

3 September 2024

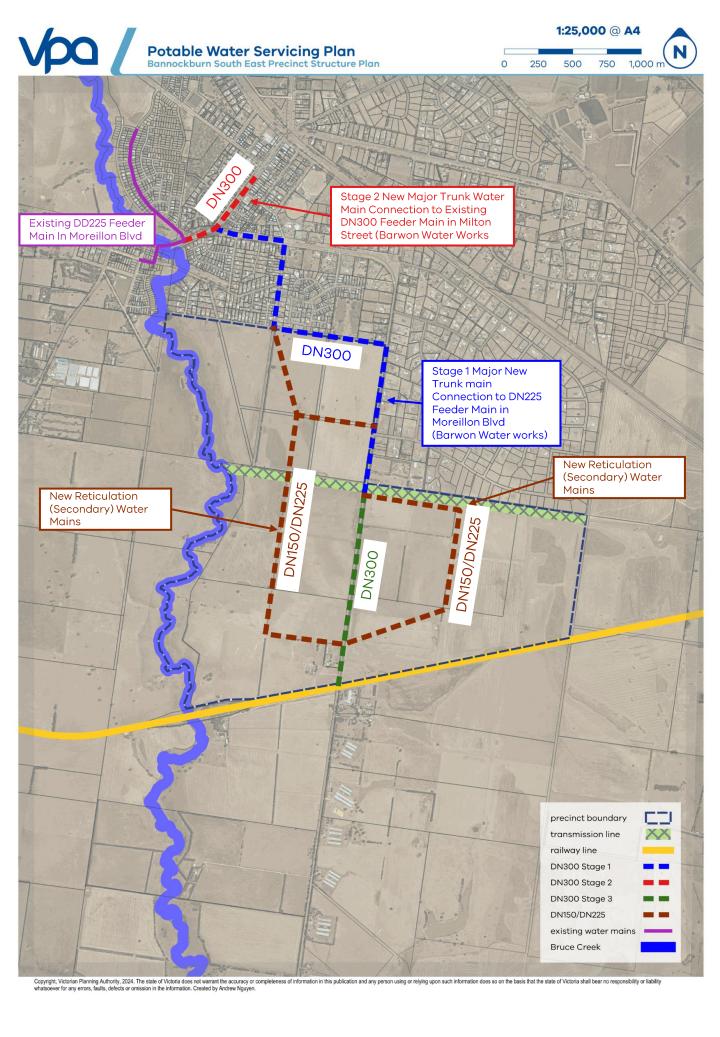
Bannockburn South East Precinct Structure Plan – Utility Servicing Assessment Addendum

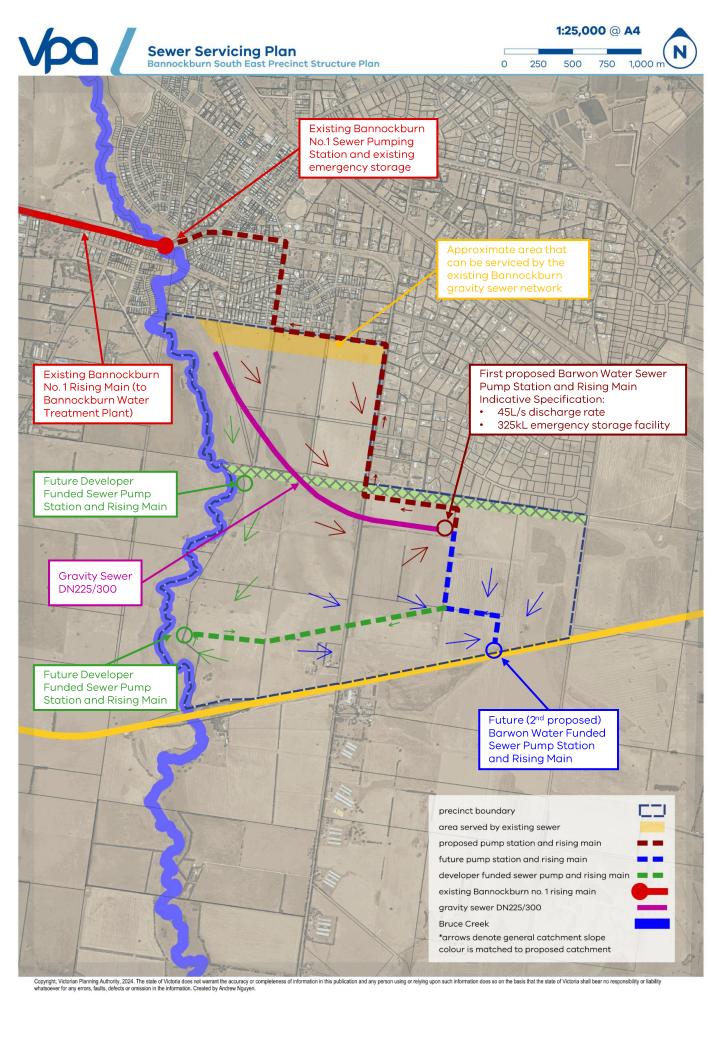
Please refer to the plans on page 2 and 3 for updated versions of the following:

- Potable Water Servicing Plan (plan on page 2 supersedes page 72 of the final assessment)
- Sewer Servicing Plan (plan on page 3 supersedes page 73 of the final assessment).

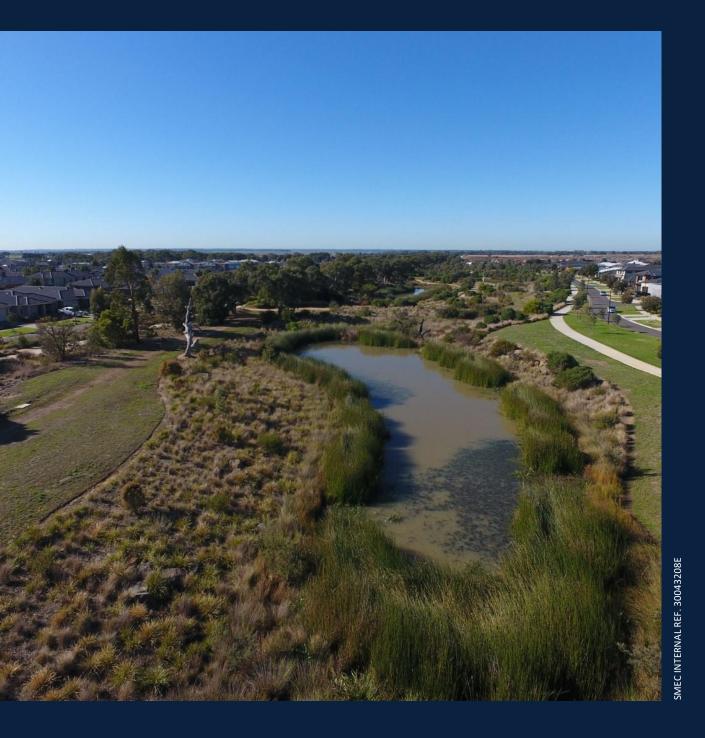
These updates have been approved by Barwon Water and reflect Barwon Water's advice to the VPA on 14 June 2024 to update the alignment for potable water and sewer for the Bannockburn South East Precinct Structure Plan.











Bannockburn South East PSP Utility Servicing Assessment

Client Purchase Order No. COR/22/3684 Prepared for: Victorian Planning Authority 01 August 2024

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Executive Summary

SMEC has been engaged by the Victorian Planning Authority (VPA) to prepare a Utility Assessment report for the Bannockburn South East Precinct Structure Plan, which is one of the first identified precincts to be planned for within the wider Bannockburn Growth Area.

The purpose of this Utility Assessment is to inform the preparation of the Precinct Structure Plan and includes reviewing existing servicing strategies, identifying opportunities and constraints regarding utility services and infrastructure related to the future development and to formalise the understanding of servicing the precinct with sewerage, water, power, gas, electrical and telecommunications. The Utility Assessment shall consider the key planning strategies set out in the Bannockburn Urban Growth Plan May 2021, including the vision for the South East Precinct in relation to the delivery of sustainable development including identifying opportunities to develop a low-carbon precinct using zero carbon design principles.

This report documents the key considerations from discussions held with VPA, Council and Service Authorities as part of this engagement.

For avoidance of doubt, stormwater management and road infrastructure do not form part of the scope of this Utility Assessment. We understand that the VPA have engaged other consultants to provide stormwater strategies and traffic assessments for this Precinct.

The information in this report is preliminary and has been obtained through discussion with key stakeholders and service authorities at the time of writing this report. The Utility Assessment is subject to change upon final confirmation of utility servicing strategies adopted by the relevant service authorities and following further review of detailed inputs (e.g. property investigations, feature and level survey, detailed engineering design and future planning decisions). SMEC does not accept a duty of care or any other legal responsibility whatsoever in relation to the current utility assessment or any subsequent changes to the servicing strategies.

1. Introduction

1.1 Background

The Victorian Planning Authority (VPA) in Partnership with the Golden Plains Shire Council has prepared the draft Bannockburn Growth Plan to guide the sustainable development of Bannockburn to the year 2050.

The Bannockburn South East PSP is the one of the first identified precincts to be planned for within the wider Bannockburn Growth area, as presented in the Bannockburn Growth Plan May 2021 (Gazetted).

The Bannockburn Growth Plan, for the South East PSP area, is characterised by existing waterways and proposed constructed waterways with the main feature being Bruce's Creek flowing through the centre of the precinct. These elements are proposed to be incorporated with linear parks/open spaces to enhance "liveability".

The Bannockburn South East precinct is at the southern edge of the Bannockburn Growth Area, refer **Figure 1**, and is bound by:

- Bruce's Creek (west).
- Charlton Road and existing urban development (north).
- "Gheringhap-Maroona Section" railway line (south).
- The proposed extended edge of existing urban development (east).

The Bannockburn South East PSP has a total area of approximately 523 hectares (with approximately 319-346 hectares of developable land) and is anticipated to deliver between 4,800 - 5,200 new dwellings to cater for a population of approximately 14,000 - 15,000 new residents.

The Bannockburn Growth Plan has regional context, with Bannockburn being the largest town in Golden Plains Shire Council and located approximately 29km north-east of Geelong's CBD approximately 64km south-east of Ballarat's CBD, with the Bannockburn South East PSP area being south of the Midland Highway (Ballarat Road) and the Geelong-Ballarat railway.

The landform has a history of rural and farming properties within a district of well-established agricultural industry. The land has gentle to medium slopes, in the west of the precinct, towards Bruce's Creek along its western boundary and similar gentle slopes to tributaries running south to the southern boundary in the east of the precinct.

One of the VPA's key considerations when planning the Bannockburn Growth Area precincts is the pursuit of a sustainable approach to planning and development through the integration of energy, water, waste, transport and building construction. This report considers and discusses relevant planning mechanisms and strategies to advance sustainability outcomes and how they can be achieved within the Bannockburn South East Precinct Structure Plan.

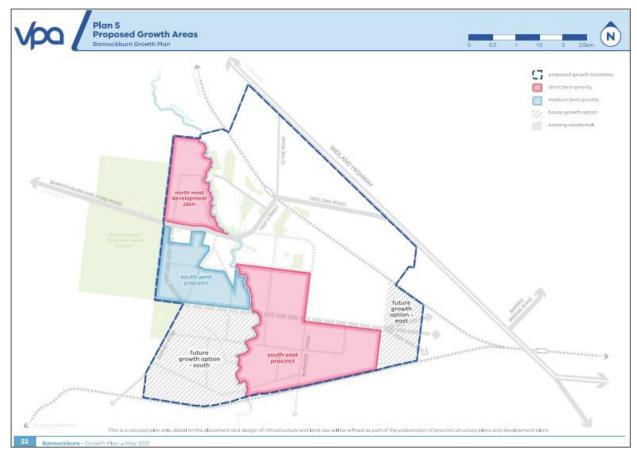


Figure 1: Bannockburn - Growth Plan, Bannockburn Growth Plan, May 2021 (Gazetted)-Source: VPA

1.2 Purpose

The purpose of this report is to provide a high-level utility servicing review of the Bannockburn South East precinct to inform the preparation of Precinct Structure Plan and the requirements for the following services:

- Sewer Reticulation;
- Potable Water;
- Recycled Water;
- Electricity;
- Gas; and
- Telecommunications.

In consultation with the relevant authorities, the capacity of existing services and the likely future infrastructure requirements has been assessed by SMEC and any constraints have been identified in this report.

For avoidance of doubt, stormwater management and road infrastructure do not form part of the scope of this Servicing Plan.

In accordance with the brief supplied by the VPA, this report is also required to document investigations and opportunities relating to a sustainable approach to development in line with State and Local Government policies that supports the transition to net-zero emissions by 2050.

1.3 Background and Reference Documents

The information within this report has been collated from the following sources:

- The Bannockburn Urban Growth Plan (May 2021, Gazetted);
- Bannockburn SE PSP Pitching Summary, Final (VPA, May 2022);
- Bannockburn South East PSP (PSP 2.0) Pitching sessions primer pack, (VPA, March 2022);
- Consultant site inspection information Landowner Details (June 2022);
- Australian Rail Track Corporation Preliminary advice (dated 18 August and 7 September 2022);
- Ausnet Services (Electrical Transmission) Preliminary Servicing Advice (dated 29 March 2023);
- Ausnet Services (Gas) Preliminary Servicing Advice (dated 10 October 2022);
- Barwon Water Bannockburn South and East Precincts Future Growth Options, Preliminary Servicing Advice (dated 21 June 2022);
- NBN Co Bannockburn SE PSP Servicing Assessment (received 01/08/2022);
- Powercor Preliminary Servicing Advice (dated 29 March 2023);
- Telstra InfraCo, Pit Pipe and Duct (dated 08 August 2022);
- Telstra Network Integrity (1 August 2022 verbal response, Paul Saunders);
- Alluvium Bannockburn Growth Plan Catchment Assessment (dated May 2020);
- IDM Infrastructure Design Manual (Version 5.40 IDM 2022);
- National greenhouse and Energy Reporting Act 2007 (NGER Act);
- Victoria's Climate Change Act 2017;
- Victoria's 2035 Emissions Reduction Target (Victorian Department of Energy, Environment and Climate Action, May 2023)
- Environment Strategy, 2019-2027 (White and Connor, 2019) (Golden Plains Shire);
- Climate Emergency Plan 2022-2032 (Golden Plains Shire);
- Guide to Community-Owned Renewable Energy for Victorians (State Government Victoria);

1.4 Key Stakeholders

During preparation of this report several key stakeholders have been requested to provide inputs. These stakeholders have been summarised in **Table 1** below.

Table 1: Summary of Key Stakeholders

Name	Detail
VICTORIAN PLANNING AUTHORITY	Sponsor of Bannockburn South East PSP
GOLDEN PLAINS SHIRE COUNCIL	Roads and Drainage Authority
BARWON WATER	Sewer, Potable Water and Recycled Water Service Authority
POWERCOR	Electrical Service Authority
AUSNET SERVICES – HV TRANSMISSION	Overhead HV Electrical Transmission Mains Authority
AUSNET SERVICES (GAS)	Reticulation Gas Service Authority
NATIONAL BROADBAND NETWORK (NBN)	Telecommunications Authority
TELSTRA	Communications Infrastructure Owner within SE PSP area
AUSTRALIAN TRAIL TRACK CORPORATION LTD	Australian Rail Track Management Authority

1.5 Methodology

SMEC have prepared this utility servicing assessment report in accordance with the methodology presented in **Figure 2** below.

Phase 1: Background Review, Investigation and Authority and Stakeholder Consultation

- Background Information and existing services review.
- Client Inception Meeting.
- Contact with Key Stakeholders/Service Authorities for information sharing and preliminary servicing advice.
- Individual consultation, as required, with service authorities to review proposed servicing options, constraints and opportunities.
- Collation of information acquired and issue to client for further discussion and consolidation of preferred servicing scope.
- Prepartion of Sustainability Research Technical Memo for Client discussion and assessment.

Phase 2: PSP Servicing Draft Report/Plan Preparation

- Ongoing consultation with authorities.
- Develop sequencing strategies and development staging based on key servicing constraints.
- Ongoing consultation with VPA to update on progress and to affirm preferences and scope.
- Incorporation of Sustainability research information into draft report document

Phase 3: Client Review & Report Finalisation

- Prepare Illustrator servicing plans and draft report document.
- •Client Assessment Meeting to discuss outcomes and actions from Client Review of Draft Report
- Report Finalisation and distribution to client in approved formats.

Figure 2: Delivery Methodology

2. Sewer, Potable Water & Recycled Water

2.1 Introduction

Barwon Water (BW) is the responsible authority for the provision of sewer, potable water and recycled water supply infrastructure to service the Bannockburn South East PSP precinct.

As development within the precinct area progresses, each developer will be required to extend services from the designated network connection location in accordance with Barwon Water's developer deed conditions.

Preliminary Servicing Advice confirmation was sought from BW to ascertain their requirements to service the Bannockburn SE precinct.

Barwon Water's written response (refer **Appendix A**) is prefaced by Barwon Water as follows, "Any information given in this preliminary servicing advice or otherwise by BW is not binding upon BW and you shall not undertake any commitment based on any information given until a formal execution of a Developer Deed or a Private Works Deed".

As the Bannockburn SE Future Structure Plan is currently being developed, Barwon Water have advised that some of the advice may change when locations of land uses, which have impacts on water and sewer assets, are decided.

2.2 Potable Water

2.2.1 Current Conditions

The township of Bannockburn is currently serviced by the Bannockburn basin, which is supplied by the Moorabool Water Treatment Plant (WTP) via the Sheoaks pipeline. After treatment, water is then pumped, via one of the two pump stations at the Bannockburn basin. The Bannockburn water supply is all delivered entirely by pumping, with no customer being able to be fed by gravity. The servicing of development will evolve over time and servicing strategies will need to adapt to the growing population needs.

There is potable water infrastructure currently within, and adjacent to, the Bannockburn SE precinct area. Water mains within proximity to the precinct are as follows:

- DN100/150mm diameter PVC water rising main on the north side of Charlton Road, from Glenbrae Court in the west to Burnside Road in the east.
- DN100/150mm diameter PVC water rising mains on the west side of Burnside Road, from Charlton Road (and further north) to southern boundary (Gheringhap-Maroona rail line) of the Bannockburn SE area.

Existing water mains which provide supply to the above reticulation mains are as follows:

- DN300 feeder main in Milton Street.
- DN225 feeder main in Moreillon Boulevard.

The existing water mains referenced above are shown on the servicing plan presented below in Figure 3.

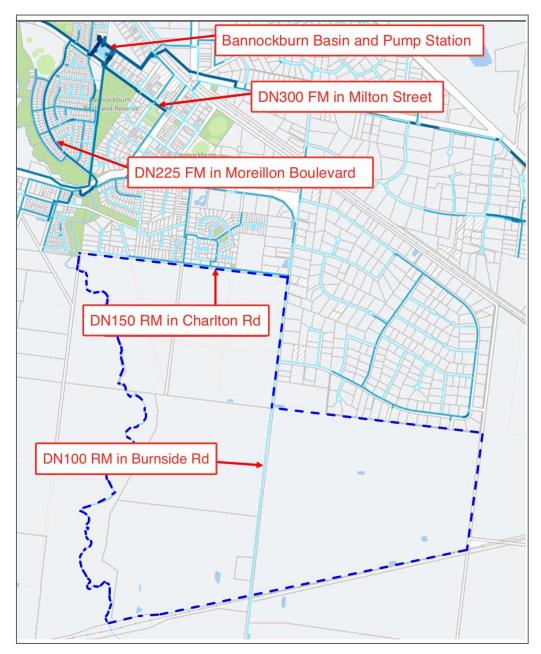


Figure 3: Potable Water Infrastructure (Existing) – Source Barwon Water

2.2.2 Servicing Strategy

Barwon Water have indicated that initially the Bannockburn SE precinct can be serviced by the existing water assets in Charlton Road and Burnside Road if development occurs adjacent to the existing Bannockburn township, i.e. in the north and uppermost (north) west.

The existing assets mentioned above are deemed to be inadequate for ultimate supply for the Bannockburn SE precinct.

Currently, the Barwon Water major infrastructure required to fulfill the ultimate servicing strategy is the extension of the Milton Street DN300 feeder main to and through the Bannockburn SE precinct. The DN300 water main extension is likely to be staged as follows:

- STAGE 1, provision of 3 km of DN300mm water main connected to the existing DN225mm pipeline in Moreillon Boulevard in tandem with the upgrade of the Pressure Reducing Valve (GID: 1511032) on Burnside Road. The Stage 1 works will be constructed through the existing residential area to the north of Charlton Road, east along Charlton Road and then through the future road network (in the South East precinct) to Burnside Road.
- STAGE 2, provision of 600m of DN300 water main connected to the existing 300mm DICL water main in Milton Road. The Stage 2 works will be constructed along High Street between Milton Road and the Stage 1 works above.
- STAGE 3, provision of 1.5km of DN300mm water main in tandem with the upgrade of the Pressure Reducing Valve (GID: 713701) on Burnside Road. The Stage 3 works are from the southern end of Stage 1 works to the southern boundary of the precinct. This extension to replace the existing DN100mm water main in Burnside Road.

Barwon Water have indicated that the Stage 1 and Stage 3 works are likely to be delivered by developers as "shared assets" and are therefore reimbursable works. However, depending on the timing of delivery of the assets they may be subject to "bring forward charges" if constructed out of sequence to Barwon Water's requirements and future water plans. (Refer **Figure 4** below). The Stage 2 works (within the existing township boundaries) are likely to be delivered by Barwon Water as part of their Capital Works program based on the proposed dates of PSP approval and subsequent development within the SE precinct.

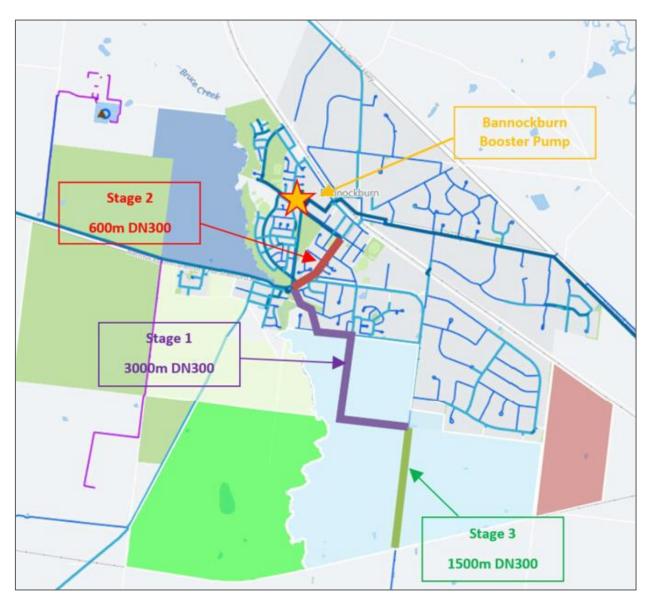


Figure 4: Potable Water Infrastructure (Proposed)-Source: Barwon Water

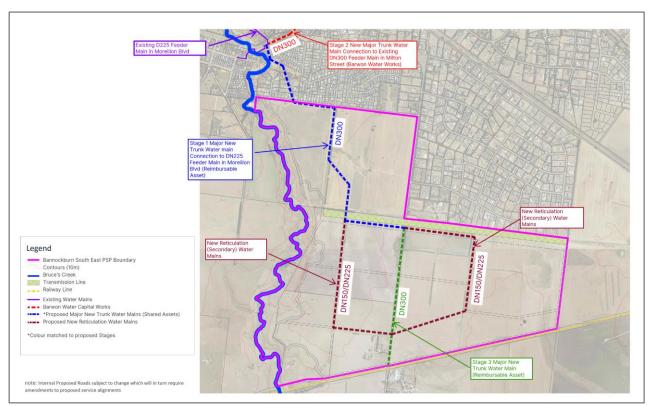


Figure 5: Potable Water Servicing Plan

In addition to the above proposed assets for the Bannockburn SE precinct, Barwon Water have advised that augmentation of "other" existing assets will be required, as follows:

- Bannockburn pump station to be upgraded with one additional pump, similar to the existing large pump (87 l/s duty point 60 m head) and a generator.
- Gheringhap booster pump (also known as Crouch Lane Pump) has capacity of 70 l/s which needs to be upgraded.
- Duplication of Bannockburn-She Oaks Transfer Main will be required.

Barwon Water have confirmed that the augmentation works listed above are incorporated within Barwon Water Capital Works Investment Plan to be funded and delivered once required by the growth area.

2.3 Recycled Water

2.3.1 Current Conditions

There is currently no recycled water infrastructure servicing the Bannockburn SE PSP precinct.

2.3.2 Servicing Strategy

Barwon Water have not indicated that recycled water infrastructure is required for the development of the Bannockburn South East PSP.

Golden Plains Shire Council commissioned Spiire and engaged Barwon Water to investigate re-use and recycled water opportunities for Bannockburn. The findings of the report, titled *Bannockburn Integrated Water Management Plan (July 2024)* included;

- Class A Recycled Water infrastructure is not readily available for connection to the precinct.
- Option to service Open Space with Class C Recycled Water is not considered feasible or practical at this time.
- Capturing of stormwater remains as primary opportunity for alternative water use in precinct.

2.4 Sewer

2.4.1 Current Conditions

Bannockburn has had a formal sewer system since 1998, with the network growing as demand on the system increased. The current reticulation system gravitates to the Bannockburn Sewer Pump Station No. 1, located in Shelford Road adjacent to Bruce's Creek. Sewerage is then pumped to the Water Reclamation Plant, located west of the Bannockburn township, via the DN300mm Bannockburn Rising Man No 1 in Shelford Road, with the current system catering for approximately 1500 homes (Refer **Figure 6** below).

A Reticulated sewer network is not currently available within the Bannockburn SE precinct and it is most likely that the existing farm properties in the area utilise septic tank systems.

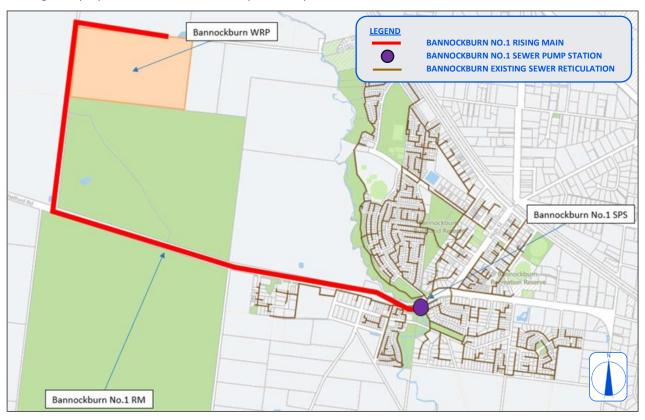


Figure 6: Sewer Infrastructure (Existing)-Source: Barwon Water

2.4.2 Servicing Strategy

Barwon Water's preliminary servicing advice indicates that the Bannockburn SE precinct will be serviced by two new sewer pump stations, strategically located to cater for development catchments as development progresses within the precinct.

The Bannockburn SE precinct existing topography slopes away from the Bannockburn township boundary & away from Barwon Water's current existing sewer network. Only a strip of land (approximately 60m wide, south of Charlton Road), is available for connection into the existing gravity sewer network.

The new sewer pump stations will transfer flows via new sewer rising mains to the existing Bannockburn No. 1 Sewer Pump Station (located near the Bruce Creek bridge crossing). The first new sewer pump station will be required to service early development beyond the land that can access the existing sewer network. The second sewer pumps station will be employed when land too low to be serviced by the first new sewer pump station is developed.

Barwon Water have provided indicative catchments, sewer alignments and locations of sewer pump station (refer **Figure 7** below), however these remain preliminary at the time of PSP preparation.

In addition to the proposed assets above, Barwon Water has advised that the following augmentation of the existing sewer assets are required when their capacities have been reached:

- Upgrade of the existing Bannockburn No 1 Sewer Pump Station.
- Upgrade of Bannockburn Water Treatment Plant.

Barwon Water have confirmed that the augmentation works listed above are incorporated within Barwon Water Capital Works Investment Plan to be funded and delivered once required by the growth area.

Additional catchments abutting Bruce's Creek may require the delivery of developer funded sewer pump stations to convey flows to the future Barwon Water funded pump stations referenced above. It is noted that any pump station reserves adjacent to Bruce's Creek will require additional space to enable supplementary storage. This is considered appropriate to mitigate the risk of spillage during a power outage causing contamination of the adjacent waterway.

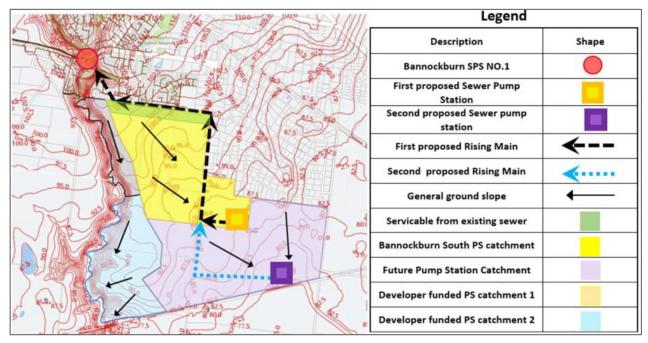


Figure 7: Sewer Infrastructure (Proposed)- Source: Barwon Water

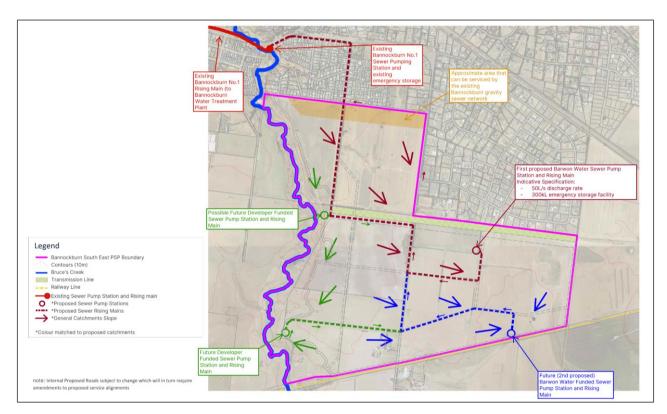


Figure 8: Sewer Servicing Plan

3. Electricity

3.1 Electrical Distribution Network

Powercor is the responsible Authority for the provision of electrical supply services in the Bannockburn region, including operating and maintenance of the network relating to the Bannockburn South East Precinct Structure Plan area.

Powercor have advised that the proposed new development created by the Bannockburn SE Precinct Structure Plan will be serviced from the recently commissioned (March 2023) new Gheringhap (GHP) Zone Substation located off the south-east corner of the intersection of Midland Highway and Fyansford-Gheringhap Road.

3.1.1 Current Conditions

The Gheringhap Zone Substation (GHPZS) has been built initially with two number 66/22kV transformers and four number 22kV feeders.

The ultimate configuration for the GHPZS is for up to three number 66/ 22kV transformers and up to twelve number 22kV feeders.

Powercor comment as follows:

- On the mark-up below the Bannockburn South East Precinct Structure Plan area is approximately highlighted yellow with black border and the new GHPZS is at the bottom right.
- Presently the GHP021 22kV feeder backbone is along Burnside Road through the middle of the PSP area and along Charlton Road (which is the northern border of the PSP area), Refer **Figure 9** below.

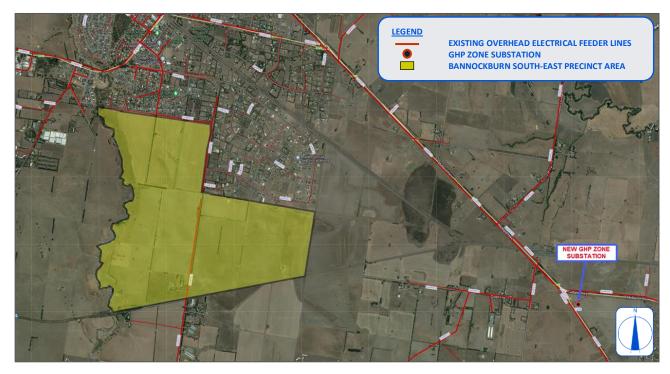


Figure 9: Powercor GIS Plot – Existing 22kV feeder assets and zone substation

3.1.2 Servicing Strategy

In the first instance development sequencing has little impact on Powercor, as the appropriate capacity required will be scoped into development supply requests. Powercor have stated that the Bannockburn SE PSP area will be serviced from the recently commissioned new Gheringhap Zone Substation (GHPZS) and that all four existing 22kV feeders have adequate capacity to cater for the load and growth in the medium term.

It is expected that the existing GHP021 22kV feeder backbone along Burnside Road will remain as an overhead 22kV powerline.

All new 22kV power supply lines required within the Bannockburn South East Precinct Structure Plan area will be placed underground to supply new kiosk substations within the development.

Powercor also considers that development within the Bannockburn South East Precinct Structure Plan area could likely have no reticulated gas infrastructure and will have provision for rooftop solar, battery storage and electric vehicle charging for new households. This could necessitate larger kiosk substations increasing from 315kVA to 500kVA, shorter low voltage circuit lengths and more kiosk substations throughout the development.

The scope of developer works required to service any development in Bannockburn South East PSP area shall be ascertained through lodgement of a request for a Powercor Supply Offer and Scope of Works (SoW).

Powercor advise that the GHPZS is a REFCL (Rapid Earth Fault Current Limiter) zone substation and as such ongoing REFCL compliance will need to be maintained. This will likely require future REFCL isolating transformers to be located within the Bannockburn South East Precinct Structure Plan area.

RECFL isolating transformers are typically required at feeder entries into developments, particularly where an overhead electrical line transitions to an underground service. Transformers sizes vary based on their electrical capacity, therefore there the size of the development dictates the amount and size of RECFL transformers required. Typical RECFL isolating transformers land allocations include;

- 1/2 MVA 7.2m x 7.2m
- 3/6 MVA 10m x 7.2m

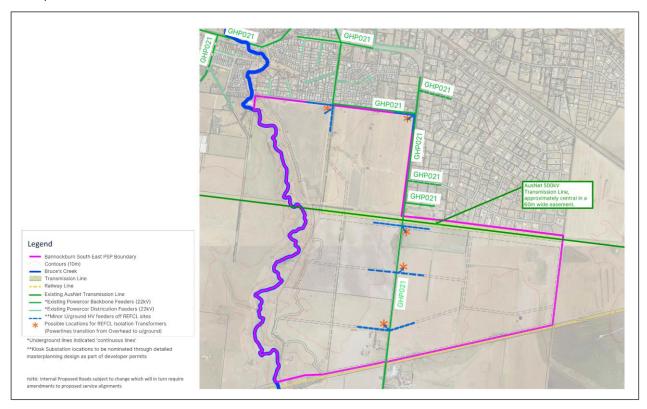


Figure 10: Electricity Servicing Plan

3.2 Renewable Energy

The Clean Energy Council – Clean Energy Australian Report (2021) indicates that the use of renewable energy for electricity within the Australian landscape has advanced from 16 per cent in 2016 (mainly New South Wales and Tasmania's hydro schemes) to over 27 per cent in 2020. The addition of clean energy sources such as wind and roof top solar being the most pronounced. The Victorian percentage component of renewable energy penetration as a proportion of generation and consumption is 27.7 per cent and 28 per cent, respectively.

The current Victorian Government has placed a high priority on the renewable energy plans for the state with increased emphasis on wind and solar energy initiatives to facilitate the ambitious target of 50 per cent renewables by 2030.

The Victorian Governments current key initiatives are as follows:

- Second renewable energy auction, whereby the government calls tenders for renewable energy projects to ensure a pipeline of projects to meet their renewable energy targets.
- Establishment of Renewable Energy Zones (in regional Victoria) to strengthen the transmission network in Victoria.
- Solar Homes program expanded to landlords and renters.

Through discussion with electrical authorities and renewable energy subject experts, the most plausible approach to renewable energy production and storage is at a household level. This would be achieved by mandating an energy rating as part of design guidelines to equip houses with solar panels and battery storage. Electrical infrastructure would then be sized by authorities to consider expected household energy demands.

3.2.1 Opportunities

Significant opportunities exist to advance renewable energy technology into infrastructure associated with greenfield development. Integrating those most suited opportunities, within the Bannockburn SE Precinct, will strengthen the ambition of a net zero carbon future.

There are two main areas of incorporation for these opportunities:

- Precinct wide On-site opportunities.
- Opportunities external to the precinct.

3.2.1.1 Precinct Wide (On-Site) Opportunities

- **Solar** (small and medium scale) technology, these may be in the form of:
 - Solar lighting, incorporated into the streetscape
 - Rooftop solar on homes, commercial, community and school buildings, possibly to be mandated
 - Battery Storage facilities, adapted both for in the home and incorporated with commercial, school and community use zones.
- Smart-meters, installed in the home by the electrical distributors to track production and usage.
- Power point tracking, typically used with solar systems to maximise energy extraction under all conditions.
- **Purchase of "green" energy** (homes, commercial, community and schools), to offset carbon emissions for the precinct.
- Wind Trees, incorporated into streetscapes of "Major Road corridors".
- **Electrical vehicle charging points**, mandated along the "Major Road corridors" and in the home.
- **Flywheel Energy Storage Systems**, a mechanical battery using an electrical motor for storage and generation, incorporated into commercial, community and school settings.
- **Hydro power production**, precinct has undulating land (including drainage corridors) which may allow some form of this technology to be incorporated into the renewable energy source mix.

Microgrids, by installing the combination of solar generation and Battery Energy Storage Systems (BESSs),
individual dwellings can become independent of the grid power network. By removing the reliance upon the
network, the precinct would form a microgrid, grouping renewable energy sources and loads that would
normally operate connected to the grid, able to disconnect from the interconnected grid and to function
autonomously.

3.2.1.2 External to the Precinct

SOLAR FARMS

There are a number of large-scale solar systems in north and north west Victoria. These Solar Farms export clean energy to the distribution networks to support the local grids.

Residential/commercial/government users with the Bannockburn South East Precinct should be encouraged to purchase their energy from retailers that have "Green Energy" options within their suite of offerings to the public.

WIND FARMS

There are a number of large-scale wind farms in Victoria which export clean energy to the distribution networks to support the local grids. Examples include the Bulgara Green Power Hub near Stawell which incorporates battery storage and connection to the national grid. Another example is the Mortlake South Wind Farm, which will supply clean energy with a capacity to service the needs of around 115,000 homes.

Residential/commercial/government users within the Bannockburn South East Precinct should be encouraged to purchase their energy from retailers that have "Green Energy" option within their suite of offerings to the public.

3.3 Electrical Transmission Network

AusNet Services is the responsible Authority for the electrical transmission supply network supply in the Bannockburn region, including operating and maintenance of the network relating to the Bannockburn South East Precinct Structure East area.

AusNet Services have advised that the 500 kV Transmission Line (Moorabool to Mortlake) traverses east/west through the northern section of the Bannockburn SE Precinct Structure Plan area, (Refer Figure 11 below).

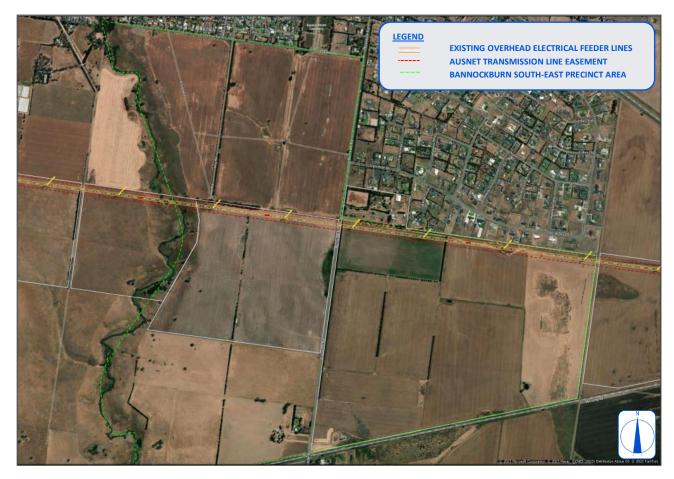


Figure 11: AusNet services GIS Plot – Existing 500kV Transmission Line

AusNet also advise that they have no objections in principle to the establishment of the PSP, with the following points to be considered for any development of the land affected by the easement:

- Roads that run parallel to the line are not permitted within the easement.
- Roads that cross generally perpendicular to the easement are acceptable provided that, they are at least 30m away from towers.
- Lighting poles are permitted, with pole heights determined by available clearances to the overhead lines and must be of a hinged design that lowers to ground for maintenance.
- Subdivision of the land is acceptable however residential or commercial lots must not cross the easement creating inaccessible and unmanageable smaller sections of easement.
- Wetlands and reserves are permitted subject to acceptance of designs by AusNet. No water bodies within 30m of towers.
- Any underground services within the easement are subject to acceptance of designs by AusNet. Nothing permitted within 30m of towers.
- Solar panels are not permitted in the easement.
- Buildings are not permitted in the easement.
- Structures are subject to acceptance of design by AusNet.
- Use of vehicles and equipment over 3m in height is subject to written approval from AusNet.
- Planting of vegetation is restricted to lower height species with reduced planting density to ensure that a fire cannot spread throughout the easement. Acceptance of designs is required by AusNet.

4. Gas

4.1 Introduction

AusNet Services (Gas) is the responsible Authority for the provision of gas reticulation supply services in Bannockburn, including operating and maintenance of the network relating to the Bannockburn SE PSP precinct.

AusNet network Planning Team have advised that there is enough existing network capacity in the Bannockburn network to support the highlighted short-term (south east precinct and north west development plan) areas and medium-term (south west precinct) propriety areas on the Bannockburn Growth Plan.

Recently the Victorian Government has implemented the Gas Substitution Roadmap (GSR) which will assist in achieving net-zero emissions across the estate. A key component of the GSR is the phasing out of gas within new residential housing developments, homes, public and social housing as well as governments buildings, including schools and hospitals.

Victoria Planning Scheme Amendment VC250 was gazetted on the 1st of January 2024 which prevents a permit being granted to connect to reticulated natural gas when constructing a new dwelling, apartment development or subdividing land for residential purposes in accordance with clause 53.03.

Clause 53.03 and the prohibition of residential gas connections does not extend to commercial or industrial developments which can make provision for gas service connections upon agreement with the relevant gas service provider.

4.2 Current Conditions

The Bannockburn SE precinct area is currently not serviced by existing gas infrastructure. However, there are gas mains adjacent to the area as follows:

- A 125mm P10 backbone mains in Levy Road.
- A 63mm P10 supply mains in Charlton Road, from Glenbrae Court in the west to Balmaha Avenue in the east.
- A 63mm P10 supply mains in Burnside Road, extending to Glenavon Drive in the south where the supply line extends east along Glenavon Drive.

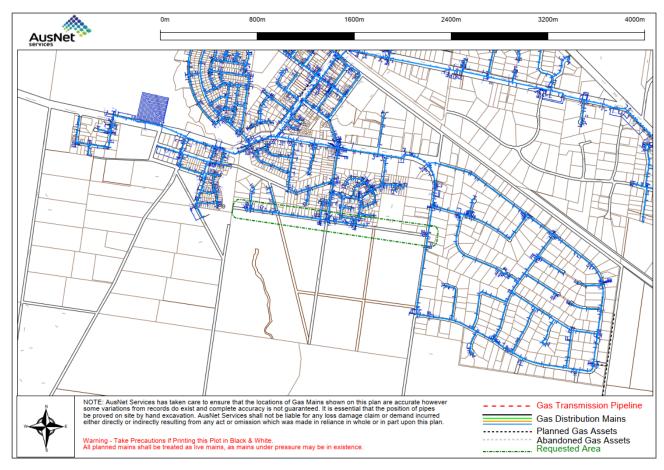


Figure 12: Existing Gas Network (Source: Dial Before You Dig) AusNet Services

4.3 Servicing Strategy

As noted above, gas connections to residential developments is now prohibited upon the gazettal of Planning Victoria Planning Scheme Amendment VC250, however applications for gas connection to commercial and industrial properties are still permitted.

Ausnet Services has advised that based on the existing supply network the backbone mains in Levy Road has adequate capacity and can be extended into the Bannockburn SE precinct to supply the area.

Under current supply policy, distribution gas mains are normally installed within developments at no cost to the developer. The developer is required to undertake trenching and backfill for the gas mains and installation of conduits under roads. However, the gas mains themselves are typically installed and commissioned by an Ausnet accredited contractor working directly for Ausnet/Downer. For any extension to the site, usual industry practice is for the initial developer who requires the service to deliver this (known as backhaul). We understand that there are current discussions in the industry with respect to a precinct approach whereby costs may be apportioned across several developments for shared backhaul assets.

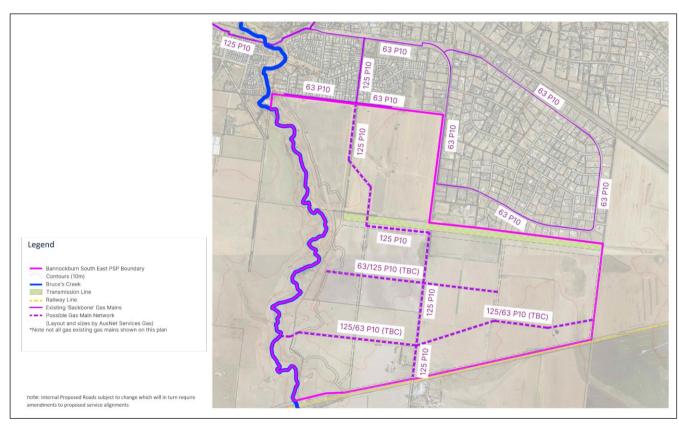


Figure 13: Gas Servicing Plan

5. Telecommunications

5.1 Service Provider Considerations

As of 1st January 2011, National Broadband Network Co. (NBN) is responsible for the deployment of fibre infrastructure in broad-acre developments that are within the NBN Co. long term footprint.

It will be the responsibility of the developer to provide pit and pipe infrastructure ("fibre ready") in new any developments. The developer will be responsible for the trenching, supply and installation of pits and pipes followed by engagement of either NBN Co or a private operator, such as Opticomm, to supply and install optical fibre cables to each lot.

The main impacts to the developer will be as follows (if NBN is chosen as the service provider):

- A new Deployment charge will apply on a per lot basis.
- \$600 (incl. GST) per lot for standard residential lots.
- \$400 (incl. GST) per lot for Medium Density lots.
- The developer will be required to contribute towards the cost of backhaul to bring fibre to the development:
 - Where backhaul costs are up to \$1,000 per lot, the developer will be required to contribute to 50% of this
 cost.
 - Any costs higher than \$1,000 per lot for backhaul will be payable by the developer.
 - NBN will not charge for backhaul if the length required is less than one kilometre from an existing NBN development or transit infrastructure.

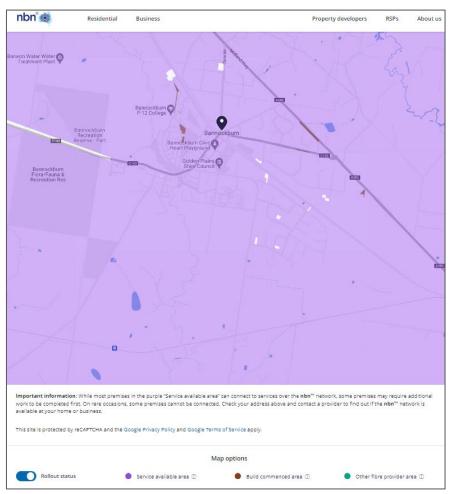


Figure 14: NBN Co Network Rollout Map (Source: https://www.nbnco.com.au/learn/rollout-map)

5.2 Current Conditions

5.2.1 Service Authorities

5.2.1.1 NBN Co

NBN is the responsible Authority for the provision of telecommunication services in the Bannockburn region, including operating and maintenance of the future communications network provided to the Bannockburn SE precinct.

NBN have advised the following:

- Currently the subject land is located within NBN's Wireless & Satellite network footprint, consequently the NBN fixed line network does not extend into the Bannockburn SE precinct;
- However, there is existing NBN infrastructure available, in the Bannockburn area, to the north of the Bannockburn SE precinct in Burnside Road and Charlton Road (Refer **Figure 15** below).
- Minimal cable infrastructure build is required to connect the precinct to the NBN network.

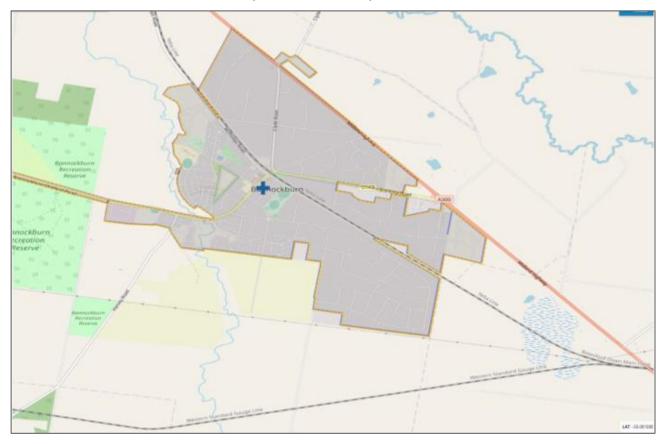


Figure 15: NBN Co Network Rollout Map (Source: NBN Co)

5.2.1.2 Telstra

Telstra (Team Telstra and Network Integrity) have been engaged to provide advice regarding their interests in the Bannockburn SE precinct.

Telstra have advised the following:

- Key stakeholders that have an interest from a Telstra point of view generally agree that without more detailed plans all that can be provided is a general response;
- Telstra have an interest in area's designated for retail and commercial purposes as these are the area's likely to get service requests from customers;

- There may be a need to provide additional mobiles coverage in the Bannockburn SE area, however, additional details are needed regarding timing and specific zoning of the land;
- There are no capacity issues on the existing sites in Bannockburn regarding mobiles coverage;
- They hope to stay engaged regarding the development and can provide greater detail once more is known about the development; and
- A desktop assessment has concluded that there appears be very little (if anything) of Telstra's assets that are affected by the development in the Bannockburn SE precinct.

5.2.2 Telecommunications Towers

There are two existing mobile phone towers within proximity of the rural township of Bannockburn. Locations are as follows (Refer **Figure 16** below):

- 3 Moore Street, Bannockburn (ID 3331002), located within the Bannockburn Recreation Reserve. User Telstra;
- McPhillips Road, Bannockburn (ID 3331001), located approximately 2.7kms north of Bannockburn township. Users Optus, Telstra and Vodaphone.

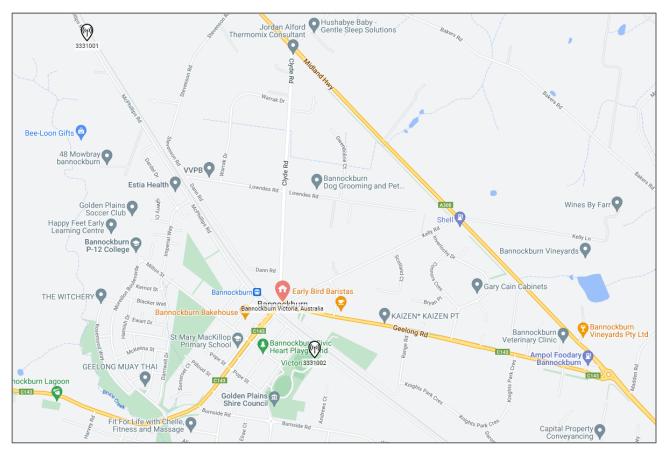


Figure 16: Radio Frequency National Site Archive Maps (Source: https://rfnsa.com.au)

5.3 NBN Servicing Strategy

5.3.1 Proposed Network Upgrades

Regarding proposed Network upgrades to service the Bannockburn SE PSP area, NBN Co advise the following:

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

5.3.2 Servicing the Precinct

Regarding servicing the Bannockburn SE PSP area, NBN Co advise the following:

- The Bannockburn SE Precinct will connect to the NBN co-located 3BBR FAN site in Milton St, Bannockburn. The FAN site currently has capacity to service the Precinct;
- Servicing of the Precinct would be planned on a case by case application basis and driven primarily by customerinitiated demand, utilising new NBN build also developer supplied & shared trenching arrangements within the precinct; and
- Any new build (conduit & cable) to this precinct is planned to connect via both Burnside Road & Charlton Road
 entries of the Precinct. It is envisioned that new pit & pipe infrastructure is required within the entire precinct.

5.3.3 Opportunities for NBN Co

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

5.3.3.1 Authorities or other Utilities

NBN Co advise that some difficulties may exist with the NBN network being located on both sides of the Bruce Creek reserve, so NBN Co would be interested in being involved in any additional service crossings that may occur.

NBN are constrained by boundaries such as railways, freeways and watercourses, so any additional crossings enable NBN to increase the robustness of the network.

Some of the opportunities that would benefit NBN are:

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

Some risks that may be an issue for the NBN Co network:

- Heritage Overlays;
- Environmental Overlays; and
- Existing infrastructure (conduit and cable) located in private land.

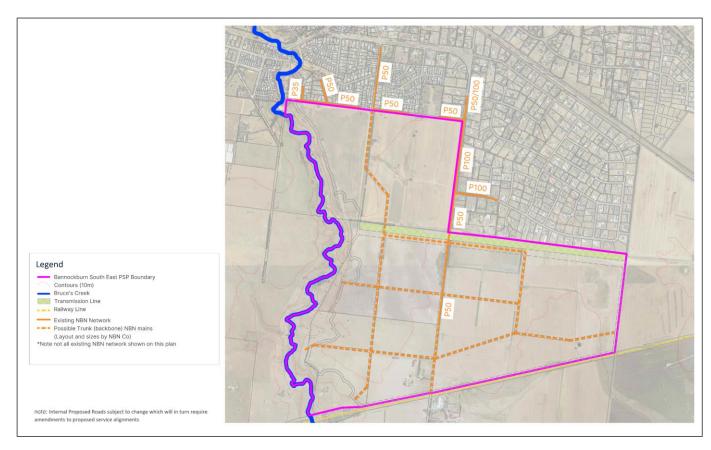


Figure 17: Communications Servicing Plan

6. Railway Line

6.1 Introduction and Assessment

Australian Rail Track Corporation (ARTC) is an Australian Government-owned statutory corporation that owns, leases, maintains and controls the majority of main line standard gauge railway line on the mainland of Australia.

The "Gheringhap-Maroona Section" that borders the southern boundary of the Bannockburn SE PSP precinct is part of the ARTC lease holdings.

Preliminary servicing advice was sought for ARTC and they have responded as follows:

- Any minor works (e.g. under boring, service locations and site inspections) where there is a need access the lease area will require contacting ARTC and the need to follow a process of formal application to ARTC.
- However, if the works are more complex additional discussion will have to take place with ARTC in order to understand the scope of works and the potential impact on the ARTC network.

7. Typical Cross-Sections

Servicing cross-sections based on typical road typologies provided by the Victorian Planning Authority for the Bannockburn South East Precinct are presented in **Appendix E.** Service locations as shown on the cross-sections are indicative only and will be subject to further discussion with the relevant utility authorities as part of the detailed design process. Placement of utilities within road reserves is dictated by the requirements of the individual service authorities with consideration to future access for maintenance, cover for asset protection and clearance between other services to ensure safety and potential for future augmentation. Other ancillary requirements including depth of services to protect tree root zones may also be considered.

Table 2 is presented below which provides indication of typical utility placement and service authority appetite for alternative locations.

Table 2: Service Placement Guidelines

	Under Pedestrian Pavement	Under Nature Strips	Under Street Trees	Under Kerb	Under Road Pavement	Within Allotments
Sewer	Preferred	Possible	Not Preferred ²	No	Possible	Possible ⁴
Potable Water	Not Preferred	Preferred	Not Preferred ²	No	Possible ³	No
Recycled Water	Not Preferred	Preferred	Not Preferred ²	No	Possible ³	No
Electricity	Possible ⁶	Preferred	Not Preferred ²	No	Not Preferred	No
Telecommunications	Possible ⁷	Preferred	Not Preferred ²	No	No	No
Drainage	Not Preferred	Possible	Not Preferred ²	Preferred	Possible	Not Preferred
Trunk Services	Possible	Possible	Not Preferred ²	Possible	Possible	No

Notes;

- 1. Trees are not to be placed directly over property service connections.
- 2. In accordance with IDM SD630 a tree root zone of 0.6 m depth must be applied where services exist in nature strips. Any service installation shall be at a greater depth than the tree root zone.
- 3. Placement of services under road pavement is typically not preferred by authorities. However, consideration may be given to placement of services beneath parking bays and bicycle lanes.
- 4. Rear Easement sewer and drainage lines are common within allotments. Less common are sewer and drainage easements within front setback of allotment.
- 5. Property connections under hard services require Fitzroy boxes for future maintenance operations.
- 6. Subject to Power authority approval.
- 7. Pits are to be placed either wholly within the footpath or wholly within the nature strip.
- 8. Items listed as "Possible" are typically not favoured by service authorities but may be considered by service authority on a case by case basis.

8. Staging Recommendations

8.1 Proposed Development Sequence

The proposed development sequencing for the Bannockburn SE precinct should consider the following:

- Location of existing services.
- Location of proposed trunk services.
- Siting of major drainage facilities (although not the subject of this Services Plan reporting).
- Ability to connect to an ultimate drainage outfall.
- Road connections to facilitate suitable "entry" points to initial development.
- Developer landholding split and readiness of developers to initiate development.
- Location of proposed open space.
- Delivery of Barwon Water Capital Works Infrastructure (sewer pump stations, associated rising mains and potable feeder mains)

Barwon Water trunk infrastructure planned for the Bannockburn SE Precinct, along with Councils assets (major roads and drainage) will play a major part in formulating the development sequencing for the Bannockburn SE precinct.

Typically, Barwon Water general principles in determining an Infrastructure Sequencing Plan for services (sewer and water) within a growth area are as follows:

- Maximising the use of any spare capacity in existing infrastructure adjacent or proximate to a growth area.
- Servicing lots on land abutting existing infrastructure.
- Maximising servicing of lots which are located in the same gravity catchment / water supply zone to any existing
 or newly constructed infrastructure which services the catchment.
- For parcels of land (in single developer ownership), prioritising the portion which is situated in the appropriate catchment for development.
- Where the "spare capacity" in existing infrastructure has been consumed the most efficient and economic
 augmentation of the system is preferred. The preferred augmentation is one which delivers the most
 developable lots per dollar invested (i.e. Lowest \$NPC/lot). This is likely to produce a priority order of
 augmentations over the life of the project.

8.1.1 Initial Locations for Development

The initial locations for development should consider the following:

- Land which abuts established major roads (Charlton Road and Burnside Road);
- Land which is owned by Developers with an ability to fund trunk infrastructure, DCP main drainage and roadworks, reimbursable Barwon Water assets and provide open space to the benefit of the precinct.
- Land serviced by the first proposed Sewer Pump Station earmarked by Barwon Water.
- Land serviced by Barwon Water nominated Stage 1 water supply works (northern area of the Bannockburn SE precinct).

In general, the servicing requirements for electricity, communications and gas, are typically less vital in development staging, however this should be confirmed as part of development supply requests.

8.1.2 Servicing Requirements and Constraints of Individual landholdings

The staging of the individual landholdings within the Bannockburn SE precinct will be largely influenced by the provision of Trunk Sewer and Water infrastructure (noting that drainage asset delivery is not part of the scope of this report – which is another key influencer to staging). The trunk infrastructure required to service each of the major landholdings has been presented in **Figure 18** and **Figure 19**.

These sketches also detail the capital works expected to be delivered by Barwon Water. Further detailed discussion on the key servicing considerations and constraints for each of the landholdings is presented below.

The descriptors (i.e. Property 1,2,3 etc.) do not necessarily correspond to the sequence of development.

All developments can be serviced provided the critical downstream infrastructure (including that within other landholdings) is supplied. Outfall drainage, sewer and water trunk infrastructure are considered the critical assets for commencement of any development.

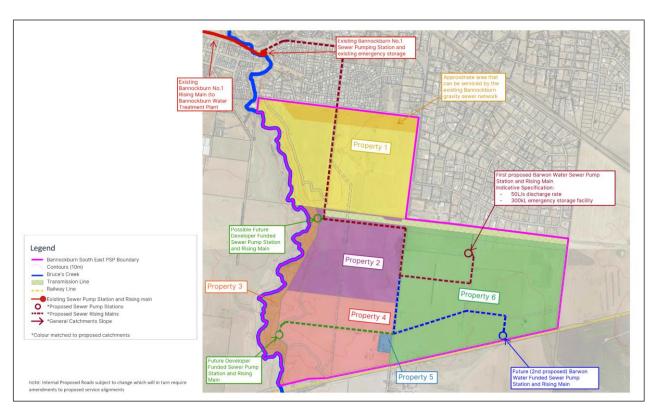


Figure 18: Sewer Development Sequencing Strategy

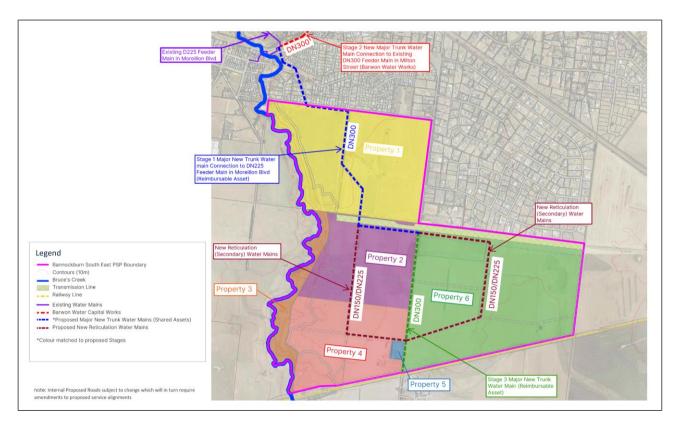


Figure 19: Potable Water Development Sequencing Strategy

8.1.2.1.1 Property 1

Slope – the land has a good slope towards the anticipated drainage facilities, Bruce Creek in the west and the proposed constructed waterway running north to south through the eastern part of the properties. The land in the western part of the properties becomes steeper around Bruce Creek interfaces.

Road – the land has direct access to Charlton Road in the north and Burnside Road to the east and the ability to develop immediately at these interfaces.

Drainage – apart from the Bruce Creek catchment the ultimate drainage outlet travels through Property 2 and Property 6 exiting the PSP area under the railway line near the south-east corner of Property 6. There may need to be retardation of flows from Property 1 if development in Property 6 has not facilitated the ultimate discharge facility.

Sewer – there is a section of land (along the northern boundary) that can be serviced by the existing gravity sewer network in Bannockburn, this would facilitate early development in Property 1. Most of the land falls to the designated (by Barwon Water) first sewer pump station in Property 6, permission to access and construct those sewer facilities would be required from the Property 6 owner, Barwon Water may be able to facilitate those negotiations or alternatively a temporary sewer pump station could be constructed within the south east corner of Property 1 to facilitate full development (except for the small catchment falling towards Bruce Creek) of Property 1.

Potable Water –requires construction of Stage 1 Major new trunk Water Main (DN300) connected to the existing DN225 feeder main in Moreillon Boulevard. This water main facilitates development of and is entirely located within Property 1 these works will also facilitate future development in the PSP.

Conclusion – Property 1 has access to all services and/or access to initial trunk services being delivered to the Bannockburn SE PSP (except the first proposed Sewer Pump Station and ultimate drainage outfalls), being closest to the township of Bannockburn. At the very least temporary arrangements could be made for both sewer and drainage to facilitate development. Hence Property 1 is most likely to be developed initially and also will extend trunk services to the other properties.

8.1.2.1.2 Property 2

Slope – the land has a good slope towards the anticipated drainage facilities, Bruce Creek in the west (through Property 3) and to the east/south-east the proposed drainage facilities in the adjoining Properties 4 and 6. The land in

the western part of the property becomes steeper around the western edge interface with Property 3, due to Bruce Creek interfaces.

Road – the land has access to Burnside Road on the eastern boundary which could readily facilitate a development main entry location.

Drainage – there is a central (north/south) ridge in the property which enables drainage outfalls to Bruce Creek (through Property 3) and to the east/south-east proposed drainage facilities in Properties 4 and 6. There may need to be retardation of flows from Property 2 if development in Property 3, 4 and 6 has not constructed the ultimate discharge facility.

Sewer – the eastern portion of land requires construction of sewer facilities contained within adjoining Property 6, these being the designated first and possibly second (future) sewer pump station facilities. The western portion of the land falls to the future developer funded sewer pump station facilities in Property 3.

Potable Water – requires the Stage 1 DN300 to be extended from Property 1 boundary through Property 2 for development to commence. The Stage 2 new Major Trunk Water Main may need to be constructed when development lot numbers reach demand criteria (to be determined by Barwon Water at time of development).

Conclusion – Property 2 has access to all services and/or access to initial trunk services being delivered by Property 1. (except the first proposed Sewer Pump Station and ultimate drainage outfalls). At the very least temporary arrangements could be made for both sewer and drainage to facilitate development. Hence Property 2 is most likely to be developed once trunk services are extended to the Property.

8.1.2.1.3 Property 3

Slope – the land has steep slopes towards Bruce Creek in the west. Property 2 and Property 4 will require access through this parcel for drainage outfalls to Bruce Creek.

Road – the land does not have access to any main roads and has only partial road construction located within this parcel.

Drainage -the land parcel has Bruce Creek bordering its western boundary, there is likely to be little or no development within this parcel. Property 2 and Property 4 will require access through this land.

Sewer – if required (there is likely to be little or no development) would need the development to the east to facilitate a sewer connection.

Potable Water – if required (there is likely to be little or no development) would need the development to the east to facilitate a potable water connection.

Conclusion – Property 3 is reliant on adjacent development to facilitate services connections. Although currently some sewer facilities (developer funded) many need to be constructed within this land.

8.1.2.1.4 Property 4

Slope – the land has a good slope towards the anticipated drainage facilities, Bruce Creek in the west (through Property 3) and to the proposed drainage facility proposed in the south-east corner of this property. The land in the western part of the property becomes steeper around the western edge interface with Property 3, due to Bruce Creek interfaces.

Road – the land has access to Burnside Road on the eastern boundary which could readily facilitate a development main entry location.

Drainage – there is a central (north/south) ridge in the property which enables a drainage outfall, via the drainage facility in this property, to Bruce Creek (through Property 3) and also to the east/south-east proposed ultimate drainage discharge facility also in this property. The Bruce Creek discharge will require access and permission from the owner of Property 3 to facilitate construction.

Sewer – the eastern portion of land requires construction of sewer facilities contained within adjoining Property 6, these being the designated first and second (future) sewer pump station facilities. The western portion of the land falls to the future developer funded sewer pump station facilities located in Property 3.

Potable Water – requires Stage 1 and Stage 2 works to be constructed with Stage 3 (DN300) to be extended (from Stage 1 works) along Burnside Road to this property's boundary for development to commence.

Conclusion – In the main Property 4 is reliant on adjacent development to facilitate services connections. It is possible that development of Property 4 could fund major trunk sewer and potable water works but it is likely that those works could be deemed "out of sequence" and hence attract Barwon Water "bring forward charges".

8.1.2.1.5 Property 5

Unlikely to develop first due to the impost related to constructing major infrastructure to service the landholdings. Property 5 is reliant on adjacent development to facilitate services connections.

8.1.2.1.6 Property 6

Slope – the land has a good slope towards the anticipated drainage facilities located adjacent to the proposed constructed waterway running north-west to south-east through the property.

Road – the land has access to Burnside Road on the western boundary which could readily facilitate a development main entry location.

Drainage – there is a proposed north-west to south-east constructed waterway and various drainage facilities, including an ultimate drainage discharge location under the railway line within the property. These drainage facilities enable drainage autonomy for this land parcel.

Sewer – the first and second proposed Barwon Water funded sewer pump station facilities are within this parcel of land. Both rising main discharges north to the existing Bannockburn No 1 SPS could be constructed by development of this land parcel as alignments of the RM are along existing roads.

Potable Water —requires construction of Stage 1 Major new trunk Water Main (DN300) connected to the existing DN225 feeder main in Moreillon Boulevard through Property 1 and Property 2 (to Property 6's boundary). The Stage 2 new Major Trunk Water Main may need to be constructed when development lot numbers reach demand criteria (to be determined by Barwon Water at time of development).

Conclusion – Property 6 could have access to services and/or access to initial trunk services being delivered to the Bannockburn SE PSP by other development. Hence Property 6 has capacity to be developed initially and/or possible second and also will be of benefit to other properties in development.

8.2 Land Allocation

Servicing authorities have varying requirements with regards to land allocation for their assets. We make comments in this regard as follows:

Barwon Water:

- Typically, potable water, recycled water and sewer reticulation assets (including trunk assets) are located within road reserves and do not require specific land allocations, however road reserves may need to be wide enough to accommodate larger trunk assets following detailed design of the asset.
- Without the benefit of detailed design, an area of 50m x 50m (2000-2500 m²) is a reasonable allowance for each of the major sewer pump station locations (First proposed SPS and Future second SPS on the Sewer Strategy Plan). It would seem reasonable that a lesser area would be required for the possible future SPS funded by development (along the Bruce Creek frontage).
- Barwon Water's preference is to avoid the siting of their sewer pump station assets within conservation or wetland areas, however, adjacent to these areas would be deeped acceptable.
- Assets that are located within allotments and other non-road reserves locations will be required to be within easements of width and size that suits the relevant asset.

Powercor:

• Generally, assets are located within road reserves and are underground in URD areas up to and including 22kV lines. 66kV lines are generally overhead if relocating of the asset is required, however new 66kV lines (installed

by Powercor) for Network upgrading are generally required to be underground through residential developments.

- Typical URD Kiosk Substation reserves can only be 2 sizes in Powercor areas (for all substations sizes). Council reserves are 7.2m x 7.2m and residential lots 7.2m x 4.8m. These reserves may increase if there are switch yards/indoor transformers required. However, these are normally only required for high rise buildings or heavyduty manufacturing plants.
- Rapid Earth Fault Current Limiters (REFCLs) will generally be installed at the 22kV zone substations across regional Victoria. As part of the REFCL system Isolating Transformers (ISO) may need to be installed in large estates with multiple stages to mitigate high capacitance. These REFCL ISO's can be pole mounted or ground mounted and if ground mounted may need a reserve size in the order of 10m x 12m.

8.3 Funding Implications

Funding of major servicing infrastructure is an issue that needs to be considered to ensure timely delivery and appropriately sequenced development.

Typically, funding arrangements fall into categories as follows:

Infrastructure funded and constructed by the Authority:

• Timing of the planning and delivery of these items can often be an issue for development, however, with early planning/consultation by stakeholders, appropriate plans and funding mechanisms can be agreed between developers and authorities to avoid stifling development timing.

Key infrastructure items which are expected to be funded and constructed by the authorities for the Bannockburn SE precinct include:

- Upgrade of the Pressure Reducing Valve (GID: 1511032) on Burnside Drive;
- Upgrade of the Pressure Reducing Valve (GID: 713701) on Burnside Drive;
- Upgrade of Bannockburn (water) Pump Station, including a generator;
- Duplication of the Bannockburn-She Oaks Transfer (water) Main;
- Stage 2 Water Main works (600m of DN300 pipeline).

Key infrastructure items which are expected to be funded and constructed by the developer through the reimbursable works process include:

- Stage 1 to Stage 3 DN300 connecting pipelines from Milton Road through the Bannockburn SE precinct southern boundary (including replacing the DN100 main in Burnside Road), possibility of "bring forward charges".;
- First proposed Barwon Water Sewer Pump Station, including sewer rising mains connection to the Bannockburn SPS No 1, likely to be constructed by the developer and reimbursed by Barwon Water (possibility of "bring forward charges").
- Second proposed Barwon Water Sewer Pump Station, including sewer rising mains connection to the SPS1, likely to be constructed by the developer and reimbursed by Barwon Water (possibility of "bring forward charges").

Infrastructure funded and constructed by the developer:

Typically, these items will not dictate the sequence or timely delivery of the precinct.

• Future Developer funded Sewer Pump Station and Rising Mains (located in Property 3) to benefit development in Property 1, 2 and 3.

9. Sustainability Opportunities

Refer to Appendix A for the Technical Memorandum – Sustainability Research, by SMEC (Ref: 30043280E – 01), dated 19 August 2022.

Appendix A

Technical Memorandum – Sustainability Research



Technical Memorandum

Memo No.	01	Date of Issue	19 August 2022		
Subject	Sustainability Research	Discipline	Sustainability		
Project Title	Bannockburn South East PSP Servicing Project No.		30043280E		
Document No.	Memo – 30043280E Sustainability Revision		0		
Authors	Maria Austria, Associate Sustainability Engineer – Environment				
Authors	Dan Paje, Graduate Sustainability Scientist - Environment				
Reviewed by	David Mutton, Project Manager Urban Com Approved by		[Name]		
Prepared for	Victorian Planning Authority	Attention to	Sarah Salem, Strategic Planning Manager		

1. Purpose

This memorandum has been prepared as part of Deliverable 2 Data Collection and Research scope for Bannockburn South East Precinct Structure Plan (PSP) Utility Servicing Assessment. This paper provides a discussion of local and state policies that supports low-carbon emissions development and identifies relevant current world-leading practices in Ecologically Sustainable Development (ESD) for comparable precincts.

2. Project background

SMEC has been engaged by Victorian Planning Authority to undertake a utility servicing assessment for the Bannockburn South East Precinct to inform the preparation of the Precinct Structure Plan. Bannockburn is a large rural township located in Golden Plains Shire Council. Its close proximity to Geelong and access to servicing infrastructure made Bannockburn one of the fastest growing areas in regional Victoria. Refer to Figure 1 Project Location.

The Bannockburn Urban Growth Plan 2021 provides a broad strategy to inform and guide the sustainable growth and development to the year 2050. There are three (3) growth areas proposed in the plan – South East, North West and South West. The focus of the assessment is South East precinct which has the largest developable land. Refer to Figure 2 Growth areas.

Figure 1 Project location (Source: Bannockburn Growth Plan May 2021 p.8)



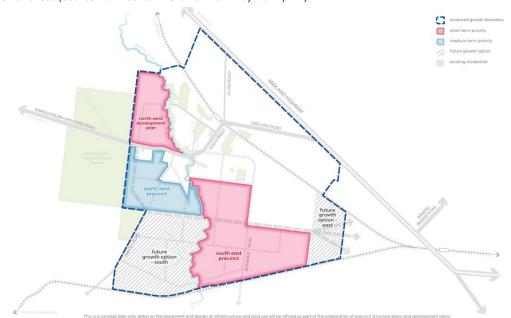


Figure 2 Growth areas (Source: Bannockburn Growth Plan May 2021 p.22)

3. Context of low-carbon emissions development

3.1 Background

The 'greenhouse effect' refers to the natural process whereby gases in the atmosphere cause warming of the Earth's surface. GHGs in the atmosphere absorb solar radiation released by the Earth's surface and then radiate some heat back towards the ground increasing the surface temperature. Human activity, especially burning fossil fuels and deforestation, is increasing the concentration of GHGs in the atmosphere and hence increasing the absorption of outgoing heat energy. Even a small increase in long-term average surface temperatures has numerous direct and indirect consequences for climate change.

The main GHG in terms of emissions is carbon dioxide (CO_2) but other gases such as sulphur hexafluoride (SF_6), methane (CH_4) and nitrous oxide (N_2O) have the same warming effect. These gases vary in effect and longevity in the atmosphere.

A parameter referred to as the Global Warming Potential (GWP) allows each gas to be described in terms of CO_2 (the most prevalent GHG). Thus, a given quantity of CH_4 , N_2O or SF_6 can be expressed in terms of carbon dioxide equivalents (CO_2 -e). A unit of one tonne of CO_2 -e is the basic unit used in carbon accounting. In simple terms, the GHG emissions associated with a project can be expressed as the sum of the emission rate of each GHG multiplied by its associated GWP. For example:

tonnes CO₂-e = tonnes CO₂(x 1) + tonnes SF₆(x 22,600) x tonnes CH₄(x 25) + tonnes N₂O(x 310)

While few, if any, individual projects would make a noticeable change to the Earth's climate, the summation of human activities increasing the concentrations of GHG in the atmosphere does. Climate change is an environmental concern at a global level. Governments and the global scientific community have established conventions for accounting for GHG emissions to enable the transparent and verifiable assessment of GHG emissions among all global jurisdictions.

3.2 GHG legislation

3.2.1 International frameworks

The emissions of GHGs is governed internationally through panels, frameworks and agreements including the Intergovernmental Panel on Climate Change (IPCC), United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the Paris Agreement. A description of these mechanisms is provided below:

• IPCC was established in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP) to provide independent scientific advice on climate change. The IPCC prepares

reports (known as assessment reports), response strategies and guidance documents on all aspects relevant to climate change and its impacts. The IPCC's most recent report is the fifth assessment report released in 2014. The sixth assessment report is anticipated to be published in 2022.

- The first assessment report of the IPCC (1990) served as the basis for negotiating the UNFCCC which sets the overall framework for efforts to manage climate change on a global scale. It compromises 172 countries (member states) who ratified the Kyoto Protocol in 2005.
- The Kyoto Protocol was a legally binding commitment by UNFCCC member states to limit or reduce GHG
 emissions between 2008–2020 from baseline levels. Each member state set their own target for GHG emission
 reductions.
- In 2015, a historic global climate agreement was reached under the UNFCCC at the 21st Conference of the Parties (COP21) in Paris (known as the Paris Agreement). The Paris Agreement set in place a durable and dynamic framework for all countries to take action on climate change from 2020 (that is, after the Kyoto Protocol ends), building on existing efforts in the period up to 2020. Key outcome from the Paris Agreement included:
 - A global goal to hold average temperature increase to well below 2°C and pursue efforts to keep warming below 1.5°C above pre-industrial levels.
 - All countries to set mitigation targets from 2020 and review targets every five years to build ambition over time, informed by a global stocktake.
 - Robust transparency and accountability rules to provide confidence in countries' actions and track progress towards targets, known as Nationally Determined Contributions (NDCs).
 - Promoting action to adapt and build resilience to climate change.
 - Financial, technological and capacity building support to help developing countries implement the Paris Agreement.

Australia ratified the Paris Agreement in November 2016. Australia's target under the Paris Agreement is to reduce emissions by 26-28 per cent below 2005 levels by the year 2030 as stated through its NDC. In 2021, prior to COP26 in Glasgow, Australia reaffirmed its NDC under the Paris Agreement as follows:

- Economy-wide target to reduce greenhouse emissions to by 26-28% below 2005 levels by 2030.
- Adopt a target of net zero emissions by 2050. This is an economy-wide target covering all sectors and gases included in Australia's national inventory.

3.2.2 Australian legislation

In Australia, there are several regulatory frameworks for management and reduction of GHG emissions. This includes the *National Greenhouse and Energy Reporting Act 2007* (NGER Act), Safeguard Mechanisms, the Emissions Reduction Fund and the Renewable Energy Target Scheme. The function of each of these is as follows:

- The NGER Act established a national framework for reporting and disseminating company information about GHG emissions, energy production, and energy consumption. Companies that trigger NGER Act thresholds must report annually all Scope 1 and Scope 2 emissions, and results are presented on the Clean Energy Regulator website.
- The Safeguard Mechanism, created under the NGER Act, applies to facilities with direct scope 1 emissions of more than 100,000 tonnes of carbon dioxide equivalent per year. This framework establishes a baseline against which their emissions reported under the NGER Act are compared. If a facility exceeds its baseline, they have the options to: establish a new baseline if the additional emissions related to a change in production variables; surrender Australian carbon credit units (ACCUs) to offset emissions; apply for a multi-year monitoring period to allow additional time to reduce net emissions; or apply for an exemption where emissions are due to exceptional circumstances.
- The Emissions Reduction Fund (ERF) is a scheme that aims to provide incentives for a range of organisations and individuals to adopt new practices and technologies to reduce their emissions and provides a legal obligation for Australia's top emitters to maintain their emissions below their emissions limit (or baseline) (defined by the Safeguard Mechanism established under the NGER Act). The ERF is enacted through the Carbon Credits (Carbon Farming Initiative) Act 2011 and allows for the generation of ACCUs. ACCUs can be sold to the ERF or sold on the secondary market and purchased by emitters who exceed their baseline to offset their emissions.

The Renewable Energy Target (RET) is a scheme that aims to reduce emissions of greenhouse gases in the
electricity sector by encouraging additional generation of electricity from sustainable and renewable sources.
There are two (2) schemes under these that is administered by the Clean Energy Regulator - Large-scale
Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES).

The LRET incentivises investment into renewable energy power stations such as wind, solar and hydro-electrical sources) to deliver 33,000 gigawatt hours of extra renewable energy per year. The stations in turn create large-scale generation certifications (LGCs) for the renewable electricity they produce. The businesses that did invest can then sell the LGCs to liable entities or companies who want to demonstrate renewable energy use. On top of this, the businesses can continue to buy certain percentages of electricity from renewable sources each year, buying LFCs and surrendering them to Clean Energy Regulators as well to further demonstrate renewable energy use.

The SRES incentives on the other hand encourage households and businesses to install small-scale renewable energy systems (such as rooftop solar panels, solar water heaters, small-scale wind or hydro systems to generate small-scale technology certificates (STCs). These STCs can then be sold to liable entities (mainly electricity retailers) for profit or reassigning STCs to the company that installed the system in exchange for a lowered price.

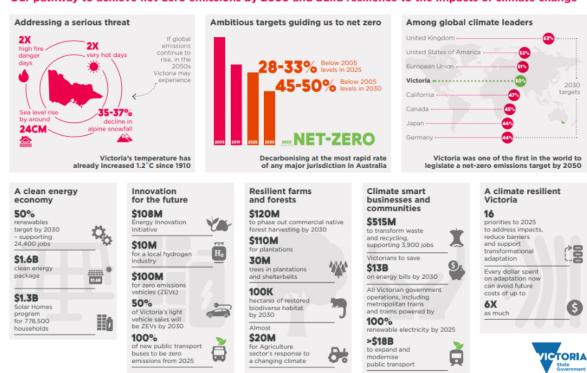
3.2.3 Victorian legislation

Victoria has established greenhouse gas emissions reductions within the Victoria's Climate Change Act 2017. This Act establishes targets of net-zero greenhouse gas emissions by 2050 by 5-yearly interim emission reduction targets to help keep Victoria on track. Such time frames include an emissions reduction of 28-33% below the 2005 levels by the end of 2025 and a 45-50% below the 2005 levels by the end of 2030. Victoria's strategy and pathway to achieve net-zero emissions are illustrated in Figure 3 Summary of Victoria's initiative towards net zero carbon.

Figure 3 Growth areas (Source: Environment, Land, Water and Planning)

VICTORIA'S CLIMATE CHANGE STRATEGY

Our pathway to achieve net-zero emissions by 2050 and build resilience to the impacts of climate change



In a report provided by the Independent Expert Panel (Interim Emissions Reduction Targets for Victoria (2021-2030), 2019), there are four (4) key policies to reduce emissions in Victoria. The four (4) policies are described in the next section.

- The Victorian Renewable Energy Targets (VRET) of 25% of electricity generated in the state by 2020, 40% by 2025, and 50% by 2030.
- The Victorian Energy Upgrades program, under which energy retailer companies must meet their share of an annual emissions reduction target by supporting the uptake of products and services that improve household and business energy efficiency.
- TAKE2, a voluntary pledge and review process focused on reducing emissions and building capacity and knowledge to identify and implement climate change actions. Pledges can be made by local governments, businesses, community groups, education organisations and individuals.
- New Energy Technologies Strategy, which focuses on investing in clean energy generation technology, strengthening sector skills, collaboration and innovation, encouraging the development of new consumer-driven markets, and building state-wide capabilities.

Electricity generation and transport sector are the top sources of Victoria's emissions. Most of the Victoria's energy is being produced from brown coal generation, even within 2016, 52% of Victoria's emissions was from this sector and only decreased to approximately 42% in 2020 with the Hazelwood power station closing in 2017. The 2016 data illustrated in Table 1 provides an emissions breakdown for electricity and transport.

Table 1: Electricity and Transportation greenhouse gas emissions breakdown

Electricity emissions breakdown	Transport emissions breakdown
34% from commercial services (including buildings)	16% from direct combustion emissions
23% from manufacturing	12% from agriculture
22% from residential users	4% from industrial processes
17% from electricity, gas and water supply	3% from fugitive emissions (gas leaks from fossil fuel production, storage and distribution)
	2% from waste

To combat transport emissions and a key driver for clean energy future, Victoria's Zero Emission Vehicle (ZEV) Subsidy has an intended goal that by 2030, half of all light vehicle sales will be ZEVs. The \$100 million dollar package of policies and programs to make this possible includes the following (Department of Environment, Land, Water and Planning, 2021):

- \$46 million for Australia's first public Zero Emissions Vehicle Subsidy Program providing individual subsidies at the point of purchase of more than 20,000 ZEVs
- \$19 million to accelerate the roll-out of electric vehicle (EV) charging infrastructure across regional Victoria and support the charging of EV fleets
- \$20 million for a ZEV public transport bus trial and a target for all public transport bus purchases to be ZEVs from 2025
- \$10 million to replace 400 vehicles in the Victorian Government Fleet (VicFleet) with ZEVs
- \$5 million to establish a Commercial Sector Zero Emissions Vehicle Innovation Fund
- \$298,000 for an 'EV-readiness' in new buildings study

There are also reforms to the National Construction Code to make new buildings ZEV-ready.

It also anticipated that there will be a massive decline in gas consumption enabling a switch from to gas to electricity for future developments in built environment.

In planning for the Bannockburn South East PSP area provision of utilities and services, it will be important to cater for future technical improvements and market changes over time. For planning considerations, it is important to note the following:

• The net amount of renewables in the electricity grid will increase per state government targets and general market trends

- Price of power will go down as a result of renewables generation
- Local and state government policies will mandate a minimum portion of household electricity to be sourced from renewable energy sources
- Smart meters will be implemented more broadly
- Household batteries will become more affordable
- Uptake of ZEV will increase

3.2.4 Local policies

Victorian Planning Authority (VPA) is working with the Golden Plains Shire Council to create the Bannockburn Growth Plan to guide the precinct towards sustainability in 2050. This is also in tangent with the Golden Shire Environment Strategy (2019-2027) (White and Connor, 2019). The Shire Community continues to work towards five major Strategic Directions:

- 1. Environmentally Connected Community
- 2. Greener Economies
- 3. Thriving natural Environments
- 4. Sustainable Urban and Rural Design
- 5. Council Leadership

It is in line with these five major directions that the following policies have been put forward for Bannockburn to put in as it is moving towards net-zero emissions and more sustainability (Victoria Planning Authority, 2021).

From the Council's Environment Strategy 2019-2027 (2019) outlines the Council's strategic direction regarding sustainability. Opportunities include Environmentally Sustainable Design (ESD), active travel, community gardens, Integrated Water Management (IWM), Water Sensitive Urban Design (WSUD) and urban greening.

3.2.4.1 Benchmarking with Green Star Communities Rating tool

Green Stars Communities is an assessment and rating tool for the planning, design and construction of precincts which is administered by Green Building Council of Australia. It provides assessment across Governance, Liveability, Economic Prosperity, Environment and Innovation. The table below outlines the linkages of each between each credit and the environmental, social and governance (ESG) action plan. Benchmarking the planning and development for the precinct would support the implementation of ESD initiatives to achieve objectives of the Council's Environment Strategy.

Table 2: Green Star Community Rating initiatives

GREEN STAR CREDITS AS RELEVANT	ESD LINKAGE	
GOVERNANCE		
DESIGN REVIEW (1)	 Design space and infrastructure to enhance the health, wellbeing, resilience and quality of life, considering the higher likelihood and intensity of extreme weather events associated with a changing climate. 	
	 Build strong and safe communities where spaces and infrastructure are designed to encourage healthy, active, socially connected lifestyles, services are easy to access, and safety is increased (crime prevention through environmental design (CPTED) 	
	Foster community resilience & inclusivity.	

ENGAGEMENT (3) + COMMUNITY PARTICIPATION AND GOVERNANCE (7)	Engage with the community to enable wider acceptance of carbon reducing initiatives.
ADAPTATION AND RESILIENCE (4)	 Design space and infrastructure to enhance the health, wellbeing, resilience and quality of life, giving consideration to the higher likelihood and intensity of extreme weather events associated with a changing climate. Increase resilience of buildings to climatic shocks.
CORPORATE RESPONSIBILITY (5)	 Engage with service providers and material providers to reduce carbon footprint in their organisations and operations.
SUSTAINABILITY AWARENESS (6)	 A 'Sustainable House' education facility, showcasing how a future household can embrace sustainability in design, construction and operation through direct ESD advocacy.
LIVEABILITY	
COMMUNITY DEVELOPMENT (10)	Advocate with developers, builders, providers and future residents to enable greater implementation of strategies more broadly.
SUSTAINABLE BUILDINGS (11)	Built form and infrastructure which incorporates local, sustainable and healthy materials and building products.
	A precinct capable of supporting sustainable industries such as sustainable construction, modular housing, green appliance tech development.
CULTURE, HERITAGE AND IDENTITY (12)	 Coordinated blue-green infrastructure which integrates principles and techniques mentioned in Green-Blue Infrastructure Guide – A guide for small towns in Victoria's Central highlands region. The following may also be considered:
	 Habitat corridors and pollinator pathways, green links
	 Natural wetlands and detention basins
	Cultural heritage connections
	 Protection of existing ecological value
ECONOMIC PROSPERITY	
RETURN ON INVESTMENT (20)	Energy generation in renewable energy systems.
INCENTIVE PROGRAMS (21)	(Zero carbon) Sustainable Transport.
DIGITAL INFRASTRUCTURE (22)	Smart cities technology to measure and adjust performance.
PEAK ELECTRICITY DEMAND REDUCTION (23)	 The growth areas as a zero net energy district, generating as much energy as it consumes on an annual basis on-site or near-site from renewable sources. Inclusion of microgrids. Fossil fuel free residential and commercial precincts.

	 Best practice energy efficiency as standard through tighter performance standards across all building types based on 'affordable living' concept (construction cost and operational costs to form the business case).
ENVIRONMENT	
INTEGRATED WATER CYCLE (24)	 Private development which meets best practice environmental management guidelines for stormwater in all development. Combination of significant alternative water supply and building based water efficiency measures that can support a best practice potable water targets.
	 Stormwater management (blue infrastructure) coordinated with green infrastructure to enhance the sustainability of the urban landscape. Combination of significant alternative water supply and building based water efficiency measures
GREENHOUSE GAS STRATEGY (25)	 The growth areas as a zero net energy district, generating as much energy as it consumes on an annual basis on-site or near-site from renewable sources. Fossil fuel free residential and commercial precincts. Best practice energy efficiency as standard through tighter performance standards across all building types based on 'affordable living' concept (construction cost and operational costs to form the business case. Inclusion of microgrids and local renewable energy generation.
MATERIALS (26)	 Built form and infrastructure which incorporates local, sustainable and healthy materials and building products. A precinct capable of supporting sustainable industries such as sustainable construction, modular housing, green appliance tech development. Use of local materials, such as reuse of quarry overburden material where appropriate. Construction materials are recycled or reused as standard practice.
SUSTAINABLE TRANSPORT AND MOVEMENT (27)	 The growth areas as a zero net energy district, generating as much energy as it consumes on an annual basis on-site or near-site from renewable sources. Fossil fuel free residential and commercial precincts. Build strong and safe communities where spaces and infrastructure are designed to encourage healthy, active, socially connected lifestyles, services are easy to access, and safety is increased (crime prevention through environmental design (CPTED) Coordinated blue-green infrastructure which integrates
ECOLOGICAL VALUE (29)	 Increased canopy cover 'Complete' streets which support significant green infrastructure within the road reserve. Coordinated blue-green infrastructure Dedicated open space for rewilding (re-establishment of functional ecosystems).

WASTE MANAGEMENT (30)	 Precinct-wide waste management systems for urban centres that incentivise waste minimisation in operation, including the reuse of organic waste and the use of smart bin technology. Development of a local, precinct scale organic waste management facility.
HEAT ISLAND EFFECT (31)	 'Integrated' street typologies with design allowance for all arterial, collector, distributor and local roads to have tree canopy, water sensitive urban design, active transport and underground infrastructure. Increased canopy cover Coordinated blue-green infrastructure Protection of existing ecological value Dedicated open space for rewilding (re-establishment of functional ecosystems).
INNOVATION	
INNOVATION (33)	• Innovation is encouraged across all infrastructure related services to enable a zero carbon PSP.

4. World-leading practices in ESD

(This section is under development to include ANZ examples)

Singapore Green Plan:

Goals of Green, Liveable and Sustainable Homes and districts for Singaporeans:

- Plant 1 million more trees and have every household within a 10-minute walk from a park by 2039 (currently 320,000 trees and 9/10 households having a park within a 10-minute walk.
- Establish 500km of park connectors by 2030 Park Connector Network is now 370km
- Develop over 130 ha of new parks and enhance around 17- ha of existing parks with more lush vegetation and natural landscape by the end of 2026.

Jurong Lake District



Artists' impression of a pedestrial-friendly street in Jurong Lake District Image: KCAP Architects & Planners, SAA Architects, Arup, S333 and Lekker

Jurong Lake district is planned as a 'car-light' district where 85% of all trips are made by foot, bike or public transport. It aims for a zero emissions and waste minimisation, optimisation of land use for centralised infrastructure which includes cooling system, pneumatic waste conveyance system etc.

Reference:

Jurong Lake District (jld.gov.sg)

Tengah Town

Tengah Town is surrounded by lush landscaping and a forest corridor and is a comparable rural precinct with Bannockburn. The development aims to create a nature-centric neighbourhood in a holistic manner. Homes are cooled by centralised systems, solar panels on roofs are installed and homes are equipped with sensors for monitoring energy consumption.

5. References

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Appendix B

Authority Services Preliminary Servicing Advices



Our Ref: L020151

Your Ref:

Enquiries to: Judy Phillips - Ph: 1300 656 007

05 July 2022

SMEC Australia
By Email: Tom.Moorfoot@smec.com

Dear Sir,

PRELIMINARY SERVICING ADVICE

RE: Bannockburn South and East Precincts - Future Growth Options Servicing advice request as of 21 June 2022

We refer to your request for servicing advice regarding the above specified land.

Please note that this is just preliminary advice based on the information you provided to Barwon Water.

Any information given in this preliminary servicing advice or otherwise by BW is not binding upon BW and you shall not undertake any commitment based on any information given until a formal execution of a Developer Deed or a Private Works Deed.

The South Precinct Structure Plan is still being developed. Therefore, some of the advice might change accordingly. The Structure Plan affects the location of land users such as activity centres, residential, commercial, reserves, etc. Thus, it impacts to water and sewer assets, which will be designed based on the type of customers and their requirements.

Preliminary advice is attached.

If you have any questions regarding this letter please contact Barwon Water's representative listed above.

Yours sincerely,

Manager Enterprise Project Delivery



Date: 05 July 2022

Subject: Bannockburn South East Precinct - Preliminary Servicing Advice

Water

Drinking water for Bannockburn is produced at the Moorabool Water Treatment Plant (WTP) before being transferred to the 23 ML Bannockburn basin via the Sheoaks pipeline. From the basin, water is chlorine dosed and then pumped directly via one of the two pump stations. The Bannockburn Booster PS directly feeds customers in Bannockburn. No customers can be fed from the basin by gravity. Figure 1 shows existing water assets in Bannockburn.

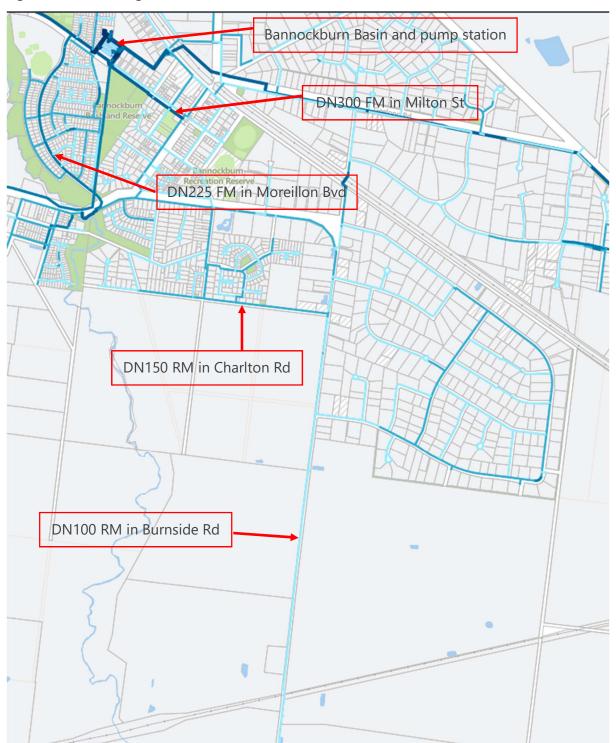


Figure 1. Existing water assets in Bannockburn



As is shown in Figure 1, if development commences adjacent to the existing township, initial stages can be serviced by existing water assets in Charlton Rd and Burnside Rd however, these are inadequate for ultimate development. A DN300 water main is required to extend from the DN300 in Milton St out to the precinct to provide servicing for growth. Figure 2 shows indicative alignment for this asset.

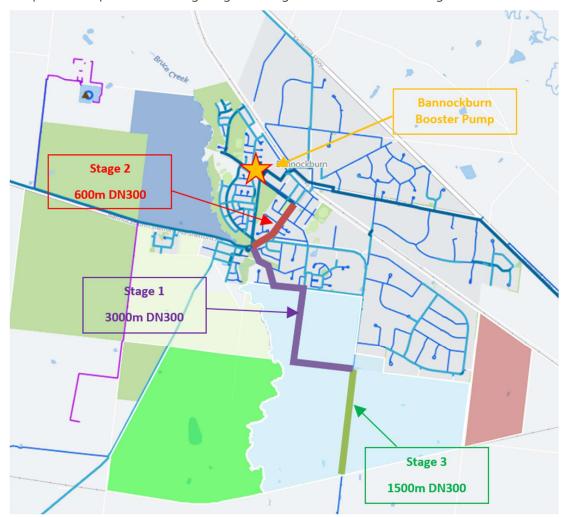


Figure 2. Proposed DN300 to provide servicing for growth in South East Precinct.

As it is shown in Figure 2:

- Stage 1 will be 3 km of ID 300 mm pipeline connecting to existing DN 225 mm pipeline along Moreillon Blv and upgrade PRV with GID: 1511032 on Burnside Rd.
- Stage 2 will be 600m of ID 300 mm pipeline connecting to the existing 300 mm DICL on Milton Rd.
- <u>Stage 3 will be 1.5 km of ID 300 mm water main to replace existing 100 mm AC water main</u> on Burnside Rd and upgrade PRV with GID: 713701 on Burnside Rd

Stage 1 and Stage 3 sections are shared assets that could be extended as development occurs.

In addition to the proposed water assets in Bannockburn South East Precinct, the below existing water assets will be augmented to provide the capacity required for the growth area:

• Bannockburn pump station to be upgraded with one additional pump, similar to the existing large pump (87 l/s duty point 60 m head) and a generator,



- Gheringhap booster pump (also known as Crouch Lane Pump) has capacity of 70 l/s which needs to be upgraded when it takes 1.2 days (10 hours) to transfer one summer's day demand with the pump operating 8 hours a day,
- Duplication of Bannockburn-She Oaks Transfer Main

Sewer

Bannockburn was first sewered in 1998. Since then there has been a steady increase in flows to the Water Reclamation Plant (WRP) coinciding with that growth. The total number of houses (connected to sewer) is currently estimated at approximately 1,500. All sewerage throughout Bannockburn is collected in gravity sewers and conveyed to the Bannockburn Sewer Pump Station No.1. The pump station is located in the southern area of the township along Bannockburn Shelford Rd and in close proximity to Bruce's Creek. The pump station lifts sewer flows through a DN300 rising main toward the existing Bannockburn Water Reclamation Plant (Bannockburn WRP) located to the west of the township. Figure 3 shows existing major sewer assets in Bannockburn.

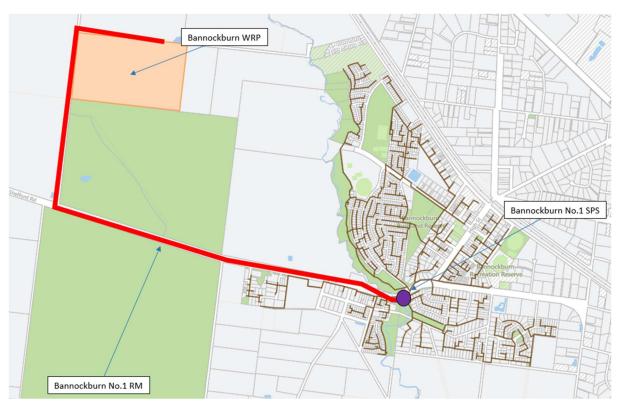


Figure 3. Existing major sewer assets in Bannockburn

A strip of land in the north side of the area can be sewered by the existing sewer network. Almost the rest of the precinct falls to the south and away from existing sewer infrastructure.

Therefore, trunk and reticulation gravity sewer pipelines will be required to collect and transport sewage to the proposed sewer pump station spots. Then, proposed pump stations are required to transfer flows to the existing network. Two sewer pump stations and wet weather storage are proposed, the first will be required early in the development timeframe and the second is needed when land too low to be commanded by the first commences development. Table 1 shows Sewer flow estimations for Bannockburn South East Precinct



Table 1: Sewer flow estimations for Bannockburn South East Precinct

Area	ADWF	PDWF	RDI	Sewer design flow
	(L/s)	(L/s)	(L/s)	(L/s)
South east precinct	23.14	52.99	37.15	90.14

Figure 4 shows indicative alignments for the pump stations, rising mains and catchments required to service the South East Precinct (final alignment to be developed when the precinct structure plan is provided to Barwon Water by the council).

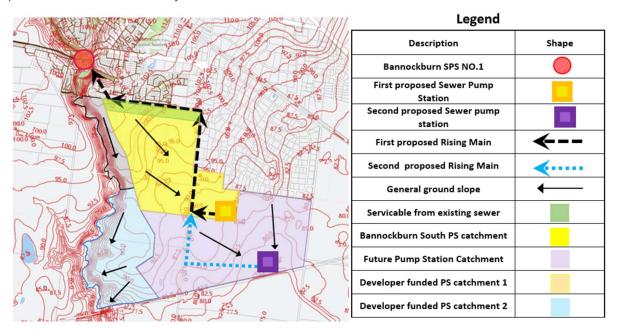


Figure 4. Indicative alignments for the pump stations, rising mains and catchments required to service the South East Precinct

- Below is the specification of the first proposed Sewer Pump Station:1 x \sim 50 L/Sec sewer pump station
- 300kL emergency storage facility
- 1 x odour dosing station at the pump station
- 3.5 km of DN300 mm PVC rising main with connection to the gravity inlet of the existing Bannockburn No. 1 Sewer Pump Station.

In addition to the proposed sewer assets in Bannockburn South East Precinct, the below existing sewer assets will be augmented when they reach their capacity in future:

- Upgrade of existing Bannockburn No. 1 SPS
- Upgrade of Bannockburn WRP

folroyd, David <Dholroyd@powercor.com.au> Wednesday, 29 March 2023 9:37 AM David MUTTON fom MOORFOOT: Morris Edwards (VPA) RE: Bannockburn SE PSP - Preliminary Servicing Advice

This message is From an External Sende

Hi David.

Powercor's response is below. I acknowledge the Ballan request and will forward information over the next week or so.

Powercor has recently commissioned new Gheringhap (GHP) zone substation near the intersection of Midland Highway and Fyansford - Gheringhap Road in March 2023.

The proposed new development area of the Bannockburn South East Precinct Structure Plan will be serviced from Gheringhap (GHP) zone substation.

Of particular importance to note is that Gheringhap (GHP) zone substation is a REFCL zone substation and as such ongoing REFCL compliance will need to be maintained. This will likely require future REFCL isolating transformers to be located within the Bannockburn South East Precinct Structure Plan. The maximum capacity of a REFCL isolating transformer is 6,000kVA. REFCL isolating transformers could likely be required close to the feeder entries into developments where the powerlines transition from overhead to underground.

Gheringhap (GHP) zone substation has been built with two x 66/ 28kV transformers and four x 22kV feeders initially. The ultimate configuration for Gheringhap (GHP) zone substation is for up to three x 66/ 22kV transformers and up to twelve x 22kV feeders.

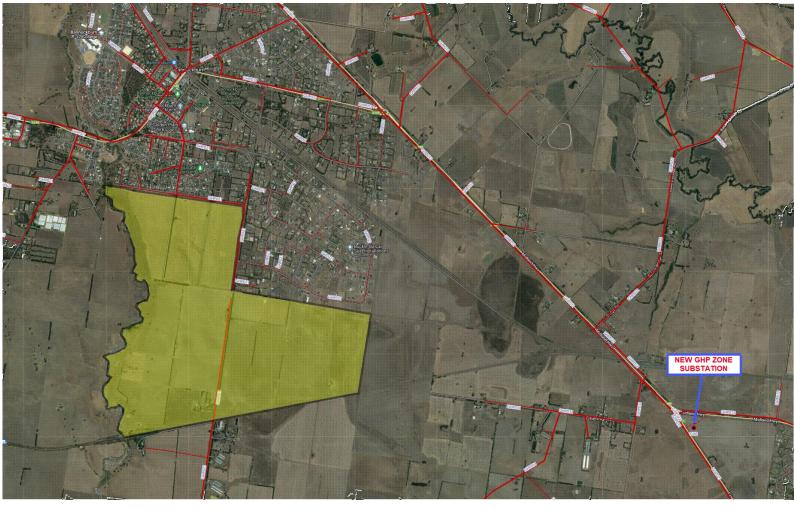
As Gheringhap (GHP) zone substation has just been commissioned within the past month all of the four existing 22kV feeders have adequate capacity to cater for the load and growth in the medium term

On the below mark up of Map Insights the Bannockburn South East Precinct Structure Plan area is approximately highlighted yellow with black border. New Gheringhap (GHP) zone substation is in the bottom right of the below mark up of Map Insights.

Presently GHP021 22kV feeder backbone is along Burnside Road through the middle of the Bannockburn South East Precinct Structure Plan and also along the northern side of the Bannockburn South East Precinct Structure Plan.

All new 22kV required within the Bannockburn South East Precinct Structure Plan will be placed underground to supply new kiosk substations within the development.

Powercor would consider that development within the Bannockburn South East Precinct Structure Plan could likely have no reticulated gas infrastructure and will have provision for rooftop solar, battery storage and electric vehicle charging for new households. This could necessitate larger klosk substations increasing from 315kVA to 500kVA, shorter low voltage circuit lengths and more klosk substations throughout the development.



Please call if you wish further explanation or detail.

David Holroyd Customer Development Manager

Network Services | Design & Customer Programs CitiPower Pty Ltd and Powercor Australia Ltd A 72 Roseneath St North Geelong, VIC 3215

T +61 3 5240 7552 | M +61 409 965 882 | E dholroyd@powercor.com.au





From: David MUTTON -David Mutton@smec.com>
Sent: Tuesday, 21 March 2023 3:03 PM
To: Holroyd, David «Dholroyd@powercor.com.au>
Cc: tom.moorfoot -Com.Moorfoot@smec.com; Morris Edwards (VPA) -\u00edMorris.Edwards@vpa.vic.gov.au>
Subject: RE: Bannockburn SE PSP - Preliminary Servicing Advice

Hi David.

I appreciate you picking this up and look forward to your response.

I have attached the email that was sent to Neil Gascoigne which contained the original request for Preliminary Servicing Advice and the background information in the email chain.

Please do not hesitate to make contact if you wish to discuss this further, your earliest attention to this matter would be very much appreciated.

Kind regards,

David

David Mutton
Project Manager - Urban Communities
M +61 407 315 601 T +61 3 9869 0843 E David Mutton@smec.com
Collins Square, Tower 4, Level 20, 727 Collins St, Melbourne, VtC, 3008, Australia

From: Holroyd, David < Dholroyd@powercor.com.au Sent: Tuesday, 21 March 2023 2:45 PM To: Tom MOORFOOT Cipm.Moorfoot@smec.com>; David MUTTON David.Mutton@smec.com>
Subject: Bannockburn SE PSP - Preliminary Servicing Advice

From: Denis Andrews "denis.andrews.com.au>"denis.

This message Is From an External Sender

Please do not click the links or attachments and do not respond to this message if you are unsure of its origin

Hi David

Sincere apologies for the delay in responding to you

The Bannockburn SE PSP has AusNet's 500kV transmission line virtually dissecting the PSP area (see attached).

There are 6 towers within the subject area and the line sits on a 60m total width easement. Under present planning, there is no proposal to duplicate this line or widen the existing easement. The line is a critical backbone of the transmission network, enabling connection of large scale renewable generation sources as well as providing an interconnector to SA and provision of large scale supply to the Alcoa smelter at Portland.

AusNet has no objections in principle to the establishment of the PSP, with the following points to be considered for any development of the land affected by the easement:

- 1. Roads that run parallel to the line are not permitted within the easement.
- 2. Roads that cross generally perpendicular to the easement are acceptable provided that they are at least 30m away from towers.
- 3. Lighting poles are permitted, with pole heights determined by available clearances to the overhead lines and must be of a hinged design that lowers to ground for maintenance.
- 4. Subdivision of the land is acceptable however residential or commercial lots must not cross the easement creating inaccessible and unmanageable smaller sections of easement.
- Wetlands and reserves are permitted subject to acceptance of designs by AusNet. No water bodies within 30m of towers.
- 6. Any underground services within the easement are subject to acceptance of designs by AusNet. Nothing permitted within 30m of towers.
- 7. Solar panels are not permitted in the easement.
- 8. Buildings are not permitted in the easement.
- 9. Structures are subject to acceptance of design by AusNet.
- 10. Use of vehicles and equipment over 3m in height is subject to written approval from AusNet.
- 11. Planting of vegetation is restricted to lower height species with reduced planting density to ensure that a fire cannot spread throughout the easement. Acceptance of designs is required by AusNet.

Don't hesitate to get back to me if you have any queries.

Kind regards

Denis Andrews Senior Easements Officer

AusNet

2 Southbank Boulevard Southbank Victoria 3006 Australia

P 0438 055 607

 $\textbf{E}\underline{\text{denis.andrews}} \\ @aus \\ \text{netservices.com.au} \\$

W www.ausnetservices.com.au



From: David MUTTON < <u>David.Mutton@smec.com</u>> Sent: Wednesday, 22 February 2023 13:52

To: Denis Andrews < denis.andrews@ausnetservices.com.au >

Cc: Tom MOORFOOT <Tom.Moorfoot@smec.com>; Morris Edwards (VPA) <Morris.Edwards@vpa.vic.gov.au>

Subject: FW: Bannockburn SE PSP Preliminary Servicing Advice

This message is from an external sender

This message originated from outside AusNet. Do not click on links or open attachments unless you recognise the sender and know the content is safe.

Hi Denis,

Further to discussion last month and my phone message this afternoon, could you please advise when you may be able to provide preliminary advice regarding the conditions and constraints around the Electrical easement running through the Bannockburn SE PSP (original email attached).

We are trying to finalise our utilities report for VPA and would greatly appreciate a response to our request for PSA

Please do not he sitate to make contact if further discussion is required $% \left(1\right) =\left(1\right) \left(1\right)$

Kind regards, David

David Mutton Project Manager - Urban Communities M +61 407 315 601 T +61 3 9869 0843

M+61 407 315 601 T+61 3 9869 0843 E David.Mutton@smec.com Collins Square, Tower 4, Level 20, 727 Collins St, Melbourne, VIC, 3008, Australia

Proud to be part of SMEC's Flexible Work Arrangements and working Monday, Tuesday and Wednesday

From: David MUTTON

Sent: Wednesday, 25 January 2023 3:40 PM

To: Amanda Vonarx <a manda.vonarx@ausnetservices.com.au>; Morris Edwards (VPA) < Morris.Edwards@vpa.vic.gov.au>

Subject: RE: Bannockburn SE PSP Preliminary Servicing Advice

Hi Amanda/Morris.

I have spoken to Denis Andrews this week and he is going to provide a response with regards to the PSA. Hopefully this week.

Lydia Markovska <lydia.markovska@ausnetservices.com.au> From: Sent: Monday, 10 October 2022 2:16 PM

Property Investigations 2021 RE: Bannockburn SE PSP and South Ballan enquiry Subject:

Good Afternoon David,

Our network planning team have advised that there is sufficient existing network capacity in the Bannockburn network to support the highlighted short term and medium term priority areas.

For North West development area, sufficient supply can be extended from existing backbone mains along Milton St.

For South East precinct area, sufficient supply can be extended from existing backbone mains along Levy Rd

Thank you

Kind Regards,

Lydia Markovska Energy Project Coordinator

AusNet

308 Hvde Street Yarraville VIC 3013 Australia

+61 437 576 160

Elydia.markovska@ausnetservices.com.au

W www.ausnetservices.com.au

We work flexibly at AusNet Services. I'm sending this message now because it suits me, but I don't expect you to respond or action it when outside of your regular hours.

From: Property Investigations 2021 <<u>sb-SMEC_Property_Investigations_2021@smec.com</u>>

Sent: Thursday, 25 August 2022 3:46 PM

To: Lydia Markovska < lydia.markovska@ausnetservices.com.au >

Subject: FW: Bannockburn SE PSP and South Ballan enquiry

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe

Hi Lydia,

Hopefully the Ballan South query will now get sorted. However, could I get some feedback on the status of the Bannockburn SE PSP query??

Kind regards,

David

Project Manager - Urban Communities

M+61 407 315 601 T+61 3 9869 0843 E David.Mutton@smec.com

Collins Square, Tower 4, Level 20, 727 Collins St, Melbourne, VIC, 3008, Australia

From: David MUTTON

Sent: Thursday, 18 August 2022 10:01 AM

To: Lydia Markovska (lydia.markovska@ausnetservices.com.au) < lydia.markovska@ausnetservices.com.au >

Subject: Bannockburn SE PSP and South Ballan enquiry

Hi Lydia,

Following on from my phone message regarding the attached outstanding enquiries.

Could you please advise of the status at your earliest convenience.

Kind regards,

David

David Mutton
Project Manager - Urban Communities
M+61 407 315 601 T+61 3 9869 0843 E David.Mutton@smec.com
Collins Square, Tower 4, Level 20, 727 Collins St, Melbourne, VIC, 3008, Australia
SMEC Australia We're redefining exceptional









SMEC acknowledges the Traditional Custodians of Country throughout Australia and their connections to land, sea and community. We pay our respect to their elders past, present and emerging and extend that respect to all First Nations peoples today.



We are extremely proud to announce SMEC's 2022 Client Choice Award

wins in the following two categories:

- Best Built & Natural Environment Consulting Firm (>200m revenue)

- Best Professional Services Firm (>200m revenue)

Thank you to our staff, clients and partners for this outstanding achievement.

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Bannockburn SE PSP

nbn-Confidential: Commercial | | Rev 0.1 | Owner: <Job title of approver (owner)>

Servicing Assessment.

Scope

Provide input into assessing the availability of NBN services infrastructure to cater for the future development of the site.

Existing Network

This area currently sits within the Wireless & Satellite footprint of the NBN network.

Currently NBN fixed line network **does not exist within the identified area**, however the NBN fixed line is available on the perimeters of the identified area. Network access is currently available on Burnside Road & Charlton Road to the north of the identified area. Minimal cable infrastructure build is required to connect the precinct.

Proposed network upgrades

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

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

Servicing the precinct area

The Bannockburn SE Precinct will connect to the NBN co-located 3BBR FAN site in Milton St, Bannockburn. The FAN site currently has capacity to service the Precinct.

Servicing of the Precinct would be planned on a case by case application basis and driven primarily by customer-initiated demand, utilising new NBN build also developer supplied & shared trenching arrangements within the precinct. Any new build (conduit & cable) to this precinct is planned to connect via both Burnside Road & Charlton Road entries of the Precinct.

It is envisioned that new pit & pipe infrastructure is required within the entire precinct.

Opportunities

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

Some difficulties may exist with the NBN network being located on both sides of the Bruce Creek reserve, so NBN Co would be interested in being involved in any additional service crossings that occur. NBN are constrained by boundaries such as railways, freeways and watercourses, so any additional crossings enable NBN to increase the robustness of the network.

Some of the opportunities that would benefit NBN are:

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



Risks-Issues

Heritage overlays Environmental overlays

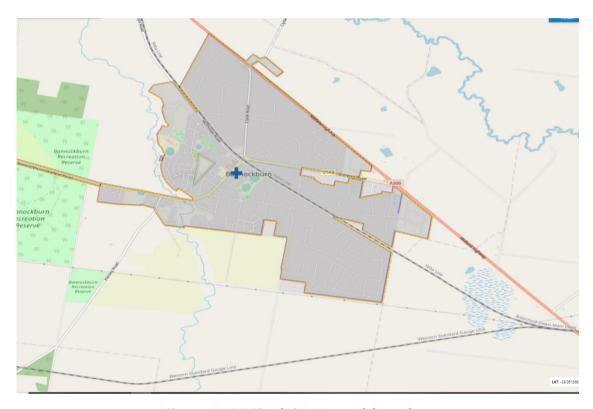
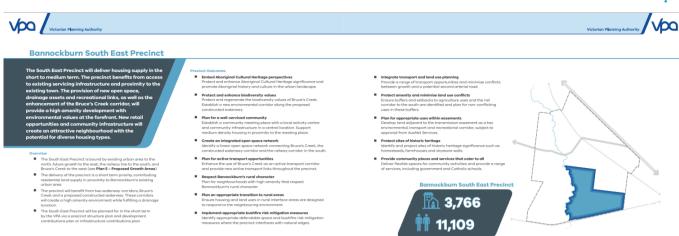


Figure 1. NBN Fixed Line Network boundary





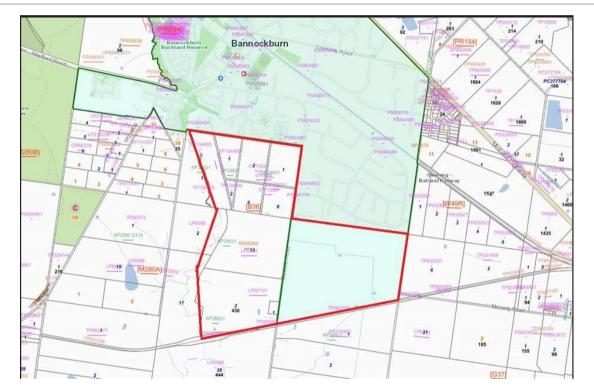
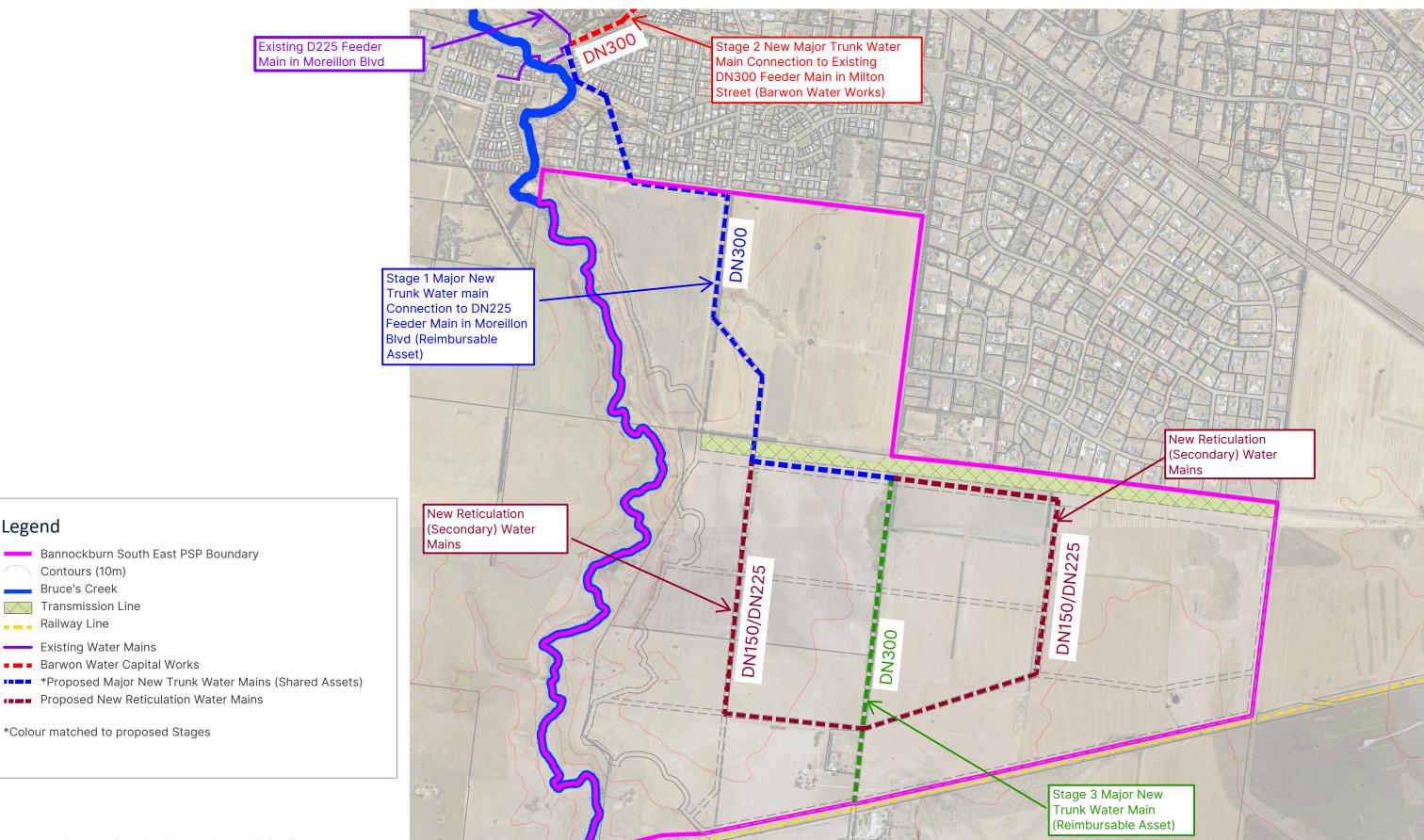


Figure 2. Bannockburn SE PSP area

Appendix C Servicing Plans



note: Internal Proposed Roads subject to change which will in turn require amendments to proposed service alignments

Potable Water Servicing Plan

Bannockburn PSP

Legend

Contours (10m) Bruce's Creek

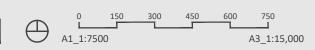
Transmission Line

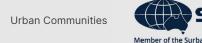
 Existing Water Mains ■■■ Barwon Water Capital Works

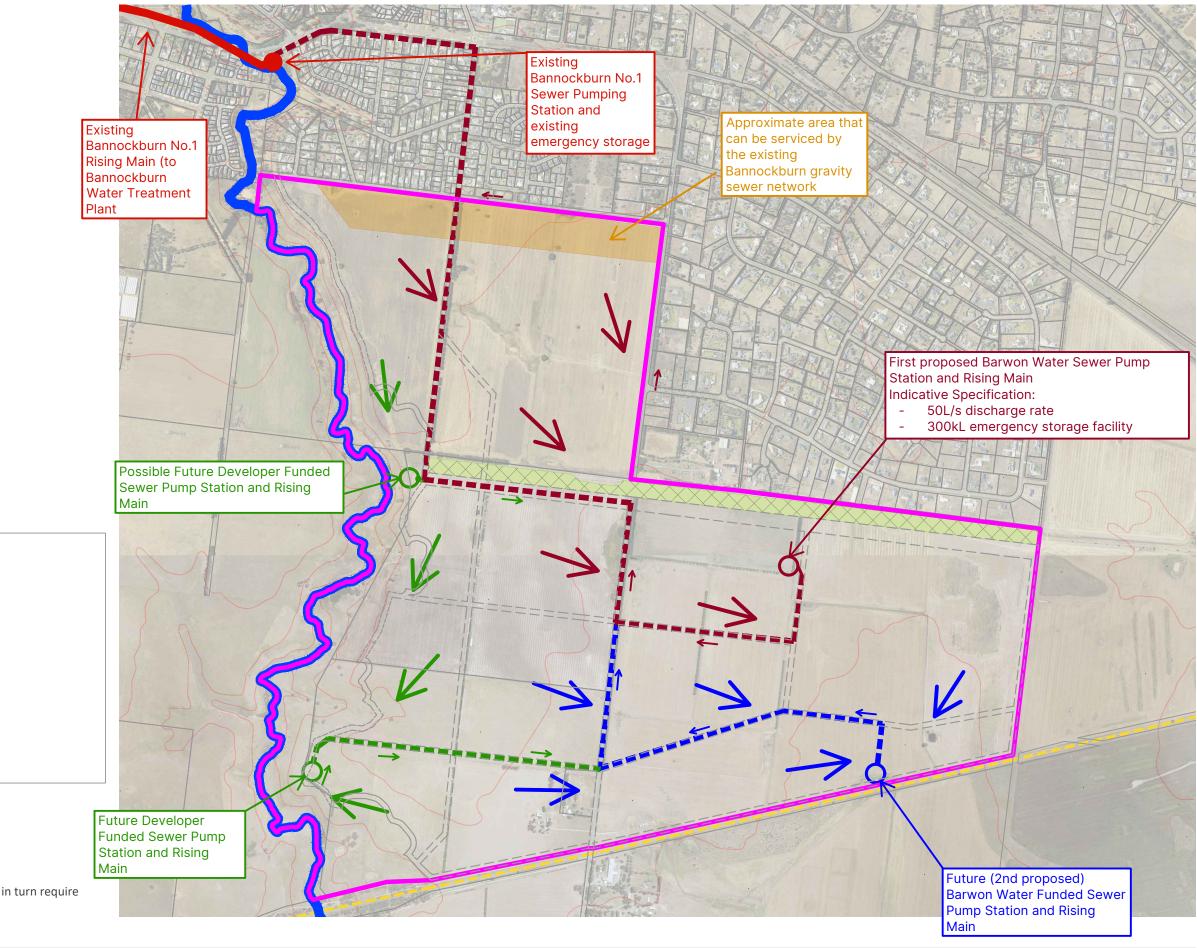
*Colour matched to proposed Stages

Railway Line

Date Issued: 05/06/2024 | Revision: D SMEC Project Reference: 30043280E.00 Drawn by: U.Tasmin | Checked by: H. Van Rijnberk







note: Internal Proposed Roads subject to change which will in turn require amendments to proposed service alignments

Sewer Servicing Plan

Bannockburn South East PSP Boundary

Existing Sewer Pump Station and Rising main

*Proposed Sewer Pump Stations
*Proposed Sewer Rising Mains
*General Catchments Slope

*Colour matched to proposed catchments

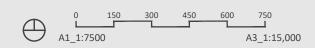
Contours (10m)

Bruce's Creek
Transmission Line
Railway Line

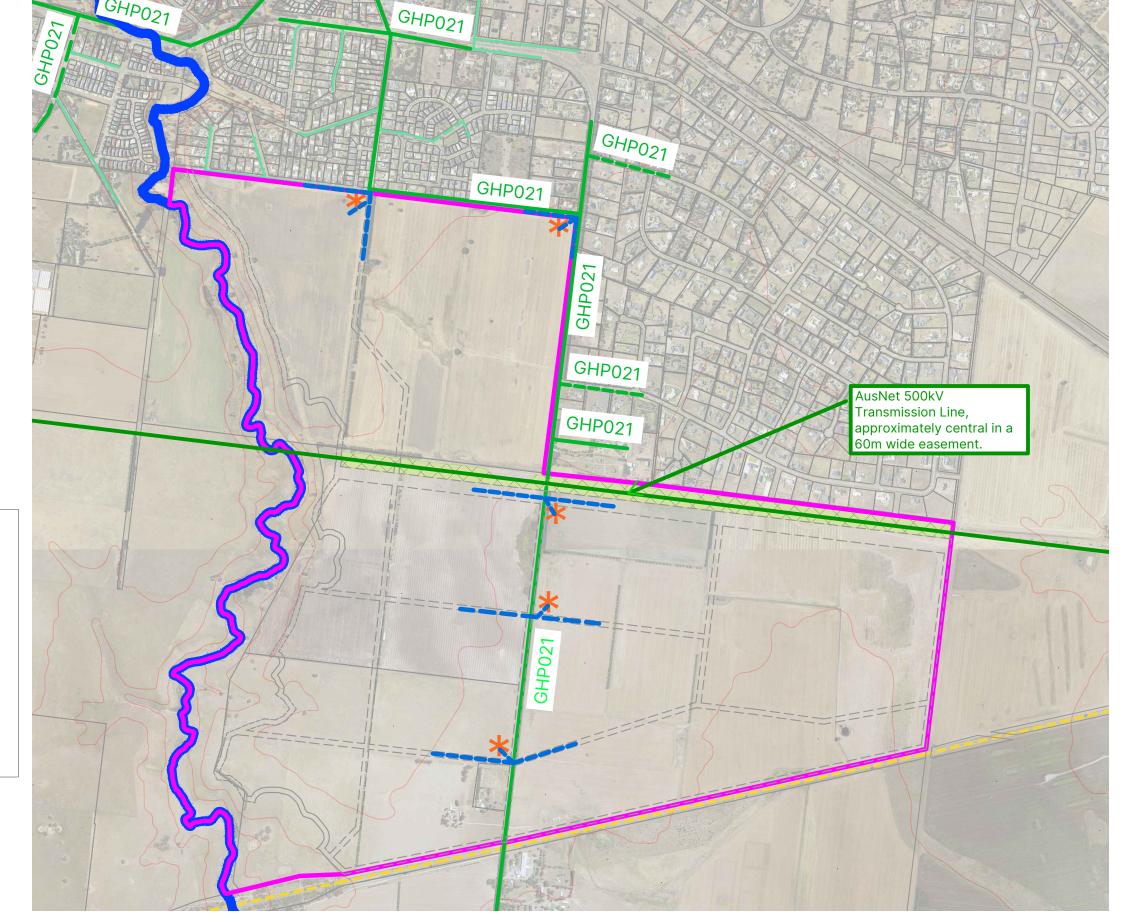
Bannockburn PSP

Legend

Date Issued: 05/06/2024 | Revision: D SMEC Project Reference: 30043280E.00 Drawn by: U.Tasmin | Checked by: H. Van Rijnberk







Legend Bannockburn South East PSP Boundary Contours (10m) Bruce's Creek Transmission Line Railway Line Existing AusNet Transmission Line *Existing Powercor Backbone Feeders (22kV) *Existing Powercor Districution Feeders (22kV) **Minor U/ground HV feeders off REFCL sites Possible Locations for REFCL Isolation Transformers (Powerlines transition from Overhead to u/ground)

*Underground lines indicated 'continuous lines'

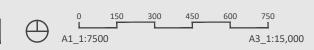
**Kiosk Substation locations to be nominated through detailed masterplanning design as part of developer permits

note: Internal Proposed Roads subject to change which will in turn require amendments to proposed service alignments

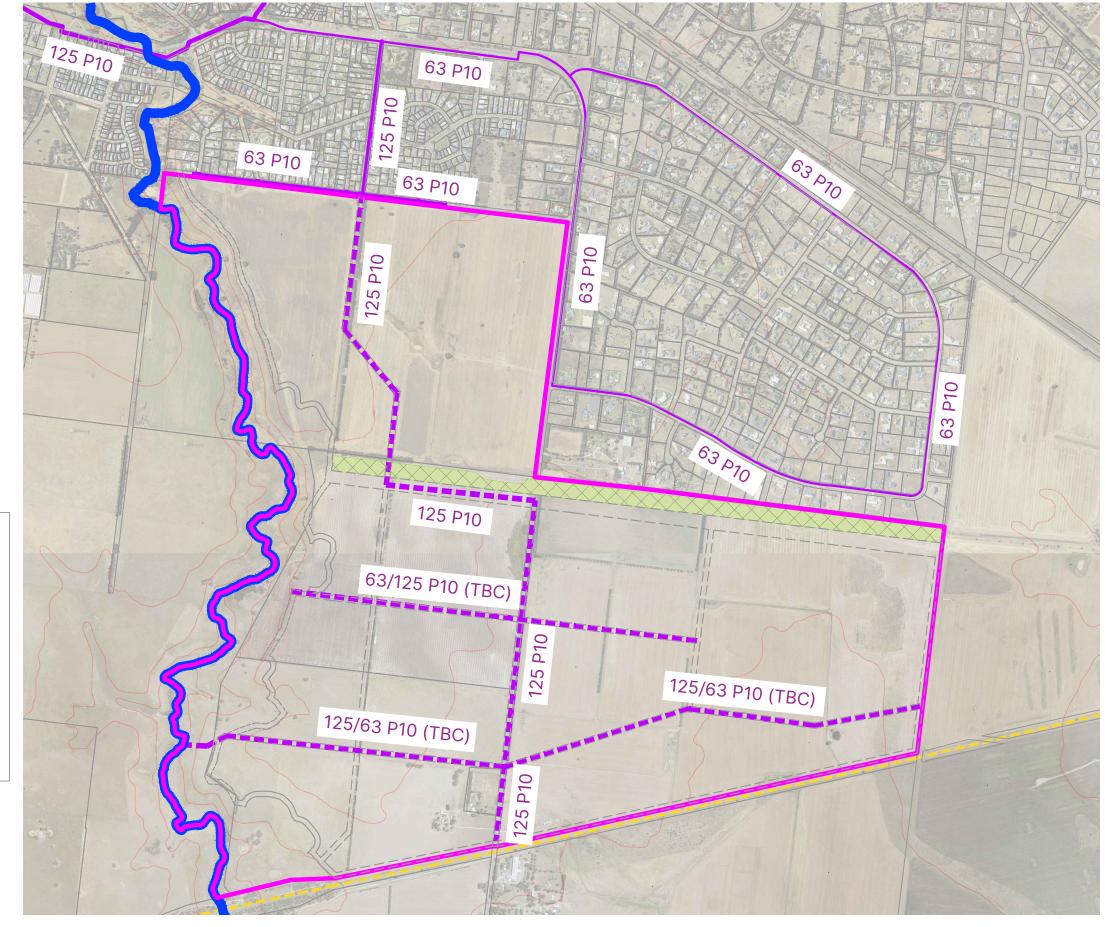
Electricity Servicing Plan

Bannockburn PSP

Date Issued: 05/06/2024 | Revision: D SMEC Project Reference: 30043280E.00 Drawn by: U.Tasmin | Checked by: H. Van Rijnberk







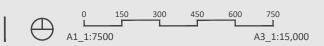
Legend Bannockburn South East PSP Boundary Contours (10m) Bruce's Creek Transmission Line Railway Line Existing 'Backbone' Gas Mains Possible Gas Main Network (Layout and sizes by AusNet Services Gas) *Note not all gas existing gas mains shown on this plan

note: Internal Proposed Roads subject to change which will in turn require amendments to proposed service alignments

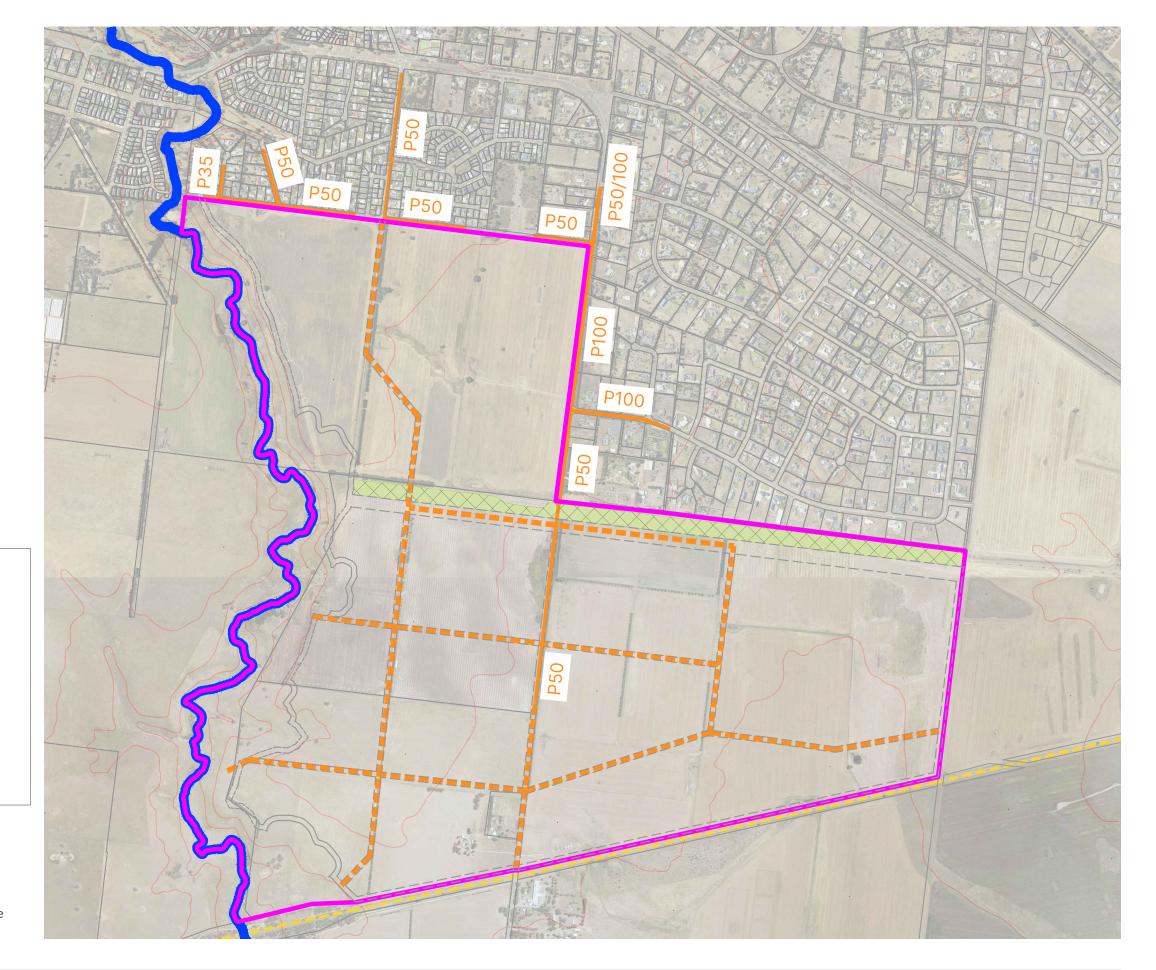
Gas Servicing Plan

Bannockburn PSP

Date Issued: 05/06/2024 | Revision: D SMEC Project Reference: 30043280E.00 Drawn by: U.Tasmin | Checked by: H. Van Rijnberk







Legend

Bannockburn South East PSP Boundary

Contours (10m)

Bruce's Creek

Transmission Line

Railway Line

Existing NBN Network

Possible Trunk (backbone) NBN mains (Layout and sizes by NBN Co)

*Note not all existing NBN network shown on this plan

note: Internal Proposed Roads subject to change which will in turn require amendments to proposed service alignments

Communications Servicing Plan

Bannockburn PSP

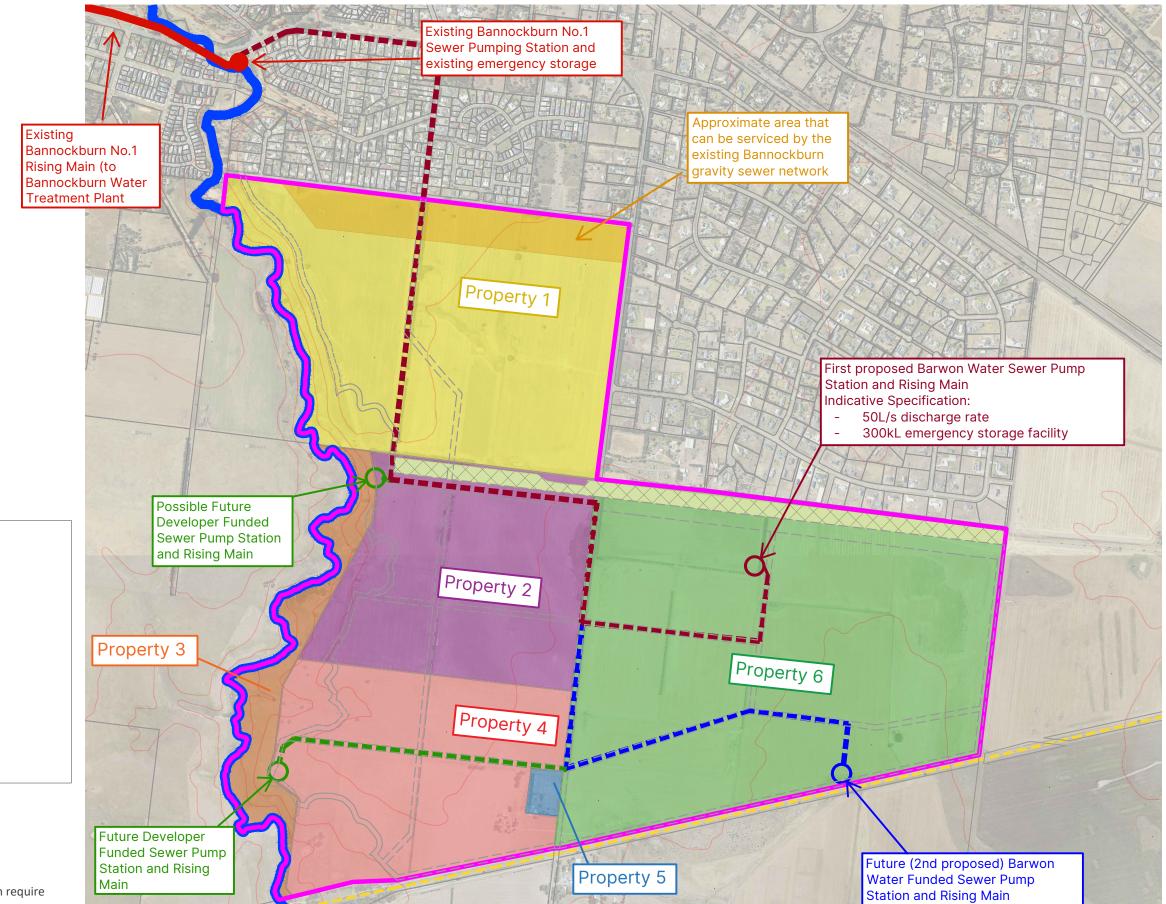
Date Issued: 05/06/2024 | Revision: D SMEC Project Reference: 30043280E.00 Drawn by: U.Tasmin | Checked by: H. Van Rijnberk







Appendix D **Utility Staging Plans**



note: Internal Proposed Roads subject to change which will in turn require

Bannockburn South East PSP Boundary

Existing Sewer Pump Station and Rising main

*Proposed Sewer Pump Stations

*Colour matched to proposed catchments

amendments to proposed service alignments

*Proposed Sewer Rising Mains
*General Catchments Slope

Development Sequencing Strategy Sewer Plan

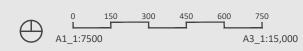
Bannockburn PSP

Legend

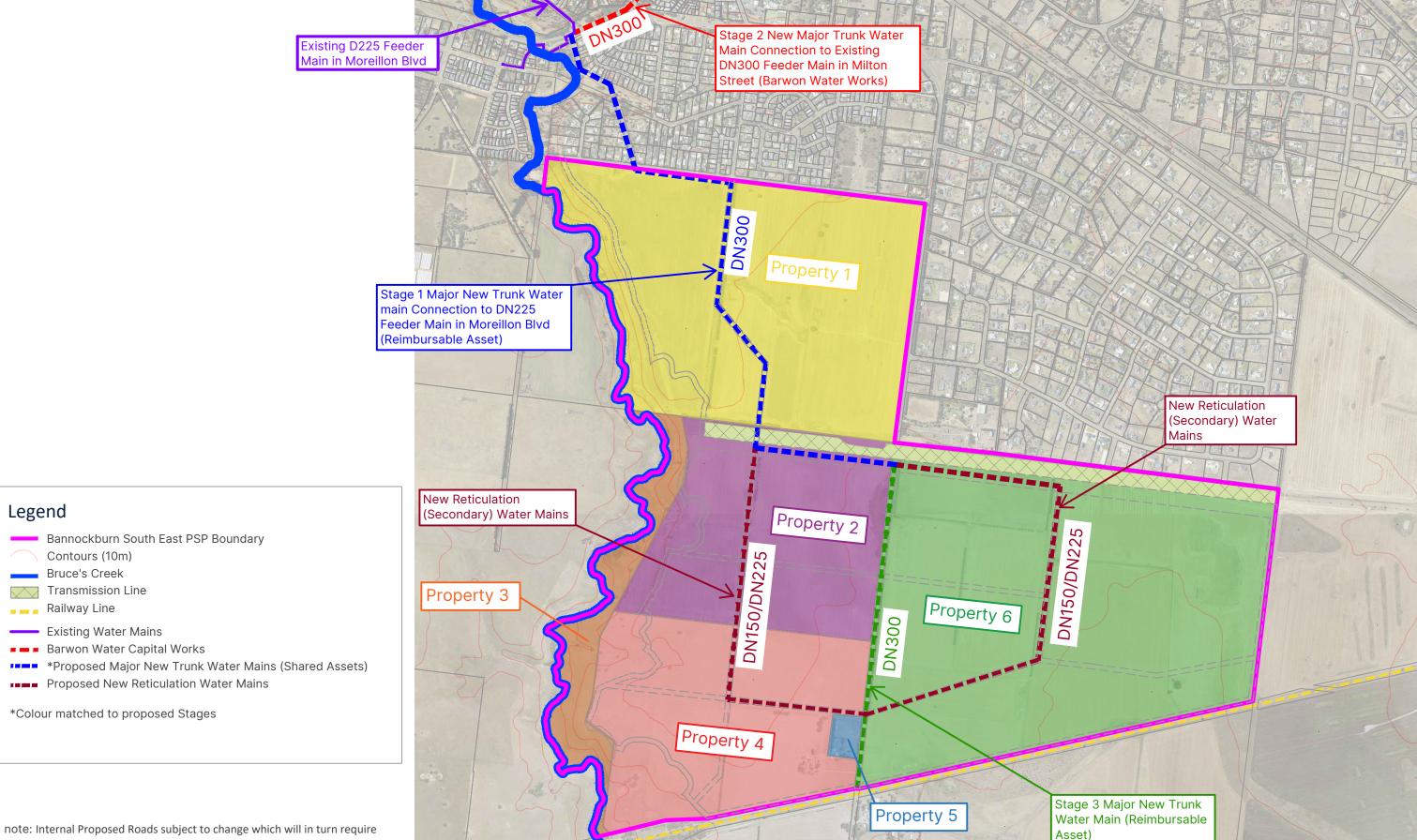
Contours (10m) Bruce's Creek Transmission Line

Railway Line

Date Issued: 31/05/2024 | Revision: C SMEC Project Reference: 30043280E.00 Drawn by: U.Tasmin | Checked by: H. Van Rijnberk







amendments to proposed service alignments

Development Sequencing Strategy Potable Water Plan

Bannockburn PSP

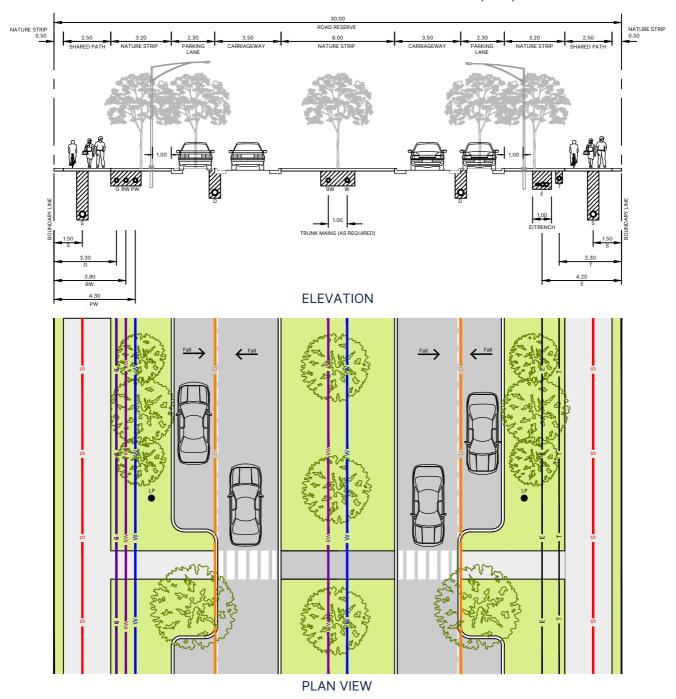
Date Issued: 05/06/2024 | Revision: D SMEC Project Reference: 30043280E.00 Drawn by: U.Tasmin | Checked by: H. Van Rijnberk





Appendix E Servicing Cross-Sections

CROSS SECTION 1 - CONNECTOR STREET LEVEL 1 (30m)



Legend



Note: Drainage pits may need to be haunched within pavement if verge space unavailable for utilities requirements

Road Cross Section

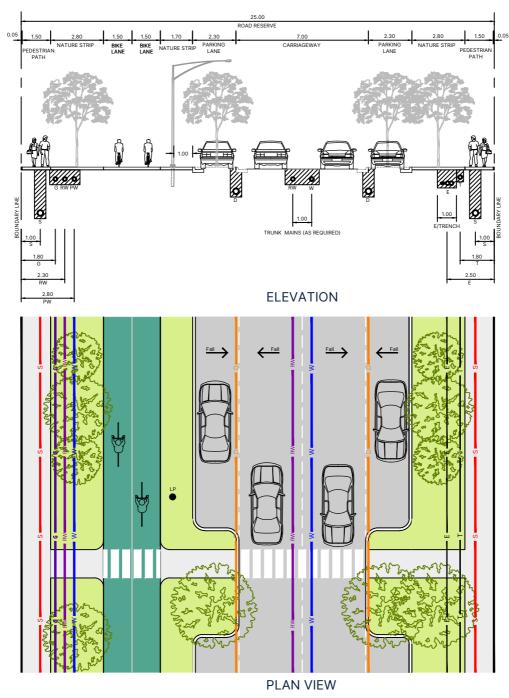
Bannockburn PSP

Date Issued: 5/06/2024 | Revision: 0 SMEC Project Reference: 30043280E | Drawing: 1 of 8 Drawn by: D.BISH | Checked by: M.MCNEEL





CROSS SECTION 2 - CONNECTOR STREET LEVEL 1 (25m)



Legend

Gas
Electricity
Sewer
Water
Recycled Water

_p__ Stormwater

Note: Drainage pits may need to be haunched within pavement if verge space unavailable for utilities requirements

Road Cross Section

T— Telecommunications

Bannockburn PSP

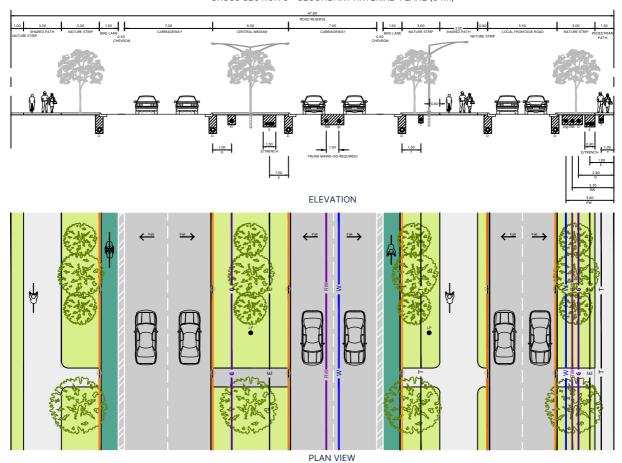
Date Issued: 5/06/2024 | Revision: 0 SMEC Project Reference: 30043280E | Drawing: 2 of 8 Drawn by: D.BISH | Checked by: M.MCNEEL







CROSS SECTION 3 - SECONDARY ARTERIAL 4 LANE (34m)



Note: Sewer to be located in rear easement or laneway if rear loaded

Note: Drainage pits may need to be haunched within pavement if verge space unavailable for utilities requirements

Legend

—G— Gas

—E— Electricity

—s— Sewer

—w— Water

—RW— Recycled Water—T— Telecommunications

_____ Stormwater

Road Cross Section

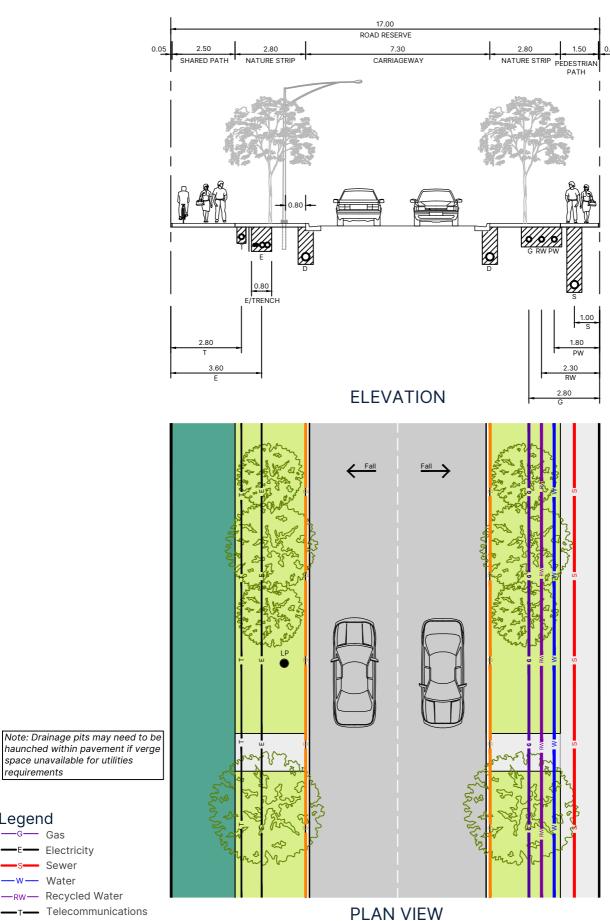
Bannockburn PSP

Date Issued: 5/06/2024 | Revision: 0 SMEC Project Reference: 30043280E | Drawing: 3 of 8 Drawn by: D.BISH | Checked by: M.MCNEEL





CROSS SECTION 4 - LOCAL ACCESS STREET SCHOOL INTERFACE (17m)



Road Cross Section

Bannockburn PSP

_p__ Stormwater

Legend

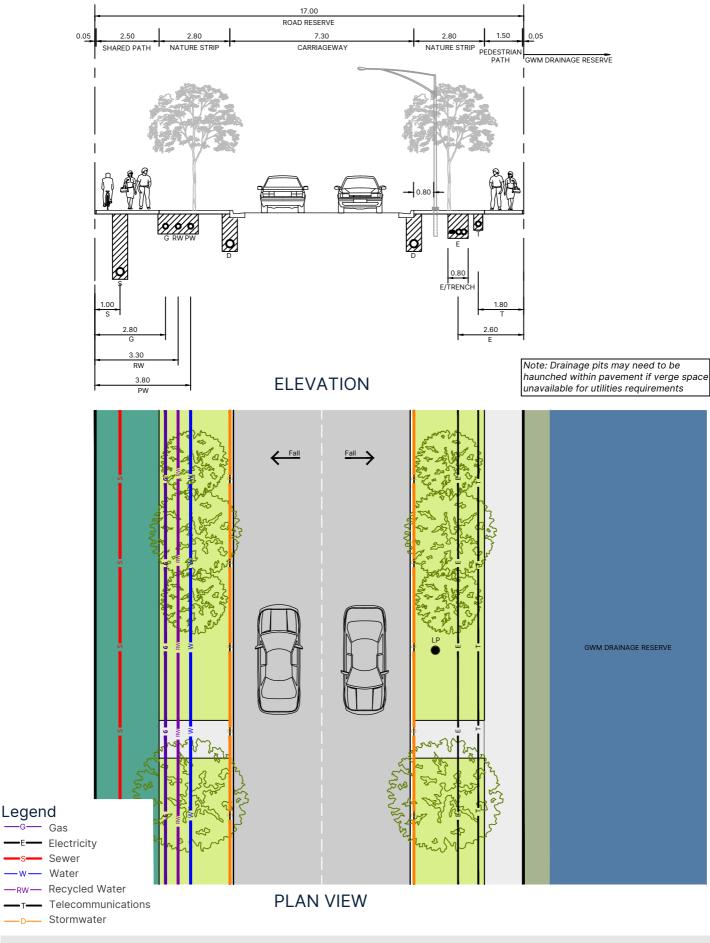
Gas Electricity - Sewer Water Rw— Recycled Water

Date Issued: 5/06/2024 | Revision: 0 SMEC Project Reference: 30043280E | Drawing: 4 of 8 Drawn by: D.BISH | Checked by: M.MCNEEL





CROSS SECTION 5 - CONSTRUCTED WATERWAY INTERFACE (17m)



Road Cross Section

Bannockburn PSP

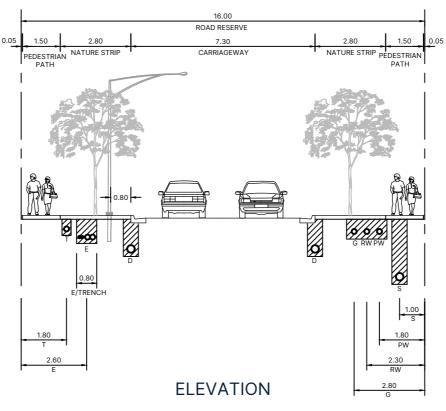
Date Issued: 5/06/2024 | Revision: 0 SMEC Project Reference: 30043280E | Drawing: 5 of 8 Drawn by: D.BISH | Checked by: M.MCNEEL

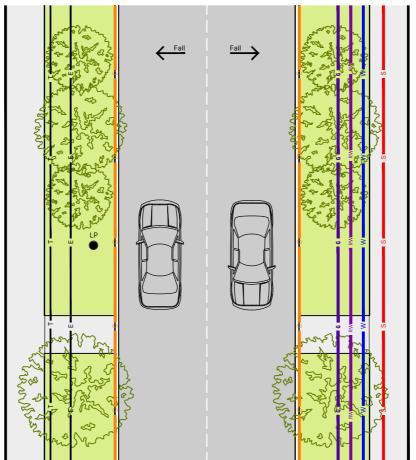






CROSS SECTION 6 - LOCAL ACCESS STREET (16m)





Note: Drainage pits may need to be haunched within pavement if verge space unavailable for utilities requirements

Legend

—G—Gas
—E—Electricity
—S—Sewer
—W—Water
—RW—Recycled Water
—T—Telecommunications

_p__ Stormwater

PLAN VIEW

Road Cross Section

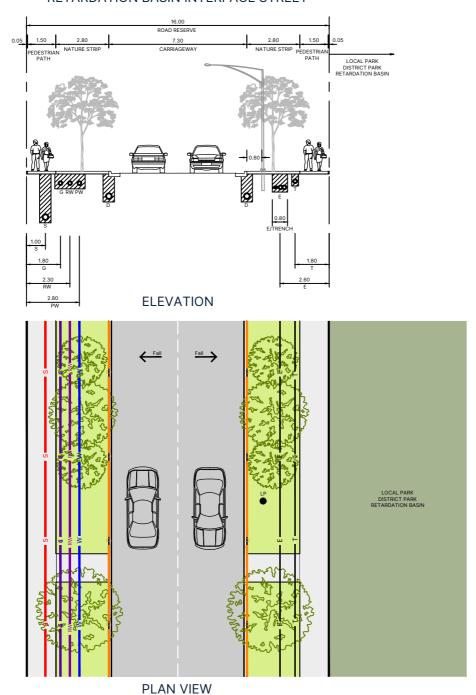
Bannockburn PSP

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CROSS SECTION 7 - LOCAL ACCESS STREET (16m) PARK AND RETARDATION BASIN INTERFACE STREET







Note: Drainage pits may need to be haunched within pavement if verge space unavailable for utilities requirements

Road Cross Section

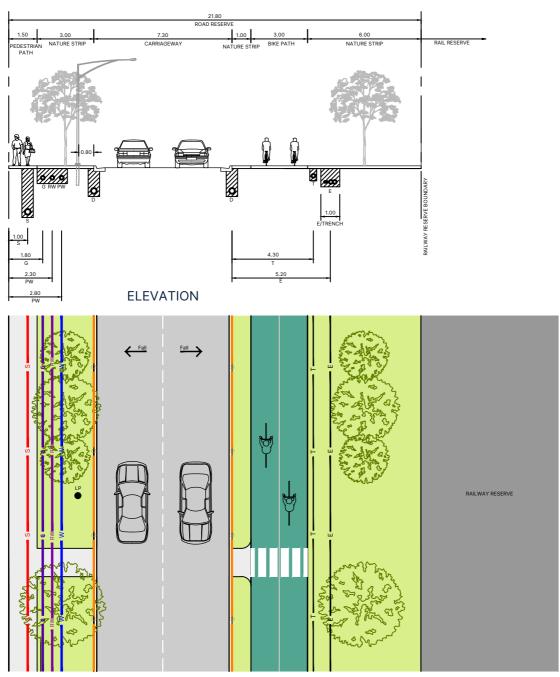
Bannockburn PSP

Date Issued: 5/06/2024 | Revision: 0 SMEC Project Reference: 30043280E | Drawing: 7 of 8 Drawn by: D.BISH | Checked by: M.MCNEEL





CROSS SECTION 8 - RAILWAY INTERFACE - RESIDENTIAL ACCESS STREET (21.8m)



PLAN VIEW

Legend



Note: Drainage pits may need to be haunched within pavement if verge space unavailable for utilities requirements

Road Cross Section

Bannockburn PSP

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