



Member of the Surbana Jurong Group



SMEC INTERNAL REF. 30043082E

Servicing Plan Report

# Creamery Road PSP

Prepared for City of Greater Geelong

4 July 2024

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# 1 Executive Summary

SMEC has been engaged by the City of Greater Geelong (the City) to prepare a Servicing Plan for the Creamery Road Precinct Structure Plan (CRPSP), which is the first precinct proposed as part of the Western Geelong Growth Area (WGGA).

The purpose of this Servicing Plan is to build upon and formalise previous information collated by the City of Greater Geelong as part of Framework Planning with respect to sewerage, water, power, gas, electrical and telecommunications for the precinct. The Servicing Plan shall consider the key Framework Plan objectives in relation to the delivery of sustainable development including Integrated Water Management and zero carbon design principles.

This report documents the key considerations from discussions held with Council, Landowners, Developers 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 Servicing Plan. We understand that the City have engaged other consultants to provide stormwater strategies and traffic assessments for this Precinct. This report is limited to high level commentary on the Integrated Water Management Strategy being implemented for the 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 servicing plan is subject to change upon final confirmation of utility servicing strategies adopted by the relevant service authorities and following further review of detailed inputs by City of Greater Geelong (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 servicing plan or any subsequent changes to the servicing strategy.

## 2 Introduction

### 2.1 Background

The Creamery Road Precinct is the first precinct proposed for development in the WGGA as presented in the Framework Plan adopted as part of Amendment C395 by Council on 25 August 2020.

The WGGA has an area of approximately 3,245 hectares and is anticipated to deliver up to 22,000 new dwellings to cater for a population of approximately 60,000 new residents. The WGGA is characterised by key waterways / waterbodies including Cowies Creek, Barwon and Moorabool Rivers and the Batesford Quarry as its centre which is proposed to become a large recreational lake.

The Creamery road precinct is in the north east corner of the WGGA and as presented in Figure 1 is bound by:

- Geelong-Ballarat Railway line (north).
- Geelong Ring Road (east).
- Midland Highway (south).
- Geelong-Ballan Road (west).

The Creamery Road Precinct is approximately 350 hectares and has the potential to provide approximately 3,000 dwellings to cater for a population of approximately 8,400 new residents.

The precinct is located adjacent to the existing suburb of Bell Post Hill to the east and can be accessed from existing key roads including the Midland Highway (Ballarat Road), Geelong-Ballan Road and the Creamery Road Overpass over the Geelong Ring Road.

The landform has a history of broad acre grazing and can be described as having gentle slopes towards Cowies Creek along its northern boundary and to a tributary running east from Cowies Creek through the middle of the site.

One of the City's key considerations when planning the Northern and Western Geelong Growth Area (NWGGA) precincts is the pursuit of a zero-carbon approach to planning and development through the integration of energy, water, waste, transport and building construction. This report outlines how that can be achieved within the Creamery Road Precinct Structure Plan (CRPSP).

The planned communities in the NWGGA have a genuine opportunity to bring this to fruition through a new type of sustainability focused Precinct Structure Plan (PSP), making these growth areas a best practice planned greenfield development area. The servicing plan for this area will underpin the sustainable implementation of key infrastructure and support the community in its response to environmental challenges and climate change.

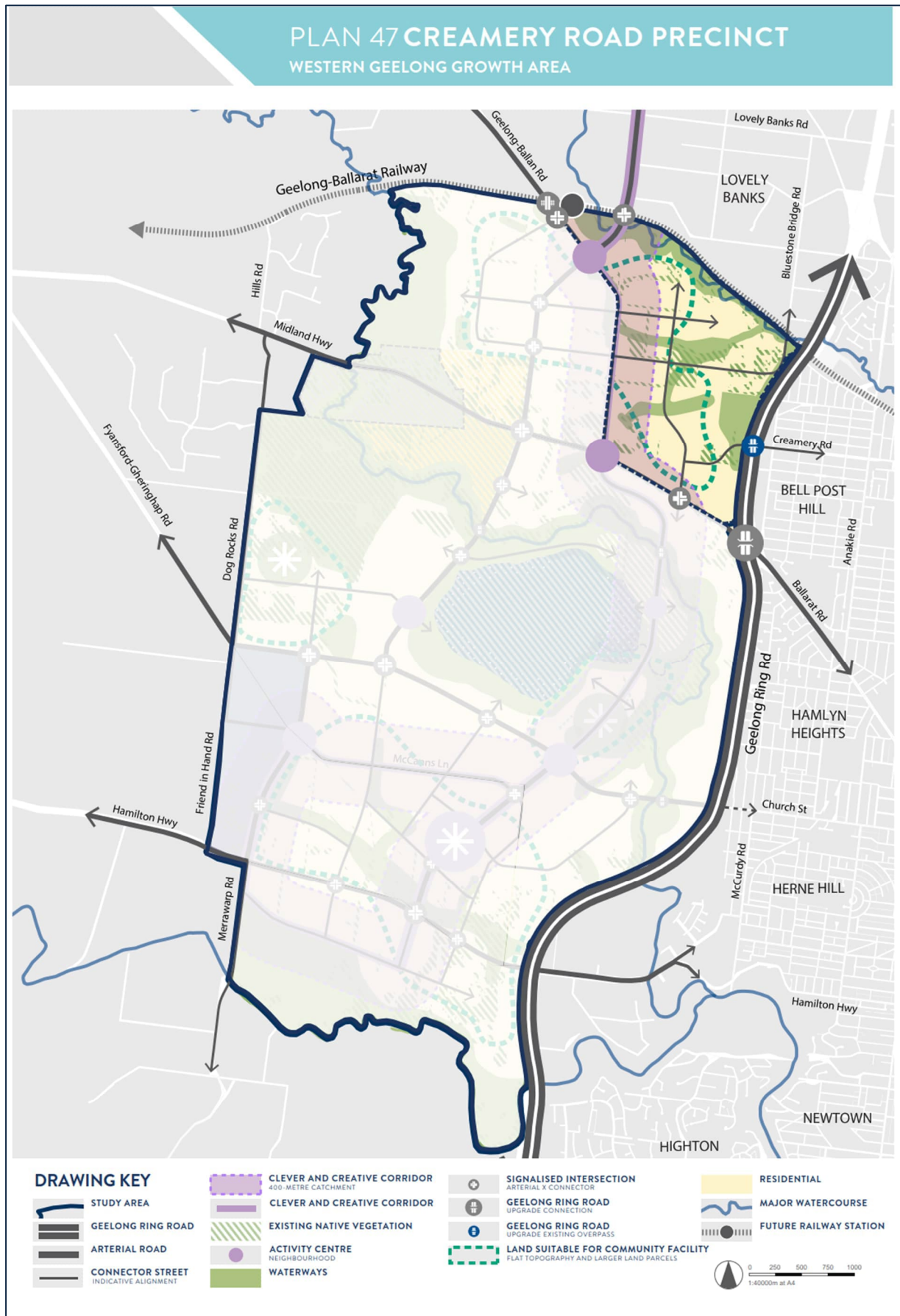


Figure 1: Creamery Road Precinct (NWGGA Framework Plan – Plan 47, August 2020)

## 2.2 Purpose

The purpose of this report is to provide a high-level utility servicing review of the Creamery Road precinct to provide information on utility infrastructure and delivery staging 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 the constraints has 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. This report is limited to high level commentary on the Integrated Water Management Strategy being implemented for the Precinct.

In accordance with the brief supplied by the City, this report is also required to document investigations, stakeholder inputs and opportunities related to the incorporation of Zero Carbon City and sustainable Integrated Water Management (IWM) design principles. This shall include investigation into low and zero carbon energy sources and prioritisation of renewable energy production, storage, and trading as part of the new development servicing strategy.

## 2.3 Background Documents

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

- Barwon Water Preliminary Servicing Advice (memo dated 04/03/2021).
- Barwon Water Additional Servicing Advice (email dated 16/04/2021)
- Barwon Water Additional Servicing Advice (email dated 17/08/2022)
- Powercor Preliminary Servicing Advice (dated 30/04/2021).
- Powercor Additional Servicing Advice (08/06/2022)
- Powercor Additional Servicing Advice (6/09/22 & 7/09/2022) Ausnet Gas Services Preliminary Servicing Advice (dated 28/06/2021).
- APA Transmission Mains Preliminary Servicing Advice (dated 10/03/2021).
- Northern and Western Geelong Growth Areas Utility Servicing Strategy– May 2019.
- Northern and Western Geelong Growth Areas Framework Plan – August 2020.
- Northern and Western Geelong Growth Areas Summary Background Report – May 2018.
- ESD Action Plan – Hip v Hype – May 2019.
- ESD Opportunities Report – Hip v Hype – March 2017.
- Integrated Water Management Position Paper Northern & Western Geelong Growth Areas – November 2018.
- Infrastructure Design Manual.
- City of Greater Geelong Urban Forest Strategy 2015–2025.
- Northern & Western Geelong Growth Area – IWM Plan (Draft Summary) December 2020.
- Western Geelong Growth Area – Flood Impact Assessment and Stormwater Management Strategy – 2019.
- Towards 2050: Gas infrastructure in a zero emissions economy Interim report, by Infrastructure Victoria - July 2021.
- Smart City Strategic Framework (SCSF) by City of Greater Geelong Council - March 2021.
- Existing Ecological Conditions Report (Ecology & Heritage Partners, 2021)

## 2.4 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
City of Greater Geelong	Sponsor of Servicing Plan
Barwon Water	Sewer, Potable Water and Recycled Water Service Authority
Powercor	Electrical Service Authority
Ausnet Services – HV Transmission	Overhead HV Transmission Mains Authority
APA	High Pressure Transmission Gas Main Authority
Ausnet Gas	Reticulation Gas Service Authority
National Broadband Network (NBN)	Telecommunications Authority
Private Developers	Refer Developer Landholdings in Figure 2

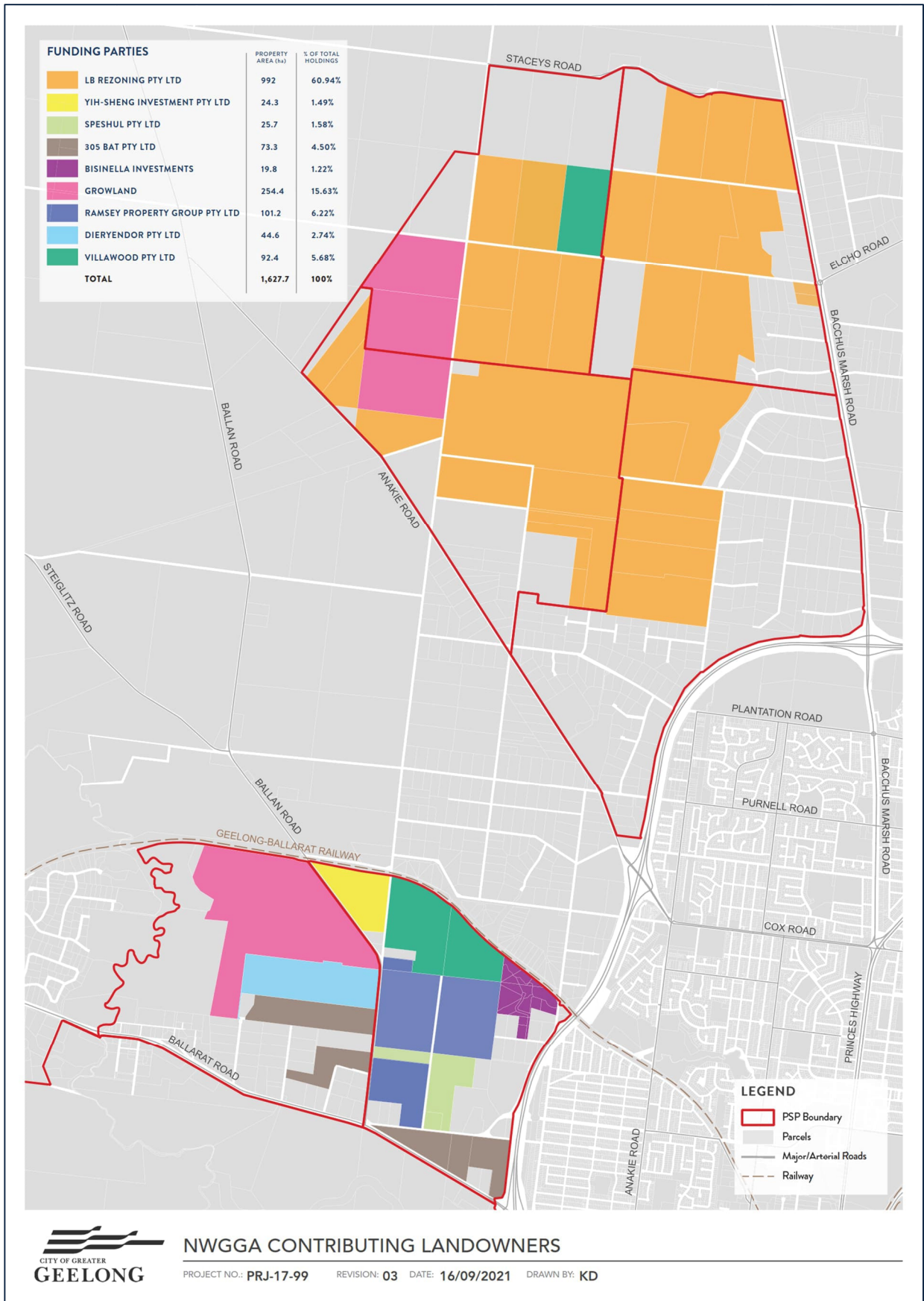


Figure 2: NWGA – Major Land Holdings

## 2.5 Methodology

SMEC have prepared this servicing plan in accordance with the methodology presented in Figure 3 below.



Figure 3: Delivery Methodology

## 2.6 Connection to Framework Plan and Sustainability Action Plan Objectives

This Servicing Plan has been prepared taking into consideration the Actions and Objectives set out in the Framework Plan adopted as part of Amendment C395 by Council on 25 August 2020. One of the 3 key principles within the Framework Plan is to “Ensure growth areas are well-planned and deliver sustainable communities”.

The “Framework Sustainability Action Plan, Hip & Hype, 2019” has underpinned the ESD discussion in this report. Our response to the key Framework Plan and sustainability action plan objectives is summarised in Table 2. The structure of this report is in general accordance with the Servicing Plan brief supplied by City of Greater Geelong.

The Framework Plan Actions (W2.3.1, W5.1.1, W5.2.1 et al) are listed under each relevant section of the report.

Table 2: Services connections to the Action Plan

Framework Plan Objectives and One Planet Living Principles	Report Reference
Integrated Water – Response to IWMS Position	Section 3
Provide Utilities & Infrastructure – Sewer, Water & Potable Water	Section 4
Provide Utilities & Infrastructure – Provide Electricity	Section 5
Renewable Energy	
Provide Utilities & Infrastructure – Provide Gas	Section 6
Provide Utilities & Infrastructure - Provide Telecommunications	Section 7
Typical Cross Sections	Section 8
Development Staging	Section 9
Zero Carbon and ESD principles	Section 10
Sustainable Transport	
Materials & Products	
Zero Waste	
Health & Happiness	
Equity & Local Economy	

Source: <https://www.geelongaustralia.com.au/common/public/documents/amendments/8d6e9c1bda2a1e1-14.SustainabilityActionPlan-Jun2019.PDF>



## 3 Response to IWMS Position

### 3.1 Integrated Water Management Objectives

The following section explores the potential for integrated water management (IWM) opportunities to be incorporated into the PSP. The urban water cycle is a critical component of the PSP to create liveable and sustainable outcomes, including:

- Minimising the potable water consumption generated by development of the precinct;
- Promoting the conservation, reuse and recycling of water through innovative solutions involving alternative water supplies, as well as water use and its management;
- Utilising all water resources including rainwater, recycled water, greywater and stormwater;
- Managing the quality of stormwater run-off to protect and enhance the quality of receiving waterways and improve ecological condition;
- Providing safe and reliable drinking water and sewerage systems.

The intention is for the integrated water solutions to help shape sustainable communities in the growth areas. In order to achieve these objectives, buy in from the following key stakeholders will be critical to the success of the project:

- City of Greater Geelong (CoGG)
- Barwon Water (BW)
- Corangamite Catchment Management Authority (CCMA)
- Southern Rural Water (SRW)
- Developers
- Residents

The current investigation provides recommendations for integrated water management assets within the precinct, considering site opportunities, constraints, delivery and how this addresses the growth area development Framework Plan.

### 3.2 Relevant Background Information

#### 3.2.1 Northern & Western Geelong Growth Areas Framework Plan

The Northern and Western Geelong Growth Areas Framework Plan (CoGG, 2020) provides a high-level strategy for the future development in the growth areas. In relation to integrated water management the new neighbourhoods are to be climate resilient, zero carbon and environmentally sustainable. A key component of the design of delivering integrated water management solutions within the precinct to maintain healthy waterways and protect the natural environment.

The Clever and Creative Corridor is intended to show how implementation of integrated water management and environmentally sustainable design can be implemented within new communities.

The Plan highlights a series of objectives and actions for the development of the growth areas. Relevant to the current assessment are the following actions (noting stormwater management is not included in the current assessment scope):

- Action W2.3.1 - Urban development will be designed to achieve a zero-carbon future for the Greater Geelong city-region.
- Action W2.3.6 - Neighbourhoods will maximise the use of alternative water sources to meet fit-for-purpose needs and deliver multi-functional benefits.
- Action W2.3.7 - Neighbourhoods will deliver safe, reliable, high quality drinking water and sewage services.

- Action W2.5.10 - Integrated water management will maximise 'green-blue connections' to active open space that allows the operation of attractive, all-year facilities.
- Action W3.1.4 - All activity centres will incorporate best practice environmental sustainability in their design and operations.
- Action W5.1.2 - A servicing plan will be prepared for each precinct structure plan that outlines the utilities required to deliver sustainable development outcomes reflected in the relevant integrated water management strategy and environmentally sustainable design (ESD) action plan.
- Action W5.1.3 - Placement of utilities will not detract from the amenity of the neighbourhood, particularly the open space network.

### 3.2.2 Integrated Water Management Strategy

An Integrated Water Management Strategy has been developed for both the western and northern growth areas. In a partnership between Barwon Water and DELWP the opportunities for the precinct were identified and assessed. A final report (E2DesignLab & Marsden Jacob Associates, 2021) was provided by Council which identified a range of integrated water recommendations relevant to the precinct, including:

- Enhanced infiltration evaporation swales and billabongs.
- Waterway corridor enhancement/naturalisation.
- Stormwater for indirect potable supply (long term).
- Class A recycled water to local industry and households.
- Class A recycled water for open space and Clever Creative Corridors.
- Passively irrigated street trees and understory.
- Environmental Flows to Moorabool River.

### 3.2.3 Integrated Water Management Position Paper

An Integrated Water Management (IWM) Position Paper for the Northern and Western Geelong Growth Areas (Barwon Water & City of Greater Geelong, 2018) identifies the outcomes from stakeholder consultation, and provides a direction for the PSP areas. Package D was the preferred delivery of IWM outcomes which reflects outstanding delivery of integrated water outcomes, including:

- Highest level improvement to ecological condition.
- Outstanding multifunctional values.
- Outstanding stormwater retardation, treatment and infiltration.
- Provision of fit for purpose alternative water which replaces drinking water demand.
- Safe and reliable drinking water and sewerage services.

Specifically, for the PSP area it includes:

- Waterways, Wetlands, Floodplains - Highest level possible of improvement in ecological condition through rehabilitation; buffer widths consistent with and exceed MW Guidelines in some areas; high amenity flood storage and/or conveyance; natural water assets have outstanding multifunctional values.
- Major Drainage - Major drainage strategy includes predominantly open major drainage pathways with significant multifunctional values; major drainage pathways and distributed detention are a vital part of the active open space linkages in the site.
- Land use and Open Space - Land use plan maximises responsiveness to natural landform and shows outstanding synergy with water cycle assets; providing extensive blue-green links with diverse multifunctional use and offering regional and broader scale benefits.
- Stormwater Management - Stormwater management plan provides outstanding distribution of stormwater retardation, treatment and infiltration across the site, property and streetscape scale; much reduced extent of end of line wetlands with a blue/green feel to the urban precinct through extensive WSUD.

- Alternative Water - Safe, reliable and quality alternative water provided by precinct scale sources reducing total precinct drinking water demand by approximately 30% and/or potentially providing alternative water for off-site use (e.g. Class A recycled water via dual pipe, use of major stormwater wetlands for extensive internal demand nodes).
- Drinking Water - Safe, reliable and quality drinking water provided via connection to regional drinking water network.
- Sewerage - Safe, reliable and quality sewerage services provided connection to local sewerage system.

The intention for the highest possible standards for delivery of integrated water outcomes has been incorporated into the recommended features for the precinct. Options discussed in the position paper have been assessed and addressed in this document.

### 3.2.4 Development Services Scheme (DSS)

It should be noted that commentary of drainage servicing for the Creamery Road PSP is excluded from the scope of this report. However, Alluvium Consulting has been engaged by the City to prepare concept and functional drainage designs (Development Services Scheme) for the Creamery Road PSP. At the time of writing this report the Creamery Road Development Services Scheme - Functional Design Report (Revised Final) (dated December 2022) has been made available. Refer to Figure 4 for the proposed layout of Wetland Retarding basins (WLRB's) within the Creamery Road Precinct. Functional Design Drawings for each of these assets have been supplied in the Alluvium report. These assets have also been incorporated into the Future Urban Structure (FUS) plan supplied by the City and has been considered when locating key trunk infrastructure.

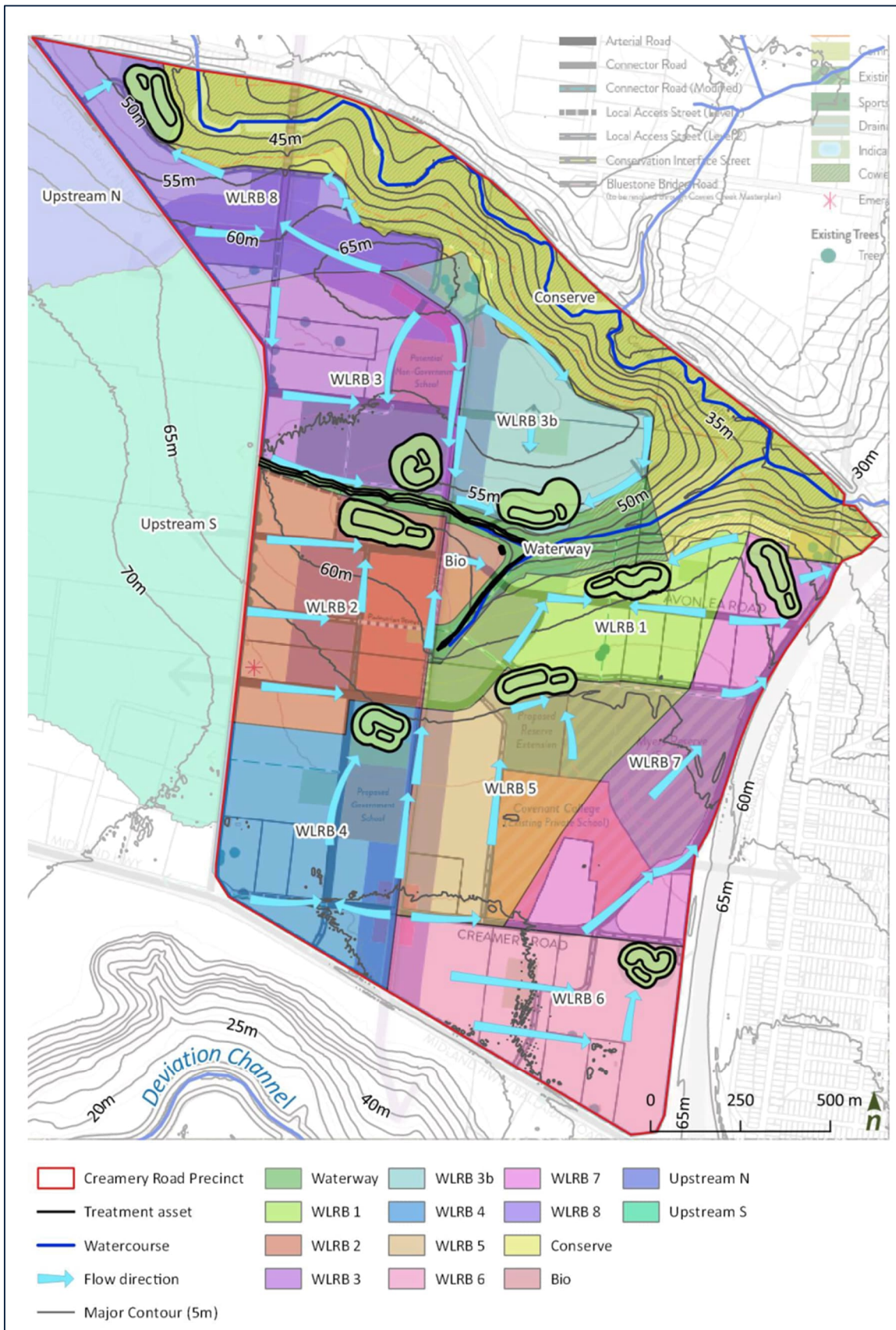


Figure 4: Creamery Road precinct – Integrated Retarding Basin & Treatment Wetland (WLRB) Plan Overview  
 From: Creamery Road Development Services Scheme Functional Design Report (Revised Final – Figure 28 (Alluvium, December 2022))

### 3.3 Changes to Water Cycle

Within the PSP area there are a number of land use changes that impact the local water cycle, creating new demands and wastewater and stormwater runoff. The key demands for the PSP area are highlighted in Table 3, where water demand has been split into potable (drinking water) and non-potable demands.

Table 3: Water Demands for PSP Area

	Potable Water Demand	Non-Potable Water Demand
Residential	Household water usage including drinking and bathing	Toilet flushing, garden watering
Reserves (including Existing Native Vegetation)	Drinking fountains	Irrigation
Neighbourhood Activity Centre	Drinking, commercial and retail potable demands (i.e. drinking)	Commercial and retail non-potable demands (i.e. irrigation and toilet flushing)
Clever and Creative Corridor	None	Irrigation

The anticipated increase in water demand for the Northern and Western Growth Areas is 8.2 GL/yr., with an increase in wastewater generation of 6.6 GL/yr. Increased urban runoff to the local creeks, with associated pollutants, equals 10.5GL/yr. (IWMP, 2021).

### 3.4 Alternative Water

The IWM Position Paper aims for a 30% reduction in potable water usage through the use of alternative water sources. The potential fit for purpose solutions are highlighted below.

The City of Greater Geelong is seeking to establish the following targets for implementation of alternate water:

- Baseline Target: 100% of residential area supplied with Class A Recycled Water.
- Stretch Target: 100% of residential and non-residential areas supplied with Class A Recycled Water.

#### 3.4.1 Recycled Water

Barwon Water has planned to provide recycled water connections to the residential areas within the PSP. The Northern Water Plant (NWP) in Corio can supply Class A Recycled Water as an interim measure to the PSP area which is suitable for toilet flushing, garden watering, car washing and irrigation of public open space. Recycled water provides a consistent supply of water, with an established billing framework for customers.

The recommended scheme as per the growth areas IWM plan (2021) is delivery of Class A recycled water to homes, local industry, agriculture and open spaces in the initial phases of the development. This will meet approximately 70% of the potable water demand. The ultimate recycled water supply is proposed to come from the future Water Reclamation Plant (WRP) proposed for the NGGA and WGGGA growth areas.

#### 3.4.2 Rainwater Harvesting

The rainwater falling on the rooftops has been considered as a source of non-potable but high-quality water for reuse within the PSP area. Rainwater harvesting through lot scale tanks provides both potable water reductions, while providing some mitigation of the effects of urbanisation. The captured water would be used for toilet flushing and household irrigation, which could be satisfied by either the recycled water connection or tanks.

While recycled water is the recommended alternative water supply within the NWGGA, rainwater and stormwater harvesting are options that can be delivered in sequence with development if the recommended options are, as a result of delivery investigations or a changing context, deferred, removed or altered. This solution is considered in order to allow flexible pathways for the precinct.

### 3.4.3 Stormwater Harvesting

A potential high water demand for the precinct is the irrigation of street trees and public open spaces such as local parks, existing native vegetation retention, waterway reserves and Clever and Creative Corridor (CCC). There is the potential to capture stormwater running off the site before it enters the receiving waterbody.

#### 3.4.3.1 Wetland Harvesting

The most effective capture locations would be the wetland systems, which could potentially be adapted include stormwater harvesting. This system would capture overland stormwater flows from the PSP area, treat within the wetland, store within a tank, and subject to EPA guidelines on recycled water use, be used as a water source for open space irrigation (particularly in the summer months). This system can be looked at a local scale up to a regional system for the entire growth area. The IWMP recommends the PSP area be 'harvest ready' with stormwater treatment infrastructure designed for harvesting in mind, and easements allocated to support future delivery of collection and transfer network.

#### 3.4.3.2 Passive Irrigation

Passively irrigated trees reduce the urban stormwater runoff by diverting runoff from paved roads and surfaces to irrigate local street trees. This measure will not only support the health of the street trees, but will reduce watering costs, improve the liveability of the local area, mitigate the impacts of urban development on the water cycle, and reduce pollutants entering the local waterways. The IWMP recommends this approach as part of the local blue-green infrastructure.

### 3.4.4 Groundwater Harvesting

There is the potential to investigate the quality of the groundwater system for aquifer storage and recovery for the precinct. Due to the complex nature of the hydrologic regime, geology of the site, and cost this option has not been recommended for this site.

### 3.4.5 Habitat Enhancement

#### 3.4.5.1 Waterway corridor enhancement/naturalisation

Swales and infiltration billabongs have been suggested throughout the PSP to hold water in the landscape, mitigate the urban heat island effects, recharge waterway baseflows and to support local landscapes. The ability to provide at source treatment provides a reduction on the reliance of end of line features, and more closely replicates the predevelopment hydrology. This will be particularly relevant for the Cowies Creek catchment, in which this precinct will drain.

Strategies for the greater catchment include the use of recycled water for environmental flows in Moorabool River. While this catchment does not directly drain to this system, the improvement in environmental flows will result in environmental and social benefits to the precinct and are strongly encouraged.

## 3.5 Recommendations

A range of potential alternative water sources are suggested to satisfy the non-potable water demands for the precinct. The IWMP analysis has shown that a combination of sources provides the greatest ability to provide a reliable supply for all demands, including the following relevant to the Creamery Road PSP:

- Provision of Class A recycled water through the purple pipe system (100% Class A supply to residential areas).
- Passively irrigated street trees.

- Swales and enhanced infiltration billabongs.
- Major waterway corridor enhancement and naturalisation, including supporting the use of recycled water for environmental flows in Moorabool River.

Additional alternative options include:

- Consideration of water harvesting from existing wetlands (long term subject to ongoing investigation)
- Encouragement of rainwater tank uptake in line with the 6 Star Housing Guidelines (not mandated)

The combination of the preferred options is well in excess of the PSP requirements for the site, not only servicing the local development, but also providing high quality water for the region. The preferred options will achieve the 30% reduction in potable water usage baseline target, with the ability to meet stretch targets based on the toolbox of options available. These options have been considered in conjunction with other integrated water management objectives, including:

- Protection and enhancement of the values of urban waterways, including the maintenance of existing hydrology and water quality;
- Improved liveability and community health;
- Holistic water management, leading to efficiencies in management of all components of the water cycle, and associated costs.



## 4 Sewer, Potable Water & Recycled Water

### 4.1 Introduction

Barwon Water (BW) is the responsible authority for the provision of sewer, potable water and recycled water supply infrastructure to service the Creamery Road 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.

BW are currently in the process of undertaking further concept and functional level design for the NWGGA. This work will refine the original concepts developed in 2016, whilst considering the IWMS Position. This work is expected to be completed in 2023 and may result in changes to the advice provided as part of this servicing plan report.

Preliminary Servicing Advice has been received from BW to ascertain their requirements to service the Creamery Road precinct. Their advice, in the form of an email dated 17 August 2022 (refer Appendix A), is documented in the Potable Water, Recycled Water and Sewer sections below.

### 4.2 Potable Water

#### 4.2.1 Current Conditions

The Creamery Road precinct is located over two water supply zones; Bell Post Hill Gravity Zone and Bell Post Hill Pressure Boosted Zone. 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 servicing the Creamery Road precinct area. Water mains within proximity to the precinct are as follows:

- 150mm diameter PVC water main on the east side of Evans Road, from the precinct northern boundary (Geelong-Ballarat Railway reserve) terminating at Geelong-Ballan Road. This water main is fed from the existing water main network in Bluestone Bridge Road along Valleyside Drive.
- Asbestos Concrete (AC) pressure boosted water main on the north side of Ballarat Rd for the full southern frontage of the precinct. The Batesford Booster Water Pump Station (BBWPS) is located at the eastern end of this main.
- The BBWPS is fed from the east via the 150mm diameter PVC water main running south along the western side of the Geelong Ring Road (GRR) from Bingley Court. The Bingley Court main crosses the Geelong Ring Road from the main water supply network in Rollins Road on the east side of the GRR.
- 150mm diameter PVC water main from the above water main in Bingley Court, runs west along Bingley Court to Creamery Road, north-east along Creamery Road and terminating at Myers Reserve.
- 100mm diameter AC water main in Avonlea Road, connection to the 660mm Mild Steel Concrete Lined (MSCL) water main in Bluestone Bridge Road.
- There are large diameter mains (including the existing Lovely Banks-Montpellier Transfer Main) in Bluestone Bridge Road with connection across the Geelong Ring Road (GRR) to the east.

The existing water mains and pressure zones referenced above are shown on the servicing plan presented in Figure 5.

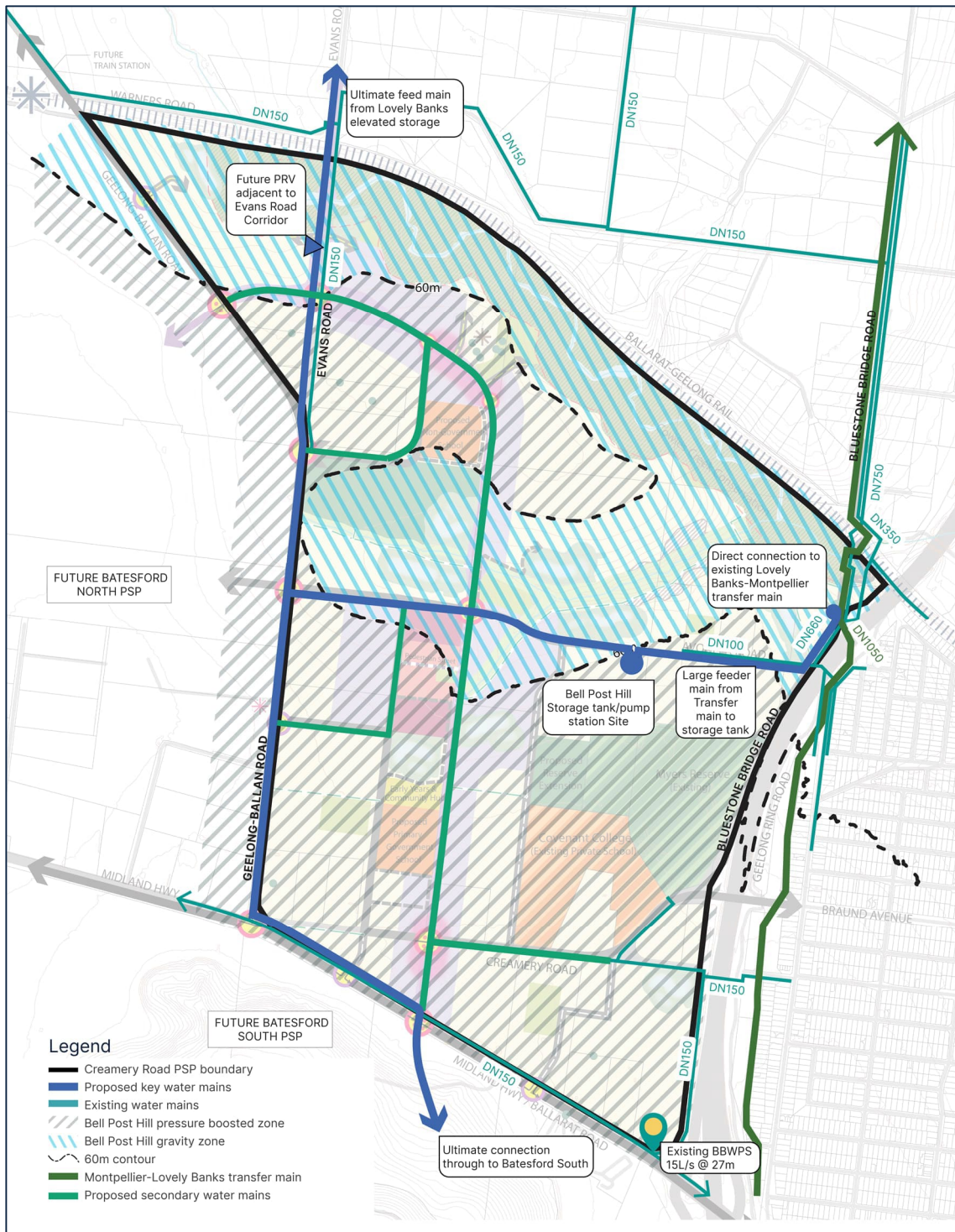


Figure 5: Potable Water Servicing Strategy

## 4.2.2 Servicing Strategy

Barwon Water have advised that the Creamery Road precinct will be serviced by the proposed Bell Post Hill (BPH) Storage Tank/Pump Station site, incorporating a tank, booster pump and possible PRV, proposed connections and assets are as follows:

- Potable water offtake from the existing Montpellier-Lovely Banks Transfer main located in Bluestone Bridge Road (North of Ring Road crossing). The exact location of connection to be determined by Barwon Water at the time of development as well as avoiding the Cowies Creek Conservation buffer.
- A large diameter feeder main (size to be determined by Barwon Water) from the offtake location to the proposed BPH tank site
- A nominal 6 ML (usable volume) storage tank, (currently assumed to be 40m diameter & 6m high). The 6 ML usable volume is equivalent to 0.8 days of the Creamery Road precinct potable water Peak Day Demand, inclusive of a 100% top-up (interim cross connection to potable water supply) of the recycled water network until a permanent connection to a recycled water supply is available.
- A booster pump station (nominal 150 L/s) with capacity to service the entire Creamery Road PSP potable water Peak Hour Demand, including 100% top-up of the recycled water network (with potable water) until a permanent connection to a recycled water supply is available.
- The Storage Tank/Pump Station site, approximately 10,000m<sup>2</sup> in area, is currently proposed to be located at the western end of Avonlea Road in order to be above the 60m contour. A potential site flagged by Barwon Water is within 60 Avonlea Road, opposite the proposed sewer transfer hub location.

Refer to Figure 5 for locations of Key potable Water infrastructure. Barwon Water will confirm infrastructure sizing at the time of development and design.

## 4.2.3 Ultimate Servicing

Barwon Water have advised that the Creamery Road precinct will have an ultimate main potable water feed from the proposed Lovely Banks Elevated Storage Tank Site to north of Creamery Road PSP. Connections will also ultimately be made to the future Batesford North and South Precincts. Barwon Water have also nominated a future Pressure Reducing Valve (PRV) site abutting Evans Road to be delivered after connection to the Lovely Banks supply is established. The land take for this asset is expected to be 150m<sup>2</sup>. Barwon Water have indicated that the existing DN150 main along the Midland Highway (Ballarat Road) is not recommended for interim connections due to capacity constraints and the fact that this main is unlikely to form part of the ultimate servicing strategy.

Barwon Water will determine the ultimate sizes, locations and delivery of potable water trunk and reticulation infrastructure at the time of development. If the infrastructure is required to be sited in differently owned properties, making it difficult for the first developer to deliver, then Barwon Water will generally undertake these works with the possible use of their Water Act powers to enter property to build assets. Potable water mains DN225 and above are considered to be "shared assets" and hence will be funded by Barwon Water. Bring forward charges (BFC's) will be applicable if the reimbursable assets are constructed out of sequence according to Barwon Waters timeframes with the amount of BFC being determined by Barwon Water at the time of development.

The Barwon Water Region's potable water supply has recently been connected to the Melbourne Water system to support the growing region with additional supply, however, future growth will require further augmentation of resources, meaning that where alternative water resources can be harnessed these will play a valuable role in increasing the resilience of the regional water supply portfolio.

#### 4.2.4 Framework Plan Actions

The Framework Plan identifies a series of actions to be addressed in the PSP process. Table 4 below addresses how the proposed outcomes address the relevant actions.

Table 4: Framework Plan Actions Analysis - Water

Action	Action Details	Current Proposal Addresses Action
<p>W2.3.1</p> <p>Urban development will be designed to achieve a zero-carbon future for the Greater Geelong city-region.</p>	<p>An environmentally sustainable design (ESD) action plan will be prepared for each precinct structure plan demonstrating the actions that urban development will take to contribute net zero carbon to the city. A 'smart city' strategy will be included within the action plan that establishes a framework for monitoring the performance of new neighbourhoods in delivering sustainable development and more efficient urban service systems. The Clever and Creative Corridor will support implementation of these technologies.</p>	<p>The current potable water strategy provides for a new storage tank and booster pump station which supplies the entire Creamery Road precinct. Barwon Water are committed to 100% renewable electricity by 2025 and zero net emissions by 2030.</p>
<p>W2.3.6</p> <p>Neighbourhoods will maximise the use of alternative water sources to meet fit-for-purpose needs and deliver multi-functional benefits.</p>	<p>An integrated water management strategy will assess the feasibility of local and precinct-scale stormwater collection, treatment and reuse, wastewater treatment and reticulation through a dual-pipe network that delivers recycled water to each neighbourhood for appropriate domestic and commercial uses. The Clever and Creative Corridor will showcase best practice integrated water management approaches and will integrate water sensitive urban design into the public realm to create attractive, interesting and drought resistant landscape elements.</p>	<p>Integrated Water Strategy currently being undertaken, where elements like recycled water meeting non-potable demands could reduce the sizing of potable water infrastructure and will alleviate the reliance on potable water.</p>
<p>W2.3.7</p> <p>Neighbourhoods will deliver safe, reliable, high quality drinking water and sewage services.</p>	<p>Drinking water and sewage services will meet mandatory standards for each neighbourhood.</p>	<p>Each lot will have safe, reliable and high-quality potable water connection.</p>
<p>W2.5.10</p> <p>Integrated water management will maximise 'green-blue connections' to active open space that allows the operation of attractive, all-year facilities.</p>	<p>Integrated water management will identify methods to utilise water sensitive urban design (WSUD), stormwater treatment and recycled water to deliver open spaces that remain useable and attractive throughout the year.</p> <p>Local parks and sports reserves will be located along waterways and river corridors, where appropriate. Co-location of parks and reserves will seek to link and extend the recreational benefits to encumbered land.</p>	<p>Open spaces should be serviced 100% by recycled water connections and passive irrigation, hence the potable water system does not need to cater for this significant water demand in the summer months.</p>

<p><b>W3.1.4</b></p> <p>All activity centres will incorporate best practice environmental sustainability in their design and operations</p>	<p>Activity centres will incorporate design that optimises solar access, walkability and the use of active transport, water sensitive urban design principles, green buildings and integrated water management. Sub-regional and neighbourhood activity centres will explore opportunities in renewable energy solutions, resource and material reuse opportunities, minimisation of maintenance requirements and access to open space and nature.</p> <p>Activity centres will be a key focus of the ESD action plan prepared for each precinct and will incorporate smart city principles.</p>	<p>The activity centre located within the precinct will have sufficient stormwater runoff and recycled water to be able to satisfy alternate water needs. There is potential for water quality treatment and educational opportunities to include water sensitive urban design into these areas. The above will minimise potable water consumption for the activity centre.</p>
<p><b>W5.1.2</b></p> <p>A servicing plan will be prepared for each precinct structure plan that outlines the utilities required to deliver sustainable development outcomes reflected in the relevant integrated water management strategy and environmentally sustainable design (ESD) action plan.</p>	<p>Provision of other services, including recycled water and gas, will be subject to these detailed investigations to determine how urban development will deliver sustainable water, zero carbon and zero waste. Indicative trunk infrastructure illustrated on Plan 39 represents a conventional servicing approach that is subject to change and innovation as part of detailed precinct structure planning.</p>	<p>The potable water network should be designed to facilitate coexistence with other utilities to deliver sustainable outcomes for the precinct.</p>
<p><b>W5.1.3</b></p> <p>Placement of utilities will not detract from the amenity of the neighbourhood, particularly the open space network.</p>	<p>Utilities will be delivered to maintain an attractive and healthy public realm in a manner that:</p> <ul style="list-style-type: none"> <li>• Locates above ground infrastructure outside of key view lines with landscape screening.</li> <li>• Avoids and minimises impacts on waterways and disturbance of their landform, biodiversity and heritage values.</li> <li>• Avoids and minimises impacts on any conservation areas.</li> </ul>	<p>The potable water network will be located within road reserves to minimise service corridors and provide ready access to allotments created within the precinct.</p>

## 4.3 Recycled Water

### 4.3.1 Current Conditions

There is currently no recycled water infrastructure within or near the Creamery Road precinct.

### 4.3.2 Servicing Strategies

Barwon Water's initial position in 2016 was that the provision of recycled water infrastructure to the NWGGA development areas was not considered feasible, however with the caveat that further investigation was warranted. The result of investigation by Barwon Water, DELWP and the City has resulted in the recycled water strategy presented in the Northern and Western Geelong Growth Areas Integrated Water Management Plan (March 2021)

This strategy "forms the basis of a shared vision for the delivery of integrated water management in the development of the growth areas". The Integrated Water Management Plan recommends a recycled water scheme involving the delivery of Class A recycled water via a dual pipe system.

Barwon Water are now committed to investigate the provision of Class A recycled water into the planning and design for the Creamery Road precinct. Provision of this service is anticipated to include the following:

- Initially, the installation of water infrastructure (dual pipe) within the Creamery Road precinct, with recycled reticulation main supply achieved by a cross-connection to the potable water system.
- Barwon Water to investigate short-term Class A recycled water supply from the Northern Water Plant via a proposed constructed transfer main. This provides a unique opportunity to utilize the unused capacity of the existing network.
- Barwon Water to investigate a Long-Term (2035-onwards) Class A recycled water supply from a future water reclamation plant delivery in the Moorabool Valley (New North West Geelong Growth Area WRP).
- Once the ultimate Recycled Water connection is established to the North, Barwon Water have noted that a Pressure Reducing Valve (PRV) will be required in Evans Road. The land take for this asset is assumed to be 150m<sup>2</sup>.

A concept plan supplied by Barwon Water showing the location of the interim connection to the Northern Treatment Plant and the ultimate connection to the New North West Geelong Growth Area WRP is presented in Figure 6. The proposed trunk recycled water servicing strategy is presented in Figure 7.

It should also be noted that ultimate sizes, locations and delivery of the recycled water trunk servicing and reticulation mains will be determined by Barwon Water at the time of development.

If the infrastructure is required to be sited in differently owned properties, making it difficult for the first developer to deliver, then Barwon Water will generally undertake these works with the possible use of their Water Act powers to enter property to build assets. Recycled water mains DN225 and above are considered to be "shared assets" and hence will be funded by Barwon Water. Bring forward charges (BFC's) will be applicable if the reimbursable assets are constructed out of sequence according to Barwon Waters timeframes with the amount of BFC being determined by Barwon Water at the time of development.

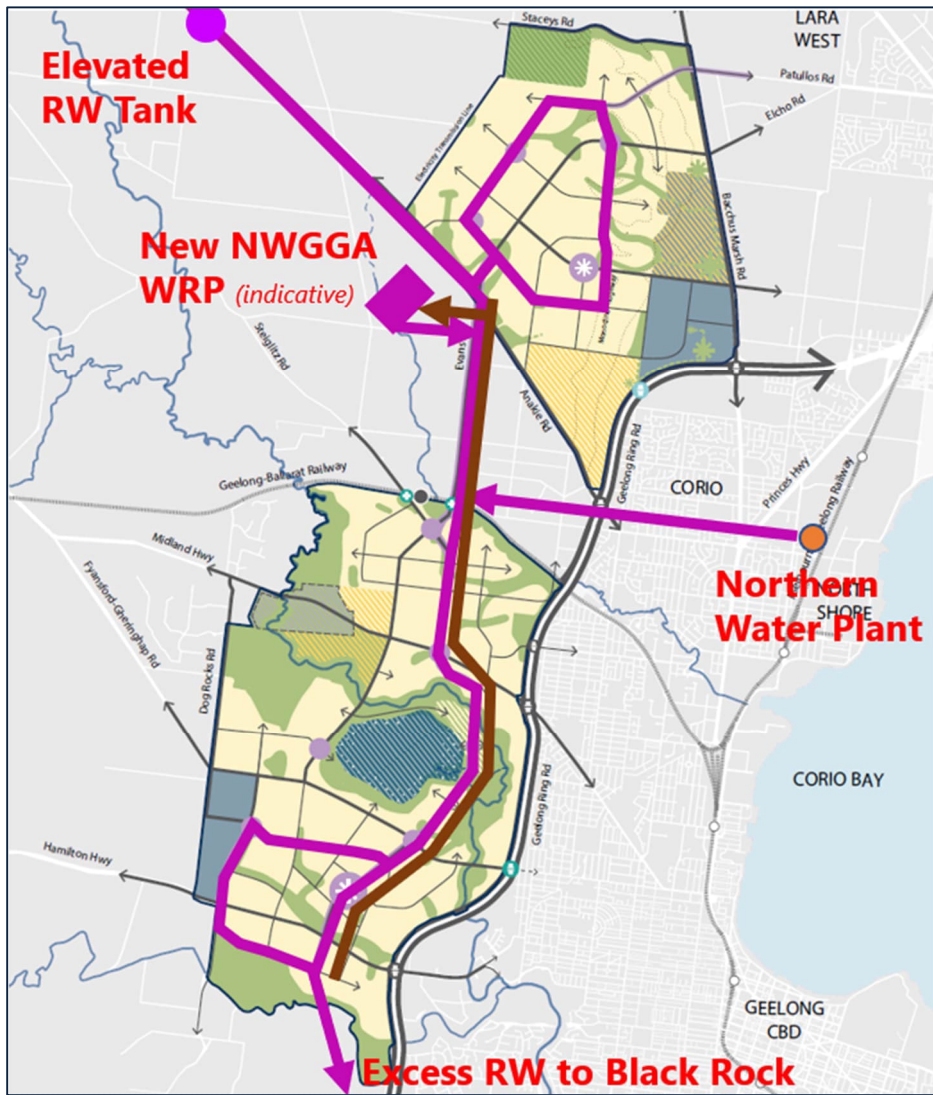


Figure 6: Concept Recycled Water Network for NWGGA (Barwon Water, 2022)

The IWM strategy aims for a 30% reduction in potable water usage through the use of alternative water sources. Barwon Water has planned to provide recycled water connections to the residential areas within the PSP. The Northern Water Plant (NWP) in Corio can supply Class A Recycled Water to the PSP area which is suitable for toilet flushing, garden watering, car washing and irrigation of public open space. Recycled water provides a consistent supply of water, with an established billing framework for customers.

The recommended scheme as per the growth areas IWM plan (2021) is delivery of Class A recycled water to homes, local industry, agriculture and open spaces. This will meet approximately 70% of the potable water demand. This includes:

- Class A recycled water to local industry, commercial and households.
- Class A recycled water for open space, amenity and recreation.
- Class A recycled water to Clever Creative Corridors.

The Creamery Road PSP will need to consider the easement requirements for the 'purple pipe' network to service the entire PSP area.

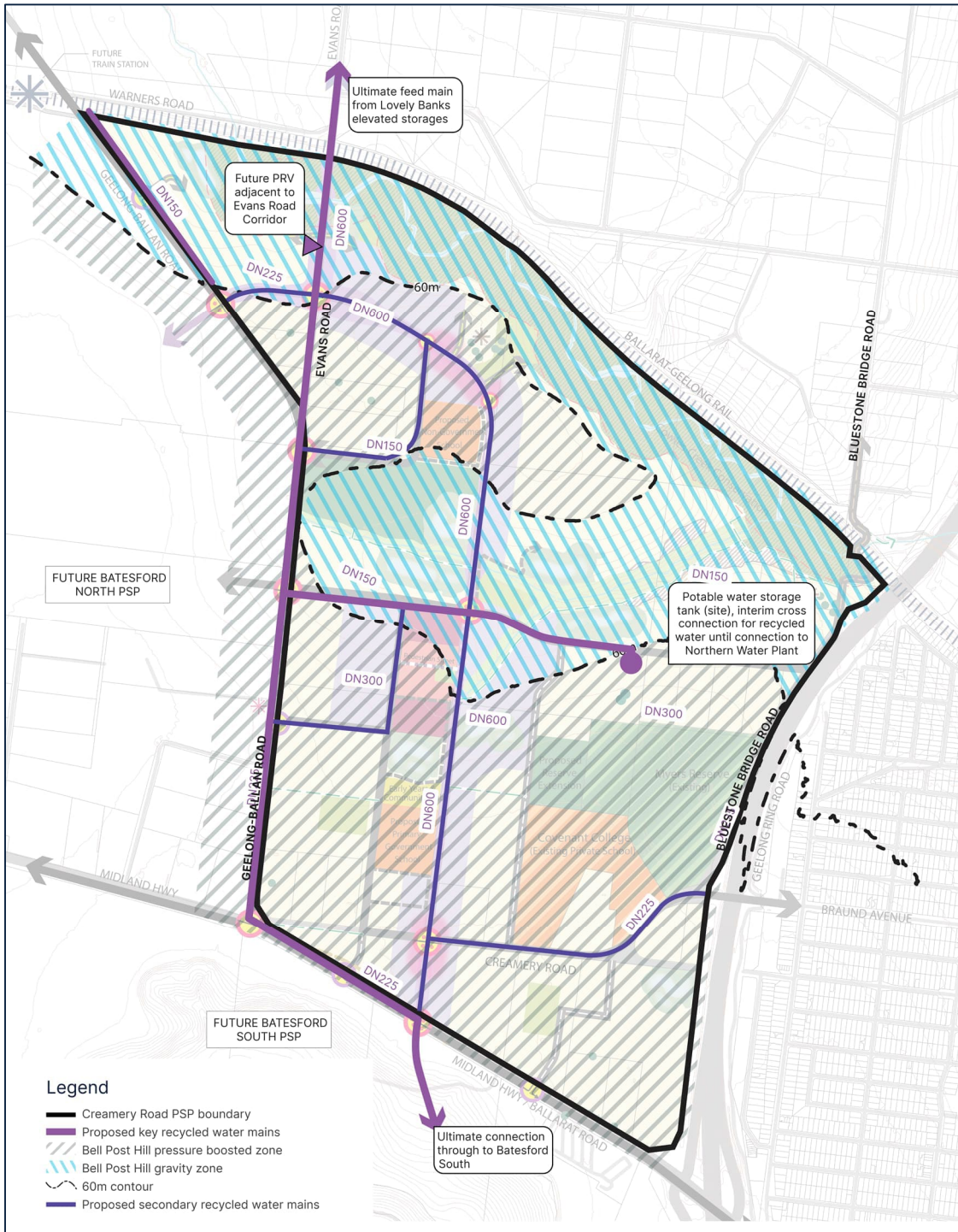


Figure 7: Recycled Water Servicing Strategy

### 4.3.3 Zero Waste

The ultimate strategy which incorporates the new North West Geelong Growth Area Water Reclamation Plant (WRP) provides an opportunity to utilise Zero Waste design principles. An example of this is the Black Rock Water Reclamation Plant.

Through Partnerships Victoria the Barwon Water Biosolids Management Project provides a valuable environmental process for the use of biosolids from the Black Rock Water Reclamation Plant and other regional water reclamation plants. Waste from the treatment plants is pelletised, and stored, in the short term, for use in broad-acre agriculture and as fuel. This process results in 100% beneficial use of the biosolids.

#### 4.3.4 Framework Plan Actions

The Framework Plan identifies a series of actions to be addressed in the PSP process. Table 5 addresses how the proposed outcomes address the relevant actions.

Table 5: Framework Plan Actions Analysis - Recycled

Action	Action Details	Current Proposal Addresses Action
<p>W2.3.1</p> <p>Urban development will be designed to achieve a zero-carbon future for the Greater Geelong city-region.</p>	<p>An environmentally sustainable design (ESD) action plan will be prepared for each precinct structure plan demonstrating the actions that urban development will take to contribute net zero carbon to the city. A 'smart city' strategy will be included within the action plan that establishes a framework for monitoring the performance of new neighbourhoods in delivering sustainable development and more efficient urban service systems. The Clever and Creative Corridor will support implementation of these technologies.</p>	<p>The carbon use as a result of the treatment of water to class A standards will need to be offset as part of the net zero carbon city. Long term cogeneration opportunities using methane from the Water Reclamation Plant should be established in the growth area. An example includes where Barwon Water have established the Colac Renewable Organics Network (Colac RON) to provide renewable energy to their treatment plant in Colac.</p>
<p>W2.3.6</p> <p>Neighbourhoods will maximise the use of alternative water sources to meet fit-for-purpose needs and deliver multi-functional benefits.</p>	<p>An integrated water management strategy will assess the feasibility of local and precinct-scale stormwater collection, treatment and reuse, wastewater treatment and reticulation through a dual-pipe network that delivers recycled water to each neighbourhood for appropriate domestic and commercial uses. The Clever and Creative Corridor will showcase best practice integrated water management approaches and will integrate water sensitive urban design into the public realm to create attractive, interesting and drought resistant landscape elements.</p>	<p>As per the integrated water management plan the neighbourhoods and Clever and Creative Corridors will incorporate the use of recycled water for non-potable demands, providing habitat and liability outcomes through the use of green spaces and reduction in the urban heat island effect.</p>
<p>W2.3.7</p> <p>Neighbourhoods will deliver safe, reliable, high quality drinking water and sewage services.</p>	<p>Drinking water and sewage services will meet mandatory standards for each neighbourhood.</p>	<p>Monitoring and treatment of the recycled water system maintains class A standards for non-potable water uses such as irrigation, household and commercial uses. This is a reliable and high-quality source fit for purpose to the water uses.</p>
<p>W2.5.10</p> <p>Integrated water management will maximise 'green-blue connections' to active open space that allows the operation of</p>	<p>Integrated water management will identify methods to utilise water sensitive urban design (WSUD), stormwater treatment and recycled water to deliver open spaces that remain useable and attractive throughout the year.</p> <p>Local parks and sports reserves will be located along waterways and river</p>	<p>Class A recycled water is intended for irrigation of open spaces and the Clever Creative Corridor. In conjunction with the passively irrigated street trees this will provide sufficient water to maintain high value green spaces throughout the precinct. Where irrigated parks are located immediately adjacent to the</p>

<p>attractive, all-year facilities.</p>	<p>corridors, where appropriate. Co-location of parks and reserves will seek to link and extend the recreational benefits to encumbered land.</p>	<p>waterways the water quality and impact on the natural system will need to be investigated (particularly if the Class A water has a higher salinity content).</p>
<p>W3.1.4 All activity centres will incorporate best practice environmental sustainability in their design and operations</p>	<p>Activity centres will incorporate design that optimises solar access, walkability and the use of active transport, water sensitive urban design principles, green buildings and integrated water management. Sub-regional and neighbourhood activity centres will explore opportunities in renewable energy solutions, resource and material reuse opportunities, minimisation of maintenance requirements and access to open space and nature.</p> <p>Activity centres will be a key focus of the ESD action plan prepared for each precinct and will incorporate smart city principles.</p>	<p>The precinct activity centre will be provided a connection to the recycled water network to deliver a high value space in accordance with sensitive urban design principles. Greening of activity centre allows for greater infiltration, more liveable spaces, and urban habitats.</p>
<p>W5.1.2 A servicing plan will be prepared for each precinct structure plan that outlines the utilities required to deliver sustainable development outcomes reflected in the relevant integrated water management strategy and environmentally sustainable design (ESD) action plan.</p>	<p>Provision of other services, including recycled water and gas, will be subject to these detailed investigations to determine how urban development will deliver sustainable water, zero carbon and zero waste. Indicative trunk infrastructure illustrated on Plan 39 represents a conventional servicing approach that is subject to change and innovation as part of detailed precinct structure planning.</p>	<p>Recycled water connection to the precinct including residential, commercial, open space and Clever Creative Corridor areas will be a significant infrastructure requirement to achieve the objectives as part of the IWMP and ESD Action Plan. The use of recycled water will reduce the potable water supply requirements but will require separate pipework running adjacent to the potable water supply.</p>
<p>W5.1.3 Placement of utilities will not detract from the amenity of the neighbourhood, particularly the open space network.</p>	<p>Utilities will be delivered to maintain an attractive and healthy public realm in a manner that:</p> <ul style="list-style-type: none"> <li>Locates above ground infrastructure outside of key view lines with landscape screening.</li> <li>Avoids and minimises impacts on waterways and disturbance of their landform, biodiversity and heritage values.</li> <li>Avoids and minimises impacts on any conservation areas.</li> </ul>	<p>The recycled water network will be co-located with other services within the road reserves. As mentioned previously the quality of the water would need to be assessed for use in conservation areas or adjacent to waterways. The use of recycled water in the green spaces will ensure plant survival and aid biodiversity and high-quality spaces.</p>

## 4.4 Sewer

### 4.4.1 Current Conditions

A Reticulated sewer network is not currently available within the Creamery Road precinct. It is understood that existing farm properties currently use septic tank systems.

Barwon Water's current existing sewer available for connection is the reticulated network within the Bell Post Hill area to the east of the precinct. Barwon Water have advised that the anticipated interim connection point is the Corio West Gravity Main (GM), as denoted on Figure 8 below, approximately 1.6km east of the Geelong Ring Road.

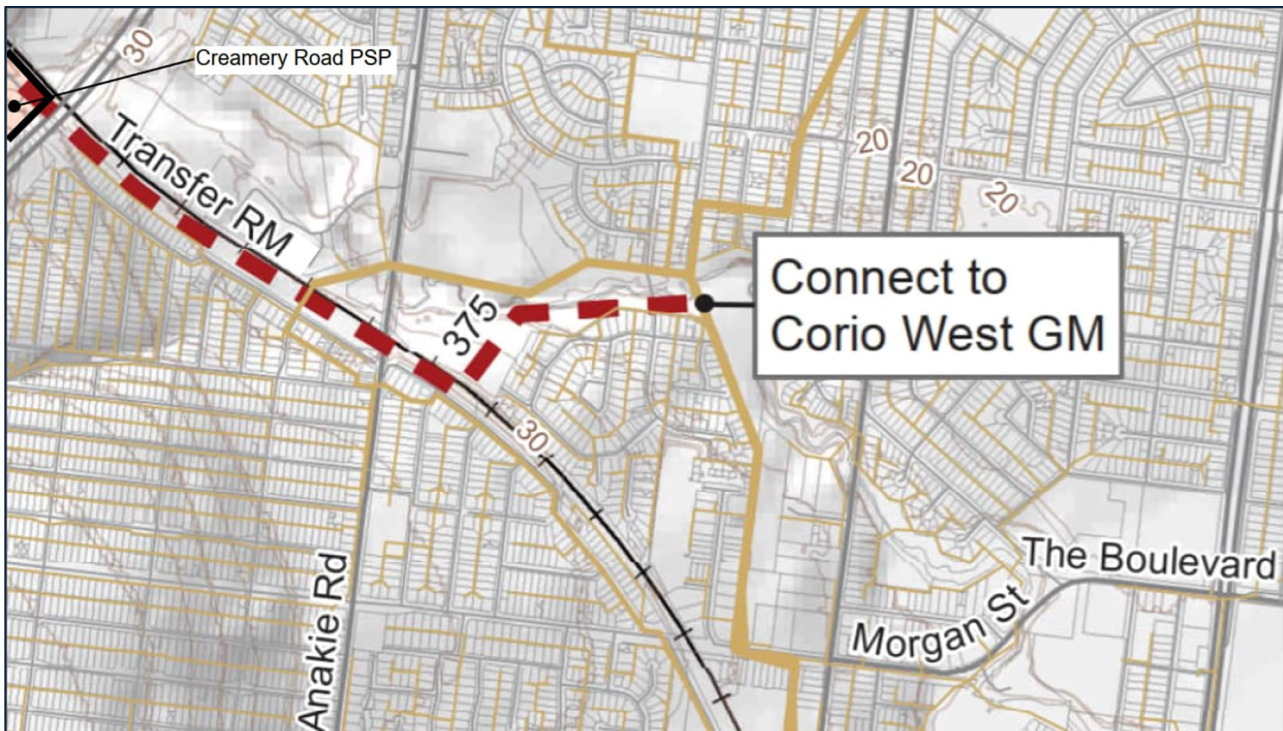


Figure 8: Sewer RM Connection (Interim) to Corio West Gravity Main

The Corio West Gravity Main feeds south through the Geelong sewerage system towards the Black Rock Water Reclamation Plant.

### 4.4.2 Servicing Strategy

Barwon Water have advised that the Creamery Road precinct is proposed to be serviced by a key Sewer Transfer Hub (refer Figure 9 below), incorporating infrastructure and assets as follows:

- Barwon Water's preferred location for the proposed Sewer Transfer Hub is within the landholding at 60 Avonlea Road which provides adequate land area while remaining outside the proposed drainage corridor and landslip susceptibility area indicated by the City's Framework Urban Structure Plan (FUS).
- Barwon Water's preference is to locate the Transfer Hub at the lowest available elevation in this area whilst remaining outside the drainage corridor. The proposed area for this site will be in the order of 10,000m<sup>2</sup>.
- The Transfer Hub will include a Sewer Pump Station (SPS), approximate capacity 250L/s and a storage and dosing facility, with an approximate capacity of 10ML. The SPS will discharge via a rising main to the interim connection point on the Corio West Gravity Main.
- Depending on the final location of the sewer transfer hub, developer funded pump stations will be likely required to service lower lying developments adjacent to the drainage corridor. Future developments North of the drainage corridor may also require developer funded pump stations, discharging back to proposed

gravity mains within the Clever Creative Corridor. Barwon Water are currently investigating the infrastructure requirements associated with these areas.

- Creamery Road Pump Station 1 (CRPS1) and storage facility, servicing the north west corner of the precinct and future catchments to the west in the Batesford North PSP utilises a rising main, discharging (at a convenient location) to the gravity sewer network in the Transfer Hub catchment.
- CRPS1 should be located at the lowest available elevation, whilst remaining outside the drainage corridor, adjacent to the wetlands/retarding basin drainage facility WLRB8 (refer Figure 4, page 20). The proposed area for this site will be in the order of 1,600m<sup>2</sup>.

Refer to Figure 9 for locations of Key Sewer infrastructure, Barwon Water to determine items of "Capital Works" to be designed and delivered by Barwon Water or Development as deemed appropriate

It should also be noted that ultimate sizes, locations and delivery of the recycled water trunk servicing and reticulation mains will be determined by Barwon Water at the time of development. If the infrastructure is required to be sited in differently owned properties, making it difficult for the first developer to deliver, then Barwon Water will generally undertake these works with the possible use of their Water Act powers to enter property to build assets. Sewer mains DN300 and above are considered to be "shared assets" and hence will be funded by Barwon Water. Bring forward charges (BFC's) will be applicable if the reimbursable assets are constructed out of sequence according to Barwon Waters timeframes with the amount of BFC being determined by Barwon Water at the time of development.

#### 4.4.3 Ultimate Servicing

Barwon Water have advised that the Creamery Road precinct sewer network will ultimately discharge, via an additional 600mm diameter (indicative sizing) rising main, to the new North West Geelong Growth Area Water Reclamation Plant (NWGGA WRP). The ultimate sewer rising main alignment will likely run north from the Sewer Transfer Hub through the Clever and Creative Corridor before crossing Cowies Creek within Evans Road towards the NWGGA WRP.

The sewer network is proposed to consist of the following:

- The Sewer Transfer Hub and 600mm diameter rising main traversing through the Creamery Road Precinct discharging at the ultimate NWGGA WRP
  - These works may be deemed as "capital works" - to be designed and constructed by Barwon Water.
- A series of trunk sewers sized 300mm and above;
  - These sewers should be classified as "shared assets" by Barwon Water and therefore are reimbursable works.
- A series of reticulation sewers, sized 225mm and below;
  - These sewers being developer funded, designed and constructed to Barwon Water's requirements by the developers approved contractor.
- All sewers within the Creamery Road precinct will need to be adequately sized to receive external flows from the adjacent west and south precincts.
- Developer funded pump stations to service low-lying catchments adjacent to the drainage corridor. Catchments will pump back to gravity mains before outfalling at proposed Sewer Transfer Hub.

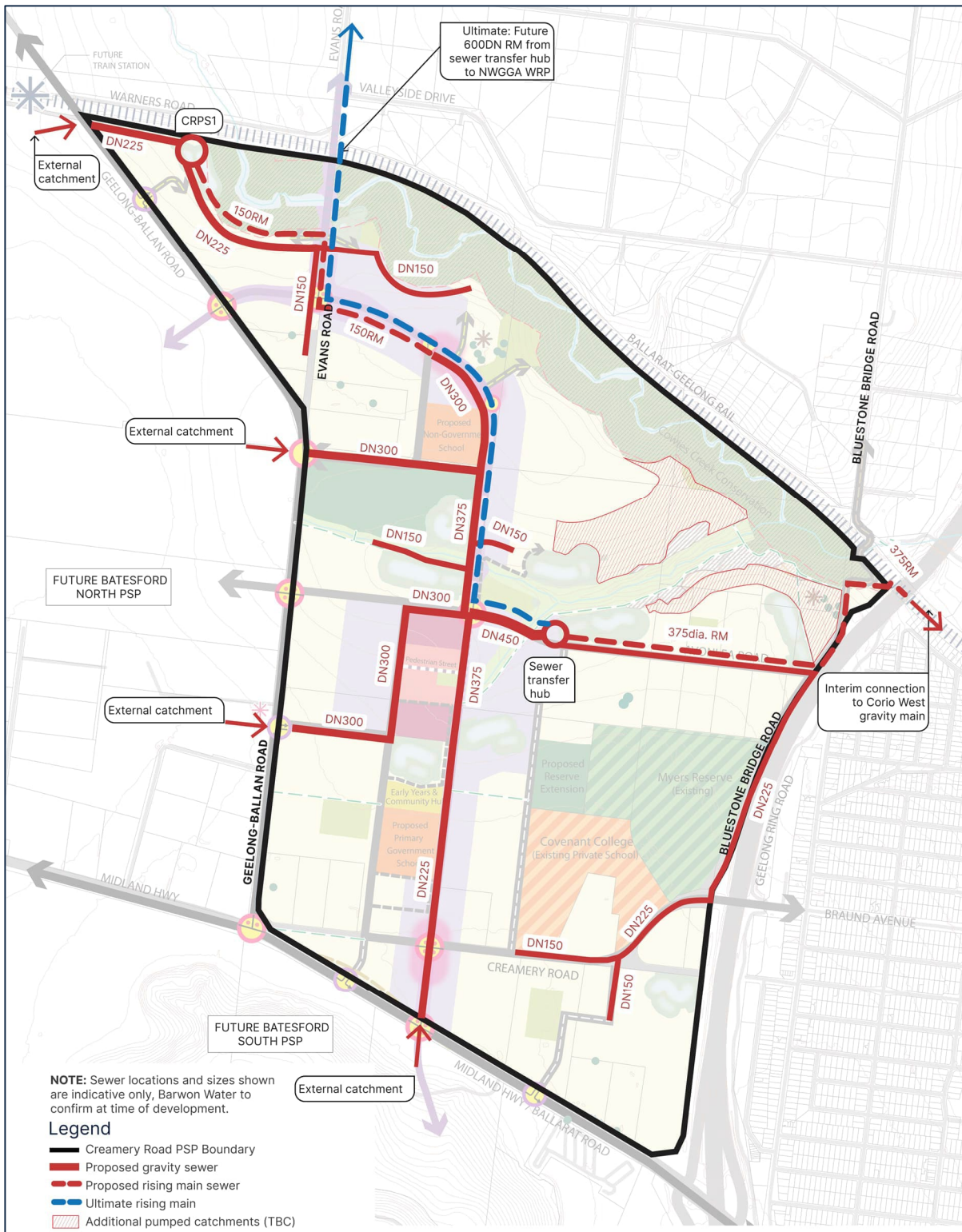


Figure 9: Sewer Servicing Strategy

#### 4.4.4 Framework Plan Actions

The Framework Plan identifies a series of actions to be addressed in the PSP process. Table 6 addresses how the proposed outcomes address the relevant actions.

Table 6: Framework Plan Actions Analysis - Sewer

Action	Action Details	Current Proposal Addresses Action
<p>W2.3.1</p> <p>Urban development will be designed to achieve a zero-carbon future for the Greater Geelong city-region.</p>	<p>An environmentally sustainable design (ESD) action plan will be prepared for each precinct structure plan demonstrating the actions that urban development will take to contribute net zero carbon to the city. A 'smart city' strategy will be included within the action plan that establishes a framework for monitoring the performance of new neighbourhoods in delivering sustainable development and more efficient urban service systems. The Clever and Creative Corridor will support implementation of these technologies.</p>	<p>Where possible the precinct will be serviced by a gravity sewer network. Sewer Pump Station systems will be minimised in accordance with the prevailing site topography constraints.</p> <p>Renewable energy sources could be investigated for pumped systems which is in line with Barwon Water's strategic objectives to reduce carbon footprint. Barwon Water are committed to 100% renewable electricity by 2025 and zero net emissions by 2030.</p>
<p>W2.3.6</p> <p>Neighbourhoods will maximise the use of alternative water sources to meet fit-for-purpose needs and deliver multi-functional benefits.</p>	<p>An integrated water management strategy will assess the feasibility of local and precinct-scale stormwater collection, treatment and reuse, wastewater treatment and reticulation through a dual-pipe network that delivers recycled water to each neighbourhood for appropriate domestic and commercial uses. The Clever and Creative Corridor will showcase best practice integrated water management approaches and will integrate water sensitive urban design into the public realm to create attractive, interesting and drought resistant landscape elements.</p>	<p>Additional infrastructure will be required to treat and manage the wastewater generated within the precinct, but no sewer mining has been proposed as part of the IWMP.</p>
<p>W2.3.7</p> <p>Neighbourhoods will deliver safe, reliable, high quality drinking water and sewage services.</p>	<p>Drinking water and sewage services will meet mandatory standards for each neighbourhood.</p>	<p>Additional infrastructure or upgrades will be required to treat and manage the wastewater generated within the precinct.</p>
<p>W2.5.10</p> <p>Integrated water management will maximise 'green-blue connections' to active open space that</p>	<p>Integrated water management will identify methods to utilise water sensitive urban design (WSUD), stormwater treatment and recycled water to deliver open spaces that</p>	<p>It is critical that major infrastructure does not encumber Sporting Reserves. The location of major branch sewer services should be</p>

<p>allows the operation of attractive, all-year facilities.</p>	<p>remain useable and attractive throughout the year.</p> <p>Local parks and sports reserves will be located along waterways and river corridors, where appropriate. Co-location of parks and reserves will seek to link and extend the recreational benefits to encumbered land.</p>	<p>avoided in, and not encumber, open spaces.</p>
<p>W3.1.4 All activity centres will incorporate best practice environmental sustainability in their design and operations</p>	<p>Activity centres will incorporate design that optimises solar access, walkability and the use of active transport, water sensitive urban design principles, green buildings and integrated water management. Sub-regional and neighbourhood activity centres will explore opportunities in renewable energy solutions, resource and material reuse opportunities, minimisation of maintenance requirements and access to open space and nature.</p> <p>Activity centres will be a key focus of the ESD action plan prepared for each precinct and will incorporate smart city principles.</p>	<p>The precinct activity centre will be connected to the precincts sewer system. Opportunities for best practice environmentally sustainable design (i.e. gravity sewer as a preference to pumped systems). Where pumped systems are utilised, renewable energy shall be considered in accordance with Barwon Water's strategic objectives to reduce carbon footprint.</p>
<p>W5.1.2 A servicing plan will be prepared for each precinct structure plan that outlines the utilities required to deliver sustainable development outcomes reflected in the relevant integrated water management strategy and environmentally sustainable design (ESD) action plan.</p>	<p>Provision of other services, including recycled water and gas, will be subject to these detailed investigations to determine how urban development will deliver sustainable water, zero carbon and zero waste. Indicative trunk infrastructure illustrated on Plan 39 represents a conventional servicing approach that is subject to change and innovation as part of detailed precinct structure planning.</p>	<p>The current servicing plan considers the need for sewer throughout the precinct, and how this interrelates with other services. Gravity sewer is proposed for a large portion of the catchment which aligns with objectives of the ESD action plan.</p>
<p>W5.1.3 Placement of utilities will not detract from the amenity of the neighbourhood, particularly the open space network.</p>	<p>Utilities will be delivered to maintain an attractive and healthy public realm in a manner that:</p> <ul style="list-style-type: none"> <li>• Locates above ground infrastructure outside of key view lines with landscape screening.</li> <li>• Avoids and minimises impacts on waterways and disturbance of their landform, biodiversity and heritage values.</li> <li>• Avoids and minimises impacts on any conservation areas.</li> </ul>	<p>It is critical that major infrastructure does not encumber Sporting Reserves. The location of major branch sewer services should be avoided in, and not encumber, open spaces. Sewer services will be generally placed in road reserves.</p>

# 5 Electricity

## 5.1 Introduction

Powercor is the responsible Authority for the provision of electrical supply services in Western Geelong Growth Area (WGGA), including operating and maintenance of the network relating to the Creamery Road precinct.

Powercor have advised that the WGGA is supplied by three 22kV backbone feeders from the Geelong Zone Substation (GL ZSS) at the corner of Ballarat Road and Ebden Street, Hamlyn Heights and new 22kV and 66kV feeders from Gheringhap Zone Substation (GHP ZSS)

## 5.2 Current Conditions

Existing Powercor electrical assets within, and feed into, the Creamery Road precinct, are as follows (Refer Figure 10 and Figure 12):

- Creamery Road 22kV feeder GL015
- Ballan Road 22kV feeder CRO022
  - Geelong Ring Road 66kV feeder from the Geelong Terminal Station (GTS)
- GHP ZSS commissioned at end of 2022
- Midland Highway new 22kV and 66kV overhead feeders from GHP
- Ballan Road new 22kV and 66kV overhead feeders from GHP
- The new GHP012 feeder from GHP ZSS will pick up GL015 and CRO022 to provide initial supply to the Creamery Road precinct.

The scope of developer works required to service any development in Creamery Road shall be determined via the Powercor Supply Offer and Scope of Works process (SoW).

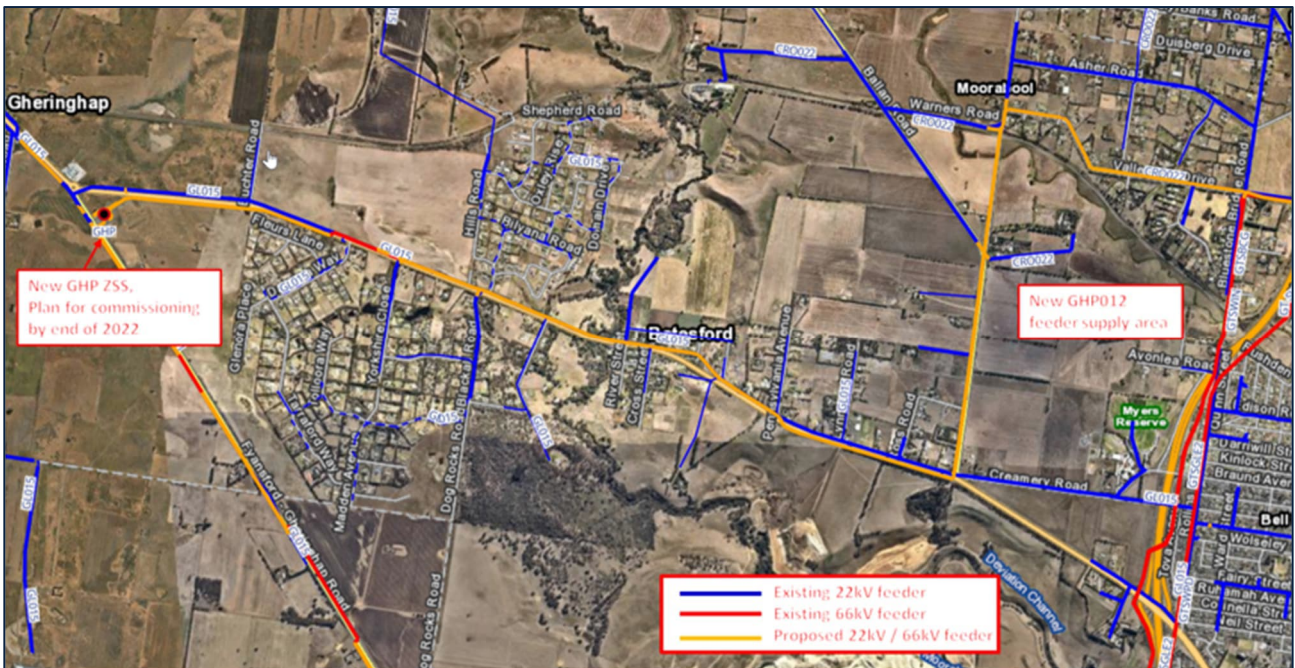


Figure 10: Existing and new 22kV feeder assets and zone substations (Powercor map, June 2022)

Note: The Proposed 22kV / 66kV feeder (yellow line) has been constructed as at the time of writing this report.

### 5.3 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 they are prepared at this time to service the power requirements of the WGGGA, and hence the Creamery Road precinct, based on the current capacity constraints of the existing infrastructure.

- Powercor have advised a Servicing Strategy as follows:
  - Existing (including the newly constructed works) 22kV and 66kV overhead power lines should remain.
  - GHP ZSS will have sufficient transformation capacity to supply the Creamery Road Precinct.
  - The new GHP012 feeder will provide initial supply, however augmentation will be required for continuing load growth. It is estimated that GHP012 can connect about 1,000 customers before further feeders and tie-ins, are required.
  - A second feeder is likely to be required from new GHP ZSS (or current GL/GB ZSS) and will most likely be installed upon the existing 66kV pole line on the south side of Midland Highway. Given that this will become a backup feeder, the second feeder needs to run on a different pole line from the initial feeder – subject to Powercor approval
  - New 22kV circuits within the development could be generally undergrounded network off the overhead lines, with new kiosk substations sites in the Creamery Road Precinct for customer connections.
  - Rapid Earth Fault Current Limiter (REFCL) isolating transformers will be located at connection locations to the overhead HV network to ensure compliance to Victorian Government legislation. It is recommended to reduce HV underground network as much as possible in order to reduce the number and size of the transformer requirement.

Powercor also advise the following;

- That requests for power supply to the WGGGA will need to be connected to the existing and new 22kV feeder backbones and would be generally placed underground, with sites in the Creamery Road precinct to be allocated to new kiosk substations. Locations, quantities and sizing of kiosks and isolating transformers will depend on development plan and the Developers Electrical masterplan designs.
- That the LV circuits do not exceed 300m in length. The network should be built to Powercor standards with 2 40mm<sup>2</sup> 4/C Al LV cables as LV mains. Apartment buildings, as well as commercial development (e.g. community and shopping precincts) will have different supply arrangement and there may be indoor sub-stations.
- Modification to sizing of kiosk substations and LV circuits will likely be required if EV charging points are added to each lot. Specific Powercor requirements and guidelines are under preparation.
- REFCL Isolation Transformers are 1, 2 or 3 MVA rated. They are required at the HV cable entrance point to the development enabling to isolate the HV underground network from REFCL complied network. These Transformers will prevent REFCL component overload at their zone substations. Easement sizing for REFCL transformers are dependent on transformer size;
  - 1-2 MVA REFCL Transformer – 7.2m x 7.2m easement size
  - 3 MVA REFCL Transformer – 10 x 7.2m easement size

### 5.3.1 No Gas Development

In accordance with the Framework Plan objectives of a “Zero Carbon City” and based on direction from the City, gas infrastructure is not proposed to be supplied to the Creamery Road Precinct.

In consultation with Powercor, the impact of No-Gas development on authority allowances for energy consumption, to accommodate the increased load per household and to support solar export, will have the following possible requirements for the electrical infrastructure:

- Shorter low voltage circuit lengths than usual (development) sites
- Reduced number of customers connected per LV circuit and substation
- Larger kiosk substations, increase from default 315kVA to 500kVA
- More kiosk substations throughout the precinct
- More REFCL isolating transformers (or bigger size), typically located at development entry location where the power connections to the overhead HV infrastructure are undergrounded to the HV network for development.
- Expediting of HV network augmentation, e.g. a second 22kV feeder.

Powercor have advised that detailed assessments are required at the developer masterplan submissions and individual customer connection requests in regard to “no gas” development.

### 5.3.2 Evans Road Electrical Easement Consultation

The City of Greater Geelong had noted an existing 35m-wide electrical easement through the properties abutting Evans Road in the North-West corner of the Creamery Road Precinct (refer Figure 11 below).

Easements of this width are typically created for electrical transmission lines, however after assessment of aerial imagery and AusNet infrastructure information – no assets were noted. SMEC has since consulted with Powercor, who have confirmed that while previously being intended for a future electrical transmission alignment, future requirements have been absolved. Further, the developers of the applicable properties will be able to pursue removal of the electrical easement through consultation with AusNet Services.



Figure 11: Evans Road Electrical Easement

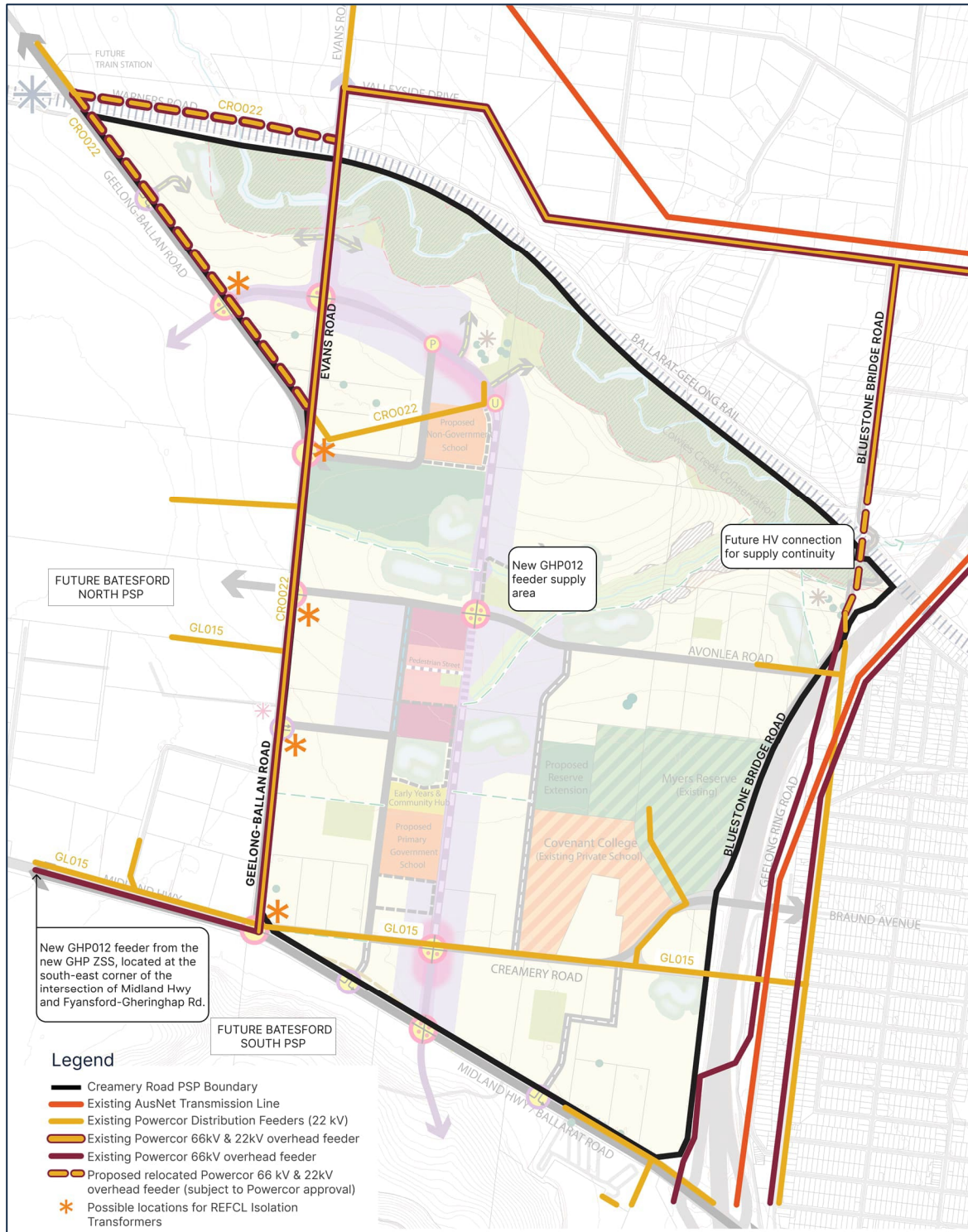


Figure 12: Existing and Proposed Electrical – Trunk Services

## 5.4 Renewable Energy

Embracing renewable energy technologies and prioritising their use within the Creamery Road PSP Area, will enable the City of Greater Geelong to achieve a net zero carbon outcome for the precinct.

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.

### 5.4.1 Opportunities

Significant opportunities exist to advance renewable energy technology into infrastructure associated with greenfield development. Integrating those most suited opportunities, within the Creamery Road Precinct, will strengthen Council's position on 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.

#### 5.4.1.1 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.
- Bio-energy solutions from adjacent farmland crop, located in larger industrial areas
- 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 the 'Clever and Creative Corridor' streetscape.
- Electrical vehicle charging points, mandated along the "Clever and Creative Corridor" and in the home

- Infrastructure construction requirements, Developers, Council, Authorities, Consultants and Contractors to adopt environmentally sustainable design principles in applicable aspects of the precinct.
- 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.
- Microgrid energy sharing.

#### 5.4.1.2 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 Creamery Road 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, a similar scale to the WGGA.

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

##### LARGE SCALE BATTERY STORAGE

Opportunity to incorporate a purpose-built Big Battery Storage, for the WGGA, in the Batesford Quarry when the Batesford South PSP area is developed. The real opportunity is to co-locate a Wind Farm and Big Battery Storage to provide clean energy to the WGGA.

##### BIOENERGY

Bioenergy technologies are generally well established, and bioenergy will play an increasing role in the proportion of renewable energy generated in Victoria.

In Victoria, bioenergy systems are employed across a number of industries, which helps to achieve the governments renewable energy targets, however, it is unlikely that bioenergy use could be directly used in a greenfield development scenario.

There is opportunity as part of the proposed Water Reclamation Plant (WRP) to implement cogeneration using methane to produce a renewable energy output from the plant which is consistent with Barwon Water's strategic objectives for reducing carbon footprint.

#### 5.4.1.3 Neighbourhood Battery Initiative

There is currently a Neighbourhood Battery Initiative underway by the Victorian State Government, to support new energy storage models in Victoria. The initiative aims to demonstrate a range of benefits for Victorian communities from feasibility to implementation.

The objectives of the Neighbourhood Battery Initiative are to:

- Facilitate and provide funding support for pilots, trials and demonstrations of a range of neighbourhood scale battery ownership and operational models, including customer battery access services and innovative local energy trading models;

- Address barriers to neighbourhood scale battery deployment in the National Electricity Market (NEM) both in the short term to facilitate trials and through longer-term regulatory reform;
- Engage effectively with customers and the broader community to ensure their perspectives are heard and considered as part of trial development;
- Understand the impacts of different network tariff arrangements on the viability of customer retail storage models and battery operation; and
- Understand the viability and benefit flows for different ownership/operational models and ensure the community benefits of neighbourhood scale batteries are maximised.

Furthermore, there may be opportunity to connect into the Victorian Big Battery (300MW/450MWh) on Geelong-Ballan Road in Moorabool, Victoria. In seeking to reduce the carbon footprint, such opportunities are expected to be investigated by stakeholders for the PSP area.

#### 5.4.1.4 Microgrids

The advent of decarbonised electrical power generation has created opportunity for consumers to reduce their carbon footprint and reduce customer reliance upon the Network Service Provider (NSP) and associated network constraints. 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.

#### MICROGRID CONSTRAINTS

Microgrids are a valuable and viable way of offsetting Electrical Network dependency. However, Electrical Utilities are bound by regulation and procedures as set out in the National Electricity Rules (NER) by the Australian Energy Market Commission (AEMC).

The rules are specific sets of guidelines which govern the operation of the National Electricity Market (NEM). As such, scaled generation can have immediate effect upon the stability and the reliability of the electrical network. Different states in Australia have alternate processes, but there is very similar due process across Australia when generating power which is connected back to the network. Specific planning must be focussed around careful collaboration with the NSP, which will require detailed analysis and considerations:

- Protection systems and protection schemes.
- Fault level management principles.
- Reactive power capability and power factor correction.
- Power quality.
- Frequency and voltage disturbance.
- Voltage control and regulation.
- Remote monitoring equipment, control and communication requirements.
- Earthing requirements and other safety requirements.
- Commissioning and testing requirements.
- Extensive Network related connection costs.

Comprehensive and precise examination is required to fully realise the cost benefits with attention to factors including:

- The average power consumption of households. The diverse climate across Australia places the range of daily power usage between 10 and 25kWh.

- Ongoing Operational Expenditure (OPEX) to maintain extensive areas of electrical network. Although often designed with an excess of 20-year life cycle, electrical infrastructure requires upkeep, repairs and servicing, the responsibility of these operations will need to be closely examined.
- The feed in/feed out tariffs of particular networks at a wholesale and retail level. An important point as to whether power consumption is to be fiscally offset, or whether stored power is to be used as a commodity.
- Size of the Microgrid as a commercial entity. Investment into decarbonised generation is incentivised on a local scale for retail consumers to reduce or remove the costs associated with power usage. The financial viability of wholesale power back to the network, although a contributing component, would need careful consideration as to the competitiveness of such a venture for this scale.
- The cost of land in a growth area, to possibly be taken up by larger scale generation sites and infrastructure, which although is to be complimented by multiple dwelling generation and storage, may limit the area and subsequent output of generation.
- The connection to the network and neighbourhood interconnectivity is suggested will be via underground cable, for ease of installation and aesthetics. Network connection and installation costs will be one of the largest variable costs to the customer, depending upon routes, locations and efficiency of distribution.
- Availability and capacity of existing infrastructure are considerable aspects of construction and installation.

**MICROGRID MODELS**

Detailed modelling can produce a separate grid or Microgrid which can allow for tradeable, scalable generation and alleviation of network constraints. Further to this, Microgrids may remove network tariffs completely. Microgrids can have different combinations and formats, mainly:

- Network supported grid, whereby a larger-scale Battery Energy Storage System (BESS); owned, operated and maintained by the local Distributed Network Service Providers (DNSPs) can facilitate the reduced Network Demand and are supported by or support numerous sources or consumers on the network. This can allow DNSPs to support load at critical periods of a load cycle, dependent upon the nature of the specific Demand Curve, i.e. Industrial, Residential, Commercial. There is still an inherent reliance upon the network but a flexible and robust delivery for Microgrids in this format which are still at the mercy of Maximum Demand within the Network. However, this form of augmented Network is a realistic approach to power consumption and reliability, with the onus of investment placed upon the providers and a formed Renewable Energy Zone is created.

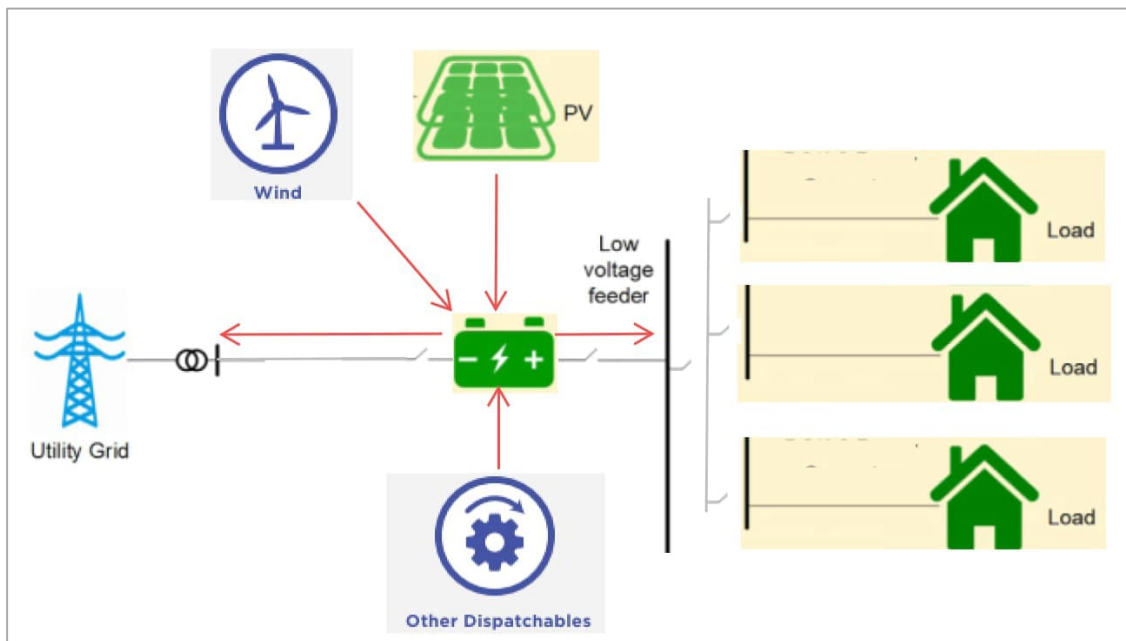


Figure 13: Network Supported Grid

- Self-reliant grid. Still inclusive of a larger-scale BESS; these micro grids can be standalone power systems or remote island systems. These systems have huge benefits in energy utilisation, the ideal approach is having an interconnected system, where individual battery use can be greatly reduced. The lifetime of a battery is closely related to the amount of charging and discharging occurring. Thus, if correct and efficient interconnection can occur, the reduction in maintenance and upkeep of a BESS, System Inverters and PV arrays, regardless of scale, can be achieved. Units of higher consumption are able to benefit from units of higher generation.

Although similar, the demand of each household will be variable, so it is difficult to obtain a completely even distribution of cost across irregular usage. But the increased apportionment of system operation will definitively reduce the burden placed upon single systems, having foreseeable reduction in individual costs.

Coordinating local electricity resources in a microgrid can bolster the resilience and reliability of supply in the event of a natural disaster or network brown out and black outs, making microgrid technologies a particularly appealing option for communities prone to bushfires, floods or other network interruptions.

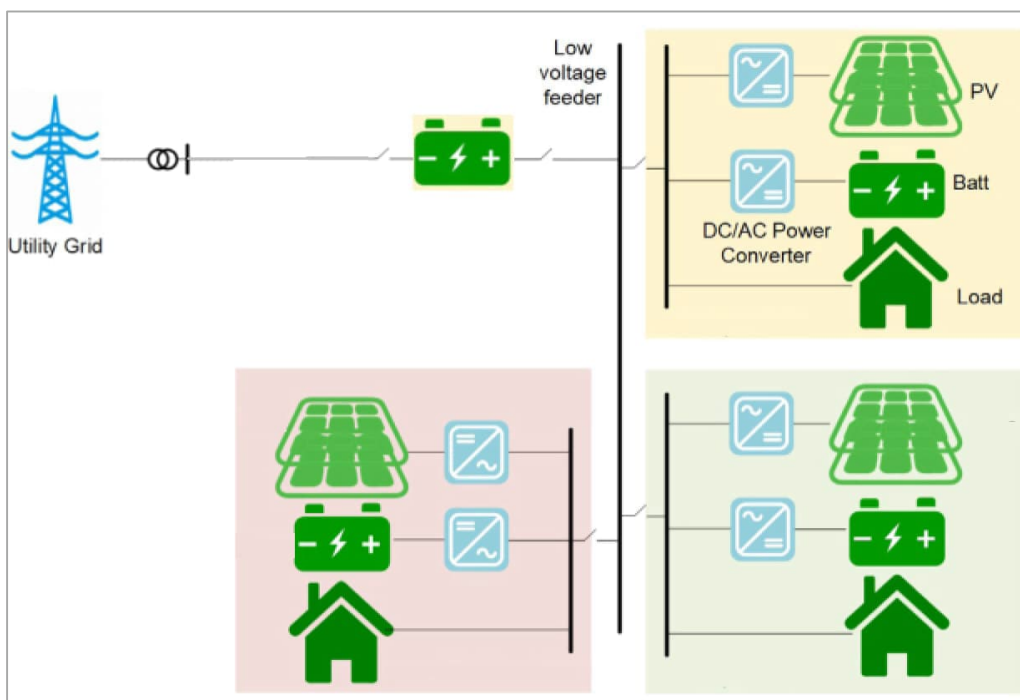


Figure 14: Standalone Interconnected Microgrid

The above figures, or a combination of both, illustrate the basic concepts in delivering generated power back into the network.

Although there are initiatives and financial incentives for customers to enjoy cheap, clean and reliable energy, the comparatively higher cost of BESS's are an insurmountable hurdle in some instances. As systems become more efficient and more affordable, the self-reliance of these installations are being more easily realised.

There are national and local schemes and options for investment, one such by ARENA. On behalf of the Australian Government, the Australian Renewable Energy Agency (ARENA) has announced in 2021, the launch of the \$50 million Regional Australia Microgrid Pilots Program (RAMPP) to support microgrid pilot projects across regional Australia<sup>1</sup>. Local and state governments may have particular strategies and incentives available as well.

<sup>1</sup> <https://arena.gov.au/funding/regional-australia-microgrid-pilots-ramp>

### 5.4.2 Pathways, Delivery Models & Constraints

It is envisaged that the following delivery models exist for the above-mentioned renewable energy opportunities. Constraints associated with implementation on a greenfield subdivision scale are also documented in Table 7.

Table 7: Renewable Energy Opportunities - Delivery Models & Constraints

RENEWABLE ENERGY OPPORTUNITY	DELIVERY MODELS	CONSTRAINTS
Solar Street Lighting	Developer funded, Council owned, operated and maintained	Cost and maintenance of infrastructure, stakeholder support and acceptance.
Solar Rooftop Panels	Home and building owner funded, operated and maintained	Cost and ownership, however readily accepted infrastructure and Government backed.
Battery Storage (Small to Medium)	Home and building owner funded, operated and maintained	Cost and ownership, becoming readily accepted infrastructure.
Battery Storage (Large)	Purpose built, privately (possible Energy Distributor) funded, built, owned, operated and maintained.	Cost, land take required, integration into existing network and stakeholder support.
Smart Meters	Installed, owned and maintained by Energy Distributor	Nil
"Green Energy" Use	Customer Purchase scheme, negotiations required with Energy retail providers.	Legalities and cost of mandating scheme, stakeholder support and acceptance.
Electrical Vehicle Charging Stations	Privately funded and installed, owner operated and maintained.	Cost, integration into existing network and stakeholder support and acceptance
Reused/Recycled Materials in Construction	Council mandated and Developer funded	Cost, legalities of mandating materials, stakeholder support and acceptance.
Micro Grids	Network supported grid - Powercor Self-reliant Grid - Council Authority and developer funded	OPEX costs, scale, capacity of existing infrastructure, land use and reliance on grid as a backup.
Wind Trees	Council mandated and Developer funded	Cost, legalities of mandating materials and maintenance of infrastructure, stakeholder support and acceptance.
Wind Farms	Purpose built, privately (possible Energy Distributor) funded, built, owned, operated, maintained and incorporation into the electricity network.	Cost, land required that could be developed, integration into existing network and stakeholder support.
Flywheel Energy Storage System	Purpose built infrastructure, owner funded, operated and maintained.	Cost and maintenance of infrastructure, stakeholder support and acceptance.

### 5.4.3 Land Allocation & Location of Potential Assets

It is envisaged that the following land allocation requirements exist for the above-mentioned renewable energy opportunities. The likely location of assets within the development are documented in Table 8.

Table 8: Renewable Energy Opportunities - Land Allocation & Potential Locations

RENEWABLE ENERGY OPPORTUNITY	LAND ALLOCATION	LOCATION OF ASSETS
Solar Street Lighting	Same space/area as standard street lights	Road reserve
Solar Rooftop Panels	None	Home, building rooftops
Battery Storage (Small to Medium)	Not Specific	Within allotments and/or buildings
Battery Storage (Large)	Dependant on capacity of facility	Commercial or community zones, outside precinct in Batesford Quarry area
Smart Meters	Not Specific	Within home, building footprints
Power Point Tracking Devices	Not Specific	Within home, building footprints
"Green Energy" Purchase Scheme	Not Specific	Not Specific
Electrical Vehicle Charging Stations	Land allocation required for public and roadside locations and space provided in home and building footprints	Should be installed in buildings/homes and public parking areas where cars are parked
Incorporation of Reused/Recycled Materials in Construction	Not Specific	Not Specific
Wind Trees	Same space/area as usual trees	Road reserve, homes and Public/private Open Space
Wind Farms	Dependant on capacity of facility	Adjacent to open space areas, outside precinct in Batesford Quarry area
Flywheel Energy Storage System	Dependant on capacity of facility	Located in schools, community centres and commercial zones (underground facilities)

#### 5.4.4 Partnerships

Partnerships that would benefit and help facilitate the incorporation of renewable energy into the Creamery Road PSP area are as follows:

- Retail energy companies that supply a “green energy” product (100% Carbon Neutral) to the market, facilitating a net zero carbon outcome for the precinct, partnering with:
  - Household owners
  - Commercial zone owners
  - Schools
  - City of Greater Geelong
- Recycled/reuse material providers, to incorporate these products into the design and construction of the precinct, partnering with:
  - Developers
  - Consultants
  - Contractors
  - City of Greater Geelong
- The Victorian State Government, facilitating connection and support for possible major renewable energy facilities within and/or adjacent to the Creamery Road precinct, partnering with:
  - Service Authorities
  - Renewable energy companies
  - City of Greater Geelong
  - Developers
- Private companies, facilitating purpose built renewable energy facilities for connection to existing authority networks, partnering with:
  - Service Authorities
  - Renewable energy companies
  - City of Greater Geelong
  - Developers

#### 5.4.5 Framework Plan Objectives

The Framework Plan identifies a series of actions to be addressed in the PSP process. Table 9 addresses how the proposed outcomes address the relevant actions.

Table 9: Framework Plan Actions Analysis - Electricity

Action	Action Details	Current Proposal Addresses Action
<p>W2.3.1</p> <p>Urban development will be designed to achieve a zero-carbon future for the Greater Geelong city-region.</p>	<p>An environmentally sustainable design (ESD) action plan will be prepared for each precinct structure plan demonstrating the actions that urban development will take to contribute net zero carbon to the city. A ‘smart city’ strategy will be included within the action plan that establishes a framework for monitoring the performance of new neighbourhoods in delivering sustainable development and more efficient urban service systems. The Clever</p>	<p>Where possible the precinct will be serviced by renewable energy sources, including but not limited to the following:</p> <ul style="list-style-type: none"> <li>• Solar panels on roofs, incorporating battery storage</li> <li>• Mandating the purchase of “Green Energy”</li> </ul>

	and Creative Corridor will support implementation of these technologies.	<ul style="list-style-type: none"> <li>Service Authority use of renewable energy involving partnerships with other stakeholders</li> </ul>
<p>W2.3.3</p> <p>Energy systems will anticipate renewable supply sources through all land use types</p>	<p>Network-scale renewable energy production and storage will be anticipated and demonstrated by urban development. As urban development progresses over time, neighbourhood-scale renewable opportunities will be investigated to provide appropriate renewable energy production, storage and trading. The action plan for each precinct will consider mandating the use of low carbon energy sources and limiting the provision of natural gas to new urban development. The Clever and Creative Corridor will, where appropriate, be the central spine to implement network-scale renewable energy systems.</p>	<p>Where possible the precinct will be serviced by renewable energy sources, including but not limited to the following:</p> <ul style="list-style-type: none"> <li>Solar panels on roofs, incorporating battery storage</li> <li>Mandating the purchase of "Green Energy"</li> <li>Service Authority use of renewable energy involving partnerships with other stakeholders</li> </ul>
<p>W2.3.4</p> <p>Neighbourhoods will be designed to enable adoption of future, cleaner technologies.</p>	<p>Neighbourhoods will be designed with the capacity to adapt to new technologies including innovations in buildings, transport, energy and waste. The Clever and Creative Corridor will provide space for incorporating future technologies and will implement enabling infrastructure to support smart city assets, electric vehicle charging and autonomous vehicles.</p>	<p>Where possible the precinct will be serviced by renewable energy sources. Adoption of the infrastructure requirements for renewable energy should be mandated. CCC's will incorporate electricity components on both sides of the corridor to facilitate new technologies</p>
<p>W5.1.1</p> <p>All lots will be provided with potable water, electricity, reticulated sewerage, stormwater drainage and telecommunications.</p>	<p>Utilities will be delivered underground in a coordinated manner that:</p> <ul style="list-style-type: none"> <li>Bundles infrastructure to maximise space for large canopy tree planting within road verges</li> <li>Responds to the local site context and uses logical placement principles</li> <li>Locates infrastructure within existing easements, where practicable</li> <li>Relocate existing above ground electricity cables underground (unless greater than 66kV)</li> <li>Aligns with trunk infrastructure illustrated as part of this report, subject to detailed investigation</li> <li>Minimises disruption during off site works to connect to existing supply networks</li> <li>Aligns with environmental protection principles for river and waterway crossings</li> </ul>	<p>Road Cross-sections will be designed to accommodate services in a logical manner. "No gas" scenario will result in possibly larger area requirements for kiosks (500 kV) and larger cable sizes, however it may be possible to maintain similar BAU infrastructure with more kiosks (less customers per kiosk). Electrical infrastructure will be located underground in road reserves, however</p>

	<ul style="list-style-type: none"> <li>• Follows a logical sequencing of development and efficient rollout of infrastructure</li> <li>• Responds to site topography, particularly around the quarry, stockpiles and river and creek corridors.</li> </ul>	<p>advice is that 66kV is cost prohibitive to underground.</p>
<p>W5.1.2</p> <p>A servicing plan will be prepared for each precinct structure plan that outlines the utilities required to deliver sustainable development outcomes reflected in the relevant integrated water management strategy and environmentally sustainable design (ESD) action plan.</p>	<p>Provision of other services, including recycled water and gas, will be subject to these detailed investigations to determine how urban development will deliver sustainable water, zero carbon and zero waste. Indicative trunk infrastructure as illustrated within this report represents a conventional servicing approach that is subject to change and innovation as part of detailed precinct structure planning.</p>	<p>Standard cross-sections will be formulated with “no gas”. Indicative trunk infrastructure plans will be ratified by the relevant authority.</p>
<p>W5.1.3</p> <p>Placement of utilities will not detract from the amenity of the neighbourhood, particularly the open space network.</p>	<p>Utilities will be delivered to maintain an attractive and healthy public realm in a manner that:</p> <p>Locates above ground infrastructure outside of key view lines with landscape screening.</p> <p>Avoids and minimises impacts on waterways and disturbance of their landform, biodiversity and heritage values.</p> <p>Avoids and minimises impacts on any conservation areas.</p>	<p>It is critical that major infrastructure does not encumber Sporting Reserves and should be avoided in, and not encumber, open spaces.</p> <p>Electricity services will be generally placed in road reserves and kiosks in easements which are located outside the open space network.</p>
<p>W5.1.4</p> <p>Staging of urban development will provide for delivery of ultimate utility servicing infrastructure.</p>	<p>Where delivery of the ultimate infrastructure is not possible, alternate proposals will demonstrate how any interim infrastructure adequately services the development and how the infrastructure will enable delivery of the ultimate servicing network.</p>	<p>Powercor have stated that development sequencing has little impact on delivery of electrical services, as the appropriate capacity required will be scoped into development supply requests.</p>

## 6 Gas

### 6.1 Introduction

AusNet Services is the responsible Authority for the provision of gas reticulation supply services in WGGA, including operating and maintenance of the network relating to the Creamery Road precinct. AusNet Services have advised that, for the WGGA, the existing network has limited capacity and is only sufficient to service the precinct in the short to medium term.

The existing network with its current backbone supply mains would not be able to support the entire anticipated 3,012 dwellings based on current Business as Usual (BAU). Network upgrades would likely be required to provide additional capacity to support medium to long term development in the precinct should gas be connected to all dwellings.

It is anticipated that the existing gas network will be redundant in the future. It may therefore be unnecessary to make allowances based on Business-As-Usual usage trends.

As the ESD baseline initiative to reach net zero within the precinct, gas should not be considered a service requirement.

### 6.2 Current Conditions

The southern Creamery Road PSP area has an existing gas supply from Bell Post Hill (the east side of the Geelong Ring Road).

The gas supply lines do not extend very far into the Creamery Road precinct; however, they are located as follows:

- A 110mm P8 supply line from Bell Post Hill, across the Geelong Ring Road, on the alignment of Bingley Court, to Creamery Road. The supply ends at this location with a 50mm P2 supply to the Covenant College and a residence at 95 Creamery Road.
- From the above supply line there is a branch 110mm P8 supply line traversing south along the western edge of the Geelong Ring Road (top of embankment) to Ballarat Road and continuing with a 63mm P8 extension for 190m, north-west along Ballarat Rd, at which point the supply line ends.

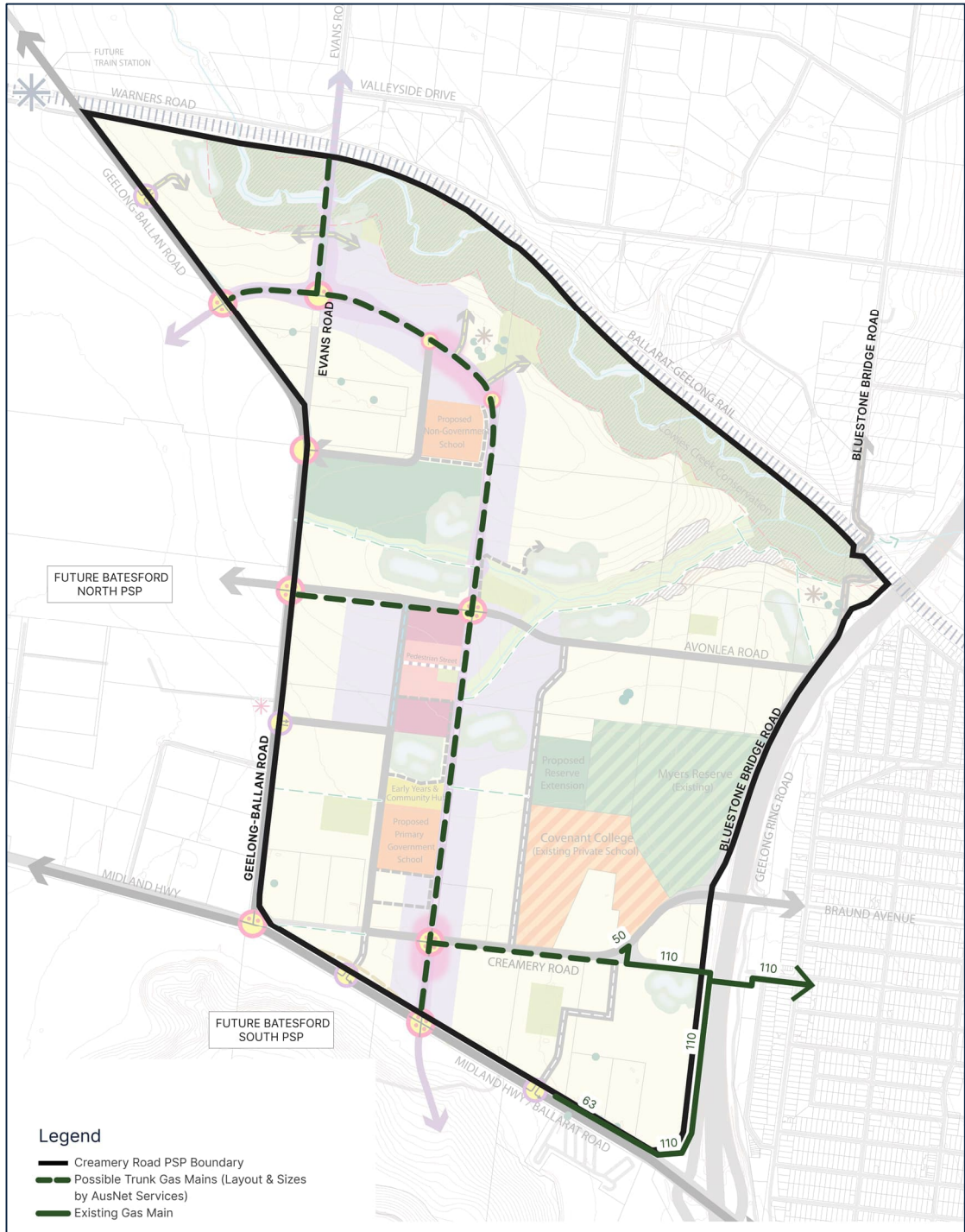


Figure 15: Existing and Potential Gas Infrastructure

## 6.3 Servicing Strategy

In accordance with the Framework Plan objectives of a “Zero Carbon City” and based on direction from the City, gas infrastructure is not proposed to be supplied to the Creamery Road Precinct.

In consultation with service authorities the impact of No-Gas development on authority allowances for energy consumption will be an increase from 20 amp per household (assuming gas cooking, heaters and hot water) to 40 amps per household (all electrical). This is expected to result in an increase in Kiosk Substation and Cabling size which can be catered for by the Power Authority. Default kiosk size to be increased from 315 kVA to 500 kVA.

## 6.4 Framework Plan Objectives

The Framework Plan identifies a series of actions to be addressed in the PSP process. Table 10 addresses how the proposed outcomes address the relevant actions.

Table 10: Framework Plan Actions Analysis - Gas

Action	Action Details	Current Proposal Addresses Action
<p>W2.3.1</p> <p>Urban development will be designed to achieve a zero-carbon future for the Greater Geelong city-region.</p>	<p>An environmentally sustainable design (ESD) action plan will be prepared for each precinct structure plan demonstrating the actions that urban development will take to contribute net zero carbon to the city. A ‘smart city’ strategy will be included within the action plan that establishes a framework for monitoring the performance of new neighbourhoods in delivering sustainable development and more efficient urban service systems. The Clever and Creative Corridor will support implementation of these technologies.</p>	<p>Mandating of “No Gas” for the entire precinct will help achieve a zero-carbon future for the Greater Geelong region in line with the net zero community emissions target set by the Climate Change Response Plan (CCRP) 2021-30.</p>
<p>W2.3.3</p> <p>Energy systems will anticipate renewable supply sources through all land use types</p>	<p>Network-scale renewable energy production and storage will be anticipated and demonstrated by urban development. The action plan for each precinct will consider mandating the use of low-carbon energy sources and limiting the provision of natural gas to new urban development. The Clever and Creative Corridor will, where appropriate, be the central spine to implement network-scale renewable energy systems.</p>	<p>Mandating of “No Gas” for the entire precinct will help achieve a zero-carbon future for the Greater Geelong region in line with the net zero community emissions target set by the Climate Change Response Plan (CCRP) 2021-30.</p>
<p>W2.3.4</p> <p>Neighbourhoods will be designed to enable adoption of future, cleaner technologies.</p>	<p>Neighbourhoods will be designed with the capacity to adapt to new technologies including innovations in buildings, transport, energy and waste. The Clever and Creative Corridor will provide space for incorporating future technologies and will implement enabling infrastructure to support smart city</p>	<p>Where possible the precinct will be serviced by renewable energy sources. Adoption of the infrastructure requirements for</p>

	<p>assets, electric vehicle charging and autonomous vehicles.</p>	<p>renewable energy should be mandated through planning permit conditions and developer design guidelines.</p>
<p>W5.1.2 A servicing plan will be prepared for each precinct structure plan that outlines the utilities required to deliver sustainable development outcomes reflected in the relevant integrated water management strategy and environmentally sustainable design (ESD) action plan.</p>	<p>Provision of other services, including recycled water and gas, will be subject to these detailed investigations to determine how urban development will deliver sustainable water, zero carbon and zero waste. Indicative trunk infrastructure illustrated within this report is a conventional servicing approach that is subject to change and innovation as part of detailed precinct structure planning.</p>	<p>Standard cross-sections will be formulated with “no gas”.</p> <p>Indicative trunk infrastructure plans will be ratified by the relevant authority.</p>
<p>W5.1.3 Placement of utilities will not detract from the amenity of the neighbourhood, particularly the open space network.</p>	<p>Utilities will be delivered to maintain an attractive and healthy public realm in a manner that: Locates above ground infrastructure outside of key view lines with landscape screening. Avoids and minimises impacts on waterways and disturbance of their landform, biodiversity and heritage values. Avoids and minimises impacts on any conservation areas.</p>	<p>It is critical that major infrastructure does not encumber Sporting Reserves and should be avoided in, and not encumber, open spaces.</p> <p>Considering that the Council is proposing to adopt a “No Gas” precinct this does not present a risk.</p>
<p>W5.1.4 Staging of urban development will provide for delivery of ultimate utility servicing infrastructure.</p>	<p>Where delivery of the ultimate infrastructure is not possible, alternate proposals will demonstrate how any interim infrastructure adequately services the development and how the infrastructure will enable delivery of the ultimate servicing network.</p>	<p>Mandating of “No Gas” for the entire precinct will help achieve a zero-carbon future for the Greater Geelong region in line with the net zero community emissions target set by the Climate Change Response Plan (CCRP) 2021-30.</p>

## 7 Telecommunications

### 7.1 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 any new 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 16: NBN Co Network Rollout Map (Service available – purple area)

## 7.2 Current Conditions

### 7.2.1 Optic Fibre

There is existing NBN infrastructure in place, in the precinct, along Creamery Road (also extending north along Ballarat Road from Ballan/Creamery Road to Ross Road), Bingley Court, Bluestone Bridge Road and Avonlea Road. The NBN infrastructure crosses the Geelong Ring Road at Ballarat Road, Bingley Court and is in close alignment with Edison Road which is on the west side of the Geelong Ring Road.

### 7.2.2 Telecommunications Towers

There is one existing CMTS Site (ID 310312) which is located within the WH Myers Reserve in Creamery Road, refer Figure 17 below.

Users at this site include Telstra, Vodaphone, Optus and BKAL Pty Ltd.

## 7.3 Servicing Strategy

The initial build stages of this precinct will connect via Creamery Road. Trunk fibre to service the precinct will be delivered from the FAN site (3GEE) located in Little Ryrie Street, Geelong.

Opportunities may arise to facilitate possible trench sharing opportunities either with Council / Rail & Road Authorities or other Utilities.

New rail crossing bridge works along with external upgrade works in Ballan Road & Evans Road are of high interest to NBN involving future opportunities.



Figure 17: Existing and Proposed Communications Trunk Services

## 7.4 Framework Plan Objectives

The Framework Plan identifies a series of actions to be addressed in the PSP process. Table 11 addresses how the proposed outcomes address the relevant actions.

Table 11: Framework Plan Actions Analysis - Telecommunications

Action	Action Details	Current Proposal Addresses Action
<p>W2.3.1</p> <p>Urban development will be designed to achieve a zero-carbon future for the Greater Geelong city-region.</p>	<p>An environmentally sustainable design (ESD) action plan will be prepared for each precinct structure plan demonstrating the actions that urban development will take to contribute net zero carbon to the city. A 'smart city' strategy will be included within the action plan that establishes a framework for monitoring the performance of new neighbourhoods in delivering sustainable development and more efficient urban service systems. The Clever and Creative Corridor will support implementation of these technologies.</p>	<p>NBN announced its Towards-Zero Carbon Ambition in 2021.</p>
<p>W2.3.3</p> <p>Energy systems will anticipate renewable supply sources through all land use types</p>	<p>Network-scale renewable energy production and storage will be anticipated and demonstrated by urban development. As urban development progresses over time, neighbourhood-scale renewable opportunities will be investigated to provide appropriate renewable energy production, storage and trading. The action plan for each precinct will consider mandating the use of low carbon energy sources and limiting the provision of natural gas to new urban development. The Clever and Creative Corridor will, where appropriate, be the central spine to implement network-scale renewable energy systems.</p>	<p>NBN announced its Towards-Zero Carbon Ambition in 2021, including a target of purchasing 100% renewable energy from December 2025.</p>

## 8 Typical Cross Sections

Reference should be made to Appendix D for the typical cross sections relevant to the Creamery Rd precinct. The cross sections have been prepared based on road reservation geometry supplied by the City. 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.

The City have nominated several non-standard road cross sections to enhance the character and amenity of the precinct. For non-standard cross sections where service placement differs to the guidelines documented in Infrastructure Design Manual Standard Drawings (SD630, SD635, SD640), the service placement guidelines in Table 12 shall apply.

Table 12: Service Placement Guidelines

	Under Pedestrian Pavement	Under Nature Strips	Under Street Trees	Under Kerb	Under Road Pavement	Within Allotments
Sewer	Preferred	Possible	Not Preferred <sup>2</sup>	No	Possible	Possible <sup>4</sup>
Potable Water	Not Preferred	Preferred	Not Preferred <sup>2</sup>	No	Possible <sup>3</sup>	No
Recycled Water	Not Preferred	Preferred	Not Preferred <sup>2</sup>	No	Possible <sup>3</sup>	No
Electricity	Possible <sup>6</sup>	Preferred	Not Preferred <sup>2</sup>	No	Not Preferred	No
Telecommunications	Possible <sup>7</sup>	Preferred	Not Preferred <sup>2</sup>	No	No	No
Drainage	Not Preferred	Possible	Not Preferred <sup>2</sup>	Preferred	Possible	Not Preferred
Trunk Services	Possible	Possible	Not Preferred <sup>2</sup>	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 on allotments. Less common are sewer and drainage easements within front setback of allotment.
5. Property connections under hard services require Fitzroy boxes.
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.

## 9 Staging Recommendations

### 9.1 Proposed Development Sequence

The proposed development sequencing for the Creamery Road PSP 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.

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

Barwon Water have advised the following for general principles are to be applied in determining an Infrastructure Sequencing Plan for services (sewer and water) within a growth area:

- Maximising the use of any spare capacity in existing infrastructure adjacent or proximate to the Growth Area.
- Servicing lots on land abutting existing infrastructure.
- Maximising servicing of lots which are located in the same gravity catchment / pressure zone as existing infrastructure.
- Servicing whole gravity catchments / pressure zones where spare capacity exists.
- For parcels of land (in single developer ownership) that straddle catchments / pressure zones, prioritising the portion which utilises gravity flow to existing infrastructure with spare capacity or that which can be most cost efficiently augmented.
- 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.
- Growth of areas and subsequent servicing to be determined by growth area forecasts which will outline a per year rate for development.

#### 9.1.1 Initial Locations for Development

The initial locations for development should consider the following:

- Land which abuts established major roads (Midland Highway, Geelong-Ballan Road and Creamery Rd).
- 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 CRPS2 Sewer Transfer Hub which is earmarked by Barwon Water for early development and provides a central location to service the entire Creamery Road precinct.
- Land lower than the 60m contour which can obtain water supply via gravity prior to construction of the Bell Post Hill (BPH) Storage Tank/booster PS site.

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.

### 9.1.2 Servicing Requirements and Constraints of Individual landholdings

The staging of the individual landholdings within the Creamery Rd Precinct will be largely influenced by the provision of Trunk Sewer and Water infrastructure. 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.

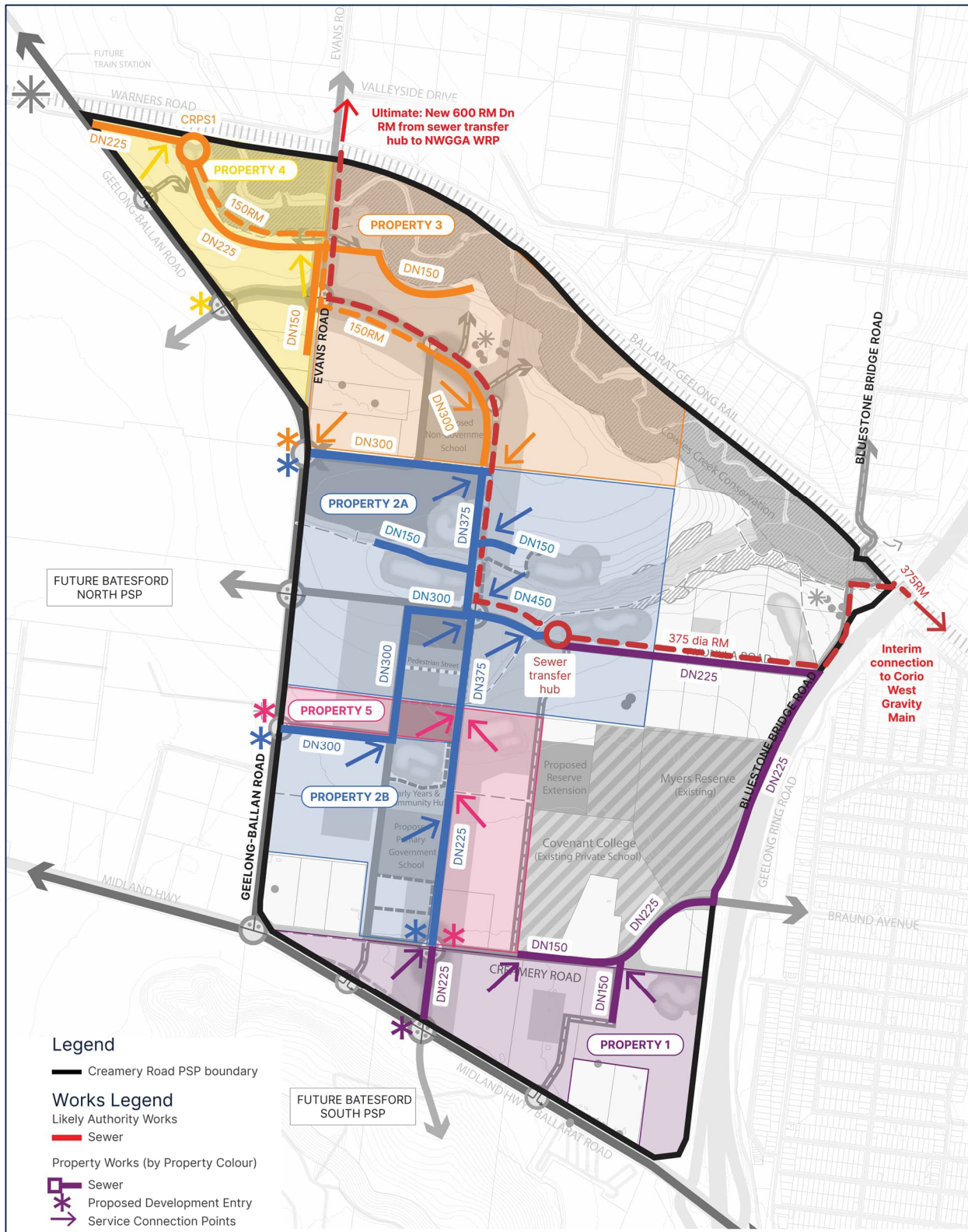


Figure 18: Landholding Servicing Requirements – Sewer

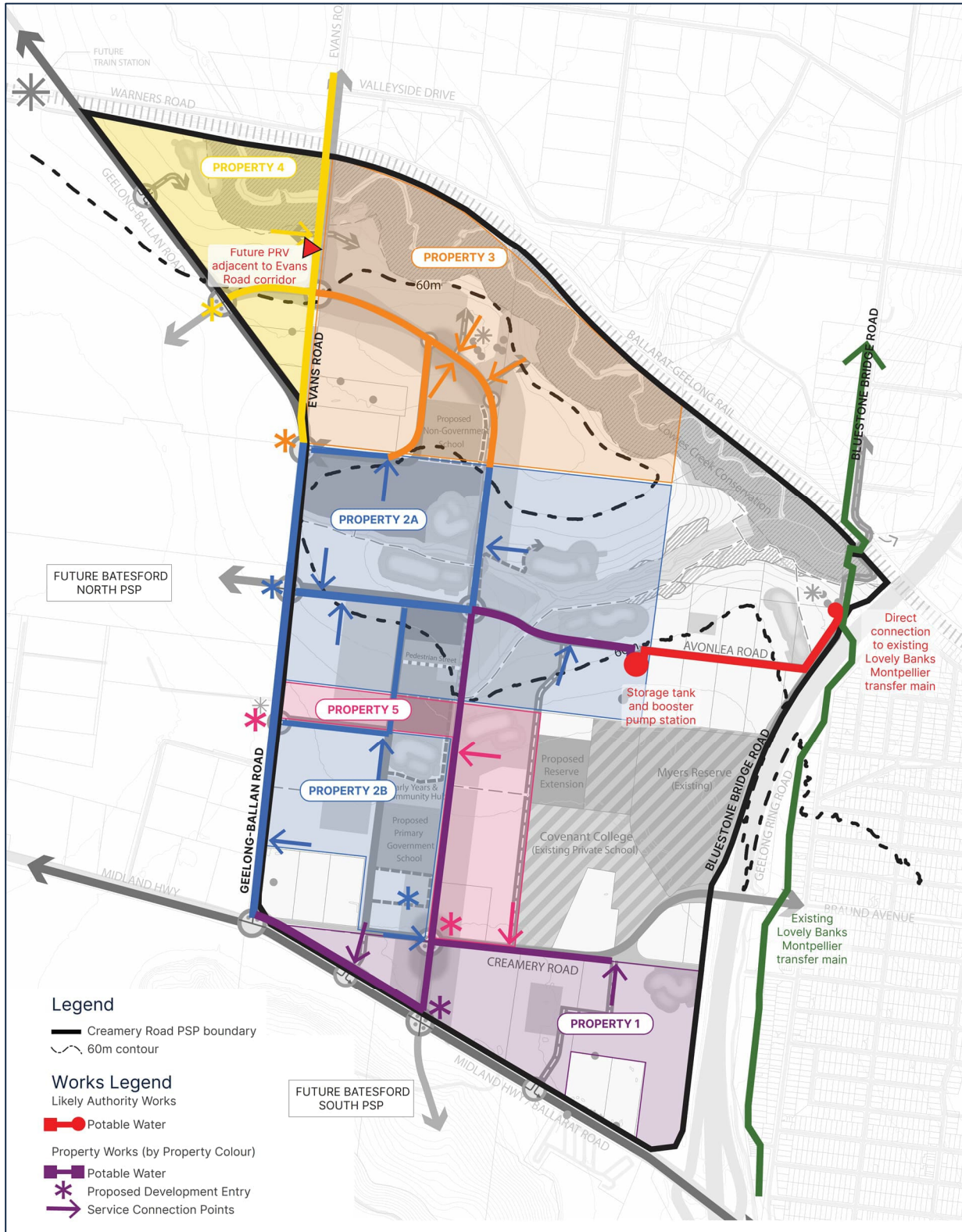


Figure 19: Landholding Servicing Requirements – Potable Water

### Property 1

Slope – land has a gentle slope towards the proposed drainage facility in its north east corner providing for a suitable drainage outlet.

Road – land has direct access to Midland Hwy and the ability to develop immediately, as well as the commencement of the Clever and Creative Corridor at that location.

Drainage – currently has a WLRB 6 drainage facility within the land holding (north-east corner), however this facility is remote from the ultimate outlet to Cowies Creek (WLRB 7) and may require additional piped infrastructure along an existing road (Bluestone Bridge Road) to Cowies Creek.

Sewer – requires Sewer Transfer Hub and interim RM connection to Corio West Gravity Main. Requires sewer mains along existing roads (Creamery and Bluestone Bridge Roads). Connection to the Sewer Transfer hub will require construction of sewer mains through Avonlea Road reserve

Potable Water – requires the large diameter water connection to Lovely Banks-Montpellier Transfer Main and construction of the Storage Tank and Booster Pump Station facility in Avonlea Road. Also requires trunk water mains through Properties 2A, 2B and 5 for full development of the area.

Recycled Water – will initially cross-connect with potable water as the ultimate supply source is remote from the Creamery Road precinct which requires major capital works by Barwon Water.

### Property 2A and 2B

Slope – the southern parcel has a relative gentle slope which supports the drainage facility and development in general. The northern parcel slopes are moderate and becoming steeper around the waterway interfaces. All the land, in general, slopes towards the waterways and proposed drainage facilities.

Road – both parcels have access to Geelong Ballan Road to readily facilitate a development main entry location. Connection could also be facilitated at the start of the Clever and Creative Corridor off the Midland Highway through Property 1.

Drainage -currently both parcels have drainage facilities within the land holding. The north parcel has direct access to an existing waterway (tributary of Cowies Creek) via WLRB 1, WLRB 2, WLRB 3 and WLRB 3b and hence direct outlet to Cowies Creek. The south parcel is a little remote from a waterway to the above tributary and would require an additional piped outlet to the waterway via WLRB 4.

Sewer – requires Sewer Transfer Hub and interim RM connection to Corio West Gravity Main. Requires trunk sewer mains along new roads within the land holdings to service the entirety of these landholdings. Low-lying developments on both sides of the drainage corridor/gully will likely required developer funded pump stations to service.

Potable Water – requires the large diameter water connection to the Lovely Banks-Montpellier Transfer Main and construction of the Storage Tank and Booster Pump Station facility in Avonlea Road. Trunk water mains are generally contained within the land holdings except for a connection from Property 2A to Property 2B which would be through Property 5.

Recycled Water – will initially cross-connect with potable water as the ultimate supply source is remote from the Creamery Road precinct which requires major capital works by Barwon Water.

### Property 3

Slope – has a relative gentle slope around the ridge of the land parcel becoming steeper around the waterway interfaces. The land also slopes in all directions from the ridge in the centre of the parcel.

Road – land parcel has west frontage to Evans Road and minor frontage to Geelong Ballan Road in the south-west, this frontage could facilitate a development entry location.

Although the Clever and Creative Corridor (CCC) passes through the land parcel it would require development within an adjacent land to connect the CCC to a major existing road.

Drainage -the land parcel currently does not have a drainage facility within the land holding. With the land sloping in all directions there may be a requirement, with permission, to outlet through other land holdings via piped infrastructure via WLRB 3, WLRB 3b and WLRB8. It is assumed that there will be no direct connection to Cowies Creek.

Sewer – requires Sewer Transfer Hub and interim RM connection to Corio West Gravity Main. Requires trunk sewer mains along new roads within the land holdings and adjacent properties. CRPS1 (in adjacent landholding) and RM is also required to service the entire landholding.

Potable Water – requires the large diameter water connection to the Lovely Banks-Montpellier Transfer Main and construction of the Storage Tank and Booster Pump Station facility in Avonlea Road. Trunk water mains are required in the land holding, however trunk connections are necessary through Property 2A for connection to the tank/booster pump site to service the developable land.

Recycled Water – will initially cross-connect with potable water as the ultimate supply source is remote from the Creamery Road precinct which requires major capital works by Barwon Water.

#### Property 4

Slope – has generally a moderate slope becoming steeper around the waterway interfaces. The land slopes to the drainage facility at the centre of the northern boundary, adjacent to Cowies Creek.

Road – land parcel has east frontage to Evans Road and west frontage to Geelong Ballan Road, this frontage could facilitate a development entry location coinciding with the Clever and Creative Corridor (CCC) which passes through the land parcel west to east.

Sewer – requires CRPS1 and RM along Evans Road and new roads in land holding connected to the Sewer Transfer Hub and interim RM sewer network in adjacent Property 3 to service the entire landholdings.

Potable Water – requires the large diameter water connection to the Lovely Banks-Montpellier Transfer Main and construction of the Storage Tank and Booster Pump Station facility in Avonlea Road. Trunk water mains are required in the land holding, however trunk connections are necessary through Property 2A for connection to the tank/booster pump site to service this land.

Recycled Water – will initially cross-connect with potable water as the ultimate supply source is remote from the Creamery Road precinct which requires major capital works by Barwon Water.

#### Property 5

Slope – has generally gentle to moderate slope. The land slopes to the beginnings of the waterway (Cowies Creek tributary).

Road – land parcel has a minor east frontage to Geelong Ballan Road and a south frontage to Creamery Road, either of these frontages could facilitate a minor development entry location. However, coincidentally the Clever and Creative Corridor also fronts the east boundary of this land parcel and may present opportunities for creating the CCC remote from the major roads.

Sewer – requires Sewer Transfer Hub and interim RM connection to Corio West Gravity Main. Requires trunk sewer mains along new roads within the land holdings and adjacent properties to service the entire landholdings

Potable Water – requires large diameter water connection to the Lovely Banks-Montpellier Transfer Main and construction of the Storage Tank and Booster Pump Station facility in Avonlea Road. Trunk water mains are required in the land holding, however trunk connections are necessary through Property 2A for connection to the tank/booster pump site to service this land.

Recycled Water – will initially cross-connect with potable water as the ultimate supply source is remote from the Creamery Road precinct which requires major capital works by Barwon Water.

#### Smaller landholdings:

Unlikely to develop first due to the impost related to constructing major infrastructure to service the landholdings

## 9.2 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. Sewer assets should not be located within a drainage corridor. The Sewer Transfer Hub site requires an area of approximately 10,000m<sup>2</sup> (100m x 100m). It will house a new 250L/s (approximate) Sewer Pump Station and a 10ML (approximate) storage and dosing facility.
- CRPS1 site requires an area of approximately 1600m<sup>2</sup> (40m x 40m) for a minor sewer pump station and a small storage facility.
- 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 acceptable.
- Bell Post Hill Storage Tank/Pump Station site requires an area of approximately 10,000m<sup>2</sup> (100m x 100m). It will house a nominal 6ML usable volume storage tank (40m diameter, 6m wall height assumed), a 150L/s booster pump station and possible pressure reducing valve (PRV).
- Evans Road PRV's (potable water and recycled water) site requires an area of approximately 300m<sup>2</sup>
- 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 heavy-duty manufacturing plants.
- Rapid Earth Fault Current Limiters (REFCLs) will generally be installed at the 22 zone substations across regional Victoria. As part of the REFCL system Isolating Transformers (ISO) will need to be installed in the Creamery Road precinct to mitigate high capacitance. These REFCL ISO's can be pole mounted or more typically ground mounted. If ground mounted, they will need a reserve size in the order of 10m x 7.2m for a 3MVA transformer. This can be reduced to a 7.2m x 7.2m if a 1 or 2MVA transformer.
- Refer to Figure 20 & Figure 21 below;

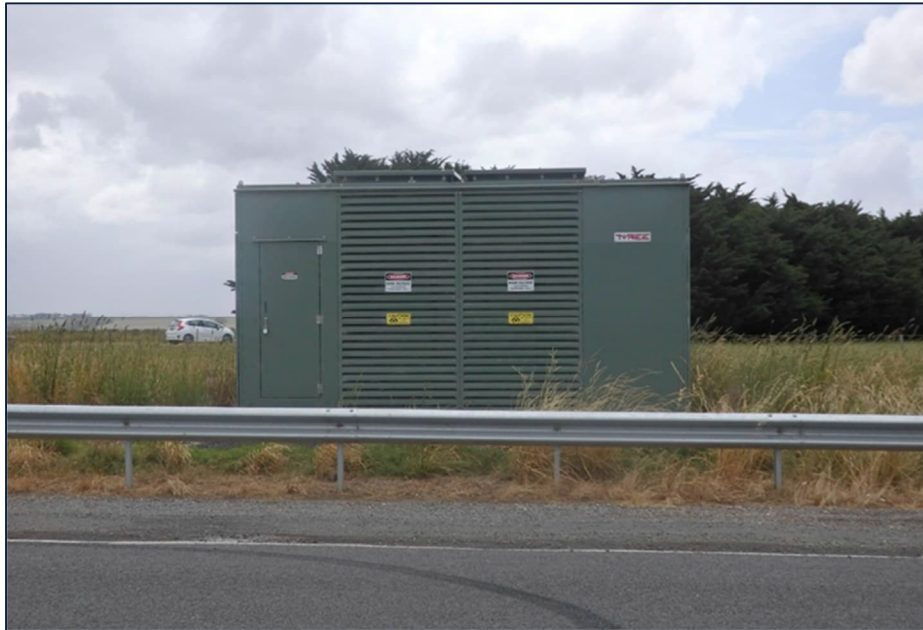


Figure 20: 3000kVA REFCL isolating transformer, high capacity high voltage cables will require this large size REFCL isolating transformer



Figure 21: 1000kVA REFCL isolating transformer, physical size is similar to a kiosk substation

## 9.3 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 authority within the Creamery Road precinct include:

- Sewer Transfer Hub and Rising Main "interim" connection to Corio West Gravity Main.
- New "ultimate" Rising Main connection to the new NWGGA WRP.
- Potable Water connection (Large diameter main) to the Lovely Banks-Montpellier Transfer Main.
- New Bell Post Hill Storage Tank/Pump Station, possibly including large diameter trunk water main to the western boundary of Creamery Road PSP (to be confirmed by Barwon Water)
- Recycled water cross connections to potable water at Bell Post Hill Storage Tank/Pump Station, possibly including large diameter trunk recycled water main to the western boundary of Creamery Road PSP.
- Recycled water, ultimate connection (feed main) from Lovely Banks elevated storages.
- Recycled water, ultimate connection through to Batesford South precinct.
- Construction of REFCL Isolation Transformers necessary for Creamery Road PSP precinct.

Infrastructure constructed and funded by the Developer and reimbursed by the Authority:

- Timing of reimbursements may sometimes be an issue if associated with contributions, however "works in kind" processes may alleviate some of these concerns. "Out of sequence" infrastructure can sometimes attract "bring forward charges" (in the case of Barwon Water items), however once again early consultation between stakeholders can minimise these costs by negotiating for the infrastructure items to be included in early "Water Plans" prepared by Barwon Water.

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

- Sewer pump station CRPS1 (including associated rising main), may be required to be funded and 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.



# 10 Achieving a Zero Carbon Precinct & Response to ESD Action Plan

## 10.1 What is a Zero Carbon City?

A number of actions need to be taken to ensure Creamery Road is developed as a zero-carbon precinct, in line with the objectives of the NWGGA Framework Plan. The carbon footprint of a location can be calculated through the amount of carbon dioxide released into the atmosphere because of the activities of individuals, organizations and companies within the precinct.

A zero-carbon development aims to maintain ideal living conditions while eliminating any environmental impact the city has both locally and globally. The transition to a zero-carbon city is defined by optimisation of resource utilisation and reduction of greenhouse gas emissions use through renewable resources, which is critical to this PSP Servicing strategy.

In summary, the following steps need to be taken to achieve a net zero carbon development:

- Use only non-carbon emitting renewable energy sources such as wind, solar, hydrogen and heat capture.
- Use energy storage systems on an individual, local and state level through batteries, hydrogen, pumped hydro and similar systems.
- Phase out fossil fuel spending and do not build new systems that enable the use of fossil fuels.
- Utilise carbon neutral materials and products which enable a reduce, re-use, recycle lifecycle.
- Enable individuals, organizations and companies to change current methods, habits and business as usual processes to adapt.
- Offset unavoidable carbon spending through various levels of carbon capture such as re-forestation and carbon sequestration.

Reducing emissions of carbon dioxide to zero and ceasing all practices that emit greenhouse gases can be achieved but relies on collaboration through political and economic support. This chapter provides several initiatives that will aid the transition to a zero-carbon city.

## 10.2 Geelong's Zero Carbon emissions strategies

### 10.2.1 Strategic Framework\*

In January 2017, the Victorian state government announced its commitment to reducing greenhouse gas emissions by releasing Victoria's Climate Change Framework. The framework sets out a long-term plan for achieving net zero emissions by 2050. Key elements of the framework include:

- Legislation of a long-term target for Victoria of net zero greenhouse gas emissions by 2050.
- Setting a renewable energy target for Victoria for 25 per cent of electricity generated in the state to come from renewable energy by 2020 and 40 per cent by 2025.
- Launching the Take2 pledge program that the City of Greater Geelong has signed up to as a founding partner. Take2 is Victoria's collective climate change initiative to reach net zero emissions by 2050 and to keep global temperature rise to under 2 degrees.
- The Victorian Energy Efficiency Target (VEET) scheme encourages energy efficiency improvements by businesses and industry. The scheme was strengthened in 2015 and set updated targets and long-term aspirations for the scheme.

### 10.2.2 Carbon emissions and Climate change at City of Greater Geelong Council\*

City of Greater Geelong has identified climate change, population growth, liveability and the local economic model as key drivers affecting the City's future. Council's *Zero Carbon Emissions Strategy* is underpinned by

strategic directions set out in Council's 'City Plan and Environment Management Strategy 2014-2017'. It is also supported by abatement opportunities identified in the *Low Carbon Growth Plan* for Greater Geelong.

The City of Greater Geelong Climate Response Plan 2021–30, includes several mitigation and adaptation principles and focus areas for the future of Geelong. The plan aligns closely with Goal 1 of the City of Greater Geelong Environment Strategy 2020–30, as well as our Sustainability Framework 2020 (refer to Section 10.2.3). The CCRP mitigation target is to "Achieve net zero community emissions by 2035" which is an incredibly important target to refer to in relation to the provision of all services for future development within the Creamery Road PSP area.

#### City of Greater Geelong Climate Change Response Plan – Principles

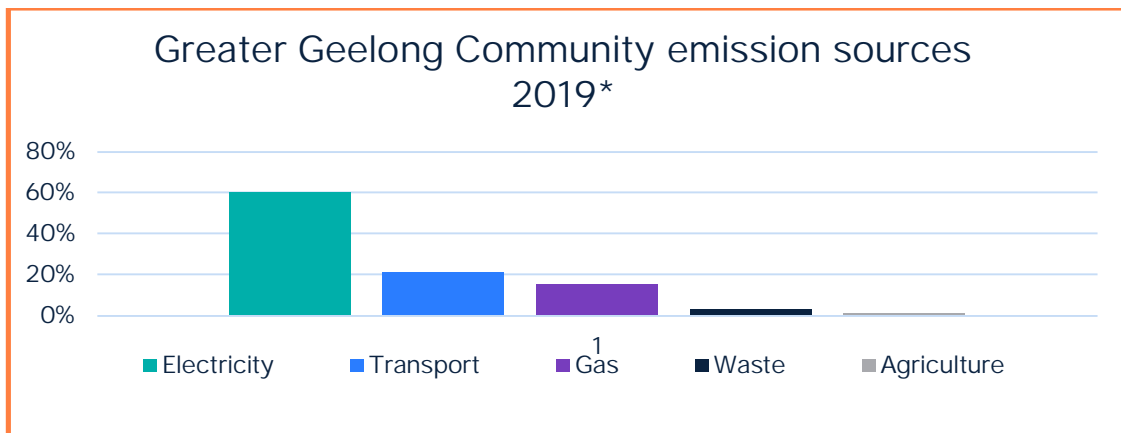
- Support an empowered and active community.
- Increase energy efficiency and renewable energy production.
- Switch to sustainable transport and cleaner fuels.
- Reduce non-energy emissions and increase carbon storage.
- Increase awareness and understanding of climate change impacts.
- Build climate action into decision making.
- Increase collaborative climate change responses.

*"By 2047, Greater Geelong will be internationally recognised as a clever and creative city-region that is forward looking, enterprising and adaptive, and cares for its people and environment."*

*City of Greater Geelong vision established in 2017*

\* For more information, see <https://www.geelongaustralia.com.au/zerocarbon> and <https://yoursay.geelongaustralia.com.au/CCRP>

The community emissions profile for the City of Greater Geelong municipality was estimated to be 3,232,000 tonnes CO<sub>2</sub>-e3 for 2019. The primary community emission source was electricity with 60% of all community emissions.



### 10.2.3 Sustainability Framework Action Plan

The City of Greater Geelong Sustainability Framework Action Plan 2020 for NWGGA supports strong measures to reduce the carbon footprint in the City through 3 Key Priority Areas as presented below. The actions which arise from the strategy closely align with the Framework Plan objectives for the WGGA.

#### AREA 1: PROTECTING THE ENVIRONMENT

- 1.2.1 Renew and implement the City's Zero Carbon Emission Strategy to inform the Climate Change Response Plan and prepare a roadmap for the region to become zero-carbon by 2047.
- 1.4.3 Implement the Stormwater Services Strategy 2020–30 to guide investment in stormwater management based on community values and objectives.
- 1.4.4 Deliver a regional Integrated Water Management Strategy with key stakeholders including Barwon Water and Corangamite Catchment Management Authority.

- 1.6.1 Develop best practice Environmentally Sustainable Design (ESD) Action Plans for all precincts within the Northern and Western Growth Areas.
- 1.6.2 Set best practice standards in the City's Sustainable Building Policy for new buildings, renovations and retrofitting and maintenance and minor works.
- 1.6.4 Monitor the implementation of the ESD policy for new developments and strengthen and breadth of the application of the policy over time.
- 1.6.5 Ensure areas identified for more intensive housing development deliver best practice ESD principles and vibrant neighbourhoods.

## AREA 2: COMMUNITY WELLBEING AND SOCIAL EQUITY

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- 2.1 Lead and support education for business and community to encourage sustainable practice.
- 2.4.1 Work in partnership with community groups, businesses, and other organisations to promote and educate about sustainable practices.
- 2.4.5 Continue to lead the implementation of the Clever and Creative vision and identify how the group will partner with others to deliver municipality-wide emissions reduction.

## AREA 3: RESPONSIBLE AND TRANSPARENT BUSINESS

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- 3.1.1 Adopt and implement the Sustainability Policy which integrates sustainable thinking as a key principle within the City.
- 3.2.1 Develop and implement a Strategic Documents Policy and Strategic Planning Framework for improved efficiency and alignment.

This report supports and takes departures in the above resources for recommendations within the servicing strategy.

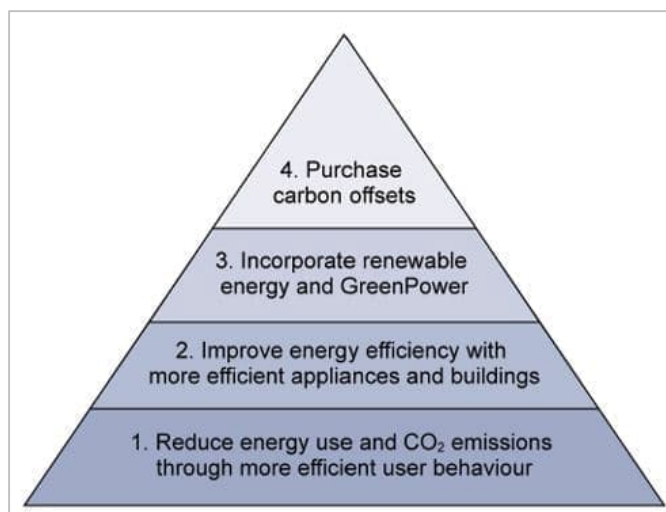
### 10.2.4 NWGGA Framework Plan

The NWGGA Framework Plan provides strategic justification for the incorporation of zero carbon principles into the Creamery Rd PSP. The objective of the NWGGA Framework Plan is to guide urban growth that supports the community's shared vision and meets the aspirations of the City and our G21 regional partners, which includes a One Planet Living Vision. One Planet Living is based on a set of guiding principles that promote the integration of sustainability into the community including sustainable water, materials and products, zero waste and zero carbon. As such the Framework Plan has provided several key actions which are required to be addressed as part of the PSP and planning conditions developed for the Creamery Road precinct.

## 10.3 ESD Approach

### 10.3.1 Reduce, re-use, recycle during the lifecycle of the PSP

A 'reduce, reuse and recycle' (RRR) approach should be taken to all services in the PSP, to support a more sustainably delivered community. This applies to all services during planning, design, construction and operation by residents and businesses within the PSP area. Reduction in use of non-renewable or scarce resources can be implemented not only by reduced use but also through efficiency in appliances, design changes and other. To align with current policy, all services constructed should target a reduction in carbon emissions through the following four steps:



ELIMINATE	REDUCE	REUSE	RECYCLE	CAPTURE / PRODUCE
	POTABLE WATER / RECYCLED WATER			
		RAINWATER		
GAS*				
	ELECTRICITY**			

Figure 22: Reduce, Re-Use, Recycle Approach

\* To achieve a carbon zero precinct the use of gas should be removed in all possible locations and replaced with renewable energy.

\*\* The technology for recycling of electricity is currently limited in Australia but can be done within the household as heat capture and transfer in ventilation systems.

For more information, see <https://www.yourhome.gov.au/housing/carbon-zero-carbon-positive>

### 10.3.2 ESD Baseline versus stretch targets

This report has been written to provide options for various levels of ESD target implementation. Two options are defined in the report, with the aim to make the PSP as sustainable as possible whilst also being sensitive to market trends and challenges. These challenges may include scale of implementation and availability of technical solutions.

The baseline ESD targets are recommended to be implemented as a minimum within the Creamery Road PSP in order to achieve the objectives of delivering a carbon neutral precinct\*.

The stretch ESD targets are encouraged in accordance with the objectives of the NWGGA Framework Plan to deliver greater benefit than baseline ESD targets.

\*Subject to detailed greenhouse gas assessment/carbon budget review of built form outcome.

## 10.4 ESD Action Plan Response

### 10.4.1 One Planet Living principles for sustainable development

The “Framework Sustainability Action Plan – City of Greater Geelong: Northern and Western Geelong Growth Areas” by Hip V Hype, May 2019 underpins the ESD implementation strategies within this PSP area. Out of the ten One Planet Living themes there are seven themes and underpinning principles that are particularly relevant to the servicing strategy, as listed below.

Renewable energy, sustainable use of water, reduced use of carbon and an avoid/ reduce/reuse / recycle approach to waste are all critical components to achieving a future proofed community ready to take on environmental challenges in the years ahead.

This section of the report provides advice on tools to lower the carbon footprint throughout the PSP in both baseline and stretch target scenarios.

Table 13: NWGGA Sustainability Action Plan Key Principles

One Planet Living theme	Key Principle - Description
Sustainable Water	Using water efficiently, protecting local water resources and reducing flooding and drought.
Land and Nature (Water)	Protecting and restoring land for the benefit of people and wildlife.
Zero Carbon Energy	Making buildings and manufacturing energy efficient and supplying all energy with renewables.
Sustainable Transport (Zero Carbon)	Reducing the need to travel, and encouraging walking, cycling and zero/low carbon transport.
Materials and Products (Zero Carbon)	Using materials from sustainable and renewable sources and promoting products which help people reduce consumption.
Zero Waste (Zero Carbon)	Reducing consumption, reusing, recycling and elimination of waste sources to achieve zero waste and zero pollution.
Equity and Local Economy (Zero Carbon)	Creating safe, equitable places to live and work which support local prosperity and international fair trade.
Culture and Community	Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living.
Health and Happiness	Encouraging active, sociable, meaningful lives to promote good health and wellbeing.
Local and Sustainable food	Promoting sustainable humane farming and healthy diets in local, seasonal organic food and vegetable protein.

### 10.4.2 ESD Implementation strategies and associated targets

The following schedule illustrates proposed implementation strategies under each of the six Action Plan topics relevant to our servicing strategy. These have been linked to the Green Star rating tool where applicable. Refer to Section 10.6.2 for more information on the Green Start Communities rating tool. The baseline and stretch targets have been developed to achieve the Targets and Outcomes per theme and are aimed for implementation via Planning Controls.

Table 14: ESD Baseline and Stretch Targets

SUSTAINABLE WATER – POTABLE WATER							
TARGETS & OUTCOMES (Hlp vs Hype 2019)							
<ul style="list-style-type: none"> <li>Combination of significant alternative water supply and building based water efficiency measures that can support a best practice potable water target of 100 litres per day per person. (2019)</li> <li>Development which meets best practice environmental management guidelines for potable water in all developments.</li> <li>Reduction of potable water usage through provision of alternative water supply (recycled water/dual water supply)</li> </ul>							
KEY PRINCIPLES	IMPLEMENTATION STRATEGIES						
	BASELINE TARGET      STRETCH TARGET						
Using water efficiently, protecting local water resources and reducing flooding and drought. (Hlp vs Hype 2019)	<table border="1"> <thead> <tr> <th>IMPLEMENTATION STRATEGIES</th> <th>BASELINE TARGET</th> <th>STRETCH TARGET</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>Reduce, re-use and recycle water locally per household.</li> <li>Rainwater collection tanks.</li> <li>Water recycling system for entire developments.</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>Install water efficient fixtures. Minimum WELS ratings:                             <ul style="list-style-type: none"> <li>Showers: 4 stars</li> <li>Taps: 6 stars</li> <li>Toilets: 4 stars</li> </ul> </li> <li>Communal rainwater capture and reuse for 80% of irrigation demand across open spaces and commercial areas.</li> <li>Implement a potable water target of 100 litres per person, per day.</li> <li>70% reduction on potable water usage through the use of alternative water sources.</li> <li>Wastewater treatment plant reticulating recycled water back to dwellings for WC flushing &amp; irrigation.</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>Implement a potable water target of less than 90 litres per person per day.</li> <li>Incremental increase of non-potable targets</li> <li>Implement 6-star Green Star Communities rating for the whole development. Refer Section 10.6.2.</li> </ul> </td> </tr> </tbody> </table>	IMPLEMENTATION STRATEGIES	BASELINE TARGET	STRETCH TARGET	<ul style="list-style-type: none"> <li>Reduce, re-use and recycle water locally per household.</li> <li>Rainwater collection tanks.</li> <li>Water recycling system for entire developments.</li> </ul>	<ul style="list-style-type: none"> <li>Install water efficient fixtures. Minimum WELS ratings:                             <ul style="list-style-type: none"> <li>Showers: 4 stars</li> <li>Taps: 6 stars</li> <li>Toilets: 4 stars</li> </ul> </li> <li>Communal rainwater capture and reuse for 80% of irrigation demand across open spaces and commercial areas.</li> <li>Implement a potable water target of 100 litres per person, per day.</li> <li>70% reduction on potable water usage through the use of alternative water sources.</li> <li>Wastewater treatment plant reticulating recycled water back to dwellings for WC flushing &amp; irrigation.</li> </ul>	<ul style="list-style-type: none"> <li>Implement a potable water target of less than 90 litres per person per day.</li> <li>Incremental increase of non-potable targets</li> <li>Implement 6-star Green Star Communities rating for the whole development. Refer Section 10.6.2.</li> </ul>
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SUSTAINABLE WATER – BLUE GREEN INFRASTRUCTURE (InCLAND & NATURE)	
<p><b>TARGETS &amp; OUTCOMES</b> (as relevant) (Hip vs Hype 2019)</p> <ul style="list-style-type: none"> <li>• Developments which meet best practice environmental management guidelines for stormwater in all development. (2019)</li> <li>• 'Integrated' complete 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. (2019)</li> <li>• Stormwater management (blue infrastructure) coordinated with green infrastructure to enhance the sustainability of the urban landscape. (2019)</li> <li>• Canopy cover of 25%, consistent with the City of Greater Geelong Urban Forest Strategy, with early delivery of parks and other green space to reach maturity quickly.</li> <li>• Coordinated blue-green infrastructure which integrates; Habitat corridors and pollinator pathway; Waterways including as the Moorabool and Barwon Rivers; Regional active transport links; Cultural heritage connections; and Protection of existing ecological value.</li> </ul>	
KEY PRINCIPLES	Implementation examples relevant to scope
	IMPLEMENTATION STRATEGIES
<p>Using water efficiently, protecting local water resources and reducing flooding and drought. (Hip vs Hype 2019)</p>	<p><b>BASELINE TARGET</b></p> <ul style="list-style-type: none"> <li>• Integrate landscape features with storm water management (bioswales, rain gardens, wetlands and other bioretention systems).</li> <li>• Enable minimum 25% tree canopy cover across the precinct, not limited by location of servicing in the street reserve.</li> <li>• Ensure street sections in the PSP enable maximum street tree coverage to reduce urban heat island effects. Refer Section 8 Typical Cross Sections for services under trees.</li> <li>• Target greater than 50% native, drought tolerant species planted within precinct.</li> <li>• Enable storm water harvesting for passive irrigation on all communal assets</li> <li>• Mandate third pipe to all households, open space and activity centre areas.</li> <li>• Implement a water monitoring system, precinct wide, to capture water harvesting, water reuse and potable water consumption.</li> </ul>
	<p><b>STRETCH TARGET</b></p> <ul style="list-style-type: none"> <li>• Enable 30% tree canopy cover across the whole precinct.</li> <li>• Achieve permeability target (20% or less of impermeable surfaces within development) such as pervious roads and footpaths.</li> <li>• Carbon positive Water Sensitive Urban Design (WSUD) for stormwater management on site to treat 100% of stormwater.</li> <li>• Implement 6-star Green Star Communities rating for the whole development. Refer Section 10.6.2.</li> <li>• 25% of roof area within precinct to be green roofs (to decrease urban heat island effect, improve energy consumption and filter rainwater quality).</li> </ul>

Using water efficiently, protecting local water resources and reducing flooding and drought. (Hlp vs Hype 2019) .... Cont.

- Water Sensitive Urban Design (WSUD) for stormwater management within road reserves and open spaces to exceed the following water quality standards:
  - Suspended solids: 80% reduction in mean annual load
  - Total phosphorus: 45% reduction in mean annual load
  - Total nitrogen: 45% reduction in mean annual load
  - Litter: 70% reduction of mean annual load
  - Flow: In accordance with performance objectives as set out in [Urban Stormwater Management Guidance \(EPA Victoria\)](#) (page 8)

ZERO CARBON ENERGY*				
TARGETS & OUTCOMES (Hip vs Hype 2019)				
<ul style="list-style-type: none"> <li>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.</li> <li>Fossil fuel free residential and commercial precincts.</li> <li>Best practice energy efficiency as standard through tighter performance standards across all building types based on 'affordable living' concept</li> <li>Showcasing how a future household can embrace sustainability in design, construction and operation.</li> <li>Increase resilience of buildings to climatic shocks through lessening the reliance on grid energy.</li> </ul>				
KEY PRINCIPLE	IMPLEMENTATION STRATEGIES			
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<p>Making buildings and manufacturing energy efficient and supplying all energy with renewables. (Hip vs Hype 2019)</p> <ul style="list-style-type: none"> <li>Energy efficient homes (reduce use &amp; minimise demand).</li> <li>Increase thermal autonomy of buildings to reduce heating / cooling energy demand during peak periods.</li> <li>Enable all electric operation.</li> <li>Enable renewable energy production onsite.</li> <li>Enable renewable energy distribution and sharing onsite (distribution across public land to be further discussed with the City of Greater Geelong).</li> <li>Incentivise green energy purchasing agreement.</li> <li>Enable energy storage locally and centrally.</li> <li>Implement smart metering.</li> </ul>				

\* Note that all Implementation strategies related to reduction in gas, vehicle fuels or other fossil fuels assumes that the majority of the electricity in the network is sourced from renewable resources. The portion of renewables in the common electricity grid is assumed to increase over the lifetime of the planning and design of the developments within the PSP, in alignment with the Victorian Government target of 50% renewable by 2030.

## ADDITIONAL ZERO CARBON INITIATIVES

Sustainable Transport Initiatives	
KEY PRINCIPLE	IMPLEMENTATION STRATEGIES
	BASELINE TARGET
<p><b>TARGETS &amp; OUTCOMES</b> (as relevant) (Hip vs Hype 2019)</p> <ul style="list-style-type: none"> <li>• A commitment to emissions-free transport by 2040.</li> <li>• Planning for autonomous and electric vehicles including:                             <ul style="list-style-type: none"> <li>– Pre-wiring of commercial and multi-residential buildings for electric vehicle charging</li> <li>– Intelligently applied electricity network infrastructure to support the future demand for electric vehicle charging.</li> </ul> </li> </ul>	<p><b>IMPLEMENTATION STRATEGIES</b></p> <ul style="list-style-type: none"> <li>• Mandate EV charging stations to be required in all town centres at 1 in every 15 car parking spots.</li> <li>• Mandate all dwellings to have EV charging facilities (at least one per dwelling).</li> <li>• Implement 6-star Green Star Communities rating for the whole development. Refer Section 10.6.2</li> <li>• Provide local public transport stops and multi-modal transport hubs in close proximity to all retail, education and community services.</li> </ul>
<p>Reducing the need to travel, and encouraging walking, cycling and low carbon transport. (Hip vs Hype 2019)</p>	<p><b>BASELINE TARGET</b></p> <ul style="list-style-type: none"> <li>• Provide EV charging stations in all town centres to meet the needs of a population with 25% EV ownership.</li> <li>• Enable EV charging in all dwellings.</li> <li>• Designate parking spots for carsharing services, in collaboration with car sharing businesses, to meet the needs of the population.</li> <li>• Enable push bike and electric bike pool services.</li> <li>• Integrate and connect green corridor landscape treatments in infrastructure corridors with pedestrian and cycling infrastructure across the precinct.</li> <li>• Enable all-electric public transport within the PSP and locate stops to ease access.</li> </ul>
	<p><b>Implementation examples relevant to scope</b></p> <ul style="list-style-type: none"> <li>• Explore partnerships with charging network providers.</li> <li>• Establish planning controls to mandate electric vehicle charging infrastructure in all developments.</li> <li>• Encourage active transport in servicing corridors.</li> <li>• Enable electric vehicle use.</li> <li>• Encourage alternative modes of sustainable transport with local area.</li> <li>• Enable car share scheme implemented for workers in industrial areas and business park.</li> </ul>

Materials and Products Initiatives						
<p><b>TARGETS &amp; OUTCOMES (as relevant) (Hip vs Hype 2019)</b></p> <ul style="list-style-type: none"> <li>Built form and infrastructure which incorporates local, sustainable and healthy materials and building products.</li> <li>Showcase how a future household can embrace sustainability in design, construction and operation.</li> <li>A precinct capable of supporting sustainable industries such as sustainable construction, modular housing, green appliance tech development.</li> <li>Use of local materials in construction, where appropriate.</li> </ul>						
KEY PRINCIPLE	IMPLEMENTATION STRATEGIES					
	<table border="1"> <thead> <tr> <th>Implementation examples relevant to scope</th> <th>BASELINE TARGET</th> <th>STRETCH TARGET</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>Ensuring sustainable resourcing of products and services</li> <li>Ensuring sustainable materials used in construction.</li> <li>Enabling purchasing or leasing of products for renewable energy production, monitoring and storage.</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>Mandate sustainable resourcing of products and services through Council engineering standards.</li> <li>Mandate sustainable materials to be used in construction of all infrastructure through Council engineering standards.</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>Implement 6-star Green Star Communities rating for the whole development. Refer Section 10.6.2</li> <li>Net zero carbon buildings that have high thermal autonomy and are constructed from low VOC materials.</li> </ul> </td> </tr> </tbody> </table>	Implementation examples relevant to scope	BASELINE TARGET	STRETCH TARGET	<ul style="list-style-type: none"> <li>Ensuring sustainable resourcing of products and services</li> <li>Ensuring sustainable materials used in construction.</li> <li>Enabling purchasing or leasing of products for renewable energy production, monitoring and storage.</li> </ul>	<ul style="list-style-type: none"> <li>Mandate sustainable resourcing of products and services through Council engineering standards.</li> <li>Mandate sustainable materials to be used in construction of all infrastructure through Council engineering standards.</li> </ul>
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<p>Using materials from sustainable sources and promoting products which help people reduce consumption. (Hip vs Hype 2019)</p>						

## 10.5 Potential Additional ESD Initiatives

It is recommended that the following initiatives could be considered as part of the growth area:

- Incorporate a carbon budget per development and land title as suitable within the planning process time frames prior to construction.
- Incorporate Green Star Rating targets for the precinct.
- Incorporate incentive mechanisms for developers to encourage zero carbon development.

### 10.5.1 Carbon Reduction Initiatives

A series of tools can be implemented for *further* carbon reduction, including but not limited to:

#### 10.5.1.1 Reductions in Design, Construction & Operation

- Utilisation of low carbon materials.
- Low energy technologies.
- Green Star, NatHERS or similar certification of buildings.
- Industry Standard accreditation of key infrastructure projects.
- Analysis and investigation of behavioural change initiatives that lower carbon emissions of residents.
- Analysis and investigation of low energy construction methodologies.
- Construction method reductions such as alternative concrete meeting green star requirements, using fly-ash or recycled materials.
- Servicing provider agreements and advocacy for a zero-carbon outcome within the PSP.
- Builder and developer advocacy.

#### 10.5.1.2 Carbon Offset Tools

Remainder of the carbon emissions from services should be investigated for offset through carbon sink offsets of the highest applicable standard *where possible*, in agreement between the service provider and the developer.

#### 10.5.1.3 Smart Cities Technology

A smart city is a framework to plan, develop and promote sustainable development practices to address growing urbanization challenges. This is achieved predominantly through Information and Communication Technologies (ICT), which can be applied on both provider and user level, supported by developers and local government. City of Greater Geelong issued a Smart City Strategic Framework (SCSF) in March 2021.

The Smart City Strategic Framework presents seven smart city principles to guide planning, action and continuous improvement. Some of the Smart City Principles and Enactment Methods include (as relevant to services) but are not limited to;

- Evidence Based: Use smart technology to collect data that will inform decision making & project prioritisation.
- Connection & Value: All new technology & systems will be interoperable & act to streamline processes, never creating more work.
- Innovation & Creativity: Council will promote new pathways for ideation & innovation in all smart city projects.
- Trust & Transparency: Smart city projects will be open about data collection & management.

In general, Smart Cities technology can assist in measuring and collecting data from the majority of services within a development. The data collection can be used to evaluate, refine, calculate and upgrade user data and associated usage patterns such as solar PV electricity generation versus the average household electricity use on both dwelling and precinct level. Smart Cities technology can similarly collect data regarding street lighting,

water usage and recycled water flows in potable water and stormwater infrastructure. Smart technology can be a useful tool in measuring a variety of data, including carbon emissions reductions within the precinct.

#### 10.5.1.4 Barriers to Implementation of Carbon Reduction Targets

The following opportunities and constraints existing to the introduction of carbon reduction targets.

Table 15: Carbon Reduction Targets – Opportunities & Constraints

SERVICE	OPPORTUNITY	CONSTRAINT
OVERALL CARBON REDUCTION	<ul style="list-style-type: none"> <li>Domestic per dwelling initiatives and built form performance will improve over time.</li> <li>Larger scale precinct initiatives (10-20% area).</li> </ul>	<ul style="list-style-type: none"> <li>Budgetary requirements for improvements.</li> <li>Embedded networks attractive option for buyers but not for retailers or developers on average.</li> </ul>
	<ul style="list-style-type: none"> <li>Incentive mechanisms will assist in the implementation of new technologies.</li> </ul>	<ul style="list-style-type: none"> <li>Ownership and maintenance of equipment and resources.</li> <li>Financial short-term investment over long term financial gain.</li> <li>Stakeholder support.</li> </ul>
GAS	<ul style="list-style-type: none"> <li>Significant reduction in carbon emissions if precluded from all or parts of the PSP areas.</li> <li>Easement land allocation savings where feasible.</li> </ul>	<ul style="list-style-type: none"> <li>Relies on a significant portion of electricity within the grid to come from renewable resources to make a significant carbon emission reduction to the current base case carbon emissions scenario.</li> </ul>
	<ul style="list-style-type: none"> <li>Reduced greenhouse emissions from cooking, indoor heating or water systems.</li> <li>Gas leaks risk reduction.</li> </ul>	<ul style="list-style-type: none"> <li>Community resistance against having no gas due to cultural cooking practices.</li> </ul>
	<ul style="list-style-type: none"> <li>Cost saving in providing new gas infrastructure.</li> </ul>	<p>Further expansion of authority gas infrastructure may increase the risk of some infrastructure becoming underutilised or a stranded asset.</p>
ELECTRICITY	<ul style="list-style-type: none"> <li>Appropriate de-centralised renewable energy networks.</li> <li>PPA on a precinct scale.</li> <li>The proportion of renewable energy will increase through clean energy purchase and household solar generation.</li> <li>Smart meters can assess usage.</li> </ul>	<ul style="list-style-type: none"> <li>Capacity in the network for different scenarios.</li> <li>Installation costs and funding mechanisms for suppliers, developers and residents.</li> <li>Space requirements.</li> </ul>
	<ul style="list-style-type: none"> <li>Community support for more sustainable solutions and reduced carbon footprint.</li> </ul>	<ul style="list-style-type: none"> <li>Reliance on fossil fuels in the energy market.</li> <li>Political support varies.</li> </ul>
	<ul style="list-style-type: none"> <li>Technology advancements.</li> </ul>	<ul style="list-style-type: none"> <li>Regulatory challenges.</li> </ul>

	<ul style="list-style-type: none"> <li>• Long term cost savings.</li> <li>• Price of electricity will be lower with a higher percentage of renewables.</li> </ul>	<ul style="list-style-type: none"> <li>• Stakeholder resistance.</li> <li>• Initial investment of new technology.</li> </ul>
	<ul style="list-style-type: none"> <li>• Small- and large-scale batteries for localised storage.</li> <li>• Affordability will increase as technology becomes more mainstream.</li> </ul>	<ul style="list-style-type: none"> <li>• Funding and space allocations similar to electricity substations, typically not allowed within parks, hence reducing the NDA.</li> <li>• Costs associated with household battery technology.</li> </ul>
POTABLE WATER	<ul style="list-style-type: none"> <li>• Reduction in use will aid reliance during droughts and climate change conditions.</li> </ul>	<ul style="list-style-type: none"> <li>• Installation and maintenance costs and responsibility of rainwater and recycled water infrastructure.</li> </ul>
BLUE-GREEN INFRASTRUCTURE	<ul style="list-style-type: none"> <li>• Increase climate change resilience.</li> </ul>	<ul style="list-style-type: none"> <li>• Property allocations, delivery costs and maintenance for infrastructure.</li> </ul>

### 10.5.2 Incentive Mechanisms

A number of incentive mechanisms to reduce carbon emissions could be explored by all stakeholders, on not only state and local government level but equally on precinct level through developer, builder, service provider and user level.

Table 16: Potential Incentive Mechanisms

Stakeholder	Incentive Opportunity
State Government	<ul style="list-style-type: none"> <li>• State Policy Framework.                             <ul style="list-style-type: none"> <li>– The State Planning Policy Framework (SPPF) encourages sustainable development, including the development of buildings which use energy and water efficiently and minimise waste within Victoria’s urban areas.</li> </ul> </li> <li>• Grant Funding</li> <li>• Legislate Emissions reductions targets and sector pledges</li> </ul>
Local Government	<ul style="list-style-type: none"> <li>• Adopt a percentage-based incentive for developers who are willing to deliver a % of their estates without the provision of gas.</li> <li>• Adopt a percentage-based incentive for developers seeking to implement 100% renewable energy PPA for parts of the development.</li> <li>• Assist to provide electric vehicle charging stations at key locations.</li> <li>• Local Planning Policy.                             <ul style="list-style-type: none"> <li>– 21.02 CITY OF GREATER GEELONG SUSTAINABLE GROWTH FRAMEWORK</li> <li>– 21.20 NORTHERN AND WESTERN GEELONG GROWTH AREAS</li> <li>– 22.71 ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT</li> </ul> </li> </ul>
Developers / Builders	<ul style="list-style-type: none"> <li>• Land development price reduction through reduced installation costs (gas).</li> <li>• Offer price reduction to buyers if gas services are not part of the build.</li> </ul>

	<ul style="list-style-type: none"> <li>• Offer behind the grid solar panels as part of the house and land package.</li> <li>• Offer Green Star or similarly rated buildings to buyers at affordable prices.</li> </ul>
Distributers / Retailers / Service Providers	<ul style="list-style-type: none"> <li>• Offer price reduction if a % of service uses are not BAU (i.e. reduced, reused, recycled or renewable).</li> <li>• Offer assistance with setting up and running microgrids for residents.</li> <li>• Assistance through Victoria's Neighbourhood Battery Initiative (NBI).</li> </ul>
Property Owners / Renters	<p>Through all of the above incentives, and hence as buyer attraction to the PSP area:</p> <ul style="list-style-type: none"> <li>• Reduced energy costs.</li> <li>• Possibility of reduced lot purchase cost.</li> <li>• Modern Green Star rated buildings.</li> <li>• Availability of EV charging.</li> </ul> <p>Through builders being offered:</p> <ul style="list-style-type: none"> <li>• Thermal performance assessment.</li> <li>• Analysis of life cycle environmental impacts.</li> <li>• ESD building inspections (aimed at Passive house, Green star criteria and others).</li> <li>• Selection of drought resistant plants in private open spaces.</li> <li>• Recycled water options to reduce potable water user costs.</li> </ul>

## 10.6 Zero Carbon Implementation Considerations

### 10.6.1 Future Planning

In planning for the Creamery Road PSP area provision of services it will be important to cater for future technical improvements and market changes over time. As the PSP area is planned, designed and developed it is probable that:

- 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.
- 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 Electrical Vehicles will become more widespread.

In the future, it is assumed a larger portion of households in a typical development will have on-site energy generation equipment such as solar PV as well as individual energy storage such as small batteries. It is likely that fossil fuel assets, such as gas services, will become redundant/stranded assets.

### 10.6.2 Green Star Communities Rating Tool

Green Stars Communities is an assessment and rating tool for the planning, design and construction of precincts. 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. Mandating the use of Green Star Communities would support the implementation of the ESD action plan for the WGA.

Table 17: Green Star Community Rating Initiatives

GREEN STAR CREDITS AS RELEVANT	ESG ACTION PLAN LINKAGE
<b>GOVERNANCE</b>	
DESIGN REVIEW (1)	<ul style="list-style-type: none"> <li>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.</li> <li>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)</li> <li>Foster community resilience &amp; inclusivity.</li> </ul>
ENGAGEMENT (3) + COMMUNITY PARTICIPATION AND GOVERNANCE (7)	<ul style="list-style-type: none"> <li>Engage with the community to enable wider acceptance of carbon reducing initiatives.</li> </ul>
ADAPTATION AND RESILIENCE (4)	<ul style="list-style-type: none"> <li>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.</li> <li>Increase resilience of buildings to climatic shocks.</li> </ul>
CORPORATE RESPONSIBILITY (5)	<ul style="list-style-type: none"> <li>Engage with service providers and material providers to reduce carbon footprint in their organisations and operations.</li> </ul>
SUSTAINABILITY AWARENESS (6)	<ul style="list-style-type: none"> <li>A 'Sustainable House' education facility, showcasing how a future household can embrace sustainability in design, construction and operation through direct ESD advocacy.</li> </ul>
<b>LIVEABILITY</b>	
COMMUNITY DEVELOPMENT (10)	<ul style="list-style-type: none"> <li>Advocate with developers, builders, providers and future residents to enable greater implementation of strategies more broadly.</li> </ul>
SUSTAINABLE BUILDINGS (11)	<ul style="list-style-type: none"> <li>Built form and infrastructure which incorporates local, sustainable and healthy materials and building products.</li> <li>A precinct capable of supporting sustainable industries such as sustainable construction, modular housing, green appliance tech development.</li> </ul>
CULTURE, HERITAGE AND IDENTITY (12)	<ul style="list-style-type: none"> <li>Coordinated blue-green infrastructure which integrates:                             <ul style="list-style-type: none"> <li>Habitat corridors and pollinator pathways</li> <li>Waterways including as the Moorabool and Barwon Rivers</li> <li>Regional active transport links</li> <li>Cultural heritage connections</li> <li>Protection of existing ecological value</li> </ul> </li> </ul>
<b>ECONOMIC PROSPERITY</b>	
RETURN ON INVESTMENT (20)	<ul style="list-style-type: none"> <li>Energy generation in renewable energy systems.</li> </ul>

<p>INCENTIVE PROGRAMS (21)</p>	<ul style="list-style-type: none"> <li>• (Zero carbon) Sustainable Transport.</li> </ul>
<p>DIGITAL INFRASTRUCTURE (22)</p>	<ul style="list-style-type: none"> <li>• Smart cities technology to measure and adjust performance.</li> </ul>
<p>PEAK ELECTRICITY DEMAND REDUCTION (23)</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Inclusion of microgrids.</li> <li>• Fossil fuel free residential and commercial precincts.</li> <li>• 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).</li> </ul>
<p>ENVIRONMENT</p>	
<p>INTEGRATED WATER CYCLE (24)</p>	<ul style="list-style-type: none"> <li>• Private development which meets best practice environmental management guidelines for stormwater in all development.</li> <li>• Combination of significant alternative water supply and building based water efficiency measures that can support a best practice potable water target of 100 litres per day per person.</li> <li>• Stormwater management (blue infrastructure) coordinated with green infrastructure to enhance the sustainability of the urban landscape.</li> <li>• Combination of significant alternative water supply and building based water efficiency measures that can support a best practice potable water target of 100 litres per day per.</li> </ul>
<p>GREENHOUSE GAS STRATEGY (25)</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Fossil fuel free residential and commercial precincts.</li> <li>• 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).</li> <li>• Inclusion of microgrids and local renewable energy generation.</li> </ul>
<p>MATERIALS (26)</p>	<ul style="list-style-type: none"> <li>• Built form and infrastructure which incorporates local, sustainable and healthy materials and building products.</li> <li>• A precinct capable of supporting sustainable industries such as sustainable construction, modular housing, green appliance tech development.</li> <li>• Use of local materials, such as reuse of quarry overburden material where appropriate.</li> <li>• Construction materials are recycled or reused as standard practice.</li> </ul>
<p>SUSTAINABLE TRANSPORT AND MOVEMENT (27)</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Fossil fuel free residential and commercial precincts.</li> <li>• 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))</li> </ul>

	<ul style="list-style-type: none"> <li>Coordinated blue-green infrastructure which integrates:                             <ul style="list-style-type: none"> <li>Habitat corridors and pollinator pathways</li> <li>Waterways including as the Moorabool and Barwon Rivers</li> <li>Regional active transport links</li> <li>Cultural heritage connections</li> <li>Protection of existing ecological value</li> </ul> </li> </ul>
ECOLOGICAL VALUE (29)	<ul style="list-style-type: none"> <li>Canopy cover of 25%, consistent with the City of Greater Geelong Urban Forest Strategy, with early delivery of parks and other green space to reach maturity quickly.</li> <li>'Complete' streets which support significant green infrastructure within the road reserve.</li> <li>Coordinated blue-green infrastructure which integrates:                             <ul style="list-style-type: none"> <li>Habitat corridors and pollinator pathways</li> <li>Waterways including as the Moorabool and Barwon Rivers</li> <li>Regional active transport links</li> <li>Cultural heritage connections</li> <li>Protection of existing ecological value</li> </ul> </li> <li>Dedicated open space for rewilding (re-establishment of functional ecosystems).</li> </ul>
WASTE MANAGEMENT (30)	<ul style="list-style-type: none"> <li>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.</li> <li>Development of a local, precinct scale organic waste management facility.</li> </ul>
HEAT ISLAND EFFECT (31)	<ul style="list-style-type: none"> <li>'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.</li> <li>Canopy cover of 25%, consistent with the City of Greater Geelong Urban Forest Strategy, with early delivery of parks and other green space to reach maturity quickly. 'Complete' streets which support significant green infrastructure within the road reserve.</li> <li>Coordinated blue-green infrastructure which integrates:                             <ul style="list-style-type: none"> <li>Habitat corridors and pollinator pathways</li> <li>Waterways including as the Moorabool and Barwon Rivers</li> <li>Regional active transport links</li> <li>Cultural heritage connections</li> </ul> </li> <li>Protection of existing ecological value</li> <li>Dedicated open space for rewilding (re-establishment of functional ecosystems).</li> </ul>
INNOVATION	
INNOVATION (33)	<ul style="list-style-type: none"> <li>Innovation is encouraged across all infrastructure related services to enable a zero carbon PSP.</li> </ul>

### 10.6.3 Implications of Mandating Zero Carbon

#### TOWARDS 2050: GAS INFRASTRUCTURE IN A ZERO EMISSIONS ECONOMY

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Infrastructure Victoria has been asked to provide the Victorian Government with advice relating to Victoria's gas transmission and distribution networks under a range of 2050 energy sector scenarios. Under the Victorian Climate Change Act 2017, the Victorian Government has committed to a whole-of-economy, net zero emissions target by 2050.

A report will be prepared by Infrastructure Victoria to assess the relative economic, social, and environmental impacts and identify infrastructure decisions that need to be made, and when, to ensure opportunities for existing gas infrastructure to be optimised. This will include exploring the extent to which gas infrastructure can be used for hydrogen, carbon capture and storage and/or biomethane. The final advice to government in "Towards 2050: Gas infrastructure in a zero emissions economy" was scheduled for submission 31 December 2021 however is currently in the 'reviewing feedback' stage (as of May 2022). The outcomes of this report will likely enable more Victorian Councils to phase out gas.

#### ENABLING A ZERO CARBON PSP

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To assist the implementation of a zero carbon PSP, it may be required to mandate zero carbon results for some sectors, industries or service providers. For clarification, zero carbon developments generally include but are not limited to:

- (a) a high standard of energy efficiency of the building fabric.
- (b) energy efficient systems and appliances.
- (c) onsite renewable energy generation.
- (d) a component of offsite renewable energy purchasing; and/or
- (e) carbon offsets to mitigate remaining emissions through mechanisms such as those governed by the Australian Government's Climate Active program.

The City of Greater Geelong Council currently seek to support, guide, implement and mandate items (a), (b) and (c) within the LPPF.

In general, Section 6(2) and 12(1) of the *Planning and Environment Act 1987* support implementing objectives of planning in Victoria as well as facilitate development in accordance with objectives (amongst others) such as:

- To provide for the fair, orderly, economic and sustainable use and development of land.
- To provide for the protection of natural and man-made resources and the maintenance of ecological and genetic diversity.
- To secure a pleasant, efficient and safe working, living and recreational environment for all Victorians and visitors to Victoria.

There are several Councils in Victoria seeking to implement a 'zero carbon' strategy, relating to a number of outcomes within the built environment for both planned and pre-existing communities. The City of Yarra was the first Council to pledge to switch its buildings from gas to renewable electricity by 2030. City of Yarra also wants the state government to support a ban on gas connections in new homes. In 2017 the Council announced a partnership in the Melbourne Renewable Energy Project to source 100% of Council's electricity from local renewable energy for 10 years. City of Yarra furthermore entered into a long-term Power Purchase Agreement (PPA) sourcing all of its electricity needs – for public lights, buildings, and electric charging — from renewable energy.

The controls related to zero carbon outcomes can be controlled in the Local Planning Policy Framework, supported by the State Planning Policy Framework. City of Melbourne has through "22.19 Energy, Water and Waste Efficiency" enabled planning controls to resource use in new developments.

*The policy provides guidelines to ensure that the design, construction and operation of buildings and urban renewal areas:*

- Minimise the production of greenhouse gas emissions and maximise energy efficiency.
- Minimise mains potable water use and encourage the use of alternative water sources.
- Minimise waste going to landfill, maximise the reuse and recycling of materials and lead to improved waste collection efficiency.

In order to support, guide, implement and mandate items d and e for zero carbon developments, City of Greater Geelong may seek to include controls within in the LPPF 22.71 ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT, supported by VPP 15.02-1S ENERGY AND RESOURCE EFFICIENCY, VPP 19.01-1S ENERGY SUPPLY AND VPP 19.01-2S RENEWABLE ENERGY. Council may wish to liaise with DELWP for further support. Council could also seek legal advice to investigate if any recent VCAT decisions exist in relation to mandating items (d) and (e) above as part of permit conditions within the PSP area.



# Appendix A

## Barwon Water Preliminary Servicing Advice

# Technical Memo

To: Michael McNeel, SMEC  
From: Rhys Bennett, Network Planning Co-ordinator  
Date: 4<sup>th</sup> March 2021  
Subject: Northern & Western Geelong – Servicing Information

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Michael,

In relation to your servicing request, Barwon Water's Asset Planning Department provides the following advice.

## Background

The City of Greater Geelong has finalised the Northern and Western Geelong Growth Areas project (NWGGA) as part of Amendment C395. Barwon Water contributed to this project and continues to work closely with COGG as the development areas progress. Most recently on an IWM Plan for the areas.

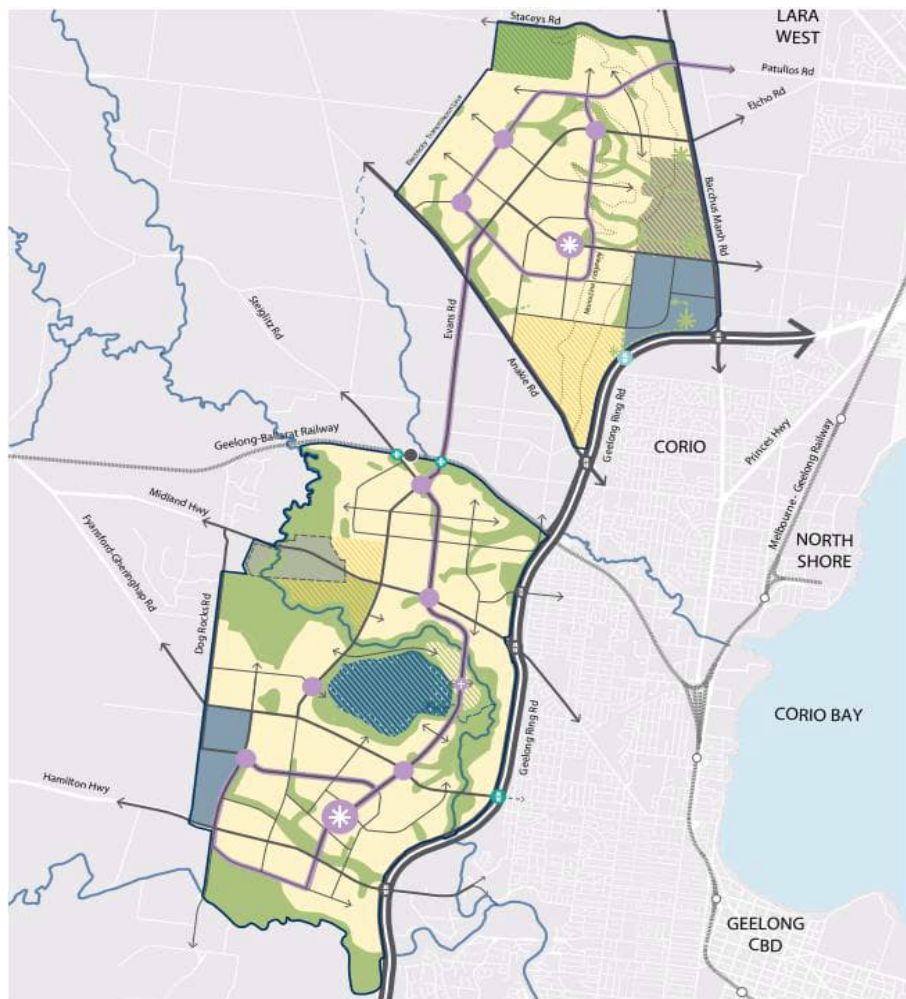


Figure 1 Northern and Western Geelong Growth Areas

## 2016 Growth Areas Servicing Strategy

Barwon Water completed a concept servicing strategy for the Growth Areas in 2016 which was been endorsed by our Board. The strategy presented a staged infrastructure approach which was flexible and adaptable to the range of potential development scenarios that may arise.

The baseline servicing strategy utilised available capacity in our existing networks to stage new infrastructure and investment over time. The strategy also highlighted significant opportunities for potential recreational and agricultural recycled water use, in particular for the Western Growth Area, that warrant further investigation in the future.

### Sewerage

The 2016 sewer servicing strategy involved utilising the existing sewer trunk network (with significant staged upgrades) to convey the flows to the Black Rock Water Reclamation Plant.

**Lovely Banks** - The Lovely Banks growth area would be serviced via a series of sewer pump stations which would ultimately connect via a new transfer pump station via a new rising main Lara No. 1 Gravity Main along Princess Highway (Geelong Ring Road);

**Bell Post Hill** – The BPH growth area would be serviced via a series of pump stations which would connect to the Geelong Sewer network near the Geelong Ballarat Railway line (interim). Ultimately flows would be pumped to Fyansford

**Batesford South** – The Batesford South growth area would be serviced via a series of pump stations. The transfer infrastructure involved a long length of pressure main around the Geelong ring road to connect into the existing Main Outfall Sewer in Armstrong Creek with treatment via the existing Black Rock WRP.

Note, since the preparation of this baseline strategy, more work has occurred which has modified this strategy as described below. Indicative sewer servicing plans are attached to this memo and include sewers both internal and external to the development.

### Water

The 2016 sewer servicing strategy involved utilising the existing water supply network with some major augmentations and extensions to service the growth.

**Lovely Banks** - The area is predominantly located above the 50m contour and therefore is too high to be supplied from the existing Lovely Banks Basins by gravity. The area above the 50m contour requires a significant amount of new water infrastructure. The new infrastructure will be staged to initially provide a boosted system, with a gravity system installed to meet ultimate demand. Each system will contribute approximately 50% of peak hour demand. The system will include:

1. Boosted Pump Station (>500L/sec) and DN600mm feeder main into the development;
2. Gravity feeder main (DN750mm, 12km length) and 20ML storage from the Moorabool Montpellier system to the development

A series of large diameter water mains will be located within the development. The final configuration of these mains has not been determined.

In the interim, it is envisaged that a new tank and booster PS system will be required for the Elcho Road Precinct.

**Bell Post Hill** - The servicing strategy for the Bell Post Hill area includes a direct connection to the existing Montpellier-Lovely Banks transfer main and new trunk infrastructure within the area. Ultimately BPH will FIA consist of both gravity and pressure boosted supply zones.

**Batesford South** – The Batesford South area broadly consists of a gravity supply zone and two pressure boosted zones. The ultimate servicing strategy includes:

- Two direct connections with PRVs to the existing She Oaks-Montpellier transfer main, allowing supply from both the Montpellier Basin and the Moorabool WTP;
- Local pressure boosting to the western and southern pressure boosted zone

Indicative water servicing plans are attached to this memo. Indicative water servicing plans are attached to this memo and include sewers both internal and external to the development.

### Recycled Water

The option of providing dual pipe recycled water to the growth areas was considered during the strategic assessment and at the time was not considered to be feasible. The strategy however highlighted significant opportunities for potential recreational and agricultural recycled water use, in particular for the Western Growth Area, that warrant further investigation in the future. That further investigation has occurred and is described below.

## 2020 Northern & Western Geelong IWM Plan

The Northern and Western Geelong Growth Areas (NWGGA) integrated water management (IWM) was a joint project between Barwon Water, DELWP and CoGG incorporating engagement of consultants (E2 Design Lab & Marsden Jacob Associates). The project has presented a significant opportunity to work collaboratively with representatives from across the water cycle in the region and has developed a clever and creative approach to IWM in the growth areas, which assists long-term liveability, climate resilient and cool urban landscapes and leadership in water sensitive cities.

Importantly, in relation to recycled water, the plan recommended a recycled water scheme involving the delivery of Class A recycled water via a 'purple pipe' network to homes, local industry, agriculture and open spaces. It will also enable the provision of recycled water for environmental flows in the Moorabool River as pumped contributions from the quarry decline. The proposal has two phases:

1. Short-term: Class A recycled water is supplied to the initial phases of development (including households, local industry and open spaces) from the Northern Water Plant via a newly constructed transfer pipeline.
2. Long term (2035 onwards): Class A recycled water is supplied to the later stages of development, local industry, agriculture, open spaces and the Moorabool River from newly constructed local water recovery plant in the Moorabool Valley.

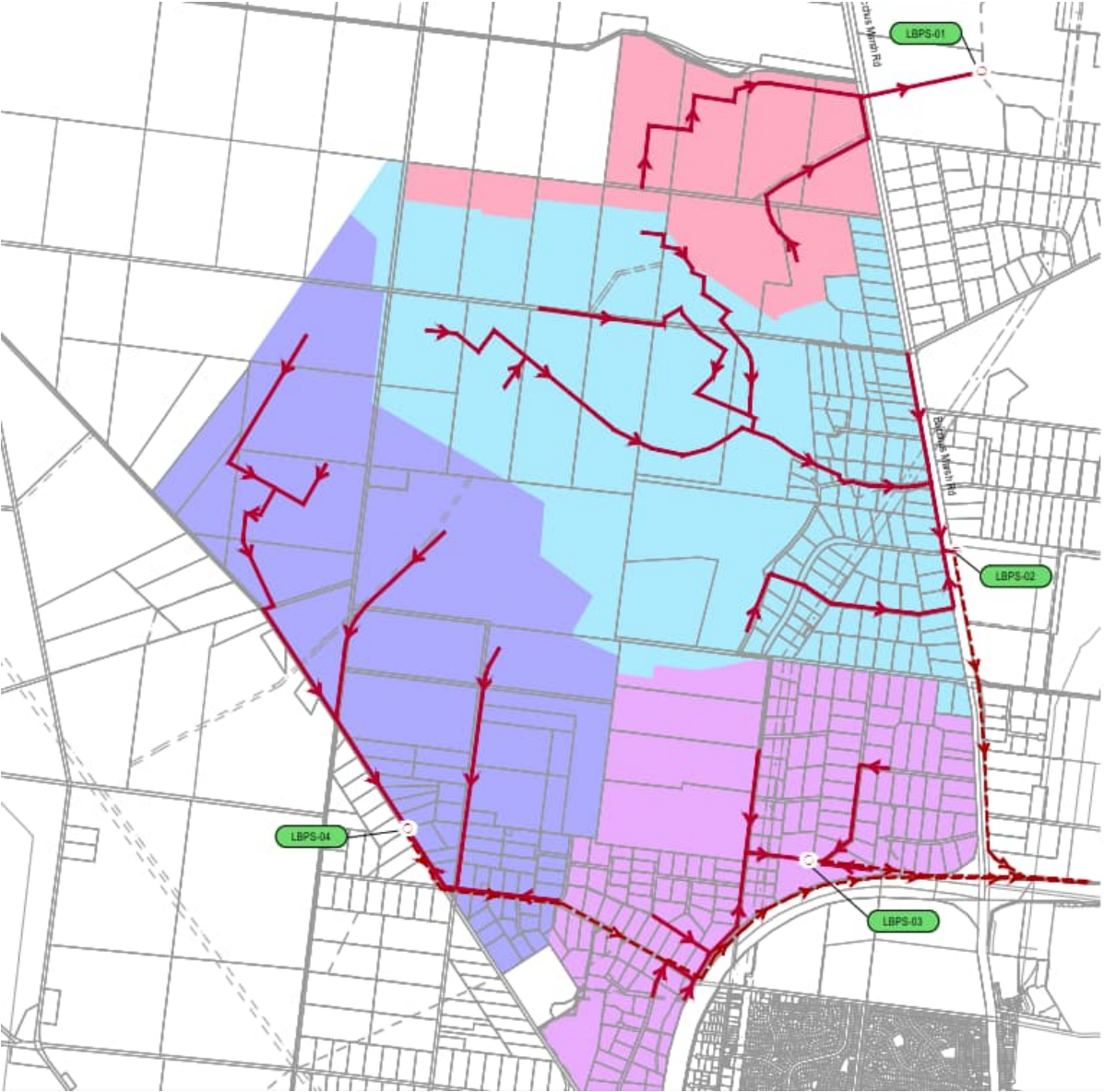
More detail on the plan is provided in an attachment emailed separately.

The above detail changes the overall ultimate sewerage servicing from a pipeline to Black Rock to a new local WRP. The detail of how those changes to the 2016 will be implemented has not been finalised. That is some of what the proposed consultancy described below will consider.

# Proposed 2021 Northern & Western Geelong Growth Areas - Functional Concept Design

As indicated above, since the 2016 Strategy, there have been quite a few changes. The impact of these will be considered in a new consultancy to develop a refined concept design. Some key changes are described below

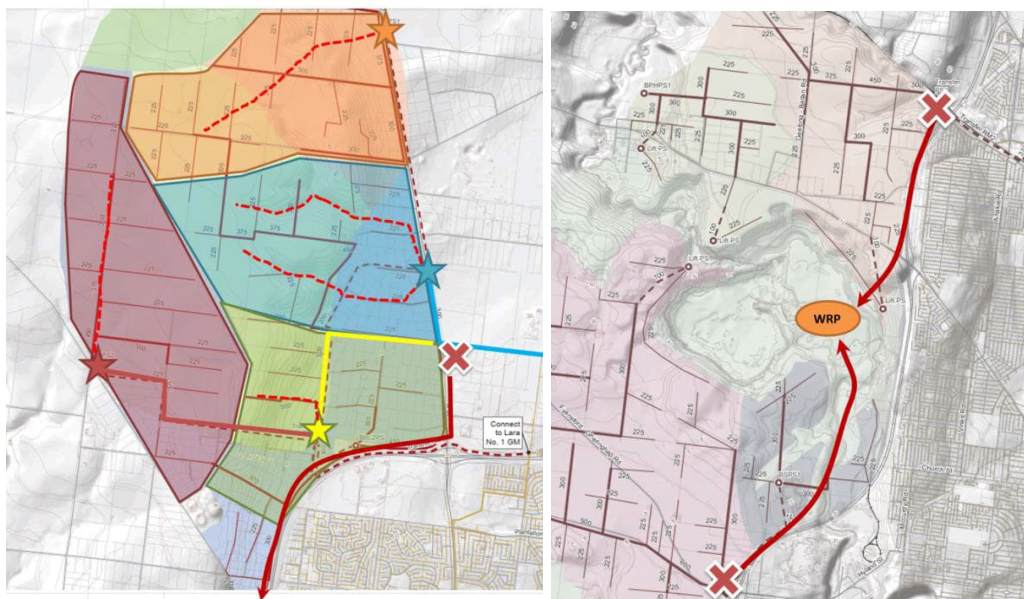
Elcho East Sewer Servicing – Since the preparation of the 2016 Strategy, Barwon Water has refined our servicing strategy in this area. The majority of the precinct will now drain via the Lara West development to a new pump station in the Austin Estate. An allowance of up to 2,000 lots from this precinct has been assumed in the design of both the pump station and incoming sewer. See concept options prepared by Beveridge Williams and Verve Consulting.



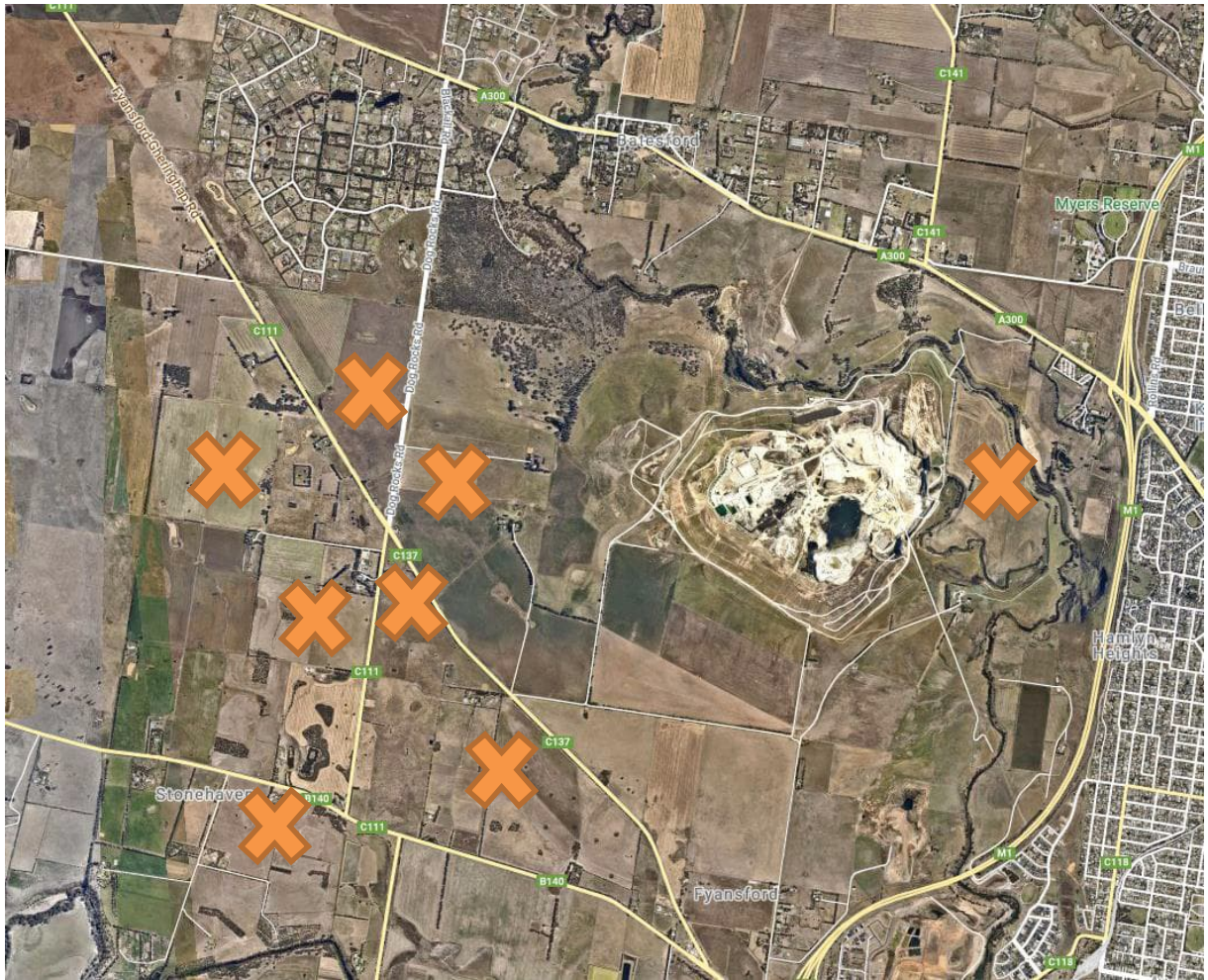


New WRP – Under the ultimate scenario, a new WRP is proposed to service the Northern and Western Growth Areas with sewerage. Concepts for the following have not been developed and are likely to form part of the scope for the consultancy:

- Main Sewer Pump Stations and Rising Mains to get the sewerage from the Lovely Banks and Bell Post Hill Growth areas to the new WRP

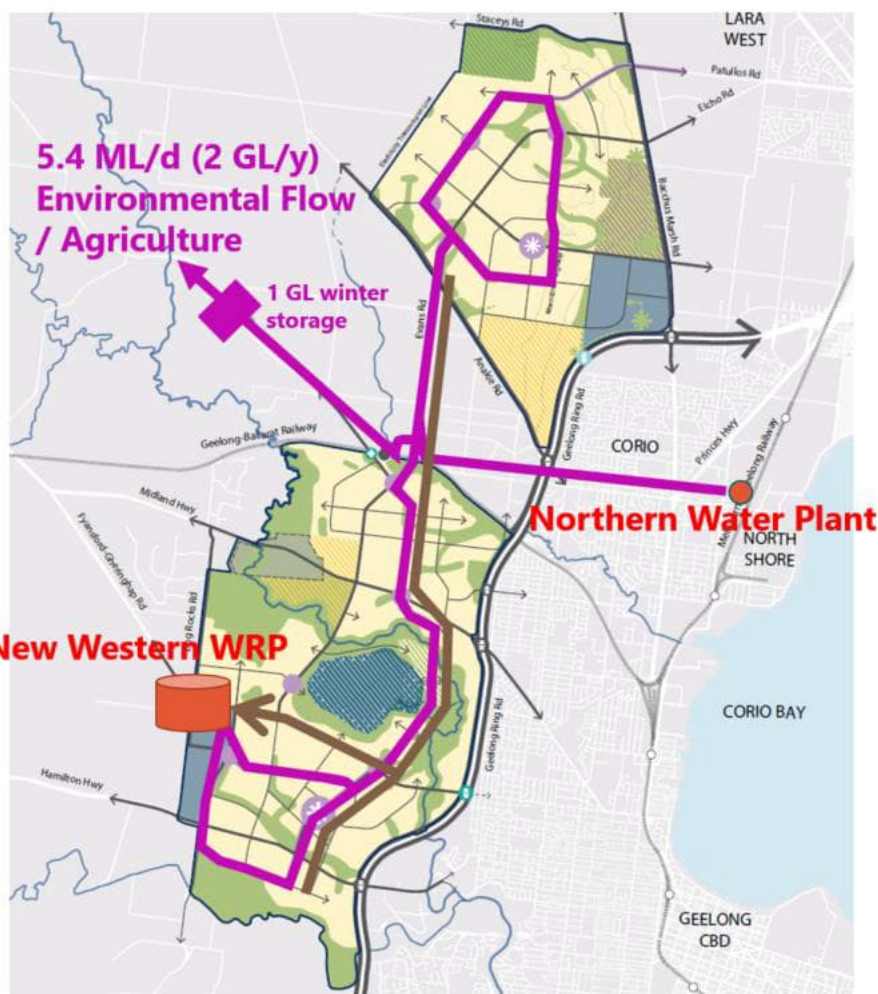


- The location of the WRP



### Recycled Water Servicing

The previous concept design did not consider how dual pipe recycled water could be provided to the growth areas. This strategy will need to consider this from both the Northern Water Plant (until 2035) and a new WRP (ultimate).



## Conclusion

Barwon Water continues to refine our servicing strategies for the Northern & Western Geelong Growth Areas. As indicated above, the most comprehensive strategy will commence shortly, and will utilise further information in the Framework Plan and PSP's to finalise many of the outstanding aspects

For further enquiries please contact Network Planning Co-ordinator, Rhys Bennett on 52262328.

Kind Regards,

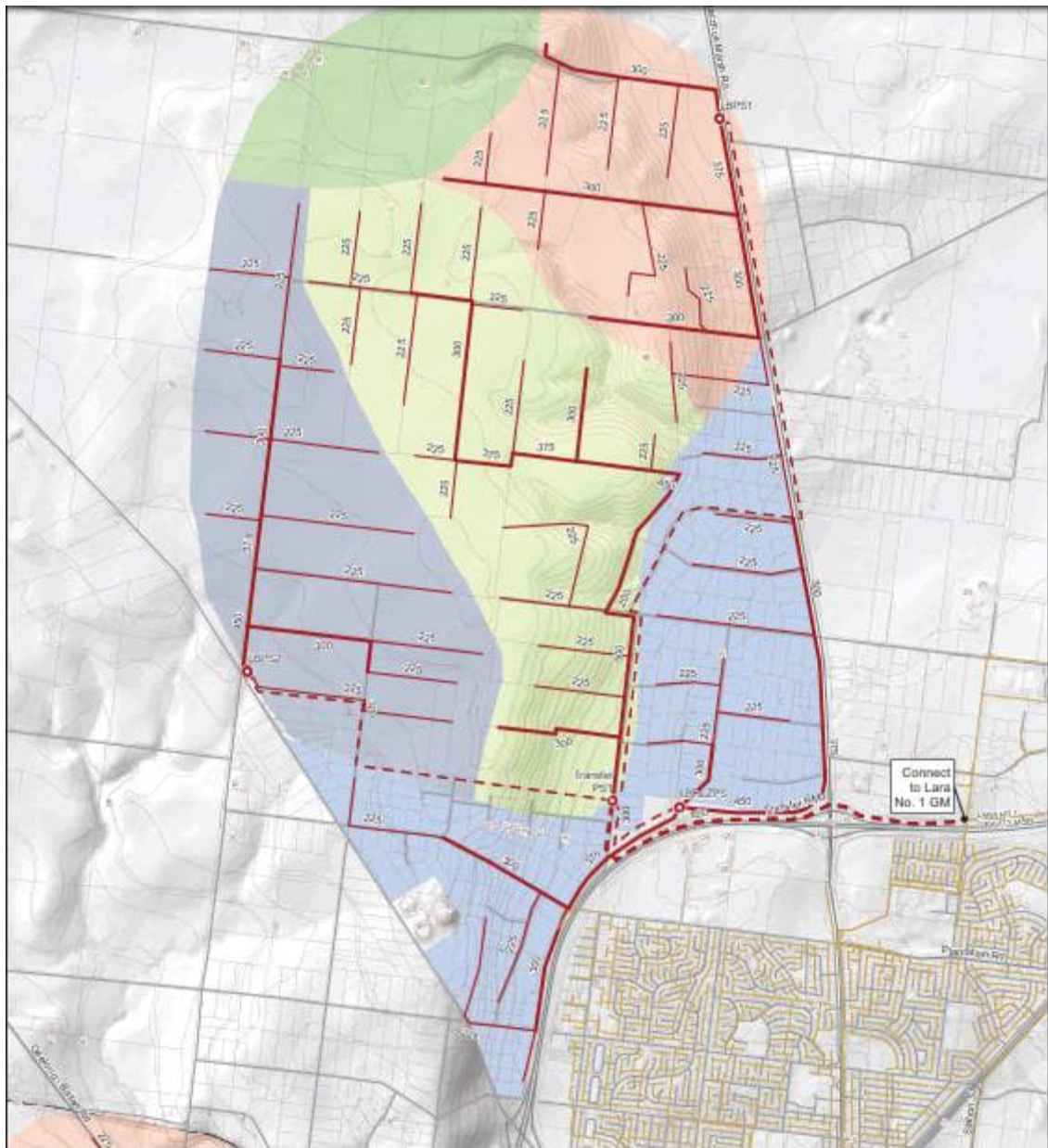
**Rhys Bennett**

Network Planning Co-ordinator

Attached

- 2016 GHD Servicing Strategy
- NWGGA IWM Plan Summary

Lovely Banks Sewer (2016)

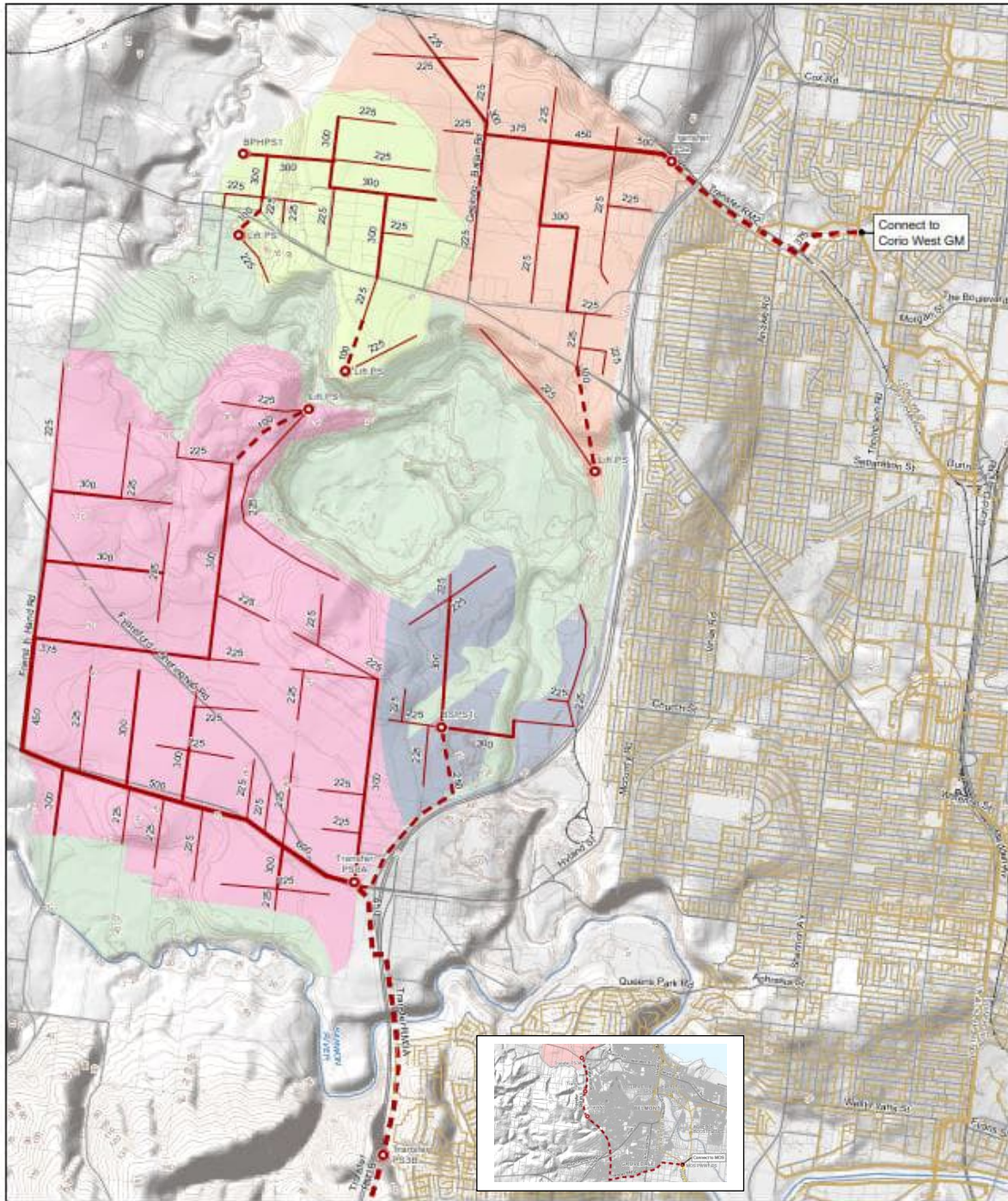


— Trunk sewer network	1000 - 3000	— Transfer Rising Main	450 - 500	<b>Catchments</b>	Passive Open Space
— 100 - 250	Proposed Pump Stations	Proposed Gravity Sewer Main (mm)	— Contour (5m)	Catchment 1	Lovely Banks adjacent RL2
— 250 - 400	Proposed Sewer Network	— 225	Existing parcels	Catchment 2	— Rail
— 400 - 1000	— Internal FIA Rising Main	— 300 - 375		Catchment 3	

<p>Page Size: A3          0 100 200 300 400 500 600 700 800 900 1000          Metres</p> <p>Barwon Water          Horizontal Datum: GDA 1984          Zone: 55E UTM MGA Zone 55E</p>		<p>Barwon Water          G21 RGP - FIA Servicing Strategy  <b>Sewer Servicing Strategy</b>          Lovely Banks - Internal Servicing</p>	<p>Job Number   31-52334          Revision   1          Date   08 Feb 2016</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--	-------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------

Figure 15

# Batesford South & Bell Post Hill Sewer (2016)



- |                     |                          |                                  |                  |                   |             |
|---------------------|--------------------------|----------------------------------|------------------|-------------------|-------------|
| Trunk sewer network | 1000 - 3000              | Transfer Rising Main             | 450 - 500        | Catchments        | Catchment 3 |
| 100 - 250           | Proposed Pump Stations   | Proposed Gravity Sewer Main (mm) | Contour (5m)     | Active Open Space | Catchment 4 |
| 250 - 400           | Proposed Sewer Network   | 225                              | Existing parcels | Catchment 1       | Rail        |
| 400 - 1000          | Internal FIA Rising Main | 300 - 375                        |                  | Catchment 2       |             |

Paper Size A3  
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 Metres  
 Map Projection: Transverse Mercator  
 Horizontal Datum: GDA 1984  
 Vertical Datum: MGA 2000

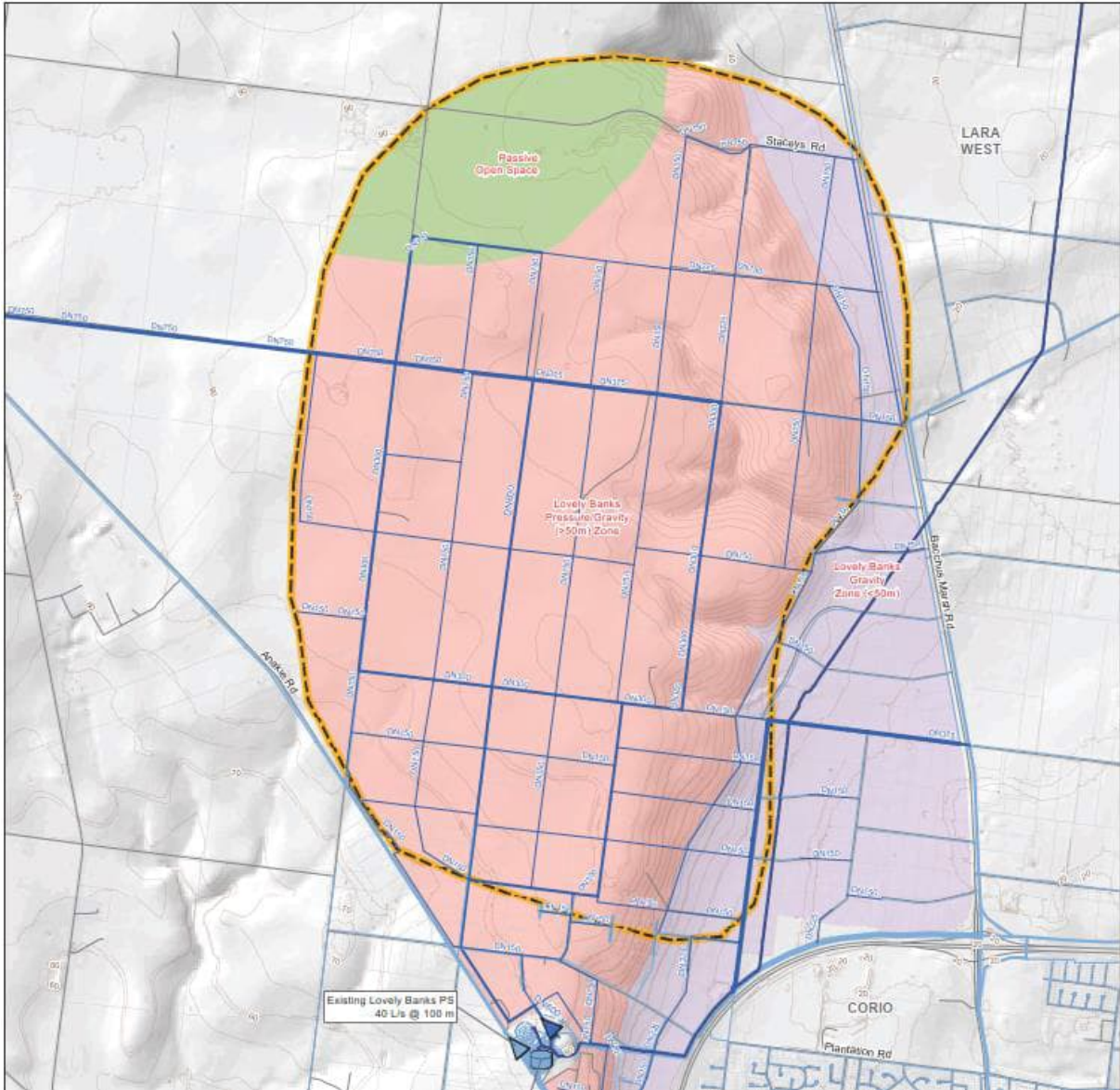


Barwon Water  
 G21 RGF - FIA Servicing Strategy  
 Sewer Servicing Strategy  
 Batesford South and Bell Post Hill - Internal Services

Job Number: 31-32334  
 Revision: 1  
 Date: 10 Feb 2016

Figure 16

Lovely Banks Water (2016)





## Michael MCNEEL

---

From: Rhys Bennett <Rhys.Bennett@barwonwater.vic.gov.au>  
Sent: Friday, 16 April 2021 12:09 PM  
To: Tom MOORFOOT  
Cc: David MUTTON; Michael MCNEEL; Sheryne Price; Kristian Webb  
Subject: RE: Elcho Road East & Creamery Rd PSP - BW Interim Strategies  
Attachments: BPH Water.pdf

Follow Up Flag: Follow up  
Flag Status: Flagged

Hi Tom,

You are correct, there's lots for us (and our consultant) to do in this area and not wanting to necessarily pre-empt any of that, but in relation to the early PSP's I can offer the following:

Elcho Road East

### Sewer

The interim and ultimate strategy for this precinct for sewer is the same. The majority of the catchment will drain via the Lara West area to the Austin SPS. This station has been sized for flows from this area. Areas not within this catchment will drain south as indicated in the plans to a new SPS discharging toward Heales/McManus Road.

### Water

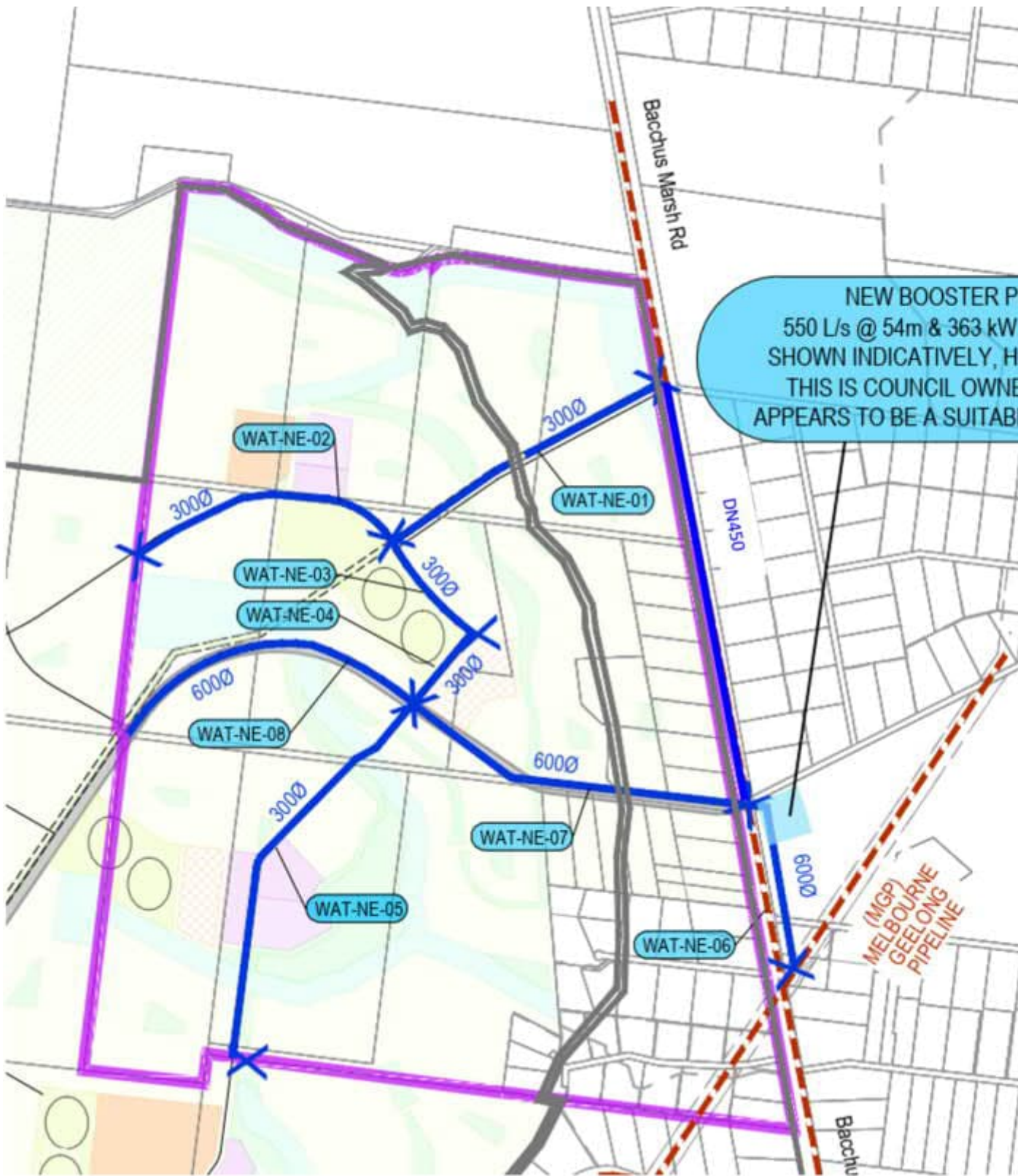
Areas below the 50m contour can be serviced off the existing network. A large diameter water main (>450 size tbd) will need to be extended from the intersection of Bacchus Marsh Road and Elcho Road, and connect to the proposed DN225 main in Patullos Road. Areas above the 50m contour will require a large tank (s) and booster PS. The size of each has not been determined. The location has not been determined.

Beveridge Williams developed a concept below which could be similar to what's proposed with some changes. The location they've shown is probably not suitable as it's CoGG land used by a horse riding club. More than likely the land would need to be set aside in the PSP area on the west side of Bacchus Marsh Road. They also haven't shown tanks and we'd expect quite large tanks will be required to provide buffer for PDD events.

This booster PS location may become would need to be in place for quite a long time, as the ultimate feed from the LB Basins proposed Pump Station, and or gravity from the wet would take a long time. This could even become part of the ultimate arrangement.

### Recycled Water

No work has been done on this. The network will likely mirror the potable, but the feed location is likely different. We will be investigating getting an early feed from the NWP in Corio, but it's likely that a cross connection (s) will be required for the early few years.



**Creamery Road PSP**

The sewer interim strategy is to drain as per the advice previously. Ultimately that PS will need to pump south to the new WRP in Batesford so a corridor the the future rising main would need to be provided.

The water strategy is attached.

The recycled water advice mirrors the advice for Lovely Banks above.

Kind Regards,

## Jayden Holmes

---

**From:** Akla Nanayakkara  
**Sent:** Wednesday, 17 August 2022 2:51 PM  
**To:** Melissa Blyton; Jayden Holmes  
**Cc:** Alexander Schmidt  
**Subject:** ReX: Sewer, water and recycled water - Creamery Road PSP  
**Attachments:** Creamery Road Servicing Sketches.docx; Creamery Draft FUS\_2021.11.15 Markup 2022.08.15 v2.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

**Record Number:** D22-426193

Hi Mel and Jayden,

Pl see below and attached advice from Rhys regarding sewer, potable and recycled water in the precinct.

Mel, does this mean that additional land needs to be set aside for the assets nominated?

Kind regards,  
Akla

---

**From:** Rhys Bennett <Rhys.Bennett@barwonwater.vic.gov.au>  
**Sent:** Wednesday, 17 August 2022 1:45 PM  
**To:** Akla Nanayakkara <ANanayakkara@geelongcity.vic.gov.au>  
**Subject:** FW: Creamery Road PSP

Good Afternoon Akla,

Just an update from our discussions last month regarding the Functional Urban Structure (FUS). Unfortunately our consultants Jacobs are continuing to work on the Concept designs for NWGGA so do not have updated drawings for the PSP just yet. That said, I can provide the following:

### Sewer

**2 sites, 1600m2 and 10,000m2 as indicated on PDF attached.**

Comments relate to the drawing P20 Sewer Infrastructure:

- Pump station labelled 'Lift PS' will be the key sewer transfer hub for the precinct. It should be located adjacent WLRB 1.
- Approx 10,000m2 (100mx100m) will be required for the site. It will house a new ~250Ls Sewer Pump Station, ~10ML storage and dosing facility.
- BW preference to site the hub in this area at lowest available elevation in this area whilst remaining outside drainage corridor.
- Pump Station will discharge to the existing network, then ultimately to the new NWGGA WRP.

Other

- The 60m contour green/blue shading is not relevant.
- CRPS2 is not preferred. Preference for one pump station at hub.

### Water & Recycled Water

**2 sites, 100m2 and 10,000m2 as indicated on PDF attached.**

Comments relate to the drawing P19 Potable & Recycled Water Infrastructure:

- The tank site is marked on the attached PDF
- A nominal 6 ML usable volume storage tank, 40m diameter, 6m wall height assumed. The tank diameter could be moderately reduced if greater wall heights are permitted. The 6 ML usable volume is 0.8 days of Creamery Rd. PSP potable water Peak Day Demand, including 100% recycled water top-up.
- The booster pump station must have capacity for the entire Creamery Rd. PSP potable PHD including recycled water top-up requiring a booster pump station capable of doing 150 L/s. The 150 L/s booster pump station delivers Creamery Rd. PSP potable water Peak Hour Demand, including 100% recycled water top-up.
- This would require an area of ~10,000m<sup>2</sup> (100m x 100m)

Other

- The offtake from the Motpellier-Lovely banks Transfer main moved further north so as to not cross the ring road.
- Larger feeder main from offtake to tank site

Regards,

**Rhys Bennett**

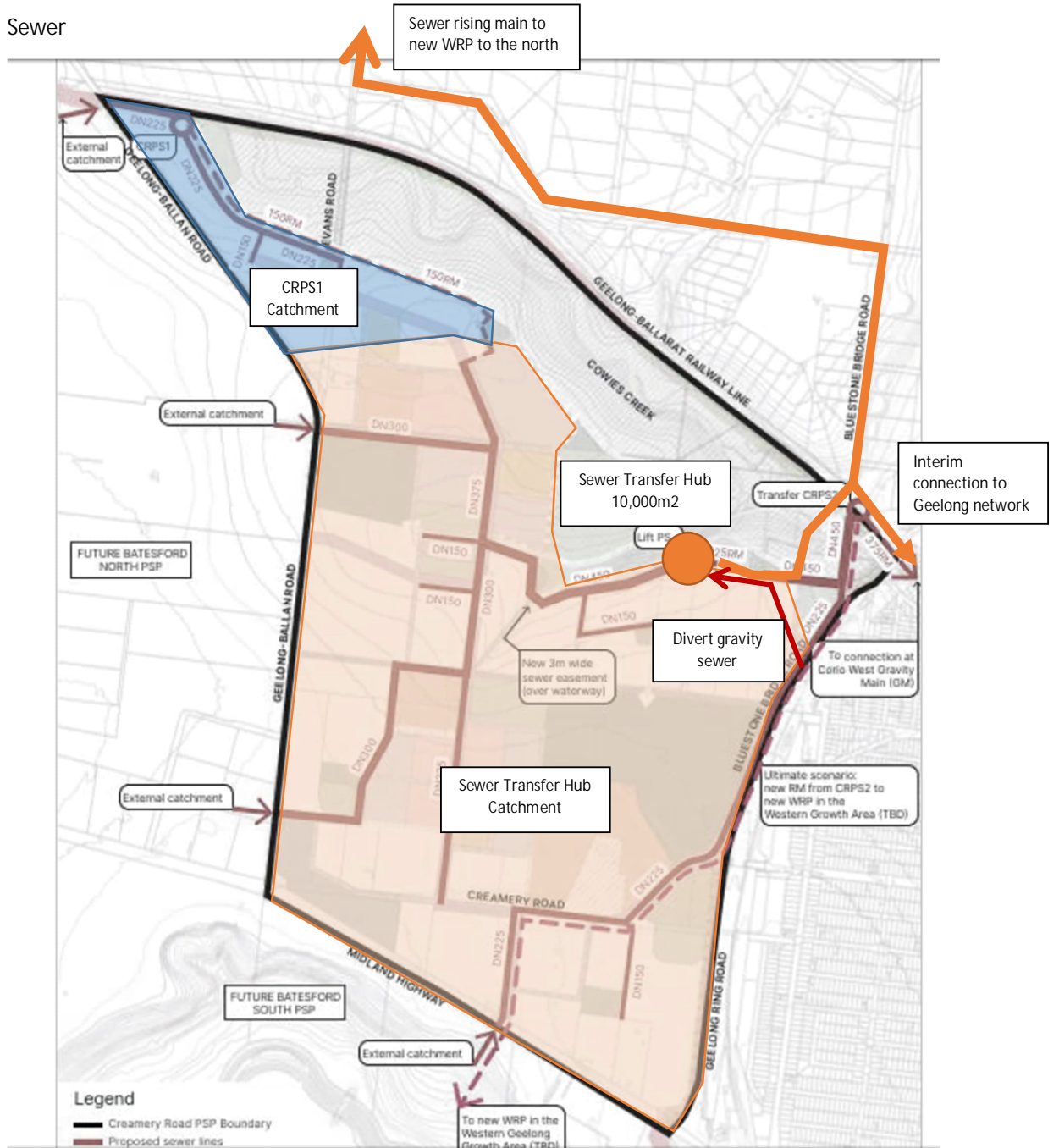
**Co-ordinator Network Planning | Barwon Water**

55-67 Ryrie Street Geelong VIC 3220

T (03) 5226 2328 | M 0410 302 708 | [www.barwonwater.vic.gov.au](http://www.barwonwater.vic.gov.au)

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Sewer





Michael MCNEEL

---

From: Sean Keown <Sean.Keown@barwonwater.vic.gov.au>  
Sent: Wednesday, 19 June 2024 12:51 PM  
To: Michael MCNEEL  
Cc: Tom MOORFOOT; Kristian Webb; David MUTTON; Cynthia Quach; Justin Hamling; Judy Phillips; Rhys Bennett  
Subject: RE: Creamery Road - BW Servicing Meeting

Follow Up Flag: Flag for follow up  
Flag Status: Flagged

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## OFFICIAL

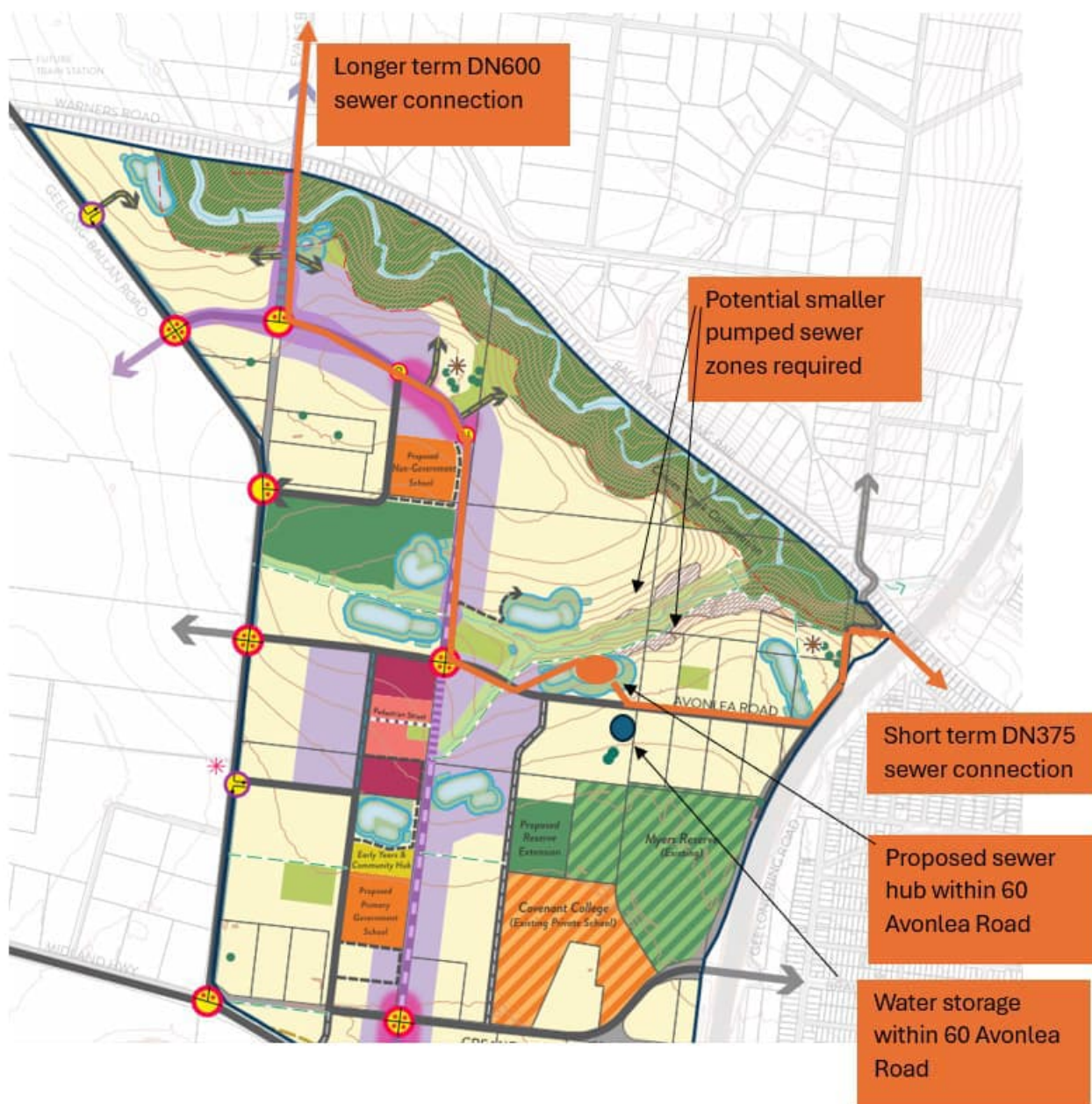
Hi Michael,

Thanks for your email, we are currently refining our concept servicing strategy for Creamery Road with the help of CMP. Therefore we haven't finalised preferred asset locations and alignments just yet but below is our current thinking on the topics you raise and the potential implications from the updated FUS.

1. Sewer rising main alignments - Due to challenges associated with constructability, environmental values and the Cowies Creek Conservation reserve includes the unmade road reserve of Bluestone Bridge Road, it is now not preferred to pursue a sewer crossing of Cowies Creek at Bluestone Bridge Road in the shorter or longer term. As such:
  - a. Shorter term sewer rising main alignment for connection to Geelong system will likely run up Avonlea road and under highway and towards top of Cowies Creek valley adjacent to 140 Bluestone Bridge Road. This is to avoid land slip susceptibility area and likely disruption from fragmented land tenure issues.
  - b. Longer term rising main connection to the proposed treatment plant will head back through developable area and be crossing Cowies Creek corridor within the Evans Road road reserve.
2. Sewer Hub location – our preference is for this to be located within the land at 60 Avonlea Road, and we have been considering a location in the vicinity of where the wetland has been shifted to. We visited site yesterday and from a levels perspective a location within 60 Avonlea Road at the top of the landslip susceptibility area and drainage corridor/creek towards the fork in the creek, would work best. We note that the proposed Villawood FUS does not have this wetland located here, which does make it a little challenging to plan for exactly what the end result here will be. Extent of land required for pump stations and storage still to be determined but could be significant (~5,000-10,000m<sup>2</sup>).
3. Preference is to avoid the area subject to landslip susceptibility for all major infrastructure. If sewer going northern side of wetland as shown on your plan below, we would need to ensure sufficient space between toe of wetland and land susceptibility area to cater for this service.
4. Depending on levels and final location of sewer hub and extent of development within land susceptibility zone, there are potentially smaller pumped catchments that will be required. Also, the northern side of the gully through 60 Avonlea Road will need sewers which aren't shown in your drawings. Alignments being confirmed now.
5. Preference for water storage and pump stations to be located on 60 Avonlea Road currently. We had explored the option of Myers Street Reserve as well but understand this is not an option for Council.

- Stormwater harvesting scheme keep live – the IWM plan for this growth area has the intention to keep live a potential stormwater harvesting scheme to harvest and transfer water from the basins. We have passed on info that would be required to facilitate this including potential pump stations and pipeline alignments to CoGG. This would be obviously additional to requirements shown in these plans.

I've marked up the plan below with a couple of these things. Excuse the roughness of this but given the tight turnaround times you require this info I thought I'd get it off sooner rather than later. Can book a time in to discuss this if easier



Regards,

Sean Keown (he/him)  
Growth Area Planning Lead | Barwon Water  
55-67 Ryrie Street Geelong VIC 3220  
M +614 5549 3580 | [www.barwonwater.vic.gov.au](http://www.barwonwater.vic.gov.au)

Barwon Water's service region includes parts of the traditional lands of Wadawurrung and Eastern Maar people. I acknowledge and pay my respects to their Elders past, present and emerging.

# Appendix B

## Powercor Servicing Advice

Michael MCNEEL

---

From: Ryan, Adam <ARyan@powercor.com.au>  
Sent: Friday, 30 April 2021 3:59 PM  
To: Michael MCNEEL  
Cc: David MUTTON; Tom MOORFOOT; Gascoigne, Neil  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice  
Attachments: NWGGA layout.png; NWGGA layout.snag

Hi Michael,

Sorry for the late response.

In relation to your questions, see below:

In general, our proposed works at either 66kV or 22kV will be overhead in nature with the exception of URD estates.

#### Northern Growth Area

The Northern Growth Area, encompassing the Lovely Banks area bounded by Staceys Road to the north, Evans Road to the west, Bacchus Marsh Road to the east and Plantation Road on the southern boundary is currently supplied by two 22kV feeder lines, one from the Corio (CRO) Zone Substation, at the corner of Beatty Street and Seaside Parade, and the other from the Ford North Shore (FNS) Zone Substation in St Georges Road, adjacent to the railway line.

The backbones of the 22kV feeders run along the major roads, Anakie Road (CRO13 22kV feeder) and Bacchus Marsh Road (FNS11 22kV feeder). Powercor plans to build a new zone substation at Gheringhap (GHP) in 2022 which will take over the Anakie Road (CRO13 22kV feeder to GHP022 22kV feeder) supply in the Northern Growth Area. These zone substations have sufficient capacity to initially provide load to new developments in the Northern Growth Area. See the attachment for a GIS plot of Powercor's existing 22kV feeder assets and zone substations supplying the Northern and Western Growth Areas, indicative overhead sub transmission routes and indicative locations of future zone substations.

Requests for power supplies will need to be connected to these 22kV feeder backbones. Power lines extended within the Northern Growth Area would be generally placed underground and sites within the precinct will need to be established for new kiosk substations. A new requirement is that REFCL (Rapid Earth Fault Current Limiter) isolating transformers may be required at sites supplied by the GHP022 feeder to be able to maintain the REFCL performance legislated by the Victorian Government.

Throughout this process augmentation will continue on the 22kV feeders to meet the forecast demand requirements. At the stage when no further augmentation on the existing lines is feasible, it will be planned to extend new 22kV feeder lines from either the FNS or GHP zone substations depending on where the load constraints develop in the Northern Growth Area.

Powercor has two new 22kV feeders planned in the next 10 years to meet growth in the northern Geelong area to Lara. Using these new 22kV feeders, rearrangements can occur to increase capacity into the Northern Growth Area.

The FNS013 new 22kV feeder is planned to be built using a combination of new lines and overbuild of existing 22kV feeder infrastructure into the vicinity of the Lara township. This project is planned for completion this year and is primarily due to the new prison development at Lara.

The FNS032 feeder extension is planned to extend the feeder into the Avalon precinct using new lines and existing 22kV feeder infrastructure. This project is planned for completion in 2024 but its timing is dependent on developments proceeding in the Avalon area.

The FNS033 new 22kV feeder is planned to be built using a combination of new lines and overbuild of existing 22kV feeder infrastructure into the Avalon precinct. This project is planned for completion in 2027 but its timing is dependent on developments proceeding in the Avalon area.

### Lovely Banks (LVB) Zone Substation

Ultimately it is planned to establish a Lovely Banks Zone Substation in the vicinity of the load centre of the Northern Growth Area to supply its established load requirements based on the estimates of around 16,000 to 18,000 dwellings. The load centre would be either in any potential Neighbourhood Activity Centres or employment areas of the Northern Growth area. Based on the information in the NWGGA Context Report, a location in the vicinity of Heales Rd would be suitable.

This new zone substation would require a footprint of up to 100m (w) x 100m (d) and is preferred to be zoned either "Minor utility installation" or "Utility installation" based on its planned use as a zone substation.

This zone substation would be supplied via overhead sub transmission lines from the Geelong Terminal Station on the corner of Cox Road and Anakie Road. The power line routes to Lovely Banks Zone Substation are to still be investigated and the final route will be dependent on the chosen location of the zone substation but there will be sections that run through the Northern Growth Area.

### Western Growth Area

The Western Growth Area, encompassing the Batesford area bounded by the Ballarat – Geelong railway line to the north, Dog Rocks and Friend in Hand Roads to the west, the Geelong Ring Road to the east and the Barwon River on the southern boundary is currently supplied by three 22kV feeders from the Geelong (GL) Zone Substation, at the corner site of Ballarat Road and Ebdon Street.

The backbones of two of the 22kV feeders run along major highways to Geelong in the Midland Highway (GL015 22kV feeder) and the Hamilton Highway (GL012 22kV feeder). The third 22kV feeder (GL014 22kV feeder) runs through the middle of the Western Growth Area in easement to the Batesford Quarry site. Powercor plans to build a new zone substation at Gheringhap (GHP) in 2022 which will take over the Midland Highway (GL015 22kV feeder to GHP011 and GHP012 22kV feeders) supply, Hamilton Highway (GL012 22kV feeder to GHP021 22kV feeder) supply, and third 22kV feeder (GL014 22kV feeder to GHP021 22kV feeder) supply in the Western Growth Area. The GHP Zone Substation has sufficient capacity to initially supply the Western Growth Area but will require augmentation for continuing load growth. See the attachment for a GIS plot of Powercor's existing 22kV feeder assets and zone substations supplying the Northern and Western Growth Areas, indicative overhead sub transmission routes and indicative locations of future zone substations.

Once capacity has been reached on the existing 22kV feeders, additional 22kV feeders will be extended from the GHP Zone Substation to supply the forecast demands of the Western Growth Area.

Similar to the Northern Growth Area, requests for power supplies will need to be connected to these 22kV feeder backbones and power lines extended within the Western Growth Area would be generally placed underground, with sites within the precinct needed to be established for new kiosk substations. Again, a new requirement is that REFCL (Rapid Earth Fault Current Limiter) isolating transformers may be required at sites supplied by the GHP 22kV feeders to be able to maintain the REFCL performance legislated by the Victorian Government.

### Gheringhap (GHP) Zone Substation

Powercor is planning to build the GHP zone substation in the vicinity of the corner of the Midland Highway and the Fyansford-Gheringhap Road to meet our bushfire mitigation requirements as legislated by the Victorian Government. The new zone substation will have REFCL's installed to meet part of those bushfire mitigation requirements.

The GHP Zone Substation will be supplied via overhead sub transmission lines with the current proposal to connect new sub transmission lines between the Geelong Terminal Station and a tee-off of the existing line to the Blue Circle Cement (BCG) customer owned substation. Note that the sub transmission line routes are still being worked through and negotiations with stakeholders are occurring so they are subject to change but they will run through sections of the Western Growth Area.

#### Bannockburn (BBN) Zone Substation

Ultimately it is planned to establish a Bannockburn Zone Substation in the vicinity of the Bannockburn township to supply its established load requirements and forecast load requirements.

Powercor's planning guidelines are based on a risk based methodology. Once the capacity constraints at the GHP Zone Substation and 22kV feeder network in the western Geelong region become too great it is planned to establish a Bannockburn Zone Substation. Continuing discussions with the Golden Plains Shire are planned to progress the site location for the zone substation. The new zone substation would be required to meet future load requirements for the Bannockburn, Lethbridge and Meredith townships but would also enable additional capacity for the Western Growth Area from it's GHP zone substation supply or from the new BBN zone substation.

This new zone substation would require a footprint of up to 100m (w) x 100m (d) and is preferred to be zoned either "Minor utility installation" or "Utility installation" based on its planned use as a zone substation.


The BBN Zone Substation is proposed to be supplied via two overhead sub transmission lines from the GHP zone substation with their proposed routes still to be developed.

#### Sequence of Developments

Powercor has existing infrastructure in both the Northern and Western Growth areas that is suitable to supply initial developments. The particular sequencing that occurs will have little impact on Powercor, as the appropriate capacity required will be scoped into development supply requests. Having said that, Powercor is better prepared at this time to service the power requirements of the Northern Growth Area than the Western Growth Area based on the current capacity constraints of existing infrastructure.

**Adam Ryan**  
**Network Optimisation Manager | Network Planning**

**CitiPower and Powercor**  
**Phone: (03) 9683 4380**  
**Mobile: 0466 130 145**  
**Email: [aryan@powercor.com.au](mailto:aryan@powercor.com.au)**

 [Chat on teams](#)



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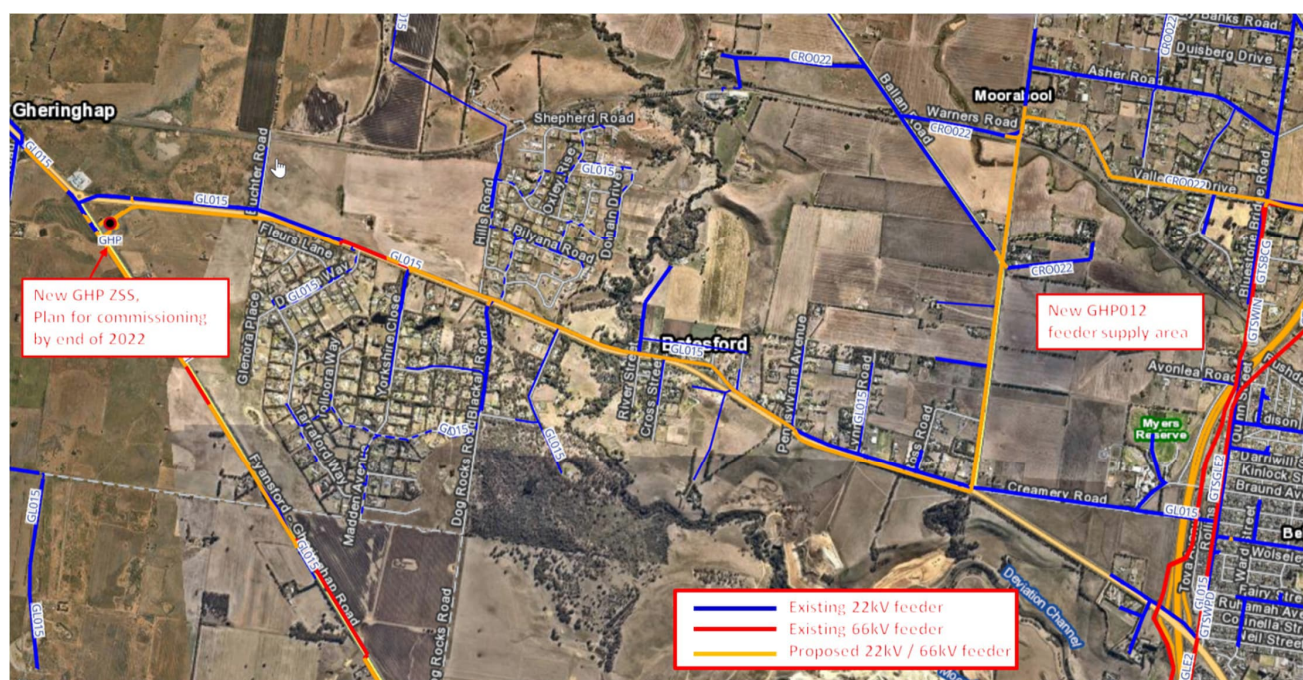
From: Michael MCNEEL <Michael.McNeel@smec.com>  
Sent: Wednesday, 28 April 2021 16:44  
To: Ryan, Adam <ARyan@powercor.com.au>  
Cc: David MUTTON <David.Mutton@smec.com>; Tom MOORFOOT <Tom.Moorfoot@smec.com>  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

8<sup>th</sup> June 2022

RE: Draft Creamery Road Precinct Structure Plan for agency consultancy (PSP) and Technical Reports

## Electricity

### 1. Current state and proposed works



Existing electrical assets within Creamery Road development:

- Creamery Road 22kV feeder GL015
- Ballan Road 22kV feeder CRO022
- Geelong Ring Road 66kV feeder to Geelong Terminal Station (GTS)

Current works:

- GHP ZSS will be commissioned by end of 2022
- Midland Highway new 22kV and 66kV overhead feeders from GHP by end of 2022
- Ballan Road new 22kV and 66kV overhead feeders from GHP by end of 2022
- New GHP012 feeder will pick up GL015 and CRO022 to provide initial supply to the Creamery Road precinct



## 2. Servicing Strategy

- Existing (including the current works) 22kV and 66kV overhead power lines should remain.
- GHP ZSS will have sufficient transformation capacity to supply the Creamery Road Precinct.
- The new GHP012 feeder will provide initial supply but augmentation will be required for continuing load growth. It is estimated that GHP012 can connect about 1,000 customers before a second feeder is required.
- A second feeder is likely to be developed from new GHP ZSS or current GL/GB ZSS.
- New 22kV circuits within the development could be generally undergrounded network off the overhead lines, with new kiosk substations sites in the Creamery Road Precinct for customer connections.
- REFCL isolating transformers will be required at sites to maintain the REFCL performance in compliance legislated by the Victorian Government. They are most likely required for 22kV underground network isolation. It is recommended to reduce HV underground network as much as possible in order to reduce the number and size of the transformer requirement.

## 3. Comments on renewable energy opportunities

Powercor noticed that the precinct plan proposed a number of opportunities (e.g. no gas infrastructure, 7kW EV charge per household, rooftop PV and battery storage, etc.) to achieve a net zero carbon outcome. To accommodate the increased load per household and to support solar export, following are the possible requirements for the electrical infrastructure:

- Shorter low voltage circuit lengths than usual sites
- Reduced number of customers connected per LV circuit and substation
- Larger kiosk substations, increase from default 315kVA to 500kVA
- More kiosk substations throughout the precinct
- More REFCL isolating transformers (or bigger size)
- Bring forward HV network augmentation, e.g. a second 22kV feeder.

Detail assessments are required at the developer masterplan submissions and individual customer connection requests.

## 4. With regards to Council proposal of smart street lighting and other signages in PSP, Powercor's public lighting team must be consulted for inputs/comments.

Appendix

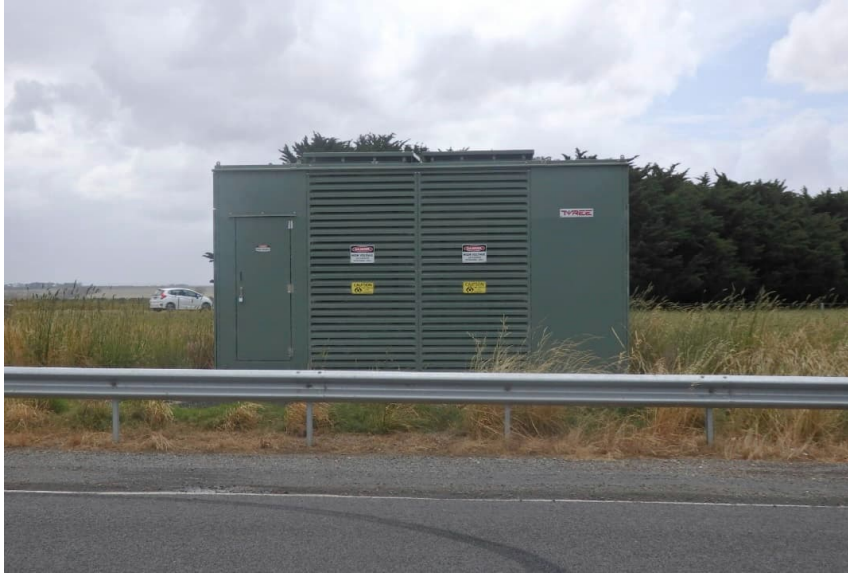


Figure 1 - 3000kVA REFCL isolating transformer, high capacity high voltage cables will require this large size REFCL isolating transformer



Figure 2 - 1000kVA REFCL isolating transformer, physical size is similar to a kiosk substation

## Jayden Holmes

---

**From:** Li, Shuyi <SHli@powercor.com.au>  
**Sent:** Wednesday, 7 September 2022 9:34 AM  
**To:** Jayden Holmes  
**Cc:** Alexander Schmidt; Melissa Blyton; Lightwala, Lovai; Akla Nanayakkara  
**Subject:** ReX: RE: Creamery Road PSP - Electricity Servicing

**Record Number:** D22-426333

Hi Jayden,

Reserve/easement for kiosk substation is 7.2m x 7.2m square. This is followed by URD developers in most case.

Reserve/easement for REFCL isolating transformers:

- 1MVA and 2MVA is 7.2m x 7.2m
- 3MVA is 10\* 7.2m

Regards,

**Shuyi Li**

Network Solutions Engineer | Network Optimisation  
CitiPower Pty Ltd & Powercor Australia Ltd

T +61 03 8363 8479 | E [SHli@powercor.com.au](mailto:SHli@powercor.com.au)  [Chat on Teams](#)



---

**From:** Jayden Holmes <JHolmes2@geelongcity.vic.gov.au>

**Sent:** Wednesday, 7 September 2022 8:45 AM

**To:** Li, Shuyi <SHli@powercor.com.au>

**Cc:** Alexander Schmidt <ASchmidt@geelongcity.vic.gov.au>; Melissa Blyton <Melissa.Blyton@geelongcity.vic.gov.au>; Lightwala, Lovai <LLightwala@powercor.com.au>; Akla Nanayakkara <ANanayakkara@geelongcity.vic.gov.au>

**Subject:** RE: Creamery Road PSP - Electricity Servicing

Hi Shuyi,

Further to my last email, could you please provide the minimum footprint required (including easement) for each type of kiosk?

Kind regards,  
Jayden

**Jayden Holmes**

Senior Strategic Planner  
Planning and Growth  
City of Greater Geelong

**P:** 03 5272 4859

**E:** [JHolmes2@geelongcity.vic.gov.au](mailto:JHolmes2@geelongcity.vic.gov.au)

We acknowledge the Traditional Custodians of the land, the [Wadawurrung](#) People of the Kulin Nation. We pay our respects to their Elders past and present, Elders in our community and our emerging leaders.

---

**From:** Li, Shuyi <[SHli@powercor.com.au](mailto:SHli@powercor.com.au)>  
**Sent:** Tuesday, 6 September 2022 5:53 PM  
**To:** Jayden Holmes <[JHolmes2@geelongcity.vic.gov.au](mailto:JHolmes2@geelongcity.vic.gov.au)>; Lightwala, Lovai <[LLightwala@powercor.com.au](mailto:LLightwala@powercor.com.au)>  
**Cc:** Alexander Schmidt <[ASchmidt@geelongcity.vic.gov.au](mailto:ASchmidt@geelongcity.vic.gov.au)>; Melissa Blyton <[Melissa.Blyton@geelongcity.vic.gov.au](mailto:Melissa.Blyton@geelongcity.vic.gov.au)>  
**Subject:** RE: Creamery Road PSP - Electricity Servicing

Hi Jayden,

Based on the number of lots and assumptions of installations, we estimated:

- Approx. 20MVA supply for the precinct, this will require two or more 22kV feeders and tie-ins for supply security.
- Around 64 \* 315kVA or 40 \* 500kVA kiosk substations may be needed. This is based on the assumption that they are houses and townhouses.
- Locations, quantities and sizing of kiosks and isolating transformers will depend on development plan and the Developers Electrical masterplan designs.
- Please note that the LV circuits do not exceed 300m in length. The network should be built to Powercor standards with 240mm<sup>2</sup> 4/C Al LV cables as LV mains. Apartment buildings, as well as commercial development (e.g. community and shopping precincts) will have different supply arrangement and there may be indoor substations.
- Necessary modification to the supply requirement (both kiosk substations and LV circuits) if EV charging point to be added in each lot. Requirement and guidelines are under preparation. This can impact number of lots per circuit based on the voltage drop calculations.
- REFCL Isolation Transformers are 1, 2 or 3 MVA rated. They are required at the HV cable entrance point to the development enabling to isolate the HV underground network from REFCL complied network. This Transformers will prevent REFCL component overload at their zone substations.

Please refer to Powercor's previous response for servicing strategy.

Links to Powercor's key EV and storage solution projects:

EV trial: [Electric Vehicle Grid Project - United Energy](#)

Pole top battery project: [Electric Avenue pole-top battery program - United Energy](#)

Neighbourhood Battery Feasibility Study and Tarneit Neighbourhood Battery: [Electric Avenue | CitiPower & Powercor](#)

Please let me know if you have any further questions.

Regards,

**Shuyi Li**

Network Solutions Engineer | Network Optimisation

CitiPower Pty Ltd & Powercor Australia Ltd

T +61 03 8363 8479 | E [Shli@powercor.com.au](mailto:Shli@powercor.com.au)  [Chat on Teams](#)



---

**From:** Jayden Holmes <[JHolmes2@geelongcity.vic.gov.au](mailto:JHolmes2@geelongcity.vic.gov.au)>

**Sent:** Wednesday, 31 August 2022 4:47 PM

**To:** Li, Shuyi <[SHli@powercor.com.au](mailto:SHli@powercor.com.au)>; Lightwala, Lovai <[LLightwala@powercor.com.au](mailto:LLightwala@powercor.com.au)>

**Cc:** Alexander Schmidt <[ASchmidt@geelongcity.vic.gov.au](mailto:ASchmidt@geelongcity.vic.gov.au)>; Melissa Blyton <[Melissa.Blyton@geelongcity.vic.gov.au](mailto:Melissa.Blyton@geelongcity.vic.gov.au)>

**Subject:** RE: Creamery Road PSP - Electricity Servicing

Hi Shuyi and Lovai,

Thank you for meeting with us this morning.

A copy of the draft Creamery Road PSP and Servicing Plan can be found [here](#). Note that these documents have not yet been updated since agency consultation.

As discussed, please provide an estimate of the number and size of kiosk substations and isolation transformers required for Creamery Road PSP (as well as preferred locations if possible), based on the below assumptions:

- 3,857 new dwellings (for estimated population of 10,800);
- No new reticulated gas networks or connections for residential and non-residential development and subdivision;
- All new dwellings built to a minimum 7 star NatHERS standard;
- All new residential lots to allow for future provision of Electric Vehicle Charging Points (EVCPs), to a minimum specification of one 7kW 32Amp EVCP per dwelling;
- All new dwellings with up to two bedrooms to have installed a 3kW minimum capacity solar photovoltaic (PV) system. An additional 1kW capacity solar photovoltaic (PV) system is required for each additional bedroom proposed; and
- Apartment buildings to have installed a solar PV system with a capacity of at least 25W per square metre of site coverage or 1kW per dwelling.

Grateful if you could also provide further information on any non-network renewable energy generation and/or storage solutions Powercor is pursuing, or would consider pursuing, in a greenfield context (i.e. neighbourhood batteries). If there is another team within Powercor that we should speak with about this, please feel free to pass on my contact details.

I will send Lovai a separate email with our questions about Myers Reserve for Powercor's Customer Projects team.

Kind regards,  
Jayden

**Jayden Holmes**

Senior Strategic Planner  
Planning and Growth  
City of Greater Geelong

**P:** 03 5272 4859

**E:** [JHolmes2@geelongcity.vic.gov.au](mailto:JHolmes2@geelongcity.vic.gov.au)

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# Appendix C

## Other Services – Authority Advice

From: Lydia Markovska <lydia.markovska@ausnetservices.com.au>  
Sent: Tuesday, 11 May 2021 7:49 AM  
To: Michael MCNEEL  
Cc: Darrin Hill; David MUTTON  
Subject: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Good Morning Michael,

Apologies for the delay on this.

Our planning department have come back and have advised the below.

For the Northern Geelong Growth area, sufficient capacity will be available with the construction of a new city gate approximately in the corner of Staceys Rd and Bacchus Marsh Rd to service the proposed development.

For Western Geelong Growth area, existing capacity is also sufficient to service Short to Medium term proposed development. Additional capacity is also available from existing gas city gate located at Fyansford-Gheringhap Rd if required for long term development areas.

Hope this helps, let me know if further information is required.

Give me a call should you have any further questions.

**Kind Regards,**

Lydia Markovska  
Energy Project Coordinator



**AusNet Services**  
308 Hyde Street  
Yarraville Victoria 3013 Australia  
Tel +61 3 9396 7616  
Mobile +61 (0) 437 576 160  
[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)  
[www.ausnetservices.com.au](http://www.ausnetservices.com.au)

---

From: Michael MCNEEL <[Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)>  
Sent: Friday, 7 May 2021 6:20 PM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

**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,

Could you please advise on the status of AusNet's servicing advice for the Creamery Road and Elcho Road East Development Precincts.

Even some indication of the timing of this advice would be beneficial to co-ordinate our own internal process and to provide feedback to our client.

Regards,

**Michael McNeel**  
Project Engineer - Urban Communities  
M +61 4 0264 8315 T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)  
East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Michael MCNEEL  
Sent: Tuesday, 4 May 2021 2:04 PM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Hi Lydia,

Just following up on this query – would appreciate some feedback on a probable timeline.

Regards,

**Michael McNeel**  
Project Engineer - Urban Communities  
M +61 4 0264 8315 T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)  
East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Michael MCNEEL  
Sent: Friday, 30 April 2021 3:02 PM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Hi Lydia,

Just following up on this servicing information – you mentioned on Wednesday that you would have something ready for issue by the end of the week.

I'm sure you can appreciate that we are working to our own timeframes with CoGG for this engagement.

Given that we requested servicing information from authorities in late February, we are running out of time to complete the associated engineering report.

Any effort you can make to expedite your servicing review would be appreciated.

Regards,

**Michael McNeel**  
Project Engineer - Urban Communities  
T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)

Michael MCNEEL

---

From: Lydia Markovska <lydia.markovska@ausnetservices.com.au>  
Sent: Monday, 28 June 2021 5:05 PM  
To: Michael MCNEEL  
Cc: David MUTTON; Darrin Hill  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Good Afternoon Michael,

Hope you had a nice weekend.

Our planning department have advised that Elcho Road East Precinct in Northern Geelong Growth area, sufficient capacity will be available in the network to service the proposed development.

Creamery Road Precinct in Western Geelong Growth area, limited capacity is available with the current backbone supply mains and would not be able to support entire 3,012 dwellings with the existing network. Therefore, network reinforcement would likely be required to provide additional capacity for medium-long term development in the area.

Hope this has been helpful.

Thank you

**Kind Regards,**

Lydia Markovska  
Energy Project Coordinator



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[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)  
[www.ausnetservices.com.au](http://www.ausnetservices.com.au)

---

From: Lydia Markovska  
Sent: Monday, 21 June 2021 6:59 AM  
To: Michael MCNEEL <Michael.McNeel@smec.com>  
Cc: David MUTTON <David.Mutton@smec.com>; Darrin Hill <darrin.hill@ausnetservices.com.au>  
Subject: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Hi Michael,

I'll follow this up this morning and hope to have something back to you in the next couple of days.

**Kind Regards,**

Lydia Markovska  
Energy Project Coordinator



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[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)  
[www.ausnetservices.com.au](http://www.ausnetservices.com.au)

---

From: Michael MCNEEL <[Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)>  
Sent: Friday, 18 June 2021 9:28 AM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Cc: David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>; Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

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,

Has your Planning Department made any further progress on this?

Regards,

**Michael McNeel**  
Project Engineer - Urban Communities  
M +61 4 0264 8315 T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)  
East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Michael MCNEEL  
Sent: Monday, 7 June 2021 10:37 AM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Cc: David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Hi Lydia,

See attached current framework plans for both NGGA and WGGA areas – note both Elcho Road East and Creamery Road Precinct's relate to a small proportion of each individual Growth area.

As per our brief the proposed maximum dwellings for each precinct equate to;

Creamery Road Precinct	3,012 dwellings
Elcho Road East Precinct	4,120 dwellings

If you have any further questions, let me know.

Regards,

Michael McNeel

Project Engineer - Urban Communities

M +61 4 0264 8315 T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)

East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>

Sent: Monday, 7 June 2021 9:31 AM

To: Michael MCNEEL <[Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)>

Subject: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

**This Message Is From an External Sender**

This message came from outside your organization.

Good Morning Michael,

Hope your keeping well and had a nice weekend.

Are you able to send through an overall PSP plan with the proposed number of lots/developments? If you could also provide me with the timing it would most appreciated.

Our planning department can then provide a response.

Apologies for the delay.

**Kind Regards,**

Lydia Markovska

Energy Project Coordinator



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[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)

[www.ausnetservices.com.au](http://www.ausnetservices.com.au)

---

From: Michael MCNEEL <[Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)>

Sent: Thursday, 27 May 2021 9:01 AM

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

Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; Shane MCGLYNN <[Shane.McGlynn@smec.com](mailto:Shane.McGlynn@smec.com)>; Tom

MOORFOOT <[Tom.Moorfoot@smec.com](mailto:Tom.Moorfoot@smec.com)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>

Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

**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,

Could you please provide a response to David's queries to the servicing information you provided on the 11/05.

Regards,

**Michael McNeel**

Project Engineer - Urban Communities

M +61 4 0264 8315 T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)

East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Michael MCNEEL

Sent: Monday, 17 May 2021 4:39 PM

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

Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; Shane MCGLYNN <[Shane.McGlynn@smec.com](mailto:Shane.McGlynn@smec.com)>; Tom

MOORFOOT <[Tom.Moorfoot@smec.com](mailto:Tom.Moorfoot@smec.com)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>

Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Hi Lydia,

Could you please assist with David's queries below?

Regards,

**Michael McNeel**

Project Engineer - Urban Communities

M +61 4 0264 8315 T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)

East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>

Sent: Tuesday, 11 May 2021 11:21 AM

To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>; Michael MCNEEL <[Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)>

Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; Shane MCGLYNN <[Shane.McGlynn@smec.com](mailto:Shane.McGlynn@smec.com)>; Tom

MOORFOOT <[Tom.Moorfoot@smec.com](mailto:Tom.Moorfoot@smec.com)>

Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Hi Lydia,

Hope you are well, thanks for the information below.

I have a few queries, in red below.

Your input would be very much appreciated.

Kind regards,

David

**David Mutton**

Project Manager

M +61 407 315 601 T +61 3 9869 0843 E [David.Mutton@smec.com](mailto:David.Mutton@smec.com)

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

---

From: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>

Sent: Tuesday, 11 May 2021 7:49 AM

To: Michael MCNEEL <[Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)>

Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>

Subject: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Good Morning Michael,

Apologies for the delay on this.

Our planning department have come back and have advised the below.

For the Northern Geelong Growth area, sufficient capacity will be available with the construction of a new city gate approximately in the corner of Staceys Rd and Bacchus Marsh Rd to service the proposed development.

The City Gate location suits the Elcho Rd E PSP area, however:

- City Gate:
  - Timing? as required by development or an approx. date??
  - Cost to development??
  - Corner of Staceys Road/Bacchus Marsh Rd – will this be the south-west corner (within the NWGGA) or external to??
  - If in the Elcho Rd E precinct, what type of area is required to be set aside for the facility??
- With no apparent distribution gas mains currently within or adjacent to the Elcho Rd PSP area, what is the feed for the City Gate?
  - Bacchus Marsh Road, from the south??
  - Requirement for development to provide land for feed main?
  - Cost to development?
- Any additional impediments to development?

For Western Geelong Growth area, existing capacity is also sufficient to service Short to Medium term proposed development. Additional capacity is also available from existing gas city gate located at Fyansford-Gheringhap Rd if required for long term development areas.

Would I be right in assuming that the existing City Gate in Fyansford-Gheringhap Rd (located approx. 1.1km south of Ballan Road) would supply the southern part of the WGGA and therefore the Creamery Road PSP area (development being in the short term) would be supplied from the existing infrastructure (feed) from Bell Post Hill under the Geelong Ring Road (see attached DBYD plan). If this the case:

- Would the existing 110 P8 need to be upgraded to service the whole of the Creamery Rd PSP area?
- Would there need to be any additional feeds across the Geelong Ring Road to supply this area?
- If any of the above is required would there be a cost to development for any of these works?

Hope this helps, let me know if further information is required.

Give me a call should you have any further questions.

**Kind Regards,**

Lydia Markovska  
Energy Project Coordinator



**AusNet Services**  
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Yarraville Victoria 3013 Australia  
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Mobile +61 (0) 437 576 160  
[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)  
[www.ausnetservices.com.au](http://www.ausnetservices.com.au)

---

From: Michael MCNEEL <[Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)>  
Sent: Friday, 7 May 2021 6:20 PM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

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Hi Lydia,

Could you please advise on the status of AusNet's servicing advice for the Creamery Road and Elcho Road East Development Precincts.

Even some indication of the timing of this advice would be beneficial to co-ordinate our own internal process and to provide feedback to our client.

Regards,

**Michael McNeel**

Project Engineer - Urban Communities

M +61 4 0264 8315 T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)

East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Michael MCNEEL  
Sent: Tuesday, 4 May 2021 2:04 PM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Hi Lydia,

Just following up on this query – would appreciate some feedback on a probable timeline.

Regards,

**Michael McNeel**

Project Engineer - Urban Communities

M +61 4 0264 8315 T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)

East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Michael MCNEEL  
Sent: Friday, 30 April 2021 3:02 PM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>  
Subject: RE: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Hi Lydia,

Just following up on this servicing information – you mentioned on Wednesday that you would have something ready for issue by the end of the week.

I'm sure you can appreciate that we are working to our own timeframes with CoGG for this engagement.

Given that we requested servicing information from authorities in late February, we are running out of time to complete the associated engineering report.

Any effort you can make to expedite your servicing review would be appreciated.

Regards,

**Michael McNeel**

Project Engineer - Urban Communities

T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)

East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Michael MCNEEL

Sent: Thursday, 29 April 2021 9:10 AM

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

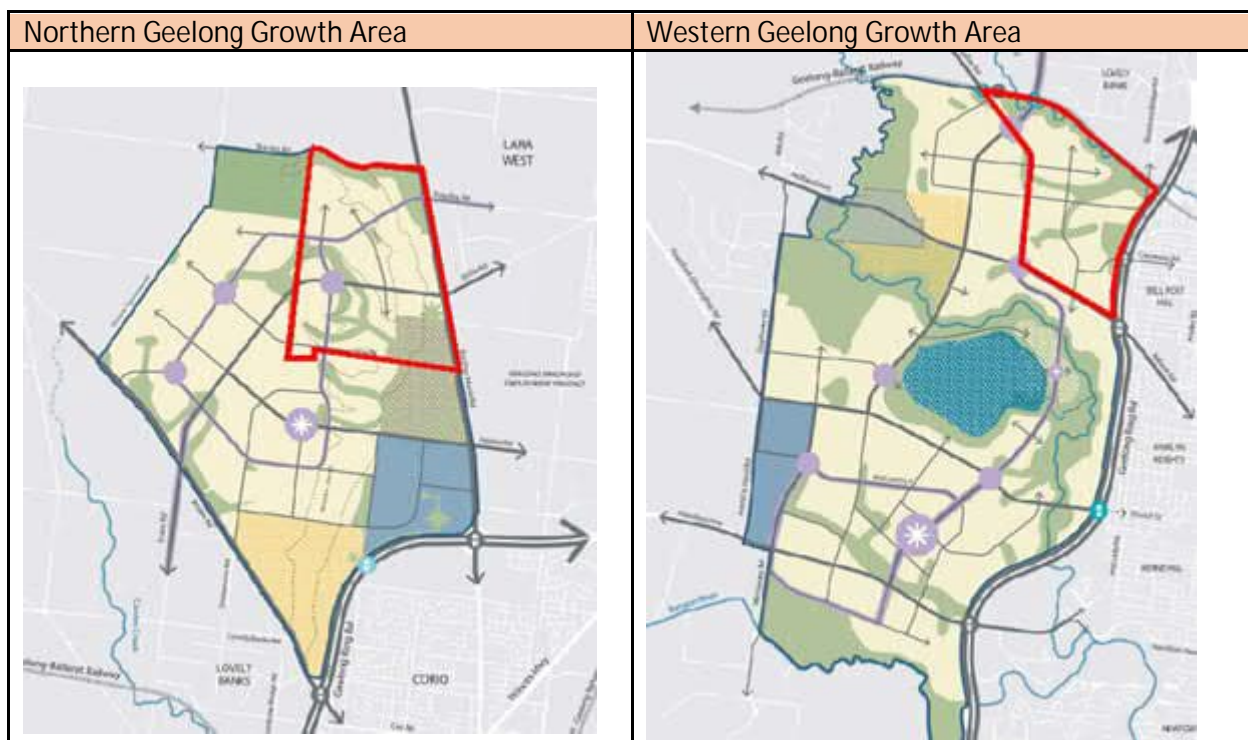
Cc: Darrin Hill <[darrin.hill@ausnetservices.com.au](mailto:darrin.hill@ausnetservices.com.au)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>

Subject: FW: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Thanks for the chat yesterday Lydia.

We require high level servicing information detailing the following for both the Creamery Road and Elcho Road East Development Precincts (located within the Western and Northern Geelong Growth areas respectively);

- Logical points of connection to existing infrastructure
- Capacity of existing supply infrastructure
- Requirements for system upgrades or delivery of external infrastructure



Regards,

**Michael McNeel**

Project Engineer - Urban Communities

T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)

East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Michael MCNEEL  
Sent: Wednesday, 28 April 2021 4:06 PM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Subject: FW: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

**Michael McNeel**  
Project Engineer - Urban Communities  
T +61 3 5228 3164 E [Michael.McNeel@smec.com](mailto:Michael.McNeel@smec.com)  
East 5, Federal Mills – 33 Mackey Street, North Geelong, VIC, 3215, Australia

---

From: Michael MCNEEL  
Sent: Friday, 26 February 2021 4:51 PM  
To: Lydia Markovska <[lydia.markovska@ausnetservices.com.au](mailto:lydia.markovska@ausnetservices.com.au)>  
Cc: Tom MOORFOOT <[Tom.Moorfoot@smec.com](mailto:Tom.Moorfoot@smec.com)>; David MUTTON <[David.Mutton@smec.com](mailto:David.Mutton@smec.com)>  
Subject: Northern and Western Geelong Growth Areas - Preliminary Servicing Advice

Hi Lydia,

SMEC have been recently awarded the CoGG Tender to prepare the PSP Servicing Plan/Report for both the Elcho Road East and Creamery Road PSP Areas. These Precincts constitute the first development sites for the Northern and Western Geelong Growth areas respectively.

The report will detail servicing provisions for the PSP areas, specifically;

- Existing Servicing arrangements
- Interim Servicing Strategies
- Ultimate Servicing plan
- Proposed Trunk Infrastructure

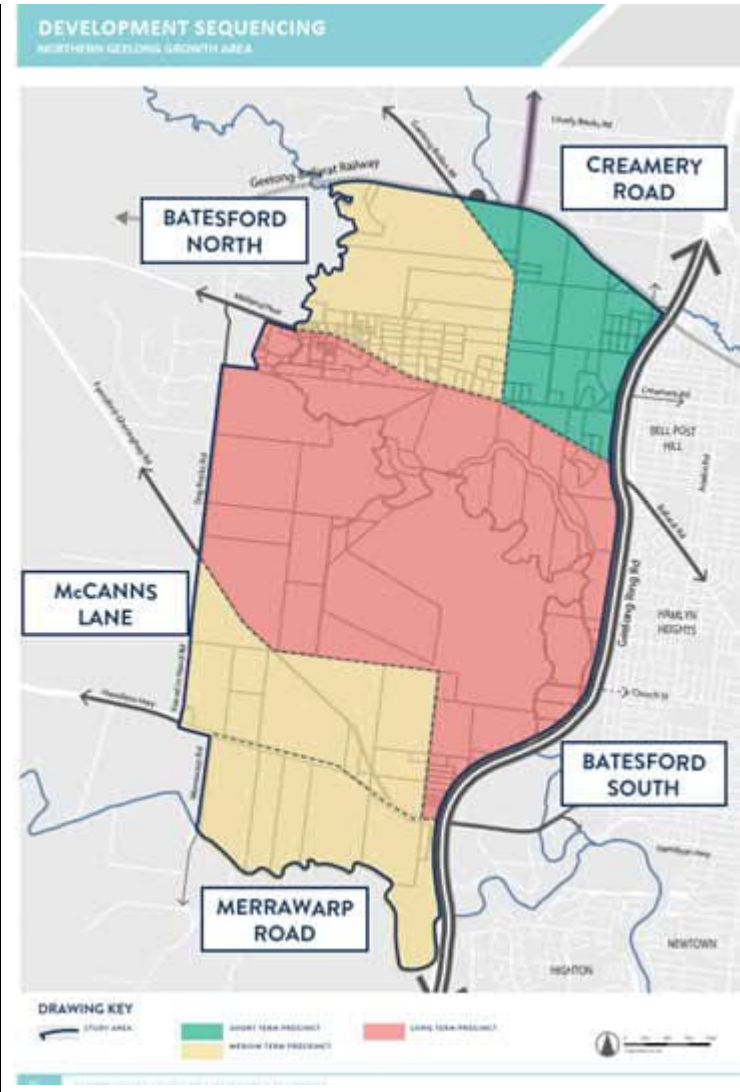
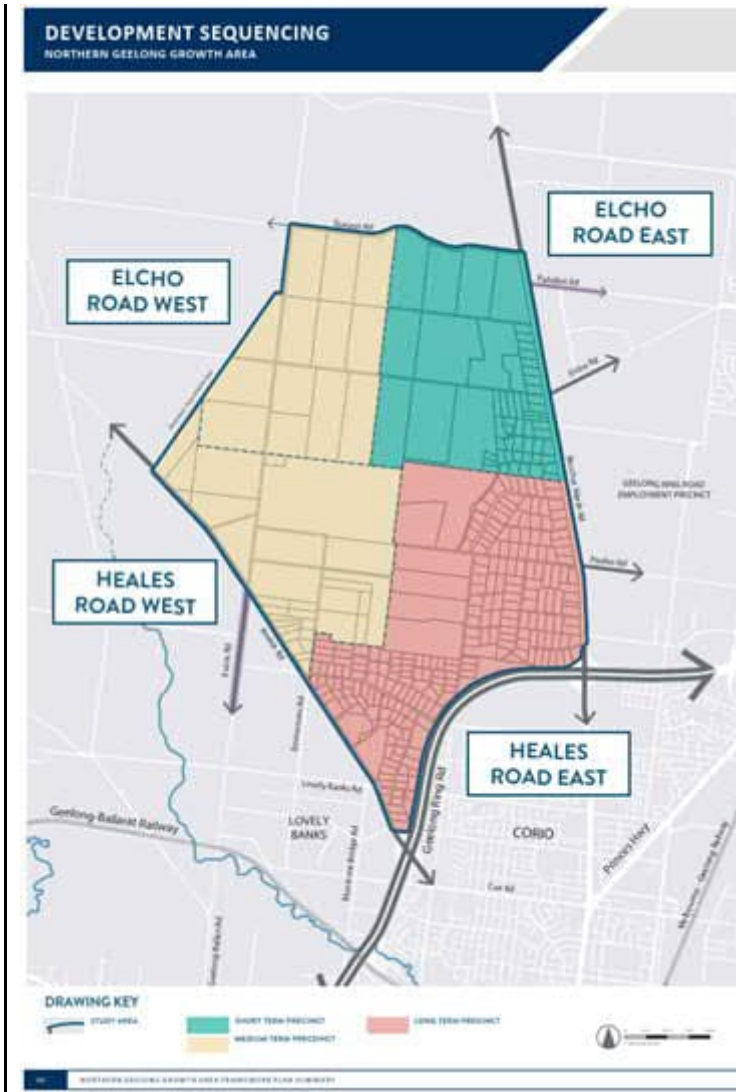
The report will also touch on the delivery of infrastructure and its corresponding impact of the sequencing of development.

Please provide AusNet Preliminary Servicing Advice pertaining to Gas services for the Creamery Road & Elcho Road East Precincts – we note that AusNet have recently provided similar advice for the Marshall Precinct Structure Plan (see attached).

In the next fortnight we will meet with CoGG to discuss the project in further detail and establish the scope of the report. Following this we will co-ordinate a meeting with AusNet to discuss Servicing provisions/planning for the two precincts referenced above.

If you need any further information, please let me know.

Northern Geelong Growth Area	Western Geelong Growth area
------------------------------	-----------------------------



Michael McNeel

Project Engineer - Urban Communities

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10 March 2021

APA Reference: 448296  
Your Reference: N/A

SMEC  
Att: David Mutton  
Collins Square  
Tower 4, Level 20  
727 Collins St  
MELBOURNE VIC 3008

**EMAIL OUT:** David.Mutton@smec.com

Dear David,

**RE: PRELIMINARY ADVICE (SERVICING PLAN) FOR ELCHO ROAD, LOVELY BANKS PRECINCT STRUCTURE PLAN**

Thank you for your email received on 9 February 2021 in relation to seeking preliminary advice the Elcho Road, Lovely Bank Precinct Structure Plan (servicing plan).

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

APA is the Pipeline Licensee for the Iona - Lara pipeline, (see table 1 for details):

**Table 1: Transmission gas pipelines in the area of consideration**

Pipeline	Pipeline Licence	Easement Width (m)	Diameter (mm)	Measurement Length (m)
Iona - Lara	PI 231 (T92)	20	500	525

**Note:** measurement length is applied to either side of the pipeline.

### APA's Role

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

APA has a number of responsibilities and duties to perform under a complex framework of legislation, standards and controls across Federal, State and Local Government landscapes. In particular, our HPGTPs are required to be operated in accordance with Australian Standard 2885 (Pipelines – Gas and Liquid Petroleum) (AS2885). In discharging our regulatory responsibilities, APA needs to

continuously review what is happening around its assets, what land use changes are occurring and what development is taking place to ensure it remains in a position to comply with applicable operational and safety standards and legislation whilst meeting its commercial obligations and imperatives.

### **Pipeline Risk Profile and the Measurement Length**

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

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

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

### **Sensitive Uses**

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

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

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

### **Safety Management Study**

AS2885 requires a Safety Management Study (**SMS**) to be undertaken whenever the land use classification of land within the ML changes. It is APA's assessment that the proposal will likely change the land use classification of this section of the pipeline and therefore an SMS must be undertaken prior to the development commencing.

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

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

## **Easement Management**

APA, is the beneficiary of the pipeline easement running through the subject site. To ensure compliance with the safety requirements of AS2885, APA needs to ensure our easement is managed to an appropriate standard. This includes:

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

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

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

## **Roads and services over easement**

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

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

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

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

## Comments

On the basis of the information provided, APA provides the following advice;

1. A preliminary SMS was previously conducted for the Northern Growth Area (Lovely Banks) by GPA Engineering consultants with input from the City of Greater Geelong and relevant land development representatives (Reference 16459-REP-002). This preliminary SMS did not assess any detailed development proposal or PSP layout and rather considered the general land use impacts of the pipeline against a high level mud map. As such a SMS will be required to assess the proposed PSP (see below).
2. APA would not object to the rezoning of the land to allow for residential development subject to a detailed SMS (as outlined above) being completed prior to exhibition of any rezoning amendment. The recommendations of the SMS will need to be incorporated into any approval process. The SMS may also find that the area of interest be reduced from that of the full measurement length to a reduced Area of Consequence based upon the design of the pipeline and the potential threats within the surrounding existing and future environment. That will be determined through the SMS process.
3. Sensitive land uses as outlined above should be located outside of the Measurement Length or any possible reduced Area of Consequence as identified as the result of the SMS.
4. Permit and notification triggers to APA for sensitive land uses within either the pipeline Measurement Length or any possible reduced Area of Consequence as identified as the result of the SMS are to be incorporated into any future planning controls resulting from a planning scheme amendment.
5. As outlined above APA will not allow any roads or service infrastructure over the easement other than perpendicular crossings to APA's satisfaction.
6. In a residential environment the easement is to be treated as linear open space, as has been the outcome in a number of recent Precinct Structure Plans e.g. Plumpton PSP, Sunbury South PSP. APA will allow for some embellishment of the easement, including a shared bike/pedestrian path preferably directly over the existing pipeline.
7. The pipeline easement is not to be contained within any future residential lots.

APA welcomes the opportunity to be involved in this project at an early stage and is happy to provide feedback on any early concept designs that may be developed.

For any further enquiries relating to this correspondence, please feel free to contact myself on (03) 8533 2141 or the Infrastructure Planning & Approvals team at [planningvic@apa.com.au](mailto:planningvic@apa.com.au) .

Yours faithfully,

A handwritten signature in blue ink, appearing to read 'M. Mielczarek', is positioned above the printed name.

**MICHAEL MIELCZAREK  
SENIOR URBAN PLANNER  
INFRASTRUCTURE PLANNING AND APPROVALS  
APA GROUP**



# Planning Design & Completions

## New Development Planning

# Preliminary Servicing Plan: Creamery Road & Elcho Road East Precincts

**FSA Code:** 3LAR & 3GEE  
**FSA Name:** Lara & Geelong  
**Fibre Access Type:** MTM  
**Status:** Draft  
**Current Version:** 1.0  
**Document No:** Prelim Servicing Plan – North & Western Geelong

Version	Author	Reviewer	Review Date	Change Comment
1.0	Daryl Martinez		09/03/2021	Draft



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## Environment

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## 1 Purpose

This document provides draft information & a high level view of how fibre distribution network is proposed to be rolled out in the proposed Northern & Western Geelong growth areas. Specific to the **Creamery Road & Elcho Road East Precincts**

## 2 Scope

Identification of proposed Trunk infrastructure required to service **Creamery Road & Elcho Road East Precincts**. The Trunk network will be constructed using 100% underground deployment.

The Elcho Road East precinct is anticipated to comprise of approximately 4,200 dwellings.  
The Creamery Road precinct is anticipated to comprise of approximately 3,000 dwellings

See below showing proposed Trunk Infrastructure route & notes.

## 3 Strategic Considerations

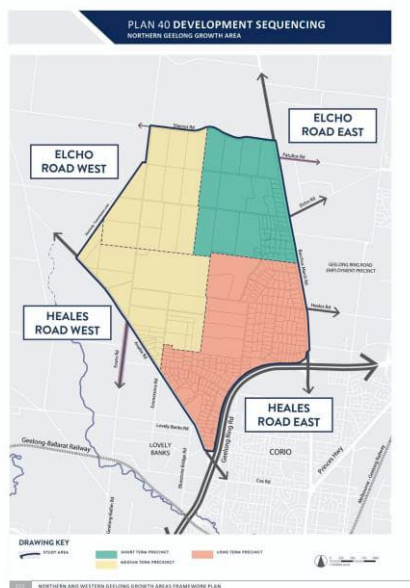
This document provides high level view of how fibre distribution network may roll out in the precincts identified within this document but does not include fibre to any existing dwellings within the precincts Final design may vary depending on the density, timing and geographical location of new development applications in the precinct.

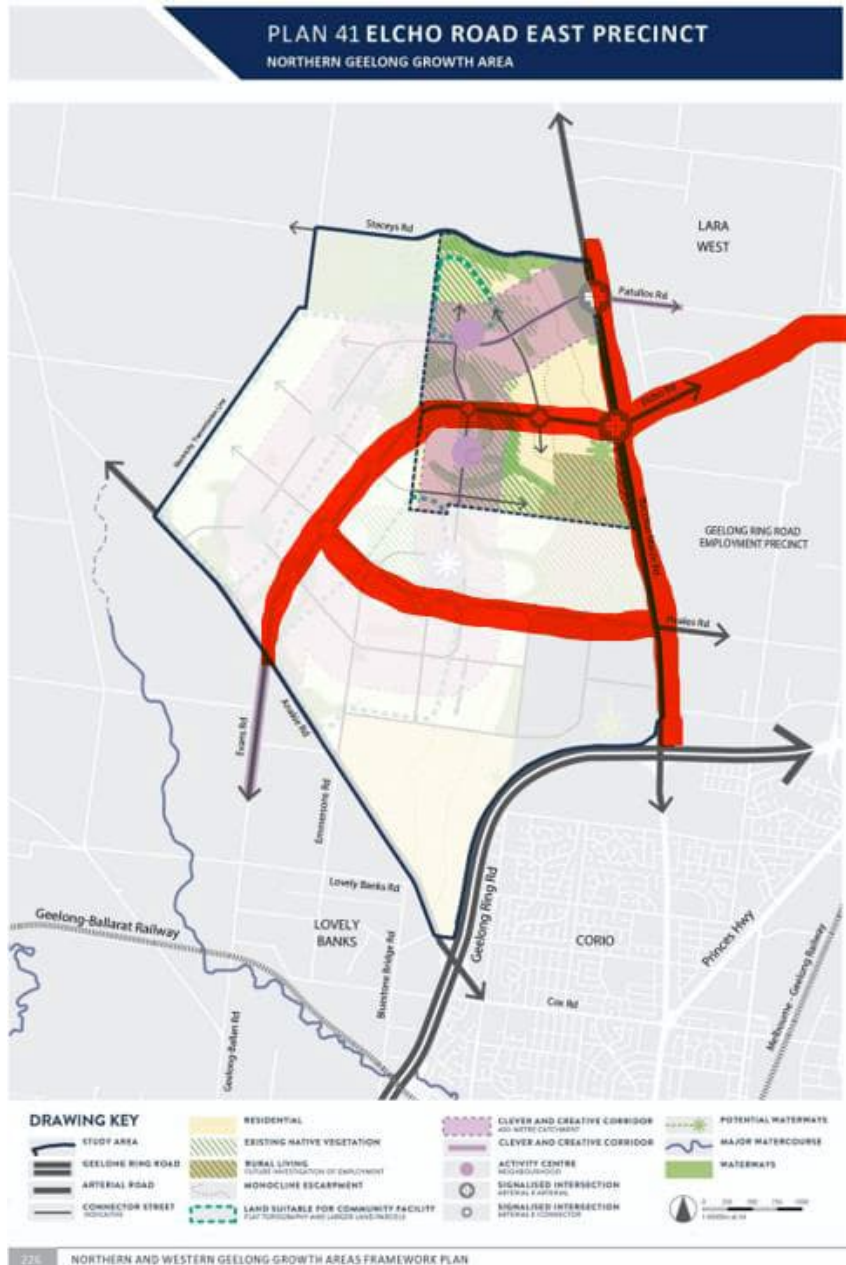
### Elcho Road East Precinct

New infrastructure pit & pipe build is required to connect to the precinct, via Elcho Road to the entry point of the precinct.

The initial build stages within the precinct will connect via Echo Rd at the eastern side of the precinct. Trunk fibre to service the precinct will be delivered from the FAN site(3LAR) located in Station Road Lara.

Opportunities may arise to facilitate possible trench sharing opportunities either with Council/Road Authorities or other Utilities. The upgrade & duplication of Bacchus Marsh Rd, external upgrade works in Patullos Rd & Elcho Rd are of high interest to NBN involving future opportunities.



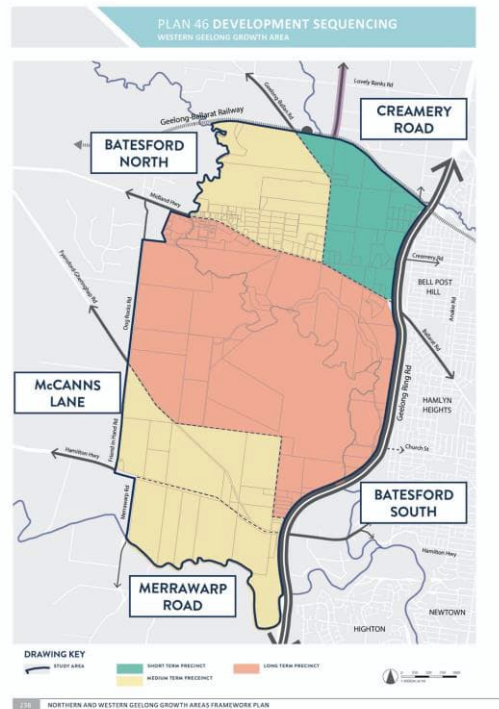


## Creamery Road Precinct

There is existing NBN infrastructure in place along Creamery Rd & Bingley Court within the precinct. The initial build stages of this precinct will connect via Creamery Rd.

Trunk fibre to service the precinct will be delivered from the FAN site(3GEE) located in Little Rynie St Geelong

Opportunities may arise to facilitate possible trench sharing opportunities either with Council/Rail & Road Authorities or other Utilities. New rail crossing bridge works along with external upgrade works in Ballan Rd & Evans Rd are of high interest to NBN involving future opportunities.





## 4 Tactical Considerations

Opportunities may arise to facilitate possible trench sharing opportunities either with Council/Rail & Road Authorities or other Utilities.

Major geographical constraints that may impact the installation of the network include existing Freeway, railway line corridor, multiple creeks & water ways.

Any additional FAN locations are yet to be confirmed.

Timing of new (yet to be built) permanent FAN site. An area of approx. 50-60sqm is required per FAN hut.

## 5 Dependencies

Nil

## 6 Contacts

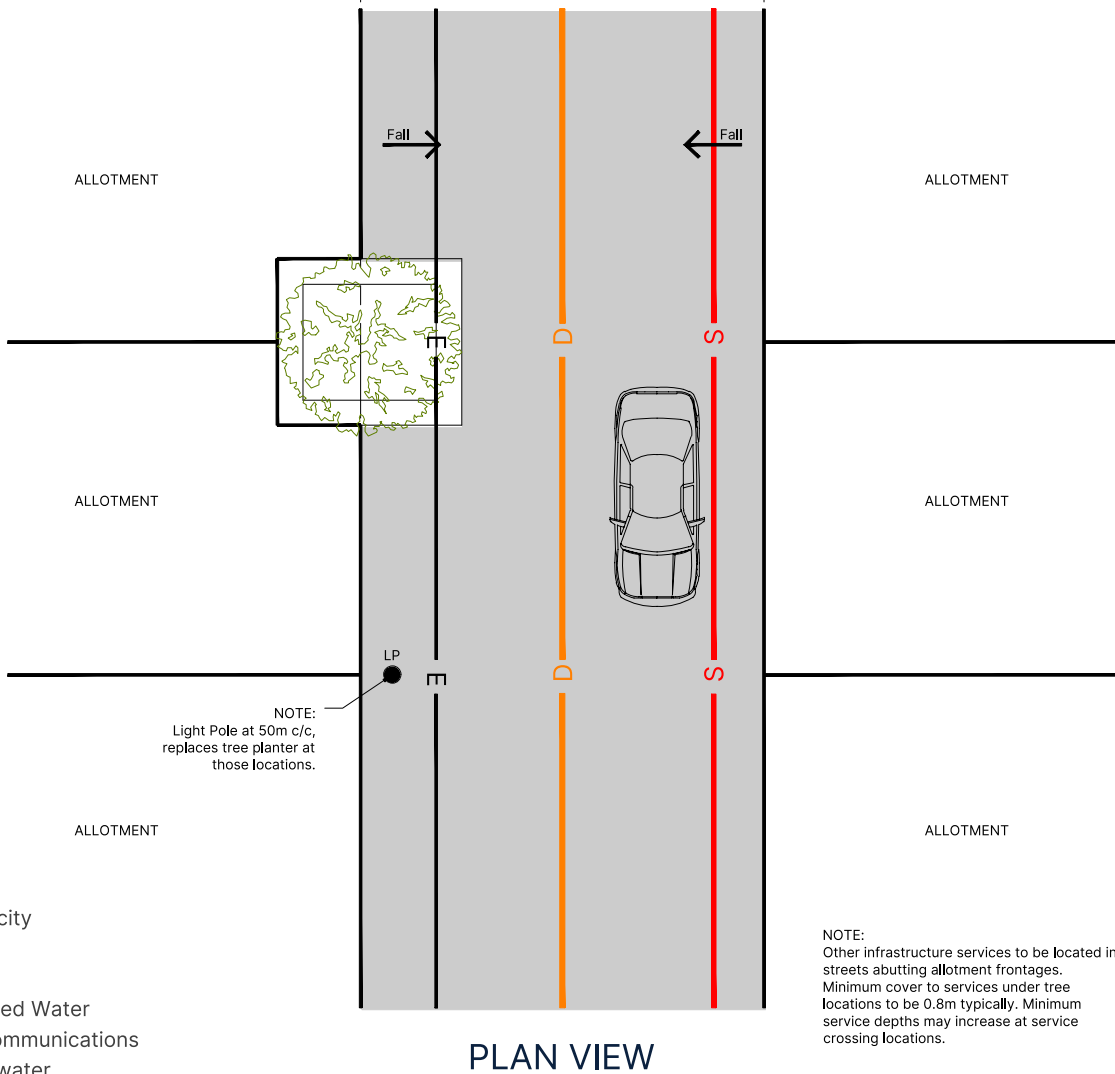
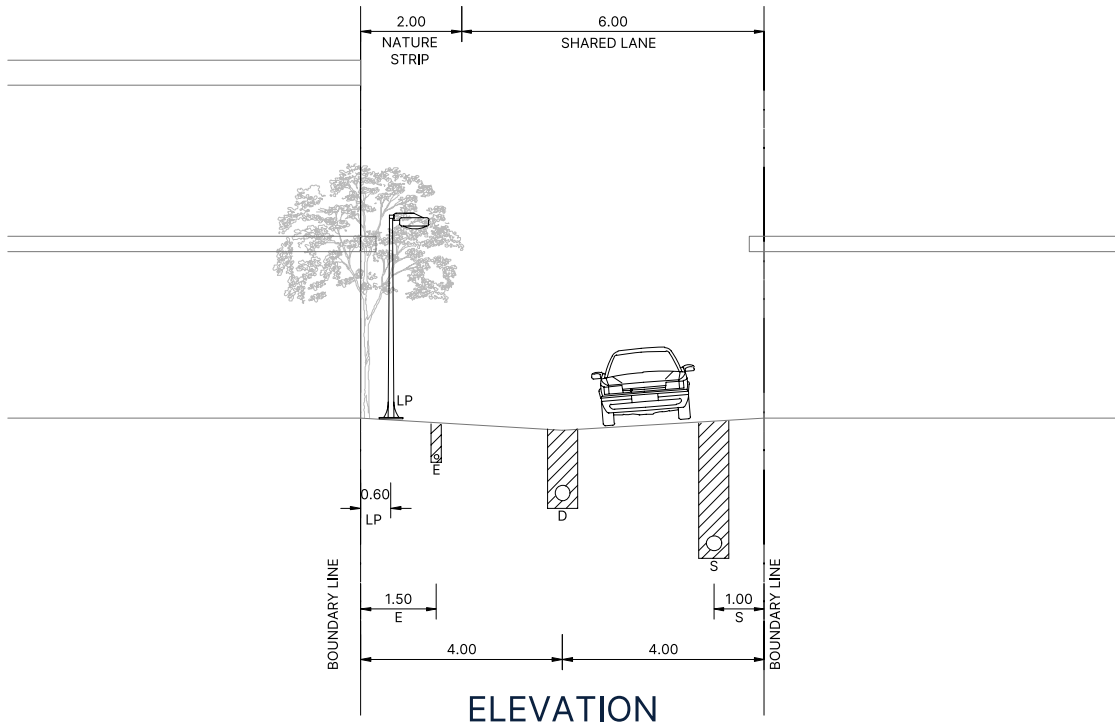
### New Development Planning

<b>Address</b>	Tower 5, Level 10, 727 Collins Street, Docklands Vic 3008
<b>Primary Contact:</b>	Daryl Martinez
<b>Title:</b>	Senior Fibre Planner
<b>Phone:</b>	(03) 96015534
<b>Mobile:</b>	0417 079 074
<b>Email:</b>	darylmartinez@nbnco.com.au
<b>Web:</b>	<a href="http://nbnco.com.au">nbnco.com.au</a>

# Appendix D

## Typical Cross-Sections

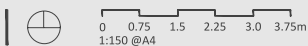
# CROSS SECTION "1" - LANEWAY - 8.0m



## Road Cross Section

Creamery Road PSP

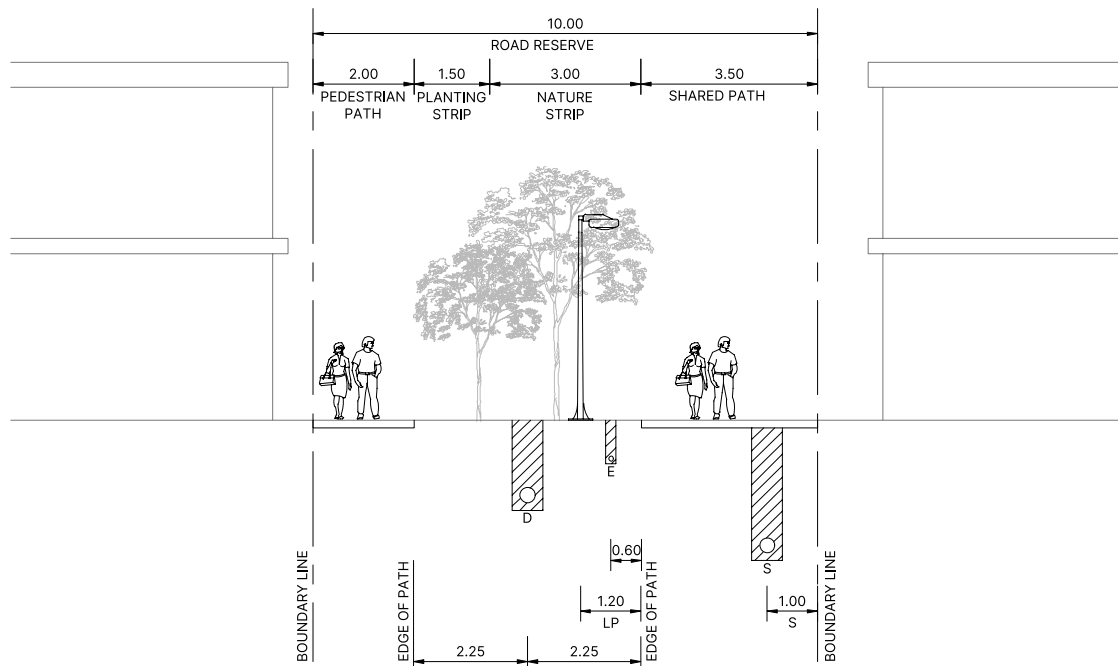
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Sheet 1 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



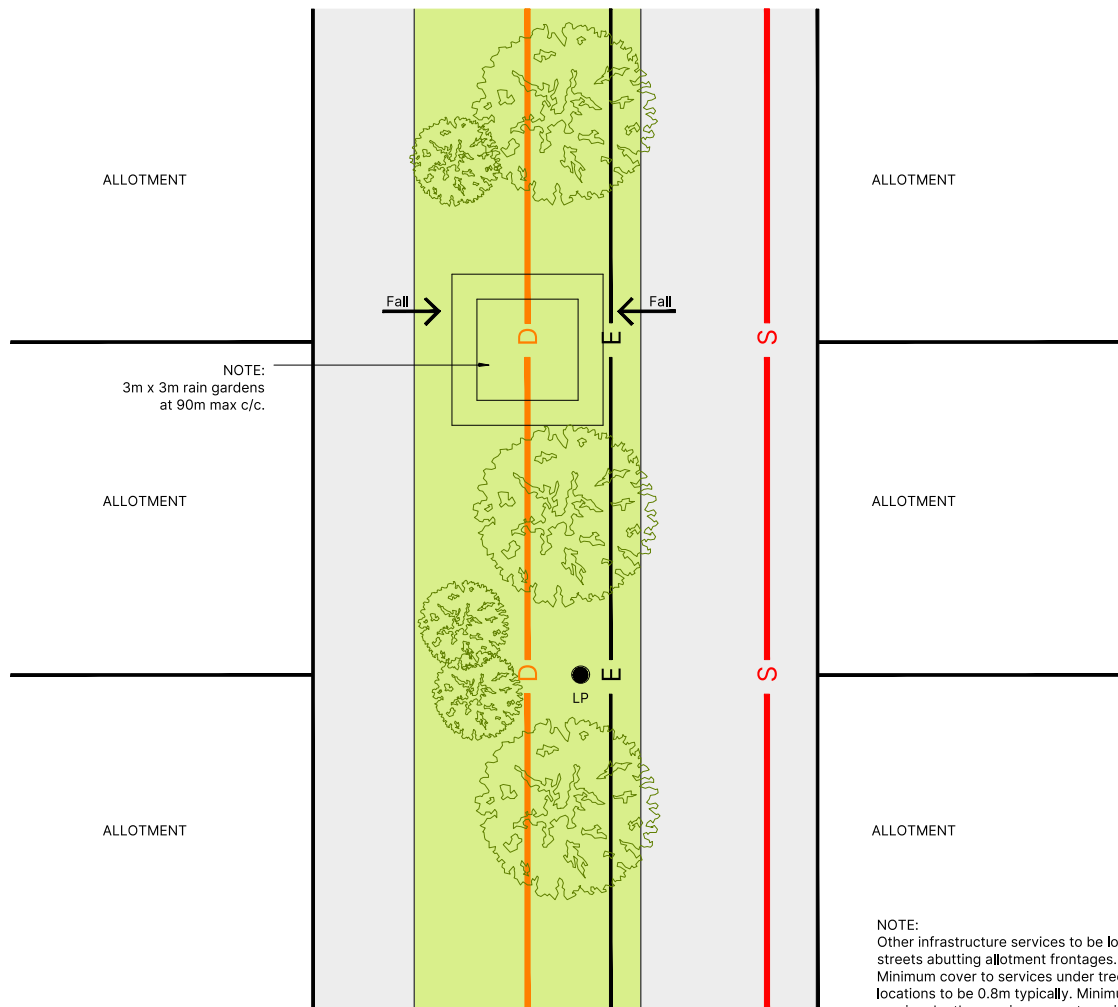
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# CROSS SECTION "2" - PEDESTRIAN STREET (NARROW) - 10.0m



ELEVATION



PLAN VIEW

## Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

## Road Cross Section

Creamery Road PSP

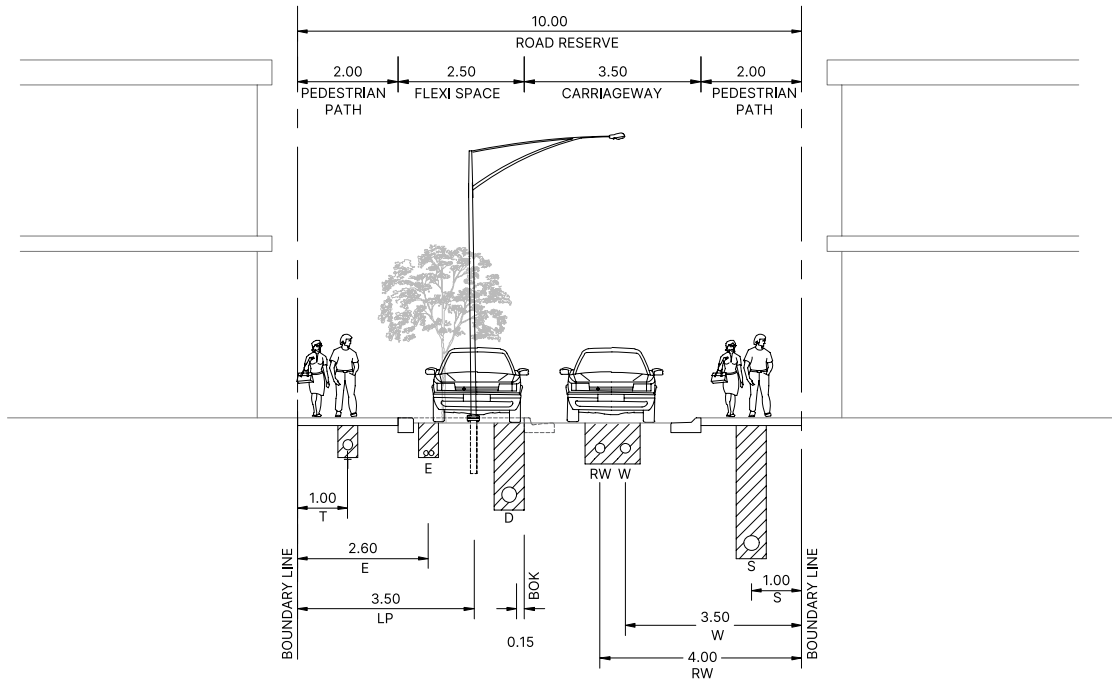
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Sheet 2 of 21  
 Drawn by: D.Bish | Checked by: D.Mitton



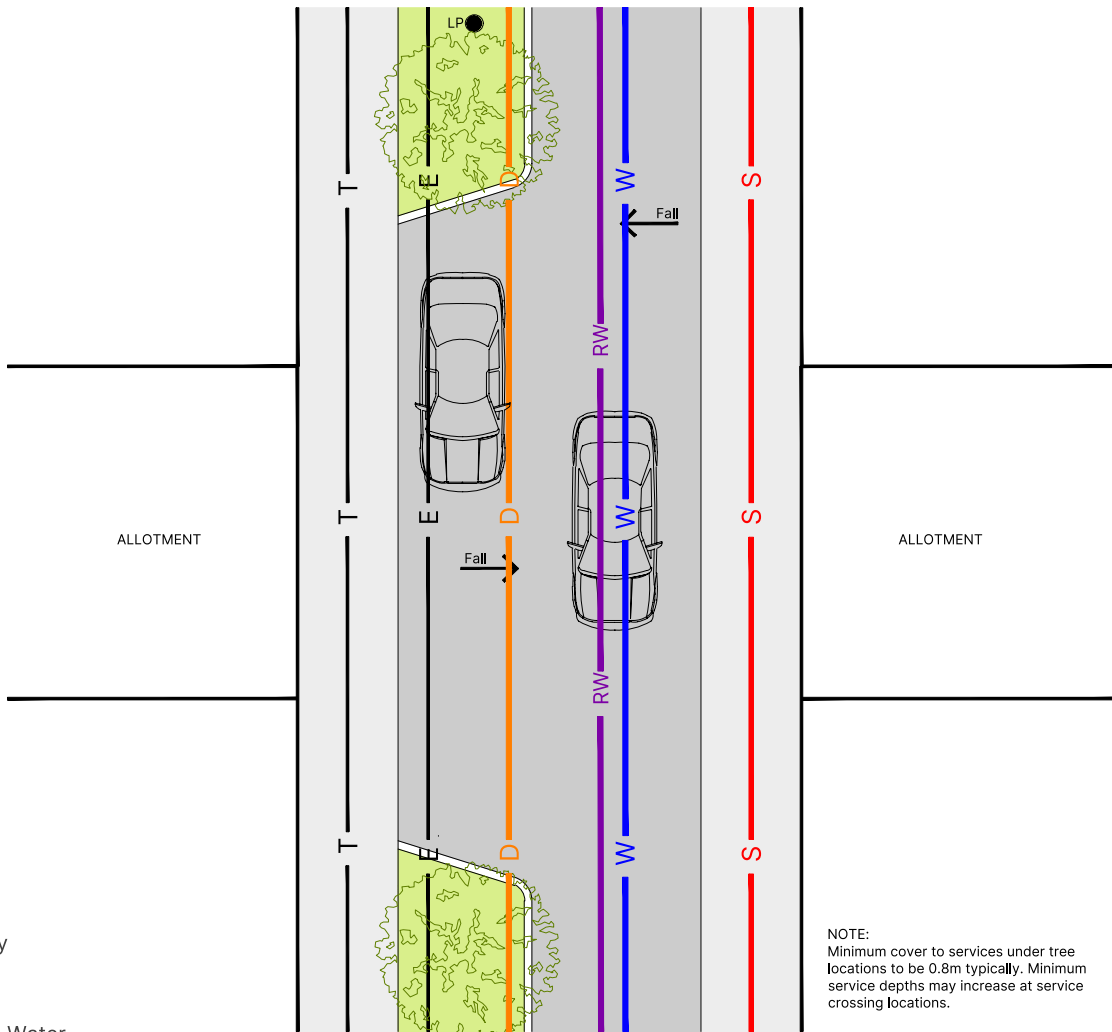
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# CROSS SECTION "3" - MICRO STREET - 10.0m



ELEVATION



PLAN VIEW

## Legend

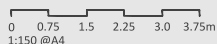
- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

NOTE:  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

## Road Cross Section

Creamery Road PSP

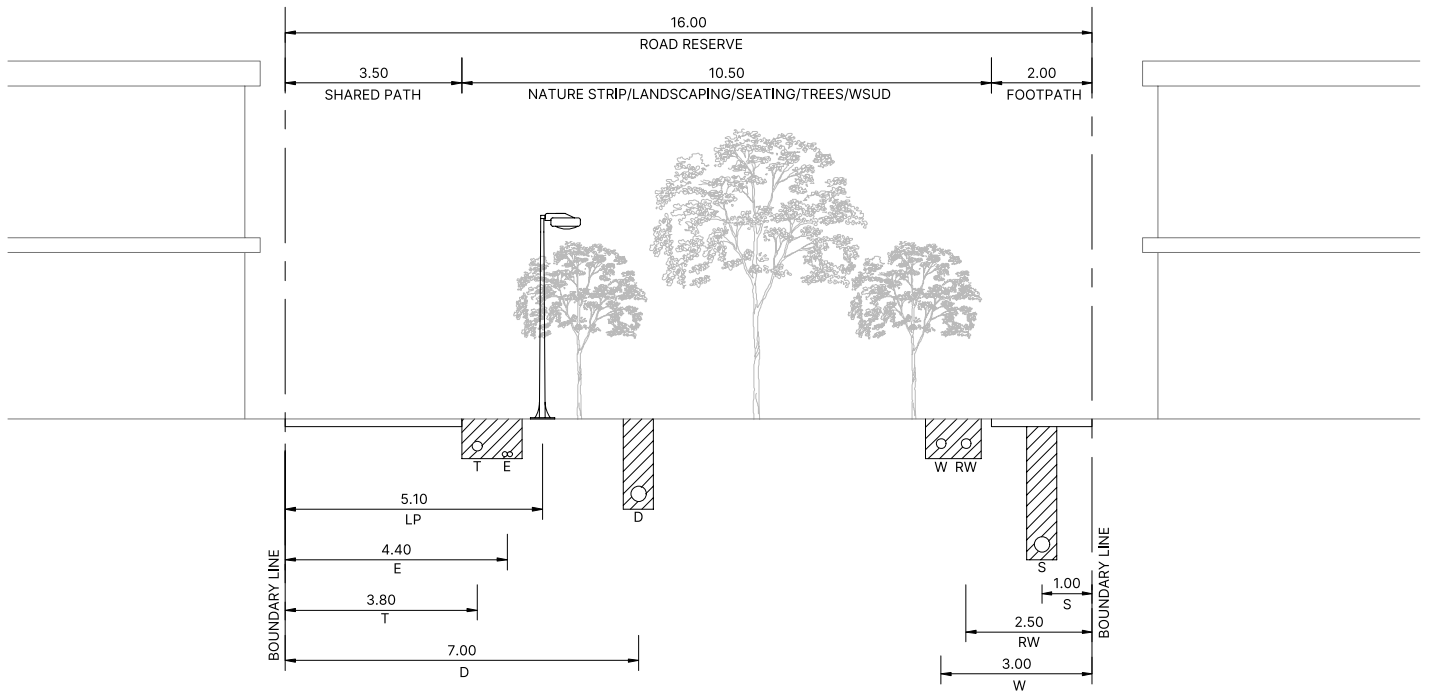
Date Issued: 1/07/2024 | Revision: 2  
SMEC Project Reference: 30043082E | Sheet 3 of 21  
Drawn by: D.Bish | Checked by: D.Mitton



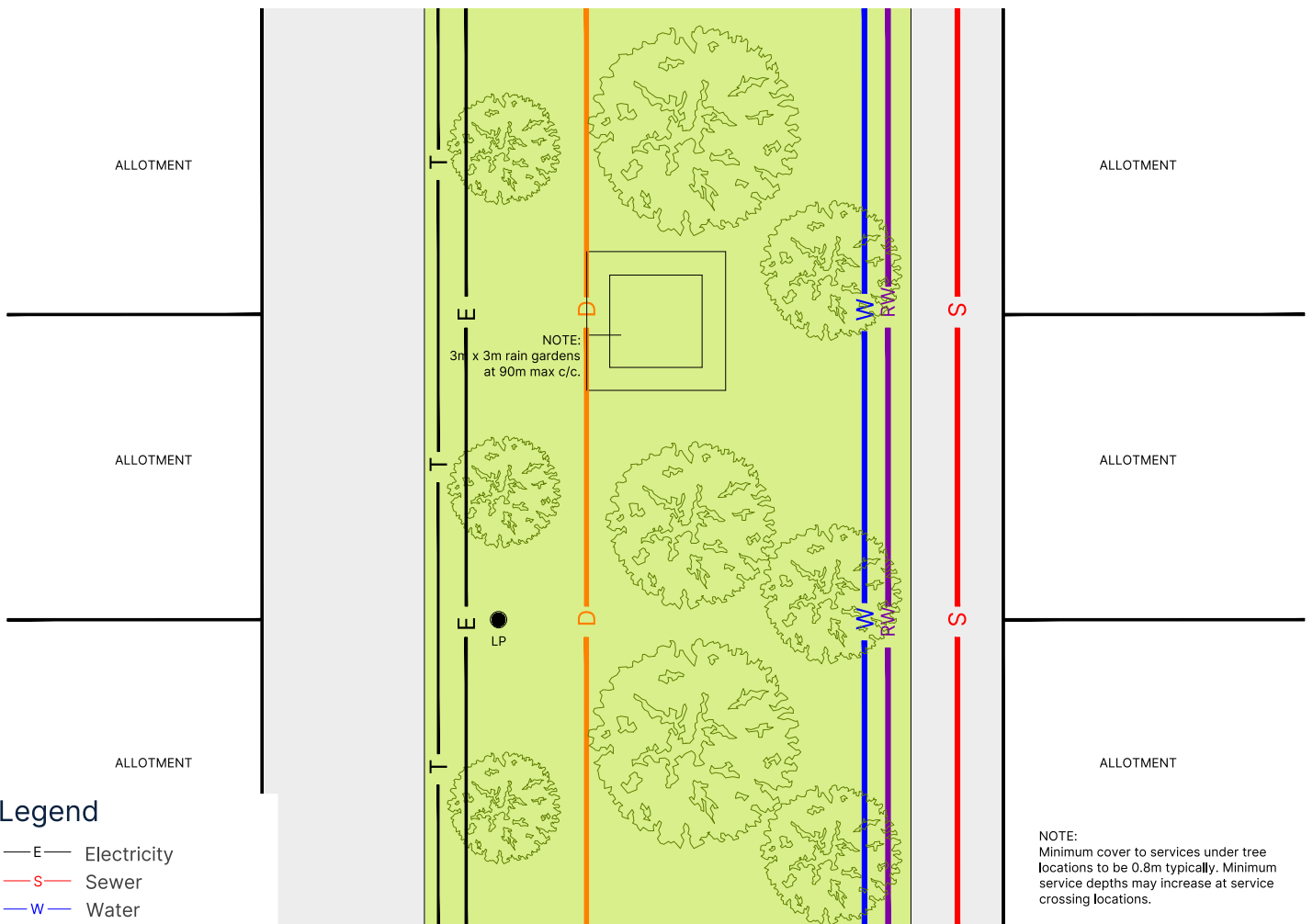
Urban Communities



# CROSS SECTION "4" - PEDESTRIAN STREET (WIDE) - 16.0m



ELEVATION



PLAN VIEW

## Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

## Road Cross Sections

### Creamery Road PSP

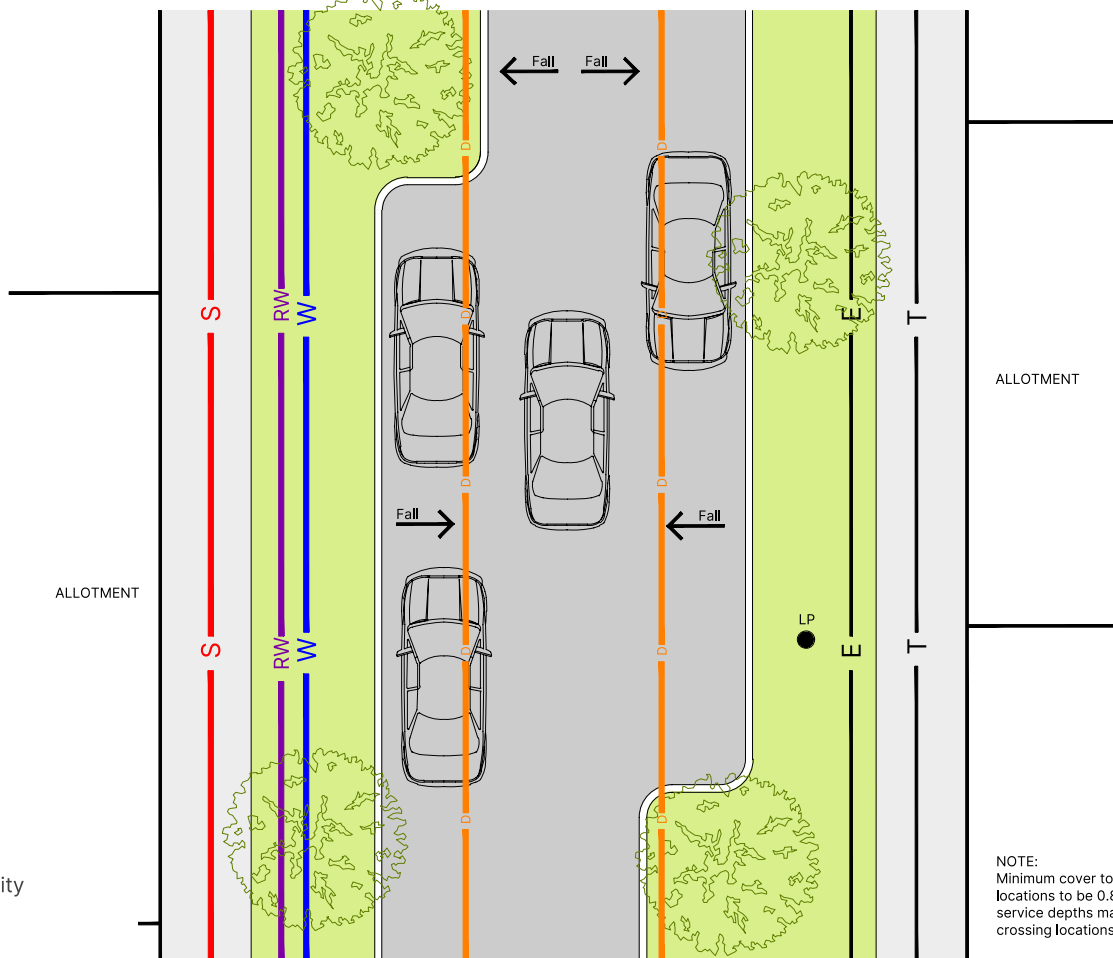
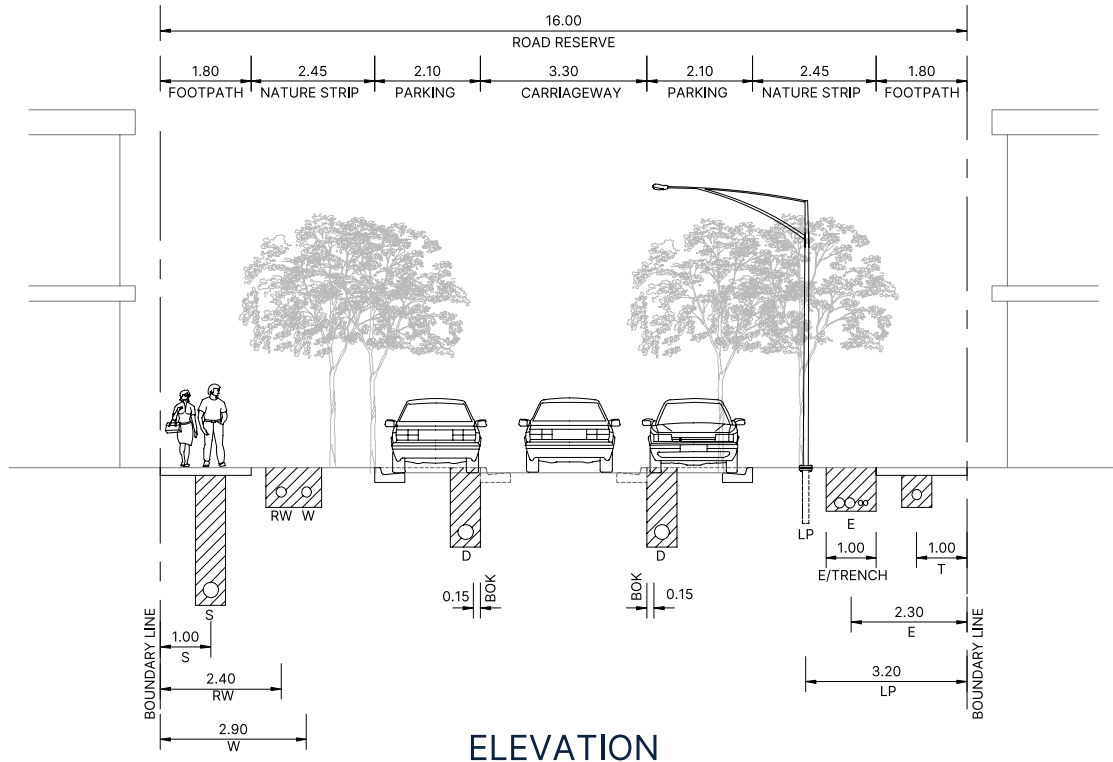
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Sheet 4 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



Urban Communities



# CROSS SECTION "5" - LOCAL ACCESS STREET (LEVEL 1) - 16.0m



## Legend

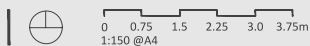
- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

**NOTE:**  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

## Road Cross Section

Creamery Road PSP

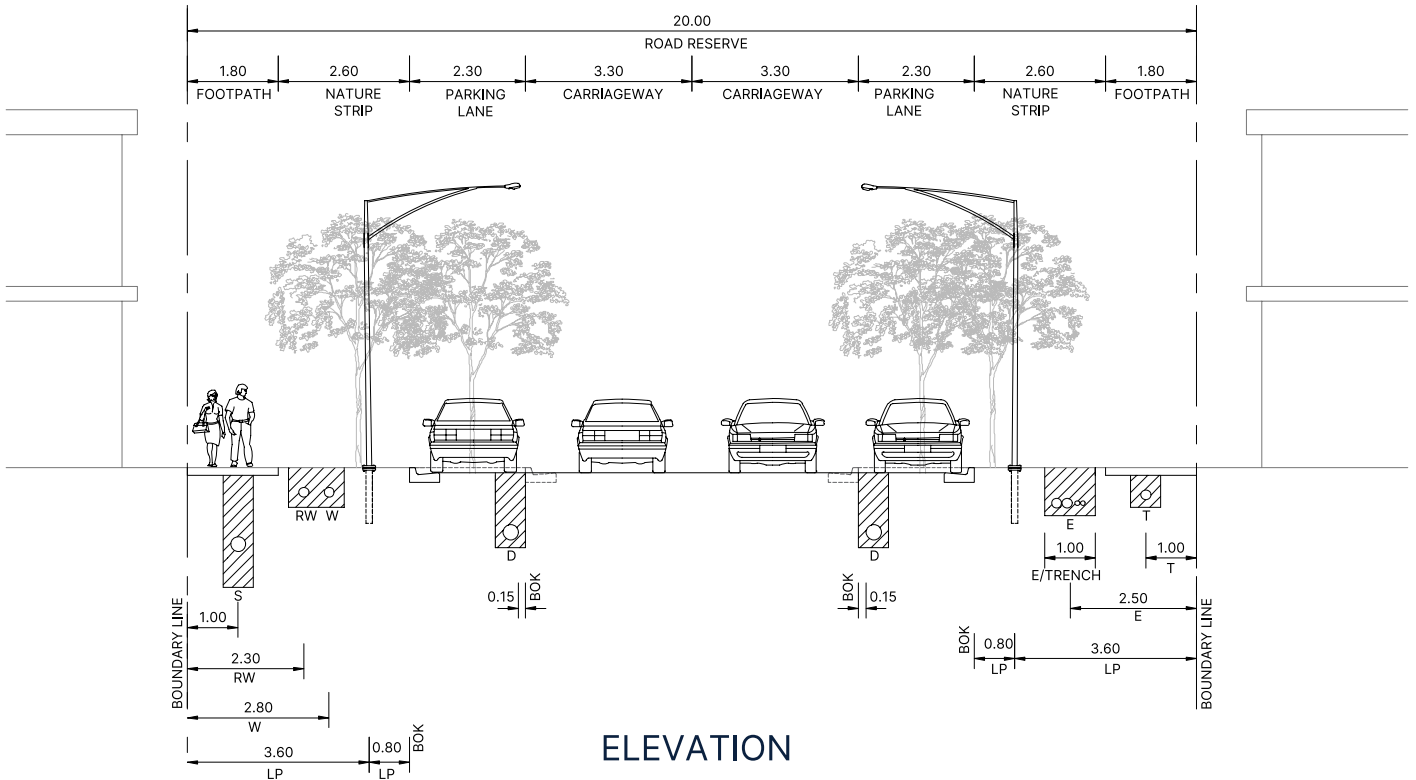
Date Issued: 1/07/2024 | Revision: 4  
SMEC Project Reference: 30043082E | Sheet 5 of 21  
Drawn by: D.Bish | Checked by: D.Mutton



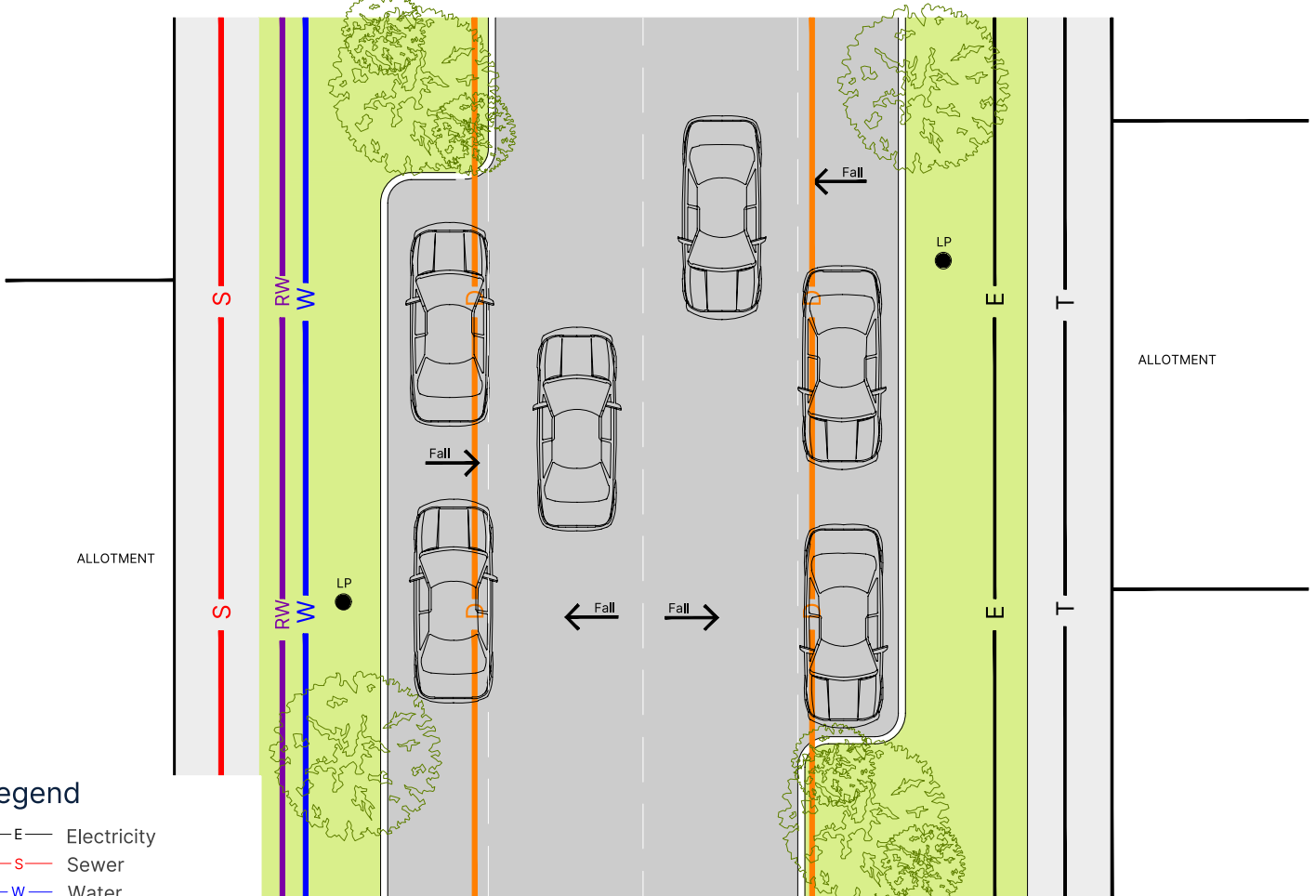
Urban Communities



# CROSS SECTION "6" - LOCAL ACCESS STREET (LEVEL 2) - 20.0m



ELEVATION



PLAN VIEW

NOTE:  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

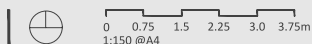
## Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

## Road Cross Section

Creamery Road PSP

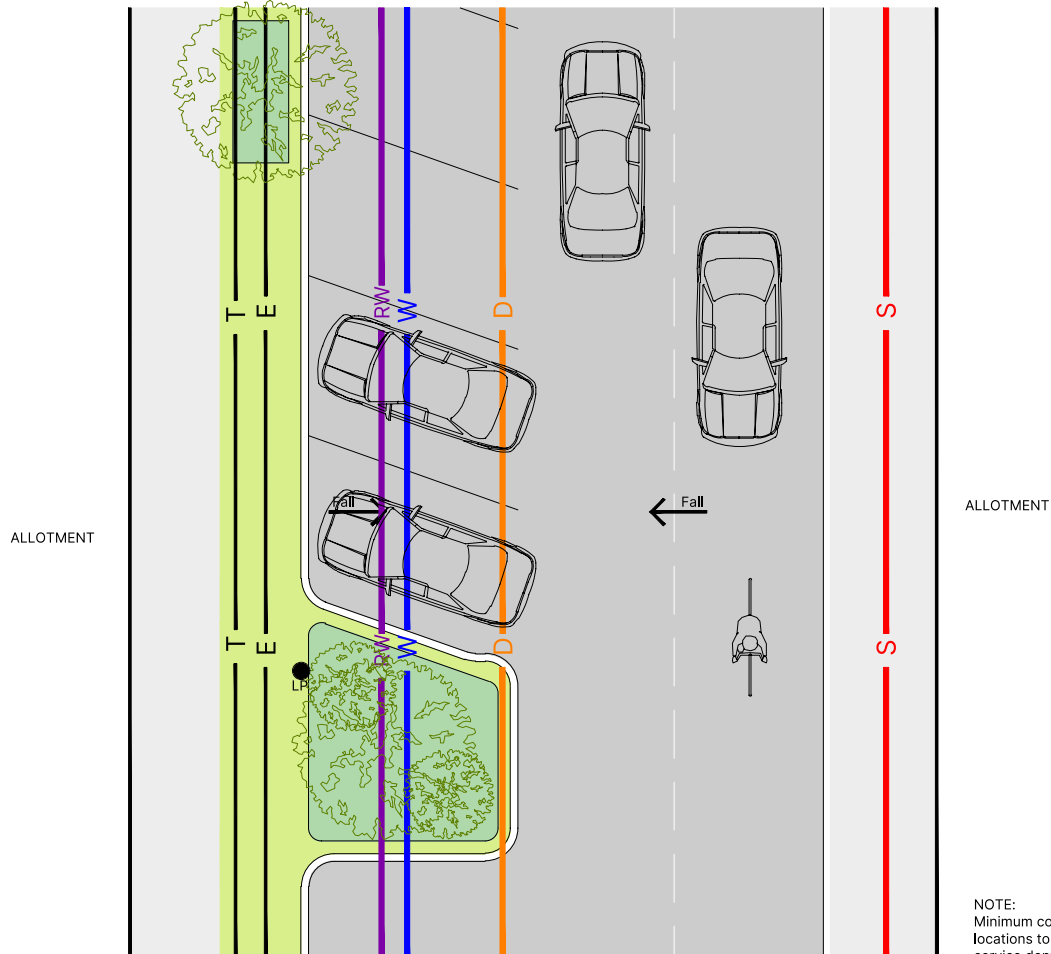
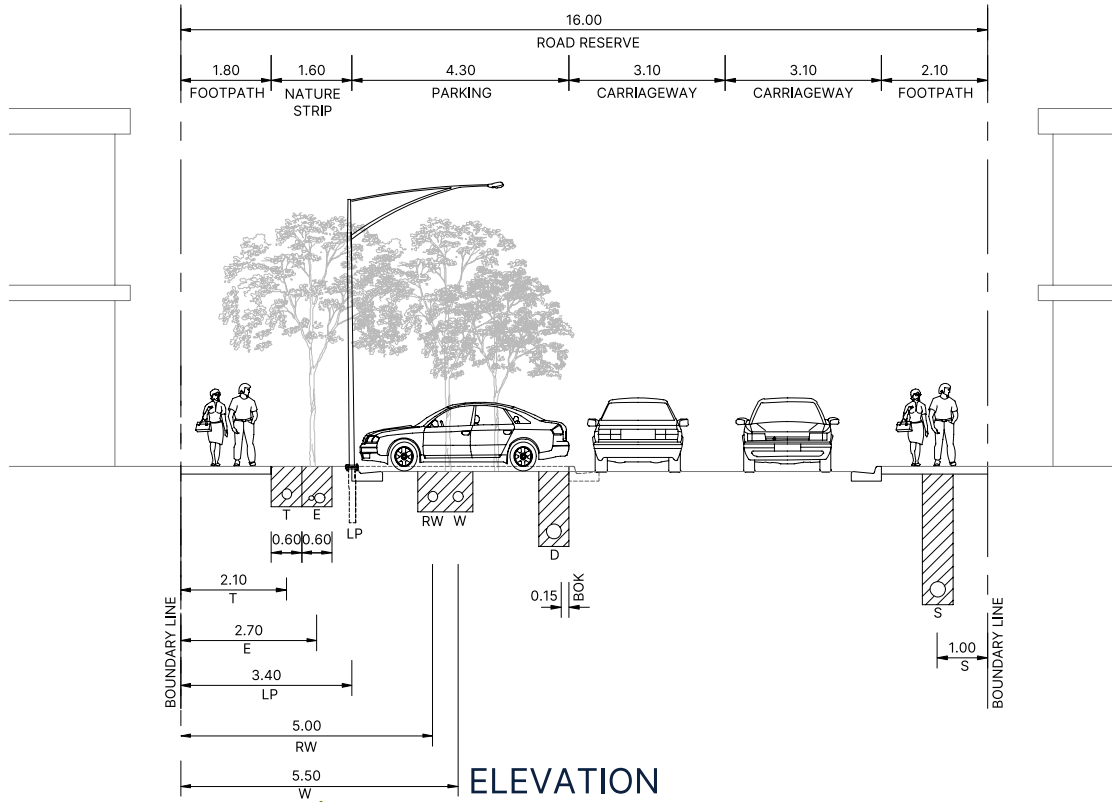
Date Issued: 1/07/2024 | Revision: 4  
SMEC Project Reference: 30043082E | Sheet 6 of 21  
Drawn by: D.Bish | Checked by: D.Mutton



Urban Communities



# CROSS SECTION "7" - PARKING STREET - 16.0m



## Legend

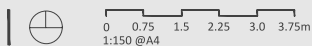
- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

**NOTE:**  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

## Road Cross Section

Creamery Road PSP

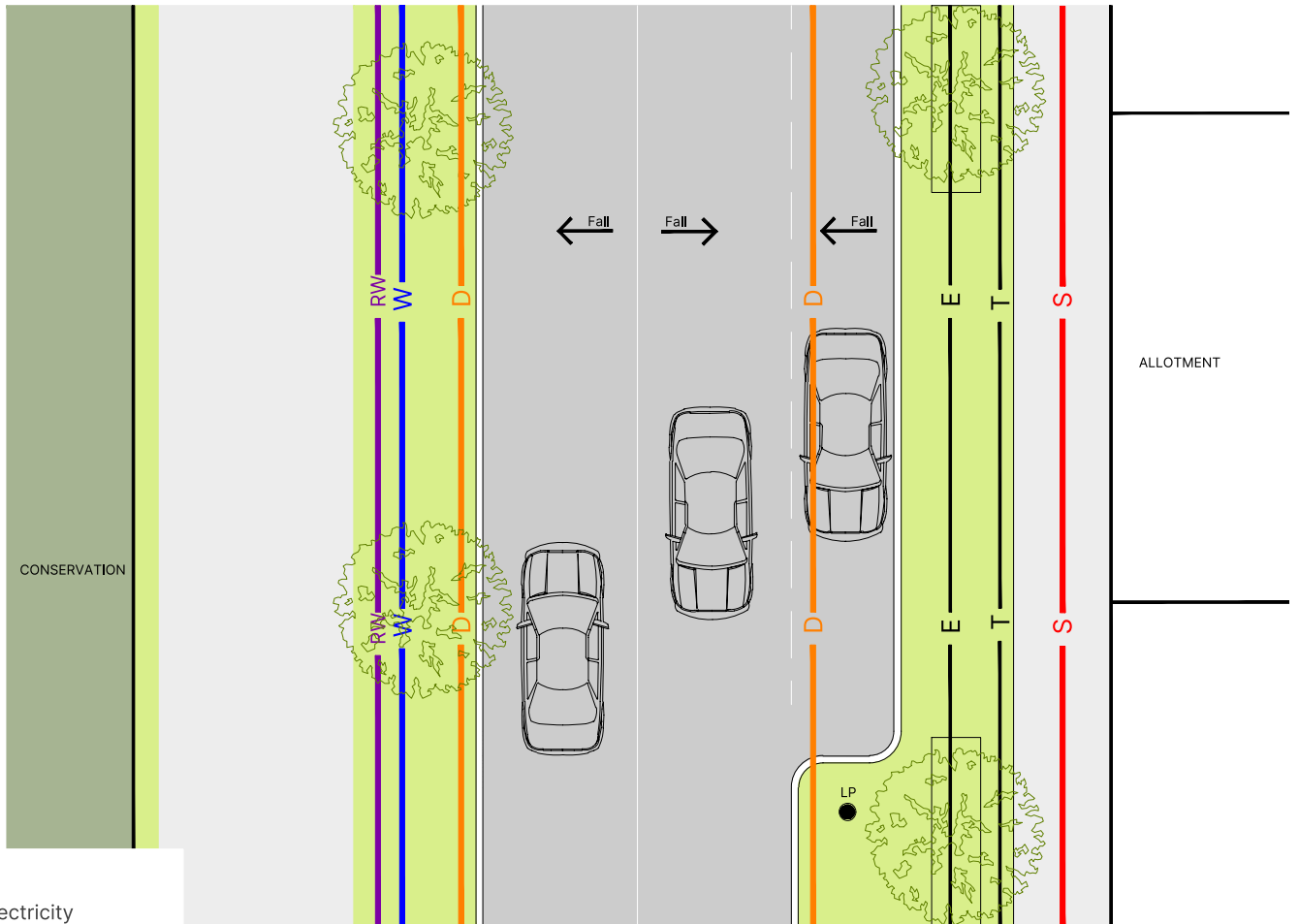
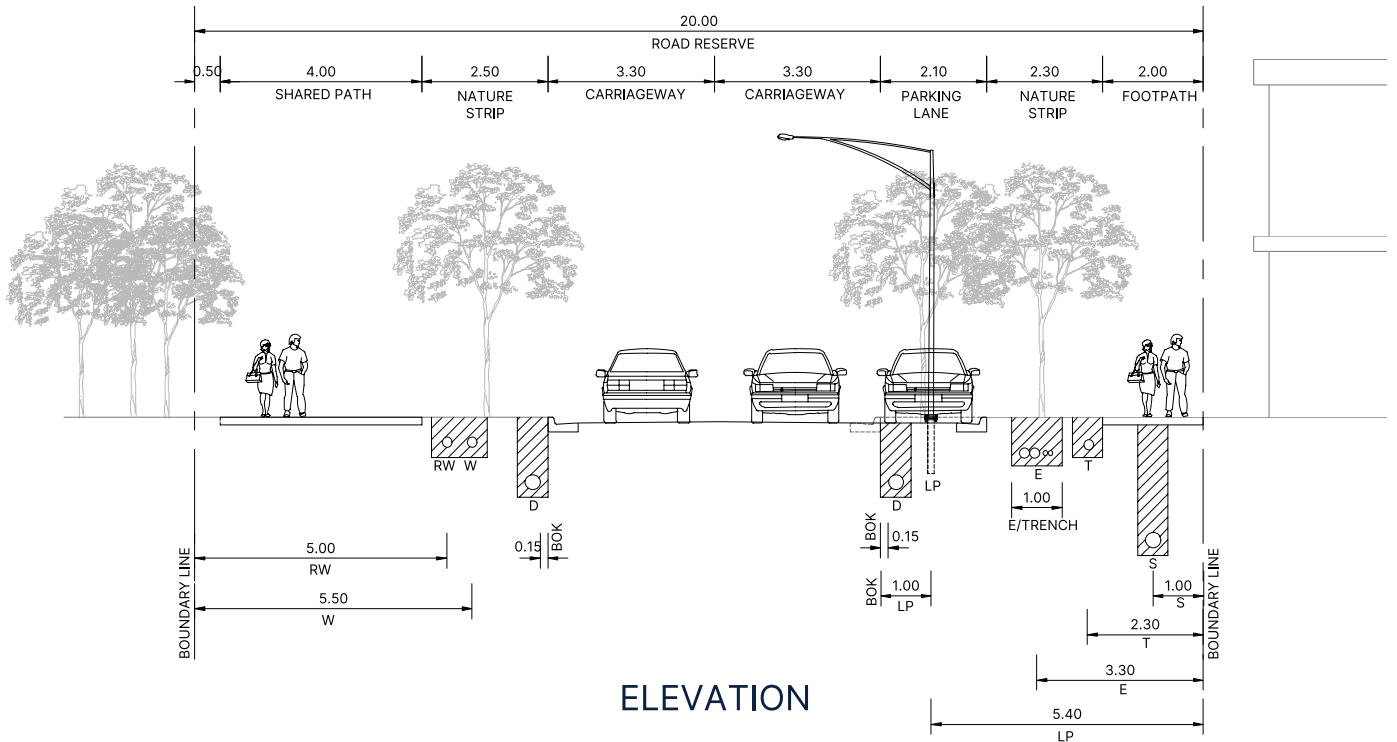
Date Issued: 1/07/2024 | Revision: 4  
SMEC Project Reference: 30043082E | Sheet 7 of 21  
Drawn by: D.Bish | Checked by: D.Mutton



Urban Communities



# CROSS SECTION "8" - CONSERVATION INTERFACE STREET - 20.0m



## Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

**NOTE:**  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

## Road Cross Section

Creamery Road PSP

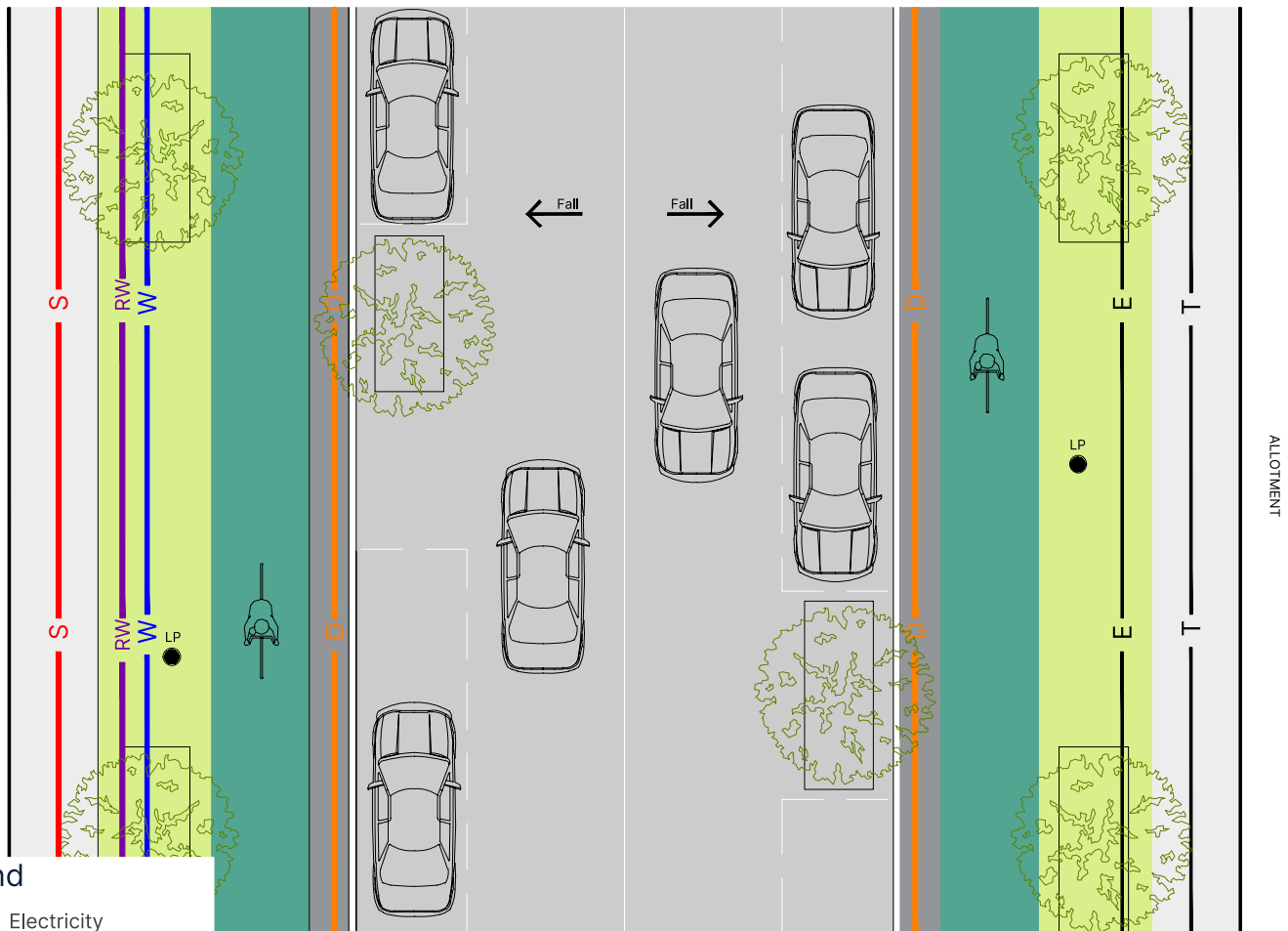
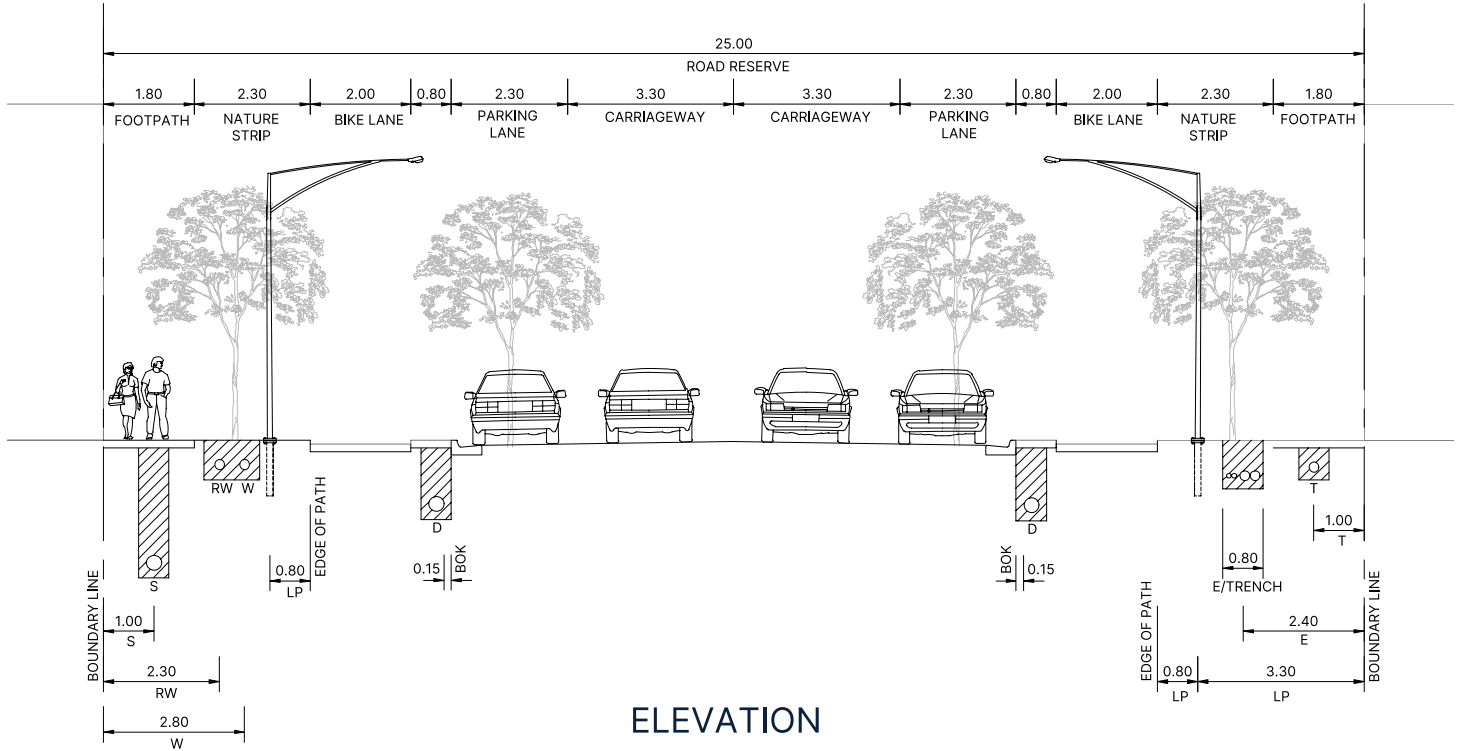
Date Issued: 1/07/2024 | Revision: 4  
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Drawn by: D.Bish | Checked by: D.Mutton



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# CROSS SECTION "9" - CONNECTOR ROAD (SUBURBAN) - 25.0m



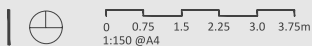
- Legend**
- E — Electricity
  - S — Sewer
  - W — Water
  - RW — Recycled Water
  - T — Telecommunications
  - D — Stormwater

**NOTE:**  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

## Road Cross Section

Creamery Road PSP

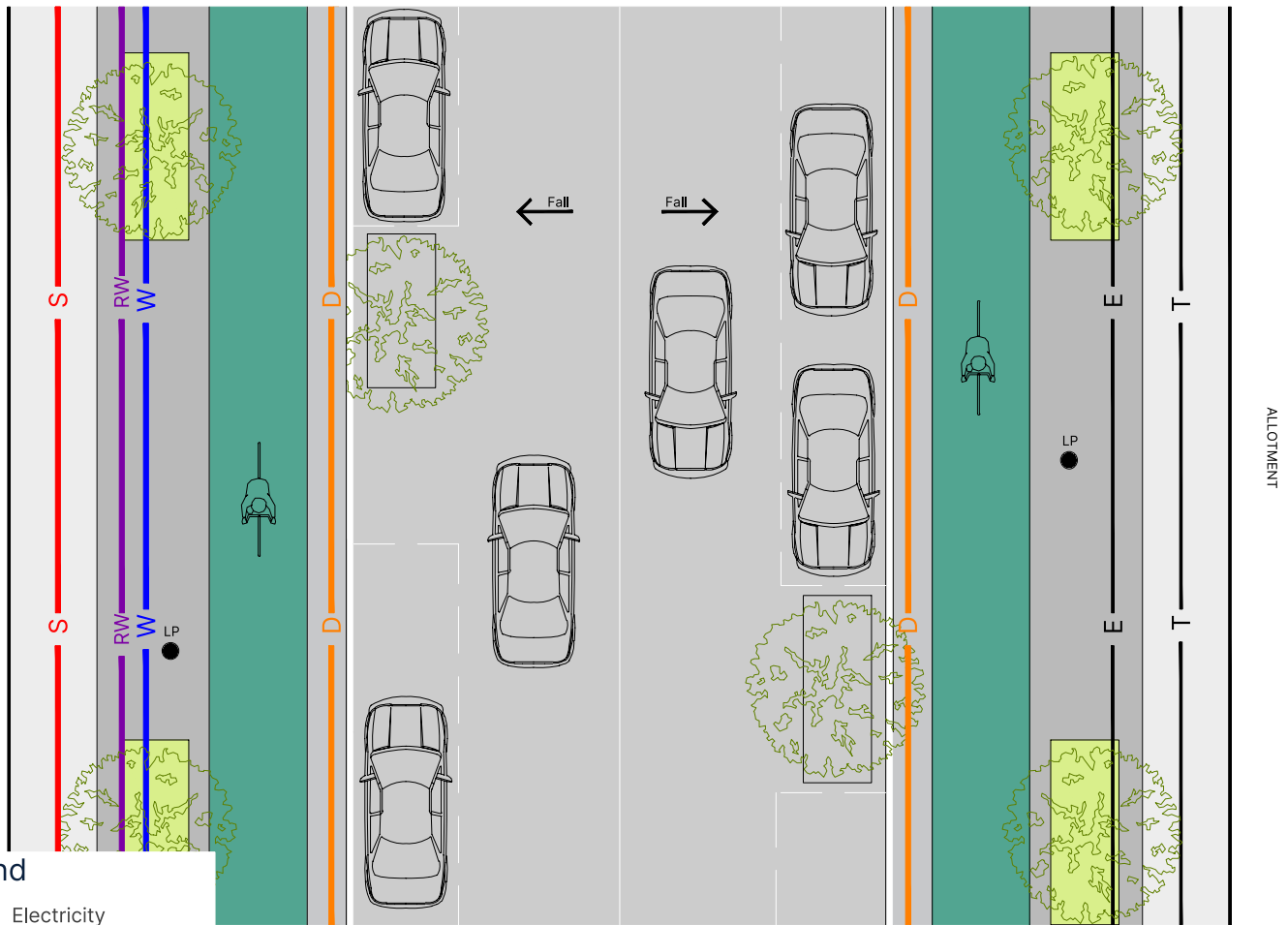
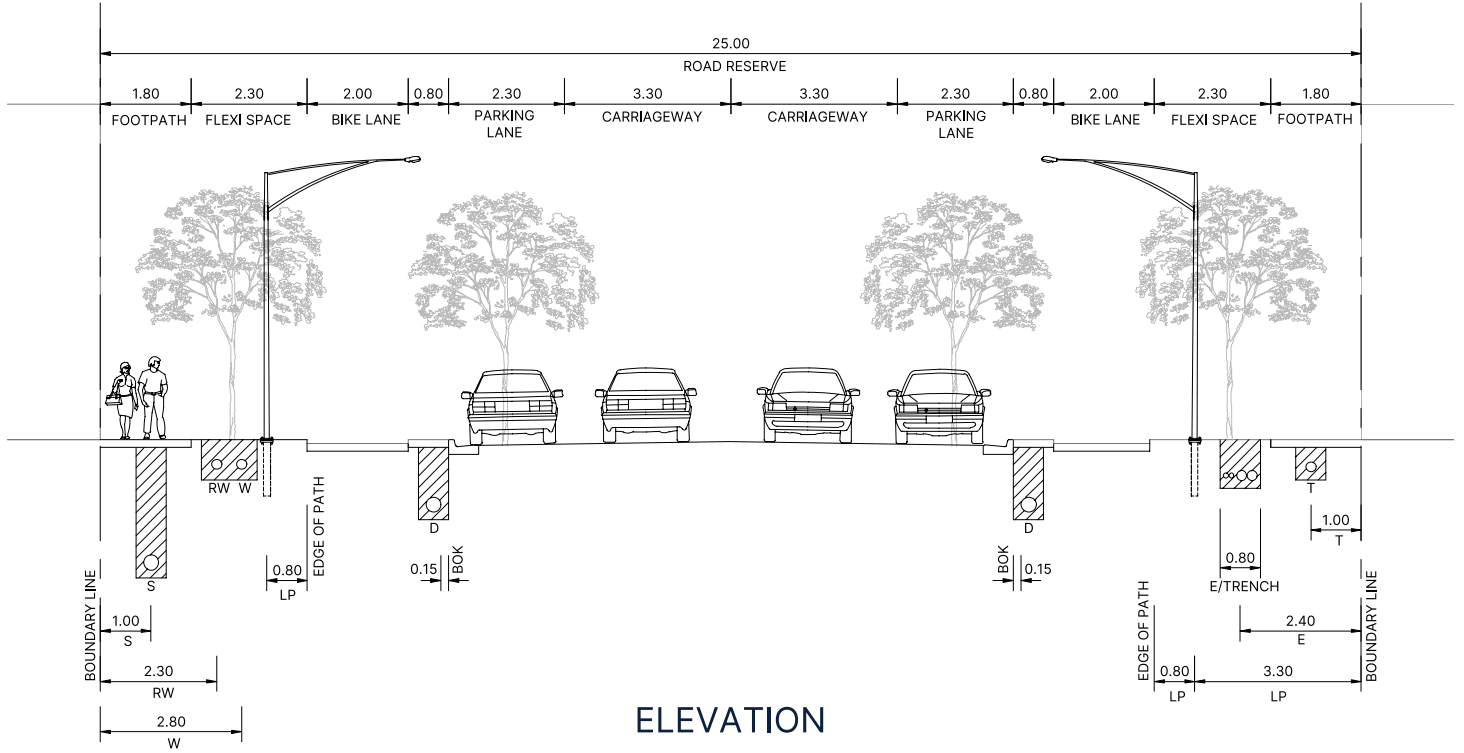
Date Issued: 1/07/2024 | Revision: 4  
SMEC Project Reference: 30043082E | Sheet 9 of 21  
Drawn by: D.Bish | Checked by: D.Mutton



Urban Communities



# CROSS SECTION "10" - CONNECTOR ROAD TYPE C (URBAN) - 25.0m

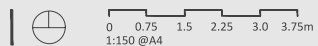


- Legend**
- E — Electricity
  - S — Sewer
  - W — Water
  - RW — Recycled Water
  - T — Telecommunications
  - D — Stormwater

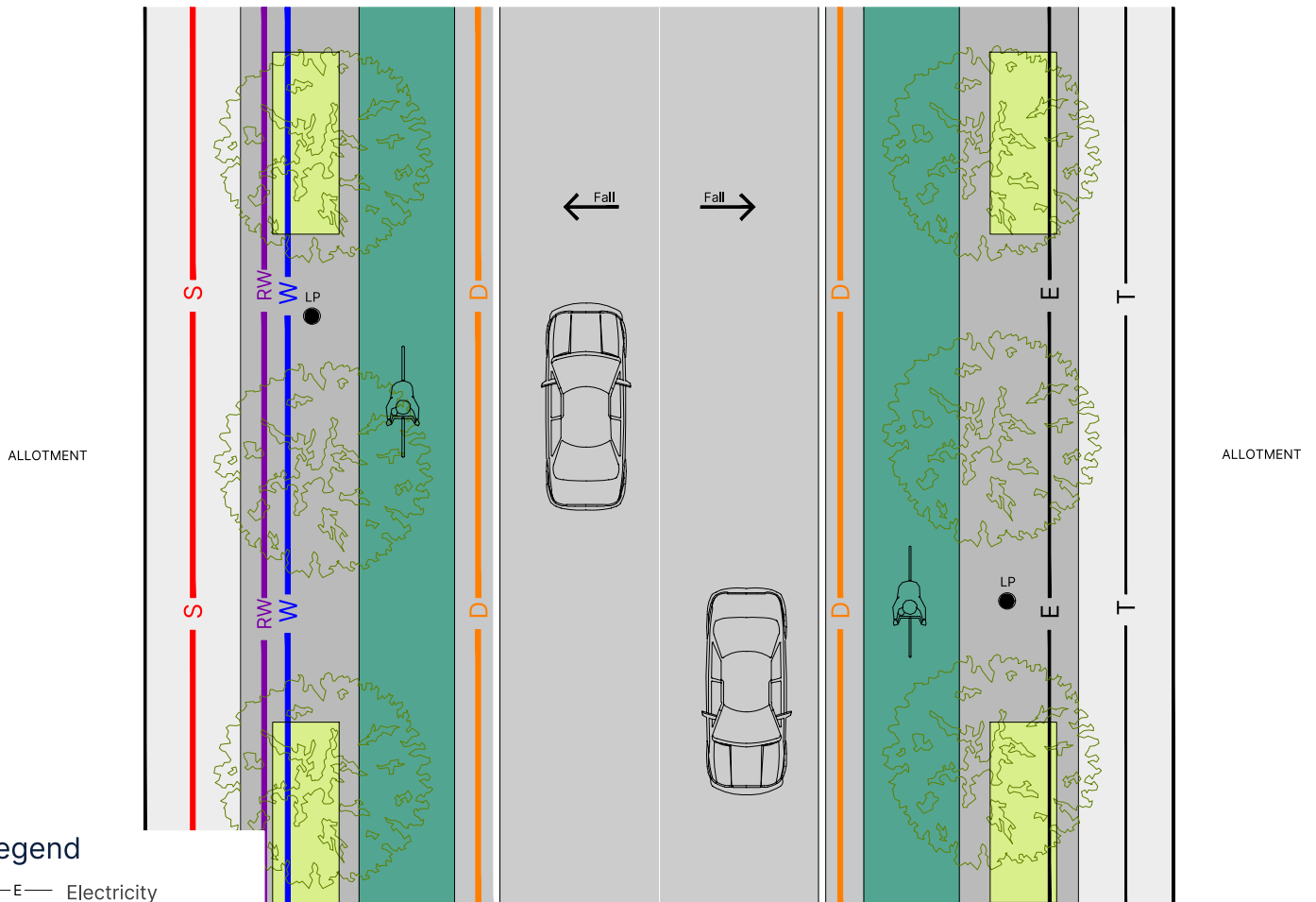
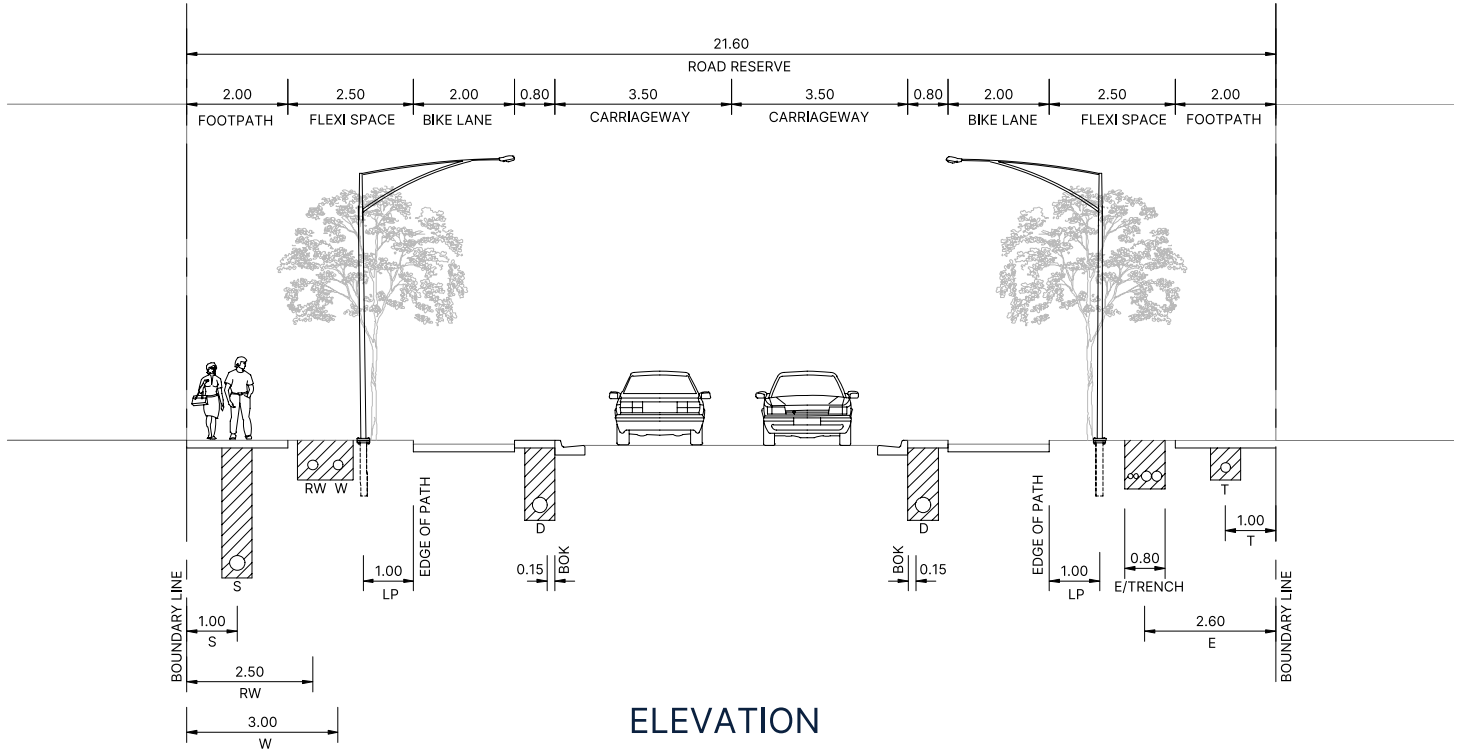
**NOTE:**  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

## Road Cross Section

**Creamery Road PSP**  
 Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Sheet 10 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



# CROSS SECTION "11" - MODIFIED CONNECTOR ROAD (URBAN) - 21.6m



## Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

**NOTE:**  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

## Road Cross Section

Creamery Road PSP

Date Issued: 1/07/2024 | Revision: 4  
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Drawn by: D.Bish | Checked by: D.Mutton

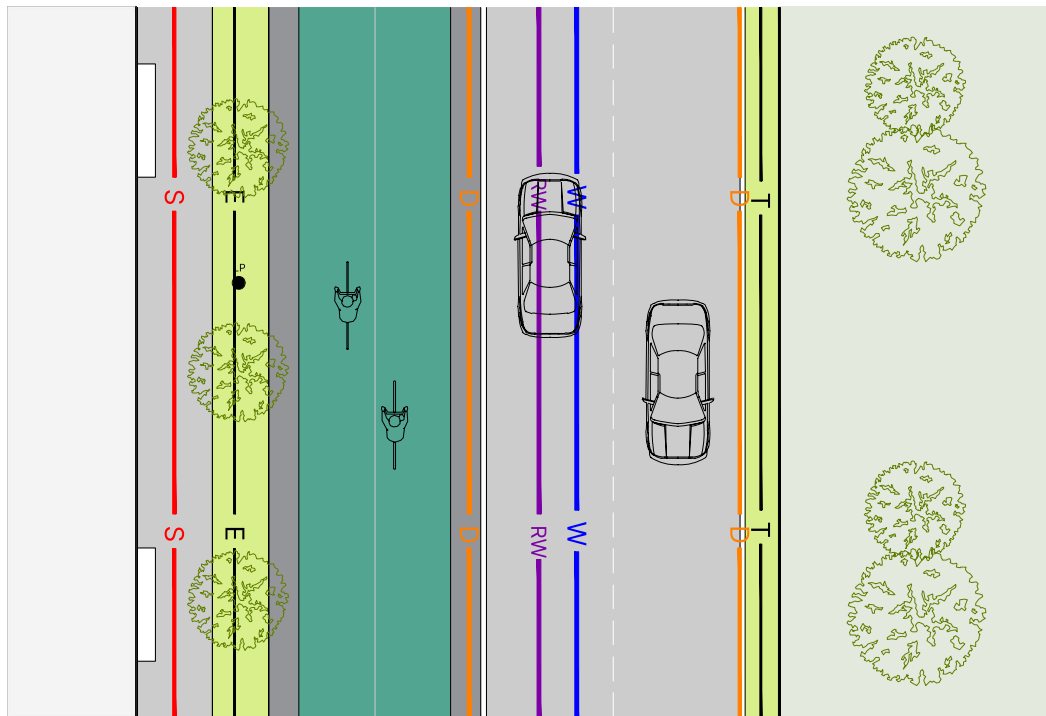
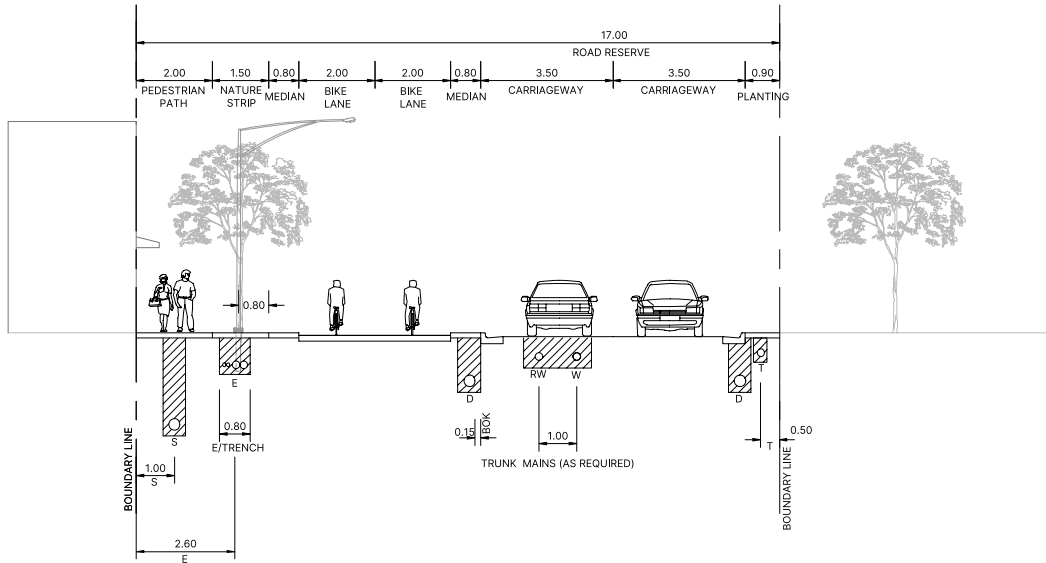


0 0.75 1.5 2.25 3.0 3.75m  
1:150 @A4

Urban Communities



### CROSS SECTION "11A" - BLUESTONE BRIDGE ROAD (MODIFIED CONNECTOR) - 17.0m



- NOTE:**
- Green pavement on this diagram is indicative only. Green pavement will typically only be used at intersections and other conflict points.
  - Bicycle lane is a half step between footpath and road levels.
  - Drainage pits may need to be haunched in front of kerb subject to service clearance requirements.
  - Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

### Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

### Road Cross Section

Creamery Road PSP

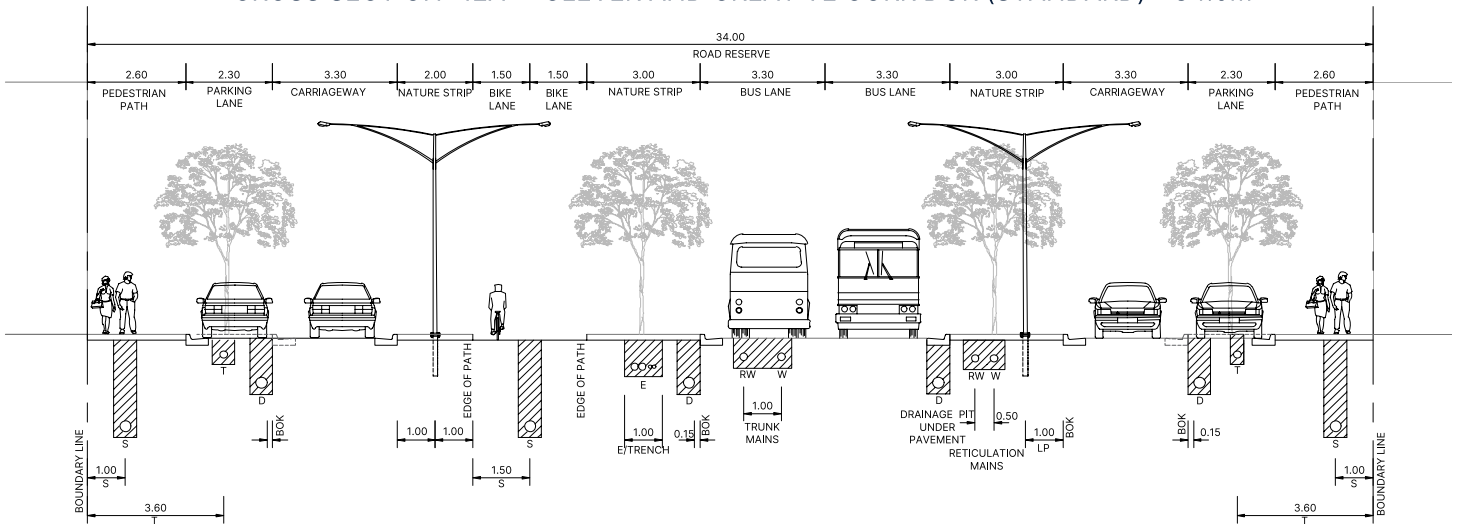
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Drawing: 12 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



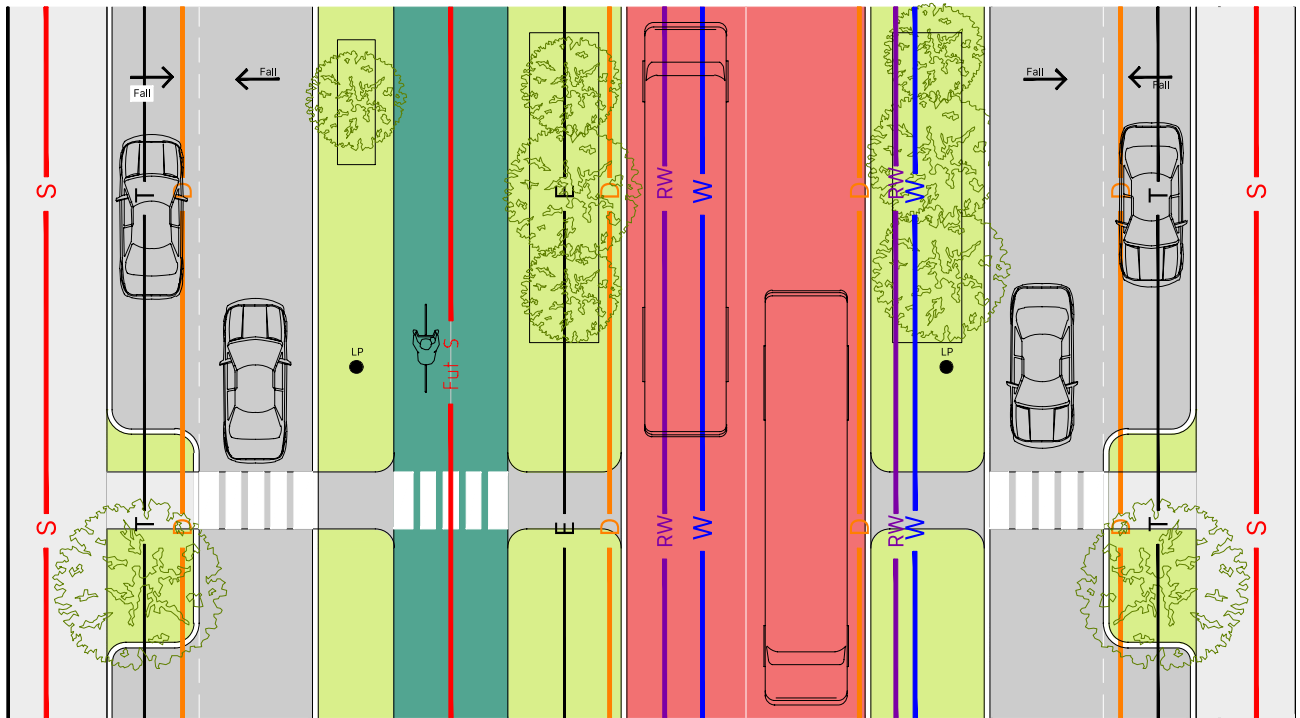
Urban Communities



## CROSS SECTION "12A" - CLEVER AND CREATIVE CORRIDOR (STANDARD) - 34.0m



ELEVATION



PLAN VIEW

**NOTE:**  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

### Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

## Road Cross Section

### Creamery Road PSP

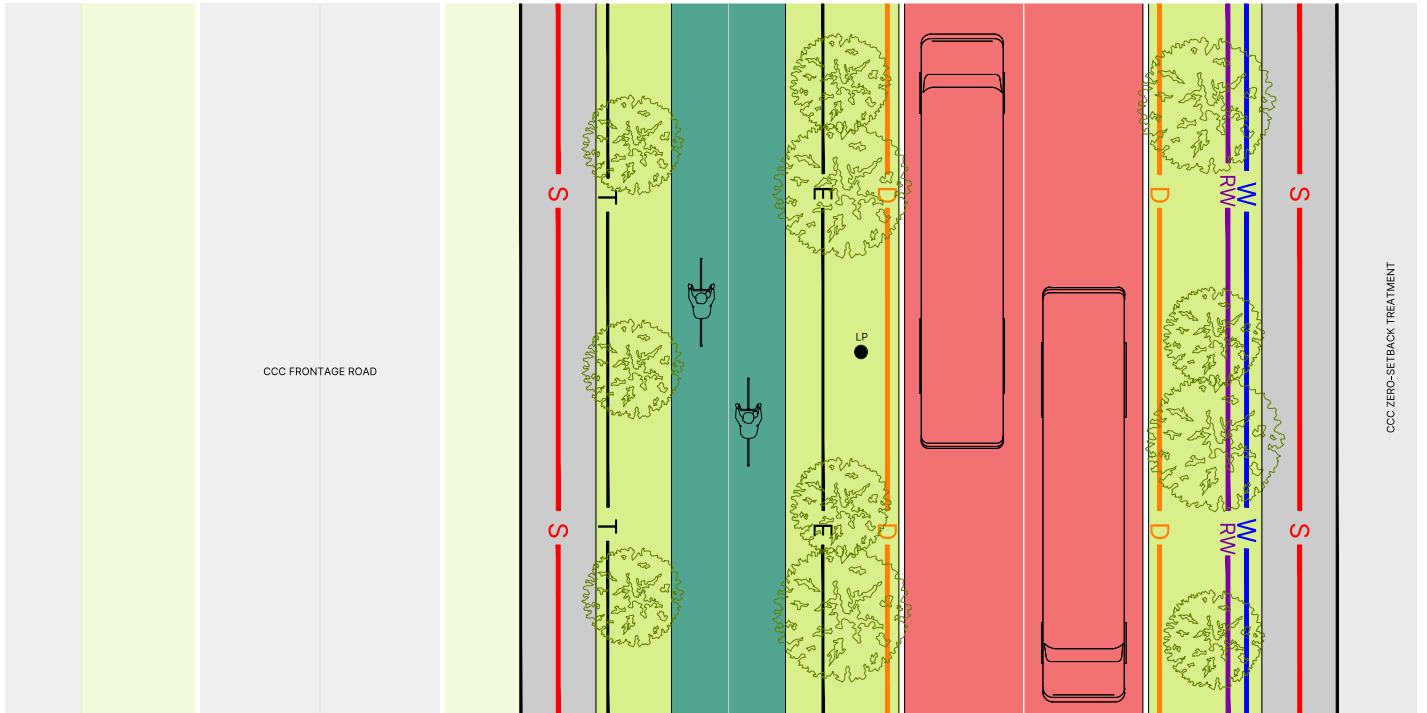
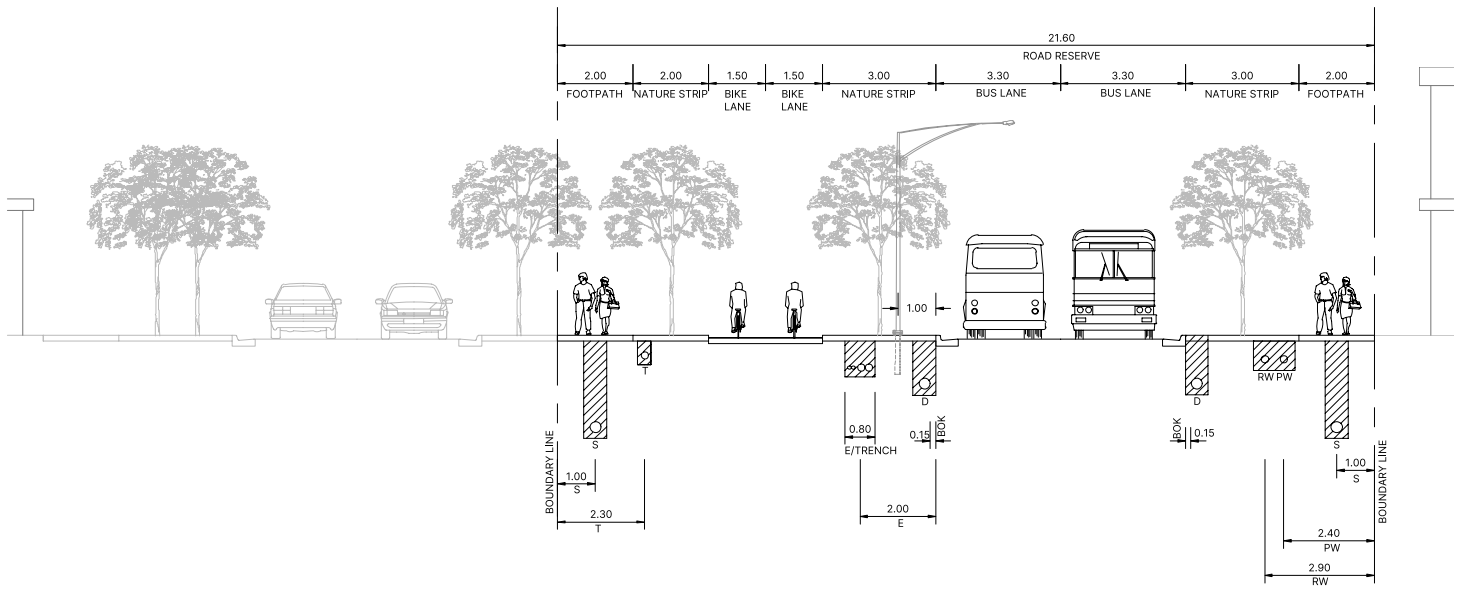
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Sheet 13 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



Urban Communities



# CROSS SECTION "12B" - CLEVER AND CREATIVE CORRIDOR VARIATION - 21.6m



**NOTE:**  
 Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

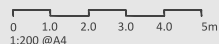
## Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

## Road Cross Section

Creamery Road PSP

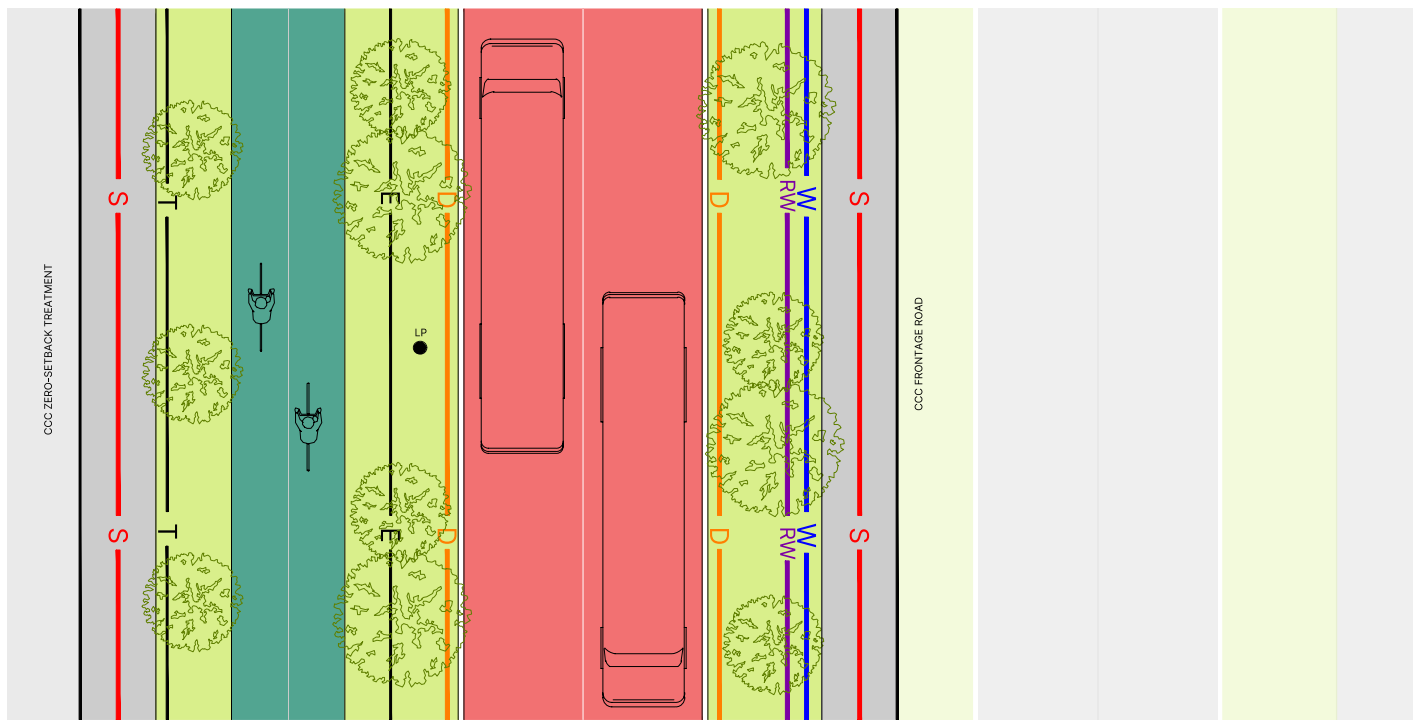
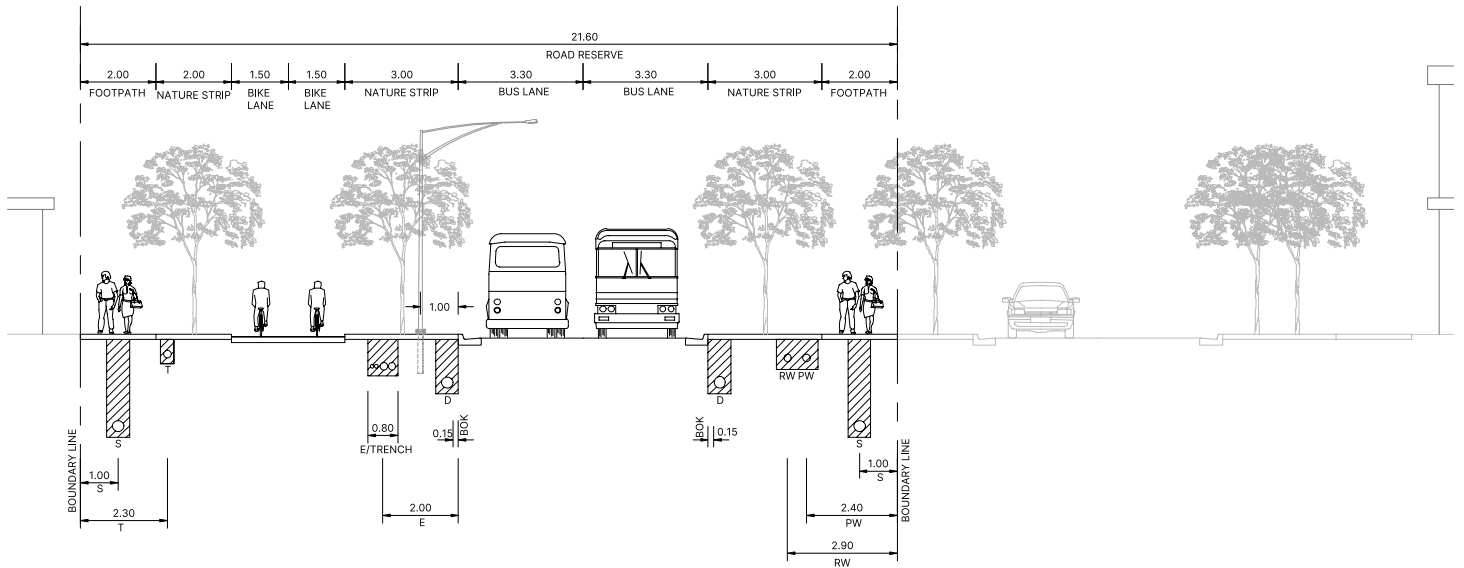
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Drawing: 14 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



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# CROSS SECTION "12C" - CLEVER AND CREATIVE VARIATION - 21.6m



**NOTE:**  
 Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

## Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

## Road Cross Section

Creamery Road PSP

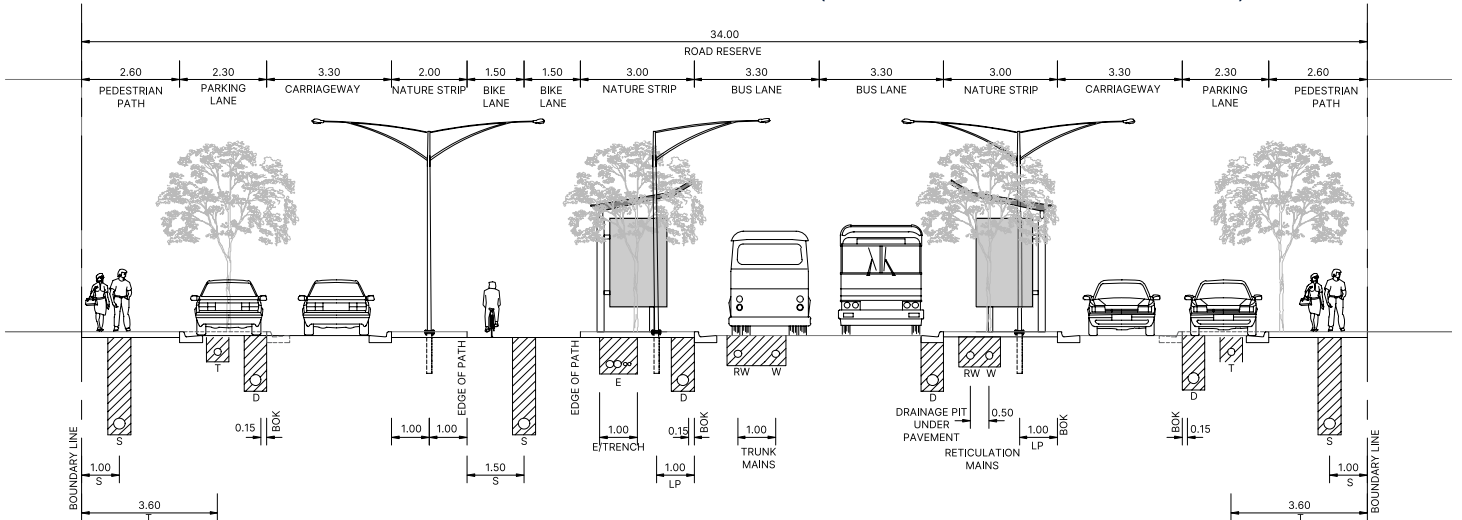
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Drawing: 15 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



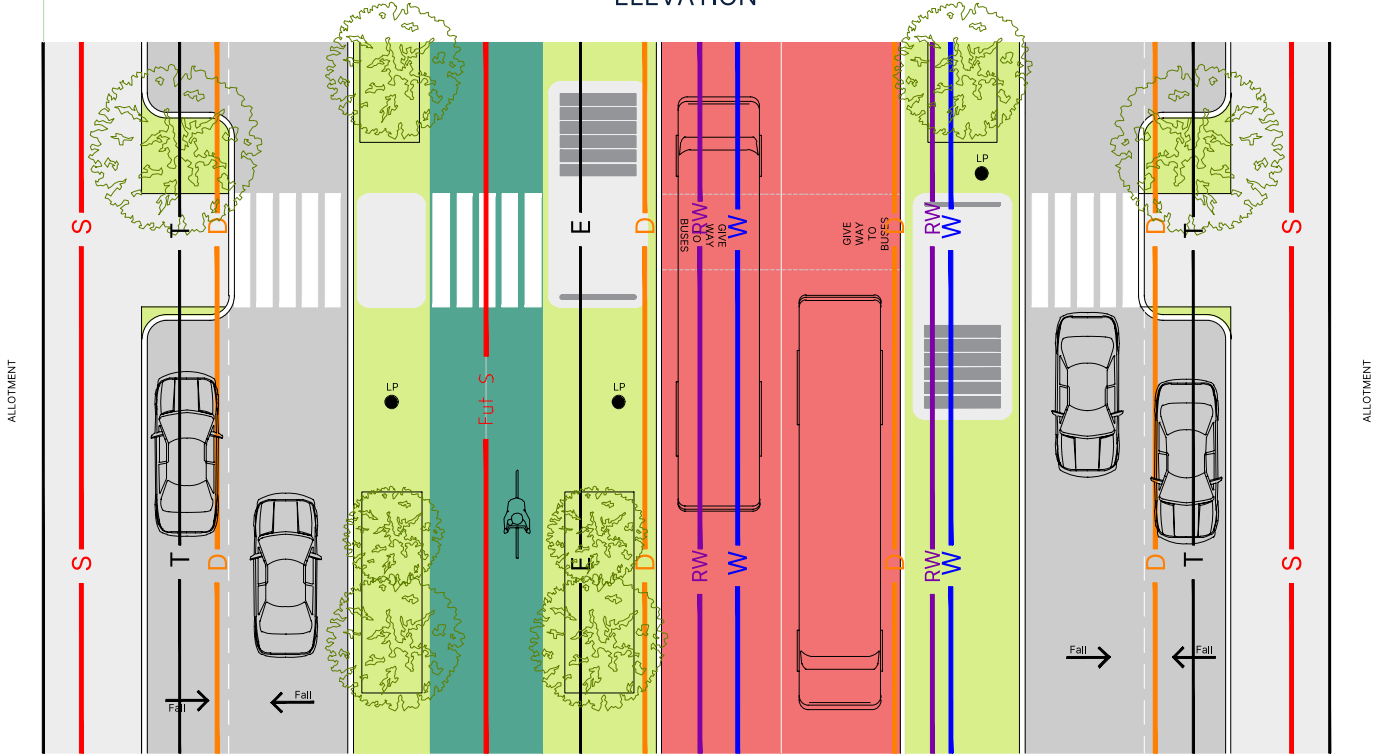
Urban Communities



# CROSS SECTION "13" - CLEVER AND CREATIVE CORRIDOR (STANDARD WITH TRANSIT STOP) - 34.0m



ELEVATION



PLAN VIEW

**NOTE:**  
 Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

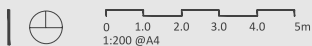
## Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

## Road Cross Section

Creamery Road PSP

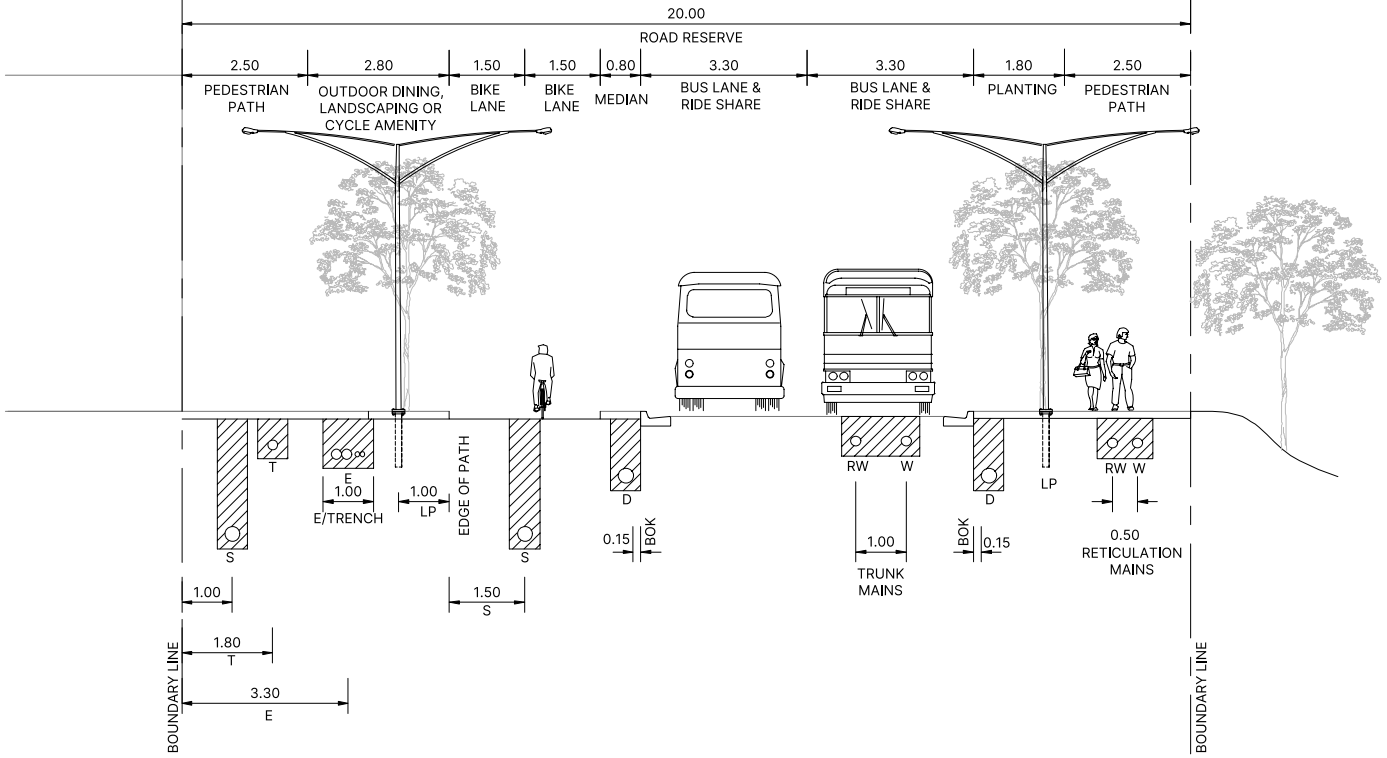
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Sheet 16 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



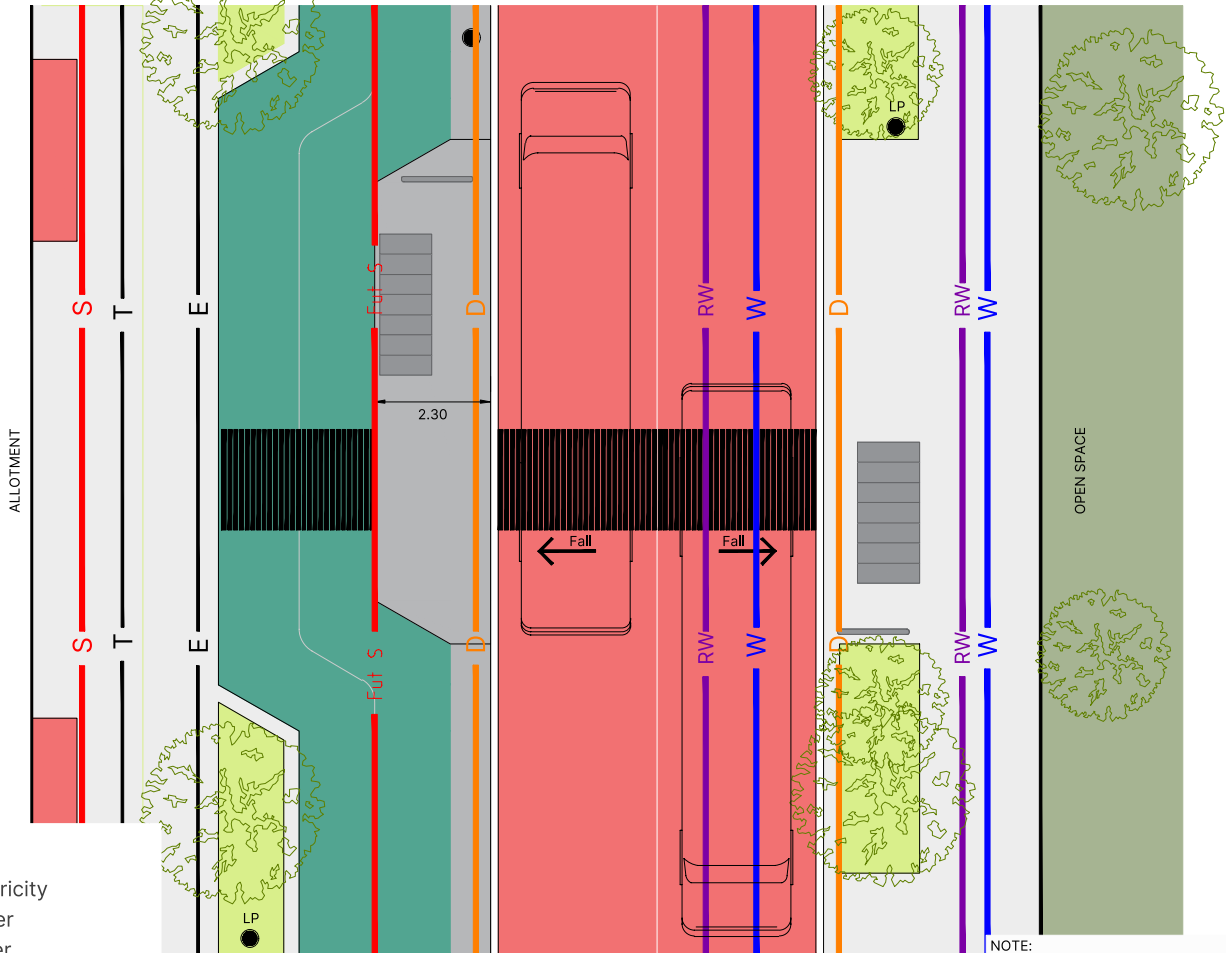
Urban Communities



# CROSS SECTION "14" - ACTIVITY CENTRE (CCC)- 20.0m



## ELEVATION



## PLAN VIEW

### Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

NOTE:  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

## Road Cross Section

Creamery Road PSP

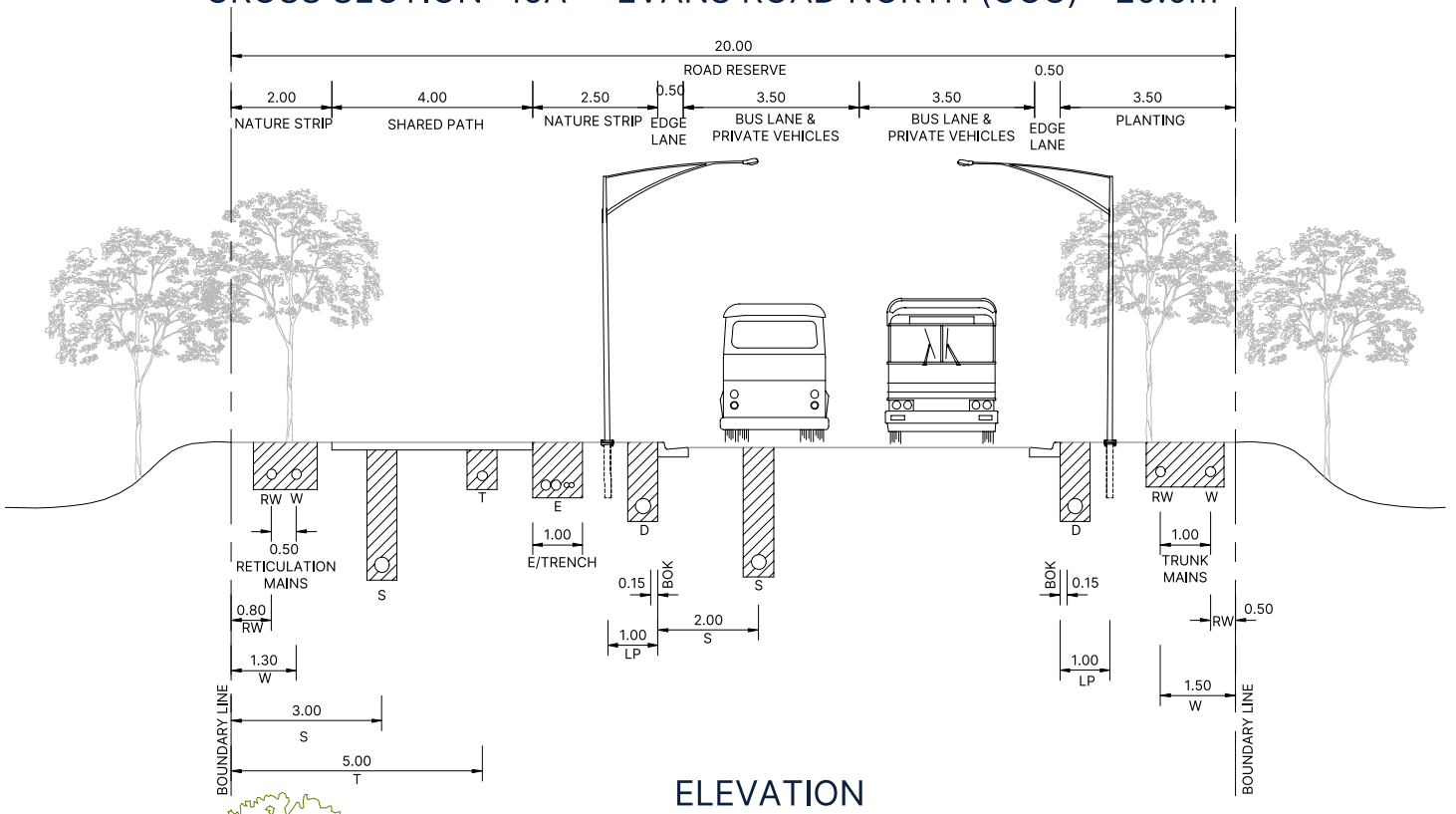
Date Issued: 1/07/2024 | Revision: 4  
SMEC Project Reference: 30043082E | Sheet 17 of 21  
Drawn by: D.Bish | Checked by: D.Mutton



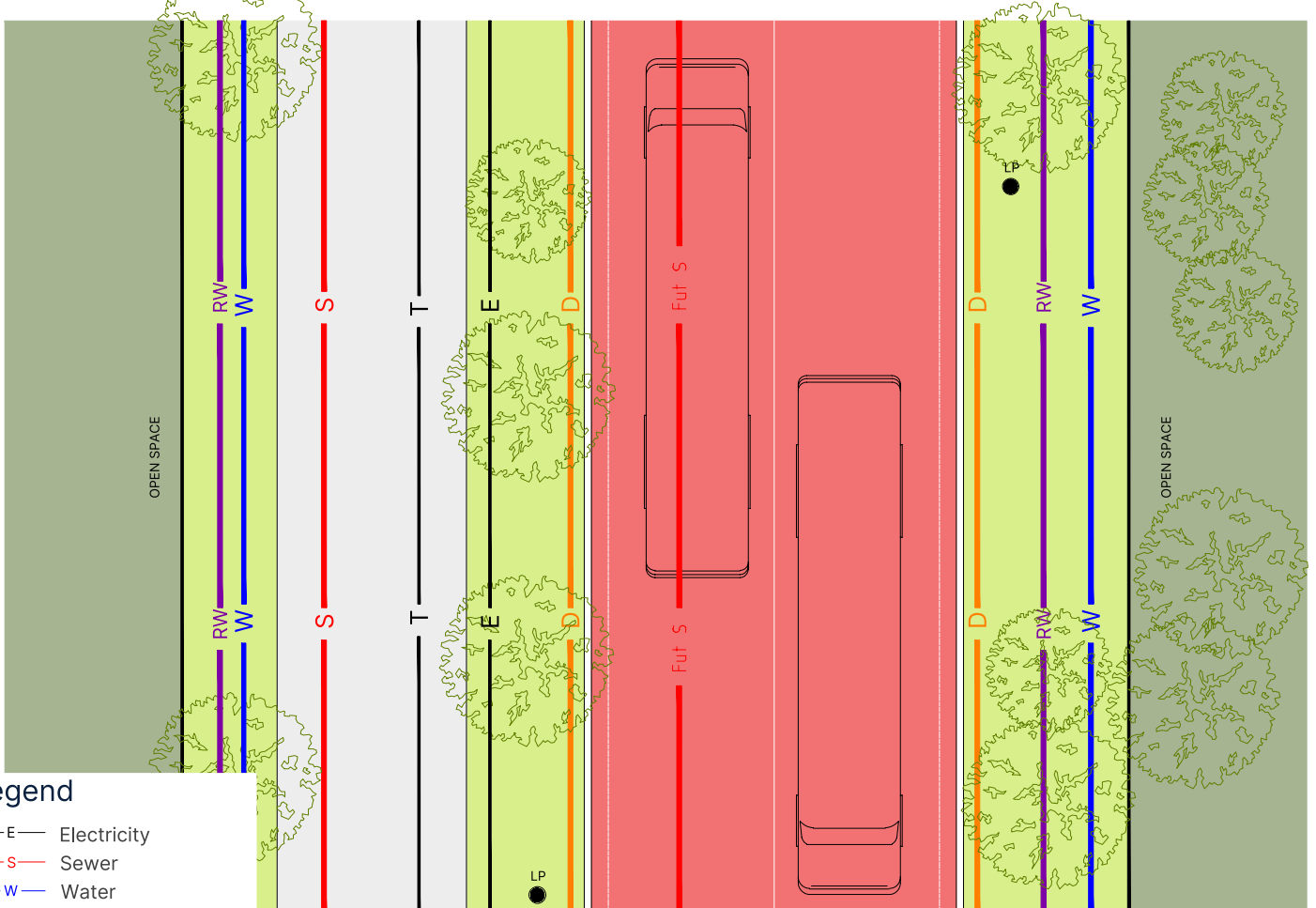
Urban Communities



# CROSS SECTION "15A" - EVANS ROAD NORTH (CCC) - 20.0m



ELEVATION



PLAN VIEW

NOTE: Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

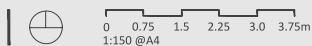
## Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

## Road Cross Section

Creamery Road PSP

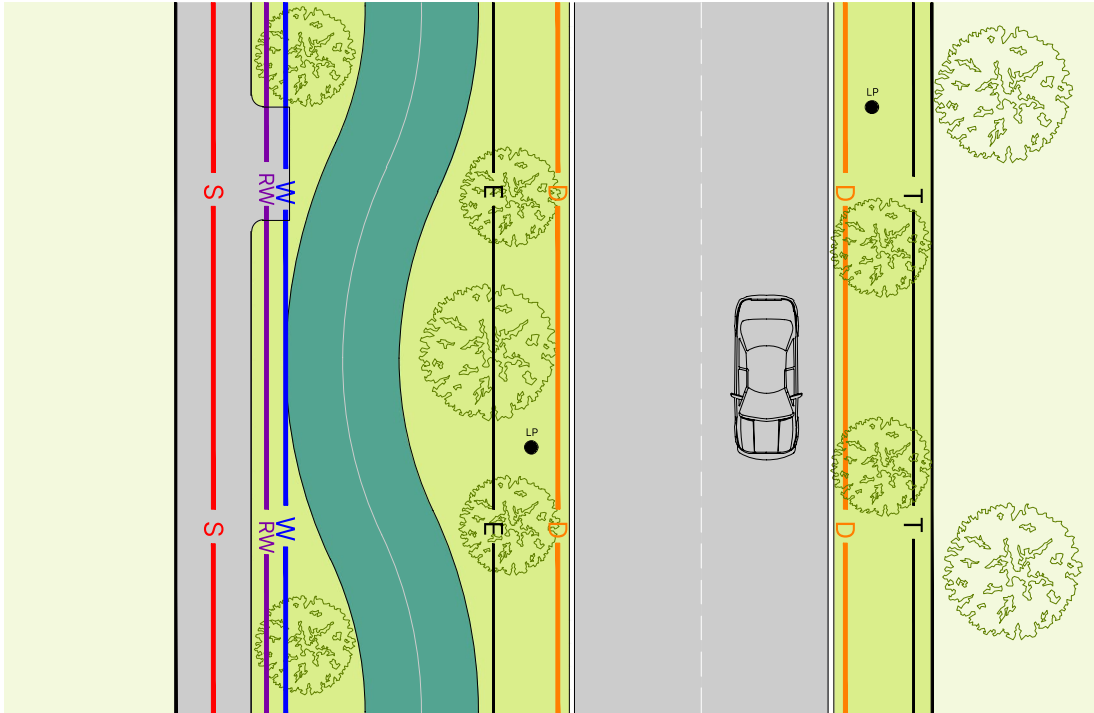
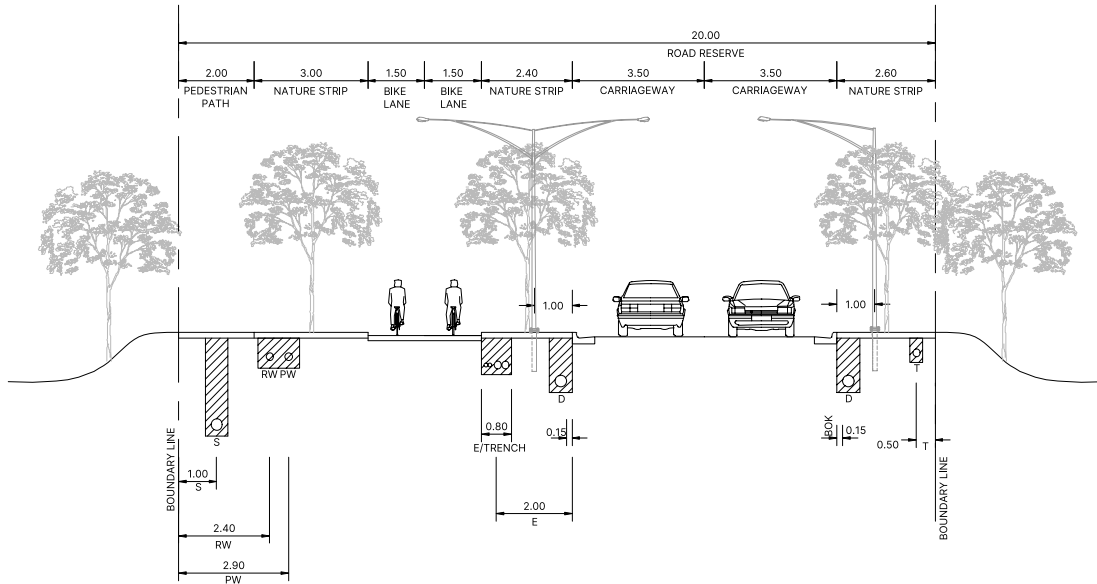
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043092E | Sheet 18 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



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## CROSS SECTION "15B" - EVANS ROAD SOUTH (CCC) - 20.0m



**NOTE:**

- Land uses on either side of this typical cross section vary. Refer to future urban structure plan and CCC alignment.
- Green pavement on this diagram is indicative only. Green pavement will typically only be used at intersections and other conflict points.
- Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations

### Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

## Road Cross Section

Creamery Road PSP

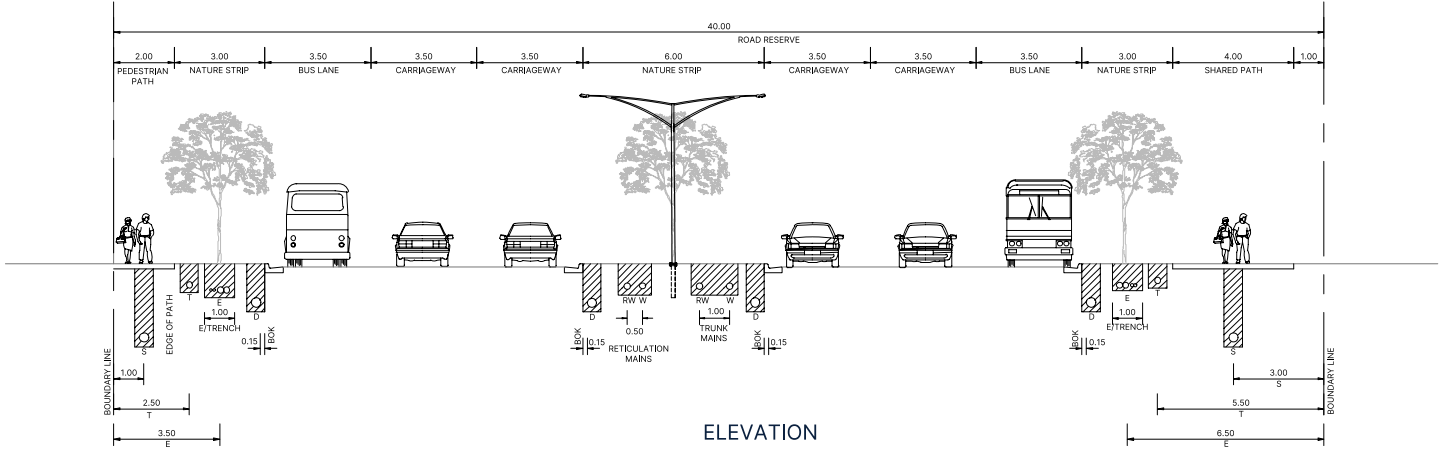
Date Issued: 1/07/2024 | Revision: 4  
 SMEC Project Reference: 30043082E | Drawing: 19 of 21  
 Drawn by: D.Bish | Checked by: D.Mutton



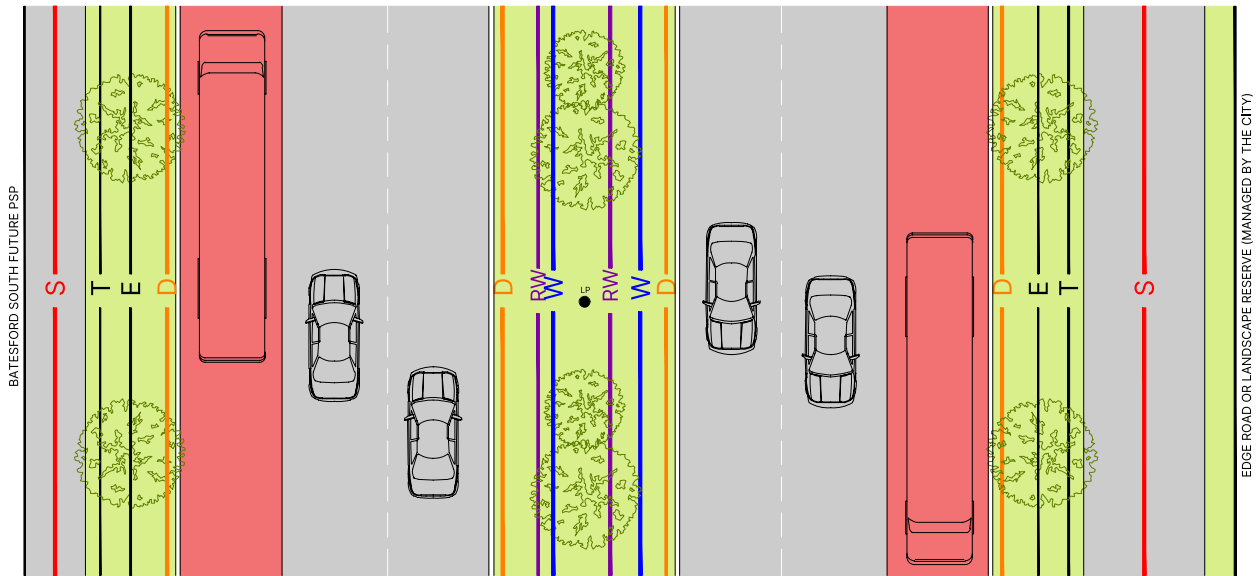
Urban Communities



CROSS SECTION "16" - MIDLAND HIGHWAY (MANAGED BY DEPARTMENT OF TRANSPORT) - 40.0m



ELEVATION



PLAN VIEW

NOTE:  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

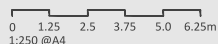
Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

Road Cross Section

Creamery Road PSP

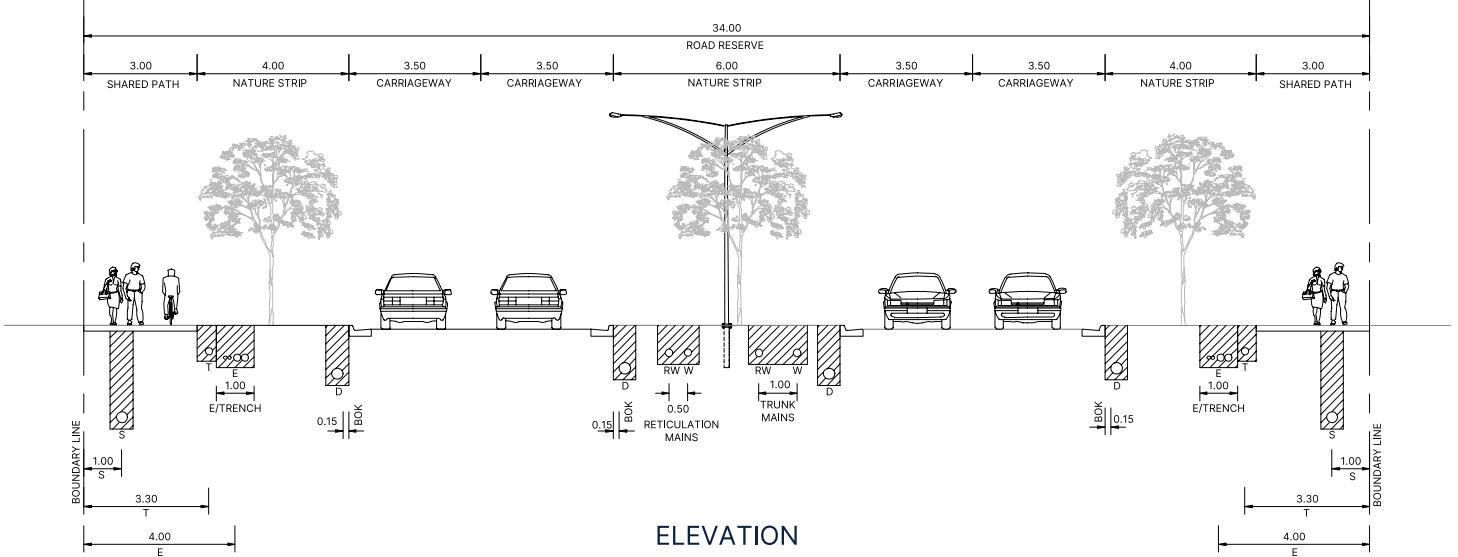
Date Issued: 1/07/2024 | Revision: 4  
SMEC Project Reference: 30043082E | Sheet 20 of 21  
Drawn by: D.Bish | Checked by: D.Mutton



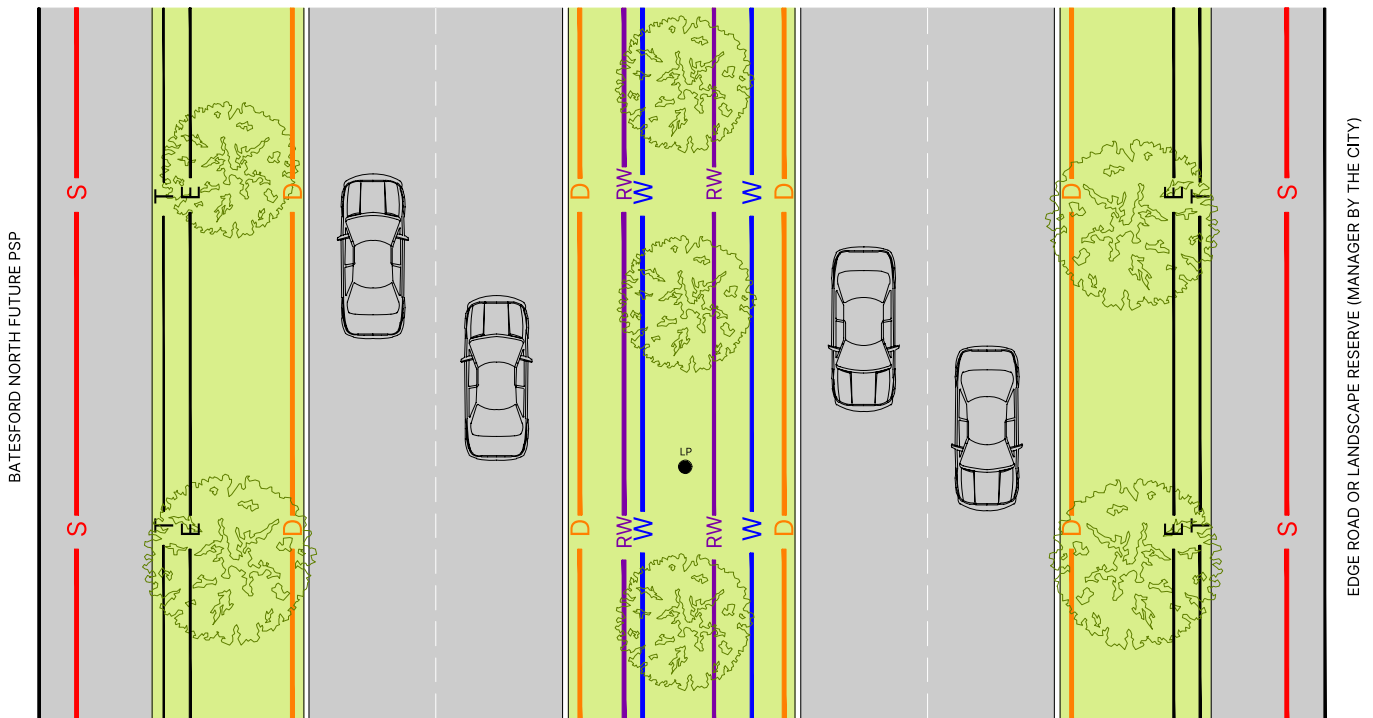
Urban Communities



CROSS SECTION "17" - GEELONG BALLAN ROAD (MANAGED BY DEPARTMENT OF TRANSPORT - 34.0m)



ELEVATION



PLAN VIEW

NOTE:  
Minimum cover to services under tree locations to be 0.8m typically. Minimum service depths may increase at service crossing locations.

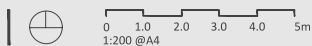
Legend

- E — Electricity
- S — Sewer
- W — Water
- RW — Recycled Water
- T — Telecommunications
- D — Stormwater

Road Cross Section

Creamery Road PSP

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