Victorian Planning Authority

Officer South Employment PSP Utility Assessment

Situational Analysis Report

October 2020

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1. Introduction

1.1 Project Context

The Officer South Employment Precinct (the Precinct) is located within the Shire of Cardinia, on the south-eastern fringe of metropolitan Melbourne. The Precinct comprises of approximately 1069 hectares of land, bound by the Princes Freeway to the north, Lower Gum Scrub Creek to the east, Patterson Road to the south and Cardinia Creek to the west. A Locality Plan is provided in Appendix A illustrating the location and boundaries of the Precinct.

1.1.1 Existing Land Use

The Precinct is currently predominantly underdeveloped, rural properties. There are several residential properties located throughout the Precinct and there is a service station located to the north of the Precinct along the Princes Freeway.

The Precinct is situated within an Urban Growth Zone (UGZ). The purpose of the UGZ is to allow for urban development[1]. The UGZ is typically associated with a Precinct Structure Plan (PSP) and also permits the existing non-urban use of land prior to the implementation of a PSP.

1.1.2 Project Overview

The Victorian Planning Authority (VPA) has commenced planning for the Officer South Employment Precinct Structure Plan in collaboration with Cardinia Shire Council, authority agencies, landowners and developers. The Precinct will complement existing surrounding development through the provision of mixed used development, incorporating industrial, commercial and residential land uses.

GHD was engaged to undertake the Utility and Servicing Assessment for the Precinct. This assessment consists of a Situational Analysis Report and a Utility Servicing Assessment. Broadly, the Situational Analysis Report identifies key constraints and opportunities associated with existing utility infrastructure. Following the completion of the Situational Analysis Report, the VPA will develop the Precinct's Future Urban Structure, and indicative development yields. GHD will commence discussions with Utility Service Providers (USPs) to identify future utility servicing requirements for the development of the Precinct. The findings of these discussions will form the Utility Servicing Assessment.

1.2 Purpose of this Report

The focus of this assessment is to determine the key constraints and opportunities relating to existing utility infrastructure within and servicing the Precinct. This report includes an assessment of stormwater, water, sewerage, electricity, gas and telecommunications infrastructure. This information will assist the VPA to prepare the Officer South Employment PSP.

This assessment also identifies local and state policy relating to low carbon emissions as well as leading Ecologically Sustainable Development (ESD) practices relevant to employment precincts to assist the VPA in adopting a sustainable approach to planning for the Precinct.

Utility infrastructure has the potential to contribute significant costs and delays if constraints are not identified and addressed early in the development process and therefore this report is crucial to maintaining lines of communication with, and giving pre-planning development information to USPs, who own or manage utility assets in the development area.

1 https://planning-schemes.delwp.vic.gov.au/schemes/vpps/37_07.pdf

The USPs consulted in this assessment are outlined in Table 1 below. This report integrates their advice regarding existing and required infrastructure to service the Precinct. Opticomm responded to the Dial Before You Dig (DBYD), however upon consultation indicated that its assets are located outside of the Precinct boundaries.

Table 1 Utility Service Providers in the Precinct

Utility	Utility Service Provider	Contact Details
Electricity	AusNet Electricity	Andrew Webber Design Team Leader
	AusNet Transmission	[redacted]
Gas	APA Group Networks	Rebecca May Planning Manager [redacted]
	APA Group Transmission	Michael Mielczarek Senior Urban Planner [redacted]
Sewer	South East Water	Matthew Snell Group Manager Growth [redacted]
Stormwater Drainage	Cardinia Shire Council	Marcelle Bell Growth Area Strategic Planner [redacted]
		Emma Cadd Development Coordinator [redacted]
	Melbourne Water Corporation	Laurence Newcome Precinct Structure Planning Coordinator, Catchment Strategies and Services, Development Services

		[redacted]
Telecommunications	NBN Co	Ferdous Alam Area Planner [redacted]
	Optus / Uecomm	Paul Lowe Senior Project Engineer VIC/TAS Operations [redacted]
	Opticomm	[redacted]
	Telstra	David A Stanley Fundamental Planning Specialist Access Network Planning [redacted]
		David Carricondo Project Specialist Network Integrity Project specialist : Vic/Tas/SA [redacted]
Water	South East Water	Matthew Snell Group Manager Growth [redacted]

1.3 Limitations and Assumptions

The location of existing services has been approximately determined based on Dial Before You Dig (DBYD) information and information provided by USPs. The location and depth of existing infrastructure is approximate and service proving is recommended to confirm the location and depth.

Assessment of the condition and capacity of existing infrastructure has been based on advice and data received from USPs. Information provided by stakeholders is preliminary information only, subject to change and should not be relied upon without verification.

This report has been prepared by GHD for the Victorian Planning Authority and may only be used and relied on by the Victorian Planning Authority for the purpose agreed between GHD and the Victorian Planning Authority as set out in this section.

GHD otherwise disclaims responsibility to any person other than the Victorian Planning Authority arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared. The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this section of the report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by the Victorian Planning Authority and others who provided information to GHD (including Government and Utility Service Providers), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report, which were caused by errors or omissions in that information.

1.4 Methodology

GHD undertook an initial investigation into the utility infrastructure within the Precinct area through a desktop study. This research involved using information obtained through a Dial Before You Dig (DBYD) enquiry.

Following the desktop investigation, GHD obtained spatial data from each USP to create Existing Infrastructure Plans, provided in Appendix C. Where spatial data was not able to be obtained from USPs, it has been digitised from the USPs' DBYD responses. A summary of the infrastructure data type utilised in the Existing Infrastructure Plans is provided below in Table 2.

Table 2 Infrastructure Data Types by Utility Service Provider

Utility Service Provider	Infrastructure Data Type
APA Group	Digitised DBYD Data and VPA supplied data
AusNet	Digitised DBYD Data
Cardinia Shire Council	Spatial Data
Melbourne Water Corporation	Spatial Data
South East Water	Spatial Data
NBN Co	Digitised DBYD Data
Optus/Uecomm	Digitised DBYD Data
Opticomm	Digitised DBYD Data
Telstra	Spatial Data

GHD consulted with the relevant USPs to gain a qualitative understanding of the capacity, size and condition of utility infrastructure within and servicing the Precinct, as well as key constraints and opportunities relating to existing utility infrastructure.

GHD provided USPs with a questionnaire to identify the following:

- The location, condition and capacity of existing utility infrastructure

- Affected transmission and trunk assets outside the boundaries of the Precinct and any associated buffers that may impact the Precinct
- Key constraints and opportunities relating to existing utility infrastructure and implications for the future planning of the Precinct
- The nature, timing, location, and costing of any planned works (maintenance, upgrades, network augmentation, extensions, relocations etc.).

GHD undertook a high level research investigation to identify local and state policy that supports low carbon emissions and to identify global leading practice in ESD for employment precincts. This information was assessed, synthesised and compiled into this Situational Analysis Report, along with relevant findings and conclusions for the future development of the Precinct.

2. Stormwater Drainage Infrastructure and Flooding Conditions

The regional drainage network in the Precinct is managed by Melbourne Water Corporation (MWC). Cardinia Shire Council (Council) is responsible for the local drainage network.

2.1 Existing Infrastructure

Existing stormwater drainage infrastructure is shown in Appendix C.

2.1.1 Melbourne Water Corporation

MWC is the floodplain management authority for the Precinct.

The Precinct is bounded by Cardinia Creek in the west and Lower Gum Scrub Creek in the east.

MWC is responsible for a short length of 1800 mm diameter pipe crossing Lecky Road at the Lecky Road and Officer South Road intersection, and a short length of 1200 mm diameter pipe on Lecky Road on the eastern perimeter of the Precinct.

2.1.2 Cardinia Shire Council

Council drainage infrastructure within the Precinct is predominantly above ground drainage channels (swales) and short stormwater pipes connecting the swales. Swales are grass lined or vegetated channels that transfer stormwater[2]. In the Precinct, swales are located in the road reserve of Officer South, Lecky and Stephens Roads, as well as Handford Lane.

Council stated that there are also several private dams in the Precinct.

2.1.3 Flood Overlays

A Land Subject to Inundation Overlay (LSIO) is applicable to areas of the Precinct. These areas are predominantly located around the Precinct perimeter, at the locations of Cardinia Creek and Lower Gum Scrub Creek, and on Officer South Road. The extents of the LSIO are shown in Appendix B.

The LSIO identifies land in flood storage or flood fringe area affected by stormwater flows generated in a rainfall event with a 1% chance of occurring in any year (100-year average recurrence interval). The LSIO relates to flooding along major waterways, or any other area determined by the floodplain management authority. The purpose of the LSIO is to ensure that any proposed development does not generate negative impacts on existing flooding and drainage conditions.

A Floodway Overlay (FO) affects areas within and bounding the Precinct. Again this overlay is associated with the Cardinia Creek and Lower Gum Scrub Creek. The FO identifies waterways, major flood paths drainage depressions and high hazards areas that are prone to active flood flows in excess of 1 m deep. The extents of the FO are shown in Appendix B.

2.2 Key Issues and Opportunities

2.2.1 Melbourne Water Corporation

MWC provided indicative flood extents for the Precinct. This information is shown in Appendix C. These flood extents encroach into the Precinct and are generally associated with Cardinia

2 https://www.melbournewater.com.au/planning-and-building/stormwater-management/options-treating-stormwater/swales

Creek and Lower Gum Scrub Creek that are located at the perimeter of the Precinct. MWC identified the following limitations associated with the flood extents:

- Gum Scrub Creek flood extent is based on the Dandenong Valley and Western Port Authority (DVWPA) modelling and does not accurately represent current best practice modelling or current flow information
- Cardinia Creek flood extent is indicatively shown as the extent does not currently match with designated flood levels.

MWC also advised the following:

- The Officer South Drain is unmapped. In a major event, the majority of flow from this drain is expected to enter Gum Scrub Creek by flooding the properties to the north of Lecky Road.
- There is an unmapped tributary in the western portion of the Precinct that would have an associated flood extent
- It is likely that majority of the Precinct is subject to shallow sheet flooding

MWC provides Development Services Schemes (DSS) for urban growth areas. A DSS outlines the drainage strategy at a catchment scale, and details the relevant drainage infrastructure required such as pipelines, overland flow paths, retarding basins, wet-lands, flood ways and other drainage and water quality treatment measures[3].

There are currently two DSS within the Precinct, the Officer South DSS and Lower Gum Scrub Creek DSS. MWC stated that further background studies (e.g. Environmental, Geomorphic and Land Capability) and designs are underway to further progress both the schemes. These background studies will also reconfirm flood extents, retarding basin locations, waterway widths, the existing condition of the Officer South Drain and outfalls to Cardinia Creek.

MWC advised that there is a previous agreement with Development Victoria to offset a retarding basin required to the north of the Princes Freeway onto land under its control within the Precinct.

MWC identified the following potential constraints that may impact the development of the DSS in the Precinct:

- Sequencing of future development
- The location of the transmission gas pipeline
- Future provision of downstream outfalls

Additionally, MWC highlighted that the requirements of the Cardinia Creek main outfall and Lower Gum Scrub Creek outfall need to be identified, as these may impact the development planning for the Precinct. MWC advised that there is opportunity for integrated water management (IWM) within the Precinct, in line with its *Healthy Waterways Strategy 2018*[4] performance objectives.

2.2.2 Cardinia Shire Council

Council advised the following regarding the Precinct:

- The key flooding issues in the Precinct are the areas affected by the LSIO.

3 https://www.melbournewater.com.au/planning-and-building/developer-guides-and-resources/drainage-schemes-and-contribution-rates/find-0

4 https://www.melbournewater.com.au/about-us/strategies-achievements-and-policies/healthy-waterways-strategy

- Achieving appropriate outfall from the Precinct, for existing flows entering the Precinct from urban development to the north of the Precinct and flows generated within the Precinct, is a significant concern for both Council and MWC due to the topography of the Precinct.
- Outfall requirements for the Precinct and the impact of the Precinct on downstream catchment needs to be considered during the development of the Precinct as it is a significant issue.

Council stated that it is advocating for a closed loop, carbon neutral integrated water network to contribute to a more sustainable and liveable community by planning and delivering innovative water supply, waterways and sewerage services to the Precinct.

Currently there are no planned works to Council drainage infrastructure other than regular maintenance programs. Any planned works such as upgrades or augmentation would be undertaken as part of any future PSP development.

3. Water Infrastructure

South East Water (SEW) is the water retailer responsible for the distribution and reticulation infrastructure within the Precinct. MWC advised it has no trunk water supply assets in the Precinct.

3.1 Existing Infrastructure

Existing potable and recycled water infrastructure is shown in Appendix C.

3.1.1 Potable Water

There is one existing water asset in the Precinct, located along Officer South Road. This asset is a DN50 un-plasticised polyvinyl chloride pipe (UPVC) dead end main. This asset is a private asset servicing the residential properties in the Precinct. This private asset is maintained by SEW under supply by agreement. SEW advised that the private water main supplies the existing residential properties. SEW stated that under the supply agreement, SEW does not guarantee water quality or a certain rate of water flow or pressure. SEW indicated that as additional potable water infrastructure becomes available in the Precinct it is likely that this agreement will be abandoned.

3.1.2 Recycled Water

There are currently no recycled water assets within the Precinct.

Residential estates outside the Precinct, including Kudana Park, Arcadia, Beaconsfield Roses and Berwick Waters are currently serviced by SEW with recycled water. The locations of these residential estates are illustrated in Figure 1 below.

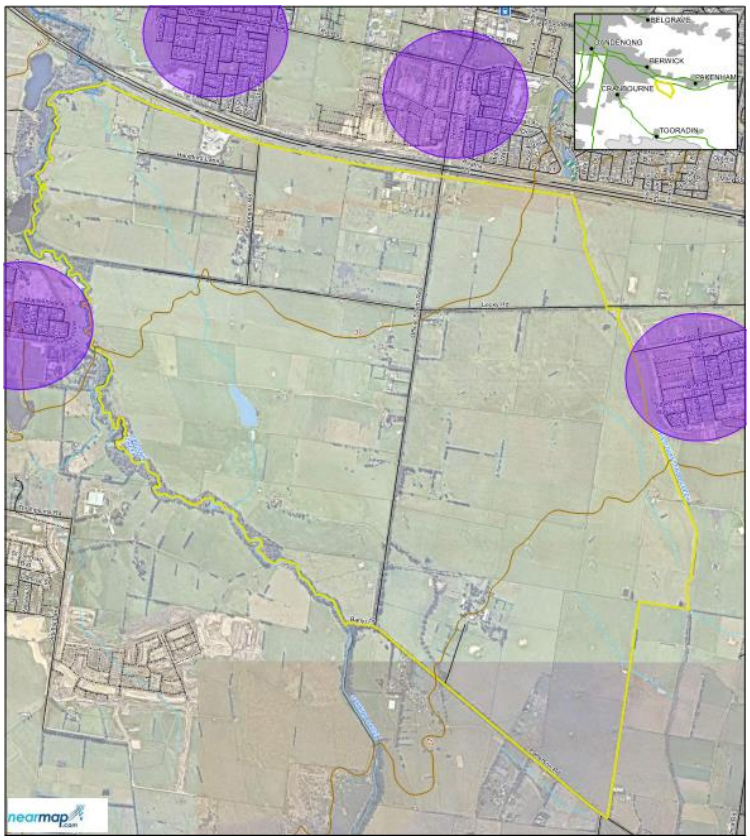


Figure 1 Residential estates serviced by recycled water

3.2 Key Issues and Opportunities

3.2.1 Potable Water

SEW advised that the future development in the Precinct will be serviced by the future Clyde-Officer PR (pressure reducing) 85 m zone. Pressure reducing refers to the hydraulic head of the reservoir being reduced. It is likely the hydraulic head (pressure) of water from the reservoir is greater than 85 m and deemed unsuitable for reticulation infrastructure. It is likely that a pressure reducing valve will be required in the network to reduce the Precinct's water supply pressure to 85 m.

SEW has advised it will deliver future the water infrastructure shown blue in Figure 2 below as part of its capital works program. SEW does not expect any additional land required for the proposed infrastructure.

SEW stated that the planned water infrastructure will be delivered in alignment with PSP development. SEW advised that all distribution assets including pipes greater than DN225 delivered by the developer will be (at least partially) cost reimbursed by SEW in line with its Land Development Policy. Future reticulation assets, DN150 or smaller, required to service the Precinct development will be provided by the developer at the developer's cost.

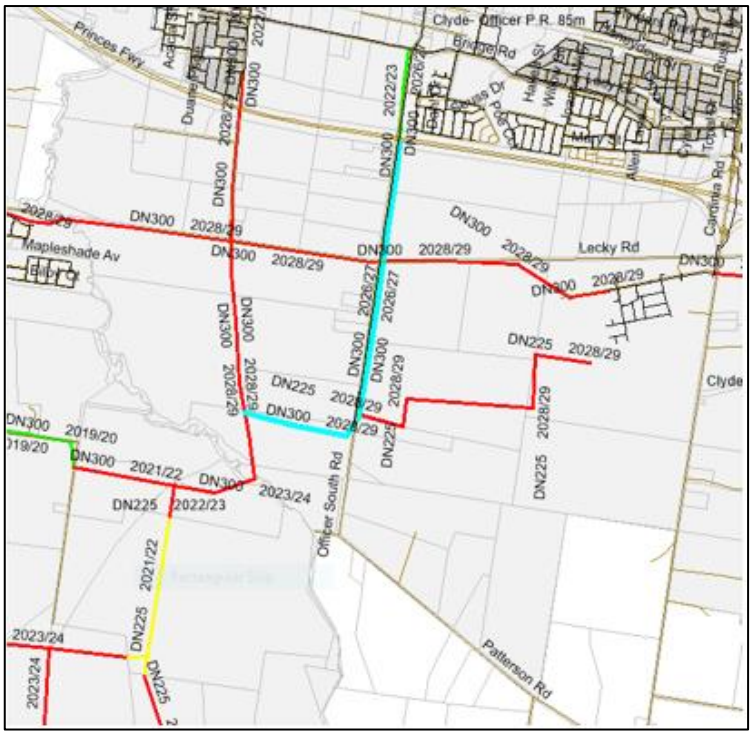


Figure 2 Proposed Distribution Water Infrastructure, South East Water 2020

3.2.2 Recycled Water

SEW does not have any recycled water infrastructure planned for the Precinct as part of its current capital works program. It advised that if recycled water is required in the Precinct, it will be supplied from the future Cranbourne – Clyde – Officer R.W (recycled water) 80 m zone, as indicated by the pink shading in Figure 3 below. SEW advised that this area is supplied from the Pakenham Treatment Plant, which will become a regional plant.

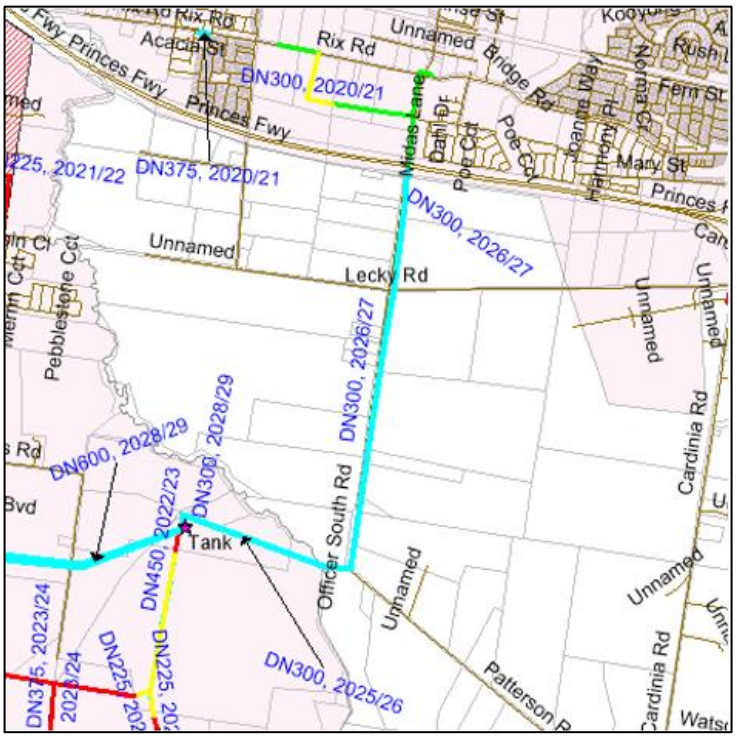


Figure 3 Proposed Recycled Water Infrastructure and R.W Zone, South East Water 2020

3.2.3 Integrated Water Management

IWM provides a sustainable and innovative approach to water servicing, taking into consideration the entire water cycle to deliver water to developments.

SEW advised that, in addition to the possibility of recycled water infrastructure, there are stormwater and rainwater harvesting opportunities within the Precinct and any USP works relating to potential stormwater and rainwater harvesting would be triggered by government funding opportunities. Individual developers will also have the opportunity to provide their own IWM strategies.

Council encourages the implementation of recycled water infrastructure within the Precinct, whether or not this is supplied by SEW.

4. Sewer Infrastructure

SEW is the authority responsible for the distribution and reticulation sewerage network in the Precinct. MWC confirmed it has no trunk sewer assets in the Precinct.

4.1 Existing Infrastructure

Existing sewer infrastructure is shown in Appendix C.

Existing sewer assets are located predominantly along the northern boundary of the Precinct. The network comprises of both gravity pipelines and pressured rising main pipelines parallel to the Princes Freeway. The gravity sewer pipeline is a 1280 mm diameter glass reinforced plastic (GRP) pipe and crosses Officer South Road. The rising main pipeline is a 600 mm GRP diameter pipe. The 600 mm diameter rising main connects to an 800 mm diameter rising main GRP pipe in the north-western corner of the Precinct.

The Officer South Road sewer pump station is located in the north of the Precinct, to the west of Officer South Road.

4.2 Key Issues and Opportunities

SEW stated that there is a 200 m buffer area around the Officer South Road sewer pump station. This buffer prohibits the following land uses:

- Residential development
- Restaurants and take away shops
- Food based retail
- Community facilities such as libraries
- Education facilities including child care centres, schools and universities
- Any other uses that may be sensitive to odour

SEW indicated that the Precinct would likely require an additional pump station, located along Patterson Road, south of the Precinct. SEW advised that this proposed sewer pump station would also have an associated 200 m buffer area. There is opportunity to liaise with SEW to explore strategies to reduce the buffer area of the existing and proposed pump stations.

5. Electrical Infrastructure

The entirety of the Victorian electricity transmission network is owned and operated by AusNet Services (AusNet).The distribution network in the Precinct is operated by AusNet Electricity, one of five electricity distributors in Victoria.

5.1 Existing Infrastructure

Existing transmission and distribution electrical infrastructure is shown in Appendix C.

5.1.1 Transmission Network

Three AusNet overhead transmission lines (two overhead 500 kV lines and an overhead 66 kV sub-transmission line) run east-west in the southern portion of the Precinct. These assets are located within a 146.30 m wide easement.

5.1.2 Distribution Network

AusNet is responsible for the high voltage (HV) overhead lines within the Precinct located on Handford Lane, Stephens Road and Officer South Road. There are HV overhead lines extending into private property from Handford Lane and Officer South. There is a small section of HV underground electrical infrastructure located at the northern boundary of the Precinct on Officer South Road and within private property further south of Officer South Road.

There are overhead single wire earth return (SWER) lines adjacent to the southern boundary along Patterson Road that enter into the Precinct These SWER lines service the surrounding properties.

5.2 Key Issues and Opportunities

5.2.1 Transmission Network

5.2.1.1 Easements

The purpose of the transmission line easement is to ensure there is adequate land for both existing and future lines, access for maintenance and repair purposes and safety control measures.[5] AusNet stated that there is provision for a future 220 kilovolt (kV) line within the existing easement, should it be required. AusNet advised that the existing transmission easement must be retained.

AusNet has the authority to restrict activities that can be carried out within the easements, AusNet approval is required for development or construction within the transmission easement.

AusNet provided general advice regarding permitted uses of transmission line easements and some non-exclusive examples are provided below:

- Sewerage, drainage and water pipes constructed from non-conductive materials
- Trees, vegetation, landscaping and paving
- Ground level sporting activities
- Parking of sedan and utility types of vehicles

AusNet advised that proposed roads are not permitted parallel and within the easement, however proposed roads are permitted to run parallel and outside of the easement.

5 https://www.ausnetservices.com.au/-/media/Files/AusNet/Residential-Electricity/Safety/A-guide-to-living-with-transmission-line-easements.ashx?la=en

Perpendicular road crossings are permitted outside a 30 metre arc of transmission tower centres.

5.2.1.2 Servicing

AusNet stated that the current loading connected of the Precinct is approximately 2,150 kilovolt amperes (kVA). AusNet advised that there is currently limited capacity in the surrounding 22 kV feeders (ORF21 and ORF22). It is expected that these feeders will exceed their capacity in the short to medium term.

AusNet advised that the AusNet System Planning Team will need to be engaged to review the proposed load requirements for the Precinct to determine the appropriate servicing strategy for the Precinct.

AusNet indicated two possible scenarios to service the Precinct:

- New 22kV feeders to be installed from the existing Officer Zone Substation (OFR) and/or Clyde Zone Substation (CLN), depending on final available capacity and load requirements of the Precinct. In this scenario, a second 22 kV switchboard in the OFR zone substation would be necessary. The works associated with a second 22 kV switchboard requires a lead time of 3 years.
- A new zone substation would be required if the load requirements of the Precinct exceed the capacity available in the existing network. The new zone substation would require approximately 10,000 m^2 of additional land take. In this scenario an overhead 66 kV double circuit line along Officer South Road is required.

AusNet advised that the existing overhead line in Officer South Road cannot be undergrounded. AusNet stated that in the scenario where a new zone substation would be required, the associated double circuit 66 kV lines would likely be installed above ground as it is cost prohibitive to install these assets underground.

AusNet stated that any planned works to its network will be funded by AusNet. Any works associated with additional private load requirements may require financial contributions from the customer. AusNet advised that the cost of the new zone substation and associated works would be approximately $25 million.

5.2.2 Distribution Network

AusNet advised the following regarding its distribution network:

- As the Precinct develops and an alternative electrical supply is available, it is likely that the existing SWER lines can be decommissioned.
- Provisions for easements or reserves are required for any future substations and underground cables, should there be a preference for underground assets.
- Additional land will be required for local kiosk substations.
- Throughout the development of the Precinct, ensuring that its existing customers are supplied with electricity is a priority and therefore planning is necessary to ensure planned shut downs are kept to a minimum.

AusNet requires that any development will need to adhere to clearances from AusNet's electricity assets as per *Electricity Safety (Installations) Regulations 2009.*[6]

6 Available at http://www6.austlii.edu.au/cgi-bin/viewdb/au/legis/vic/consol_reg/esr2009470/

6. Gas Infrastructure

APA Group owns the gas transmission network and APT O&M services (APA) operates and manages the natural gas reticulation network within the Precinct on behalf of Australian Gas Networks (AGN).

6.1 Existing Infrastructure

Existing transmission and distribution gas infrastructure is shown in Appendix C.

6.1.1 Transmission Network

APA Group is responsible for the T1 Morwell-Dandenong high pressure gas pipeline, a 450 mm diameter transmission pipeline that runs west-east through the Precinct. This asset is contained within a 20.1 m wide easement. There is approximately 1.2 m of cover from the top of the pipe to the existing surface level.

6.1.2 Distribution Network

APA controls distribution assets within the Precinct. This includes a 180 mm diameter high pressure gas pipeline in the Lecky Road road reserve to the east, and a 150 mm diameter high pressure gas pipeline located in an easement in private property, adjacent to the Officer South Road road reserve in the north of the Precinct at an offset of 2.1 m.

6.2 Key Issues and Opportunities

6.2.1 Transmission Network

APA Group stated that the easement associated with the transmission pipeline allows for access to the existing pipeline and any future duplication if required. APA Group does not permit road reserves or any utility infrastructure to be located within the easement, other than perpendicular utility service crossings approved by APA Group.

Council advised the following regarding the easement associated with APA's transmission pipeline:

- Linear parks and shared user paths may be permitted along easement
- APA Group may consider the easement to be located within the front of private lots where there is car parking and landscaping. In this scenario, APA retains the legal access to the pipeline.
- APA Group is developing a policy to identify the permitted types of landscaping within the easement.

The Australian Standard 2885 (Pipelines – Gas and Liquid Petroleum) (AS2885) governs the operation of high pressure gas transmission pipelines. The measurement length (ML) of the T1 Morwell-Dandenong high pressure gas pipeline is 275 m either side of the pipeline. APA Group identified the following sensitive land uses should be located outside of the ML, and requires risk management consideration if located within 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 and medical centres
- Places of assembly or worship
- Retail premises (large scale – high density)
- Service stations
- Higher density residential uses (greater than 50 dwellings per hectare)
- Industrial development which store or create large volumes of volatile materials (e.g. explosive factory or refinery).

APA Group advised that in accordance with AS2885, a Safety Management Study (SMS) is required when the land use classification changes within the ML. APA Group stated that proposed development would likely require a change in land classification and therefore an SMS should be undertaken prior to the development commencing. VPA stated that an SMS will be conducted as part of the development of the Precinct Structure Plan (PSP) process.

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 identify appropriate controls to reduce risks to 'as low as reasonably practicable' (ALARP). The SMS will also consider what controls are necessary, such as the requirement for a construction management plan in a designated area around the pipeline.

The SMS may also find, based upon the pipeline design and credible threats in the area that a number of the sensitive land uses listed above may be able to be safely located in inside the ML. VPA advised that in the Pakenham East PSP, the SMS identified that the high design quality of the gas pipeline and the likelihood of a rupture in the pipeline was deemed to be non-credible. Subsequently in this instance, the trigger area was reasonably applied to the areas of highest possible consequence or risk, rather than the full ML.

6.2.2 Distribution Network

Gas is not an essential service and therefore individual developers have the option whether or not to service their development with gas. Given the limited amount of gas distribution infrastructure within the Precinct, it is highly likely that any development requiring a gas servicing would require additional distribution infrastructure.

APA advised the following regarding its distribution network and future servicing:

- The existing 150 mm diameter pipeline currently located in an easement in private property needs to be preserved.
- The existing distribution assets will require a 2.0 m clearance from title boundaries and a 3.0 m clearance from building facades, inclusive of verandas and canopies.
- There are currently no planned works in the Precinct
- Any additional distribution infrastructure would be provided in response to a customer connection request. If a customer connection requests triggers augmentation to the distribution network, it is likely that the customer would be required to make a financial contribution.
- Developers can choose to provide a natural gas reticulation network, the costs associated with this infrastructure would be fully attributable to the developer.

- APA requires an indication of the proposed demand of each building and the location of expected proposed supply point (metering) to evaluate capacity and asset alignment.
- For residential development, APA only requires the number of proposed lots to evaluate network capacity and asset alignment.

7. Telecommunication Infrastructure

The Precinct is serviced by three telecommunication service providers: Telstra, NBN and Optus. As developers are entitled to choose their own telecommunications provider, the Infrastructure of Last Resort (IPOLR) is the telecommunications provider that must provide the developer with a commercial offer for telecommunication services.

NBN is the IPLOR in new development consisting of 100 lots or more. Telstra is the IPOLR for developments less than 100 lots until the NBN access network rollout commences in the area[7].

7.1 Existing Infrastructure

Existing telecommunication infrastructure is shown in Appendix C.

7.1.1 Telstra

Telstra assets throughout the Precinct currently comprise of pit and pipe infrastructure in Handford Lane, Officer South and Stephens Road road reserves. A major fibre optic asset is located in the Precinct in Lecky Road, from Officer South Road to Soldiers Road. This major fibre optic runs from Cranbourne, Berwick South and Pakenham and is vital to the Telstra network.

Telstra stated that the existing infrastructure is operational and meets the current demand.

7.1.2 NBN

There is NBN pit and pipe infrastructure in Officer South Road and Lecky Road. The NBN roll out map[8] indicates that the Precinct is currently serviced via a fixed wireless connection from transmission towers[9]. NBN advised that infrastructure within the Precinct is transit cable infrastructure and not used for connection.

7.1.3 Optus

Optus considers its assets in the Precinct as critical fibre assets. Optus cables are present on Officer South Road, the west of Lecky Road and along Stephens Road. Optus stated that its cables are co-located with Telstra assets along Lecky Road and the north of Officer South Road.

7.2 Key Issues and Opportunities

7.2.1 Telstra

Telstra advised that the major fibre asset along Lecky Road requires consideration in the Precinct planning and may require protection. Telstra's Network Integrity team indicated that any works occurring within 3.0 m of the asset would trigger an Impact Study to identify the necessary protection measures and clearances.

Telstra stated that there are currently no planned works in the Precinct. Any planned works would be triggered by commercial agreements with developers and requests for service by individual businesses.

Telstra stated that it can provide telecommunication services to the Precinct as development occurs via fibre optic and wireless networks. Telstra requires provision for a Telstra conduit in a

7 https://www.nbnco.com.au/corporate-information/about-nbn-co/policies/telecommunications-policies

8 https://www.nbnco.com.au/learn/rollout-map

9 https://www.nbnco.com.au/learn/network-technology/fixed-wireless-explained

main road easement to service the Precinct. Telstra advised that it may require one or more parcels of land for future mobile phone towers. Once the Precinct's demand for telecommunications servicing is understood, Telstra can provide further information about the type and number of future mobile phone towers required.

7.2.2 NBN

There is a lack of fixed line infrastructure throughout the Precinct. NBN fixed line infrastructure comprises of backhaul and new build construction. Backhaul infrastructure is the infrastructure required to connect new developments to the broader telecommunications network. This infrastructure involves a connection from the new development to an access point that has capacity to service the new development.[10] Due to the underdeveloped nature of the Precinct it is likely that both backhaul and new build infrastructure would be required for the Precinct.

NBN advised that there is no NBN pit and pipe infrastructure in the area available for connection. NBN requires information regarding the Precinct's telecommunication demand to provide advice regarding the infrastructure requirement and costs necessary to service the Precinct.

7.2.3 Optus

Optus advised it requires clear access to its assets at all times and advises that any future assets be located within road reserve or open space. Optus does not have any planned upgrades to its infrastructure in the Precinct and planned upgrades would be triggered by a customer request. Optus advised that any upgrades would likely be to its existing conduits, as these have capacity for additional cables.

10 https://www.nbnco.com.au/content/dam/nbnco2/documents/backhaul-contributions-fact-sheet.pdf

8. Ecologically Sustainable Development

A key goal of the VPA in planning for the development of the Precinct is to facilitate a low carbon emissions development. GHD undertook a high level desktop study to understand how local and state policy could facilitate low carbon emissions development, as well as to obtain examples of employment precincts already utilising innovative electricity servicing models.

8.1 Low Carbon Emissions Development Policies

8.1.1 Renewable Energy Target

The Victorian government set a Renewable Energy Target of 25% renewal energy by 2020 and 40% by 2025[11]. These targets will increase renewable energy investment in Victoria, creating thousands of new jobs and moving the state towards a future of sustainable energy. The Victorian government is considering both policy level and financial support to meet its renewable energy target.

8.1.2 Net Zero by 2050 Emissions Reduction Target

In response to the Independent Review of the Climate Change Act 2010, the Victorian government has set a net zero greenhouse gas emissions by 2050. As part of this target the Victorian government sets interim targets every five years until 2050 to ensure the target is met[12].

8.1.3 National Energy Productivity Plan

Endorsed by the Council of Australian Governments (COAG) Energy Council, the National Energy Productivity Plan (NEPP) is aimed at improving Australia's energy productivity by 40% by 2030[13].

Energy productivity is a measure of the value received from an investment in energy and energy infrastructure. By implementing energy efficiency activities, in the commercial and residential sectors, there is opportunity to reduce energy consumption by 104 petajoules (PJ) and 84 PJ respectively[14].

8.1.4 Plan Melbourne 2017 - 2050

Plan Melbourne 2017-2050 supports Ecologically Sustainable Design (ESD) that considers geography, planning and design in ways that facilitates connections between people, places and resources[15]. It also supports the inclusion of energy efficiency and renewable energy to assist in the delivery of cost-effective environmental outcomes.

8.1.5 State Planning Policy Framework (SPPF)

The State Planning Policy Framework (SPPF) currently includes high-level strategic objectives and statements, which encourage developments to incorporate ESD and consider the environment in land use and development.

Clause 11.07 of the SPPF seeks to develop environmentally sustainable regions and settlements in regional Victoria. This clause identifies key principles to guide settlement

11 https://www.energy.vic.gov.au/renewable-energy/victorias-renewable-energy-targets

12 https://www.climatechange.vic.gov.au/media-releases/victorias-net-zero-by-2050-emissions-reduction-target

13 https://www.energy.gov.au/government-priorities/energy-productivity-and-energy-efficiency/national-energy-productivity-plan

14http://www.coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/National%20Energy%20Productivity%20Plan%20release%20version%20FINAL_0.pdf

15 https://planmelbourne.vic.gov.au/__data/assets/pdf_file/0005/377123/Plan_Melbourne_2017_Implementation_plan.pdf

planning in Victoria's regions (including peri-urban areas), and provides strategies to respond to the impacts of climate change include:

- Siting and designing subdivisions to minimise the impact on the natural environment
- Encouraging reduced energy and water consumption through environmentally sustainable subdivision and building design.

8.1.6 Cardinia Council Aspirational Energy Transition Plan 2014 – 2024

Council's Aspirational Energy Transition Plan[16] includes the following emission reduction targets

- Zero net emissions for Council operations by 2024
- 36% reduction in emissions per resident by 2024

This plan also proposes several community actions and initiatives to support the emission reduction targets.

8.2 Ecologically Sustainable Development for Employment Precincts

ESD describes the type of development that does not negatively impact natural ecologically processes. ESD practices in employment precincts ensure that the user's needs are met while simultaneously ensuring that the availability of resources required for future generations and development is not compromised.

8.2.1 Distributed and Renewable Energy Generation

Distributed energy generation refers to a variety of different grid-connected energy technologies that generate electricity at, or close to, the location of use. Whilst a number of different technologies can be utilised, the most accessible technologies for the residential or commercial sectors are solar photovoltaic panels and small wind-turbines. The use of solar photovoltaic panels in an employment precinct is beneficial, particularly when there is provision provided to allow for the installation of solar photovoltaic panels.

Distributed and renewable energy grids provide numerous benefits to residents and businesses within an employment precinct, including energy security and the potential for energy export and income generation. When combined with energy storage technologies, a distributed network can reduce the load on centralised utilities and provide reduced and predictable energy pricing.

8.2.2 Energy Efficient Buildings

The benefits to increased energy efficiency in buildings include moderated temperatures, lower energy bills and increased air quality. It also provides benefit to residents and business owners in the form of increased resale value.[17]

In relation to building efficiency, the COAG Energy Council direction for new buildings is towards net zero energy and carbon ready buildings[18].

All new homes and buildings in Victoria must comply with the Building Code of Australia. The National Australian Built Environment Rating System (NABERS) and National House Energy Rating Scheme (NatHERS) can be used to measure a building's energy efficiency and carbon emissions.

16 https://www.cardinia.vic.gov.au/downloads/download/286/aspirational_energy_transition_plan_2014%E2%80%9324_-_cardinia_shire_council

17 https://www.sustainability.vic.gov.au/betterbuildings

18 http://coagenergycouncil.gov.au/sites/prod.energycouncil/files/publications/documents/Trajectory%20for%20Low%20Energy%20Buildings.pdf

Many new urban developments implement a target building energy efficiency rating, and some precincts may mandate minimum energy efficiency building ratings.

8.2.3 Waste Management, Smart Separation and Disposal

Waste collection in Australia is highly dependent on regional and local requirements, often involving the collection of waste using garbage trucks.

An emerging technology in waste industry is the use of an underground pneumatic waste conveyance system. The system transports waste from residential and commercial buildings through a system of underground pipes that appear above ground at collection points. The system is suitable to high-density urban environments and represents a significant reduction in resources in terms of labour, hours and fuel when compared to the traditional waste collection practices[19].

The system is being used or trialed around the world, including locations such as the Pearl-Qatar (Doha), Wembley (UK), Singapore and in the Maroochydore City Centre (Queensland)[20].

Effective waste management systems also support ESD and some of these practices can include:

- On-site management of food, garden and organic waste. At a commercial scale this can involve composting or organics processing technologies[21]
- Allowing for the provision of additional glass recycling in residential and commercial sites
- Co-locating recycling and general waste bins to encourage recycling
- Considering the use of smart bins to reduce the frequency in which the bins are emptied.

8.2.4 Encouraging Electric Vehicle Use

By 2040, it is predicted that 70% of all new vehicle sales will be represented by Electric Vehicles (EVs)[22]. One of the major barriers for EV uptake is the availability of public charging station infrastructure. In sustainable precinct developments, EV charging stations should be provided in anticipation of increased demand. Many cities around the world already have extensive public charging infrastructure. The world leaders in this field are Norway and the Netherlands, each with over 1,500 public charging points per million population.[23] Whilst there are currently fewer than 800 charging stations located throughout Australia, the development of a more extensive infrastructure network has been identified as a high priority initiative by Infrastructure Australia.

8.2.5 Integrated Water Management and WSUD

IWM encourages a sustainable and holistic approach to water servicing by considering the entire water life cycle.

To reduce the demand for potable water, a number of strategies and technology can be used including:

- The installation and use of rainwater tanks
- Water harvesting from rainwater and storm water collection for use in laundries and toilets and using recycled waste water for gardens
- Water reuse systems

19 https://www.hdb.gov.sg/cs/infoweb/about-us/our-role/smart-and-sustainable-living/hdb-greenprint/waste-management

20 https://www.sunshinecoast.qld.gov.au/Council/Planning-and-Projects/Infrastructure-Projects/Automated-Waste-Collection-System

21 https://www.sustainability.vic.gov.au/Government/Waste-and-resource-recovery/Waste-management-in-multi-unit-developments

22 Infrastructure Australia, (2019), Infrastructure Priority List: Project and Initiative Summaries

23 https://www.smartcitiesworld.net/news/news/netherlands-and-norway-lead-the-way-in-electric-car-adoption-3959

- Closed loop systems

Water Sensitive Urban Design (WSUD) aims to provide drainage systems that provide water quality treatment and flood management. WSUD is an approach to planning and design which integrates the management of total water cycle into urban development. Elements of WSUD include:

- Storage treatment and beneficial use of storm water runoff
- Treatment and reuse of wastewater
- Use of vegetation for treatment purposes, water efficient landscaping and enhanced bio diversity
- Water saving measures associated with residential, commercial and industrial land uses
- Implementation of ‘green’ public realm elements (streetscape, waterways, buildings etc.)

8.2.6 Gas Free Energy Servicing

Gas is not considered an essential service and developers can elect whether or not they wish to service the development with gas. The transition from natural gas servicing to electrical servicing has environmental benefits as electricity generation moves towards renewable energy sources.

9. Summary

This assessment identified the key issues and opportunities related to existing utility infrastructure that may impact on the preparation of the Officer South Employment Precinct (OSEP) masterplan, as established through consultation with USPs.

9.1 Key Issues and Opportunities

The following Table 3 outlines the key issues and opportunities related to utility infrastructure in the Precinct.

Table 3 Key Issues and Opportunities

Utility	Key Issues	Key Opportunities
Stormwater Drainage	• Achieving appropriate outfall from the Precinct for existing flows and flows generated from adjacent developments due to the topography of the Precinct • Flows generated from a major flood event from the Officer South Drain will likely flood properties north of Lecky Road • Flood extents associated with Cardinia and Lower Gum Scrub Creek will impact the adjacent land. • Current flood extents are based on past modelling and is not representative of current best practice modelling or current flow information. There is also an unmapped tributary that would likely have additional associated flood extents. • Majority of the Precinct is likely subject to shallow sheet flooding • The Development Victoria retarding basin north of the Precinct and its implications will need to be considered throughout	• Consult with MWC, SEW and Council to facilitate a closed loop, carbon neutral integrated water network within the Precinct. • Consult with MWC to workshop flood mitigation strategies for the Officer South Drain, and the Cardinia and Lower Gum Scrub Creeks • Undertake updated flood modelling to accurately understand the current flood extents and impacts on development planning. • Two Development Service Schemes are underway for the Precinct, further MWC background studies are underway to progress these schemes.

	development of the Precinct • The location of the transmission gas pipeline and its constraints relating to stormwater drainage infrastructure crossings. • The staging and sequencing of the OSEP. • LSIO and FO overlays on the Precinct impose limitations on land use.	
Potable and Recycled Water	• There are limited potable water reticulation assets within the Precinct • Recycled water is important for the Precinct • SEW indicated that there is no provision in its capital works program to supply recycled water supply to the Precinct.	• Recycled water can be supplied from Cranbourne-Clyde-Officer RW 80 m zone if required, the Pakenham Treatment Plan is being upgraded to a regional facility. • Liaise with SEW to confirm that recycled water will be required to service the Precinct, • There are stormwater and rainwater harvesting opportunities for the Precinct and these opportunities would be triggered by government funding schemes. • Local recycled water infrastructure can be implemented in the Precinct regardless of whether it is provided by SEW
Sewer	• There is a 200 m buffer[24] around existing and proposed sewer pump stations. This buffer restricts specific types of land use that may be sensitive to odour.	• Consultation with SEW to explore strategies to reduce the existing and proposed 200 m buffer area.

	• There are limited sewer reticulation assets throughout the Precinct. • SEW advised that there a future sewer pump station will be required to service the Precinct and will be located within the Precinct along Patterson Road.	
Electrical	• Three transmission lines run east-west in the southern portion of the Precinct and the associated 146.30 m wide easement restricts development and construction. • There is limited capacity to support the Precinct via the surrounding 22 kV distribution feeders. • The servicing strategy for the Precinct is dependent on the available capacity of the existing network and proposed load requirements of the Precinct. • Depending on the demand load from the Precinct, it will either require new distribution feeders from the existing OFR and/or CLN zone substations, or the provision of a new zone substation. • New distribution feeders will require a second 22 kV switchboard in the OFR zone substation that requires a 3 year lead time. • A new zone substation will require approximately 10 000 m2 land take and a capital expenditure of	• AusNet advised that it is unlikely that planned works will take into account new generation technology. • Consult with AusNet to understand the demand load required to trigger a future zone substation • Consult with AusNet to determine whether environmentally sustainable electrical servicing strategies could be utilised to reduce future electrical demand • Consult with AusNet to identify any opportunities to co-locate IWM elements (WSUD and stormwater harvesting) under transmission lines. • Explore opportunities to utilise the transmission easement for public open space infrastructure and landscaping.

	approximately $25 million. This scenario involves new 66 kV double circuit lines along Officer South Road that are generally installed above ground.	
Gas	• There is a 450 mm diameter high pressure transmission gas pipeline has an associated 20.1 m wide easement. This asset imposes constraints such as utility and road crossings and land uses surrounding the area. • A Measurement Length of 275 m either side of the gas pipeline restricts development by prohibiting sensitive land uses. • An SMS is required prior to development commencing and developers are responsible for the cost of an SMS. • Future utility or road crossings of the transmission pipeline (specifically drainage) can be costly and will require detailed investigations and coordination with APA. • There are limited gas distribution assets within the Precinct.	• Gas is not an essential service. Although Councils cannot enforce a prohibition on gas servicing, Councils can discourage applications from using gas and encourage the switch to electrical servicing. • The findings of the SMS may indicate that the development area affected by the transmission pipeline is less than the existing Measurement Length. • APA Group is developing a landscaping policy to identify permitted landscaping treatments within the transmission pipeline easement.
Telecommunications	• There is limited fixed line telecommunications infrastructure throughout Precinct. • Consultation with Telstra's Network Integrity team is necessary to understand the possible protection measures required for the major	• Undertake Impact Assessment in collaboration with Telstra to identify constraints associated with Telstra major fibre and whether protection measures will be required • Consult with telecommunications USPs to determine the optimal

	fibre asset along Lecky Road. • Telstra may require one or more land parcels for mobile phone towers. • Optus requires clear access to its critical fibre asset at all times. • NBN has no fixed pit and pipe infrastructure within the Precinct	future servicing strategy for the Precinct

10. Next steps and Recommendations

GHD will commence the Utility Servicing Assessment for the OSEP, following the completion of VPA's Future Urban Structure and indicative employment typologies and dwelling yields.

10.1 Utility Servicing Assessment Next Steps

GHD will consult with USPs regarding the following:

- Potential relocations, protection, undergrounding, connections, decommissioning of upgrades required to support redevelopment
- Potential indicative servicing arrangements for the future development of the OSEP including proposed land or easement needs.
- Potential high level funding implications including indicative utility servicing cost implications to inform the VPA's Infrastructure Contribution Plans (ICPs).
- Approximate USP lead in times for applications and approvals for infrastructure works
- Key infrastructure issues and opportunities for future development in the Precinct including implications for staged development
- Opportunities to integrate innovative and/or sustainable approaches to utility servicing, particularly in regards to innovative electricity servicing alternatives

Based on information provided by USPs GHD will also develop Future Infrastructure Plans and Future Typical Cross Sections.

10.2 Recommendations

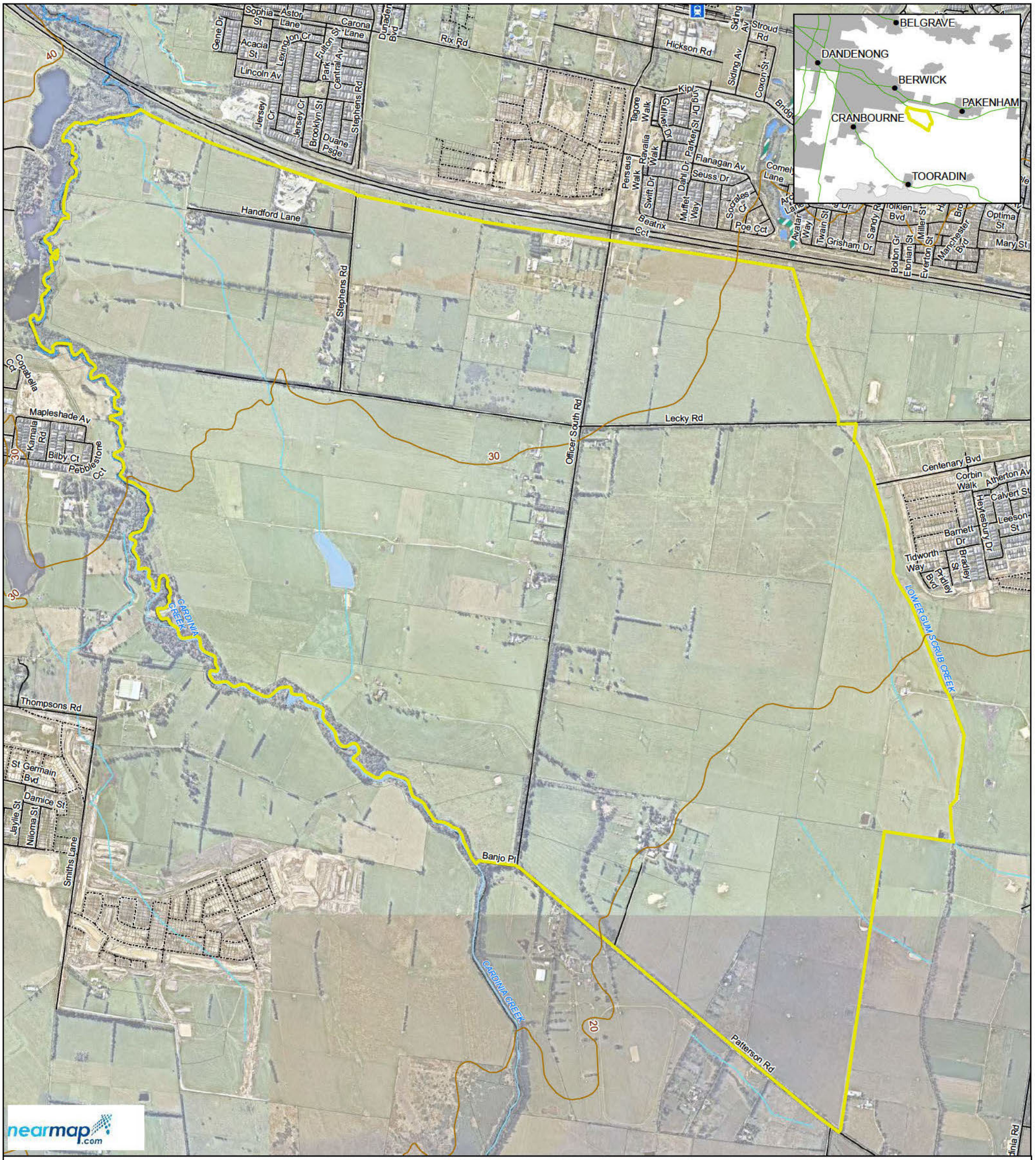
The following actions are recommended for the next stage of planning in the OSEP:

- VPA to undertake consultation with MWC to understand the following:
  - Current scope and timing of ongoing MWC investigations regarding existing flood extents and conditions within the Precinct
  - MWC flood mitigation strategies for the Precinct including the Officer South Drain, and the Cardinia and Lower Gum Scrub Creeks
  - The implications to development planning of the Precinct from Lower Gum Scrub Creek DSS and Officer South DSS.
- VPA to undertake consultation with MWC, SEW and Council to understand the requirements, opportunities and constraints for an integrated water management network including the following:
  - Closed loop, carbon neutral IWM network
  - Stormwater and rainwater harvesting and reuse
  - Water reuse systems
  - WSUD and implementation of 'green' public realm elements (streetscape, waterways, buildings etc.)
  - Waste to energy opportunities
- VPA to undertake consultation with SEW to understand the following:
  - Opportunities to reduce impact of existing and future pump stations, in particular minimising the impact of odour from the sewer pump stations and reducing the associated buffer areas

  - Understand the additional investigation works and revised sewer servicing strategy for the OSEP
  - Opportunities to service the OSEP with recycled water
- VPA to undertake consultation with AusNet team to understand the following:
  - AusNet demand load estimates for AusNet proposed infrastructure options including future distribution feeder upgrades and future zone substation
  - Appropriate locations for future zone substation and ancillary electrical infrastructure
  - Alternative electrical servicing opportunities including new generation technology
  - Opportunities to utilise the transmission easement for public open space infrastructure and landscaping.
- VPA to undertake Safety Management Study in consultation with APA to understand the following:
  - Risks associated with a change in land use, inclusive of both construction and ongoing land use risks
  - Constraints imposed on development surrounding the existing transmission gas pipeline including the extent of impact on sensitive land uses
  - APA Group's Landscaping Policy identifying permitted types of landscaping within the transmission pipeline easement
- VPA to undertake Impact Study in collaboration with Telstra to understand the following:
  - Location of existing major fibre within existing road reserves
  - Constraints of existing major fibre on proposed development including the location and cross sections of roads within the Precinct
  - The requirement for, and type of, protection measures for the major fibre
- VPA to prepare a Future Urban Structure to determine optimised location of dwellings, lot sizes and alignment of new roads.
- VPA to prepare indicative employment typologies and dwelling based on the Future Urban Structure
- VPA to ensure the OSEP planning works are consistent with current State ESD policies and best practice.
- VPA to consider Council's Ecologically Sustainable Development (ESD) policies in its OSEP planning works
- VPA to explore and confirm Ecologically Sustainable Development objectives to be implemented in the OSEP

Appendices

Appendix A Locality Plan



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LEGEND

- Rail station
- Contour 10 m
- Roads
- Proposed Roads
- River
- Stream
- Railway
- Project Study Area
- Watercourse
- Lake
- Swamp
- Parcel

0 75 150 300 450 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

Victorian Planning Authority

Victorian Planning Authority
Officer South Employment Precinct

Locality Plan and Contour Map

Job Number 12526394
Revision B
Date 19/10/2020

Figure 1

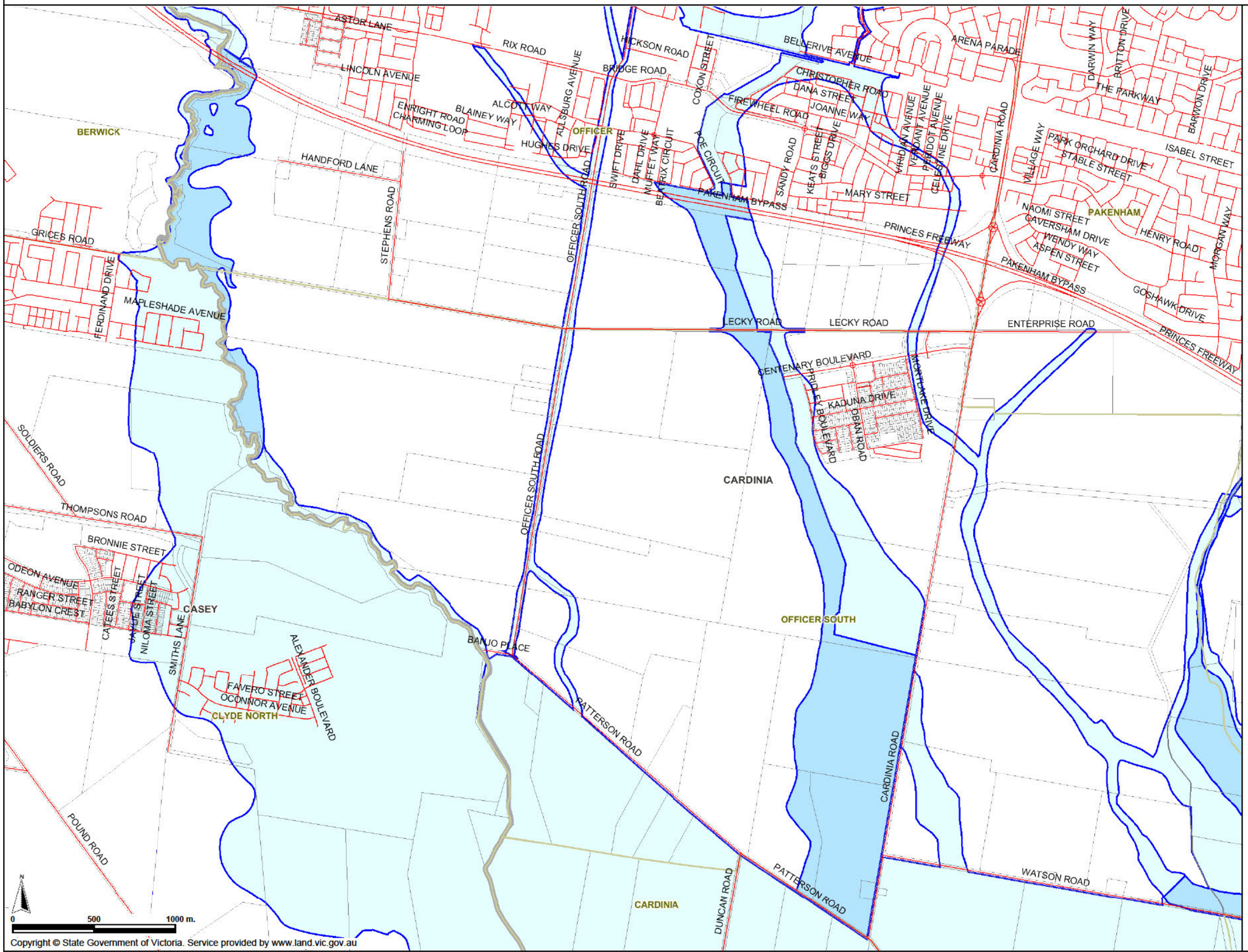
G:\31\12526394\GIS\Maps\Deliverables\12526394_KBM_A3P.mxd

Data source: DEWLP, VicMap, 2020; GHD, 2020; Nearmap Imagery 28/04/2020 Created by: cjauniau

Appendix B Flood Overlays

Planning Map
Flood Overlays

Department of
Environment, Land
Water and Planning



Legend

- WARRNAMBOOL — Major Town
- Major Road, Road
- BOURKE STREET — Road name
- Railway, Tramway
- Property/Parcel, Selected
- 25 2 1C — Address, Lot, Crown allotment
- River, Stream, Coastline
- Waterbody
- Locality
- SEDDON — Locality Name
- Local Government Area
- BRIMBANK — Local Government Name
- Urban Growth Boundary (UGB)
- Area outside the UGB
- Investigation Area
- Land added to UGB since 2005
- Boundary of Searched Suburb

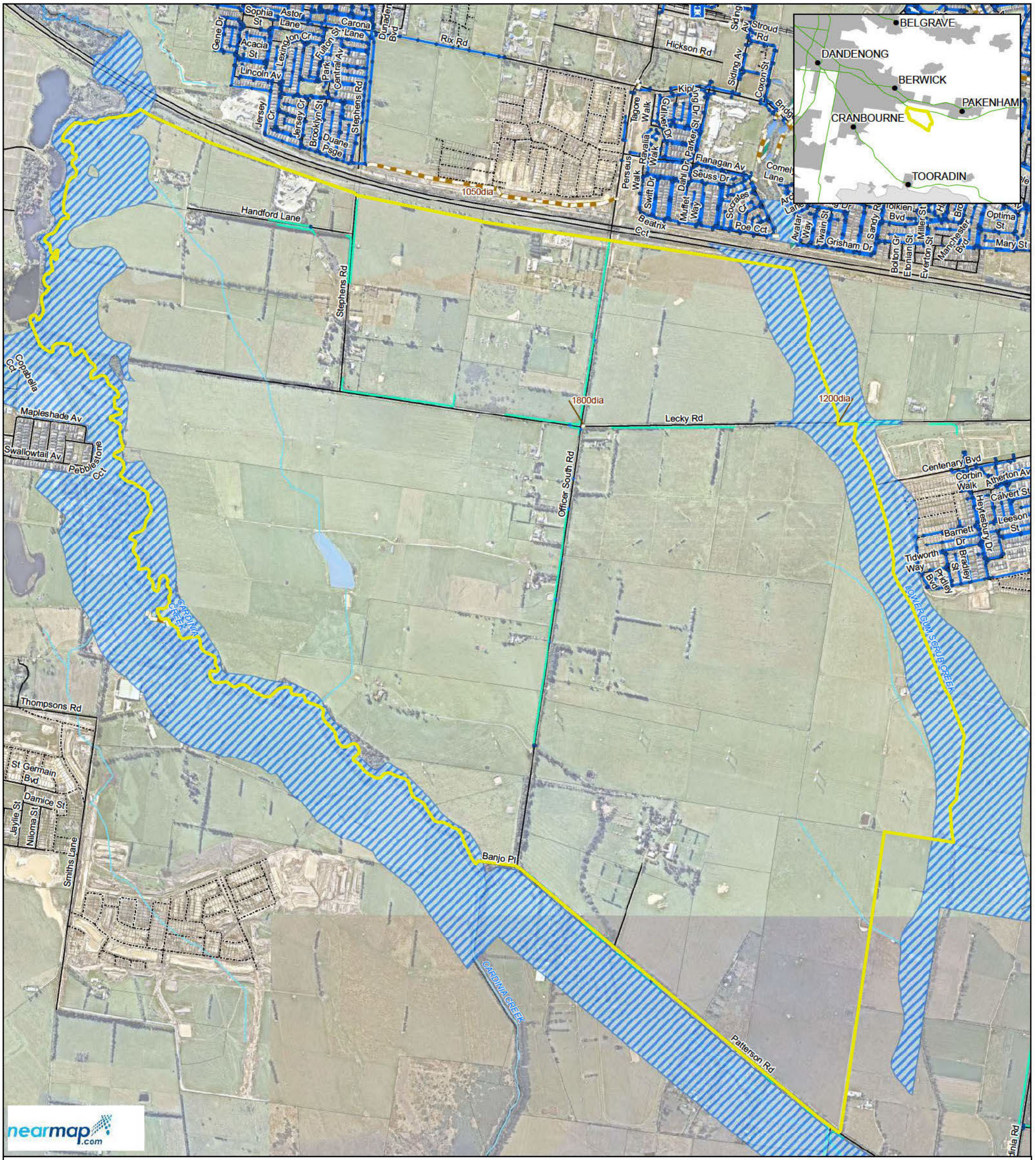
OVERLAYS

- AEO - Airport Environs
- BMO - Bushfire Management
- CLPO - City Link Project
- DCPO - Development Contributions Plan
- DDO - Design & Development
- DDOPT - Design & Development Part
- DPO - Development Plan
- EAO - Environmental Audit
- EMO - Erosion Management
- ESO - Environmental Significance
- FO - Floodway
- HO - Heritage
- ICPO - Infrastructure Contributions Plan
- IPO - Incorporated Plan
- LSIO - Land Subject to Inundation
- MAEO1 - Melbourne Airport Environs 1
- MAEO2 - Melbourne Airport Environs 2
- NCO - Neighbourhood Character
- PO - Parking
- PAO - Public Acquisition
- RO - Restructure
- RCO - Road Closure
- SBO - Special Building
- SLO - Significant Landscape
- SMO - Salinity Management
- SRO - State Resource
- VPO - Vegetation Protection

Map Centre - Melways 214 H12
Map Scale 1:23,260
June 18, 202012:41:11 PM

VICTORIA State Government | Environment, Land, Water and Planning

Appendix C Existing Infrastructure Plans and Typical Sections



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LEGEND

- Rail station
- Railway
- Roads
- Proposed Roads
- River
- Stream
- Project Study Area
- Watercourse
- Lake
- Swamp
- Parcel

Melbourne Water Assets

- Drainage Pipe
- Flood Extent (Melbourne Water)

Cardinia Shire Assets

- Drainage Pit
- Drainage Pipe
- Drainage Swale

0 75 150 300 450 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Victorian Planning Authority
Officer South Employment Precinct

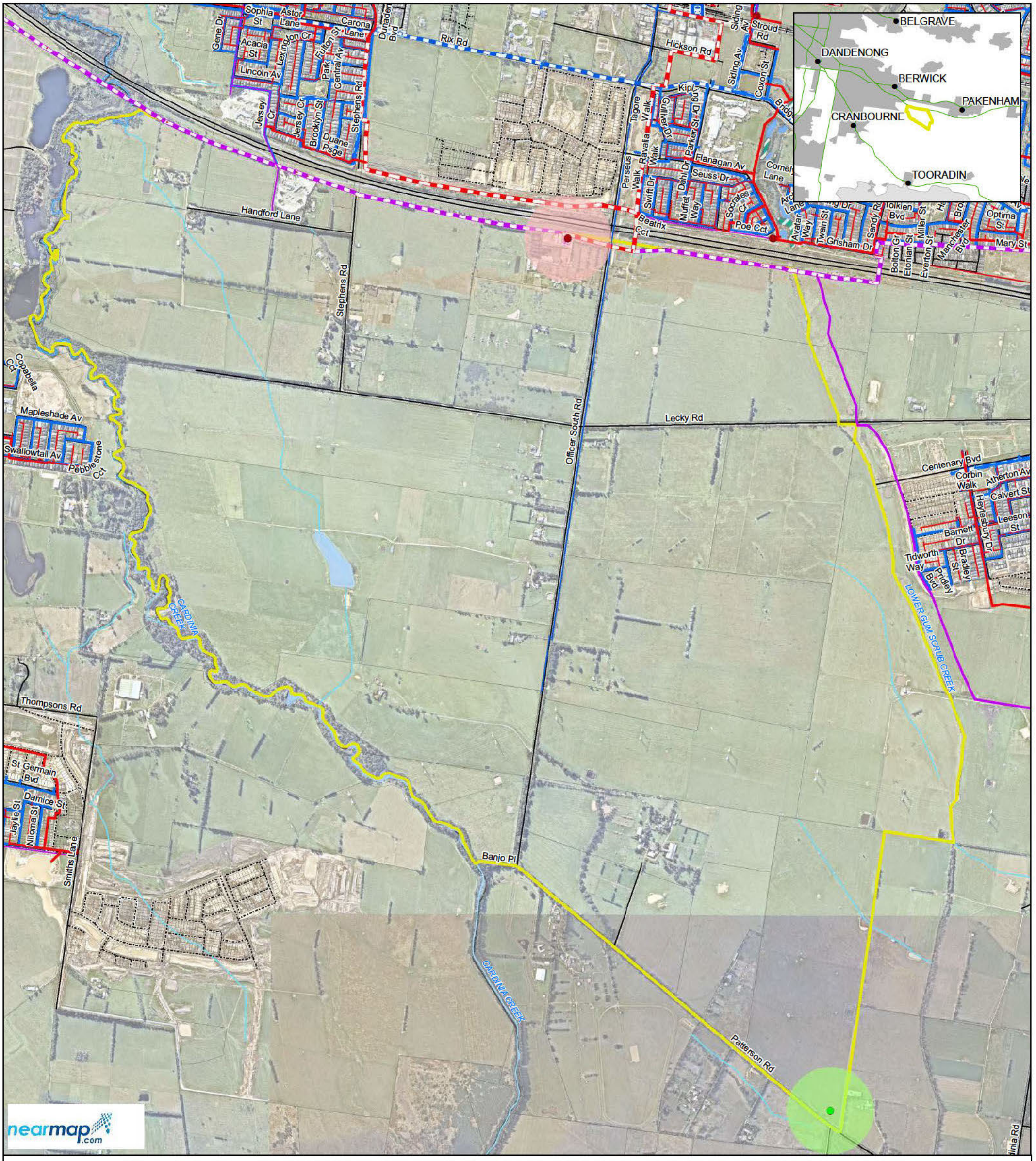
Job Number 12526394
Revision B
Date 19/10/2020

Stormwater Drainage Assets

Figure 2

G:\31\12526394\GIS\Maps\Deliverables\12526394_KBM_A3P.mxd

Data source: DEWLP, VicMap, 2020; GHD, 2020; Nearmap Imagery 28/04/2020; Drainage, Melbourne Water data,2020; Shire Council Assets Drainage, 2020 Created by: cjauniau



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LEGEND

- Project Study Area
- Rail station
- Roads
- Proposed Roads
- River
- Stream
- Railway
- Watercourse
- Lake
- Swamp
- Parcel
- Proposed Sewer Pump Station 200m buffer
- Proposed Sewer Pump Station

South East Water Assets

- Sewer Pump Station
- Sewer Pipe,<150mm dia
- Sewer Pipe, >150mm - 300mm dia
- Sewer Pipe, >300mm - 1280mm dia
- Rising Main,<150mm dia
- Rising Main, >150mm - 300mm dia
- Rising Main, > 300 - 800mm dia
- Water Pipe, 50mm - 90mm dia
- Water Pipe, >90mm -230mm dia
- Water Pipe, >230mm - 600mm dia
- Sewer Pump Station 200m buffer

0 75 150 300 450 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Victorian Planning Authority
Officer South Employment Precinct

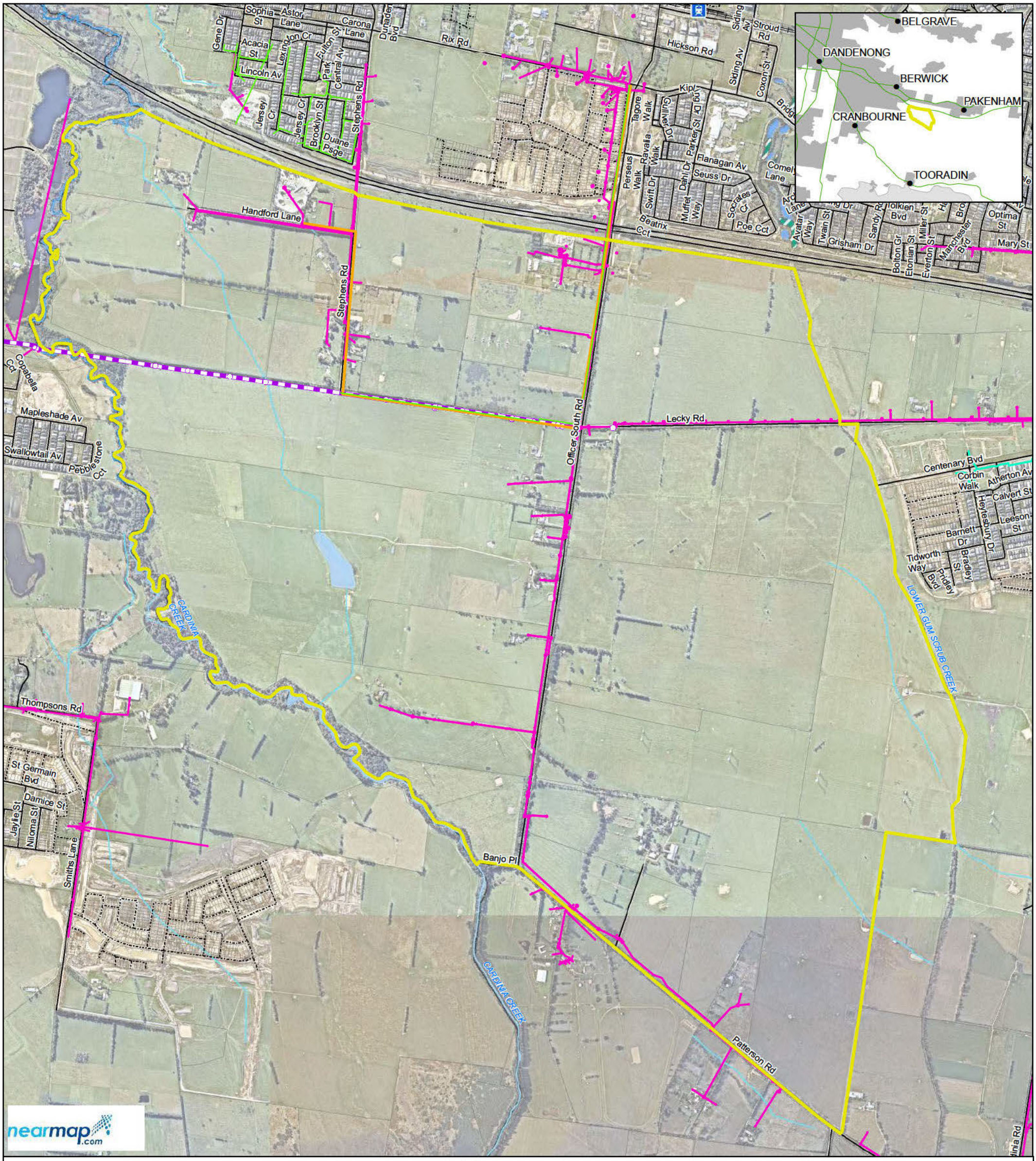
Water and Sewer Assets

Job Number	12526394
Revision	C
Date	19/10/2020

Figure 3

G:\31\12526394\GIS\Maps\Deliverables\12526394_KBM_A3P.mxd

Data source: DEWLP, VicMap, 2020; GHD, 2020; Nearmap Imagery 28/04/2020; South East Water sewer and water main, South East Water, 2020; Created by: cjauniau



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LEGEND

- Project Study Area
- Rail station
- Roads
- Proposed Roads
- River
- Stream
- Railway
- Watercourse
- Lake
- Swamp
- Parcel
- Telstra Assets
- Major Telstra Fibre
- Optus Assets
- NBN Assets
- OptiComm Assets

0 75 150 300 450 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

Victorian Planning Authority

Victorian Planning Authority
Officer South Employment Precinct

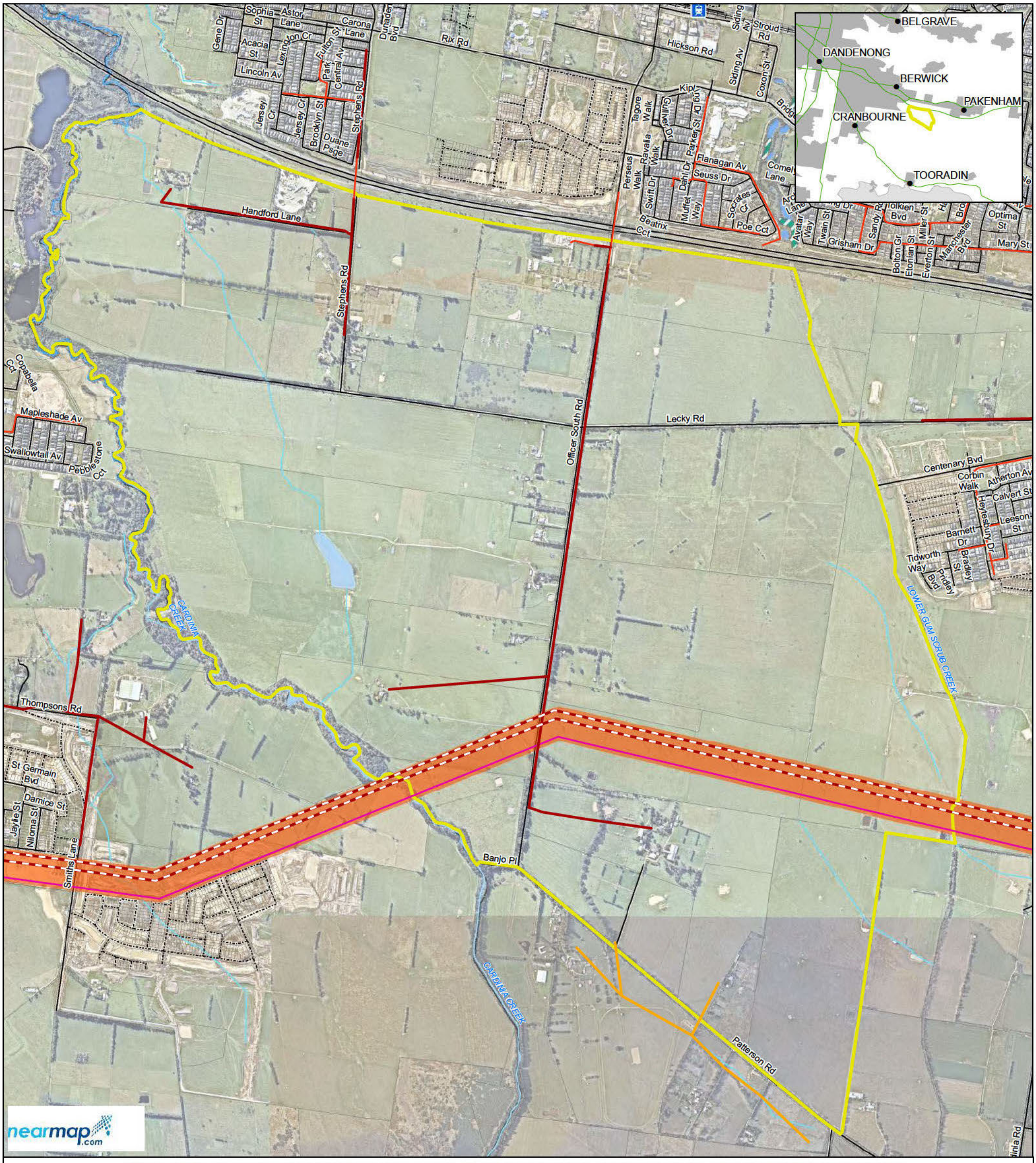
Job Number 12526394
Revision C
Date 19/10/2020

Telecommunication Assets

Figure 4

G:\31\12526394\GIS\Maps\Deliverables\12526394_KBM_A3P.mxd

Data source: DEWLP, VicMap, 2020; GHD, 2020; Nearmap Imagery 28/04/2020; Optus Assets digitised from DBYD, 2020; NBN Assets digitised from DBYD,2020; Telstra Asset DWF received from DBYD georeferenced by GHD,2020 Created by: cjauniau



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LEGEND

- Project Study Area
- Rail station
- Roads
- Proposed Roads
- River
- Stream
- Railway
- Watercourse
- Lake
- Swamp
- Parcel

AUSNET Assets

- High Voltage Overhead Line
- High Voltage Underground Cable
- HV SWER (single wire earth return) Overhead cable
- Overhead Transmission Line
- Overhead Sub-transmission line

- Approximate AUSNET Easement

0 75 150 300 450 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Victorian Planning Authority
Officer South Employment Precinct

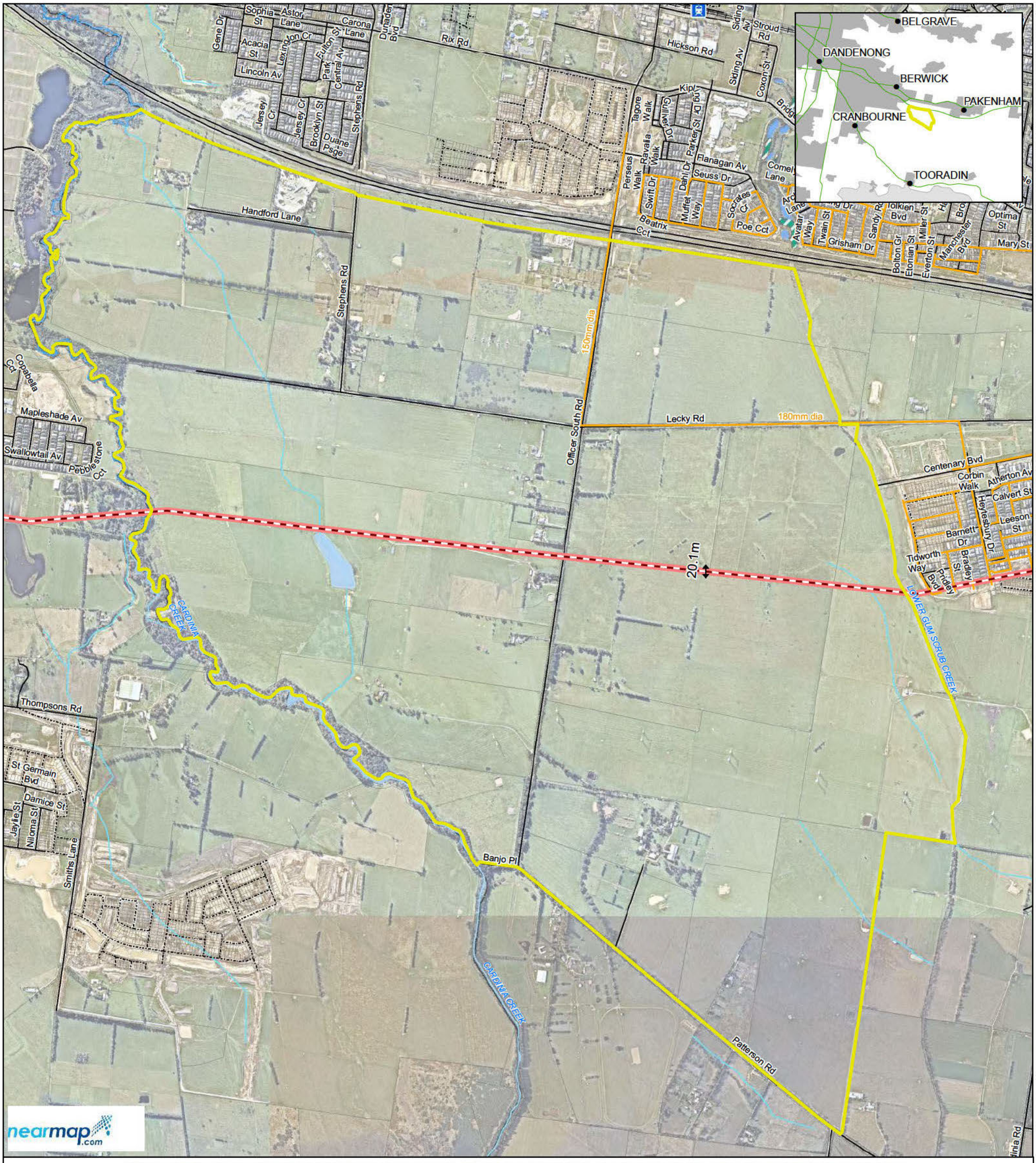
Job Number	12526394
Revision	E
Date	19/10/2020

Electricity Assets

Figure 5

G:\31\12526394\GIS\Maps\Deliverables\12526394_KBM_A3P.mxd

Data source: DEWLP, VicMap, 2020; GHD, 2020; Nearmap Imagery 28/04/2020; AUSNET asset digitised from DBYD,2020 Created by: cjauniau



Utilities details are provided for information purposes only. GHD does not warrant, guarantee or make any representations regarding the completeness, accuracy, reliability, or any other aspect, of the information presented. In some case asset positions have been digitised from pdf plans The user accepts sole responsibility and all risk for accessing, using and relying upon any information or material provided. GHD does not accept any liability for any claims, loss or damage which may be incurred as a result of accessing, using or relying upon this information.

LEGEND

- Project Study Area
- Rail station
- Roads
- Proposed Roads
- River
- Stream
- Railway
- Watercourse
- Lake
- Swamp
- Parcel

APA Assets

- Transmission Pressure Gas Pipeline, 450mm dia
- Distribution High Pressure Gas Pipeline, 63 -180mm dia
- APA Easement

0 75 150 300 450 600

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Victorian Planning Authority
Officer South Employment Precinct

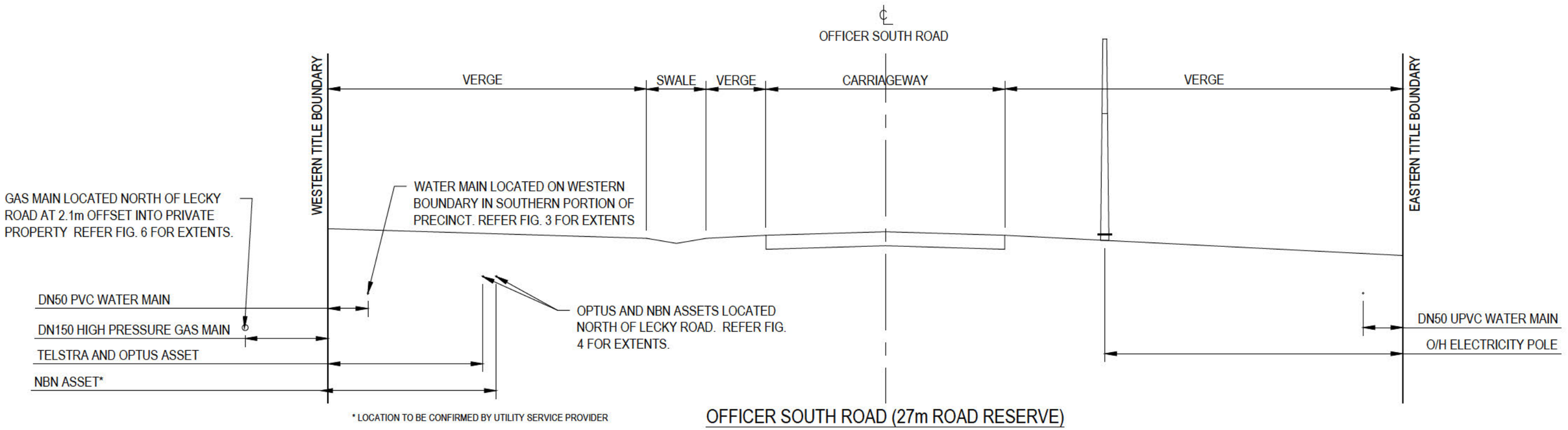
Job Number 12526394
Revision C
Date 19/10/2020

Gas Assets

Figure 6

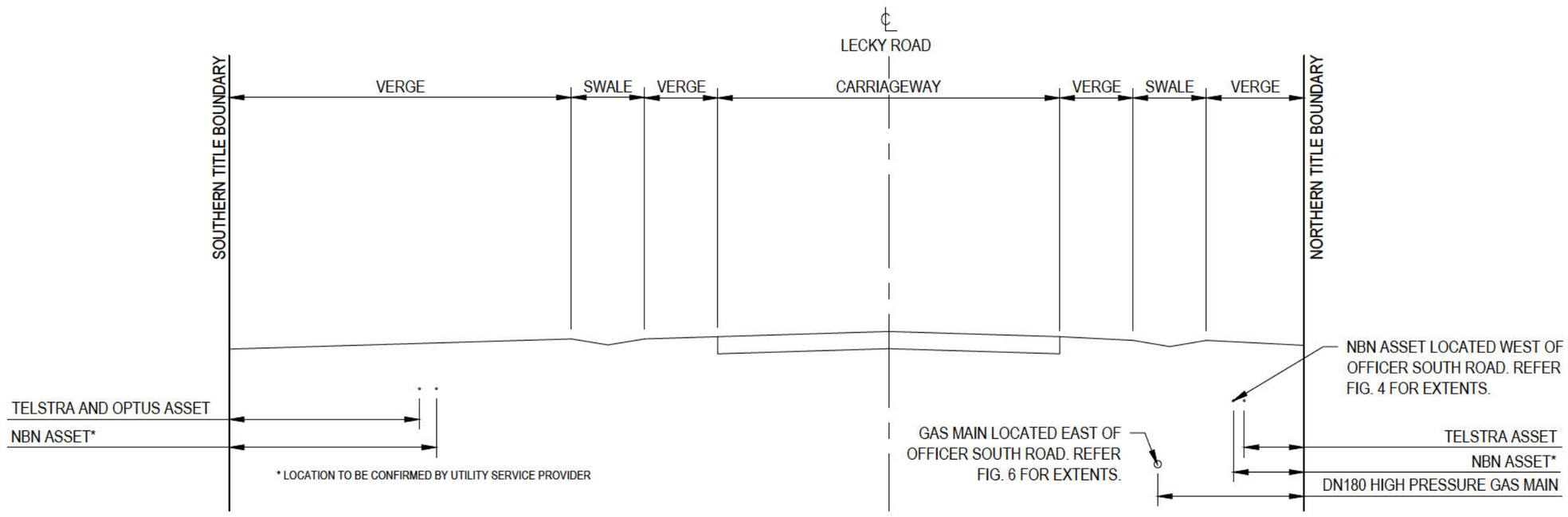
G:\31\12526394\GIS\Maps\Deliverables\12526394_KBM_A3P.mxd

Data source: DEWLP, VicMap, 2020; GHD, 2020; Nearmap Imagery 28/04/2020;APA asset digitised from DBYD,2020 Created by: cjauniau



OFFICER SOUTH ROAD (27m ROAD RESERVE)

SCALE 1:200



LECKY ROAD (22m ROAD RESERVE)

SCALE 1:200

NOTE:

1. ALL SERVICES SHOWN ARE EXISTING SERVICES.
2. THESE DRAWINGS ARE NOT FOR CONSTRUCTION.

DIAL BEFORE YOU DIG www.1100.com.au

WARNING

SERVICES SHOWN ON THIS DRAWING ARE APPROXIMATE ONLY. THE EXACT LOCATION IS TO BE CONFIRMED ON SITE BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS.

Paper Size A3

0 2 4 6m

SCALE 1:200 AT ORIGINAL SIZE

Victoria Planning Authority
Officer South Employment Precinct
Utility Servicing Assessment

Existing Typical Sections

Job Number 12526394
Revision C
Date October 2020

Figure 7

Level 8, 180 Lonsdale Street Melbourne VIC 3000 Australia **T** 61 3 8687 8000 **F** 61 3 8687 8111 **E** melmail@ghd.com.au **W** www.ghd.com

Plot Date: 19 October 2020 - 6:18 PM Plotted by: Alina Pham Cad File No: \\ghdnet\ghd\AU\Melbourne\Projects\31\12525394\CADD\Drawings\12526394-TYPICAL SECTIONS.dwg

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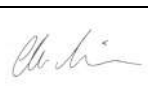
Level 8, 180 Lonsdale Street Melbourne, Victoria 3000
T:03 8687 8000 E: melmail@ghd.com

12526394-12242-11/https://projectsportal.ghd.com/sites/pp17_03/officersouthemployme/ProjectDocs/12526394 - REP - Situational Analysis Report.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft A	A. Pham	T. Cooley		L. Morrison		23/06/20
Draft B	A. Pham	T. Cooley		L. Morrison		07/07/20
Final 0	A. Pham	T. Cooley		L. Morrison		19/10/20

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