GREATER AVALON EMPLOYMENT PRECINCT

UTILITY ASSESSMENT REPORT

NOVEMBER 2025

This report has been prepared by the office of Spiire

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Looking southeast from Avalon Road, near Coonawarra Drive (August 2024)

Contents

1. EXECUTIVE SUMMARY

Spiire Australia Pty Ltd has been engaged by Victorian Planning Authority (VPA) to prepare a Utility Assessment Report to inform the servicing requirements of the proposed Greater Avalon Employment Precinct (GAEP), located to the east of Lara.

This document is to support the planning of the Greater Avalon Employment Precinct (GAEP), which is proposed as a key strategic employment precinct centred around Avalon Airport. The precinct will be an attractor for national, state and regionally significant economic investment including the manufacturing, freight and logistics industries.

The purpose of this report is to identify the location of existing utility infrastructure and discuss how utility services may be provided to facilitate development of the precinct. Services that have been investigated include sewer, potable water, gas reticulation, electricity supply and telecommunications. Detailed assessment of traffic impacts and requirements, as well as drainage and flood modelling, will be provided in separate reports, and therefore only briefly commented on in this report.

The precinct has access to existing sewer reticulation, potable water supply, electricity supply, gas supply and telecommunications network infrastructure, but it is clear that the authorities need to further develop their overall strategies and plans for the provision of increased service to this area.

The logical staging of development would be to commence near either the Beach Road or Avalon Road interchanges with the Princes Highway, as they are the closest proximity to the existing infrastructure to connect to and begin expanding from.

Each of the respective services has provision within the report to understand the requirements to service the precinct in an economical, efficient and sustainable manner.

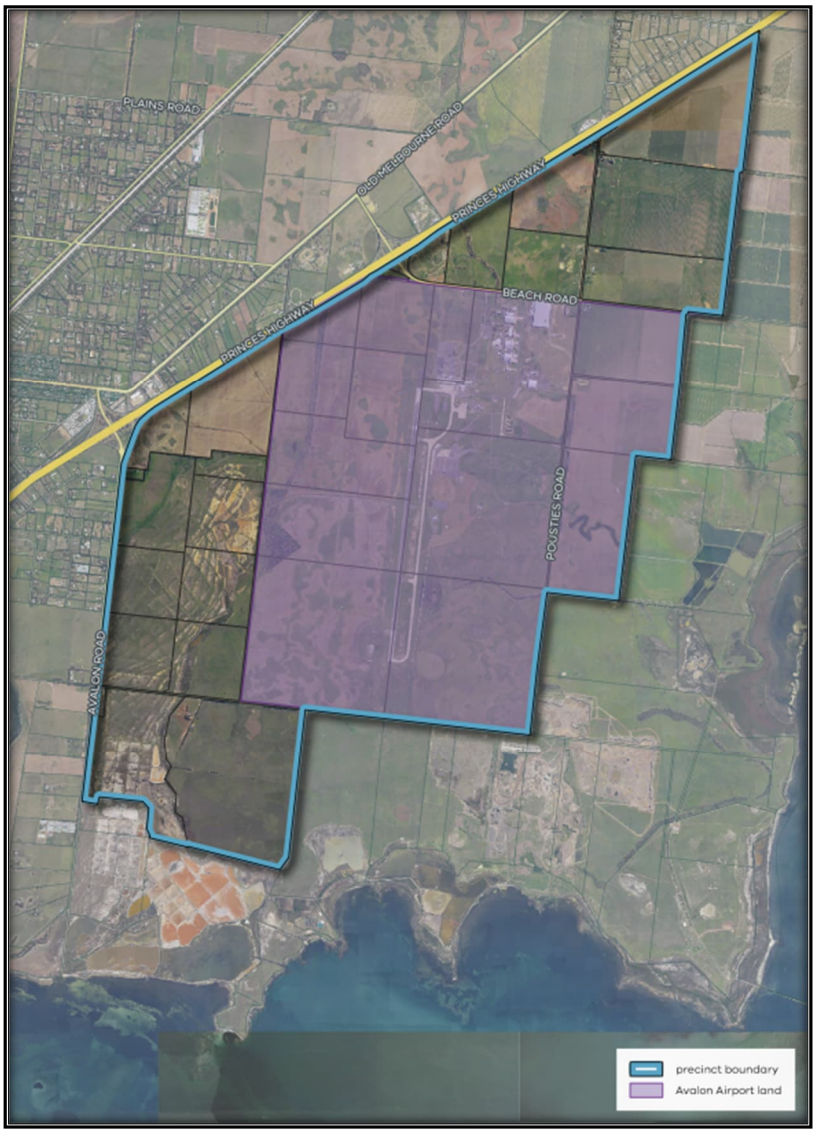

Figure 1 – Precinct Area

2. BACKGROUND

In 2022 the City of Greater Geelong (CoGG) and Wyndham City (WC) councils released their joint Avalon Corridor Strategy (ACS). The prepared strategy was developed to guide land use and development in the broader Avalon Corridor to 2050. Building from the findings of the ACS, the VPA is working with CoGG to progress the planning for the Greater Avalon Employment Precinct (GAEP), which is located at the southwestern end of the overarching Avalon corridor.

The GAEP comprises 3,437 hectares of land, approximately 1,581ha of which is non-airport land. The precinct is bounded by the Princes Highway to the north, Avalon Road to the east, Dandos Road to the south, and Pousties Road and “Western Road” to the east. The precinct is currently mixed zoning, including Avalon Airport, industrial/commercial and farming and is rural in nature. The Avalon Airport is subject to its own master planning process, and the remaining area is split into two sections. The Northern section includes the triangular section north of Beach Road, and the Western section is the

area between Avalon Road and the Airport land. Road and service connections through the Airport land will require coordination with the Airport's masterplan.

VPA will undertake community consultation and other studies such as traffic and stormwater strategy investigations. Drainage and Traffic are only briefly discussed in this report as it is understood that these will be investigated in more detail through a Drainage and Hydraulic Assessment and Traffic Impact Report, noting that some advice on these matters will be provided as part of the planning scheme amendment, and more detailed reports will be prepared as part of future development plans.

To help inform this report, VPA presented Spiire with a draft plan of the GAEP site, where a discussion regarding the utilities servicing took place (Aug 2024). Additionally, VPA coordinated a discussion with Avalon Airport to obtain a greater understanding of the effects and contributions of the GAEP to the Avalon Airport (Sep 2024).

Further to this, a separate site visit was undertaken by Spiire (Aug 2024). Several photos can be found throughout the report from this visit, with this experience also aiding in the culmination of the report.

These discussions have all worked to inform this report.

This report is limited to investigating the following services.

- Sewerage reticulation.
- Potable water supply.
- Electricity supply.
- Gas reticulation.
- Telecommunications.

Spiire has engaged with all Responsible Authorities for the servicing to determine the current infrastructure in the vicinity and obtain comments on the future provision of services to the precinct. Their responses have been reviewed, and the resultant impacts and constraints are discussed within this report.

Refer Appendix A for copies of the Authority responses received.

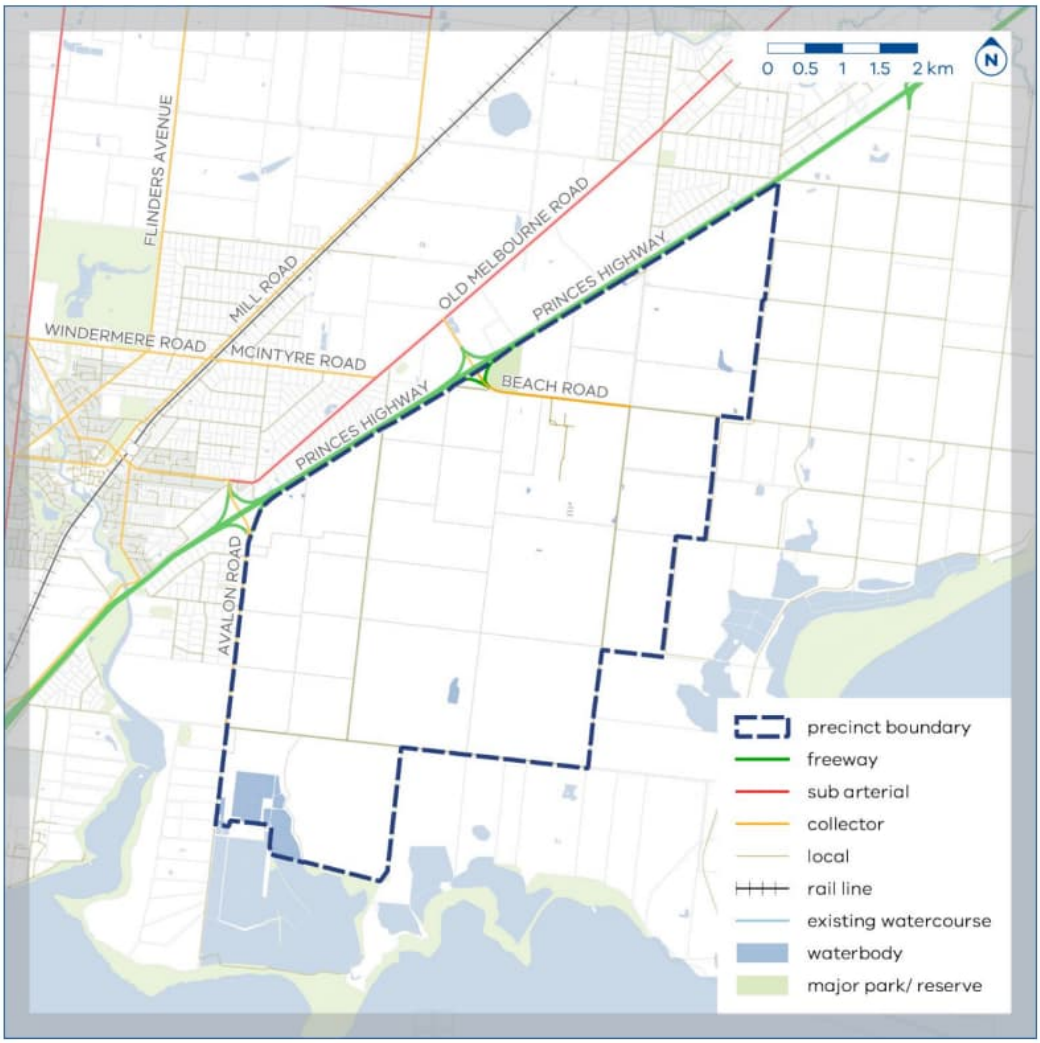

Figure 2 – Growth Area

3. EXISTING SITE CONDITIONS

The GAEP is bounded by the Princes Highway to the north, Avalon Road to the east, Dandos Road to the south, and Pousties Road and "Western Road" to the east. The precinct comprises 3,437 hectares of land, approximately 1,581ha of which is non-airport land.

The precinct has a current land use of mostly agricultural and commercial. This includes the Avalon airport, recreation (Avalon motor sports complex), farming and industrial. The most south-western section of the area includes the interface between the wetlands and coastal reserve.

It's expected that there will be areas of environmental importance within areas that haven't been disturbed by farming activities.

Figure 3 – Looking northwest from Beach Road, towards the Motor Sports Complex (August 2024)

4. SERVICE INFRASTRUCTURE

4.1 Roads

The GAEP is bounded by the Princes Highway to the north, Avalon Road to the east, Dandos Road to the south, and Pousties Road and “Western Road” to the east. Access to the precinct will primarily be via the Beach Road and Avalon Road grade separated interchanges with the Princes Highway. Beach Road, Avalon Road, Dandos Road and Pousties Road are the main, existing connecting roads within the precinct, and they generally have a rural two lane, two-way cross section with sealed pavement and overland drainage. “Western Road”, as nominated on mapping, is effectively a formalised farm track which passes through the land parcels to the east of Pousties Road.

It is anticipated that a detailed traffic analysis will be undertaken by others and provided in a separate report. Refer to it for more information on the proposed road network requirements.

Spiire has created a series of typical cross sections using the Infrastructure Design Manual (IDM) and Victorian Planning Authority (VPA) for guidance to provide preliminary insight into what the proposed road networks may look like. This can be seen in Appendix B.

4.2 Drainage

The GAEP straddles two catchment authorities. The Corangamite Catchment Management Authority to the west and the Melbourne Water to the east of the precinct, with the boundary between the two cutting across the site from the southeast to the Beach Road interchange.

Figure 4 – Looking south from Dandos Road along the existing water channel near to the intersection with Avalon Road (August 2024)

4.3 Sewer Reticulation

Barwon Water is the responsible authority for sewer reticulation within the Greater Avalon Employment Precinct.

4.3.1 Existing Sewer Infrastructure

There are currently no Barwon Water sewers servicing the Avalon precinct. All previous upgrades to the Avalon Airport site, including the new International Terminal and Cotton On, AusPost, Petstock Distribution Centres and Hanwha Defence, are being managed via upgrades (or new) onsite wastewater systems (package plants).

4.3.2 Proposed Sewer Infrastructure

Barwon Water has completed a concept sewer servicing strategy

Barwon Water have identified a gravity main along Heales Road (GID: 616541) as being the target location within the Lara sewer system that all sewer generated within GAEP must be pumped to. They propose a sewer pump station (SPS1) be established within the GAEP along Avalon Road as a potential location to facilitate this. A potential route for this sewer rising main has also been provided by Barwon Water and can be seen below.

Figure 5 – Potential route for the sewer rising main (provided by Barwon Water)

Network planning have requested that a duplicated rising main is also constructed, comprised of a smaller rising main (RM1) to service the initial development stages, and a larger rising main (RM2) to service the ultimate development. This method is established to cater for the growth of the GAEP over time, with RM1 being able to service the GAEP for flows up to 25L/s, with an estimated service time of 10 years. Once flows exceed the capacity of RM1, SPS1 can switch to using RM2, which can cater up to 65L/s. This method also allows SPS1 to utilise both rising mains if required with a combined capacity of 90L/s. Barwon Water deem this method the most appropriate outcome given the unpredictable nature of the growth for the GAEP, with flows dependent on the type of industry being developed. Network planning have requested that both rising mains are delivered together.

Internally, Barwon Water prefer a reticulated pressure sewer system be established for the GAEP due to the following reason.

- It is well suited to flat terrain with a high-water table
- It should substantially reduce groundwater infiltration, lower sewer salinity, risk of contamination (e.g. PFAS) and total sewer flows
- Industrial discharges are well suited to pressure sewer applications
- It provides better flexibility for staging the capacity of the internal sewer infrastructure

A concept of the internal sewer strategy was provided by Barwon Water and is shown below.

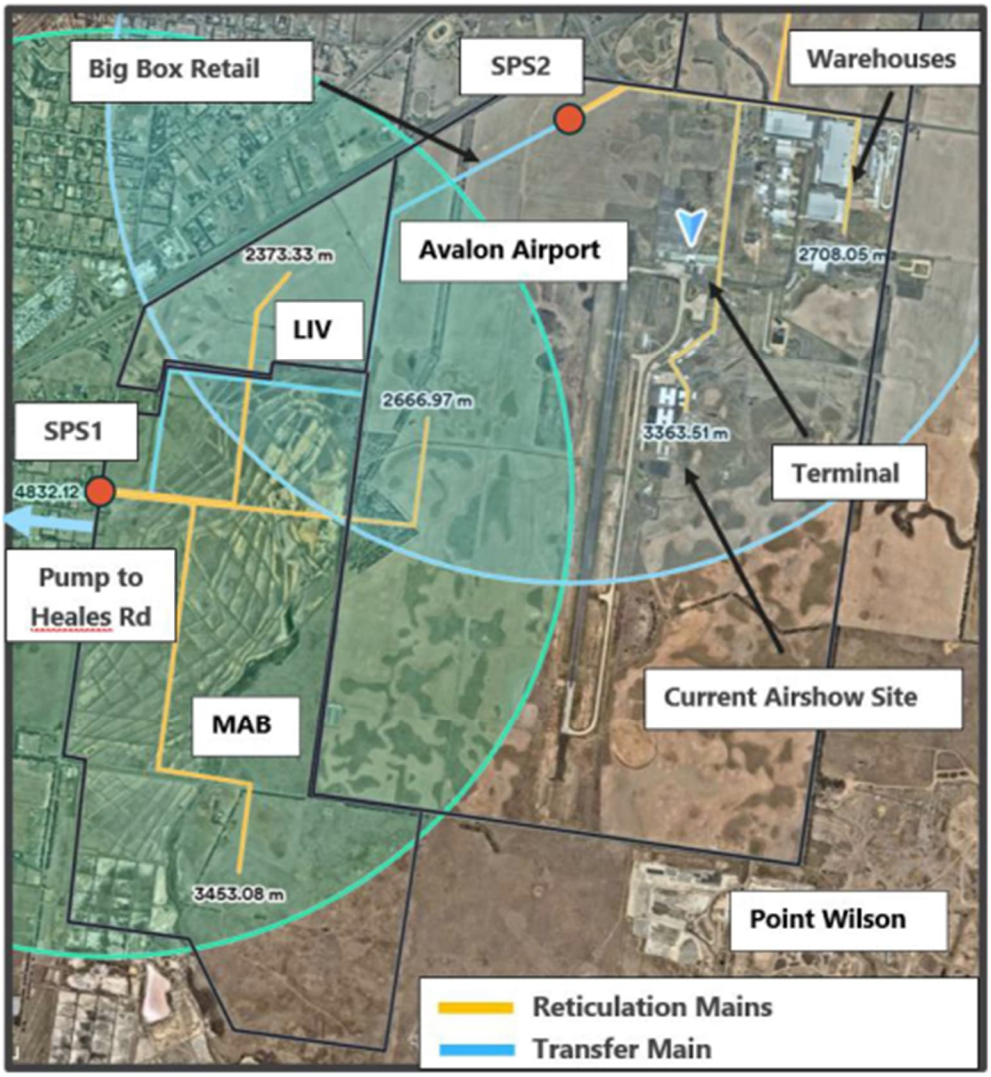

Figure 6 – Internal sewer concept strategy (Provided by Barwon Water)

Barwon Water note that this concept is flexible, with the location of SPS1 unfixed and capable of moving depending on negotiations with developers. A second pump station (SPS2) is likely required to service a significant portion of Avalon Airport. The catchments are indicatively shown as extending ~3km from each SPS, based on a preliminary assessment of the head loss incurred within a pressure sewer network. Barwon Water stress that this strategy is concept only and needs to be appropriately modelled using hydraulic models of the proposed network and customer flows, which may change the requirements of the pump stations and transfer mains.

Barwon Water have also noted that all developers are responsible for the design, funding and delivery of all necessary water and sewerage infrastructure required to service the precinct, including pipeline connections which extend outside of the site boundaries that are necessary to connect into Barwon Water's network in Lara. This approach is appropriate to manage uncertainties associated with the timing, scale and feasibility of the development, ensuring that the existing customers that utilise the network are not exposed to any risks associated with servicing the GAEP.

4.4 Potable Water Supply

Barwon Water is the responsible authority for potable water supply within the Greater Avalon Employment Precinct.

4.4.1 Existing Potable Water Infrastructure

Avalon is currently serviced by limited potable water infrastructure. The Airport is fed via a tapping from a DN225 main in Beach Road. Private mains then feed the terminal and other tenants in the precinct. In addition, there is a larger DN300 water main that was recently constructed in Dandos Road, which is fed by smaller DN150 reticulation mains crossing the Princes Hwy in Lara via Cozens and Avalon Roads. This main was installed at an increased size in anticipation of the growth of Avalon and will form part of a future ring main for the area, shown in Figure 7. Barwon Water is currently investigating upgrades to the Lara network at McClelland Avenue which should increase capacity in the short term prior to additional strategic main construction.

4.4.2 Proposed Potable Water Infrastructure

Barwon Water is currently preparing a strategy for servicing the GAEP which will involve construction of additional feeds to the area to boost capacity. It is expected that ultimately, the area will be fed from the Lara system via a DN600 main. This main will then extend around Avalon as a ring main. The indicative size of this main is DN450 and DN300.

Due to the uncertainties of future demands in the area, Barwon Water's preference is to build the larger feeder mains (DN300, 450, 600) at a later date, only after the areas have established and demand triggers are met. Building large water mains at the very start poses main risks including, inadequately sized mains, risks water quality through low turnover, unbudgeted capex affecting customer prices, underutilised assets and maintenance issues.

Figure 7 – GAEP Strategic Water Requirements (provided by Barwon Water)

The water supply to Avalon will be increased in three stages as described below.

- Stage 1 – (2024-2028) (Red in Figure 8) Construct a DN300 water main in McClelland Avenue Lara to address capacity constraints in the Lara system and allow additional flow to Avalon Airport and its continued expansion.
- Stage 2 – (Approx 2028) (Blue in Figure 8) Construct a DN300 water main from McClelland Avenue Avalon Road to Dandos Road to provide additional water supply to GAEP area.
- Stage 3 – (As required) (Purple in Figure 8). Construct a DN600 water main from the Lara Feeder main in Forrest Road Lara to the GAEP via Canterbury and Cozens Road. This main would be constructed when demands required it.

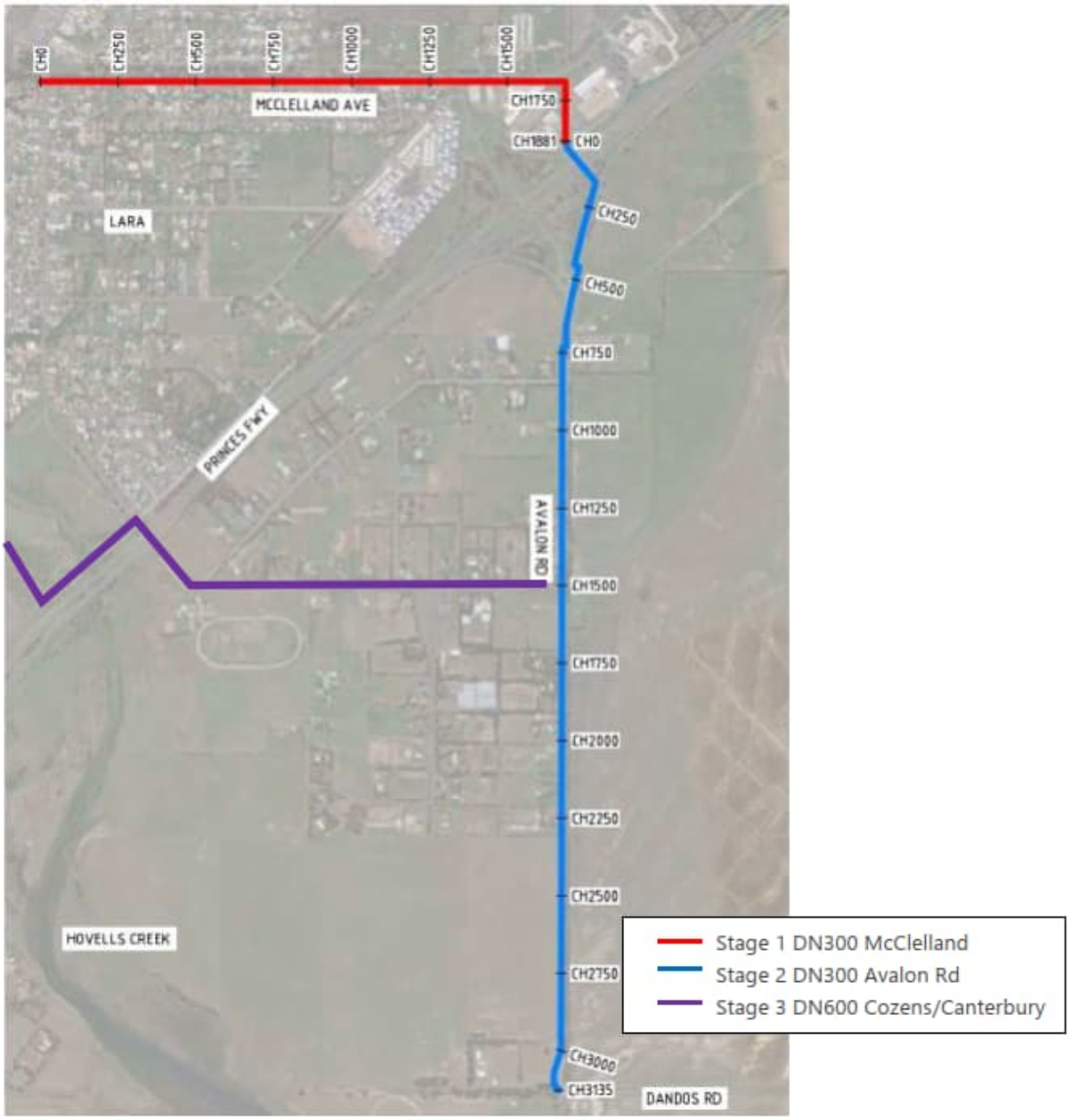

Figure 8 – Staged approach to get additional water to GAEP (provided by Barwon Water)

The current overall concept for water mains to service the GAEP is shown below in Figure 9. This will be reviewed and refined when more is known about the potential water demands for the area.

Figure 9 – GAEP Strategic Water Servicing Concept (provided by Barwon Water)

It can be seen from these Figures that there are several water mains, including trunk water mains, which are proposed along the GAEP precinct boundary. Figure 7 indicates that a DN300 trunk water main along Dandos Road is already in construction, with the DN300 mains along Avalon Road and Pousties Road marked as being part of future works, as identified in Figure 7. Whilst no comment has been made on the location of these mains to date, it is assumed that they can sit within the road reserve, with potential for construction at a later date to take place.

4.4.3 Recycled Water

Currently there is no recycled water within the GAEP or surrounding areas, within concept strategy advice received from Barwon Water, refer Appendix A, they note that one of the strategic options is to look at a local treatment and reuse of recycled water. This would require Barwon Water to construct a treatment plant within the area to facilitate this option. There has been no further advice from Barwon Water regarding this concept. This could be on the table in the future once the development plan has been through more development planning, but at this stage Spiire would deem this as a low priority and would not be relying on the connection being present.

4.5 Electricity Supply

Powercor is the responsible authority for the electricity supply within the Greater Avalon Employment Precinct (GAEP) area.

4.5.1 Existing Electricity Infrastructure

A review of the Powercor Network portal map indicates there are currently two existing 22kV High Voltage (HV) overhead (OH) feeder lines within the vicinity of the GAEP, the FNS022 feeder line to the north and west, and the FNS032 feeder line to the south and east.

Both the FNS022 and FNS032 feeder lines are supplied from the Ford North Shore (FNS) Zone Substation, located at North Shore, Geelong. The 2023 Powercor Distribution Annual Planning Report (DAPR) notes there are no current or forecast system limitations into the forward planning period of 2024 to 2028, for the Ford North Shore (FNS) Zone Substation and its associated HV feeder lines. Therefore, the likelihood of electricity supply issues or constraints to the GAEP via the FNS022 and FNS032 HV feeder lines, is very unlikely based on this information.

The extension of the FNS032 22kV feeder line has recently been constructed, which included the FNS032 feeder line being extended out towards the GAEP, south along Avalon Road and then east along Dandos Road. This extension of HV towards the GAEP suggests increased supply will become available in the near future for the area to the south and north of Dandos road and surrounds.

Existing 22KV high voltage HV OH lines run east-west along Beach Road, north-south along Pousties Road, and east-west along Dandos Road. This suggests future development in the GAEP area is well serviced by the existing electricity network.

There are several small capacity pole mounted substations supplying properties adjacent, on Beach Road near the Avalon Airport hanger buildings, on the northern section of Pousties Road, and along Avalon Road.

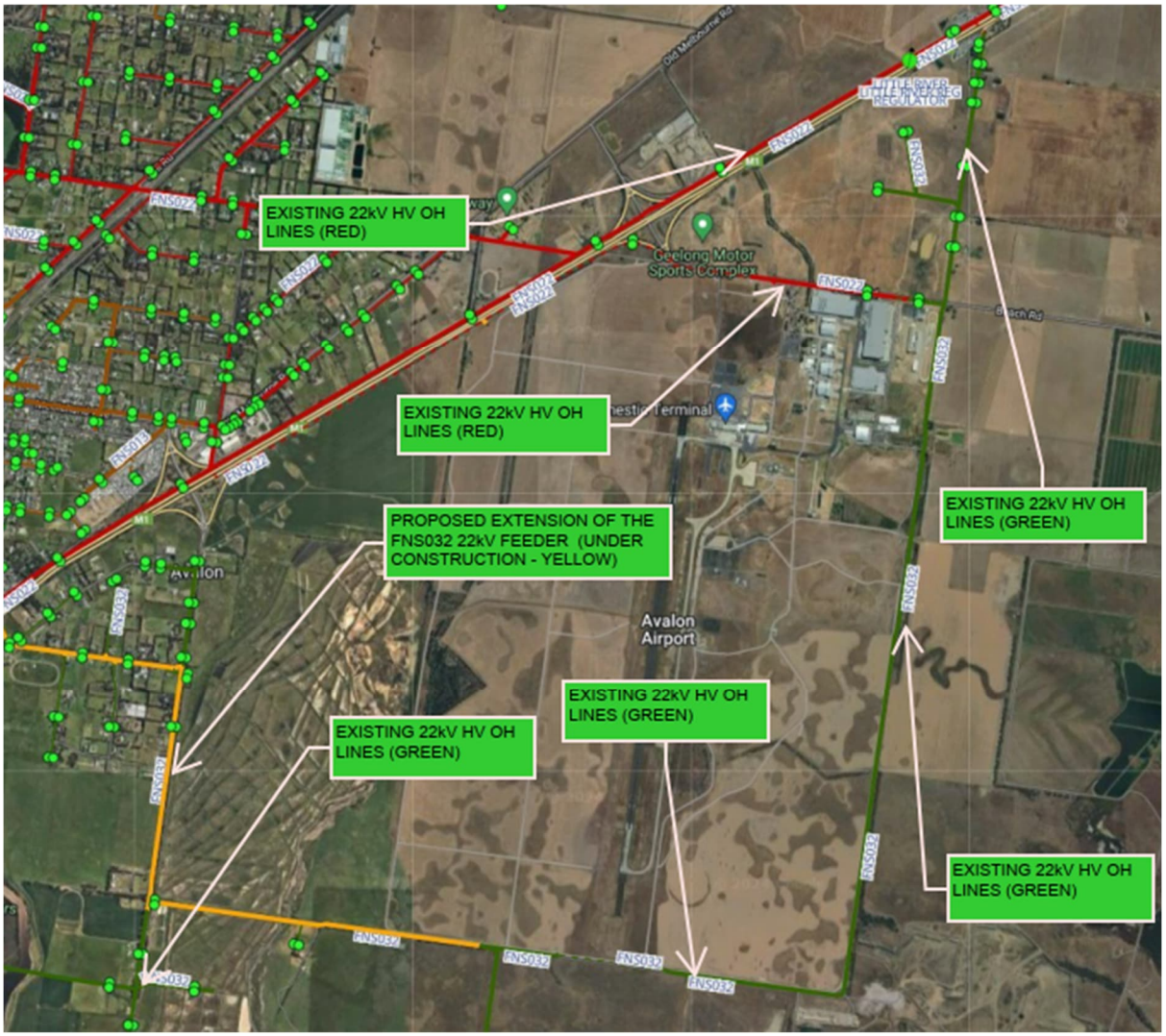

Figure 10 – Existing Electrical Network

4.5.2 Proposed Electricity Infrastructure

Powercor's Network Services team advised that a typical industrial development of this scale would require the establishment of one, or two, zone substations (66kV to 22kV). Planning the development will need to consider strategic locations for these substations, along with 66 kV sub-transmission powerlines to supply them. It's likely that upgrades would be needed at the Geelong Terminal Station to provide a suitable connection point for the new 66 kV lines. Depending on the typical industrial customer usage profile, each facility may require a connection capable of supplying between 2 MVA and 10 MVA (or more). Each zone substation may have a supply capacity of approximately 50 MVA, subject to engineering requirements. The typical area required for a zone substation is approximately 1.1 hectares, again depending on engineering considerations.

Powercor is experiencing an increasing demand for AI and data centre developments within large industrial regions, such as Melbourne's western corridor. These facilities significantly increase the complexity of the overall development, requiring substantial additional electrical infrastructure and capacity from both the distribution and transmission networks. If AI and/or data centre sites are intended for the development, electrical capacity would need to be provided by new transmission assets (220kV or above) and a new transmission terminal station in the area. Sub-transmission lines to customer-specific onsite zone substations or switching stations would then be used within the development to distribute capacity.

The extent of external network infrastructure upgrades will need to be confirmed by Powercor network planning during the electrical Masterplan development stage, once demand requirements are further understood. As such, there is no further comment regarding the need for electrical easements at this current time.

For the standard network requirements, application for the provision of electrical supply for the GAEP will be required to be made through Powercor at the time of development. Powercor's preference for connection to the existing network would be to the existing OH HV lines mentioned above, that have sufficient spare capacity to provide supply to the initial development.

Underground electrical infrastructure will be required to be provided as part of the development. This will involve the installation of kiosk substations, cables, pits, conduits and public lighting to public roads by the developer.

Electrical substations (or kiosks) will be required to be installed throughout a development. As such it is expected that a substation kiosk reserve for each kiosk substation would be required as part of the development of the area.

Electrical infrastructure will be required to be designed, constructed and audited in accordance with Powercor's Technical Standards and VESI requirements at the cost to the developer.

Rebates invoiced back to the developer may be applicable to the development subject to Powercor's financial modelling of its revenue vs cost for the additional loads on the network. If applicable, these rebates will be actioned by Powercor to the developer after tie-in of each development stage to the electrical network.

4.6 Gas Supply

Ausnet are the responsible authority for the reticulation gas supply within the Greater Avalon Employment Precinct (GAEP) area.

4.6.1 Existing APA Gas Infrastructure

There are a pair of significant APA gas transmission pipelines which are present within the vicinity of the site. They are located within an easement running parallel to the Princes Highway, which varies in width from 10m to 24.82m, and passes through the precinct. These assets are the 'T112' Brooklyn to

Lara transmission main, which is 500mm diameter in size, and the ‘T024’ Brooklyn to Corio transmission main, which is 350mm diameter in size.

Approximately halfway between Avalon Road and Beach Road there is a change in the alignment of the T112. To the northeast of this change, both transmission mains are parallel and in the same easement. To the southwest the T112 diverts and enters the Princes Highway road reserve and continues at close offset to the Princes Highway through to the Hovells Creek substation, beyond the GAEP area.

The APA transmission mains share the easement with the Viva Energy pipelines, refer to Section 4.8.

APA advise that the land use adjacent to these pipelines is of upmost importance, as the risk to community safety is severe in the event of a pipeline rupture. The area of focus is defined by AS2885 as the Measurement Lenth (ML), which is the heat radiation zone associated with a full-bore pipeline rupture. The Brooklyn – Lara pipeline has a ML of 525m and the Brooklyn – Corio pipeline has a ML of 297m. Noting that the ML is a radial dimension and therefore applies to both sides of the pipe. The urban design of the GAEP will have to consider this, as there is a list of land uses which APA would prefer to not be located in the ML area.

The urban design will also have to consider the maintenance requirements of the easement and ensure ease of access for this to occur. Locations where roads and services cross the easement will also need to be carefully considered and kept to a minimum to reduce impact and risk to the APA assets.

For further information about the required considerations of the APA pipelines, refer to the Safety Management Study Review prepared by Delphi Risk Management Consulting.

4.6.2 Existing Ausnet Gas Infrastructure

Consultation with Ausnet has identified that a single reticulation gas main exists within the precinct. This main connects to the transmission pipeline adjacent to the Beach Road interchange and the transition to Ausnet asset occurs via the “city gate infrastructure”. The main extends east along Beach Road for approximately 920m and feeds the Avalon Airport maintenance facilities. It has no other connections. Refer Figure below.

Figure 11 – Existing Gas Network (provided by Ausnet)

4.6.3 Proposed Gas Infrastructure

Whilst the Victorian State Government has announced the phase out of gas for new residential connections, it is understood that commercial and industrial precincts may require gas, subject to the proposed usage of the development.

To facilitate gas provision throughout the GAEP, it is expected that the existing main in Beach Road can be connected to and built upon. Ausnet notes that the custody transfer meter (CTM) at the inlet to the “city gate” is managed by APA. The CTM requirements set by APA may limit the available throughput to feed extension of the gas network and may need to be upgraded to accommodate additional throughput. The exact demand requirements will be established at the time of development, and any required upgrades are expected to be undertaken by the developer/s.

A second connection to the APA transmission pipeline would be expected adjacent to the Avalon Road interchange, and a new Ausnet mains network heading south along Avalon Road would be installed as development occurs.

It is Ausnet’s preference that all new gas infrastructure throughout the development is located within road reserves, and it would be most efficient for development to commence as close the existing infrastructure as possible.

4.7 Telecommunications Network

The provision of telecommunication infrastructure to development is a commercial decision between development and communications providers. Typically, Telstra and NBN Co. have been providers of telecommunications infrastructure, however there are also alternative providers on the market. For the purpose of this servicing assessment, it has been assumed that the development would be serviced by NBN Co. due to the proximity to existing services and the nationwide roll out of the NBN network.

4.7.1 Existing Telecommunications Infrastructure

A portion of the precinct area is within the Fixed line footprint of the NBN network. Currently NBN FTTX technologies provides service to the Avalon Airport and surrounding industrial premises. Other parts of the existing industrial premises are being serviced using FTTP technology.

4.7.2 Proposed Telecommunications Infrastructure

Currently there are no plans to install or upgrade any infrastructure within this precinct. NBN do not foresee any constraints or issues with future standard infrastructure installation. There are no plans to extend the network to the precinct area unless customer initiated.

Overall, NBN Co consider it highly unlikely the need to implement any new key infrastructure.

Any extension of the Fixed line footprint to remaining part of Avalon Airport Precinct will connect to NBN FAN site located at 79-81 Station Lake Road, Lara, 3212. The FAN site is large and has capacity to service the precinct.

Servicing of the Precinct would be planned on a case-by-case application basis and driven primarily by customer-initiated demand. New infrastructure would be deployed utilising a mixture of existing Telstra, new NBN build, also developer supplied & shared trenching arrangements. Any new build (multiple conduit) to this precinct is planned to connect via Beach Road, Old Melbourne Road at the Northern end of the Precinct. It is envisioned that new pit & pipe infrastructure is required within the new part of the precinct.

NBN Co is open to working with the other Utility Service Providers (USPs), governments and other entities to cater for growth in the Precinct. NBN would also consider significant one-off investments if deemed necessary to accommodate future growth. Opportunities may arise to facilitate possible trench sharing opportunities either with Council/Road Authorities or other Utilities.

Some difficulties do exist with the NBN network being crossing the Princes Freeway and future network will also need to be installed through its vicinity, so NBN Co would be interested in being involved in any additional service crossings that occur. NBN are constrained by boundaries such as railways, freeways and watercourses, so any additional crossings enable NBN to increase the robustness of the network.

NBN Co. considers its best planning approach to cater for growth is a consistent staged rollout in a direction, e.g. out from the FAN site, and are interested in any future planning that takes place so that we can plan works on the network accordingly. Therefore, there has been no immediate comment regarding the need for telecommunication easements.

Some of the opportunities that would benefit NBN are:

- working with other USPs when working on additional crossings of freeways, waterways and railways.
- encouraging additional space in any road restructuring and widening to enable future telecommunications work.
- installing additional conduits and ducts for future cables where possible.

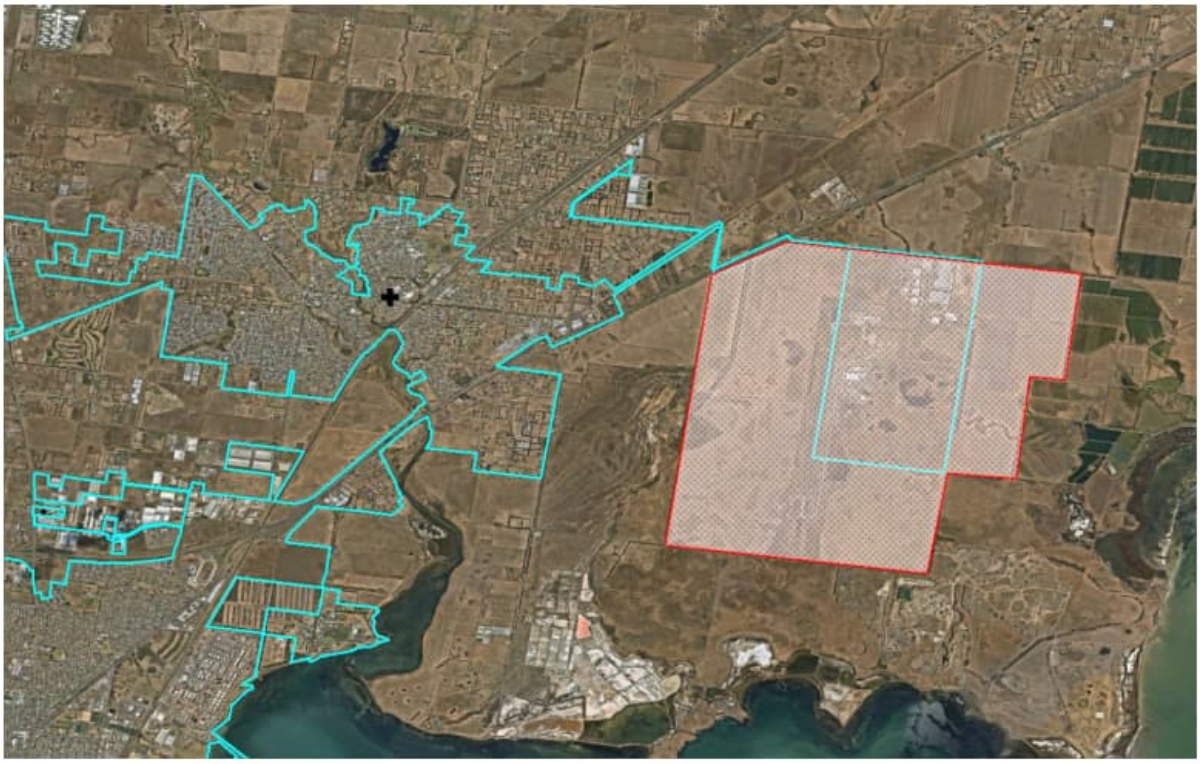

Figure 12 - NBN service area rollout map for the Avalon Precinct

4.7.3 Mobile Phone Coverage and Connectivity

Telecommunications in new development (TIND) policy provides guidance to developers, property buyers, occupants and telecommunications carriers. The policy was updated on February 2024 to expand the scope to include mobile coverage due to the diminished digital connectivity within some new developments.

The policy states that within new residential developments with more than 50 lots that the following consideration are to be made.

- Consider mobile connectivity as part of the overall development application process, with a similar level of importance as other utilities such as water, electricity and sewer.
- Engage with a mobile network operator (MNO) and/or mobile network infrastructure provider (MNIP) as early as possible to ensure mobile coverage is in place to the selling or leasing of a building unit.
- Identify or set aside one or more sites, spaces, that are appropriate for mobile telecommunications infrastructure such as a pole or tower to be built upon.
- Make all reasonable efforts to reach 'fair terms' in agreements with MNOs/MNIPs for access to land for the deployment of telecommunications facilities.

Although this policy is relating to residential developments the following can still apply to employment and industrial precincts.

Within the Avalon Precinct there are three main mobile network operator, Telstra, Optus and Vodafone. They all have online coverage maps on their websites showing their coverage which are in Figures 13, 14 and 15 below. All have access to 5G networks, with Optus and Vodafone having greater 5G coverage than Telstra.

The Optus map in the Figure below shows the locations of existing phone tower. It is assumed that these are in control by Optus. It is also possible that these are controlled by MNIPs and could have multiple providers on the same tower.

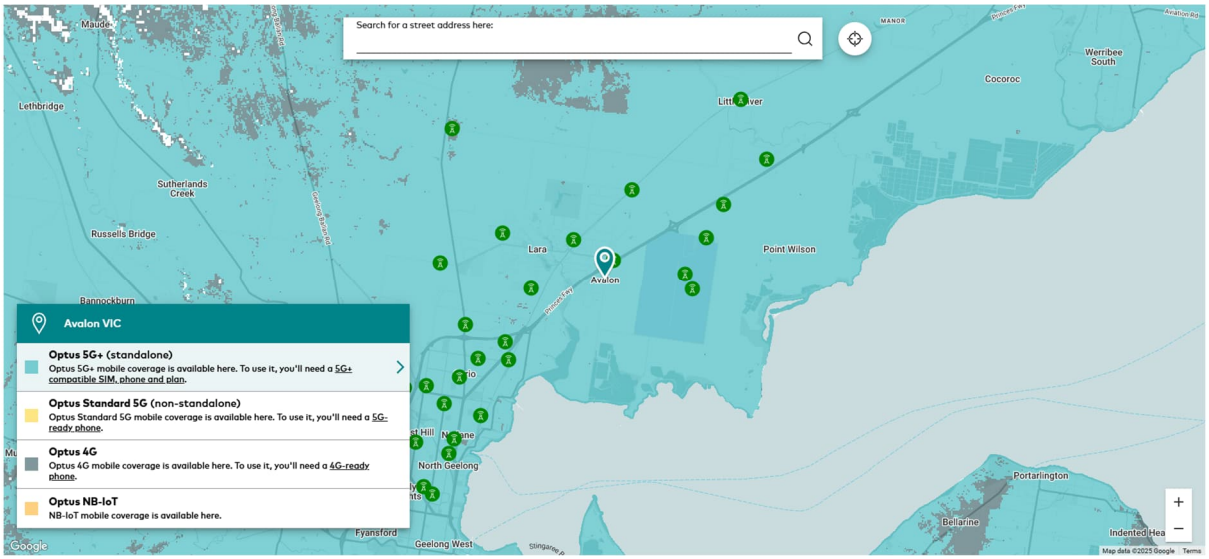

Figure 13 – Optus Mobile Coverage Map

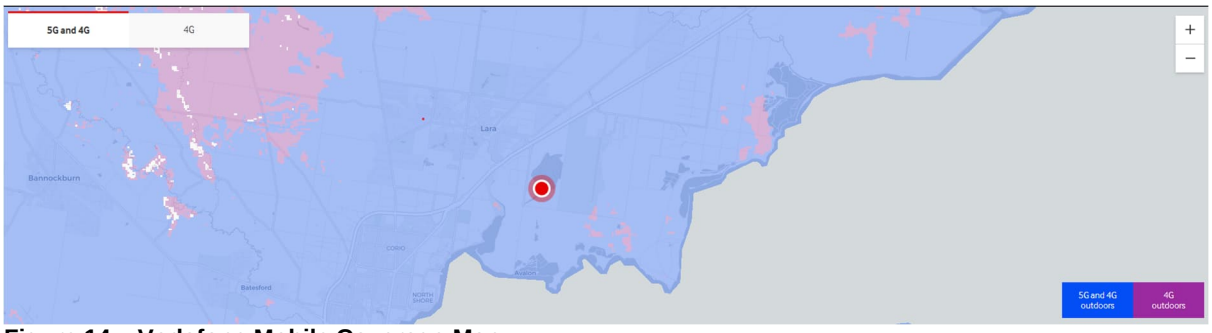

Figure 14 – Vodafone Mobile Coverage Map

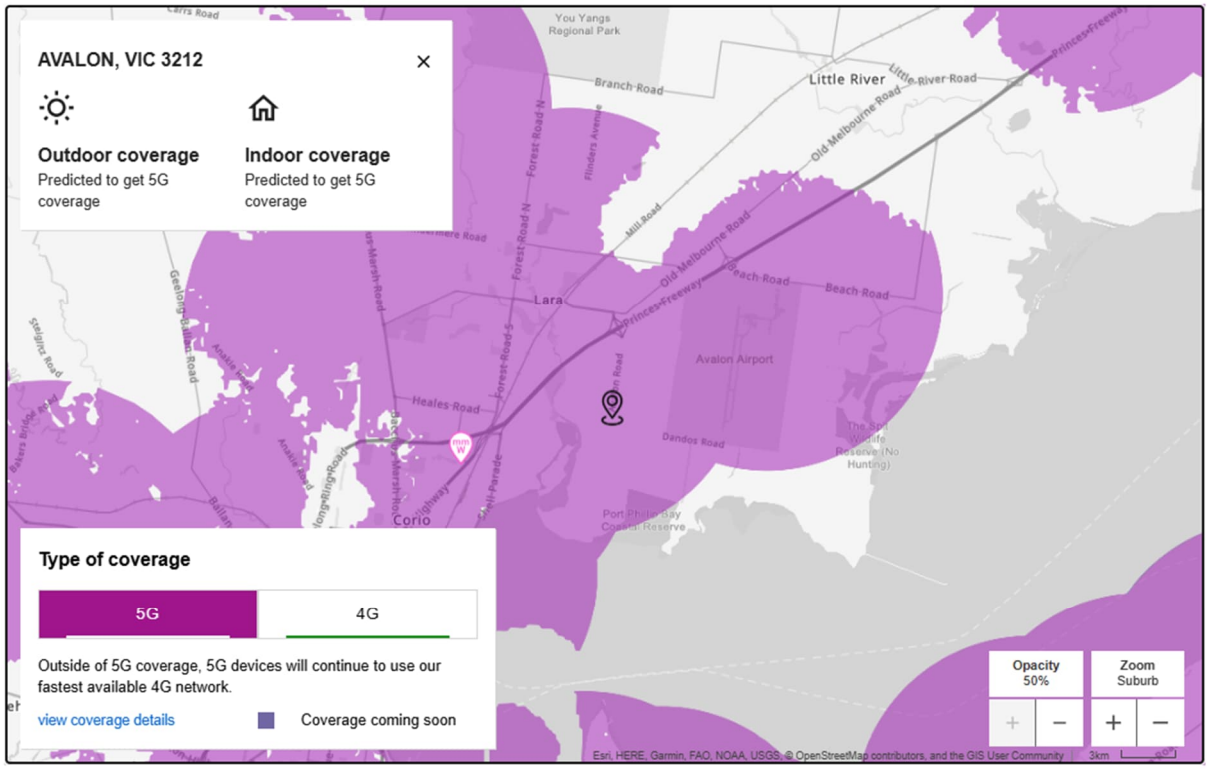

Figure 15 – Telstra Mobile Coverage Map

Further consultation with either MNOs or MNIP would be required to ensure existing infrastructure is suitable to handle the development, if deemed inappropriate then provisions for tower upgrades or new towers are to be considered through the Development Plan where relevant.

4.8 Major Pipelines

In addition to the APA gas transmission pipeline noted previously in Section 4.6.1, Viva Energy has multiple major pipelines which pass through the site. The pipelines are major, high pressure oil pipelines, and are located adjacent to the APA main within an easement that runs parallel with the Princes Freeway. Avalon Road and Beach Road have existing crossings of the pipelines. These assets will require adequate provision during planning the urban design of the precinct and significant protection during the resulting construction and ongoing usage. Further consultation with Viva Energy will be required to determine the requirements of these assets.

4.9 Vopak Victoria Energy Terminal

Victoria's Vopak Energy Terminal is a floating liquified natural gas (LNG) import terminal, proposed approximately 19 kilometres east from Avalon. This is achieved by pumping processed LNG from the site via a proposed high pressure gas pipeline of approximately 19km length. The terminal will be able to store enough gas to meet the needs of Victorians for up to a week and can be scaled throughout to satisfy the intermittent needs of Victorians. The terminal is only a temporary establishment, proposed to help combat Victorians gas shortage as the state transitions to a renewable energy future. It is expected to be moored in Port Phillip Bay for 10 to 20 years, however, can be maintained for a long as required.

There are several associated pieces of infrastructure required to facilitate the terminal, including onshore facilities such as a gas receiving station, nitrogen generation plant and pipelines. The facilities also require high voltage cables to be installed to provide electricity to the terminal. This involves the construction of 14-19 kilometres (along road reserves) of underground transmission lines between a new terminal station which will be located adjacent the existing transmission line corridor north of Lara. A new 220kV substation is also required. Whilst its exact location is still unknown, it is likely to sit along Beach Road towards the eastern side of the GAEP boundary. The location of the terminal and the associated infrastructure in relation to the GAEP can be seen in the Figure below:

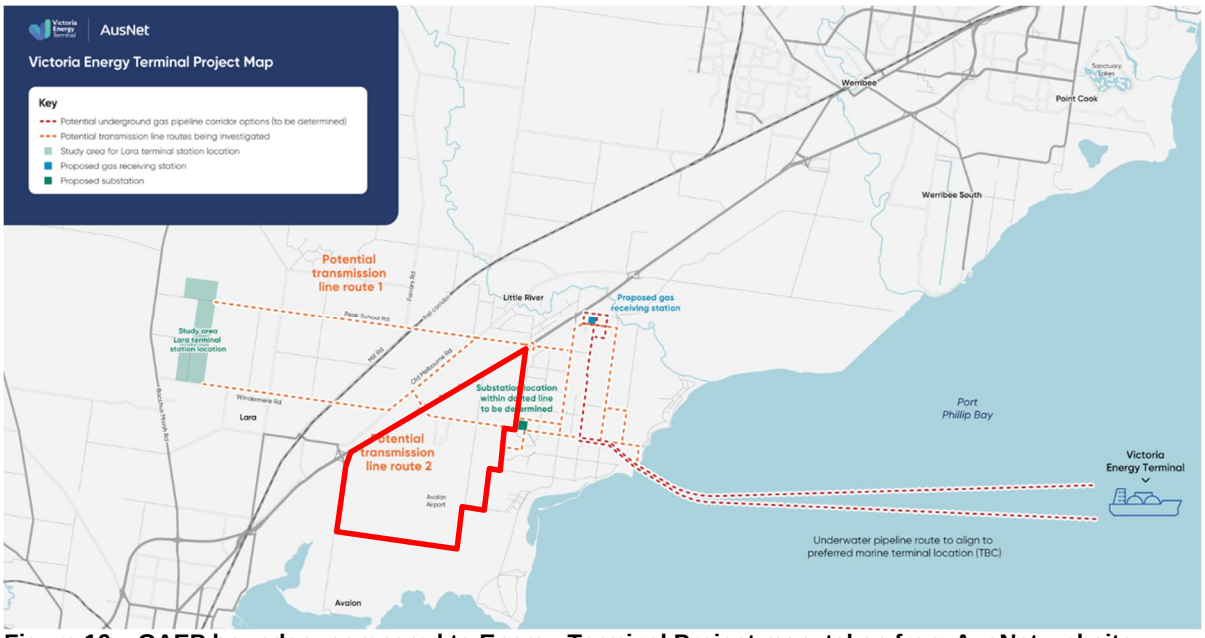

Figure 16 – GAEP boundary compared to Energy Terminal Project map, taken from AusNet website

There are several implications to the GAEP because of the Vopak Victoria Energy Terminal. Primarily, it is possible that the proposed 220kV substation will require transmission lines to run through the site to connect into the Lara terminal station, with further potential for the substation to sit in / near the site. Correspondance with Ausnet is required to determine the potential to connect into any of the proposed infrastructure.

The Vopak Victoria Energy Terminal and the proposed electrical infrastructure are being assessed by the Commonwealth and the Victorian Government through an Environment Effects Statement process. The outcomes of this process will outline greater project specifications to be identified and allow greater insight into the effects on the GAEP to be known.

5. STATE POLICY AND ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)

Ecologically Sustainable Development (ESD) is a long-standing, internationally recognised concept which has been included in over 60 pieces of Australian legislations. The National Strategy for Ecologically Sustainable Development (1992) defines ecologically sustainable development as:

"using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased."

In short, ESD is the consideration of social, economic and environmental impacts in the decision-making processes during development.

In Victoria the Planning and Environment Act 1987 and Environment Protection and Biodiversity Conservation Act 1999 form the basis of all the relevant policies in this space. As there are many policies which influence ESD, the planning department of the State Government, Department of Transport and Planning (formerly Department of Environment, Land, Water and Planning) produced a 'roadmap' for Victoria's planning system in 2021, to support environmentally sustainable development of buildings and subdivisions.

The roadmap outlines a program to introduce new ESD planning policies and standards that assist the following key aims.

- Make it easier to recycle.
- Cool new developments and our urban environment.
- Facilitate active and sustainable transport choices.
- Reduce exposure to air and noise pollution.
- Improve building energy efficiency and support the transition to a low emission future.
- Enhance the role of planning in stormwater management and efficient water usage.
- Strengthen and extend ESD considerations for commercial and industrial developments.

The roadmap can be found here: https://www.planning.vic.gov.au/guides-and-resources/strategies-and-initiatives/environmentally-sustainable-development

An integrated ESD implementation approach should include conducting early environmental and ecological assessments, design using green infrastructure, promoting public and active transport options, creating biodiversity corridors and ensuring ongoing monitoring and adaptive management of environmental impacts.

For GAEP, ESD considerations could include.

- Protect and enhance identified conservation areas.
- Strategically incorporate green spaces such as open space and local parks in appropriate locations.
- Encourage and incorporate (if appropriate) Solar and alternative energy provisions within development areas to support the power network requirements.
- Encourage and incorporate (if appropriate) alternative construction materials, methods and finished surfaces to reduce impact of development.
- Incorporate sustainable Water treatment and reuse practises, particularly if local treatment option of sewerage is adopted.

There are many opportunities to tailor ESD considerations for industrial applications specifically. These could include.

- Adopt electric vehicles and electric machinery (forklifts, trucks etc) during construction and utilisation of the site, including the installation of onsite solar charging stations for the vehicles. This is a strategy which was implemented at Duxton Dried Fruits, who were recipients of the Commercial Sector Innovation Fund.
- Renewing existing infrastructure and services to create second-life material.
- Incorporating efficient engineering design to minimise earthworks and construction materials.
- Efficient pavement designs to reduce materials and nominate carbon reduced options, including locally sourced materials.
- Implementing water-saving techniques on site to minimise consumption.
- Investigate other low-carbon opportunities to reduce carbon footprint.
- Introducing sustainable materials in design such as reduced carbon concrete, asphalt and pipe. One particular case study in Epping North as part of the Mickleham Road upgrade, put this into action through the installation of a low-carbon concrete, which provided a 30% reduction in carbon by replacing a portion of Portland grey cement with supplementary materials, such as waste products produced from the metal and energy production industries. This innovative concrete mix, developed by Major Road Projects Victoria, the University of Melbourne, ARUP and Hanson Australia. The cost of the product was comparable in price to standard materials used in similar applications. Please see link to the Big Build article outline its use: https://bigbuild.vic.gov.au/news/roads/joint-project-develops-low-carbon-concrete#:~:text=Importantly%2C%20our%20low%20carbon%20mix,ensure%20it%20met%20industry%20standards.

The Avalon Corridor Integrated Water Management (IWM) Plan further strengthens this integrated approach by identifying key opportunities for water sustainability that align with ESD principles. These include.

- Leveraging stormwater harvesting and recycled water to reduce reliance on potable water supply, particularly for open space irrigation and industrial uses.
- Promoting precinct-scale integrated water management infrastructure, such as constructed wetlands and stormwater treatment systems, that deliver multiple environmental and community benefits.
- Improving flood resilience and enhancing waterways through strategic “green-blue” infrastructure planning.
- Encouraging water-sensitive urban design (WSUD) and alternative water sources across both new urban areas and industrial precincts.
- Recognising Traditional Owner values in water planning and management, ensuring cultural heritage is preserved and respected.

6. CONCLUSION

This report has assessed the availability and requirements for the provision of the following service infrastructure required within the Greater Avalon Employment Precinct.

- Sewer reticulation.
- Potable water supply.
- Electricity supply.
- Gas supply.

- Telecommunications network.

The precinct has access to the above existing infrastructure, but it is clear that the authorities need to further develop their overall strategies and plans for the provision of increased service to this area.

The logical staging of development would be to commence near either the Beach Road or Avalon Road interchanges with the Princes Highway, as they are the closest proximity to the existing infrastructure to connect to and begin expanding from.

The location of trunk service infrastructure should be cognisant of environmental factors such as minimising impact to areas of high ecological value and significant vegetation for retention.

Timing of infrastructure will generally be dependent on the timing of application for staged development within the area. Should applications be “out of sequence” authorities have the ability to provide infrastructure, potentially with additional bring forward charges past on the development applicant.

Costs associated with the provision of infrastructure will generally be borne by the developer, with larger trunk infrastructure being funded under the relevant authority’s capital works programs.

Developing proponents will be required to deliver drainage and road infrastructure in line with requirements of the Development Play Overlay (DPO) for GAEP West and would be subject to a Section 173 Agreement with relevant responsible authorities. The infrastructure requirements for GAEP North will be further investigated as per planning policy proposed in the planning scheme amendment.

Figure 17 – Looking southeast from Pousties Road, near the intersection of Beach Road (August 2024)

APPENDIX A – RESPONSES FROM AUTHORITIES

BARWON WATER – JULY 2024

Briefing Note

To: [redacted] Senior Engineer, Spiire
From: [redacted] Growth Area Planning Lead
Date: [redacted]
Subject: Proposed servicing of Greater Avalon Employment Precinct Area

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The Network Planning Team has prepared the following high level servicing advice related to the Greater Avalon Employment Precinct (GAEP) Area. In general, the GAEP is relatively remote from existing infrastructure to service commercial development, in particular for sewer. Significant investment in new water and sewer infrastructure will be required to service the region.

Water servicing

Existing water infrastructure

Avalon is currently serviced by limited potable water infrastructure. The Airport is fed via a tapping from a DN225 main in Beach Road. Private mains then feed the terminal and other tenants in the precinct. In addition, there is a larger DN300 water main that was recently constructed in Dandos Road, which is fed by smaller DN150 reticulation mains crossing the Princes Hwy in Lara via Cozens and Avalon Roads. This main was installed at an increased size in anticipation of the growth of Avalon and would form part of a future ring main for the area, shown in **Figure- 1.** Barwon Water is currently investigating upgrades to the Lara network at McClelland Avenue which should increase capacity in the short term prior to additional strategic main construction.

Figure-1 GAEP Strategic Water Requirements

Proposed water servicing

Barwon Water is currently preparing a strategy for servicing the GAEP which will involve construction of additional feeds to the area to boost capacity. It is expected that ultimately the area will be fed from the Lara system via a DN600 main. This main will then extend around Avalon as a ring main. The indicative size of this main is DN450 and DN300.

Due to the uncertainties of future demands in the area, Barwon Water's preference is to build the larger feeder mains (DN300, 450, 600) at a later date, only after the areas have established and demand triggers are met. Building large water mains at the very start poses main risks including, inadequately sized mains, risks water quality through low turnover, unbudgeted capex affecting customer prices, underutilised assets and maintenance issues.

The water supply to Avalon will be increased in three stages as described below

- Stage 1 – (2024-2028) (Red in figure 2) Construct a DN300 water main in McClelland Avenue Lara to address capacity constraints in the Lara system and allow additional flow to Avalon Airport and its continued expansion.

- Stage 2 – (Approx 2028) (Blue in figure 2) Construct a DN300 water main from McClelland Avenue Avalon Road to Dandos Road to provide additional water supply to GAEP area
- Stage 3 – (As required) (Purple in figure 2). Construct a DN600 water main from the Lara Feeder main in Forrest Road Lara to the GAEP via Canterbury and Cozens Road. This main would be constructed when demands required it.

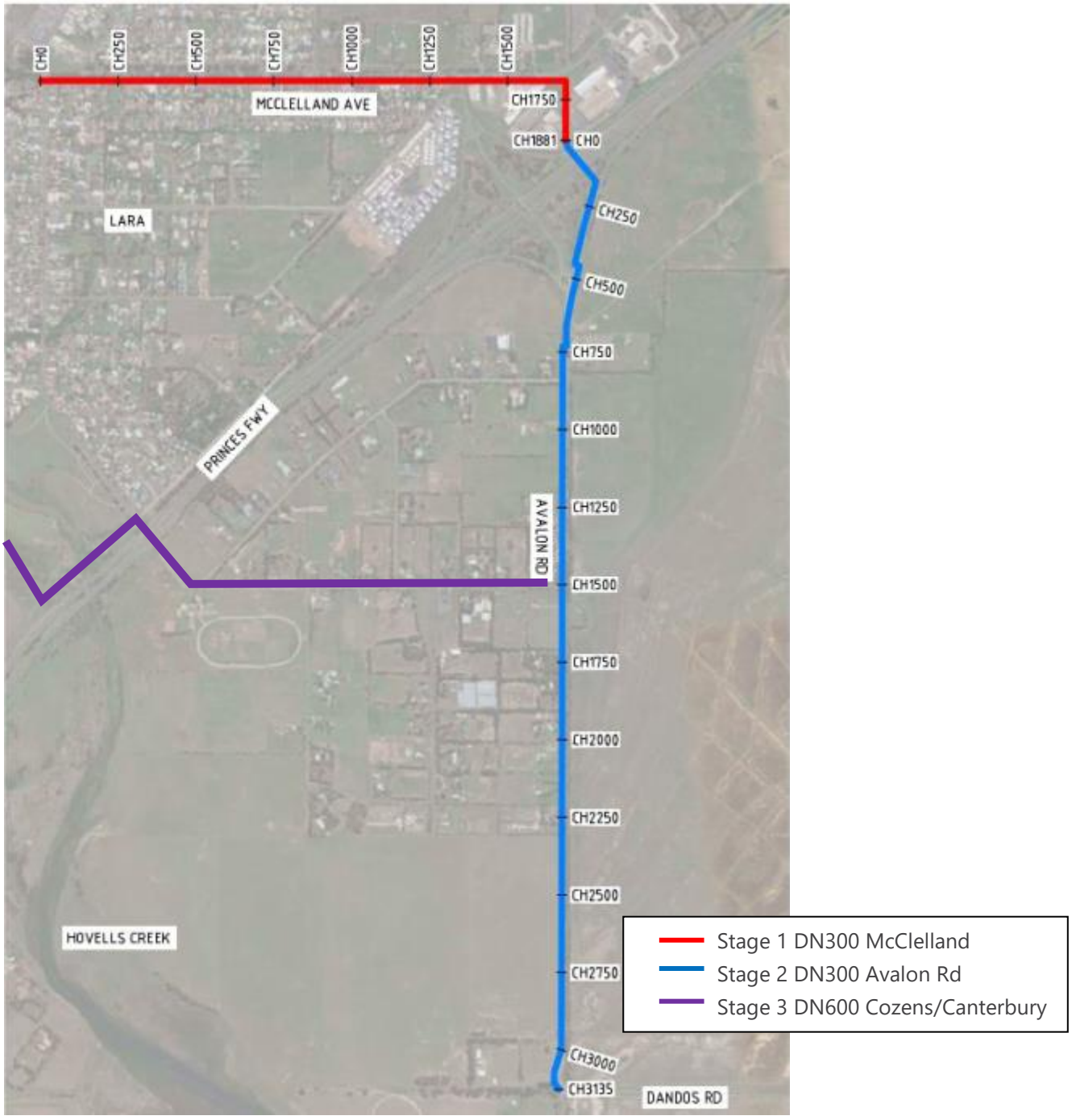


Figure 2 - Staged approach to get additional water to GAEP

The current overall concept for water mains to service the GAEP is shown below as **Figure 3.** This will be reviewed and refined when more is known about the potential water demands for the area.

Figure-2 GAEP Strategic Water Servicing Concept

Sewer (and recycled water) servicing

There are currently no Barwon Water sewers servicing the Avalon precinct. All previous upgrades to the Avalon Airport site, including the new International Terminal and Cotton On, AusPost, Petstock Distribution Centres and Hanwha Defence, are being managed via upgrades (or new) onsite wastewater systems (package plants).

As indicated, Barwon Water has commenced a water and sewerage strategy for the area. This is on the assumption that ultimately, there is a desire for the area to be serviced with reticulated sewerage. Broadly, the assessment will look at three strategic sewer options present below and shown in **figure-4**

1. Transfer of untreated sewage to the Barwon Water network via Lara.
2. Transfer of untreated sewage to the Melbourne Water network via the inlet of the WTP.
3. Local treatment and reuse of recycled water at Avalon

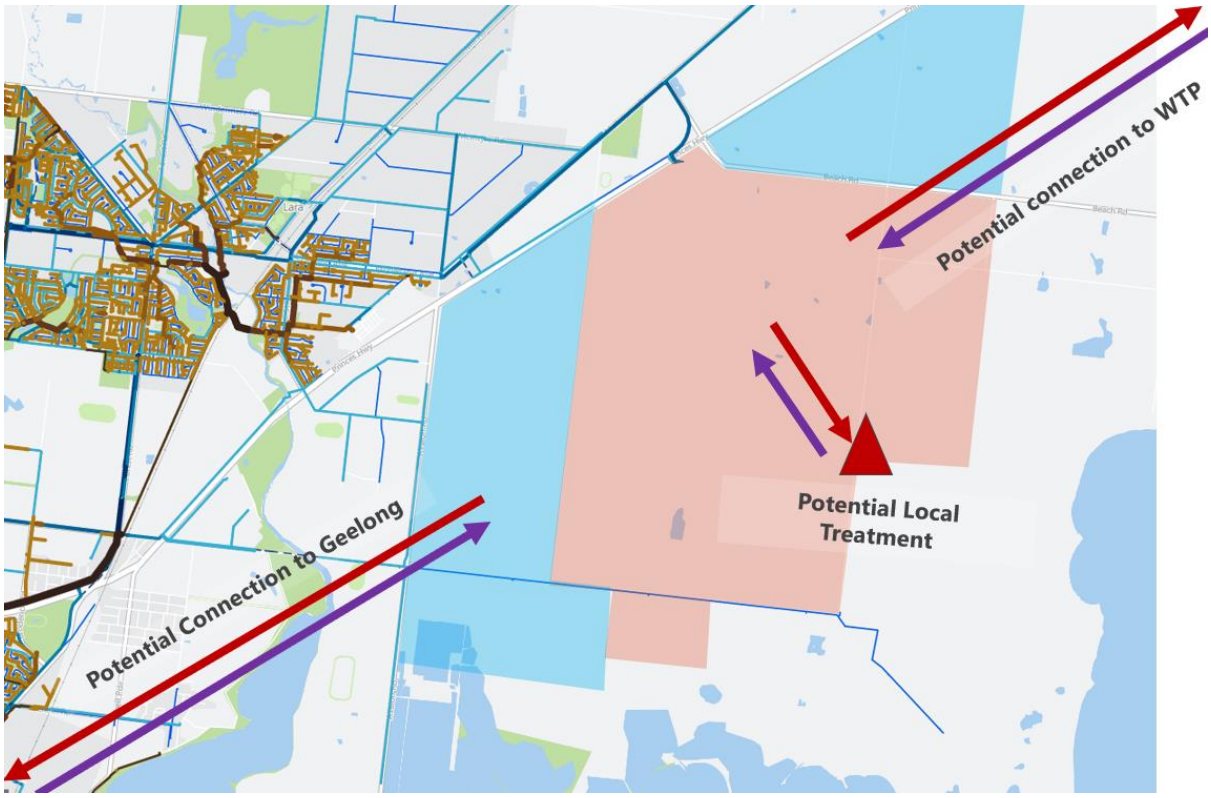


Figure-4 Strategic sewer and recycled water options.

For internal sewers within the GAEP, there is a current preference for pressurise sewer systems, to reduce inflows due to the high-water table and extent of the area subject to inundation.

No decision has been made on the preferred strategic option. This servicing strategy is being developed over 2024, and given the lead time required to implement a solution it is unlikely any reticulated sewer would be available in the medium term, (i.e. prior to 2028). It is

assumed that any development prior to significant investment in new sewer infrastructure to the region would be serviced via an onsite system by landholders within private properties.

Another challenging aspect of sewer servicing relates to the uncertainties of future demands and sewer volumes. This makes it very difficult to plan infrastructure and ensure it is appropriately sized. It is likely that in the short term, volumes would be quite low and this could present big issues with odour and corrosion, with flows having the potential to significantly impact the downstream receiving network. This will be a key component of the upcoming studies.

Conclusion

Avalon is relatively remote from existing water and sewer infrastructure to service the region. Work is underway to better understand options for water and sewer servicing for GAEP. Significant investment in new water and sewer infrastructure will be required.

BARWON WATER – MAY 2025

Barwon Water

Briefing Note

To: [redacted]
From: [redacted]
Date: 27/05/2025
Subject: Greater Avalon Employment Precinct – Sewer Servicing Concept

1. Background

The Greater Avalon Employment Precinct (GAEP) includes both private land as well as the Avalon Airport. The Victorian Planning Authority are leading the development of a Precinct Structure Plan for the proposed Greater Avalon Employment Precinct which is due for gazettal late 2025. Although considerable uncertainty as to the developability of the site currently exists, if rezoned, it could yield significant industrial and commercial growth in coming years. Simultaneously, the number of businesses operating on airport land has increased in recent years, with new commercial sites such as Australia Post and Cotton On, as well as additional demands from Australian Defence Force sites within the region.

2. Infrastructure Funding

Barwon Water's latest submission to the VPA stated the following:
From a water and sewerage infrastructure servicing perspective, the scale and isolation of the Avalon precinct means that infrastructure planning will require a long lead time.

With the current level of uncertainty of the developable area, and consistent with the Negotiation Framework in Barwon Water's New Customer Contributions Guidelines, developers within the GAEP will be required to design, fund and deliver all necessary water and sewerage infrastructure to service the precinct, including pipeline connections across to Barwon Water's network in Lara. This infrastructure will need to be designed and delivered to meet Barwon Water's standards and requirements and then vested to Barwon Water. Negotiated New Customer Contributions will also be applicable, consistent with ESC pricing principles.

This approach is necessary to manage uncertainty associated with the timing, scale and feasibility of the development and to ensure that Barwon Water's existing customers are not exposed to risks associated with servicing of the GAEP. We also note that, due to potential legacy contamination issues within the GAEP, and risk of saline water ingress to sewers due to low elevation of the GAEP, there may be special design measures required to be implemented by developers to manage these risks and possible limitations on the quality and volume of sewage that can be received into the broader Geelong network. This will need to be considered in more detail as part of any future servicing strategy.

3. External Sewer Servicing Concept

Due to capacity constraints within the Lara sewer system, all sewerage generated within GAEP must be pumped to the gravity main (GM) beginning at Heales Rd (GID: 616541). Figure 1 demonstrates a possible alignment for this rising main between the western boundary of the precinct and this discharge point.

Figure 1 – An example of the rising main required to connect the precinct to the existing sewer network

Network planning requests that a duplicated rising main is constructed, comprising of a smaller rising main (RM1) to service initial development stages and a larger rising main (RM2) to service ultimate development. This is required to minimize the production of odours, being the highest priority mitigation strategy recommended by WSA04 (10.10)[1]. Network planning requests that both rising mains are delivered together.

[1] This will also reduce the quantity and cost of chemical dosing

The sewer flows form GAEP are highly uncertain as they are largely dependent on the types of industry that develop within the precinct. Network Planning's best attempt at forecasting sewerage flows is shown in figure 2. Figure 2 suggests that RM1 could be expected to service the first 10 years of development, after which point SPS1 would switch to using RM2. A benefit of having the duplicated rising mains is that RM1 could be utilised should flows exceed the 65L/s forecast[2], providing a combined capacity of 90L/s for the precinct (~38% exceedance of estimate).

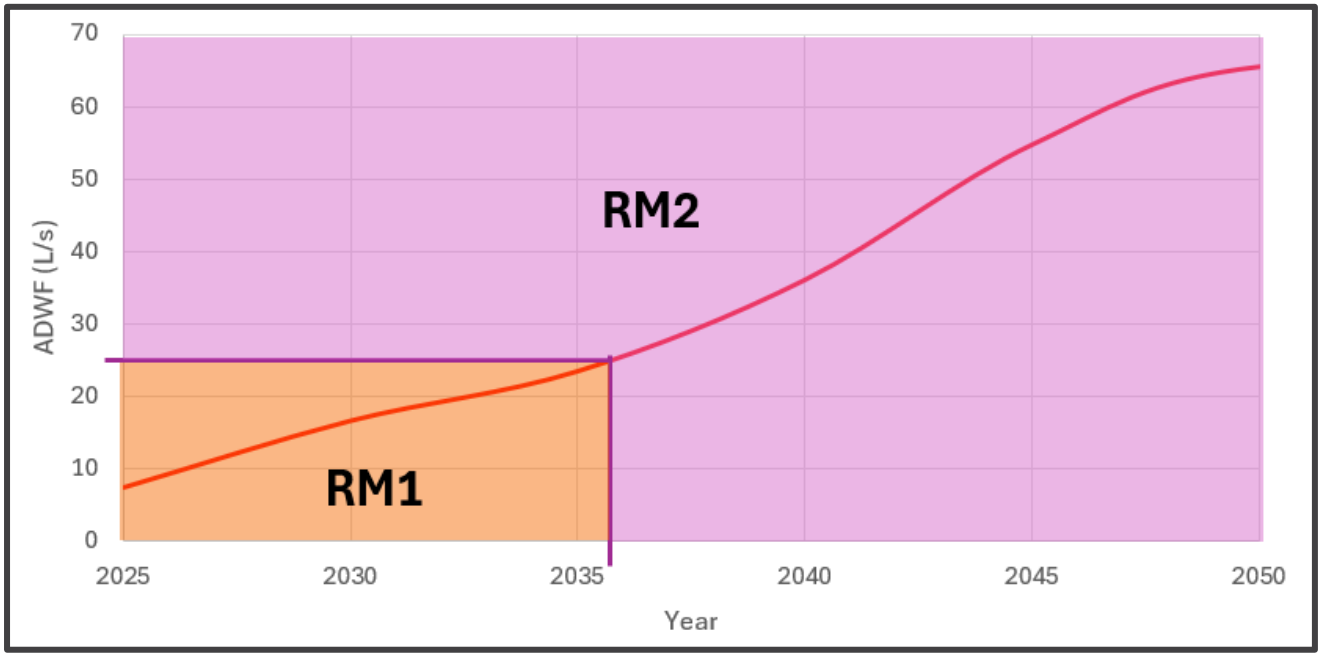


Figure 2 - GAEP Sewer flow forecast, demonstrating utilization of the two rising mains (RM1 and RM2)

Indicative sizing of external sewer assets:

- RM1 – ID180[3] (design flow of ~25L/s) – 4.4km
- RM2 – ID250 (design flow of ~65L/s) – 4.4km
- SPS1 – 2.5m wet well and electronics sized for ultimate pump set (~65L/s)
- Chemical dosing unit/s - location TBD, depending on the dosing strategy proposed[4]
- 2 hours of peak flow storage (~500kL) located at SPS1

[2] Either by allowing SPS1 to pump into both rising mains, or providing RM1 as the direct outfall for a large sewer customer should one eventuate nearby.
[3] Inner diameters are specified instead of DNs, as this is the critical dimension. For PE pipes, the DN may be significantly larger than the ID.
[4] Chemicals such as FeCl2 may need to be dosed near the discharge point while others can be dose at the pump station.

4. Internal Sewer Servicing Concept

A reticulated pressure sewer system is the preferred internal servicing option for the growth area, due to the following reasons:

- It is well suited to flat terrain with a high-water table
- It should substantially reduce groundwater infiltration, lowering sewer salinity, risk of contamination (e.g PFAS) and total sewer flows.
- Industrial discharges are well suited to pressure sewer applications
- It provides better flexibility for staging the capacity of the internal sewer infrastructure

Figure 3 demonstrates the internal sewer concept. This concept is flexible, e.g. the location SPS1 may be moved depending on negotiation with developers. The catchments are sized as extending ~3km from each SPS. This is based on a preliminary assessment of the head loss incurred within a pressure sewer network but needs to be re-evaluated using hydraulic model of a proposed network and customer flows. A second pump station, SPS2, is likely required to service a significant portion of Avalon Airport.

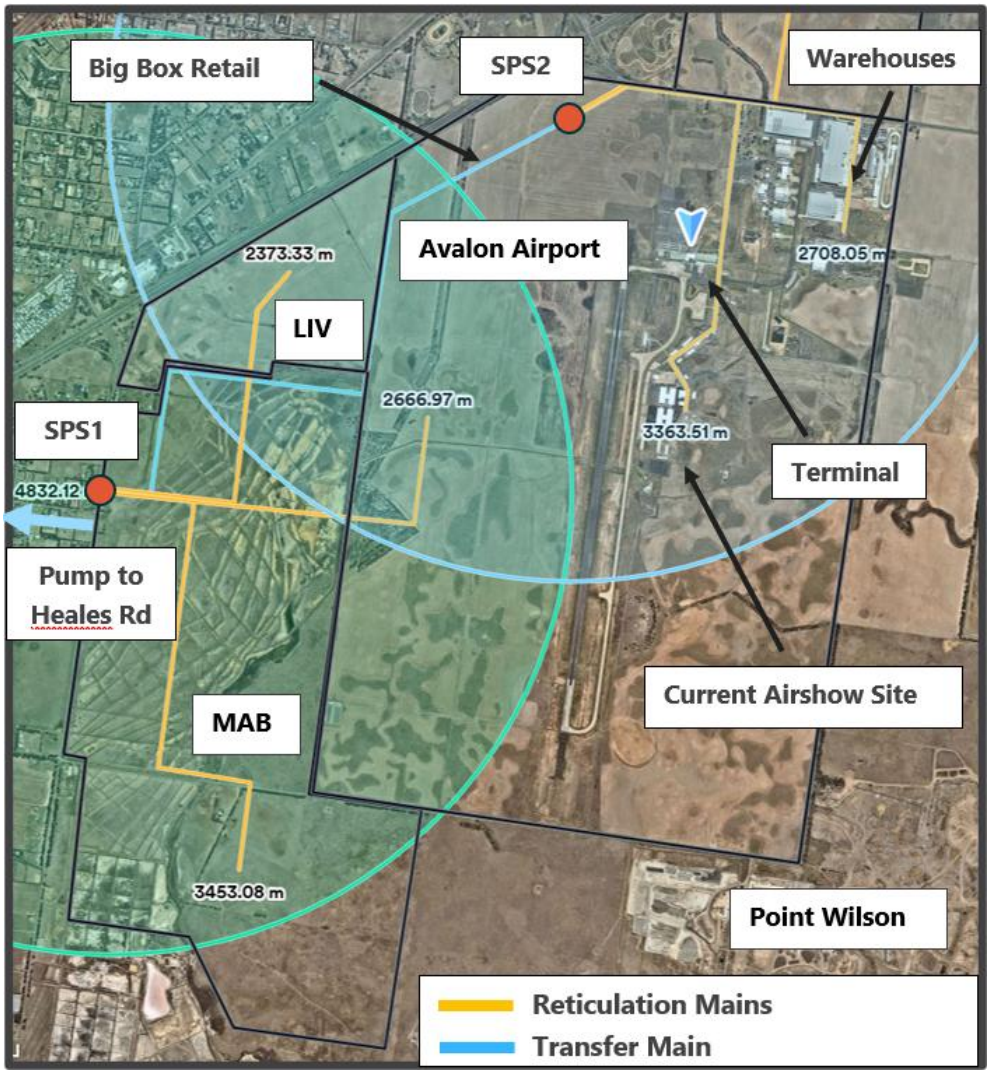


Figure 3 – Internal Servicing Concept for GAEP. Pump station catchments have been shown as a 3km radius, with indicative reticulated main alignments.

Indicative sizing of internal sewer assets:

- SPS2 – 2m Wet Well (sized to accommodate ~30L/s flow) + Chemical Dosing Unit
- Sewer Transfer Main – ID180 (Design flow ~30L/s) – 4.8km
- Reticulated Pressure Sewer assets

Note: The number of pump stations and transfer mains required to service the entire precinct, may change depending on the results of hydraulic modelling once the network and loads are further defined.

[redacted]

AUSNET (GAS)

[redacted]

From: [redacted]
Sent: [redacted]
To: [redacted]
Cc: [redacted]
Subject: FW: Greater Avalon Employment Precinct - Utility Assessment Report

Follow Up Flag: Follow up
Flag Status: Completed

FileCode: [redacted]
Filed: [redacted]

Hi [redacted],

Please see comments below from [redacted], one of the engineers in my team. I will follow up with a phone call.

Regards,
[redacted]
Acting Manager
Gas Asset Management

AusNet

Wurundjeri Country
Level 31, 2 Southbank Boulevard
Southbank Vic 3006 Australia

[redacted]
[redacted]
W www.ausnetservices.com.au

BUSINESS USE ONLY

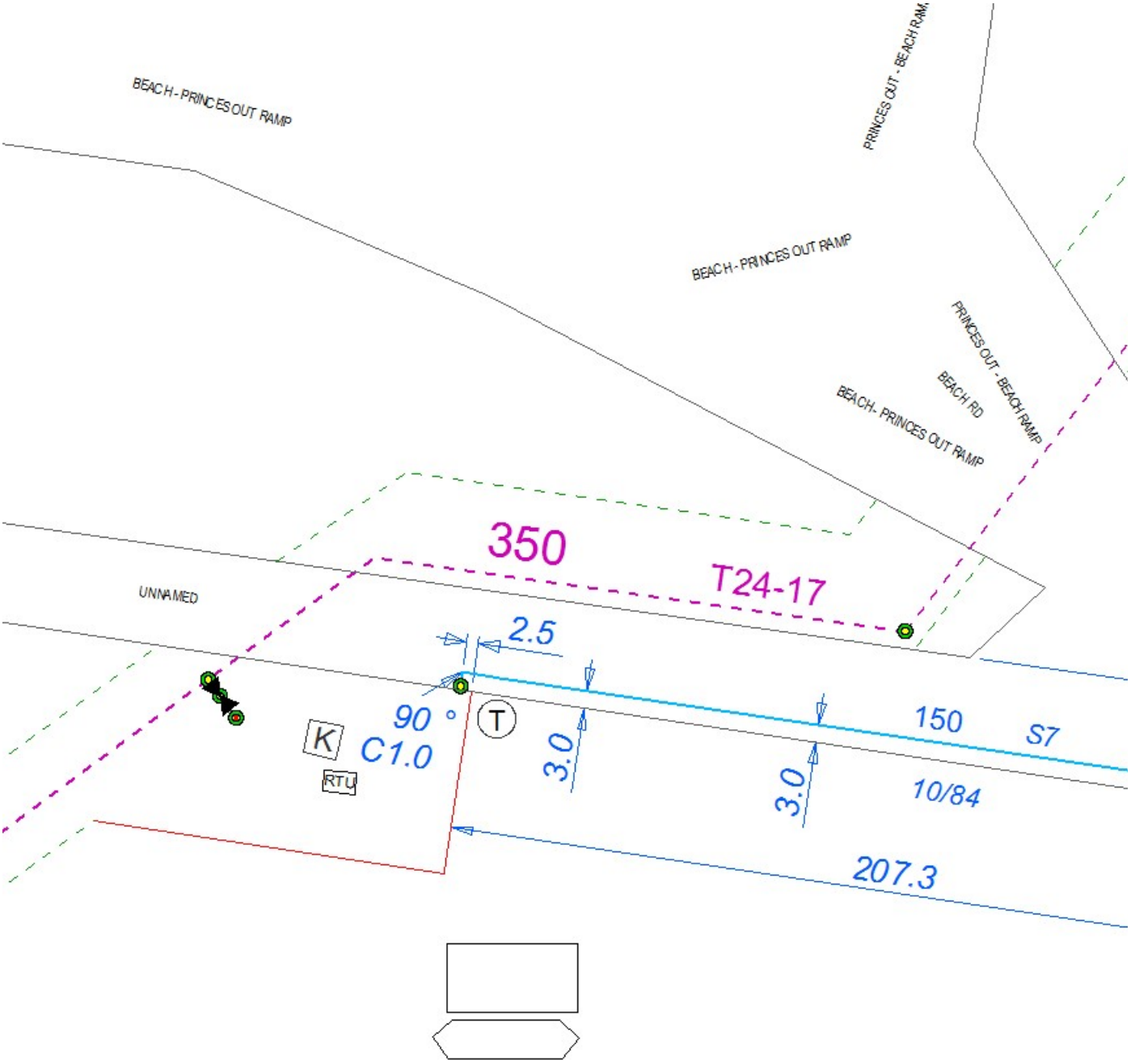
From: [redacted]
Sent: [redacted]
To: [redacted]
Subject: FW: Greater Avalon Employment Precinct - Utility Assessment Report

Hi [redacted],

Please see my responses to the Avalon development queries below;

1. Existing gas assets in the vicinity of the precinct

AusNet has a city gate and approximately 920m of 150mm diameter supply main within the develop precinct proposed. The city gate is a pressure reduction station which supplies gas into the Avalon network mains from this high pressure transmission pipelines (Note this transmission pipeline is owned and operated by APA.) The transition to AusNet's assets occurs at the inlet to the city gate). This infrastructure was originally built to supply the aircraft maintenance facility at Avalon airport. Currently these gas assets only supply the airport terminal building.


BEACH - PRINCES OUT RAMP
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BEACH - PRINCES OUT RAMP
PRINCES OUT - BEACH RAMP
BEACH RD
BEACH - PRINCES OUT RAMP
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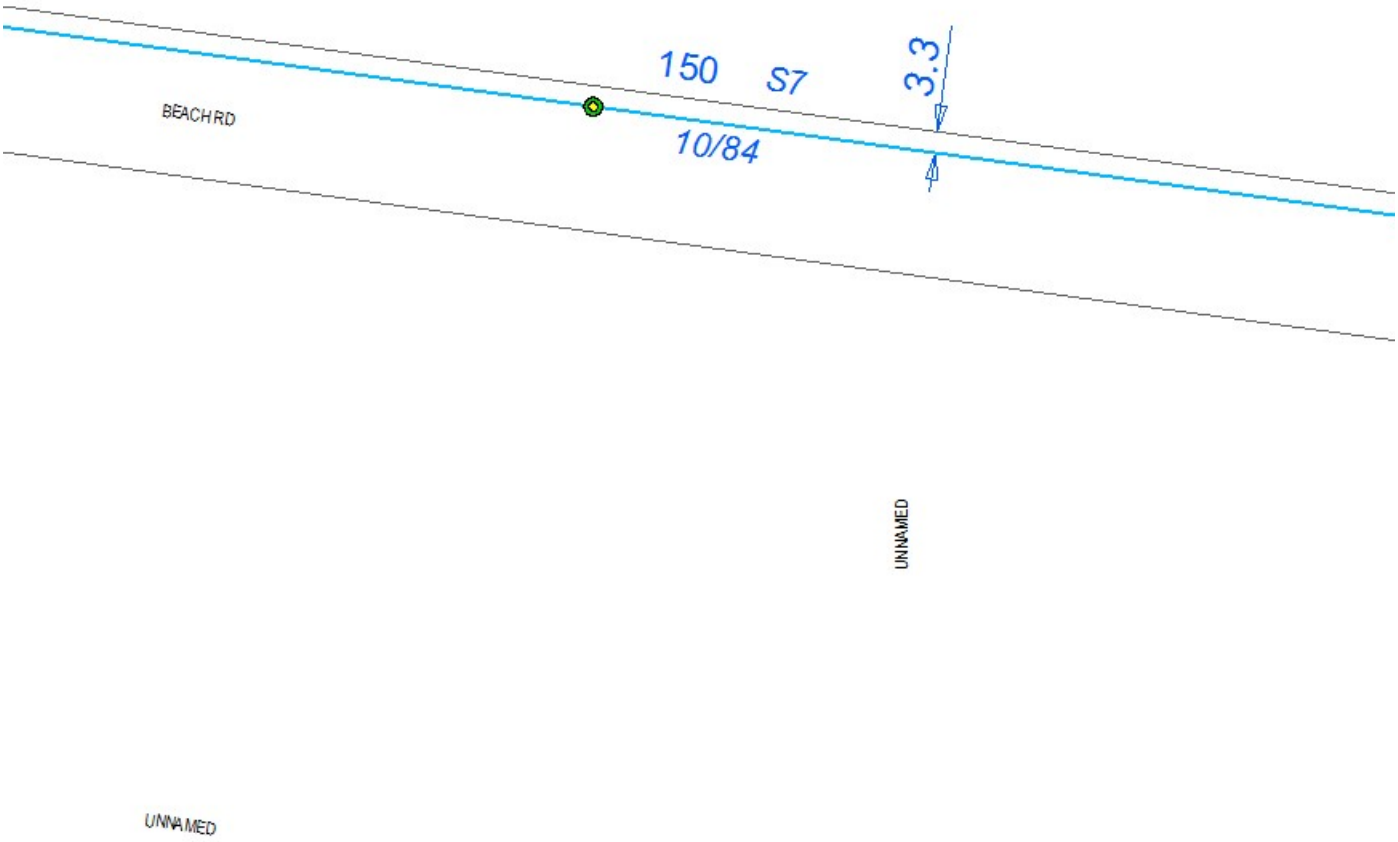


2. Capacity of the existing infrastructure to facilitate commercial development

The maximum capacity of AusNet's Avalon City Gate is 6,000sm3/hr (approx. 232,200 MJ/hr). The existing demand on this infrastructure (Avalon Airport) is approximately 80sm3/hr (3,100MJ/hr). As such there is significant available capacity from these assets.

Please note that APA owns and operates a custody transfer meter (CTM) at the inlet to the city gate. This may limit the available throughput and may need to be upgraded to accommodate additional

throughput. Further details on this can be established once we understand the anticipated demands

3. Preferred location of initial stages of development
   The closer to the existing gas distribution infrastructure the better, however we can construct new gas mains to deliver to other locations within the precinct as required. It is AusNet's strong preference that these new gas mains be located within road reserve.

4. Infrastructure required to service development of the precinct
   AusNet would need to construct new gas mains to deliver the gas from the existing infrastructure to the location of the new development. The diameter and type of the gas mains will depend on the required consumption of the new customer and the distance. Possibly APA may need to upgrade the CTM as described above.

5. Approximate cost, expected timing and funding requirements of infrastructure.
   This will depend on the required capacity and location of the development.

Regards

[redacted]
Lead Gas Network Engineer
[redacted]

AusNet

L30, 2 Southbank Blvd,
Southbank Victoria 3006 Australia
[redacted]
www.ausnetservices.com.au

POWERCOR

[redacted]

From: [redacted]
Sent: Tuesday, 20 May 2025 11:59 AM
To: [redacted]
Cc: [redacted]
Subject: RE: Greater Avalon Employment Precinct - Powercor Network information request 6057207 GREATER AVALON EMPLOYMENT DEVELOPMENT (PRELIM)

Follow Up Flag: Follow up
Flag Status: Flagged

FileCode: R07 ELECTRICITY
Filed: -1

Hi [redacted],

I understand you've been in recent discussions with [redacted] regarding the future development of the Avalon area. I work in [redacted]'s team and have been briefed on your current need for a preliminary statement for the Precinct Servicing Report.

At a high level, a typical industrial development of this scale would require the establishment of one or two zone substations (66kV to 22kV). Planning the development will need to consider strategic locations for these substations, along with 66 kV sub-transmission powerlines to supply them. It's likely that upgrades would be needed at the Geelong Terminal Station to provide a suitable connection point for the new 66 kV lines. Depending on the typical industrial customer usage profile, each facility may require a connection capable of supplying between 2 MVA and 10 MVA (or more). Each zone substation may have a supply capacity of approximately 50 MVA, subject to engineering requirements. The typical area required for a zone substation is approximately 1.1 hectares, again depending on engineering considerations.

Powercor is experiencing an increasing demand for AI and data centre developments within large industrial regions, such as Melbourne's western corridor. These facilities significantly increase the complexity of the overall development, requiring substantial additional electrical infrastructure and capacity from both the distribution and transmission networks. If AI and/or data centre sites are intended for the development, electrical capacity would need to be provided by new transmission assets (220kV or above) and a new transmission terminal station in the area. Sub-transmission lines to customer-specific onsite zone substations or switching stations would then be used within the development to distribute capacity.

I understand this advice is high level in nature. Please let me know if you require further detail or clarification.

Kind regards,

[redacted]
Customer Development Manager | Network Services
CitiPower Pty Ltd & Powercor Australia Ltd
72 Roseneath Street, North Geelong, VIC 3216
Locked Bag 14090 Melbourne VIC 8001
citipower.com.au | powercor.com.au

[redacted]

NBN Co. (TELECOMMUNICATIONS)

Avalon Airport precinct

nbn-Confidential: Commercial | <BMSXXXXXX> | Rev 0.1 | <DD MMM YY>
Owner: Tailesh Patel<Job title of approver (owner)>

Strategic notes for Avalon Airport precinct

Scope

Provide input identifying any key issues related to the initial planning assisting in creation of a Precinct Structure Plan.

Existing Network

Part of this area is within the Fixed line footprint of the NBN network. Currently **NBN** FTTX technologies provides service to Airport and surrounding Industrial premises. Part of the Industrial premises are getting serviced using FTTP technology

Proposed network upgrades.

Currently there are no plans to install or upgrade any infrastructure within this precinct. NBN do not foresee any constraints or issues with future standard infrastructure installation. There are no plans to extend the network to the precinct area unless customer initiated.
Overall, NBN Co consider it highly unlikely the need to implement any new key infrastructure.

Servicing the precinct area

Any extension of the Fixed line footprint to remaining part of Avalon Airport Precinct will connect to **NBN** FAN site located at 79-81 Station lake rd, Lara,3212. The FAN site is large and has capacity to service the precinct.

Servicing of the Precinct would be planned on a case-by-case application basis and driven primarily by customer-initiated demand. New infrastructure would be deployed utilising a mixture of existing Telstra, new NBN build also developer supplied & shared trenching arrangements. Any new build (multiple conduit) to this precinct is planned to connect via Beach Road, Old Melbourne road at the Northern end of the Precinct. It is envisioned that new pit & pipe infrastructure is required within the new part of the precinct

Opportunities

NBN Co is open to working with the other Utility Service Providers (USPs), governments and other entities to cater for growth in the Precinct. NBN would also consider significant one-off investments if deemed necessary to accommodate future growth. Opportunities may arise to facilitate possible trench sharing opportunities either with Council/Road Authorities or other Utilities.
Some difficulties do exist with the NBN network being crossing the Princes Freeway and future network will also need to be installed through its vicinity so NBN Co would be interested in being involved in any additional service crossings that occur. NBN are constrained by boundaries such as railways, freeways and watercourses, so any additional crossings enable NBN to increase the robustness of the network.
NBN Co considers its best planning approach to cater for growth is a consistent staged rollout in a direction, e.g. out from the FAN site, and are interested in any future planning that takes place so that we can plan works on the network accordingly.

Some of the opportunities that would benefit NBN are:

- working with other USPs when working on additional crossings of freeways, waterways and railways
- encouraging additional space in any road restructuring and widening to enable future telecommunications work
- installing additional conduits and ducts for future cables where possible.

Risks-Issues

Commercial Assessments
Heritage - Environmental overlays

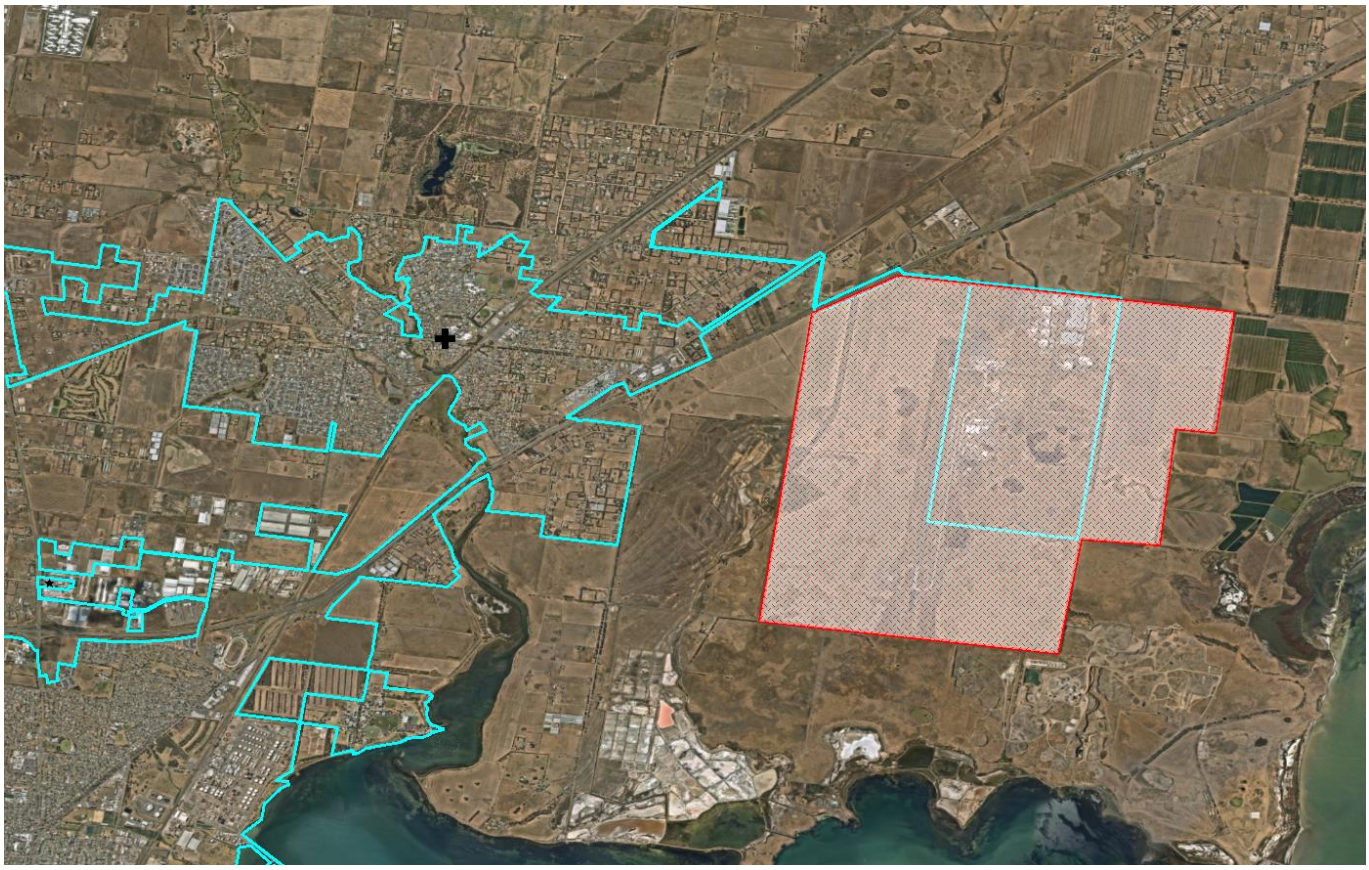


Figure 1. NBN Service area-rollout map showing Avalon Airport Precinct

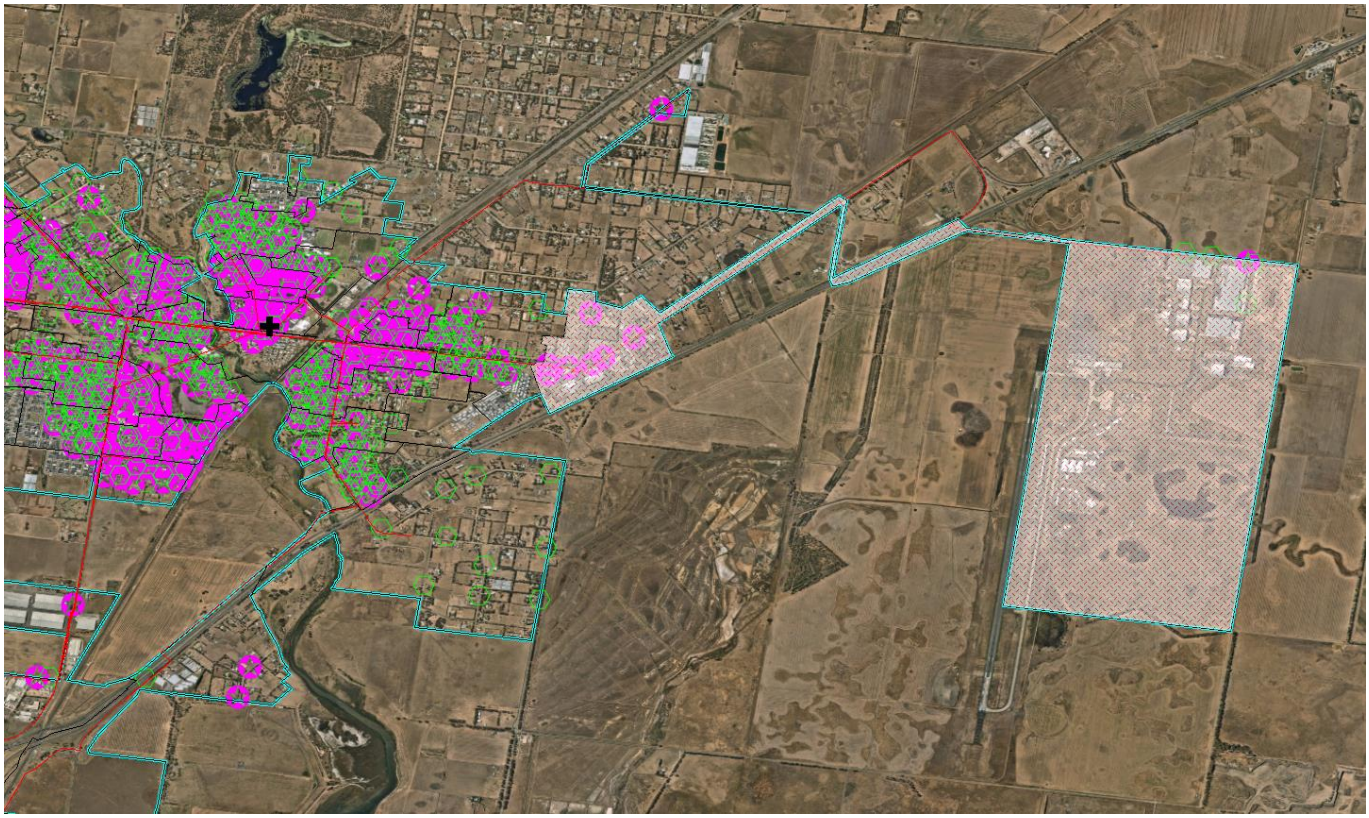


Figure 2. NBN Service Fixed Line map

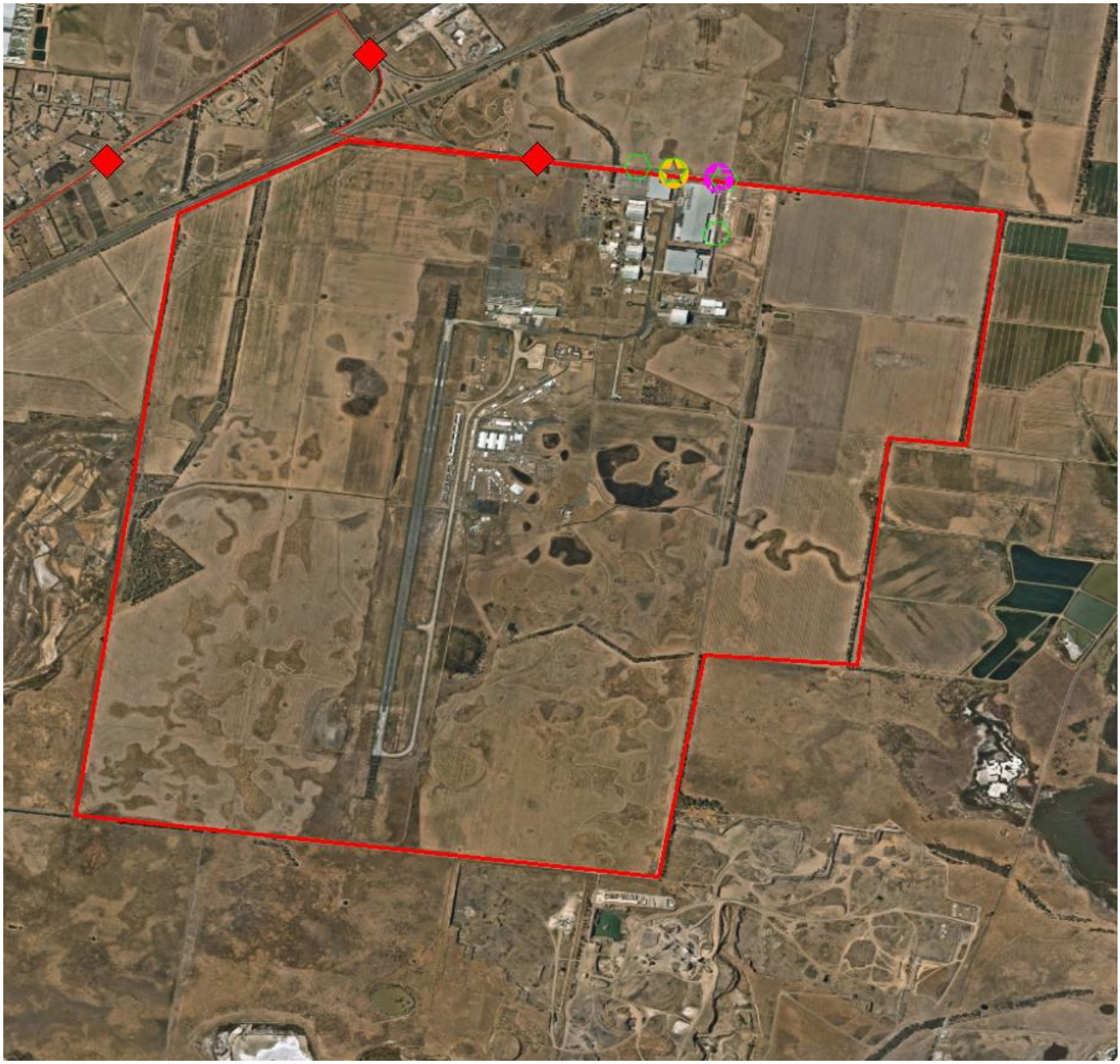


Figure 3. Site Context Plan

APA PIPELINES

APA VTS Australia (Operations) Pty Limited ACN 083 009 278
Level 14, 60 City Road, Southbank VIC 3006
PO Box 423 Flinders Lane, Vic 8009
P: +61 3 8626 8400 | F: +61 3 8626 8454
APA Group | apa.com.au

23 September 2021

APA Reference: 449902
Your Reference: N/A

Coordinator Strategic Planning
City of Greater Geelong
Wadawurrung Country
P.O. Box 104
GEELONG VIC 32200

EMAIL OUT:
Avalon_CorridorStrategy@geelongcity.vic.gov.au

Dear Sir / Madam

RE: AVALON CORRIDOR STRATEGY – DRAFT FRAMEWORK

Thank you for your email received on 26 July 2021 in relation to the Avalon Corridor Strategy, Draft Framework Plan.

APA Group (APA) is Australia's largest natural gas infrastructure business and has direct management and operational control over its assets and investments. APA's gas transmission pipelines span across Australia, delivering approximately half of the nation's gas usage. APA owns and operates over 15,000 km's of high pressure gas transmission pipelines across Australia.

APA is the Pipeline Licensee for the Brooklyn – Corio and Brooklyn – Lara pipelines, (see table 1 for details):

Table 1: Transmission gas pipelines in the area of consideration

Pipeline	Pipeline Licence	Easement Width (m)	Diameter (mm)	Measurement Length (m)
Brooklyn – Corio	Pl 81 (T24)	19.82	350	297
Brooklyn – Lara	Pl 266 (T112)	20	500	525
Note: Measurement Length is applied to either side of the pipeline.				

APA's Role

As a Licensee under the Pipelines Act 2005 (VIC), APA is required to operate high pressure gas transmission pipelines (**HPGTP**) in a manner that minimises adverse environmental impacts and protects the public and property from health and safety risks. Once a HPGTP is in place, APA is required to constantly monitor both the pipeline easement and also a broader area within which we are required to consider land use changes and development and to assess what such changes means to the risk profile of the HPGTP.

APA has a number of responsibilities and duties to perform under a complex framework of legislation, standards and controls across Federal, State and Local Government landscapes. In particular, our HPGTPs are required to be operated in accordance with Australian Standard 2885 (Pipelines – Gas

and Liquid Petroleum) (AS2885). In discharging our regulatory responsibilities, APA needs to continuously review what is happening around its assets, what land use changes are occurring and what development is taking place to ensure it remains in a position to comply with applicable operational and safety standards and legislation whilst meeting its commercial obligations and imperatives.

Pipeline Risk Profile and the Measurement Length

In managing HPGTP's and considering land use changes, APA must focus on that area geographically defined by AS2885 as the Measurement Length (**ML**). The ML area is the heat radiation zone associated with a full-bore pipeline rupture. APA is mandated to consider community safety in the ML due to the high consequences of pipeline rupture to life, property and the economy.

The ML is determined by taking account of a number of factors including the design criteria of the pipe (driven by the environment within which it was designed for at the time of construction) and the Maximum Allowable Operating Pressure (MAOP) of the pipe. APA must consider any changes of land uses within the ML area to determine the effect of a new use on the risk profile of the pipeline.

For reference, the ML of the Brooklyn – Corio pipeline is 297 metres and Brooklyn – Lara pipeline is 525 metres. Note that the ML is a radial dimension, and therefore applies to both sides of the pipe.

Sensitive Uses

APA seeks to limit sensitive uses from establishing within the ML so as to retain a high level of compliance with applicable safety standards. AS2885 defines a sensitive use as one which may increase the consequences of failure due to its use by members of the community who may be unable to protect themselves from the consequences of a pipeline failure.

To this end, APA's preferred position is that all land uses listed below be located outside of the ML:

- Aged Care Facilities.
- Retirement villages.
- Child care / family day care centres.
- Cinema based entertainment facility.
- Schools or other educational establishments.
- Prisons / corrective institutions.
- Hospitals
- Place of assembly or worship.
- Retail premises.
- Service station.
- Higher density residential uses.
- Other uses, as determined by the relevant decision maker, as substantially used by community members unable to protect themselves from the consequences of pipeline failure.

Safety Management Study

AS2885 requires a Safety Management Study (**SMS**) to be undertaken whenever the land use classification of land within the ML changes.

The purpose of an SMS is to assess the risk associated with a change in land use, including both construction risks and ongoing land use risks. The SMS will also develop appropriate controls to reduce risks to 'as low as reasonably practicable' (**ALARP**).

The cost of undertaking an SMS is to be borne by the proponent as the 'agent of change'. APA has developed a list of preferred SMS facilitators. This ensures facilitators are both independent and satisfactorily qualified to undertake this assessment. This list is available from APA on request.

Easement Management

APA, is the beneficiary of the pipeline easements that run through the study area. To ensure compliance with the safety requirements of AS2885, APA needs to ensure our easement is managed to an appropriate standard. This includes:

- Ensuring the easement is maintained free of inappropriate vegetation and structures.
- Place warning signs at various mandated points along the pipeline route, including any change in property description/boundaries.
- Maintain a constant line of sight between warning signs.
- Undertake physical patrols and inspections of the easement.

APA will not accept outcomes that do not enable us to achieve our safety responsibilities to the surrounding community.

Any works within the easement must be approved by APA through our Third Party Works Authorisation process. This process will ensure all works are undertaken in a safe manner that does not physically impact on the pipeline. If you are seeking to undertake works on property containing a pipeline, or are seeking details on the physical location of the pipeline, please contact Dial Before You Dig on 1100 or APA directly at APAprotection@apa.com.au.

Roads and services over easement

It is APA's preference that roads being constructed over pipeline easements be avoided wherever possible. The creation of roads over pipeline easements results in the following issues:

- Loss of control over easement area which has been secured through a legally enforceable easement agreement.
- Increased potential for external interference with the pipeline due to other parties utilising the road reservation for infrastructure (water, sewer etc.) over or around the pipeline.
- Increased difficulty accessing the pipeline due to the need for access approval from Council or other roads authorities.
- Increased cost in accessing the pipeline due to the need to make good a road reserve.
- Loss of ability to duplicate or loop the pipeline in the future.

APA will consent, in principle (and subject to detailed assessment), to periodic road or services crossings over the easement on the basis that Council and other utility operators (as relevant) enter into an agreement with APA to maintain our existing easement rights in the area to be covered by road.

The proponent must demonstrate that the number of crossings has been minimised. Crossings are to be as perpendicular as possible to the pipeline to minimise the area of impact.

Comments

On the basis of the information provided, APA provides the following comments/observations on the draft Avalon Corridor strategy:

1. The Avalon corridor strategy should identify the high pressure gas pipeline Measurement Lengths to ensure that consideration is given for any proposed sensitive land uses (as outlined above) that maybe proposed within that area. Sensitive land uses should be located outside of the Measurement Length or any reduced Area of Consequence that maybe identified through a Safety Management Study process. This approach is consistent with recent Precinct Structure Plans.

2. We note there is 'proposed highway landscape planting' proximate to the pipelines. APA generally resists larger trees within our easements or proximate to the pipelines. This is predominantly due to the need to retain line of sight along the pipeline easement and to avoid large roots impacting the pipe. This will need to be a consideration should larger trees be proposed in this area (see comments 3 and 4 below).

3. APA would encourage that its easements be located within linear open space corridors in any new urban environments. This approach is consistent with recently approved Precinct Structure Plans.

4. APA has prepared "APA Site Planning and Landscape National Guidelines" which may assist with any proposed development/embellishment of the APA easement for linear open space. These guidelines can be found at https://www.apa.com.au/pipeline-corridors/

5. A Safety Management Study (as outlined above) will be required as part of any proposed land use change within the pipeline Measurement Lengths that results from the Avalon Corridor Strategy.

For any further enquiries relating to this correspondence, please feel free to contact [redacted] on [redacted] or the Infrastructure Planning & Approvals team at planningvic@apa.com.au .

Yours faithfully,

[redacted]

[redacted]

SENIOR URBAN PLANNER
INFRASTRUCTURE PLANNING AND APPROVALS

9 June 2023

[redacted]
Victorian Planning Authority
Level 25, 35 Collins Street
Melbourne, VIC 3000

By Email:[redacted]

Dear [redacted],

Re: Response to "Greater Avalon Employment Precinct Strategic Planning"

Thank you to you and your team for presenting the information around Strategic Planning for the Greater Avalon Employment Precinct at our virtual meeting on 19 April 2022. Viva Energy Australia Ltd (Viva Energy Australia) confirms the below advice:

1. Energy Transition considerations

Viva Energy Australia is the exclusive licensee of Shell in Australia and supplies approximately a quarter of the country's liquid fuel requirements. There is a network of around 1,350 Shell and Liberty service stations across the country. It owns and operates the strategically located Geelong Refiniery in Victoria, and operates bulk fuels, aviation, bitumen, marine, chemicals and lubricants businesses supported by more than 20 terminals and 55 airports and airfields across the country.

The acquistion of the Coles Express Convenience retailing business covering more than 700 stores nationwide has been completed this month. The recent acquistion of the On The Run Group, (subject regulartory approvals) will see Viva Energy Australia consolidate our transformation to become the leading convenience and mobility retailer in Australia.

The energy transition is ever evolving. The use of eletricity, hydrogen, renewable fuels and many other energy types will be required to fuel the transport sector, from cars and trucks, to ships and planes. As zero and low carbon solutions become both technically and commerically viable, it's inevitable that the use of alternative fuels will only continue to grow. It is important in the strategic planning of the Greater Avalon Employment Precinct that consideration is given to how the areas are planned to anticipate how people and vehicles will move in the future.

There is a need to consider the footprint and allowance for the delivery of these energies, for example, EV chargers and/or hydrogen infrastructure. Physical footprint, and access to sufficient power are two key considerations in the planning stage. For example, a gaseous hydrogen refuelling station will likely require a minimum of 400m2. Ensuring enough physical space ensures that future safe operation, including the interaction with traffic and pedestrians, can be achieved. We are happy to provide some advice on any further questions in this area.

2. The Pipelines

The White Oil Pipeline (WOPL or Pipeline Licence 7), Black Oil Pipeline (BOPL or Pipeline Licence 8) and Western – Altona – Geelong Pipeline (WAG or Pipeline Licence 65) are within or in the vicinity of Greater Avalon Employment Precinct. The Pipelines lengths respectively are 54km, 55km and 136km. The Pipelines supply 50% of Victoria's liquid fuel demand and connect Geelong Refinery to Newport Terminal. The WAG Pipeline is the only crude oil Pipeline to the Geelong Refinery.

The Pipelines operate 24 hours per day, 365 days of the year with operating pressures up to 9,600 kPa. As such any damage to the Pipelines may result in a potentially hazardous situation in terms of:

- Fire and/or explosion causing high risk to life (and property); and
- Significant environmental impact.

3. The Legislation and Standards

All works associated with licensed Pipelines in Victoria are regulated by the Pipelines Act 2005 (Vic) and the Pipelines Regulations 2017 (Vic). The Pipelines Act and the Regulations require all Pipelines to be operated and maintained in accordance with Australian Standard 2885 Pipelines – Gas and Liquid Petroleum. The Standard requires additional safety controls when a Pipeline route passes any urban area and Sensitive land use. These Sensitive uses include childcare centres, schools and others as defined in the standard.

AS2885 states a Safety Management Study (SMS) is required if land use changes are proposed within the Measurement Length. The Victorian Planning Authority (VPA) are proposing land use changes within the Measurement Length and the VPA are currently gathering information to conduct the SMS. The SMS will review threats to the Pipelines and will detail the controls required to protect the assets and the public.

The standard requires safety performance of the Pipelines to be driven by the Location Class. Therefore any changes to the Location Classification of an existing Pipeline drives change to design, construction and operation.

AS2885 Part 6, 2.3 outlines Location Classification of Pipeline routes:

- Rural (R1) : Land that is unused, undeveloped or is used for rural acitivies such as grazing, agriculture and horticulture. Rural applies where the population is distributed in isolated dwellings.
- Rural Residential (R2) : Land that meets the following criteria:
    - Defined in a local land planning instrument as rural residential or its equivalent
    - Occupied by single residence blocks typically in range of 1 ha to 5 ha.
    - Rural or semi-rural areas for which the number of dwellings within the measurement length radius from any point on the Pipeline does not exceed approximately 50.
- Residential (T1) : Land that is developed for community living or is defined in a local planning instrument as residential or its equivalent.
- High Density (T2) : Land that is developed for high density community use or is defined in a local planning instrument as high density or its equivalent. High Density applies where multi-storey developments.

In addition to the broad Primary Location Classifications above, there are Secondary Location Classifications including: Sensitive, Environmental, Industrial, Heavy Industrial, Common Infrastructure Corridor and Crowd:

- Sensitive use (S) : The sensitive use location class identifies land where the consequences of a failure event may be increased because it is developed for use by sectors of the community who may be unable to protect themselves from the consequences of a Pipeline failure event. Defined to include; schools, hospitals, aged care facilities and prisons. Sensitive use location class shall be assigned to any section of the Pipeline system where there is a sensitive development within the Measurement Length.
- Industrial (I) : The industrial location class identifies land that poses a different range of threats because it is developed for manufacturing, processing, maintenance, storage or similar activities or is defined in local planning instrument as intended for light or general industrial use. Industrial applies where development for factories, warehouses, retail sales of vehicles and plant predominate.

- Heavy Industrial (HI) : Sites developed or zoned for use by heavy industry or for toxic industrial use shall be classified as Heavy Industrial. They shall be assessed individually to assess whether the industry or the surroundings include features that –
    - Contain unusual threats to the Pipeline system or
    - Contain features that may cause a Pipeline failure event to escalate either in terms of fire, or for the potential release of toxic or flammable materials.

Currently, the Pipelines in the proposed Avalon Precinct Structure Plan are classified as R2. The proposed changes to the Precinct Structure Plan would likely create the classification of T1 with subclassification Industrial.

Viva Energy Australia will not permit Senstive uses within the Pipelines Measurement Length.

4. The Measurement Length

The "Measurement Length" is the area of land around the Pipeline where any land use changes would require Viva Energy Australia consultation and our advice needs to be incorporated in the planning scheme with specific planning controls. For any proposed land use change within 87m of WOPL, 102m of BOPL and 142m of WAG will need to be referred to Viva Energy Australia for advice.

5. Safety

The Pipelines Act, Regulations and Standard demand changes to Licensed Pipelines as required, to ensure safety of the public. Likewise, the agent of land use change, who is responsible for the change in safety risks to the public, is required to respect these requirements and accommodate appropriate measures to reduce safety risks to the public.

Viva Energy Australia requests that the below conditions be included into the planning controls:

1. No sensitive uses to be allowed planning permission within the Measurement Length of each Pipeline. (Sensitive uses include; schools, hospitals, aged care facilities and prisons, as per AS2885).
2. A Safety Management Study led by Viva Energy Australia is required for any Planning Permit within any Pipeline Measurement Length.
3. Structures and Buildings cannot be built above or in close proximity to the Pipeline.
4. Roads and Railway Reserves are not to be placed above any Licensed Pipeline, other than a crossing.
5. Road and rail crossings are to be perpendicular to pipeline route.
6. The Pipelines are clearly displayed on the Precinct Structure Plan.

Viva Energy Australia needs to ensure that the ability to maintain and operate the Pipelines, the integrity of the Pipeline and safety to the surrounding environment and people are safeguarded during Strategic land use planning phase, development, construction and post construction.

Whilst Viva Energy Australia are generally supportive of light industrial uses and active open space such as parks or bike paths, the Safety Management Study of the specific land use changes may generate the need for other planning controls and protection measures. Viva Energy Australia request the Safety Management Study continues to be progressed in this planning phase.

6. Consider Reserving land for possible future Pipelines

Viva Energy Australia ask that you consider reserving a suitable easement corridor for future jet fuel Pipeline assets from BOPL Pipeline to service Avalon airport.

The purposes of this Pipeline would be to transport jet fuel to the airport which would reduce the need for truck supply, hence reduced transport emissions, improve overall safety and increase capacity for fuel supply to the airport. This would be desirable to meet future Avalon airport fuel demand.

7. Conclusion

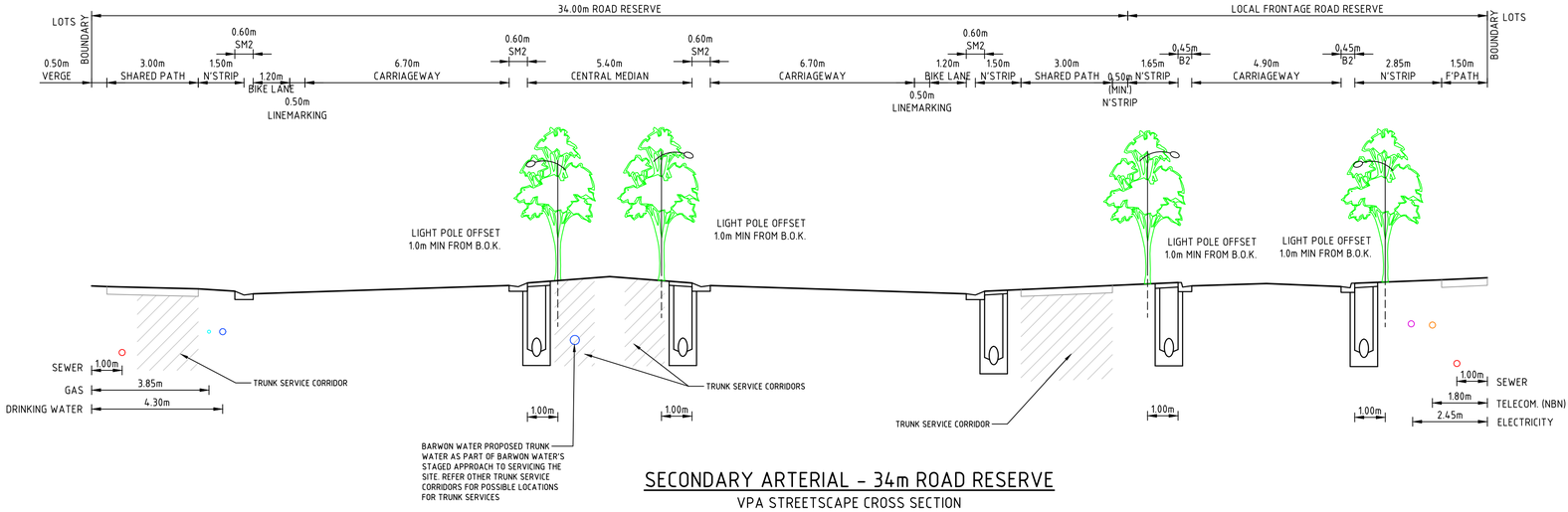
Thankyou for the opportunity to be consulted about the future land use strategic planning for the Greater Avalon Employment Precinct. We will provide the GIS layers for the Pipelines as discussed.

Should you wish to further discuss, please do not hesitate to contact me directly at SAL-NPT-Pipelines@vivaenergy.com.au

Yours Sincerely,

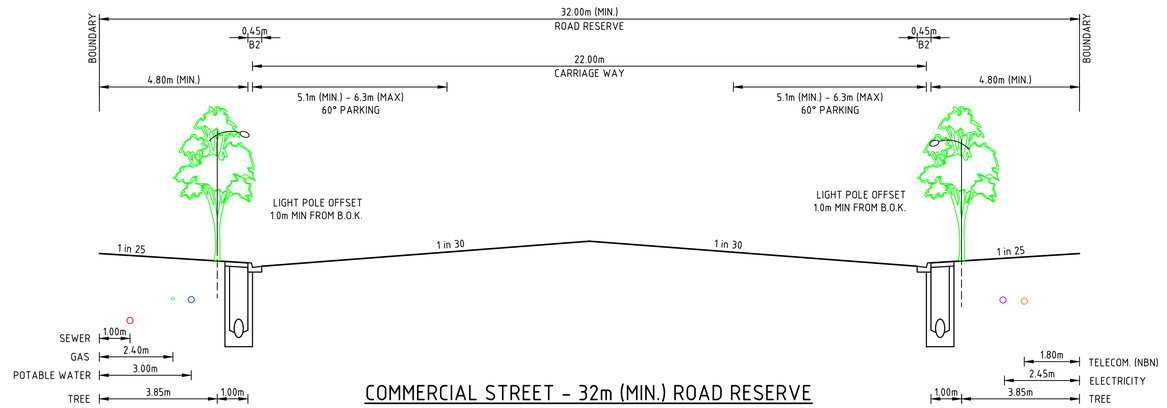
[redacted]
State Operations Manager, Victoria
Pipeline Licensee Representative
Viva Energy Australia Pty Ltd
SAL-NPT-Pipelines@vivaenergy.com.au

APPENDIX B – TYPICAL ROAD CROSS SECTIONS



SECONDARY ARTERIAL - 34m ROAD RESERVE

VPA STREETSCAPE CROSS SECTION



COMMERCIAL STREET - 32m (MIN.) ROAD RESERVE

IDM SD 620

SERVICES ARE INDICATIVELY SHOWN. OFFSETS HAVE NOT BEEN CHECKED AGAINST LARGER SIZED SERVICES AND LARGER SIZED MAIN DRAINS

Rev	Amendments	Approved	Date
	CROSS SECTIONS UPDATED	J.G	15/10/2025
A	PRELIMINARY ISSUE	J.G	10/09/2025

Scale
H 1:100 SCALE @ A1 V 1:50
0 1 2 3 4 5
0 0.5 1 1.5 2 2.5

spiire
10 MOORABOOL STREET GEELONG
VICTORIA 3220 AUSTRALIA T 61 3 5249 6888
spiire.com.au ABN 55 050 029 635

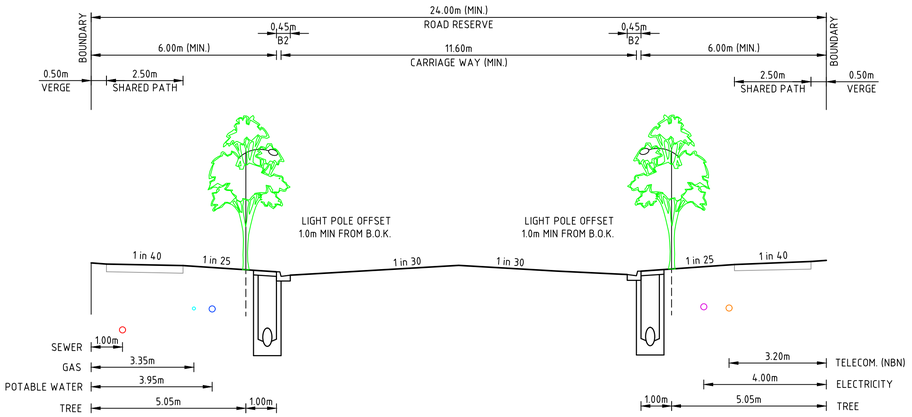
Designed B. GOLI
Checked
Authorised J. GUTHRIE
Date SEPTEMBER 2025

GREATER AVALON EMPLOYMENT PRECINCT

CROSS SECTIONS - SHEET 1
CITY OF GREATER GEELONG/ WYNDHAM CITY COUNCIL
VPA

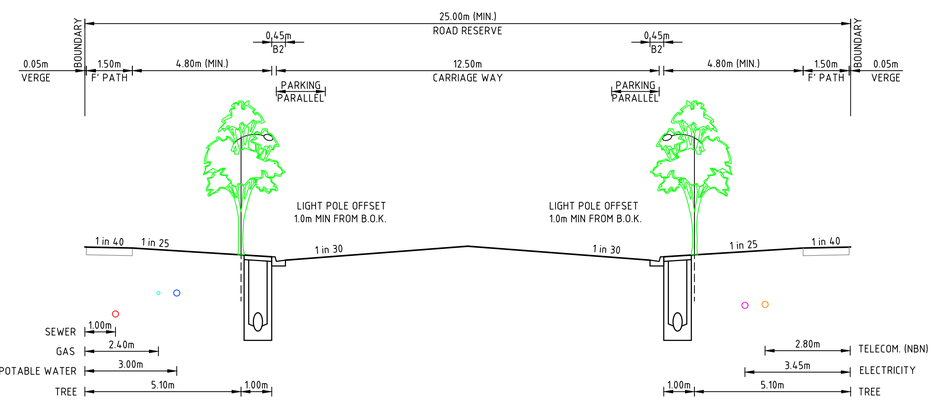
PRELIMINARY Drg No **322390 ROAD** Rev **B**

file name: 322390CG020_Typical Sections.dwg Layout name: CG020 plotted by: Joel Guthrie
file location: \\spiire.local\data\Data\300s\310\Civil\Strategy plot date: 04/11/2020 2:31 PM Sheet ##### of #####Sheets



COLLECTOR STREET - 24m (MIN.) ROAD RESERVE

IDM SD 605



INDUSTRIAL STREET - 25m (MIN.) ROAD RESERVE

IDM SD 620

SERVICES ARE INDICATIVELY SHOWN. OFFSETS HAVE NOT BEEN CHECKED AGAINST LARGER SIZED SERVICES AND LARGER SIZED MAIN DRAINS

SERVICE PLACEMENT GUIDELINES

EXISTING OR PROPOSED SERVICE	UNDER PEDESTRIAN PAVEMENT	UNDER NATURE STRIP	UNDER STREET TREES	UNDER KERB	UNDER ROAD PAVEMENT	WITHIN ALLOTMENTS
SEWER	PREFERRED	POSSIBLE	NOT PREFERRED[2]	NO	POSSIBLE	POSSIBLE[3]
POTABLE WATER	NOT PREFERRED	PREFERRED	NOT PREFERRED[2]	NO	POSSIBLE[7]	NO
GAS	NOT PREFERRED	PREFERRED	NOT PREFERRED[2]	NO	POSSIBLE[7]	NO
ELECTRICITY	POSSIBLE[5]	PREFERRED	NOT PREFERRED[2]	NO	NOT PREFERRED	NO
TELECOMMUNICATIONS	POSSIBLE[6]	PREFERRED	NOT PREFERRED[2]	NO	NO	NO
DRAINAGE	NOT PREFERRED	POSSIBLE	NOT PREFERRED[2]	PREFERRED	POSSIBLE	POSSIBLE[3]
TRUNK SERVICES	POSSIBLE	POSSIBLE	NOT PREFERRED[2]	POSSIBLE	POSSIBLE	NO

1. TREES ARE NOT TO BE PLACED DIRECTLY OVER PROPERTY SERVICE CONNECTIONS
2. IN ACCORDANCE WITH IDM SD630, A TREE ROOT ZONE OF 0.6m DEPTH MUST BE APPLIED WHERE SERVICES EXIST IN NATURE STRIPS. ANY SERVICE INSTALLATION SHALL BE AT A GREATER DEPTH THAN THE TREE ROOT ZONE.
3. REAR EASEMENT SEWER AND DRAINAGE LINES ARE COMMON WITHIN ALLOTMENTS. LESS COMMON ARE SEWER AND DRAINAGE EASEMENTS WITHIN FRONT SETBACK OF ALLOTMENTS.
4. PROPERTY CONNECTIONS UNDER HARD SERVICES REQUIRE FITZROY BOXES FOR FUTURE MAINTENANCE OPERATIONS.
5. SUBJECT TO POWER AUTHORITY APPROVAL.
6. PITS ARE TO BE PLACED EITHER WHOLLY WITHIN THE FOOTPATH OR WHOLLY WITHIN THE NATURE STRIP.
7. ITEMS LISTED AS "POSSIBLE" ARE TYPICALLY NOT FAVOURED BY SERVICE AUTHORITIES BUT MAY CONSIDERED BY THE SERVICE AUTHORITY ON A CASE BY CASE BASIS.

Rev			
	CROSS SECTIONS AND TABLE ADMENDED	J.G	15/10/2025
A	PRELIMINARY ISSUE	J.G	10/09/2025
Rev	Amendments	Approved	Date

Scale

spiire
10 MOORABOOL STREET GEELONG
VICTORIA 3220 AUSTRALIA T 61 3 5249 6888
spiire.com.au ABN 55 050 029 635

Designed B. GOLI
Checked
Authorised J. GUTHRIE
Date SEPTEMBER 2025

GREATER AVALON EMPLOYMENT PRECINCT

CROSS SECTIONS - SHEET 2
CITY OF GREATER GEELONG/ WYNDHAM CITY COUNCIL
VPA

PRELIMINARY Drg No **322390 ROAD** Rev **B**

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file location \\spiire.geelong.local\Data\3Ph\3867-100\Civil\Strategy\ plot date 04/11/2020 2:31 PM Sheet ##### of ##### Sheets