Star Communities scorecards are appended to this report to demonstrate that the initiatives identified are able to meet the benchmark requirements. As the project proceeds through planning, design and construction, the balance of initiatives and credits targeted will likely change based on design, predicted performance and whole-of-life cost. The flexibility to changes to the individual credit strategies is an important aspect of the Green Star rating tools, providing opportunities for an optimised sustainability strategy that achieves equivalent performance, provided the total points and certified rating are maintained.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
GOVERNANCE				
Green Star Accredited Professional	1.0	Green Star Accredited Professional	1	1
Design Review	2.1	Site Planning and Layout	4	4
	2.2	Urban Design	4	4
Engagement	3.1	Stakeholder Engagement Strategy	3	3
	3.2	Strategy Implementation	3	3
Adaptation and Resilience	4.1	Climate Adaptation	2	2
	4.2	Community Resilience	2	2
Corporate Responsibility	5.1	Corporate Responsibility	1	1
	5.2	Sustainability Reporting	2	2
Sustainability Awareness	6.1	Community Users' Guide	1	1
	6.2	Sustainability Education Facilities	1	0
Community Participation and Governance	7.1	Community Facility Management	1	1
	7.2	Community Program Management	1	1
Environmental Management	8.1	Environmental Management System	1	1
	8.2	Environmental Management Plan	1	1
Total			28	27.0

LIVEABILITY				
Healthy and Active Living	9.0	Minimum Requirement - Footpaths	-	Complies
	9.0	Minimum Requirement - Footpaths	-	Complies
	9.1	Active Lifestyle	2	2
	9.2	Recreational Facilities	2	2
	9.3	Healthy Places	1	1
Community Development	10.0	Minimum Requirement - Community Development Plan	-	Complies
	10.1	Community Development Officer	1	1
	10.2	Community Group	1	1
	10.3	Community Events	1	1
	10.4	Community Information	1	1
Sustainable Buildings	11.1	Certified Non-Residential Buildings	-	
	11.2	NatHERS and Livable Housing Australia	4	1

Culture, Heritage and Identity	12.1	Understanding Culture, Heritage and Identity	1	1
	12.2	Enhancing Community Culture, Heritage and Identity	2	2
Walkable Access to Amenities	13.1	Walkable Access to Amenities	2	2
Access to Fresh Food	14.1	Access to Fresh Food	1	1
	14.2	Local Food Production	1	1
Safe Places	15.0	Minimum Requirement - Visibility	-	Complies
	15.1	Design for Safety	2	2
Total			22	19.0

ECONOMIC INVESTMENT				
Community Investment	16.1	Community Infrastructure Investment	4	4
Affordability	17.1	Residential Affordability Strategies	4	4
	17.2	Non- Residential Affordability Strategies	-	
Employment and Economic Resilience	18.1	Net Percentage Increase of Local Jobs	1	0
	18.2A	Diverse Local Employment – Performance Pathway	-	
	18.2B	Proximity to Major City – Prescriptive Pathway	1	0
	18.2C	NCC Class mix – Prescriptive Pathway	-	
Education and Skills Development	19.1	Higher Education Facilities	1	1
	19.2	Skills Development Programs	1	1
	19.3	Industry Capacity Development	1	
Return on Investment	20.1	Analysis of Direct Costs and Benefits	1	
	20.2	Analysis of Indirect Costs and Benefits	1	
Incentive Programs	21.1	Residential Incentives	2	2
	21.2	Non-residential Incentives	-	
Digital Infrastructure	22.1	High-speed Broadband	1	1
	22.2	Wireless Local Area Network	1	1
Peak Electricity Demand	23A	Reduced Peak Electricity Demand - Performance Pathway	-	
	23B.i	On-site Generation – Prescriptive Pathway	2	
	23B.ii	Energy Storage – Prescriptive Pathway	-	
Total			21	14.0

ENVIRONMENT				
Integrated Water Cycle	24A.1	Stormwater – Performance Pathway	2	2
	24A	Water Sensitive Urban Design – Performance Pathway	5	2
	24B.1	Alternative Water Sources - Public Open Spaces	-	
	24B.2	Alternative Water Sources - Buildings	-	
	24B.3	Stormwater Peak Discharge	-	
	24B.4	Stormwater Quality	-	

Greenhouse Gas Strategy	25A	Greenhouse Gas Strategy – Performance Pathway	6	6
	25B.1	Energy Efficiency - Infrastructure Lighting	-	
	25B.2	Energy Efficiency - Existing Buildings	-	
	25B.3	Renewable Energy Production	-	
	25B.4	District Heating and Cooling	-	
Materials	26A	Life Cycle Assessment (LCA) – Performance Pathway	-	
	26B	Life Cycle Impacts – Prescriptive Pathway	3	1.5
Sustainable Transport and Movement	27A	Sustainable Transport and Movement: Performance Pathway	3	3
	27B	Sustainable Transport and Movement: Prescriptive Pathway	-	
Sustainable Sites	28	Conditional Requirement	-	Complies
	28.1	Previously Developed Land	1	1
	28.2	Best Practice Site Decontamination	1	
Ecological Value	29.1	Change of Ecological Value	1	0
	29.2	Biodiversity Enhancement	1	0
Waste Management	30.1	Construction, and Demolition Waste	1	0.7
	30.2	Operational Waste	1	1
Heat Island Effect	31.1	Heat Island Effect	1	1
Light Pollution	32.1	Light Pollution	1	1
Total			27	19.2
INNOVATION				
Innovative Technology or Process	33A	Innovative Technology or Process	10	
Market Transformation	33B	Market Transformation		1
Improving on Green Star Benchmarks	33C	Improving on Green Star Benchmarks		
Innovation Challenge	33D	Innovation Challenge		2
Global Sustainability	33E	Global Sustainability		
Total			10	3
		TOTALS	AVAILABLE	TARGETED
		CORE POINTS	100	79.2
		CATEGORY PERCENTAGE SCORE		79.2
		INNOVATION POINTS	10	3.0
		TOTAL SCORE TARGETED		82.2

C. GREEN STAR DESIGN AND AS BUILT INDICATIVE SCORECARD

Green Star Design and As Built scorecards are appended to this report to demonstrate that the initiatives identified are able to meet the benchmark requirements. As the project proceeds through planning, design and construction, the balance of initiatives and credits targeted will likely change based on design, predicted performance and whole-of-life cost. The flexibility to changes to the individual credit strategies is an important aspect of the Green Star rating tools, providing opportunities for an optimised sustainability strategy that achieves equivalent performance, provided the total points and certified rating are maintained.

CATEGORY / CREDIT	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
MANAGEMENT				
Green Star Accredited Professional	1.0	Accredited Professional	1	1
Commissioning and Tuning	2.0	Environmental Performance Targets	-	Complies
	2.1	Services and Maintainability Review	1	1
	2.2	Building Commissioning	1	1
	2.3	Building Systems Tuning	1	1
	2.4	Independent Commissioning Agent	1	1
Adaptation and Resilience	3.1	Implementation of a Climate Adaptation Plan	2	2
Building Information	4.1	Building Operations and Maintenance Information	1	1
	4.2	Building User Information	1	1
Commitment to Performance	5.1	Environmental Building Performance	1	1
	5.2	End of Life Waste Performance	1	1
Metering and Monitoring	6.0	Metering	-	Complies
	6.1	Monitoring Systems	1	0
Construction Environmental Management	7.0	Environmental Management Plan	-	Complies
	7.1	Formalised Environmental Management System	1	1
Operational Waste	8A	Performance Pathway - Specialist Plan	1	1
	8B	Prescriptive Pathway - Facilities	-	
Total			14	12

INDOOR ENVIRONMENT QUALITY				
Indoor Air Quality	9.1	Ventilation System Attributes	1	1
	9.2	Provision of Outdoor Air	2	2
	9.3	Exhaust or Elimination of Pollutants	1	1
Acoustic Comfort	10.1	Internal Noise Levels	1	1
	10.2	Reverberation	1	0
	10.3	Acoustic Separation	1	0
Lighting Comfort	11.0	Minimum Lighting Comfort	-	Complies

	11.1	General Illuminance and Glare Reduction	1	1
	11.2	Surface Illuminance	1	1
	11.3	Localised Lighting Control	1	1
Visual Comfort	12.0	Glare Reduction	-	Complies
	12.1	Daylight	2	0
	12.2	Views	1	1
Indoor Pollutants	13.1	Paints, Adhesives, Sealants and Carpets	1	1
	13.2	Engineered Wood Products	1	1
Thermal Comfort	14.1	Thermal Comfort	1	
	14.2	Advanced Thermal Comfort	1	
Total			17	12

ENERGY				
Greenhouse Gas Emissions	15A.0	Conditional Requirement: Prescriptive Pathway	-	
	15A.1	Building Envelope	-	
	15A.2	Glazing	-	
	15A.3	Lighting	-	
	15A.4	Ventilation and Air-conditioning	-	
	15A.5	Domestic Hot Water Systems	-	
	15A.6	Building Sealing	-	
	15A.7	Accredited GreenPower	-	
	15B.0	Conditional Requirement: NatHERS Pathway	-	
	15B.1	NatHERS Pathway	-	
	15C.0	Conditional Requirement: BASIX Pathway	-	Complies
	15C.1	BASIX Pathway	16	9
	15D.0	Conditional Requirement: NABERS Pathway	-	
	15D.1	NABERS Energy Commitment Agreement Pathway	-	
	15E.0	Conditional Requirement: Reference Building Pathway	-	
	15E.1	Comparison to a Reference Building Pathway	-	
Peak Electricity Demand Reduction	16A	Prescriptive Pathway - On-site Energy Generation	-	
	16B	Performance Pathway - Reference Building	2	
Total			18	8

TRANSPORT				
Sustainable Transport	17A.1	Performance Pathway	10	0
	17B.1	Access by Public Transport	0	
	17B.2	Reduced Car Parking Provision	0	
	17B.3	Low Emission Vehicle Infrastructure	0	
	17B.4	Active Transport Facilities	0	
	17B.5	Walkable Neighbourhoods	0	
Total			10	4

Water				
Potable Water	18A.1	Potable Water - Performance Pathway	0	
	18B.1	Sanitary Fixture Efficiency	1	1
	18B.2	Rainwater Reuse	1	1
	18B.3	Heat Rejection	2	2
	18B.4	Landscape Irrigation	1	1
	18B.5	Fire System Test Water	1	1
Total			6	6

MATERIALS				
Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment	0	
	19A.2	Additional Life Cycle Impact Reporting	0	
	19B.1	Concrete	3	0
	19B.2	Steel	1	1
	19B.3	Building Reuse	4	0
Responsible Building Materials	20.1	Structural and Reinforcing Steel	1	1
	20.2	Timber Products	1	1
	20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1
Sustainable Products	21.1	Product Transparency and Sustainability	3	1
Construction and Demolition Waste	22A	Fixed Benchmark	-	
	22B	Percentage Benchmark	1	1
Total			12	9

LAND USE AND ECOLOGY				
Ecological Value	23.0	Endangered, Threatened or Vulnerable Species	-	Complies
	23.1	Ecological Value	3	1
Sustainable Sites	24.0	Conditional Requirement	-	Complies
	24.1	Reuse of Land	1	1
	24.2	Contamination and Hazardous Materials	1	
Heat Island Effect	25.0	Heat Island Effect Reduction	1	1
Total			6	3

EMISSIONS				
Stormwater	26.1	Reduced Peak Discharge	1	1
	26.2	Reduced Pollution Targets	1	1
Light Pollution	27.0	Light Pollution to Neighbouring Bodies	-	Complies
	27.1	Light Pollution to Night Sky	1	1
Microbial Control	28.0	Legionella Impacts from Cooling Systems	1	1
Refrigerant Impacts	29.0	Refrigerants Impacts	1	0
Total			5	4

INNOVATION				
Innovative Technology or Process	30A	Innovative Technology or Process	10	1
Market Transformation	30B	Market Transformation		
Improving on Green Star Benchmarks	30C	Improving on Green Star Benchmarks		
Innovation Challenge	30D	Innovation Challenge		5
Global Sustainability	30E	Global Sustainability		
Total			10	6
		TOTALS	AVAILABLE	TARGETED
		CORE POINTS	100	58.0
		CATEGORY PERCENTAGE SCORE		58.0
		INNOVATION POINTS	10	6.0
		TOTAL SCORE TARGETED		64.0

Appendix B

PROPOSED DEVELOPMENT MASTER PLAN

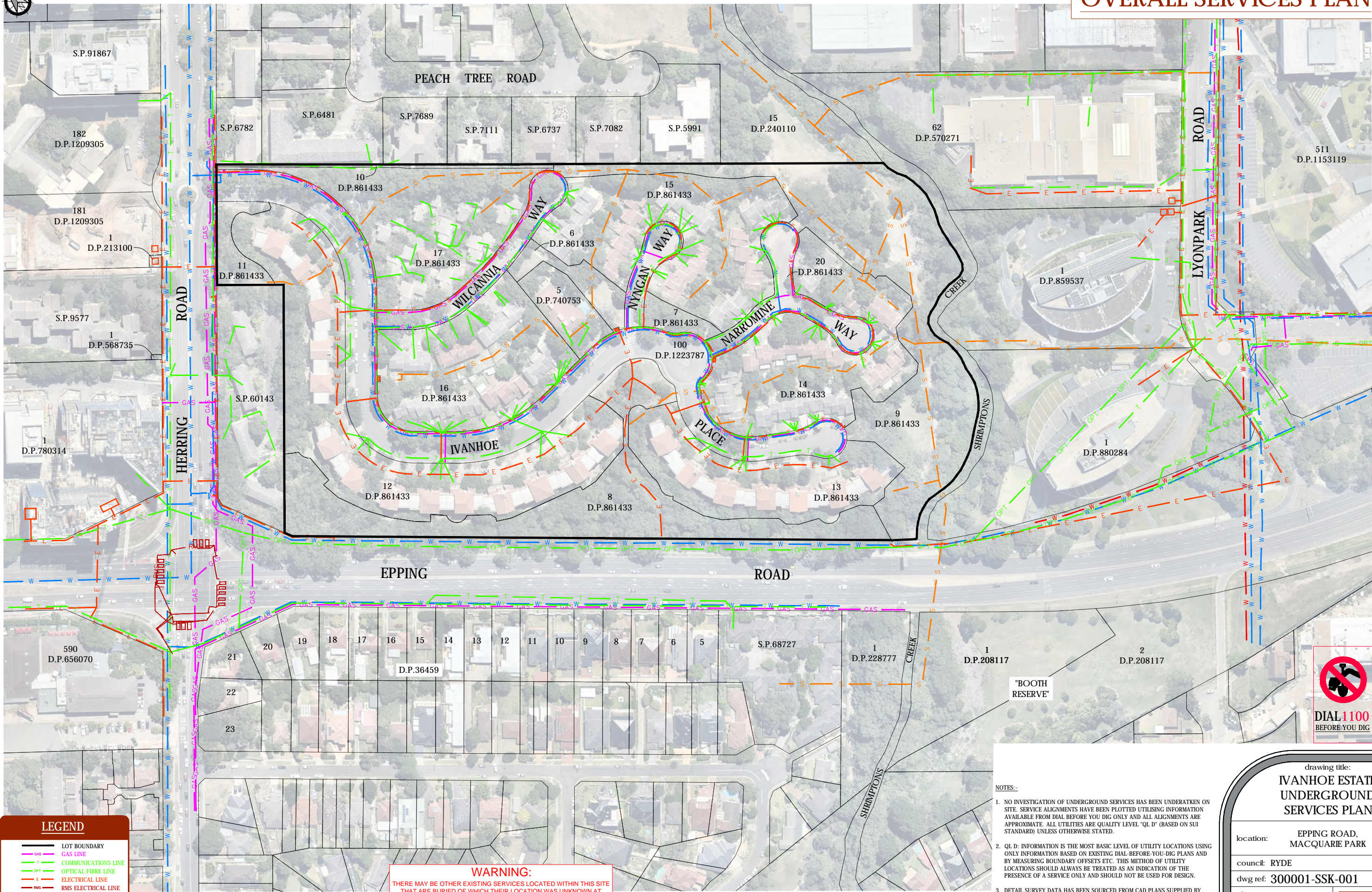


Appendix C

DIAL BEFORE YOU DIG PLANS



OVERALL SERVICES PLAN



LEGEND

- LOT BOUNDARY
- GAS LINE
- COMMUNICATIONS LINE
- OPTICAL FIBRE LINE
- ELECTRICAL LINE
- RMS ELECTRICAL LINE
- WATER LINE
- SEWER LINE

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council: RYDE

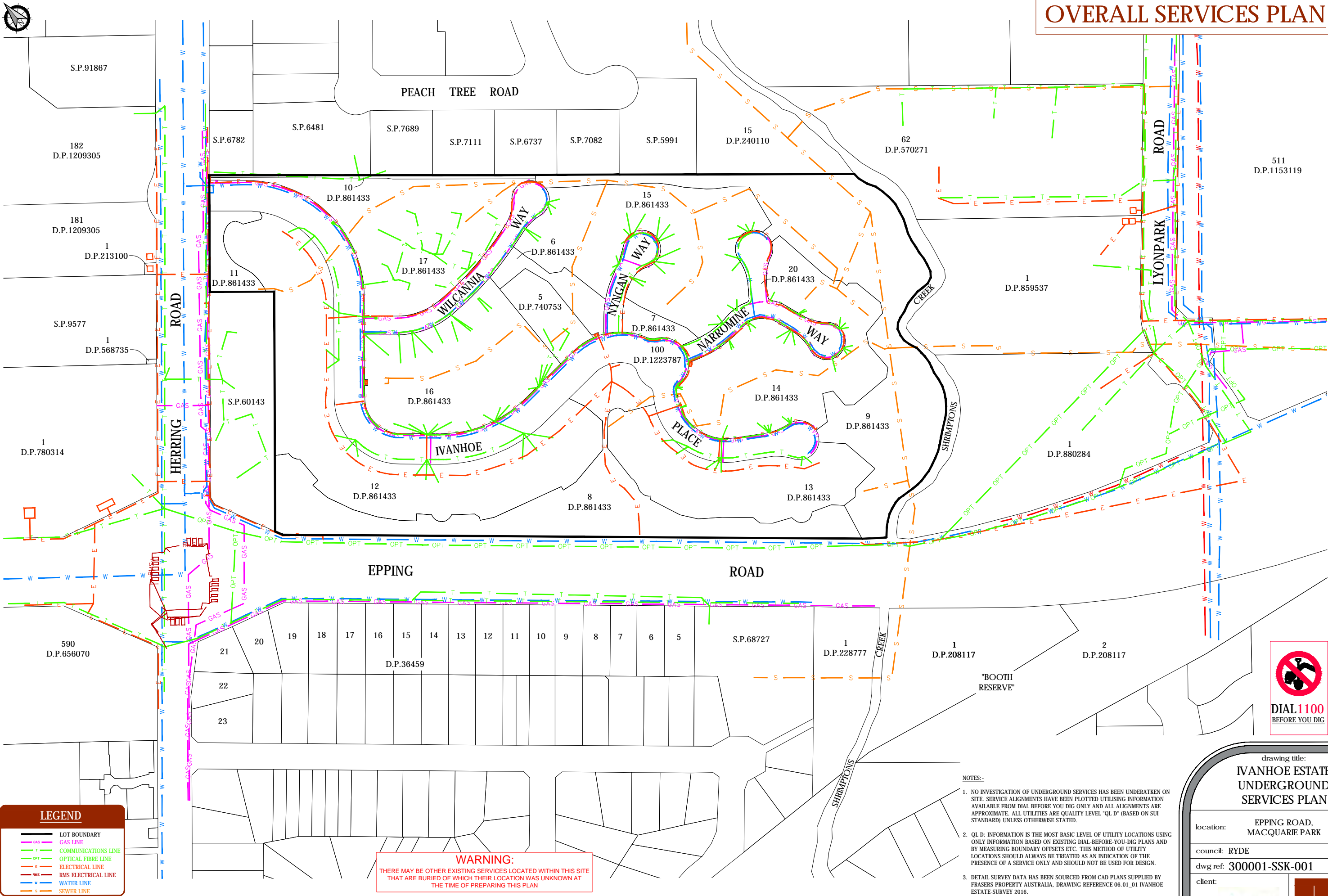
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OVERALL SERVICES PLAN



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drawing title:
**IVANHOE ESTATE
UNDERGROUND
SERVICES PLAN**

location: EPPING ROAD,
MACQUARIE PARK

council: RYDE

dwg ref: 300001-SSK-001

client:

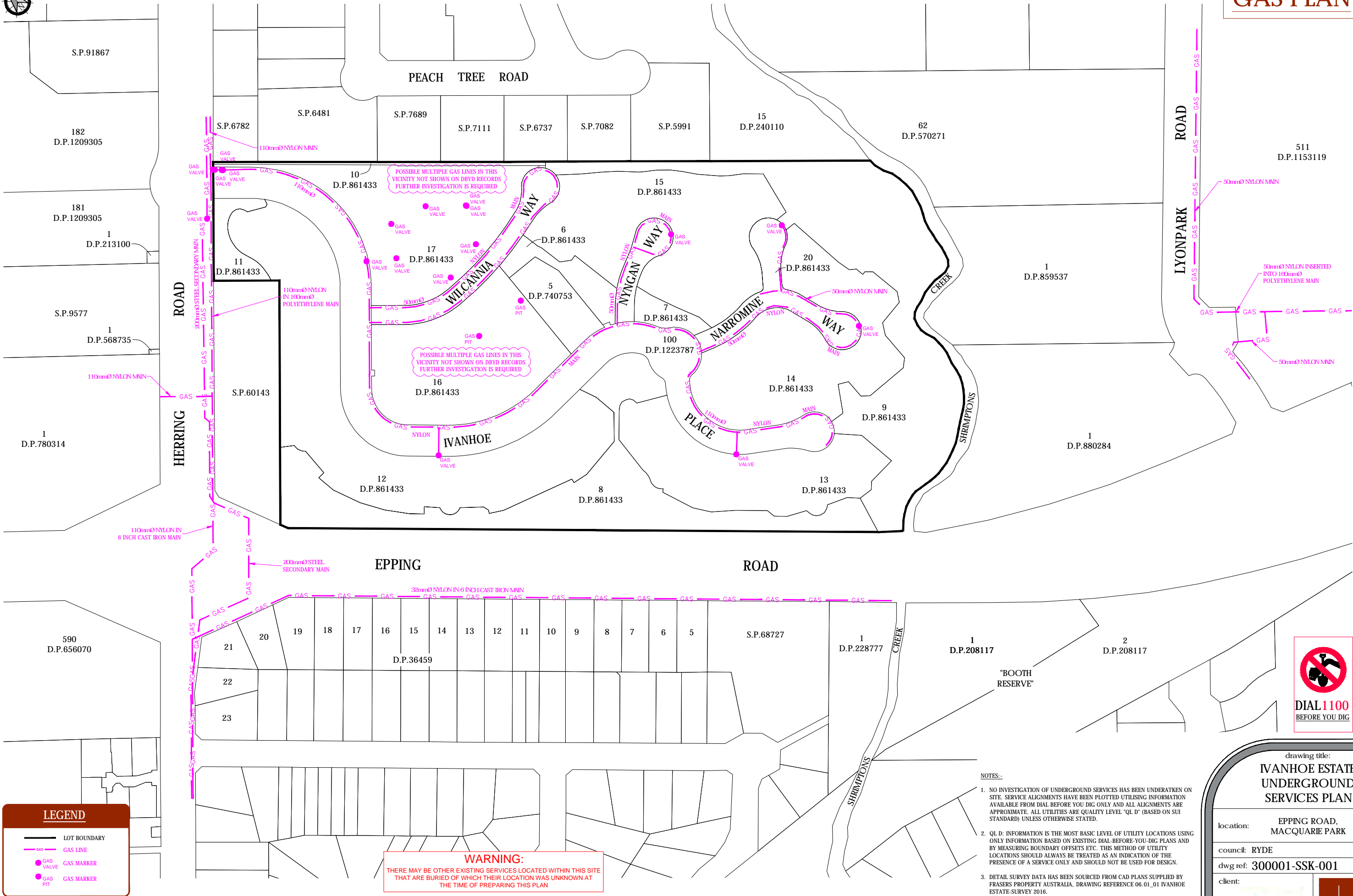
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GAS PLAN



LEGEND

LOT BOUNDARY

GAS LINE

GAS VALVE

GAS MARKER

GAS PIT

GAS MARKER

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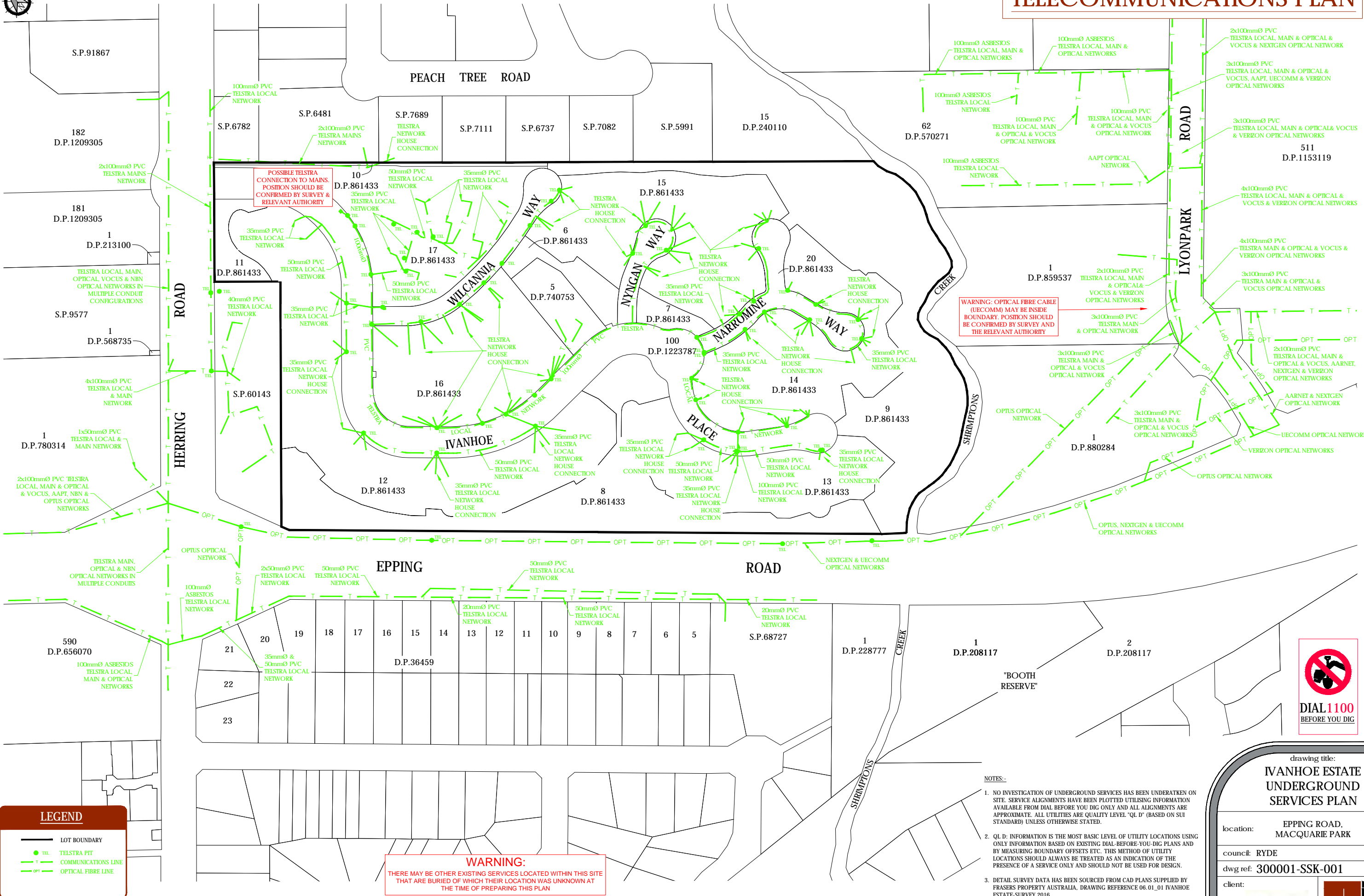
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TELECOMMUNICATIONS PLAN



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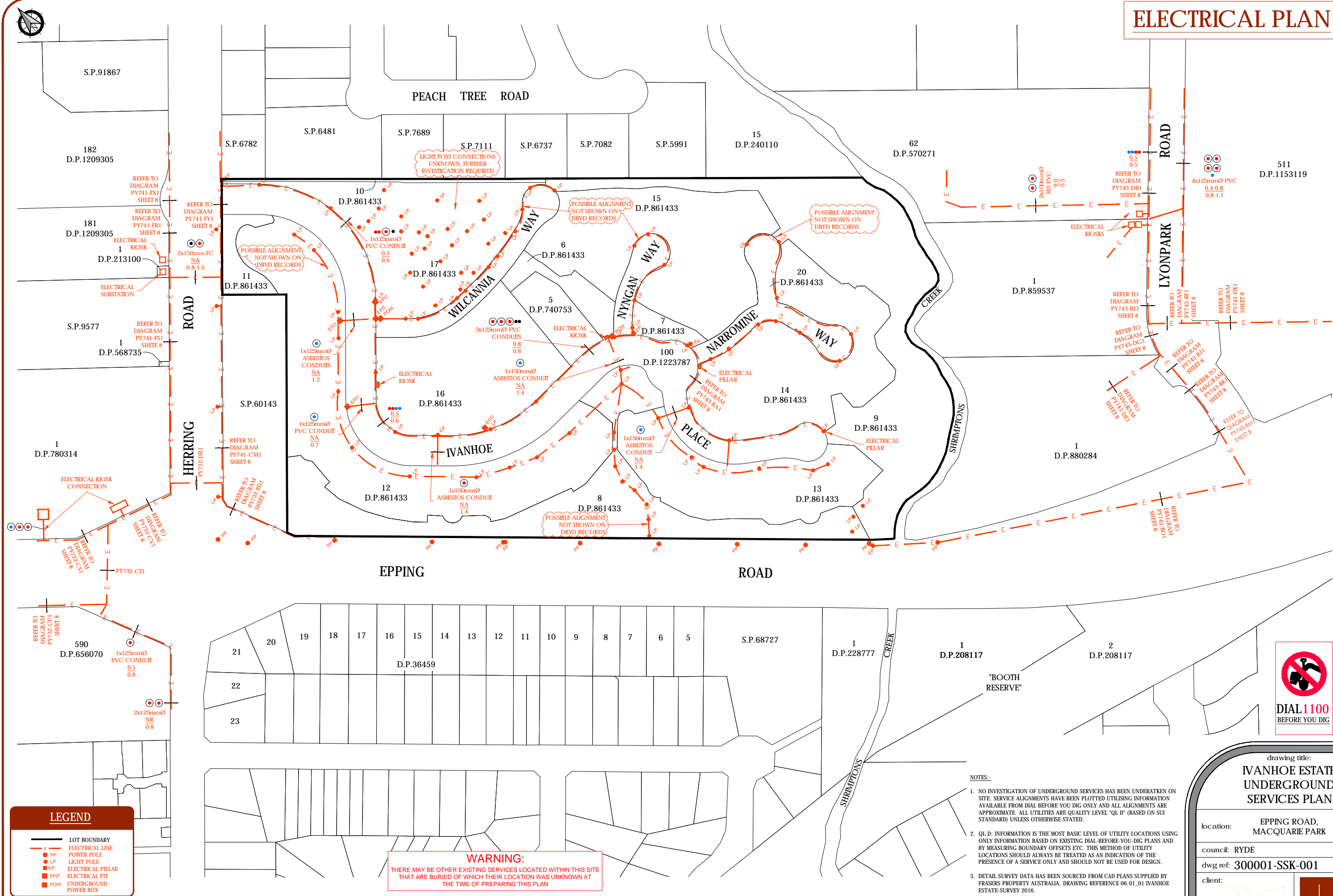
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project management civil engineering infrastructure superintendency economic analysis social impact town planning surveying development feasibility visualisation urban design



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RMS SERVICES PLAN

EPPING

ROAD

IVANHOE
ROAD

1
D.P.780314

S.P.60143

12
D.P.861433

8
D.P.861433

ROAD

590
D.P.656070

HERRING

20
D.P.36459

19

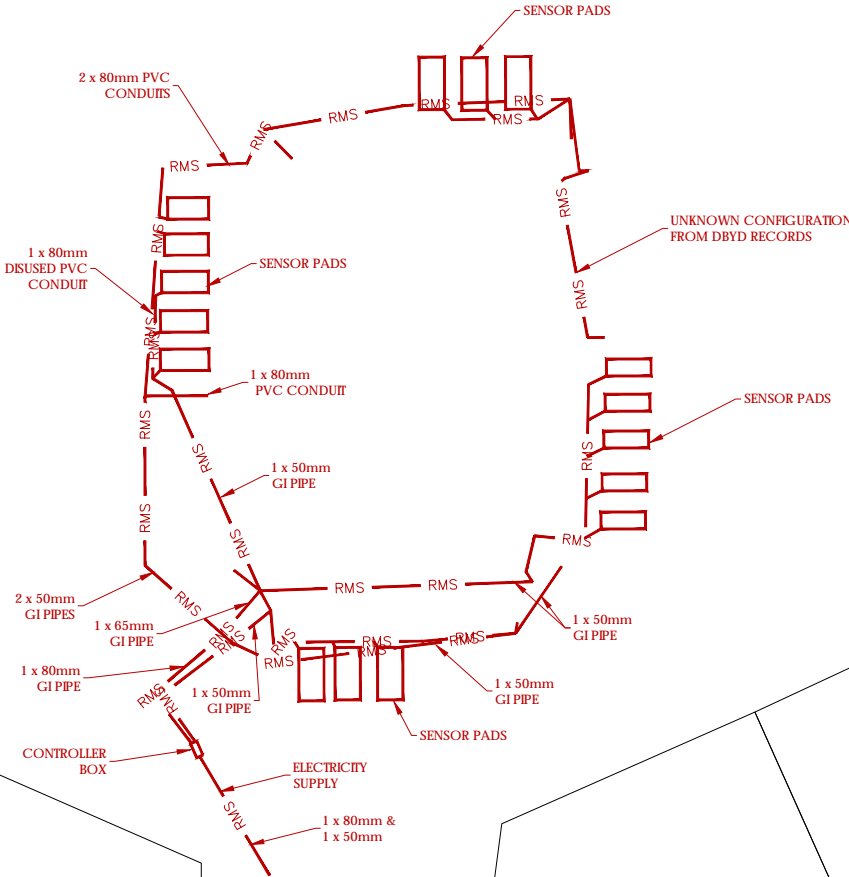
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LEGEND

- LOT BOUNDARY
- RMS ELECTRICAL LINE

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drawing title:
**IVANHOE ESTATE
UNDERGROUND
SERVICES PLAN**

location: **EPPING ROAD,
MACQUARIE PARK**

council: **RYDE**

dwg ref: **300001-SSK-001**

client:



central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100

www.adwjohnson.com.au

ver.	date	comment	surveyed	drawn	checked	pm	co-ordinate information	level information	scale (A1 original size)	page
A	23.03.17	INITIAL ISSUE	-	PB	DH	MO	CO-ORDINATE SYSTEM: MGA 56 ORIGIN OF CO-ORDINATES: N/A DATE OF SURVEY N/A	DATUM: N/A ORIGIN OF LEVELS: N/A CONTOUR INTERVAL: N/A	0 10 20 30 40 A1 / A3 1:1000 / 1:2000	6 OF 9

project management

civil engineering

infrastructure

superintendency

economic analysis

social impact

town planning

surveying

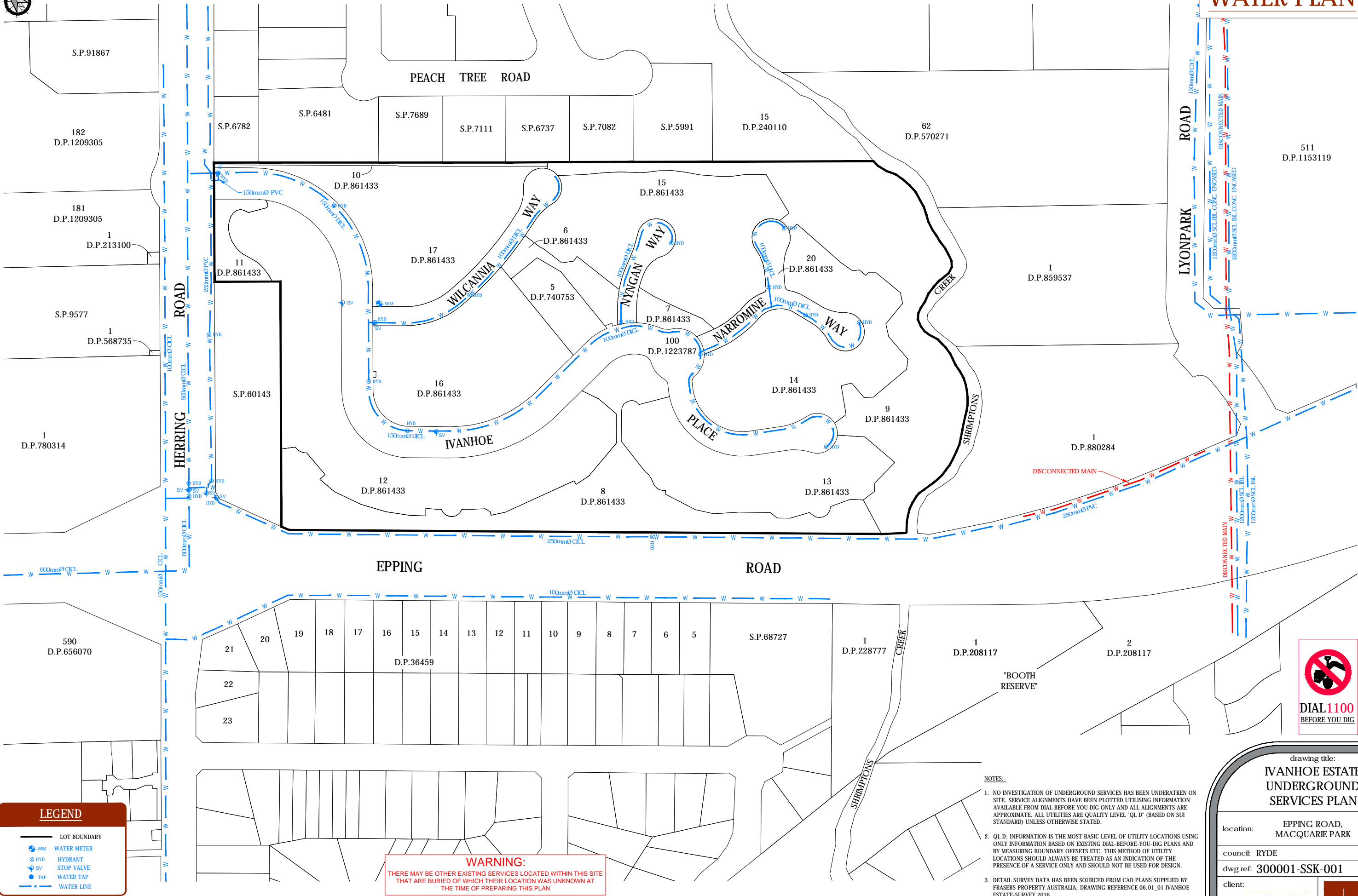
development feasibility

visualisation

urban design



WATER PLAN



LEGEND

LOT BOUNDARY

WM WATER METER

HYD HYDRANT

SV STOP VALVE

TAP WATER TAP

WATER LINE

WARNING:
THERE MAY BE OTHER EXISTING SERVICES LOCATED WITHIN THIS SITE
THAT ARE BURIED OF WHICH THEIR LOCATION WAS UNKNOWN AT
THE TIME OF PREPARING THIS PLAN

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drawing title:
**IVANHOE ESTATE
UNDERGROUND
SERVICES PLAN**

location: EPPING ROAD,
MACQUARIE PARK

council: RYDE

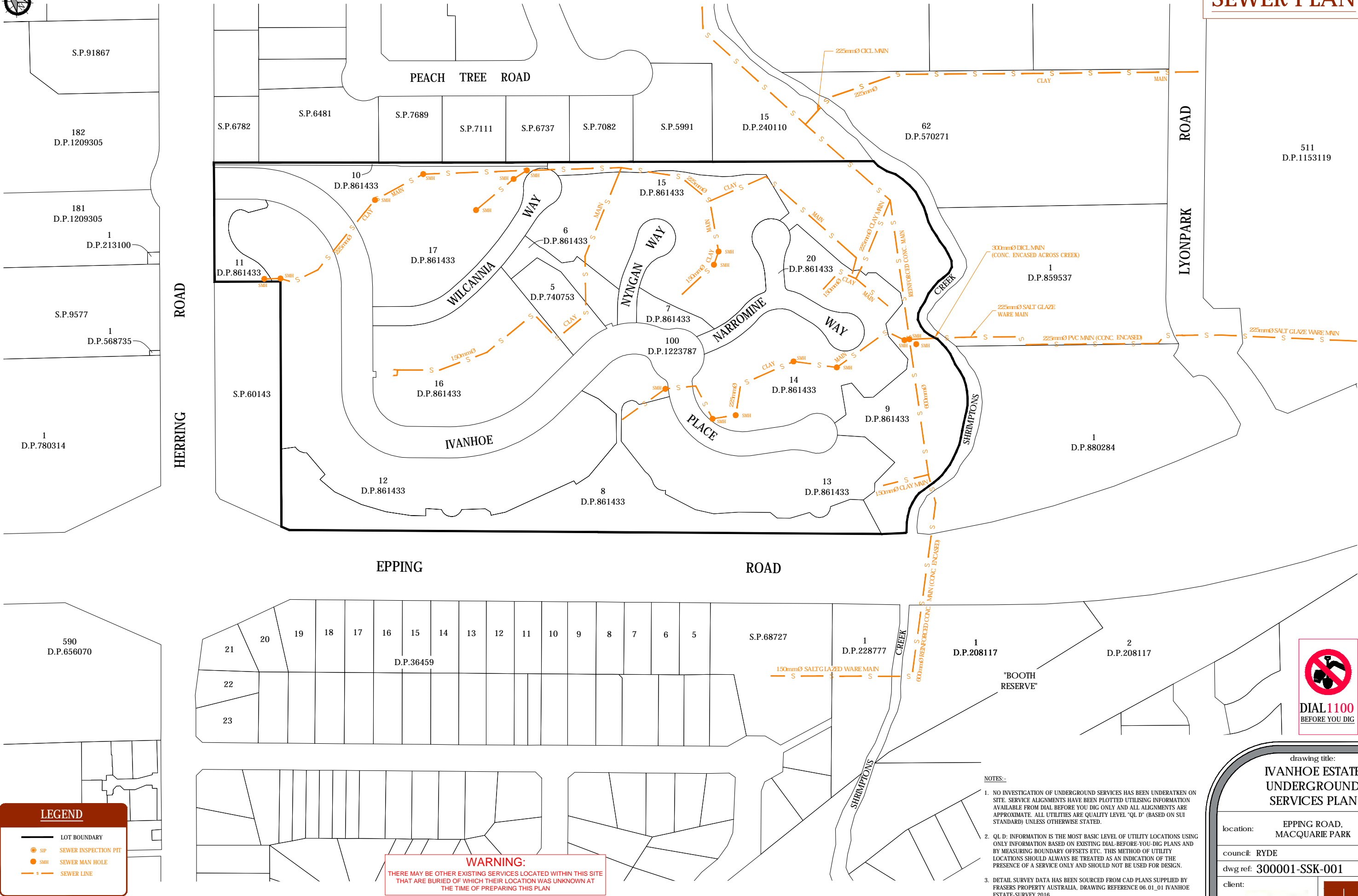
dwg ref: 300001-SSK-001

client:

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SEWER PLAN



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drawing title:
IVANHOE ESTATE UNDERGROUND SERVICES PLAN

location: **EPHING ROAD, MACQUARIE PARK**

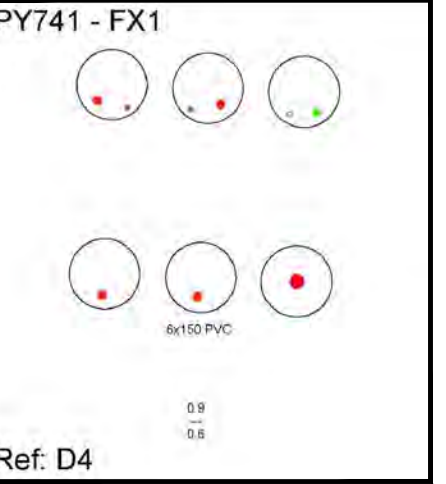
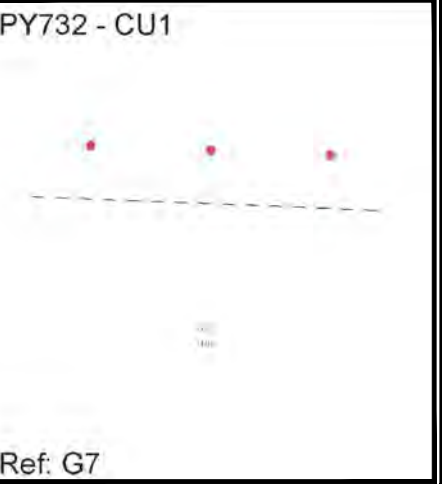
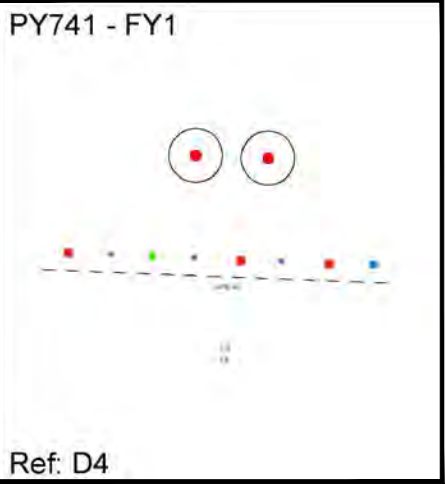
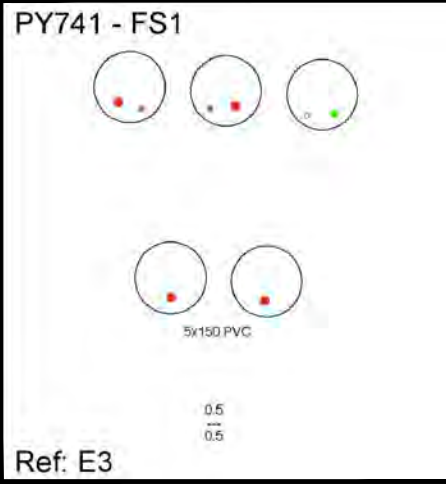
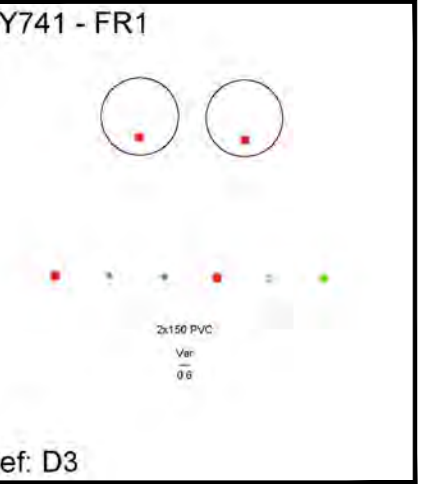
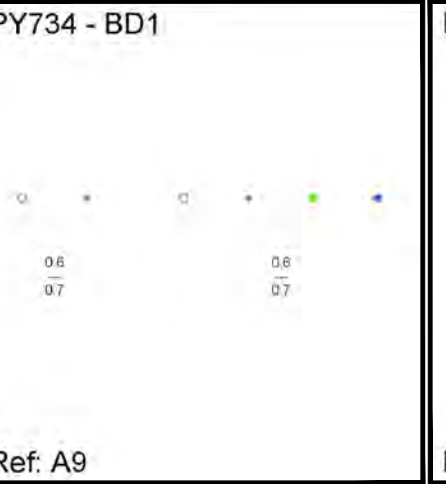
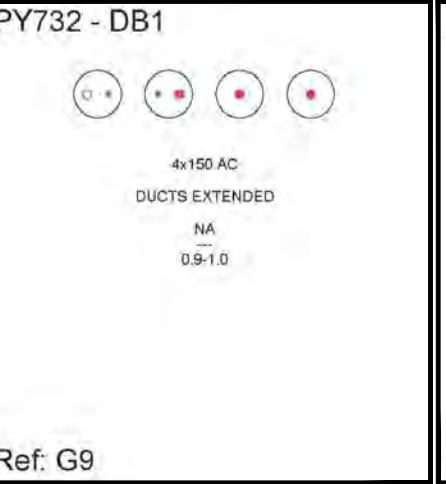
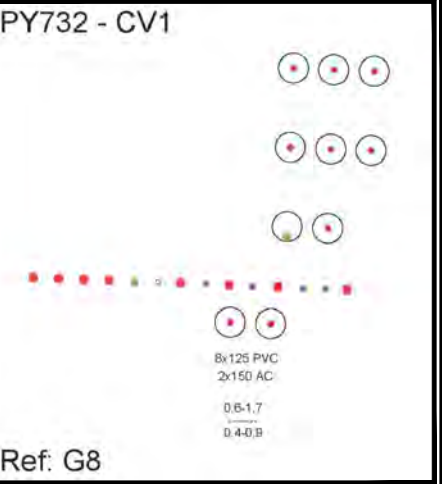
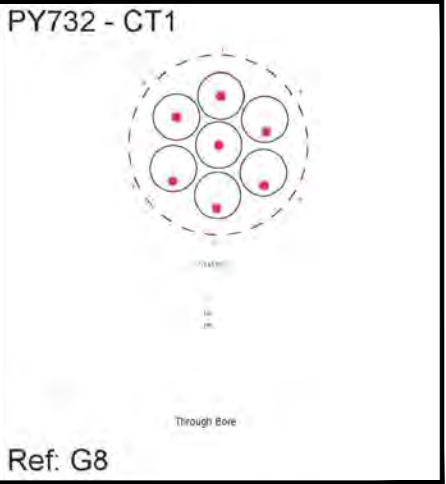
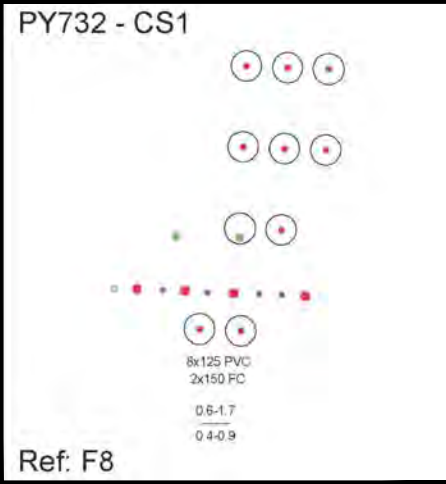
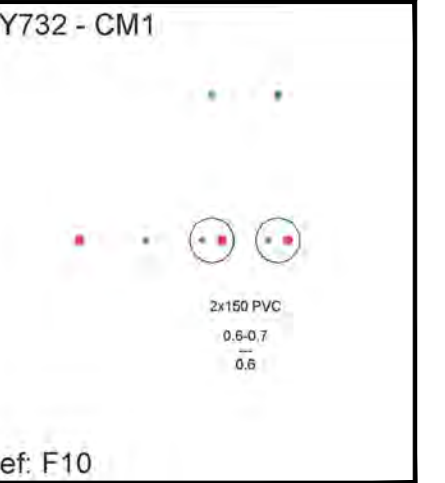
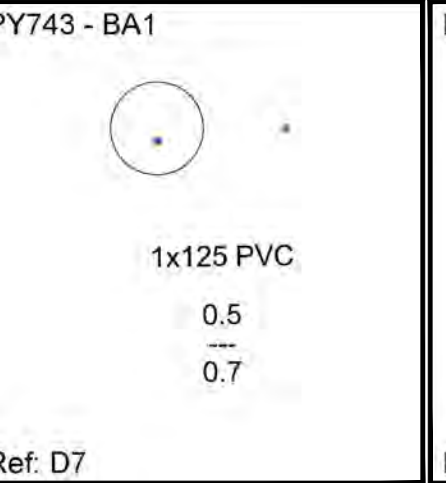
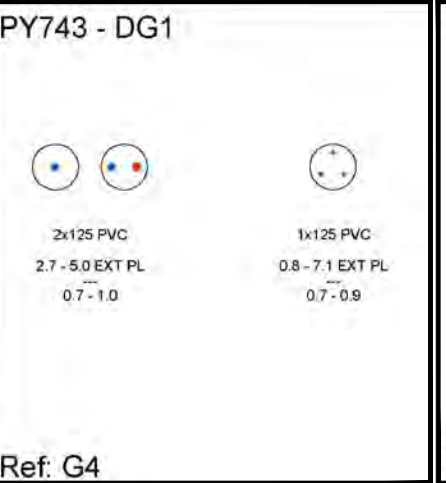
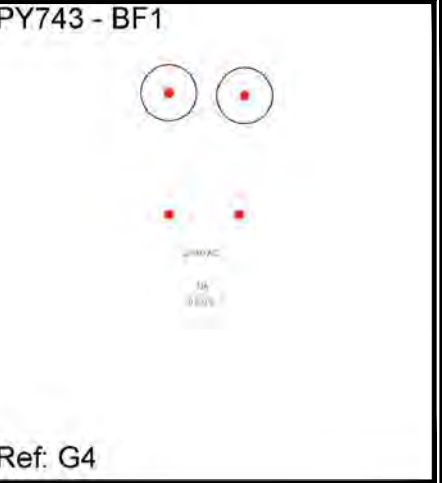
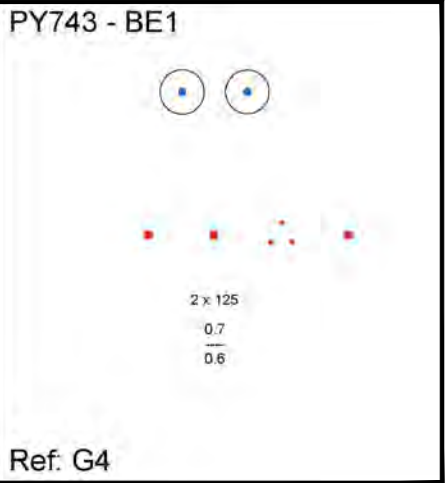
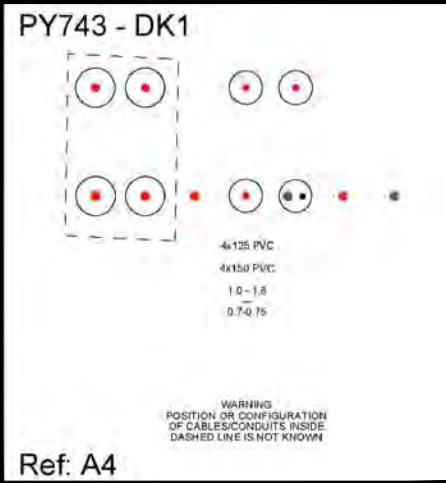
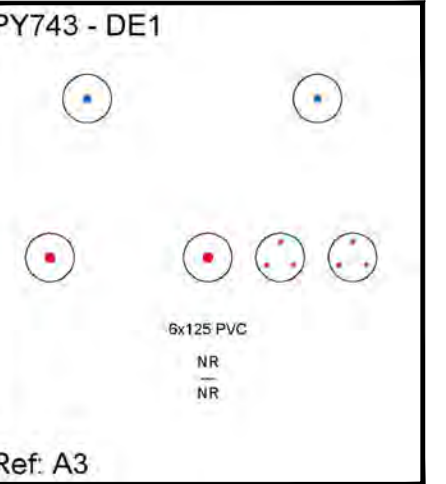
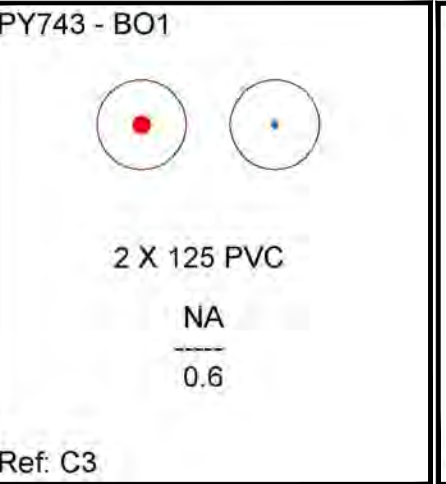
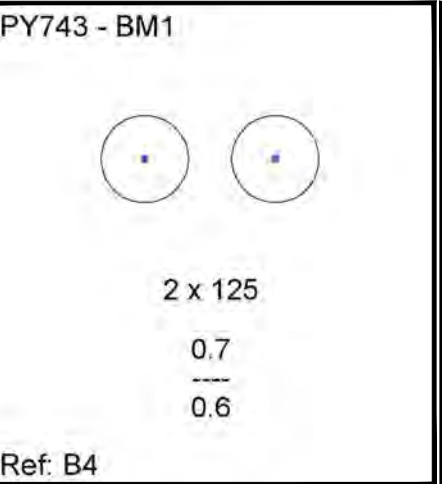
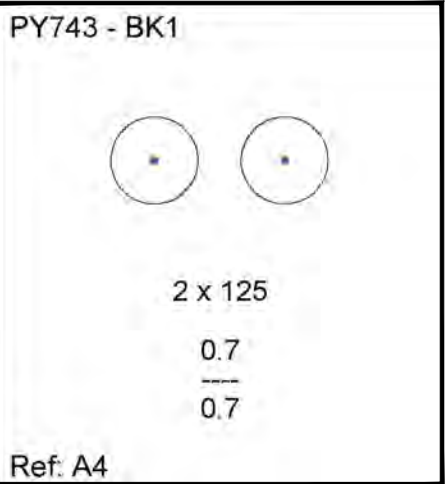
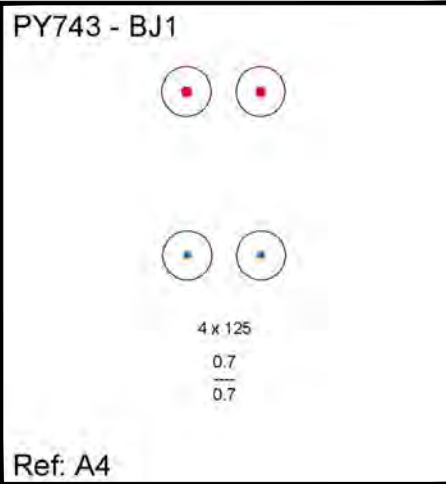
council: **RYDE**

dwg ref: **300001-SSK-001**

client:

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ELECTRICAL
DIAGRAMS PLAN



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project managementcivil engineeringinfrastructuresuperintendencyeconomic analysissocial impacttown planningsurveyingdevelopment feasibilityvisualisationurban design										



drawing title:
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UNDERGROUND
SERVICES PLAN**

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MACQUARIE PARK**

council: **RYDE**

dwg ref: **300001-SSK-001**

client:

central coast office ph: (02) 4305 4300
hunter office ph: (02) 4978 5100
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FRASERS
PROPERTY

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johnson

Appendix D

SYDNEY WATER CORPORATION CORRESPONDENCE

Case Number: 163934

3 August 2017

Frasers Property Australia
c/- Rose Atkins Rimmer

FEASIBILITY LETTER

Developer: Frasers Property Australia
Your reference: 41/24958
Development: Lot 5 DP740753 27 Ivanhoe Pl, Macquarie Park
Development Description: Social and market housing, independent living units, residential aged care facility, school and child care centres are being delivered in stages from Herring Road progressively east towards Shrimpton's Creek.
Your application date: 16 June 2017

Dear Applicant

This Feasibility Letter (Letter) is a guide only. It provides general information about what Sydney Water's requirements could be if you applied to us for a Section 73 Certificate (Certificate) for your proposed subdivision. **The information is accurate at today's date only.**

If you obtain development consent for that subdivision from your consent authority (this is usually your local Council) they will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (Coordinator).

Sydney Water will then send you either a:

- Notice of Requirements (Notice) and Developer Works Deed (Deed) or
- Certificate.

These documents will be the definitive statement of Sydney Water's requirements.

There may be changes in Sydney Water's requirements between the issue dates of this Letter and the Notice or Certificate. The changes may be:

- if you change your proposed development eg the development description or the plan/site layout, after today, the requirements in this Letter could change when you submit

your new application; and

- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

You have made an application for specific information. Sydney Water's possible requirements are:

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from Sydney Water and to the extent that it is able, Sydney Water limits its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

What You Must Do To Get A Section 73 Certificate In The Future.

To get a Section 73 Certificate you must do the following things. You can also find out about this process by visiting www.sydneywater.com.au > Plumbing, building & developing > Developing > Land development.

1. **Obtain Development Consent from the consent authority for your subdivision proposal.**
2. **Engage a Water Servicing Coordinator (Coordinator).**

You must engage your current or another authorised Coordinator to manage the design and construction of works that you must provide, at your cost, to service your subdivision. If you wish to engage another Coordinator (at any point in this process) you must write and tell Sydney Water.

For a list of authorised Coordinators, either visit www.sydneywater.com.au > Plumbing, building & developing > Developing > Providers > Lists or call **13 20 92**.

The Coordinator will be your point of contact with Sydney Water. They can answer most questions that you might have about the process and developer charges and can give you a quote or information about costs for services/works (including Sydney Water costs).

3. **Developer Works Deed**

It would appear that your feasibility application is served from existing mains and does not require any works to be constructed at this time. Sydney Water will confirm this with you after you have received Development Approval from Council and your Coordinator has submitted a new Development application and Sydney Water has issued you with a formal Notice of Requirements.

4. **Water and Sewer Works**

4.1 **Water**

Sydney Water has assessed your application and found that:

The proposed site is in the Marsfield water supply zone boundary. There is an existing DN500 trunk water main along Herring Road which has capacity to service the proposed development. A detailed planning study must be carried out to determine whether augmentation of existing water infrastructure within the Macquarie University growth precinct is required.

Sewer

The proposed development will drain to the existing North Head System via existing infrastructure. There is a DN600 trunk wastewater main adjacent to Shrimptons Creek, which has capacity to service the proposed site.

A detailed planning study must be carried out to determine whether augmentation of existing

wastewater infrastructure within the growth precinct is required.

5. Ancillary Matters

5.1 Asset adjustments

After Sydney Water issues this Notice (and more detailed designs are available), Sydney Water may require that the water main/sewer main/stormwater located in the footway/your property needs to be adjusted/deviated. If this happens, you will need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. Sydney Water will need to see the completed designs for the work and we will require you to lodge a security. The security will be refunded once the work is completed.

5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use Sydney Water's **Permission to Enter** form(s) for this. You can get copies of these forms from your Coordinator or the Sydney Water website. Your Coordinator can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

OTHER THINGS YOU MAY NEED TO DO

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement of Sydney Water in the future because of the impact of your development on our assets. You must read them before you go any further.

Approval of your building plans

Please note that your building plans must be approved. This can be done at Sydney Water Tap inTM. Visit www.sydneywater.com.au > Plumbing, building & developing > Building > Sydney Water Tap inTM or call 13 20 92.

This is not a requirement of the Certificate but the approval is needed because construction/building works may impact on existing Sydney Water assets (e.g. water and sewer mains). In any case, these works MUST NOT commence until Sydney Water has granted approval.

Your Coordinator can tell you about the approval process including:

- Possible requirements;
- Costs; and
- Timeframes.

Note: You must obtain our written approval before you do any work on Sydney Water's systems. Sydney Water will take action to have work stopped on the site if you do not

have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.

Backflow Prevention Water supply connections

A backflow prevention containment device appropriate to the property's hazard rating must be installed at the property boundary. The device is to be installed on all water supplies entering the property, regardless of the supply type or metering arrangements. It is needed to reduce the risk of contamination by backflow from these supplies.

A licensed plumber with backflow accreditation can advise you of the correct requirements for your property. To view a copy of Sydney Water's Backflow Prevention Policy and a list of backflow accredited plumbers visit www.sydneywater.com.au > Plumbing, building & developing > Plumbing > Backflow prevention.

Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the subdivision and the ability of Sydney Water's system to provide that flow in an emergency. Sydney Water's Operating Licence directs that Sydney Water's mains are only required to provide domestic supply at a minimum pressure of 15 m head.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to a Sydney Water's water main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to a Sydney Water sewer main. This work must meet Sydney Water's standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Soffit Requirements

Please be aware that floor levels must be able to meet Sydney Water's soffit requirements for property connection and drainage.

Other fees and requirements

The requirements in this Notice relate to your Certificate application only. Sydney Water may be involved with other aspects of your development and there may be other fees or requirements.

These include:

- plumbing and drainage inspection costs;
- the installation of backflow prevention devices; and
- council fire fighting requirements. (It will help you to know what the fire fighting requirements are for your subdivision as soon as possible. Your hydraulic consultant can help you here.)

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END

Appendix E

AUSGRID CORRESPONDENCE

From: Amir Mohina [<mailto:AMohina@ausgrid.com.au>]
Sent: Wednesday, 2 August 2017 1:42 PM
To: David Taylor
Cc: Cedric Halferty
Subject: Preliminary Enquiry at: Ivanhoe Place, Macquarie Park_ B17/2627 (Ausgrid Reference: 700003921)

Hi David,

Please refer to response below relating from our distribution planning group which addresses some of the issues raised in your earlier Preliminary enquiry. If you wish to proceed with one of the options listed below to supply the proposed development, make sure you refer your selection to the response below in your application for connection that way we have something to work off.

Feel free to contact me if you have any questions relating the information below... If the site requirements have changed and you wish to explore a different option proceed with submitting a new preliminary enquiry request to dataNorth as per the standard process

Regards
AMIR MOHINA

ENGINEER- Contestability| **AUSGRID**

Building 3, 59 Bridge Road, Hornsby, NSW, 2077 AUSTRALIA

☎ (02) 9585 5835 (ext.35835) | 📠 (02) 9394 6908 (ext. 36908) | ✉ amohina@ausgrid.com.au

----- Forwarded by Amir Mohina/Ausgrid on 02/08/2017 01:21 PM -----

From: Ahmad Chehade/Ausgrid
To: Amir Mohina/Ausgrid@Ausgrid,
Cc: Charbel Estephan/Ausgrid@Ausgrid
Date: 31/07/2017 08:41 AM
Subject: TRIM: D17/718074 - HVCon2017_382 Preliminary Enquire for the Ivanhoe Development

Hi Amir,

I have received a Preliminary Enquiry to investigate the connection of a large residential & commercial development on the corner of Epping Rd & Herring Rd, Macquarie Park.
The Preliminary Enquire for Ivanhoe Development HVCon2017_382 indicates the load required will be 447A at 11kV or 8.5MVA of load.

The proposed load will more than likely require 3 HV feeders to support the load in N and N-1. There are several 11kV feeders that run past the site which are connected to either Macquarie Park Zone or Epping Zone but these feeders can not support the requested load without a considerable and uneconomic upgrade of the existing network. Macquarie Park Zone is also heavily loaded and no longer has capacity to support the proposed load.

At present the closest zone with enough capacity to support the proposed load is Epping Zone. Therefore I have made the following assumptions to cost out this project:

1. Three HV feeders are required to support the load for N and N-1.
2. 500mm² Al XLPE is required for the bulk of the installation.
3. There are spare conduits available which are not in use.
4. Thermal Stable Backfill(TSB) is not required for the bulk of the installation.
5. Epping Zone or Top Ryde have enough capacity to carry the new load.

Considering the information we have received to date from the customer and Contestability and the available capacity at the surrounding zones, I have investigated two options for the Ivanhoe Development HVCon2017_382. These are:

Option 1 - Install New Conduits - Epping Zone

Outline: This option is for a complete new cable run and installation of bank of 4x150mm conduits from Epping Zone to the Ivanhoe work site .
Three new 500mm² Al XLPE cables are installed for the entire run. The conduits may require installation in Thermal Stable Backfill in some areas which has not been included as part of the cost. Four existing feeders will require consolidation to allow for connection at the zone.

Benefit: This is the cheapest option available. It provides an absolute cost of the final project.. It also uses an alternate route along non-RMS roads.

Distance: 2.62km

Cost: **\$3,500,000**

Option 2 - Use Existing Conduits where possible - Top Ryde Zone

Outline: This option looks at running three new 500mm² Al XLPE cables from Top Ryde Zone to the Ivanhoe work site .
The cables will be installed using some existing conduits and some new conduits as shown on the attached PDF.

Benefit: This is a contingency option in the event that Epping Zone does not have capacity available. It provides an absolute cost of the final project.. It also uses an alternate route along non-RMS roads.

Distance: 4.81km

Cost: **\$6,100,000**

Regards,

Ahmad Chehade | Distribution Planner | Distribution Planning | AUSGRID

|

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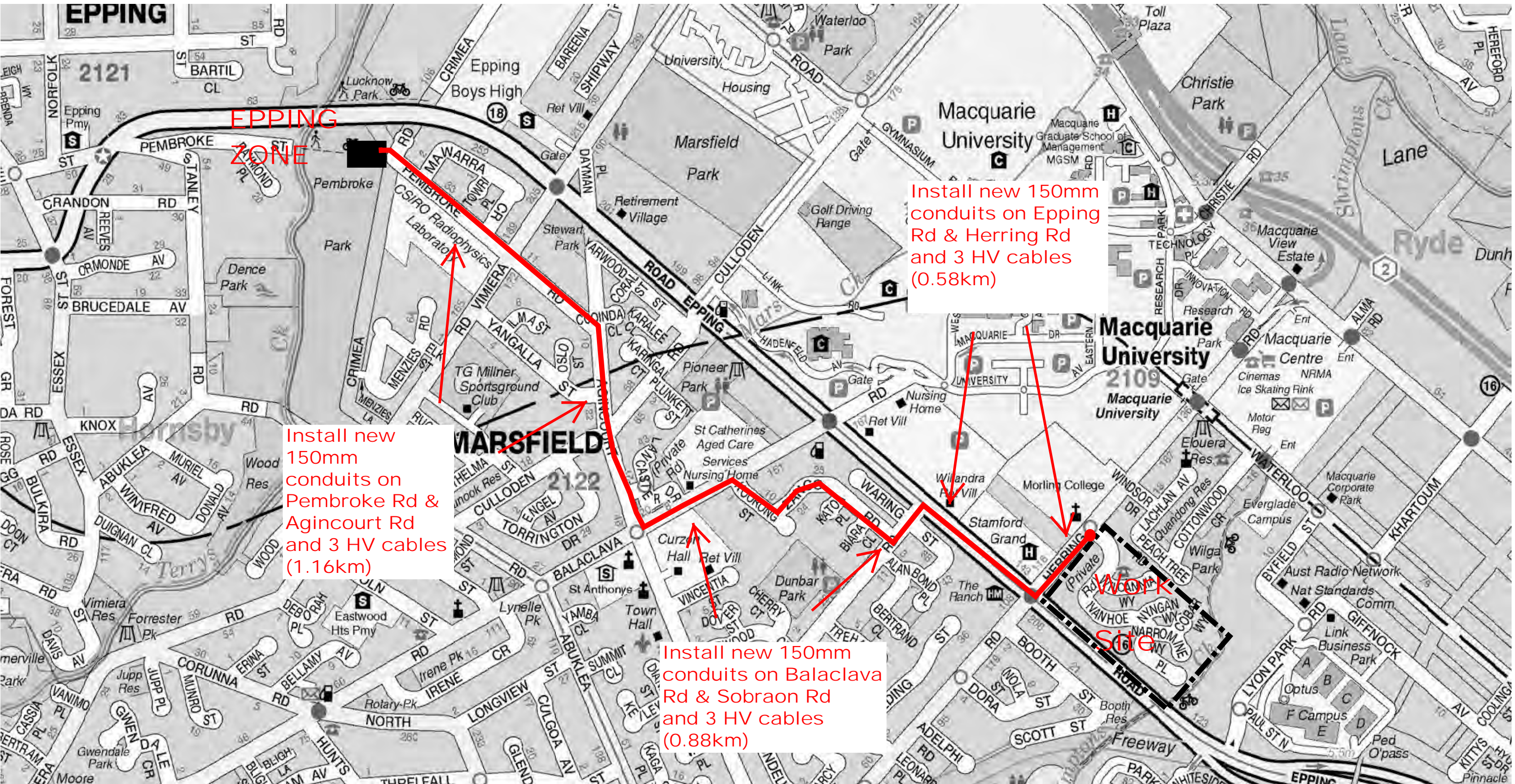
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OPTION 1 - Install new conduits - Epping Zone

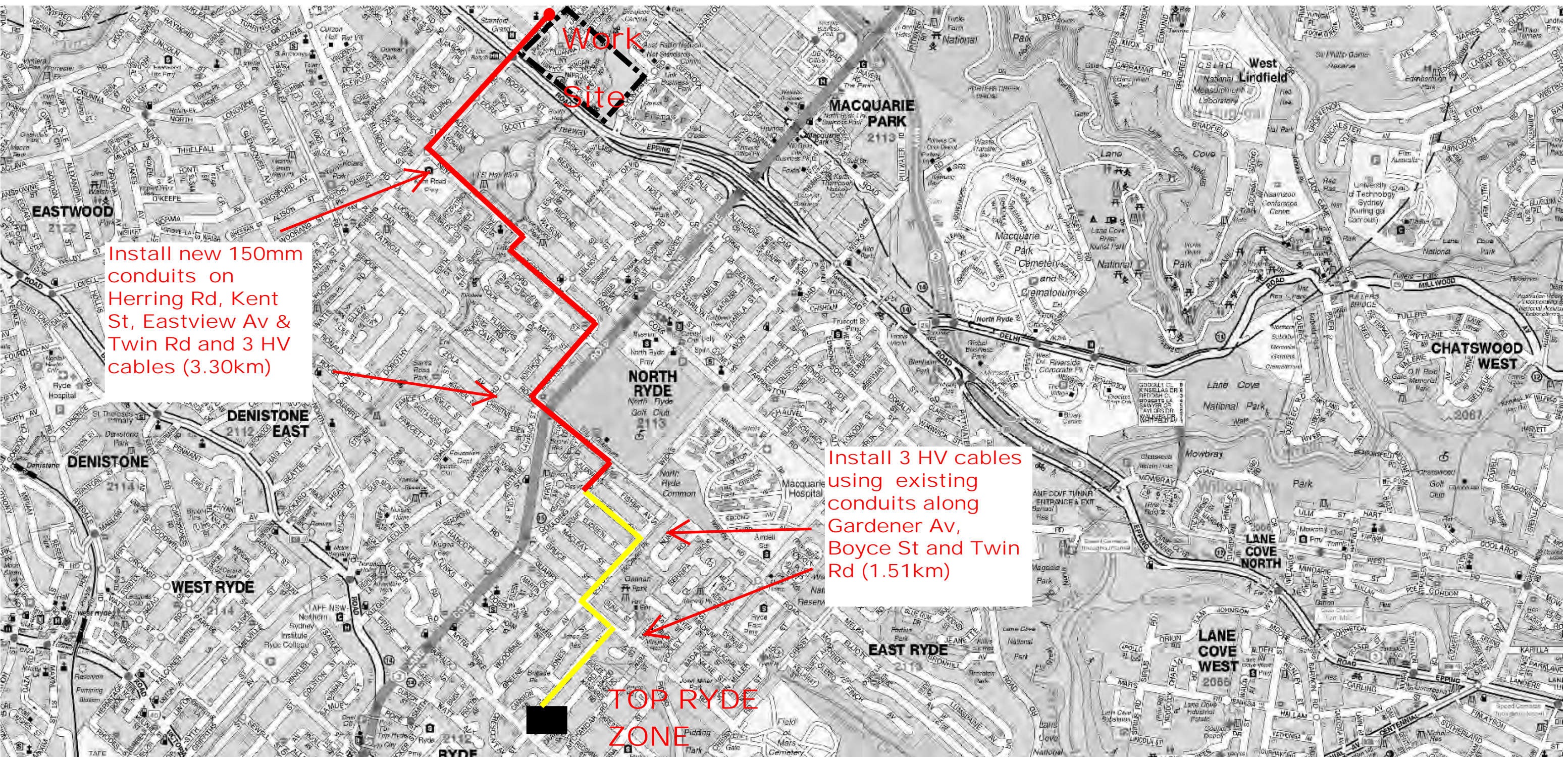
— New Conduits (Install 4x150mm conduits)



OPTION 2 - Install new conduits - Top Ryde Zone

 New Conduits (Install 4x150mm conduits)

 Existing Spare Conduits



Appendix F

TELECOMMUNICATION CORRESPONDENCE

Date: 17 October 2017

Attn: Matt Owen,
Senior Project Manager
ADW Johnson Pty Limited,
Level 35 One International Towers,
100 Barangaroo Avenue, Sydney NSW 2000

Re: Telecommunications Infrastructure and Services Feasibility Report,
Ivanhoe Estate, 137-143 Herring Road, Macquarie Park, NSW 2113

Matt,

OptiComm is an Australian Government policy compliant wholesale Carrier that delivers Telecommunications services over Optical Fibre networks to both Master Planned Communities (MPC) and Multi-Dwelling Unit (MDU) residential and commercial developments. OptiComm networks fully comply with the amendments to Federal Telecommunications Act that were required to facilitate the Government's Telecommunications in New Developments (TIND) regulatory framework.

OptiComm has conducted a desktop study of the site and determined that the site can be serviced with superfast Fibre-optic Telecommunications Infrastructure and Services.

The map below shows Optical Fibre splice points in the vicinity. We can also confirm that although developer contributions apply for the construction of Fibre-to-the-Premises network infrastructure within the site, there is no backhaul construction cost to the developer to connect Telecommunications Infrastructure and Services to the overall site.

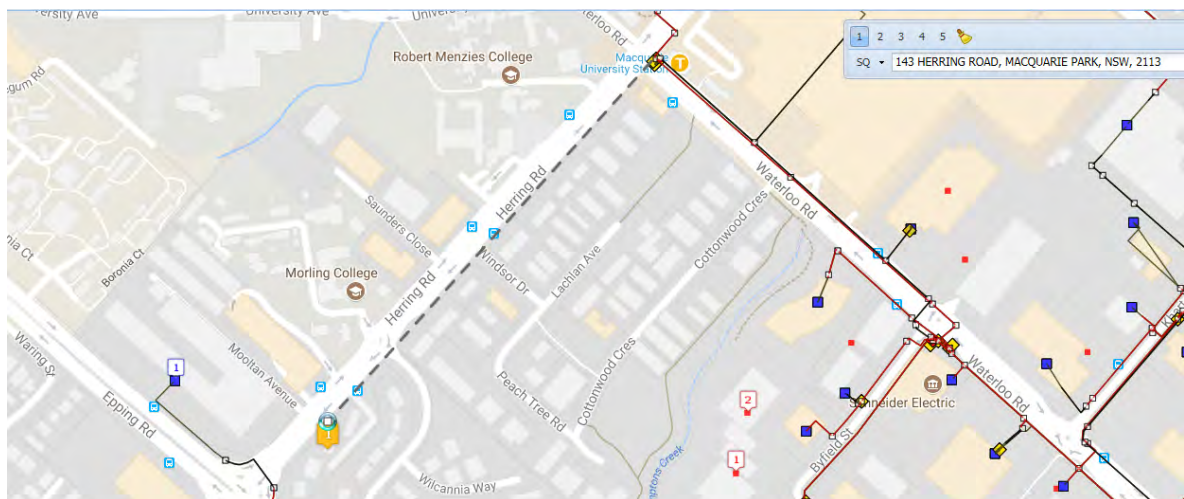


Fig 1: Telecommunications Infrastructure in the vicinity of the Ivanhoe Development

There are a number of lead-in options available to OptiComm and OptiComm will work with the developer to establish the actual route. It is expected that OptiComm will either construct or lease duct in either Herring Road or Epping Road. Final lead-in locations and route will be determined closer to actual construction commencement.

At the appropriate time, OptiComm is keen to submit a proposal for Fibre-to-the-Premises for the relevant stages.

OptiComm provide National Broadband Fibre in large and small Multi-Dwelling Unit developments.

In addition to the essential Broadband and Telephone, OptiComm offers a range of building services including:

Lift and FIP phone connectivity | SMATV system (FOXTEL & Free-to-Air TV) | Access Control, CCTV and Security systems connectivity | Public Wi-Fi | OptiComm Audio/Video Intercom | EMS/BMS connectivity | Distributed Antenna System (DAS) for mobile phone in-building coverage.

OptiComm is now the largest independent provider of broadband infrastructure with over 150 Greenfield developments nationally, 250,000 lots under contract and more than 70,000 lots constructed to date.

Let me know if you require further assistance or information.

Regards,

A handwritten signature in black ink, appearing to read 'R Carrick', with a long, sweeping underline.

Robert Carrick
Sales Manager – NSW and ACT
OptiComm Co Pty Ltd
Unit 23, 380 Eastern Valley Way,
Chatswood, NSW, 2067
M: 0421 058 734
P: (02) 8252 3604
E: rcarrick@opticomm.net.au

Matt Owen

From: Matthew Schwabrow <MatthewSchwabrow@nbnco.com.au>
Sent: Wednesday, 25 October 2017 12:43 PM
To: Matt Owen
Cc: Andy Every
Subject: Ivanhoe feasibility assessment [nbn-Confidential:Commercial]

Follow Up Flag: Follow up
Flag Status: Completed

nbn-Confidential: Commercial

Hi Matt,

Great catching up again today.

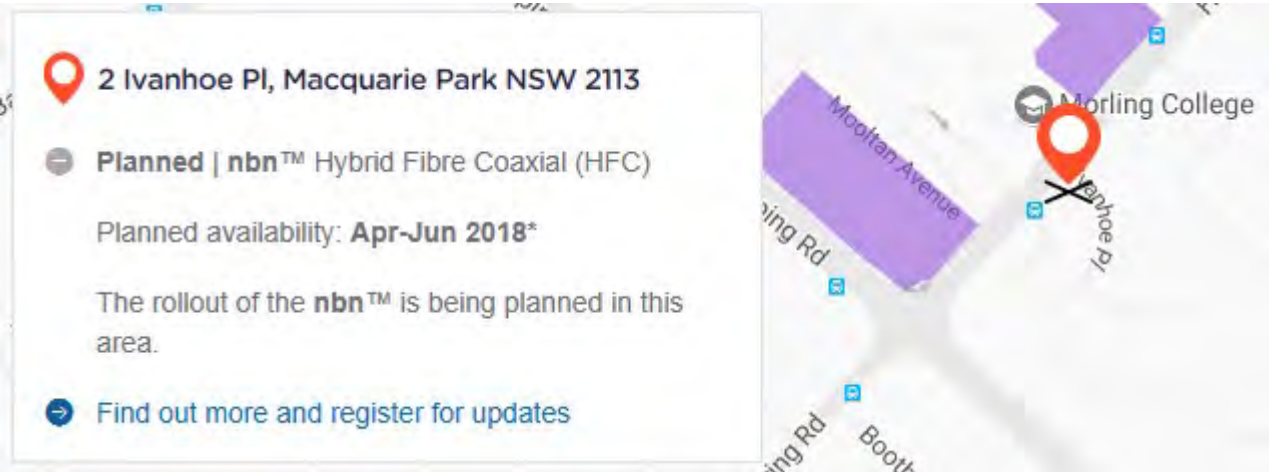
Please see the information relating to Ivanhoe.

Planning and Design has completed a feasibility assessment on New Development opportunity below:

Opportunity Id: AYCA-4TUKBO
Opportunity Name: Ivanhoe
Address: 25 Ivanhoe Pl
Suburb: Macquarie Park
State: NSW
Post Code: 2113
FSA: 2RYD
No. of New OLTs Required:
Total Route Distance (Kms): 5.2
Estimated Backhaul Cost Per Premises: \$ 18.77778
Backhaul Charge Amount: \$ 33800



In relation to the sales office it looks like we will have the ability to service it from June 2018.



I will send the letter shortly.

Regards,

Matt Schwabrow

Enterprise & Government NSW/ACT | Demand Deployment

M +61 423 567 060 | **E** matthewschwabrow@nbnco.com.au

A Level 11, 100 Arthur St, NORTH SYDNEY NSW 2060



Appendix G

JEMENA CORRESPONDENCE

10 October 2017



ADW JohnsonP/L
5 Pioneer Ave
TUGGERAH NSW 2259
Attn. B. Myles

Jemena Limited
ABN 95 052 167 405

Level 9-15
99 Walker St
North Sydney NSW 2060
PO Box 1220
North Sydney NSW 2060
T +61 2 9867 7000
F +61 2 9867 7010
www.jemena.com.au

Dear Ben

**RE: PROPOSED DEVELOPMENT OF
IVANHOE PLC, MACQUARIE PARK**

Natural Gas is available adjacent to the above subdivision and could be extended to supply any proposed development at this site depending upon it's commercial viability. Jemena does not reserve capacity for any individual project.

Suitable medium pressure 210kPa Natural Gas infrastructure exists in Herring Rd. Jemena intends to extend this network throughout the proposed estate. It is anticipated that the Developer will supply trenching and restorations during the construction phase for Jemena as staging takes place.

Caution should be exercised when carrying out any road works that may expose the Natural Gas mains existing in this location. Contact Dial B4 you Dig, ph 1100 to confirm their location.

We appreciate the opportunity to be involved in the forward planning of this development and would like to pursue the potential for the connection to the natural gas network. An offer for supply could be made available once a DA, Staging and construction is imminent. Please provide the preliminary electrical reticulation (PDF) and a CAD file of the Lot layout(DWG) when available to assist Jemena prior to construction taking place. Shared trenching is encouraged for services to minimise coordination and maximise benefits.

Caution should be exercised when carrying out any road works that may expose the Natural Gas mains existing in this location. Contact Dial B4 you Dig, ph 1100 to confirm their location.

Thank you for your inquiry. If further information or assistance is required, please do not hesitate to contact me on 0402 060 151.

Yours faithfully,

Neale Hilton

Neale Hilton
Network Development Manager