



Metropolitan Planning Authority

Mt Atkinson and Tarneit Plains PSPs

High Level Utility Servicing and Infrastructure Assessment

September 2014

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1. Introduction

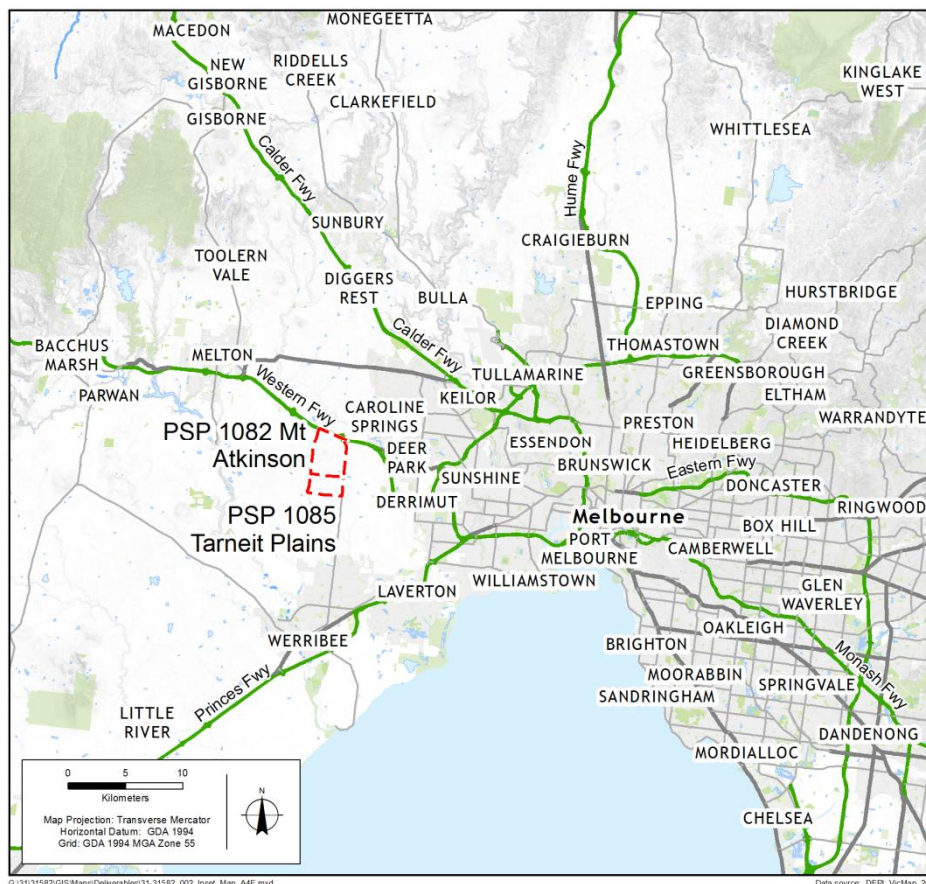
GHD has been commissioned by the Metropolitan Planning Authority (MPA) to undertake a high level utilities capacity assessment for the Mt Atkinson Precinct Structure Plan Area (PSP 1082) and the Tarneit Plains Precinct Structure Plan Area (PSP 1085) in the City of Melton, Victoria. Throughout this report the two precincts will be referred to simply as the 'PSPs'. The site location of both PSPs is illustrated in Figure 1 below.

The proposed development areas are bordered to the north by the Western Freeway and extend south to Middle Road. Plans for Melbourne's future Outer Metropolitan Ring Road (OMRR) indicate the site will eventually be bordered to the west by this proposed road network.

Although masterplans for the development areas have not been finalised, it is understood that the majority of the PSP's development will comprise mixed use development occupying approximately 16.5 lots per hectare. The MPA has provided an estimate of between 4,300 and 7,100 lots with an estimated population of 12,000 to 20,000 people living in the PSPs.

This report provides high level detail of GHD's infrastructure investigation for the PSPs. Existing trunk infrastructure, proposed servicing strategies and service constraints and opportunities have been investigated and reported on.

Figure 1 Site Location Sketch





2. Methodology

2.1 General

GHD conducted a general servicing location enquiry for all relevant services via Dial Before You Dig in early May 2014, and has received existing services plans from all relevant authorities. Upon receipt of these plans, brief discussions were held with each service authority to determine relevant contacts to provide further advice regarding the proposed future development. Digital copies of services plans were requested and used to create existing services plans shown in Appendix A. Previously prepared reports and information supplied by MPA were also reviewed to determine the requirement for further information.

Formal requests for further servicing advice were issued to all relevant authorities and subsequent meetings were held with a number of the stakeholder authorities. Phone and email discussions were followed to confirm and expand on all relevant servicing information.

A detailed review and analysis of the available service authority information was undertaken and broad high level service capacity and strategy advice was obtained from all service providers listed under Section 2.2 of this report. Meetings were held with the following service authorities in addition to receiving formal servicing information:

- Powercor
- SP Ausnet
- Western Water

It is noted that an investigation into the stormwater drainage infrastructure is being undertaken by others and does not form part of this report.

2.2 Service Authorities

GHD has contacted all relevant service authorities to obtain plans and details of existing services in the PSPs, with specific reference to the immediate area bound by the proposed development site.

The following asset owners and service providers were contacted:

- Electricity Transmission - SP Ausnet;
- Electricity Distribution - Powercor;
- Telecommunications - Telstra;
- Telecommunications - NBN Co;
- Gas Reticulation - SP Ausnet;
- Gas Transmission - APA Group;
- Sewer, Water and Recycled Water - Western Water & City West Water

The following asset owner was not contacted:

- Stormwater Drainage – City of Melton

Available service capacity, infrastructure strategies and high level costing advice received from the authorities has been gathered and detailed in the following sections.

Importantly, the Outer Metropolitan Ring Road (OMRR) easement exists adjacent to and a significant power easement runs through both PSPs. These both provide a key development constraint for future servicing. Generally, service authorities have informed that further consultation is required when functional designs are completed for both of the significant infrastructures to ensure service strategies are amended accordingly.



3. Electricity

3.1 Responsible Authorities

Ownership of power assets in Victoria is split between the transmission network and the distribution network. The majority of the transmission network in Victoria is owned, maintained and operated by SP-Ausnet.

Within metropolitan Melbourne there are five distribution businesses that own, operate and maintain the distribution network. The relevant distribution business in the Tarneit precinct is Powercor.

As part of this assessment we consulted with SP-Ausnet, Powercor and the Australian Energy Market Operator (AEMO) who are responsible for regulating and planning the Australia's national electricity market.

3.2 Terminology

The transmission network includes terminal stations and transmission lines, which connect the power stations to the terminal stations.

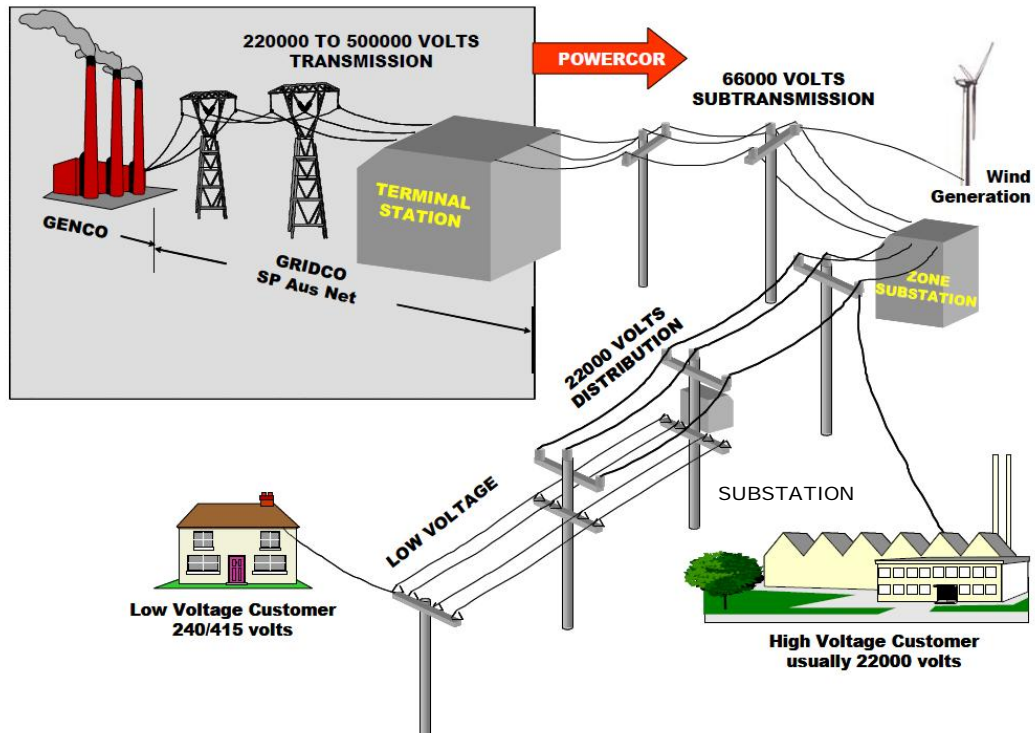
The distribution network connects to the Terminal Stations, and extends to the individual properties.

The distribution network comprises the following components:

- Sub-transmission lines that connect Terminal Stations to Zone Substations
- Zone substations
- Distribution Feeders – either overhead or underground lines that connect Zone Substations to Local Substations
- Substations – indoor, kiosk or pole mounted
- Low Voltage Power lines – either overhead lines or underground cables connecting the substations to the customers

The components of typical transmission and distribution networks are broadly described in Figure 2.

Figure 2 Typical Electricity Transmission and Distribution Network



Source: CitiPower 2011 'Distribution System Planning Report' p10

3.3 Existing Services and Assets

Existing transmission and distribution electricity infrastructure for the PSPs is shown in Plan 1 in Appendix A.

3.3.1 Capacity ("N – 1") Assessment

The measurement of capacity for electricity networks is not a simple task. The standard test that power authorities generally used is an "N – 1" assessment, which in principle is an assessment of the redundancy within the network, rather than a measurement of the absolute capacity of the network.

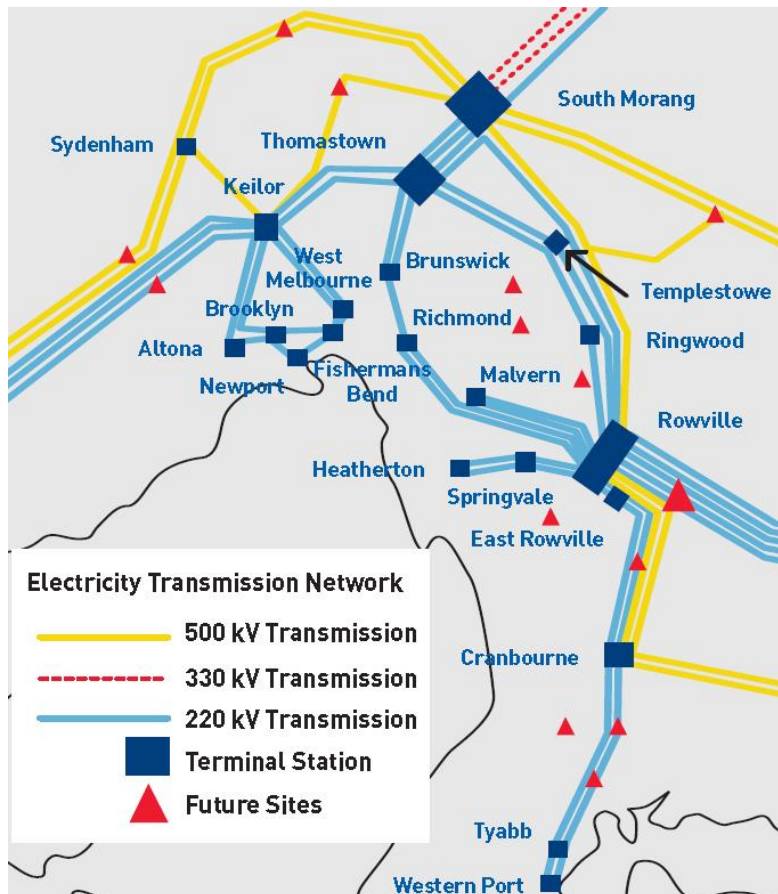
Put simply, the "N – 1" assessment measures the impact of removing a component of the infrastructure being assessed, and then assesses this reduced capacity against the overall demand requirements. An example would be the removal of a transformer from a zone substation. In so doing, the utilisation within the network can exceed 100%. The decision as to whether to address this issue is then based on an assessment of the probable cost to consumers due to lost power against the cost of the required upgrade taking into account the failure rate of equipment, repair times and the annual demand profiles. Where this cost to consumers exceeds the upgrade cost an upgrade will proceed.

The percentage utilisations quoted in the following sections are based on this "N – 1" assessment.

3.3.2 Transmission Network

The existing transmission network and terminal stations in the vicinity of the PSPs is shown in Figure 3 below.

Figure 3 Metropolitan Area Electricity Transmission



Source: AEMO 'Vision 2030: 25 year vision for Victoria's Energy Transmission Networks' October 2005. Updated 2009.

The area surrounding the PSPs is serviced by the Altona/Brooklyn (ATS/BLTS), Altona West (ATS West) and Keilor Terminal Stations (KTS).

Altona/Brooklyn (ATS/BLTS) comprises two terminal stations in close proximity and supplies 66kV to Altona Brooklyn, Laverton North, Tottenham, Footscray and Yarraville.

Altona West (ATS) West supplies 66kV to Laverton, Laverton North, Altona Meadows, Werribee, Wyndham Vale, Mount Cottrell, Eynesbury, Tarneit, Hoppers Crossing and Point Cook.

Keilor (KTS) supplies both 220kV and 66kV to Airport West, St. Albans, Sunshine, Melton, Woodend, Pascoe Vale, Essendon and Braybrook.

The demand, capacity and percentage utilisation for each of the relevant terminal stations is shown in Table 1.

Table 1 Terminal Station Utilisation

Connection Asset	2014 Max Demand (MVA*)	2014 Firm Capacity (MVA)	Percentage Utilisation
Altona/Brooklyn (ATS/BLTS)	333.2	344	97%
Altona West (ATS West)	231.2	170	136%
Keilor (KTS)	389	339	115%

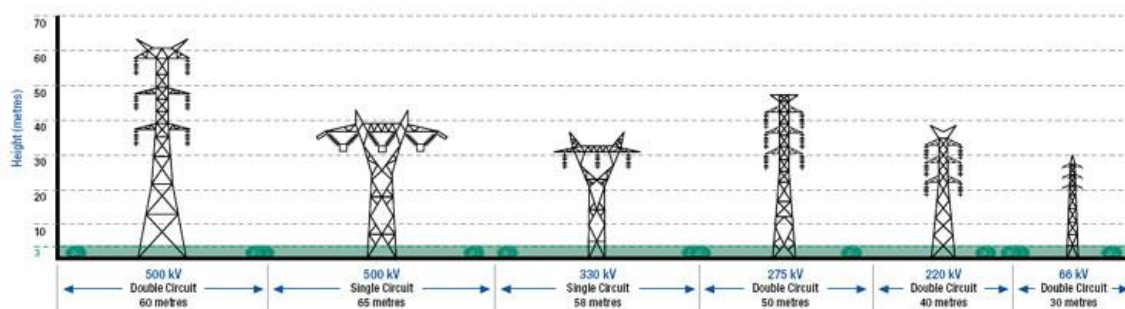
*MVA = Mega Volt Ampere (can be approximated to Mega Watts)

Transmission Easements

The corridors of land that contain transmission towers and power lines are referred to as transmission line easements. Easements secure a 'right of way' for the safe transmission of power.

Usually SP-Ausnet does not own the land contained within the easement, they instead have acquired rights for its use by agreement with and compensation of the original landowner for maintenance and access to the network. There are restrictions relating to what activities can occur within SP-Ausnet's easements and what can be located within easements. Typical easement widths based on the type of tower are shown in Figure 4.

Figure 4 Electricity Transmission Easements



Source: SPI PowerNet "Electricity transmission easements" Retrieved 28 June 2012 from <http://www.sp-ausnet.com.au/?id=2301331700507AA09DC076AAEBCA2575760038DB0A>

Building and Works within Easements

The types of activities and buildings and other structures that can be built on easements are tightly controlled by SP-Ausnet, AEMO and Energy Safe Victoria. There are strict limits on what can and can't be built on easements so that public safety and the reliability of the transmission network are not compromised.

Suitable land uses for underground cable easements include grassed or paved areas. No variation in finished surface levels is permitted following design and construction and no buildings or other structures can remain in the easement. SP-Ausnet has a document called *Guidelines for Subdivision and Development of Land Affected by Transmission Line Easements* which should be referred to throughout the masterplanning and design stages of redevelopment.



3.3.3 Distribution Network

The developed suburbs in closest proximity to the PSPs are serviced by the Laverton (LV), Melton (MLN) and Werribee (WBE) zone substations.

The Laverton (LV) zone substation is serviced via two sub-transmission lines from the Altona West (ATS West) terminal station. Laverton (LV) supplies residential and commercial customers in Altona Meadows, Tarneit, Hoppers Crossing and Point Cook.

The Melton (MLN) zone substation is serviced via sub-transmission lines from the Keilor (KTS) terminal station. Melton (MLN) supplies residential, commercial, industrial and farming customers in Melton, Melton South, Melton West, Kurunjang, Rockbank and Brookfield.

The Werribee (WBE) zone substation is serviced via two sub-transmission lines from the Altona West (ATS West) terminal station. Werribee (WBE) supplies residential and commercial customers in Altona Meadows, Tarneit, Hoppers Crossing and Point Cook.

The demand, capacity and percentage utilisation for each is shown in Table 2.

Table 2 Zone Substation Utilisation

Zone Substation	2014 Max Demand (MVA)	2014 Firm Capacity (MVA)	Percentage Utilisation
Laverton (LV)	94.3	79.8	118%
Melton (MLN)	60.2	39.9	108%
Werribee (WBE)	106	82.8	128%

3.4 Planned Works

Proposed transmission and distribution electricity infrastructure in the vicinity of the PSPs is shown in Plan 1 in Appendix A.

3.4.1 Transmission

SP-Ausnet has planned new terminal stations at Deer Park (DPTS) and Truganina (TTS). The Deer Park (DPTS) will be located at the intersection of Christies Road and Riding Boundary Road and the Truganina (TTS) lies within PSP 1085 at the intersection of Mt. Atkinson Road and Riding Boundary Road. These terminal stations are required to offload the Keilor (KTS) terminal station.

Deer Park (DPTS) will act as a step down point from 220kV to 66kV and Truganina (TTS) will provide both 500kV to 220kV and 220kV to 66kV. Easements and indicative circuits are shown in Plan 1 in Appendix A.

3.4.2 Distribution

Powercor's preferred feasible options for alleviation of constraints and to manage the load at risk in the vicinity of the PSPs is detailed for each relevant substation in their Distribution Annual Planning Report 2013. An overview of relevant options are summarised below in Table 3.

All zone substations are planned to maintain their contingency for quick load transfer to adjacent zone substations for unplanned outages.

Table 3 UED's Preferred Constraint Alleviation Options

Zone Substation	Preferred Network Option(s) for alleviation of constraints
Laverton (LV)	Transfer load via 22kV links to Werribee (WBE) and Laverton North (LVN) Establish a new zone substation at Truganina (TNA) and transfer load from other substations via new sub-transmission lines. Truganina (TNA) will be supplied from new Deer Park (DPTS)
Melton (MLN)	Transfer load via 22kV links to Bacchus Marsh (BMH) Install new capacitor bank and transformer
Werribee (WBE)	Transfer load via 22kV links to Laverton North (LVN) Not expected to require any further major augmentation within 5 years

Proposed zone substations

Discussions held with Powercor have revealed that there will be a requirement for a new zone substation located in close proximity to the PSPs. Two possible locations for the Rockbank zone substation are shown in Plan 1 in Appendix A. The Rockbank zone substation will supply 66kV and 22kV to the PSPs.

Powercor has also planned to complete the Truganina (TNA) zone substation before 2017. This will allow Laverton (LV), Werribee (WBE), Laverton North (LVN), Sunshine (SU) and St. Albans (SA) zone substations to transfer their load to the new zone substation. By doing so, the overall risk of power outages will be reduced and electricity supply can meet demand in the future.

In addition to the Truganina (TNA) and Rockbank zone substations, Powercor have planned the new Tarneit (TRT) zone substation. It is understood that the three proposed zone substations will have adequate capacity to service future mixed use development within the broader area surrounding and including the PSPs.

3.5 Proposed Servicing Advice

Powercor has advised that the planned zone substation works as described above are essential in providing electricity supply to the PSPs. In addition, major augmentation of existing distribution assets (poles and wires) will be required to provide linkages from the zone substations to the PSPs. Powercor have also advised that the time frames associated with planned works may be brought forward if necessary for development.

Powercor intends for the Tarneit (TRT) zone substation to be located at the corner of Tarneit and Dohertys Road where an existing 66 kV feeder currently exists. Construction is scheduled some time between 2020 and 2025. New zone substations will require approximately 1 hectare of land and are necessary to downgrade power from 66 kV to 22 kV. Zone substations should be located adjacent to existing or planned 66kV feeder alignments so as to eliminate the need for additional feeders into and out of the zone substation. The cost of a new zone substation is estimated



between \$15 and \$20 million. Powercor require access to their zone substation assets 24 hours a day and as such, zone substations should be located adjacent to road reserves to allow vehicular access.

Funding of new zone substations is based on incremental revenue versus incremental cost to build the zone substation and generally, Powercor funds zone substation installations. Any new project however, is based on a case-by-case basis and Powercor has advised this may not be the case with every installation. It should be noted that current Powercor modelling practices may change by the time of construction for the area in question.

Locations of the proposed zone substations and terminal stations are detailed on Plan 1 in Appendix A.

3.6 Key Development Opportunities and Constraints

The cost difference between the provision of overhead power and underground power is significant. One kilometre of 22 kV cable is estimated to cost \$200,000 for overhead infrastructure and approximately \$400,000 for underground construction. On an even larger scale, one kilometre of 66 kV cable costs approximately \$400,000 for overhead while for underground 66 kV feeders, the cost is approximately \$4 million. The exact cost of underground power will vary depending on trenching conditions and a number of other factors.

Under Powercor's current policy arrangement, Powercor will fund the cost of High Voltage (HV) materials (for 22 kV overhead or underground provision) within a continuous medium density development as well as contribute towards the cost of Low Voltage (LV) materials. This contribution amount is calculated for each stage and considers the expected revenue over a 30 year period for the number of lots being connected against the capital costs and ongoing maintenance of the assets installed.

While Powercor funds the cost for new HV materials within a residential development, relocation of existing 66 kV or 22 kV infrastructure underground, or construction of new 66 kV infrastructure underground, may be borne by the developer. Powercor has advised however, there have been instances when Powercor has covered the cost for shared trunk underground infrastructure. The cost for relocation or installation of major trunk infrastructure underground is determined based on a case-by-case basis and although unlikely, there may be instances where Powercor will contribute to these costs.

4. Telecommunications

Telstra is the authority responsible for the existing supply and reticulation of telecommunication services within the established areas near to the PSPs. Telstra has specified that the provision of telecommunications infrastructure to the PSPs will be the responsibility of NBN Co.

NBNCo is wholly Government owned, with the role to design, build and operate the NBN. NBNCo will become the wholesale provider of fixed line telecommunications through a network of fibre optic cables to be rolled out over the next 10 or so years.

The key component of the NBN is that it is to be an open access network. This will allow any Retail Service Provider to enter into an access agreement with NBN Co, and ultimately to sell services to consumers. The network is to be a combination of fibre to the premises, fixed wireless and satellite services. The fixed wireless and satellite services are intended for areas where the rollout of fibre optic cable is uneconomical. This represents approximately 7% of premises.

Prior discussions with both Telstra and NBN Co suggest limited information regarding the provision of communications infrastructure to future developments is being shared between the two organisations, proving difficult for external parties to obtain site specific servicing strategies. As such, any servicing advice provided by these parties has not been conclusive and can only be considered as potential servicing opportunities.

4.1 Existing Services

Existing telecommunications infrastructure is shown in Plan 2 in Appendix A.

Plans provided by Telstra indicate telecommunications infrastructure is located along Troups Road South to the west of the precinct and along Greigs Road to the north of the PSPs. Generally, telecommunications infrastructure is located within the road reserve and at a nominal depth of 600mm from the surface level.

A heads of agreement has been signed between NBN Co and Telstra which will allow NBN Co access to Telstra's existing infrastructure. However, this access is still subject to the ACCC's acceptance and a Telstra Shareholder vote. Telstra has advised the existing telecommunications network is inadequate to service the future growth within the PSPs and as such the network will require significant upgrades.

NBN Co do not currently own telecommunications infrastructure within the vicinity of the PSPs.

4.2 Key Opportunities and Constraints

Telstra has informed that any provision of their infrastructure would be with regards to commercial development and Telstra may overlay infrastructure in the area to reach specific customers including businesses or government properties. It is expected that Telstra would not be responsible for providing interim mobile services if there are delays in the NBN fibre construction.

NBN Co is responsible for installing fibre at all broad acre developments and at infill developments with 100 or more premises and as such, will likely be responsible for servicing major development within the PSPs. Depending on the scale of development anticipated in the precinct, NBNCo may grant the PSPs priority in future rollout planning. In addition, future high density development may



cause NBNCo to allocate greater capacity to the precinct. The staging and timing of development in the PSPs will affect the rollout planning and design. NBNCo would be keen to obtain greater information relating to the scale and timing of development in the PSPs so that the fibre capacity allocated to the area can meet the demand.

A Fibre Access Node (FAN) site is typically required to house active equipment in order to service a fibre servicing area. Given that the precinct is not part of the three year NBN rollout a Temporary Fibre Access Node (TFAN) may be deployed in the interim to support redevelopment. TFANs are typically located in a Council owned road reserve which would be decided through collaboration between NBN and relevant Councils. Cables would be located within Telstra owned conduits provided there is sufficient space.

In the event that there is no available space in Telstra's conduits, NBN would install their own conduits. NBN would adhere to required clearances and offsets from other services. Access requirements to the TFAN for maintenance would be determined in collaboration with Council and the developer, dependant on the site layout of the development.

It would be beneficial to advise Telstra and NBNCo of any undergrounding of electricity cables to maximise the possibility of co-location between electricity and telecommunications assets.

The cost of headworks to the development boundary as well as any fibre infrastructure within the PSPs will be covered by NBN Co. However, it is the developer's responsibility to design, trench for and install pit and pipe infrastructure within the PSPs at their own cost. This cost is variable as it is up to a developer or their agents to procure such services.

NBN Co has advised that it is too early to recommend staging and easement requirements, as this will depend upon whether developers apply to NBN Co for infrastructure.

5. Gas

5.1 Responsible Authorities

APA GasNet is the transmission pipeline network asset owner. The transmission of natural gas involves transporting gas through pipelines from extraction to reticulation processing facilities at city gates or field regulators, and direct supply to major customers, including distribution businesses. Generally, transmission pressures operate between 2,800kPa and 10,000kPa and are far too high to directly service end users. The process of downgrading to distribution pressures in order to service end-users is generally achieved via an off take (or tapping) connected to the transmission pressure main. This tapping includes a gas city gate, custody transfer meter (CTM) and regulator heater. The CTM measures the quantity of gas extracted from the supply transmission pipe while a regulator heater is also necessary to offset the temperature decrease experienced when pressures are lowered.

SP AusNet is the asset owner responsible for the gas distribution network within the PSPs and is also responsible for the city gates, CTMs and heaters. Gas is depressurised at city gates and field regulators to appropriate pressures for the distribution of gas to final users which can include commercial and industrial users as well as residential users. Gas is transported in smaller volumes and at lower pressures through the distribution networks than along the transmission pipelines.

GHD has previously met with SP AusNet, to discuss their strategic servicing plan for PSPs area and have been recently informed that this advice is still current.

5.2 Existing Services and Assets

Existing transmission and distribution gas infrastructure is shown in Plan 3 in Appendix A

5.2.1 Transmission Network

Within close proximity to the PSPs there are the following gas transmission network pipelines:

- 150mm diameter pipeline built in 1978/1979. Runs north-south along Hopkins Road. This pipeline has a measurement length of approximately 164m and supplies all towns between Deer Park to Sunbury
- 500mm diameter pipeline built in 2012. Runs north-south along Hopkins Road. This pipeline has a measurement length of approximately 571m and was built to increase the Sunbury pipeline capacity and supply gas to the North of Melbourne
- 500mm diameter pipeline built in 2008. Runs east-west along Middle Road. This Brooklyn to Lara pipeline has a measurement length of approximately 571m and carries 30% of all of Victoria's gas
- 200mm diameter pipeline built in 1972. Runs east-west along Middle Road. This Brooklyn to Ballan pipeline has a measurement length of approximately 214m and supplies all towns from Brooklyn to Ballan



The 500mm pipeline along Middle Road is connected to the Iona gas processing plant near Port Campbell. The transmission main currently services the Western district of Melbourne. This and the other three transmission mains are owned and operated by APA GasNet.

Where an easement is registered on title or the gas transmission main is located within Crown Land, APA GasNet has the right to review/approve any development proposals under the Pipelines Act.

5.2.2 Distribution Network

There is currently no distribution gas infrastructure within the PSPs. The nearest existing distribution gas is situated south of Leakes Road and east of Davis Road. SP AusNet has advised this infrastructure is nearing capacity and may therefore be inadequate to service ongoing development in the PSPs.

The nearest existing city gates are situated east of the PSPs along Christies Road and north at the intersection of Sinclairs Rd and Taylors Road.

SP AusNet has advised a new gas off-take was constructed along APA GasNet's existing transmission main on Hopkins Road. However, this off-take may not be commissioned for use pending a VicRoads decision to have the transmission pipeline relocated to avoid the Outer Metropolitan Ring Road (OMRR).

5.3 Proposed Servicing Advice

Proposed gas infrastructure is shown in Plan 3 Appendix A.

SP AusNet intends to use APA GasNet's transmission asset to downgrade pressure and distribute gas to end users in the PSPs. SP AusNet has planned for a distribution main to be located along Mt. Atkinson Road between Middle Road and the Western Highway.

SP AusNet has advised that at least one additional city gate is required to service development within the PSPs and have a proposed city gate located to the south of the PSPs on Middle Road. This additional city gate will provide sufficient capacity for the mixed use development within the PSPs.

5.4 Key Development Opportunities and Constraints

The commissioning of a new city gate in close proximity to the PSPs will provide opportunity to expand the gas supply distribution network. The approximate cost to build and house a city gate is between \$1 and \$3 million which includes the CTM and heater, and is paid by the distribution gas company and passed on to the developer. Approval from APA and the Department of Primary Industries for a new city gate would most likely take up to 12 months.

SP Ausnet is currently negotiating with APA GasNet over the preferred area to construct future connections to APA GasNet's transmission pipeline and is hopeful that land can be purchased within these areas. The proposed positioning of the city gate is at the intersection of Mt. Atkinson Road and Middle Road. This will allow the distribution main to run through the middle of the PSPs along Mt. Atkinson Road. This alignment will be most beneficial to development.

Within the PSPs, the electrical easement for the future Turganina Terminal Station to the north of APA GasNet's transmission gas main is owned by SP Ausnet (refer to Section 3.4.1 of this report) which could potentially house a new city gate. Construction of a new city gate at this location will require a transmission gas main to the city gate from APA GasNet's pipeline. SP Ausnet has stated that they own minimal transmission pressure pipelines and believe APA GasNet would not be willing to take ownership of this proposed transmission main.

5.4.1 Spatial Requirements

Discussions with SP Ausnet and APA GasNet reveal that pipelines will be relocated prior to the construction of the Outer Metropolitan Ring Road (OMRR). Future city gate connections to APA GasNet's gas main will need to be in areas where the transmission line will not be relocated due to OMRR construction. It is understood that APA's transmission main will be relocated to the north wherever it interferes with VicRoads' OMRR development. The easement requirement for APA's gas transmission pipeline is 20m in width with a minimum offset of 7m from one side of the easement boundary to the pipeline. These widths cannot be reduced due to the possible duplication of the existing pipelines in these easements in the future.

Easements

Changes in current land use within the PSPs may result in easements being modified in favour of APA GasNet to protect better protect their assets.

Clearances

Clearances to gas assets need to be maintained for asset integrity reasons, but also in the interest of public safety. This is of particular importance for transmission mains.

An incident whereby a damaged gas main caused an explosion, while unlikely, has the potential to cause enormous damage and loss of life in the vicinity of the pipeline. For this reason, APA GasNet prefers that facilities such as schools, hospitals and high density development are not located in close proximity of their gas transmission mains.

The critical offsets are in regard to the 500mm transmission mains running north-south along Hopkins Road and east-west along Middle Road. The 'measurement length' for both of these pipelines is 571m and as stated above sensitive use buildings are preferred not to be located within this distance from the gas pipeline. The 'measurement length' for the 150mm north-south pipeline along Hopkins Road is 164m and 214m for the 200mm east-west pipeline along Middle Road.

Alternatively, if this is not able to be achieved, transmission mains could be deepened, relocated, concrete encased or relocated to reduce the likelihood of an incident occurring and to protect the main or procedures improved.



6. Sewer

Western Water is the authority responsible for the provision of sewer reticulation within the PSPs. A meeting with Western Water was held on 4 June, 2014, to discuss Western Water's strategic servicing plan for the proposed development site. Discussions have previously also been held with City West Water in regard to this larger catchment area. Although the PSPs are within the Western Water catchment area, there is some uncertainty as to where this boundary will lie in the future. There are ongoing discussions and negotiations between Western Water and City West Water in regard to the licence boundary.

6.1 Existing Services and Assets

Sewer plans provided by Western Water and City West Water indicate that no sewer infrastructure exists within the PSPs. The sewer networks that are located in closest proximity to the precinct are to the south in the suburb of Tarneit, to the east in Ravenhall and to the northeast in Caroline Springs. The southern network consists of a 300mm diameter branch sewer that extends from Leakes Road south along the east side of Skeleton Creek and increases in size to a 600mm diameter branch, continuing along Skeleton Creek south of Sayers Road. The network eventually connects to the Western Trunk sewer main located to the south east of the PSPs. This sewer network currently services existing development in the Hoppers Crossing and Tarneit region, south of Leakes Road. The existing networks to the north and east both ultimately discharge into the Derimut Interceptor Sewer and then into the Western Treatment Plant at Werribee. These sewers currently have limited capacity to take additional flows from new development.

Existing sewer infrastructure surrounding the PSPs is shown in Plan 4 in Appendix A.

6.2 Proposed Servicing Advice

The PSPs have been covered in a recently released sewer network servicing plan undertaken by Melbourne Water, City West Water and Western Water. Plan 4 shown in Appendix A includes indicative infrastructure sizing and the year of planned upgrade. Western Water and City West Water have both advised that these are likely to change with ongoing strategic planning.

The PSPs will both ultimately be serviced by localised gravity sewer networks however, it is likely that there will be a requirement for temporary localised rising mains and sewer pumping infrastructure particularly in PSP 1082. This is further discussed in section 6.3.

Due to the natural topography of the site, PSP 1082 will be divided into two distinct sewer catchments to the north and south of Mt. Atkinson. The section of the precinct to the north will discharge via 225mm and 375mm diameter mains towards the north and cross over the Western Highway. The sewer network servicing plan indicates that ultimately the northern catchment of PSP 1082 will connect into the proposed sewer networks within the developments on the western edge of Caroline Springs. A 750mm/825mm diameter main will transport the sewage along Kororoit Creek to a proposed sewerage pump station near Clarke Road. A proposed rising main will transport sewage along the Western Highway and ultimately flow into the Derimut Interceptor Sewer and then into the Western Treatment Plant at Werribee.

The section of the precinct to the south of Mt. Atkinson will discharge via 225mm and 375mm diameter mains towards the south through PSP 1085 over Middle Road, towards Leakes Road and east along Leakes Road via a future sewer to the Western Trunk Sewer at Sayers Road located east of Truganina.

Sewer from the PSP 1085 will be transported south via 225mm and 375mm diameter mains over Middle Road, towards Leakes Road and east along Leakes Road via a future sewer to the Western Trunk Sewer at Sayers Road located east of Truganina.

The provision of a sewer distribution network to the PSPs is contingent on infrastructure extending from the north and south from existing residential areas. Western Water and City West Water have advised that they will cover the cost of any capital sewer works as long as they are within the planned upgrade timeframes. Any works that are required to be brought forward as a result of early onset of development will trigger contribution costs to the developer.

The sewer distribution network within the PSPs is likely to consist of mains ranging from 225mm to 450mm diameter. The larger size mains are like to discharge to the south along Skeleton Creek and over Middle Road. The internal sewer network will largely be defined by the future developments road network.

6.3 Key Development Opportunities and Constraints

City West Water has indicated that there is limited capacity in the existing sewer networks to the south of the PSPs. Further development in this and other adjacent precincts will require an extensive augmentation to the network as shown in Plan 4 in Appendix A. Stringent long-term planning will allow for this servicing strategy to provide an adequate network with enough capacity to provide for future mixed use development.

The preference will be for works to be staged so that new development begins in the south along Leakes Road and moves north towards the PSPs. This northerly progression of development will provide the most efficient means for the water authorities to gradually upgrade and extend their networks. The sewer infrastructure required to service the PSPs is not planned until around the years 2040-2045. If the proposed development is out of sequence with the planned upgrades any temporary servicing solution for the PSPs must be in line with the strategic servicing strategy. Invert levels, pipe sizes and locations must be such that the ultimate network can be easily integrated.

In the likely event that development is to occur in the northern section of PSP 1082 prior to planned network extensions being constructed, Western Water have advised that a local sewer pump station and rising main will be required to service the development. This rising main will possibly be aligned with Greigs Road and connect into the existing Western Water sewerage network near the intersection of Griegs Road and Troups Road North in Rockbank. The temporary sewer rising mains and pump stations are shown in Plan 4 in Appendix A. As stated above any temporary infrastructure is to be in line with future servicing strategies. Western Water has also advised that although there is currently no capacity in the Rockbank network however, upgrades are planned and should be and would have sufficient capacity.



7. Water

Western Water is the authority responsible for providing the distribution and reticulation of potable water to future residents and industries in the PSPs. Discussions have previously also been held with City West Water in regard to this larger catchment area. Western Water's strategic water servicing plan for the proposed development site was discussed in a meeting held on 4 June, 2014. Melbourne Water is the authority responsible for trunk water infrastructure in the Tarneit and Truganina area which transports water to elevated tanks via their Melbourne to Geelong supply network. Although the PSPs are within the Western Water catchment area, there is some uncertainty as to where this boundary will lie in the future. There are ongoing discussions and negotiations between Western Water and City West Water in regard to the licence boundary.

7.1 Existing Services and Assets

Melbourne Water owns an existing 1150mm trunk potable water pipeline located to the south of the PSPs, extending from Palmers Road southwest to the existing Cowies Hill (Werribee) Reservoir tanks on Tarneit Road. These tanks are elevated to approximately 67 m and currently service the surrounding Werribee and Hoppers Crossing areas. Melbourne Water has advised this 1150mm pipeline exists within a 10m wide Melbourne Water owned pipe reserve. The location of this 1150mm main is shown in Plan 5 in Appendix A.

Provision of water supply from the Cowies Hill elevated tank to the surrounding development is the responsibility of Western Water. Western Water's potable water mains are located throughout existing development south of Leakes Road however, there is no Western Water owned infrastructure within the PSPs. Plans show some small diameter reticulation mains for predominately agricultural use and Western Water have indicated that these are at capacity and would not be appropriate for the demand required from future mixed-use development in the PSPs. Western Water has also advised that there is limited available capacity in the Cowies Hill elevated tank system.

7.2 Proposed Servicing Advice

The PSPs have been covered in a recently released water network servicing plan undertaken by Melbourne Water, City West Water and Western Water. This servicing plan is shown in Plan 5 in Appendix A and includes indicative infrastructure sizing and the year of planned upgrade. Western Water and City West Water have both advised that these are likely to change with ongoing strategic planning.

Due to future development in the area, a new elevated water tank is required to support further growth in the western corridor. The proposed Holden Tank to the north of the Melton Highway and adjacent to the Hillside development is proposed to service future development spanning to the south and this network will likely extend to the PSPs. The potable water supply to this future network will be via a proposed 1150mm diameter trunk Melbourne Water potable water main along the Melton Highway. This new main will connect into the existing Melbourne Water network at the intersection with Calder Park Drive.

The proposed water distribution network within the PSPs will consist of 300mm diameter mains. As the potable water network moves to the north towards the Holden Tank these mains will

increase in diameter. Plan 8 in Appendix A provides an overview of the broader Water and Recycled Water network.

In regard to preliminary costing for the associated potable water works required to service the PSPs, the approximate cost for an elevated water tank (Holden) is in the vicinity of \$5 million and for a ground tank, approximately \$10 million. The water authorities have advised that the cost for proposed capital works and shared water assets including will be paid for by the water authorities as long as these are within the planned upgrade timeframes. However, if the works are required ahead of time costs will be brought forward and will be borne by the developer. Developers will also be required to pay a developer contribution fee to Western Water of approximately \$500 per lot.

7.3 Key Development Opportunities and Constraints

The future Holden Tank will have capacity to supply potable water to the PSPs. If development begins prior to the commission of the Holden tanks, there is an opportunity for temporary elevated water tanks to be built to cater for the interim supply. The Holden Tank is planned for commission sometime around 2023, and if demand for water due to new development exceeds existing supply capacity before this time, temporary elevated tanks may be erected. Temporary elevated water tanks would be required in a suitable location in accordance with the developer's requirements and Western Water's approval. The elevated tanks should be located outside the Rural Conservation Zone (RCZ) centred at Mt. Atkinson. The cost to install and supply elevated tanks is likely to be borne by the developer. Furthermore, the water distribution assets that will be required to transport water from the temporary elevated tanks to the PSPs will be constructed before the planned date of 2035-2045. Any assets built will be at a cost to the developer and must be in line with the future servicing strategy to the larger network in that pipe sizes and locations must be suitable.



8. Recycled Water

Western Water is the authority responsible for providing the supply of class A recycled water to future residents and industries in the PSPs. Class A recycled water is the quality of water required for high exposure uses such as flushing toilets and watering gardens however, it is not intended for drinking. Western Water's strategic water servicing plan for the proposed development site was discussed in a meeting held on 4 June, 2014. Existing developments in Werribee and Tarneit already benefit from access to Class A recycled water from the Melbourne Water Western Treatment Plant. Although the PSPs are within the Western Water catchment area, there is some uncertainty as to where this boundary will lie in the future. There are ongoing discussions and negotiations between Western Water and City West Water in regard to the licence boundary.

8.1 Existing Services and Assets

The Melbourne Water Western Treatment Plant is located approximately 25 km to the southeast of Tarneit. It supplies Class A recycled water with 1000 mg/L Total Dissolved Solids. Much of this water is sold through contractual agreements to a variety of water users. The water which Western Water provides to its customers undergoes a salt reduction (reverse osmosis) process and is diluted to bring the Total Dissolved Solids down to 500 mg/L.

There is no recycled water infrastructure located within the PSPs. The provision of recycled water to new development within the PSPs will be the responsibility of Western Water and future sources of recycled water supply to the area have been proposed by Western Water.

8.2 Proposed Servicing Advice

The PSPs have been covered in a recently released water and recycled water network servicing plan undertaken by Melbourne Water, City West Water and Western Water. This servicing plan is shown in Plan 6 in Appendix A and includes indicative infrastructure sizing and the year of planned upgrade. Western Water and City West Water have both advised that these are likely to change with ongoing strategic planning.

A future Ravenhall Treatment Plant is planned along Robinsons Rd, north of Middle Road in Truganina. This treatment plant is scheduled for construction sometime after 2020. Flows will be captured from the surrounding northern area and transfer flows to the proposed Ravenhall treatment facility, before treating the water and distributing north to the Holden tank site. A potential route for this major recycled water transfer may exist along Hopkins Road to the east of the PSPs. The Holden tank site will house both potable and recycled water tanks. It is estimated that approximately 14ML per day will be available to treat at the Ravenhall Treatment Plant. Refer to Plan 6 and 8 in Appendix A for the location of proposed recycled water infrastructure. Any recycled water infrastructure must be located within the road reserve and at an offset to be agreed upon with Council.

8.3 Key Development Opportunities and Constraints

The future Holden tanks will have capacity to supply recycled water to the PSPs. If development begins prior to the commission of the Holden tanks however, the preference is for third pipe installation to transport potable water in the interim prior to recycled water becoming available.

Western Water informs recycled water supply is not mandatory for the PSPs. However, Western Water can mandate third pipe supply for an area of development if necessary, and development conditions regarding third pipe construction can be placed on the developer when applying for a planning permit. Furthermore, any assets that are required to be built ahead of planned works (2040-2045) will be at a cost to the developer and must be in line with the future servicing strategy to the larger network in that pipe sizes and locations must be suitable.



9. Funding Arrangements

9.1 Water Supply and Sewerage

9.1.1 General

Planning permit applications are referred to a number of statutory authorities including water retailers. A condition generally included is that any developer of subject land, must enter into an agreement with the relevant Water Retailer to provide water, recycled water and sewer services and meet all requirements to the water retailer's satisfaction, in this case Western Water and City West Water.

Whilst Water Retailers have a general contributions policy, as detailed in the following section, specific details of the financial, servicing and special conditions that the developer must meet are described in the Development Deed, produced as part of any development.

Developers must meet all of these conditions before the water retailer will issue its consent to the issuing of a Statement of Compliance to Council, as required by section 57 of the Subdivision (Procedures) Regulations 1989.

Where existing water and / or recycled water mains need to be realigned or abandoned due to the redevelopment or changes to the subdivision of land, the owners must pay all costs associated with such works.

9.1.2 Water Retailer Contributions Policy

Developers are required to make standard regulated development contributions as well as fund the construction of the water reticulation network within developments. New customers make an up-front contribution to the costs of connecting to existing water and sewerage networks. Existing customers are also required to contribute to the costs of new infrastructure when they connect to additional services.

Water Retailers and developers must provide services in accordance with Essential Services Commission's Guidelines as detailed below

- Water Retailers are responsible for providing shared distribution assets and temporary shared works
- Developers are responsible for providing reticulation assets and temporary reticulation works (these assets are generally known as 'gifted assets')
- Developers are responsible for the financing costs associated with bringing forward the provision of shared distribution assets and temporary shared works
- Developers are responsible for the cost of connecting their development to the water retailer's shared infrastructure assets
- Developers are responsible for the installation and financing of dedicated assets to service their development

Shared distribution assets are infrastructure assets that are generally provided for more than one development and do not include:

- Reticulation assets
- Headworks and tailworks

Headworks and tailworks are infrastructure assets that are owned by a water and sewerage wholesaler (Melbourne Water) and may include major water supply reservoirs, raw sewage transfer pump stations, and major waste water purification plants and disposal systems.

Water Retailers are responsible for providing shared distribution assets which are funded by New Customer Contributions.

Where shared distribution assets are required to be installed Water Retailers will refund the developer the estimated or tendered value of the works, including an allowance of 8% for design, project management, and survey costs.

Asset size thresholds are for guidance only. The key determinant of whether an asset is a reticulation asset or a shared asset is the number of developments it serves. A reticulation asset is the minimum sized asset to serve one development.

If the asset has been upsized in any way from the minimum requirements to serve the development or had its location or route altered to serve future developments it should be considered a shared asset.

New Customer Contributions

Water Retailers may levy new customer contributions by scheduled or non-scheduled charges. Non-scheduled charges may be applied if the financing costs associated with the Water Retailer bringing forward the provision of shared distribution assets and/or temporary shared works to an out-of-sequence development exceed the approved scheduled charge.

The percentage cost that may be levied as a non-scheduled charge is determined based on the timing of planned works in terms of logically sequenced network expansion. Typically the following applies:

- 0 - 5 years = 0% bring forward charge
- Over 5 and up to 15 years = 40% bring forward charge
- Greater than 15 years = 70% bring forward charge

New customer contributions are charged on an allotment basis where a lot is defined as separately titled property or any dwelling that can be separately metered. New customer contributions for water and recycled water are set out in Table 4.

Table 4 New Customer Contributions for Water and Recycled Water

Lot Size	Potable Water *	Recycled Water
Small lots < 450sq.m	\$550	\$550
Standard lots: 450sq.m to 1,350sq.m	\$1,100	\$1,100
Large lots > 1,350sq.m	\$2,200	\$2,200



**If recycled water supply is included as part of a development, the scheduled charge per lot for potable water is halved.*

Table 5 New Customer Contributions for Sewerage

Lot Size	Sewerage
Small lots < 450sq.m	\$550
Standard lots: 450sq.m to 1,350sq.m	\$1,100
Large lots > 1,350sq.m	\$2,200

Application Fees

Application fees are required to be paid by developers in accordance with the relevant water retailer's land development and pricing policies.

Application fees may be charged due to:

- A connection to / extension of the Water Retailer's network(s)
- Early release of a Statement of Compliance
- Audit
- Supply of pressure and flow information / development deed
- Build over or creation of an easement
- Operations and maintenance for temporary works
- Issue or revision of a development deed
- Sewage education

9.2 Electricity

Costs associated with upgrades to the electricity transmission and distribution network to zone substation level are typically funded by the distribution business through customer tariffs. These upgrades are planned in response to load growth, therefore provision of redevelopment densities and staging to the distribution business is crucial to allow planning for growth to occur in a timely manner.

The distribution business typically pays a contribution towards new 11kV feeders and local substations required to match the load generated by redevelopment, with the remaining cost attributable to the developer that triggers the works. The scale of cost for these works depends on the distance from the development to existing infrastructure and the size of assets required. Costs would be determined by the distribution business on a case by case basis.

Costs associated with relocations and undergrounding of existing overhead powerlines to suit redevelopment aspirations are typically attributable to the developer that requests the works. Costs associated with undergrounding works may also need to include relocations of kiosk substations, undergrounding of existing connections to third party properties, new light poles and public lighting assets and electrical assets associated with traffic lights. Estimating the cost of

undergrounding is difficult and relies on the above, plus the capacity of the existing asset amongst other things.

It is important to note though that the way connection charges are levied is under review. The Australian Energy Regulator prepared a new national electricity connection charge guideline the impact of which is still being reviewed and understood. It is expected that the new guideline will apply from the end of the current tariff period, which is 2015.

9.3 Gas Supply

There are two types of tariff arrangements for gas customers depending on the volume of gas required, Tv (tariff volume) and Td (tariff demand) customers. Customers such as residential developers usually fall into the category of a Tv customer. Td customers have an extremely high peak hourly load (10,000MJ/hour) or annual volume required (10TJ/annum). Cost for gas is less expensive for Td customers but they are liable for greater capital costs in financing extensions and network augmentation.

In line with regulatory requirements gas project funding is determined in several ways. Where a connection request is made for commercial and residential sites, future gas distribution revenues for the site are calculated and offset against the construction costs associated with the gas assets.

Where a shortfall occurs, it is the responsibility of the applicant / developer to finance the deficit in order for the project to proceed.

Where a request is made for installation of a gas main to a building or site for the purposes of enabling future connection, with no connection requests being current at the time of installation, the full construction cost is passed on to the developer.

If specific developments require upgrades to the existing network in order to meet load and/or metering pressure requests, offers are made to the retailers outlining the charge that corresponds to each case. The scale of works would dictate the period over which works are undertaken post receipt of acceptance of a supply offer issued via a retailer.

9.4 Telecommunications

9.4.1 NBN Requirements

Applications to the network are processed online and if NBN's criteria are met, NBN will provide a Developer Agreement. NBN installs all cabling and associated infrastructure including reticulation from the Fibre Distribution Hub (FDH) to each dwelling.

According to NBNCo, the developer is responsible for the following:

- Design of pit and pipe infrastructure to NBN Co specifications and standards and submission of drawings to NBN Co for review prior to installation
- Installation of pit and pipe infrastructure to NBN Co specifications and standards, including:
- Provision of a suitable building entrance facility (lead-in) from the street network to the building entrance, through to any area designated for Telecommunications services. Where diversity or other special needs exist, an alternative entry location may also be required



- Provision of suitable space and access for the installation, maintenance and repair of all NBNCo network elements up to and including the Network Termination Unit (NTU) and Power Supply Unit (PSU)
- Provision of a minimum of P20 (23mm nominal inside diameter) communications conduit, racks and cable trays, from either the telecommunications room or riser/closet location to each NTU location
- Transfer of ownership of pit and pipe infrastructure to NBNCo

NBN Co is responsible for:

- The cabling, installation and maintenance of all network assets up to and including the NTU and PSU would be the responsibility of NBN and the developer would not be responsible for costs associated with those items

Compliance to the Building Code of Australia for all cabling and with reasonable directions provided by authorised developers, builders, owners, managers and customers in respect to building and fire authority requirements. In the cases where requests are received which are regarded as unreasonable, advice may be sought.

10. Conclusion

This assessment analysed existing infrastructure in and around PSP 1082 and PSP 1085 in Melbourne's west and aimed to identify any constraints or opportunities and determine the ability of the existing networks to accommodate predicted residential, commercial and industrial development and the investment associated with any infrastructure works required.

Trunk services investigated include electricity, telecommunications, gas, sewer, water and recycled water. An investigation into the service of stormwater drainage was not part of the scope for this servicing assessment and will be investigated by others. Key findings by utility are summarised below in Table 6

Table 6 Key Findings for the Provision of Services

Sector	Key Findings
Electricity	<ul style="list-style-type: none"> • The proposed Rockbank zone substation location will need to be decided upon consultation with local landowners and SP Ausnet • New feeders and a local substation are required to match the load generated by redevelopment. The costs of these assets are typically attributable to developers • Powercor have planned the new Tarneit (TRT) and Truganina (TNA) zone substations. These will service future development in the precinct • Costs associated with undergrounding electricity lines are expected to be borne by developers • SP-Ausnet has planned new terminal stations at Deer Park (DPTS) and Truganina (TTS) • Works at the zone or terminal substation level and in the transmission network are unlikely to be attributable to developers
Telecommunications	<ul style="list-style-type: none"> • The existing Telstra network infrastructure is inadequate to service the future growth within the precinct and will require significant upgrades • A temporary NBN solution may be required to support redevelopment prior to the rollout of the permanent network depending on when redevelopment occurs in the precinct • Future telecommunications to the proposed development will be the responsibility of NBN Co provided that developers enter into an agreement with NBN Co. and

	<p>that NBN Co's new development requirements are met</p> <ul style="list-style-type: none"> • The scale and density of development in the PSPs may result in it being granted priority in future rollout planning and may require NBNCo to allocate greater capacity to the area
Gas Supply	<ul style="list-style-type: none"> • APA owns a two high pressure transmission gas mains which run north-south and east-west along Hopkins Road and Middle Road respectively and pass through the PSPs • No existing distribution infrastructure is located within the precinct however the PSPs can be adequately serviced through construction of a new gas city gate tapping and a proposed distribution main along Mt. Atkinson Road • The financing of extensions of the gas network are economically feasibility tested and costs may be attributable to the developer who requests the extension
Water Supply & Sewerage	<ul style="list-style-type: none"> • Western Water and City West Water plans indicate no sewer, water or recycled water infrastructure within the PSPs • The PSPs will likely be serviced by a gravity sewer network and it is unlikely that there will be a need for new rising mains or sewer pumping infrastructure • The provision of a sewer distribution network to the southern catchment in the PSPs is contingent on the infrastructure extending in a northerly direction from the existing residential areas to the south at Tarneit and Truganina. Provision of a sewer distribution network to the northern catchment in the PSPs is contingent on the infrastructure extending in a southerly direction from the existing residential areas to the north or via a temporary connection into the existing sewer network in Rockbank • The future Holden Tank will have capacity to supply potable water to the PSPs • Developers will be required to make standard regulated development contributions as well as fund the construction of the reticulation network within developments • A future Ravenhall Treatment Plant is planned for construction sometime after 2020

Appendices

Appendix A

Services Plans

Plan 1: Electricity Infrastructure

Plan 2: Telecommunications Infrastructure

Plan 3: Gas Infrastructure

Plan 4: Sewer Infrastructure

Plan 5: Water Infrastructure

Plan 6: Recycled Water Infrastructure

Plan 7: Combined Infrastructure

Plan 8: Water & Recycled Water (larger scale)



Appendix B

Key Contact List

Electricity

- Herman De Beer, SP Ausnet
- Rob Ingram, Powercor
- John Owens, Powercor

Telecommunications

- Julian Nachmias, NBNCo.

Gas

- Daniel Tucci, APA GasNet
- Mark Baker, SP Ausnet

Sewer, Water, Recycled Water

- Derek Robertson, Western Water
- Bruce Collins, City West Water



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Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
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B	N. MOYLAN	M. WHALEN		M. WHALEN		21/07/2014
C	N. MOYLAN	M. WHALEN		M. WHALEN		03/09/2014

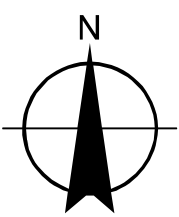


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Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



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| Existing Electrical Transmission line | Terminal Stations | Rail station | Local road | Swamp | LGA outline |
| Easements | Substations | Railway | Unsealed road | River | Parcel |
| Proposed Electrical Transmission line (Indicative) | VM_Prop_Easement_Li... | Freeway | Track and bike path | Stream | Reserve |
| | PSP Boundary | Highway | Lake | Channel / drain | Sport facility |
| | OMRR PAO | Arterial | Water course | Connector | |



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Metropolitan Planning Authority
Infrastructure Assessment

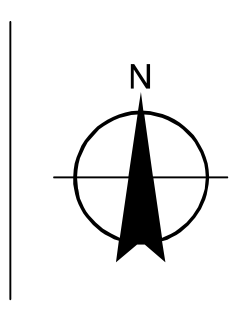
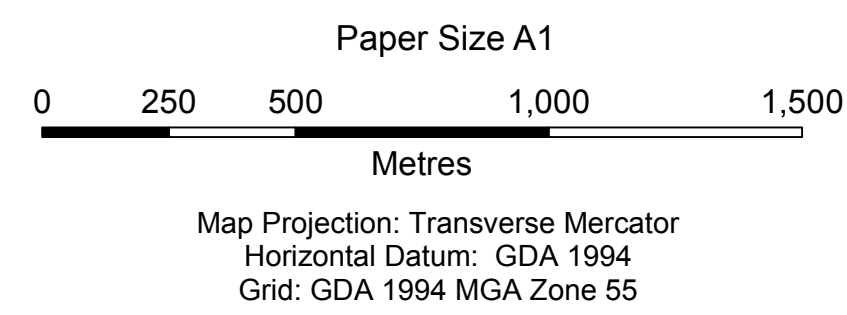
Mt Atkinson and Tarneit Plains
Existing & Proposed Electricity Infrastructure

Job Number 31-31582
Revision 0
Date 03 Sep 2014

Plan 1

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LEGEND	
Telstra Infrastructure	
Main Cable/Conduit	PSP Boundary
Distribution	OMRR PAO
Railway	Rail station
Local road	Arterial
Unsealed road	Track and bike path
Swamp	River
Stream	Lake
Water course	Channel / drain
Connector	LGA outline
Parcel	Reserve
Freeway	Highway
Sport facility	



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Infrastructure Assessment

Mt Atkinson and Tarneit Plains
Existing & Proposed Telecommunications Infrastructure

Job Number 31-31582
Revision 0
Date 03 Sep 2014

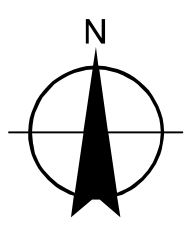
Plan 2

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Mt Atkinson and Tarneit Plains
Existing & Proposed Gas Infrastructure

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Plan 3

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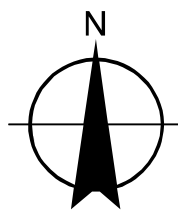


Paper Size A1

0 250 500 1,000 1,500

Metres

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



LEGEND

- | | | | | | |
|--|---------------------|-----------------|-------------|---------|----------------|
| Temporary Elevated Tank | 611 - 1350 | PSP Boundary | Arterial | Swamp | Parcel |
| Existing Water Main | OMRR PAO | Local road | River | Reserve | Sport facility |
| Proposed Water Main (indicative) (Proposed Year of Construction) | Rail station | Unsealed road | Stream | | |
| DIA | Track and bike path | Channel / drain | Connector | | |
| 20 - 200 | Lake | Water course | LGA outline | | |
| 201 - 610 | Freeway | Highway | | | |



METROPOLITAN
PLANNING
AUTHORITY

Metropolitan Planning Authority
Infrastructure Assessment

Mt Atkinson and Tarneit Plains
Existing & Proposed Water Infrastructure

Job Number 31-31582
Revision 0
Date 03 Sep 2014

Plan 5

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