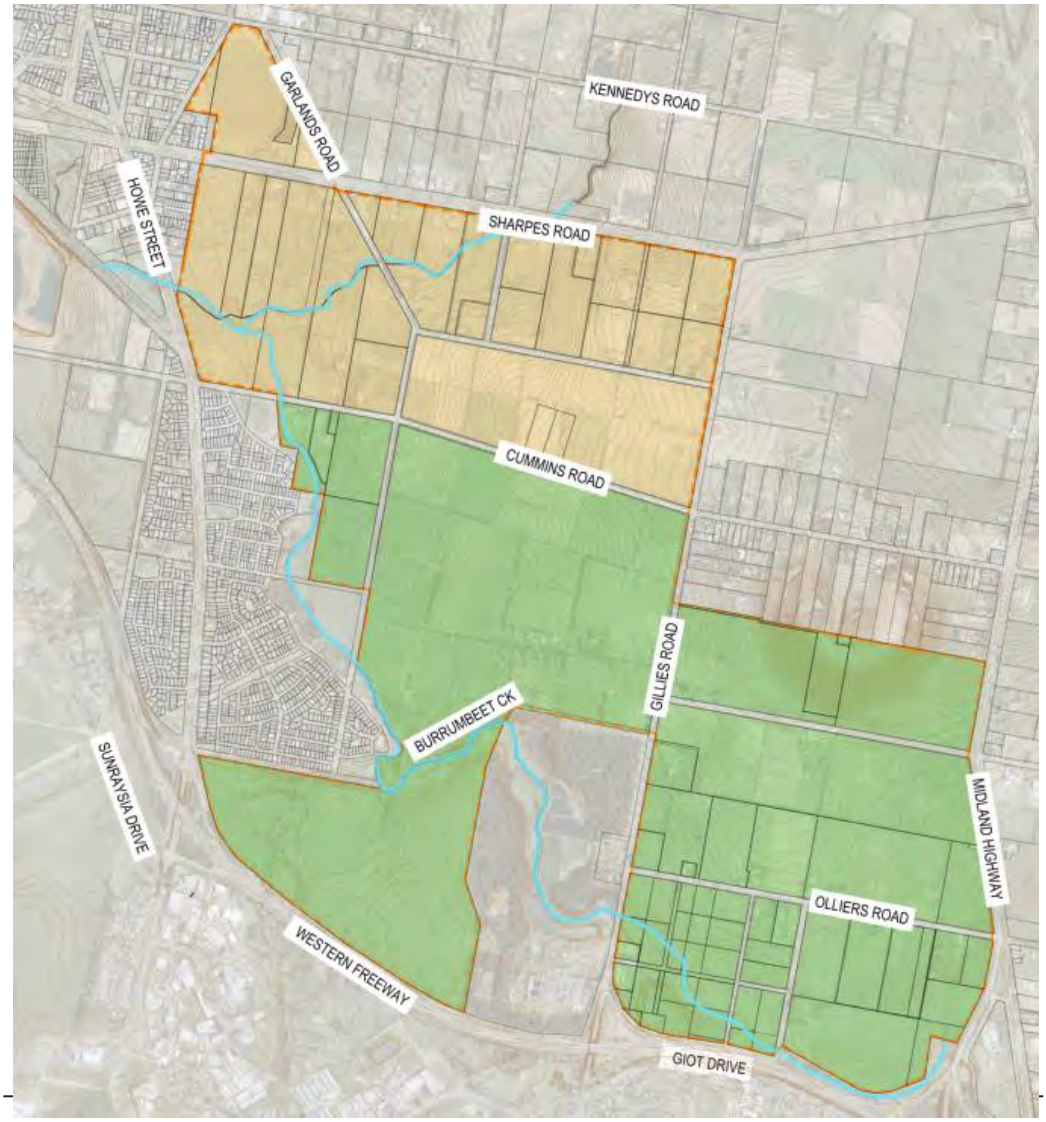
Ballarat North Precinct Structure Plan

Utilities Assessment Report



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PREPARED FOR:

Victorian Planning Authority (VPA)

PREPARED BY:

Stantec

Revision Schedule

Revision No.	Date	Description	Prepared by	Quality Reviewer	Independent Reviewer	Project Manager Final Approval
01	11/11/2024	Draft	Sajan Thapa	Alex De Jong	Claire Bickerstaff	Josef Seter
02	18/03/2025	Client Review	Sajan Thapa	Josef Seter	Claire Bickerstaff	Josef Seter

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Executive Summary

This Utilities Assessment Report provides an evaluation of the utility infrastructure and services essential to the development of the Ballarat North Precinct Structure Plan (PSP). The assessment is informed by the Place Based Plan prepared by the VPA and focuses on ensuring that critical utilities including water supply, wastewater management, stormwater drainage, electricity, gas, and telecommunications are effectively planned to support anticipated growth in the area. The PSP core area is projected to accommodate approximately 6,600 lots, averaging 20 dwellings per developable hectare.

This report lays the groundwork for strategic planning and investment in utility infrastructure, ensuring that the Ballarat North PSP can meet the needs of a growing community.

Whilst the Expanded Area is not likely to be included in this PSP, it is understood that the Expanded Area will likely be an additional growth front which may see the development of between 2,600 to 3,100 additional homes. The Expanded Area will need to be planned for via a separate strategic planning process. However, in evaluating the utility infrastructure and services essential for the Core Area, Stantec have also considered the potential development of the Expanded Area to ensure that the Expanded Area can be 'future proofed'.

Sewer

Central Highlands Water (CHW) manages the sewer infrastructure within the precinct including the Ballarat North Water Reclamation Plant (WRP) that provides for the treatment of domestic sewage and trade waste for disposal and/or reuse. CHW has indicated that the current network will require augmentation to service the PSP's future development, necessitating the installation of new infrastructure. A significant trunk sewer has however been installed to service land within the eastern portion of the proposed PSP. Planning is underway to further upgrade the sewer network as part of CHW's current capital works program, however additional developer-funded infrastructure will also be required for full precinct development, in accordance with typical practices in growth areas.

Water

Central Highlands Water is the provider of reticulated water services within Ballarat. Properties within the precinct are currently serviced primarily by existing 150mm diameter water mains that run north-south down Gillies Road and east along Olliers Road. CHW have indicated that the water network will required upgrades with larger diameter water mains extended to augment the supply to support the future development. Such works will form part of CHW planned capital works programs and be delivered in partnership with developers. Suitable integrated water management strategies are being considered for the precinct.

Gas

While there are existing gas assets within the precinct, new dwellings, apartment buildings and residential subdivisions requiring planning consent will not be permitted to connect to gas from January 1, 2024. Therefore, this report assumes no further investment in gas infrastructure for the residential development. Despite the legislative changes, gas may still play a crucial role in the energy mix for Neighbourhood and Local Activity Centres within the precinct.

Electricity

Powercor has indicated that the precinct currently has limited electricity supply available. However, infrastructure upgrades are included in Powercor's 10-year plan to accommodate growth. This is likely to include the installation of multiple new kiosks/substations throughout various development stages to ensure adequate power supply.

Telecommunications

The telecommunication assets in the area are owned by Telstra and NBN, assets are a mix of both underground and overhead assets to provide connection to existing properties. There is currently no NBN fixed line network in the identified area, and it does not support Fibre to the Premises (FTTP) or any other fixed line technology. At present, NBN have no plans to install or upgrade infrastructure within the precinct. NBN have advised that they are not anticipating any constraints or issues with future standard infrastructure installations. The network will not be extended to this area unless initiated by customers. Overall, NBN Co considers it highly unlikely that new key infrastructure will be needed.

Stormwater

The precinct lacks significant drainage infrastructure, with most properties relying on existing table drains along roads and stormwater retention/detentions systems for runoff management. To support future development, new drainage infrastructure must be installed, potentially connecting to adjacent drainage networks on Howe Street, Midland Highway, or the Western Freeway, depending on capacity. Major roads such as Gillies Road, Cummins Road, and Olliers Road are proposed as key locations for drainage assets, with water-sensitive urban design (WSUD) treatments likely needed to manage runoff before discharge into adjacent waterways.

Summary of infrastructure upgrades required to facilitate development from Stage 1:

Authority-led projects:

- Upgrade of existing Burrumbeet Creek Sewer Pump Station (CHW)
- Construction of Water Main from White Swan Reservoir (CHW)
- Upgrade of Ballarat North Substation to allow for future electrical connection (Powercor)

Developer-led projects:

- Construction of new local drainage infrastructure
- Construction of new local sewer infrastructure
- Construction of new local water infrastructure

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1. Introduction

Stantec has been engaged by the Victorian Planning Authority (VPA) to undertake a Utilities Assessment for the proposed Ballarat North PSP. Stantec have reviewed available information on existing authority/utility services infrastructure within and around the precinct. This information has come direct from Authorities, Utilities, Dial Before You Dig (DBYD), authority infrastructure planning maps, aerial photography, Streetview imagery and onsite inspections. Stantec have also consulted with relevant services authorities to understand their strategies for delivering utility services to support the precinct. Additionally, Stantec have identified potential connection points for new services and their implementation. This Utilities Assessment report will be focusing on the trunk infrastructure required to enable servicing of the entire precinct.

2. Site Overview

The Ballarat North PSP is approximately 832Ha in size and located approximately 8km from the centre of Ballarat. The PSP is surrounded by major and minor highways and existing residential streets. The PSP is currently split into two areas; a core area in the south and a proposed expanded area to the north. For this assessment both areas will be considered in servicing strategies to ensure that planned infrastructure is sized to accommodate development of both the core and expanded areas.

It is estimated that the PSP planning and execution will be completed by the end of 2026 with development on site to begin in 2028. The Core Area has a proposed capacity of 6,600 lots which is based on 20 Lots per net developable hectare. The area is already known to multiple service authorities being developed in the area in preparation for growth.

The existing land in the area is predominantly used for agricultural use, resulting in a limited number of existing assets that can support significant development. Therefore, new infrastructure will need to be proposed to adequately service the precinct. Figure 1 below displays the current draft Place Based Plan provided by the Victorian Planning Authority (VPA).

The Core Area of the development is set to include the following land use elements:

- 1 Non-Government School
- 1 Government Secondary School
- 2 Government Primary Schools
- 2 Community Centres
- 1 Large Neighbourhood Activity Centre
- 2 Local Activity Centres
- Town Commons – Undevelopable Area
- Mount Rowan – Undevelopable Area

This assessment aims to ensure that the proposed community infrastructure can be successfully developed.

Figure 1 - Ballarat North PSP – Place Based Plan (Source: VPA)

2.1 Key Authorities and Stakeholders

The following bodies have been identified as Key stakeholders for the development.

- Central Highland Water
- City of Ballarat
- Glenelg Hopkins Catchment Management Authority
- Ausnet (Electrical)
- Powercor
- National Broadband Network (NBN)
- Telstra

3. Methodology

Our methodology to complete this report was as follows:

- Review available reports and information provided by the VPA
- Review Dial before you Dig requests and information received from relevant service Authorities to date.
    - Review existing infrastructure information relating to the following.
        - Central Highlands Water (CHW)
        - Powercor
        - Gas – Downer Group & Ausnet Services
        - National Broadband Network (NBN)
- Discussions with services authorities on their plans
- Collation of data – report and mapping
- Production of utility plans for additional context
- Assessment and analysis of findings to inform potential connection locations and servicing opportunities.
- Discussion with VPA on place-based plan
- Review staging from the Utility Servicing Situational Analysis Report

4. Authority Correspondence

The plan package contained in the Appendix's and extracted in the series of figures listed in the relevant sections below, identifies all current services located within, and adjacent to the precinct. The source of this information is derived from a combination of Dial Before you Dig Information and direct requests from Authorities.

5. PSP Staging

All service authorities recognise the Ballarat North PSP investigation area as a future development precinct and are at different stages of integrating this into their asset planning. Considering existing infrastructure, anticipated costs and timelines for upgrades, and constraints like topography, Stantec propose the staging outlined in Figure 2 as the most efficient for the precinct. This approach optimises the use of current infrastructure, including Gilles Road and the Midland Highway.

A major existing piece of infrastructure, a trunk sewer has already been constructed along Burrumbeet Creek and north along the Midland Highway to service the proposed Ballarat Show Grounds managed by the Ballarat Agricultural and Pastoral Society and the Level 3 Incident Control Centre and Depot Facility managed by the Department of Energy, Environment and Climate Action. This trunk sewer has been sized accordingly to accommodate flows from Stage 1, 2 and 3 where applicable. The capacity of these trunk sewer mains will support immediate development in Stage 1, shown in Figure 3 below.

Stage 1 is strategically located at the lowest point of the catchment area, which offers significant advantages for managing stormwater drainage. This positioning enables the design and construction of effective drainage retention and detention systems that can capture and control runoff before it is released into Burrumbeet Creek. By implementing these systems early in the development process, this ensures they are appropriately scaled and configured to accommodate the

anticipated stormwater needs of future stages within the PSP. This proactive approach will help mitigate flooding risks, enhance water quality, and promote sustainable drainage practices throughout the entire precinct as it develops. Additionally, having a well-planned drainage infrastructure in Stage 1 will set a strong foundation for subsequent stages, ensuring that they integrate with the overall hydrological management strategy.

Commencing development with Stage 1 is the most strategic approach for the Ballarat North PSP investigation area due to several key factors. All service authorities acknowledge this precinct as a future development area and are adapting their asset planning accordingly. Stage 1 leverages existing infrastructure, including the trunk sewer along Burrumbeet Creek, which has been designed to accommodate flows from proposed growth areas. This infrastructure supports immediate development and optimizes the use of Gilles Road and the Midland Highway. Furthermore, Stage 1's location at the lowest point of the catchment facilitates effective stormwater management through the establishment of retention and detention systems. This is also consistent with the current draft Place Based Plan utilizing undevelopable areas with drainage infrastructure.

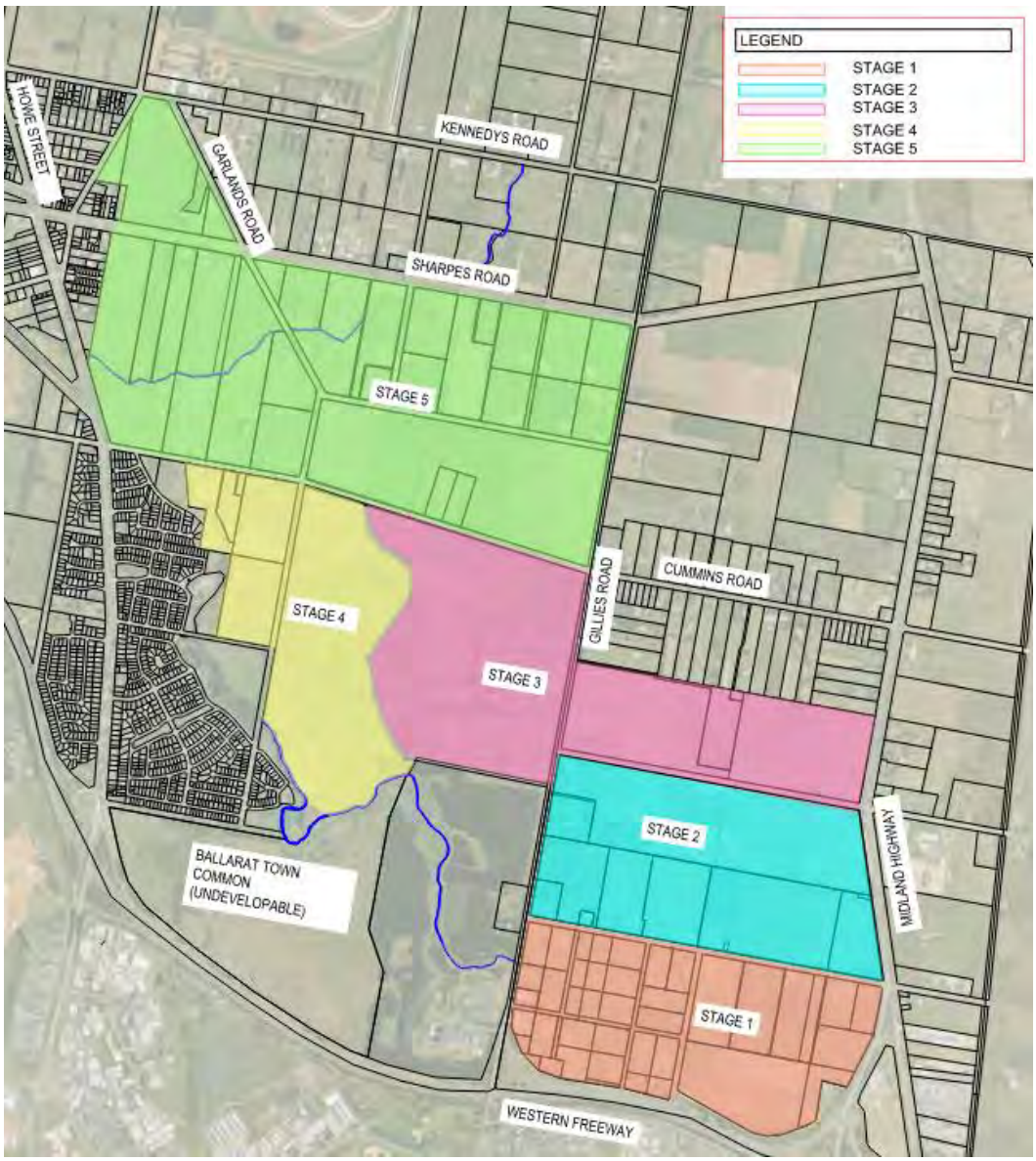

Figure 2 - Proposed Staging Plan

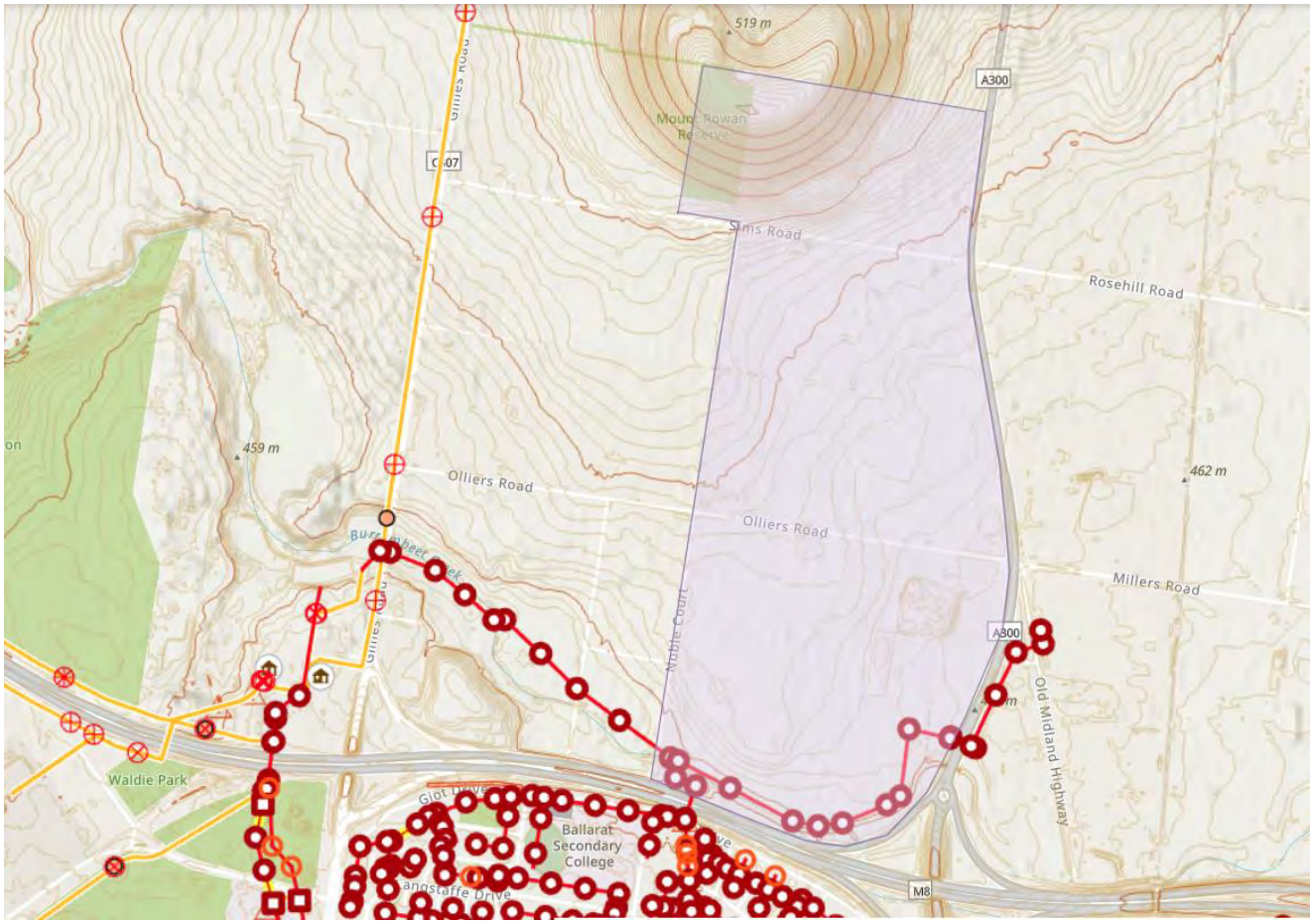

Figure 3 - Approximate sewer catchment plan – courtesy of CHW

6. Utility Analysis

6.1 Sewerage

6.1.1 Existing infrastructure

Central Highlands Water (CHW) is the authority responsible for the provision of sewer services in the area.

There are several sewer mains within the precinct and around its perimeter, however there is currently no properties within the precinct that are connected to sewer infrastructure. It is understood that all of the existing sewer mains within the precinct area direct wastewater to the Ballarat North Water Reclamation Plant (WRP) for treatment. There are several sewer mains entering the WRP from the southern and western boundaries of the precinct. The WRP is located at Western Highway/Gillies Road junction, directly south of the precinct area.

There is an existing 825mm diameter trunk sewer main that transfers reticulated sewage from the Ballarat North area to the WRP (Gilles Road) and a 525mm diameter trunk sewer main that services from the east of the PSP. Consultation with CHW has occurred and confirmed there is capacity for connection to these sewer assets to service the precinct. The 525mm diameter trunk sewer main has been recently constructed by CHW for the purpose of servicing part of the precinct and industrial land adjacent to the precinct, which will also service parts of Stage 1, 2 and 3 of the proposed precinct sequencing.

There are a number of existing sewer assets along the western boundary of the proposed precinct that are used to service the developed areas of Miners Rest.

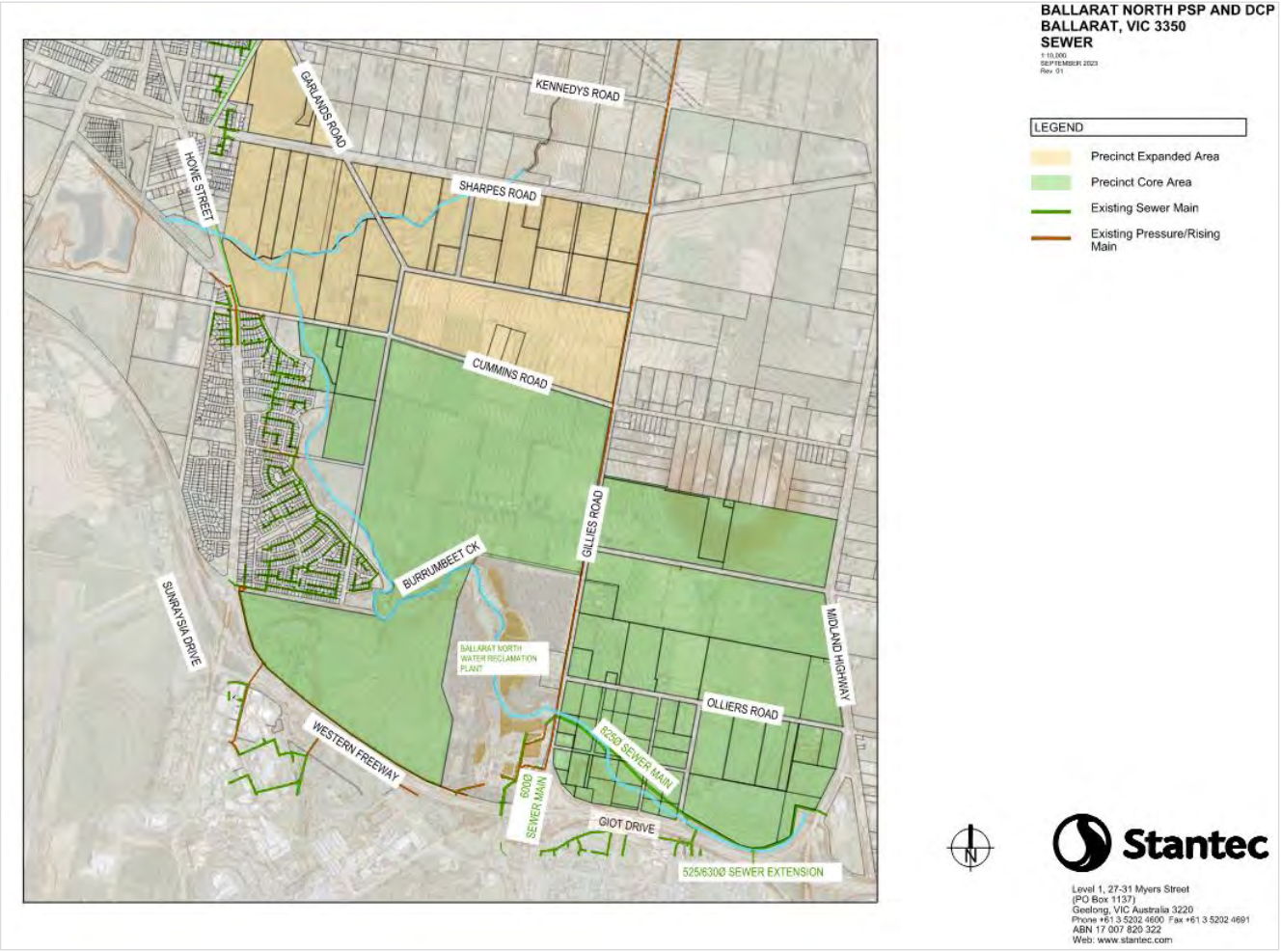

Figure 4 - Ballarat North Existing Sewer Assets

6.1.2 Potential Connections and Servicing Strategy

Timing of proposed upgrades and CHW capital works will be critical, specifically CHW's PR23 submission for the "Ballarat Sewer Growth Project – Northern Growth Area" which is expected to be completed by 2028. This aligns with anticipated commencement of development in the Ballarat North PSP investigation area.

The completion of these capital works in the PR 23 Plan by CHW will allow for the extension of sewer assets to service a majority of the proposed precinct area. The topography of the area, falling from east to west will allow for gravity main servicing for a majority of stages 1, 2 and 3 – refer to Figure 5 below. Main connections into the existing CHW network for trunk sewer is shown in Figure 5 below.

Note: connection of sewer to existing assets are indicative only. Final connection locations are to be confirmed.

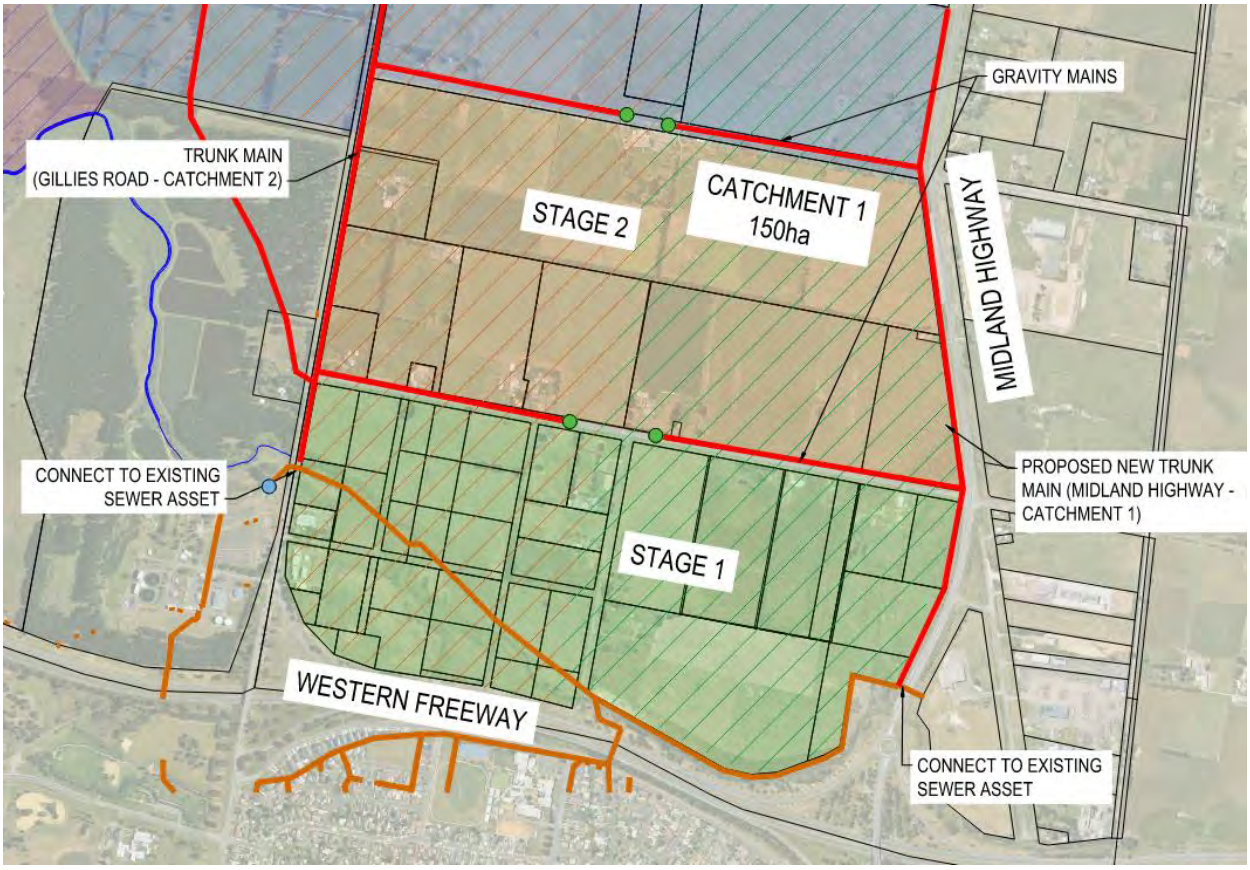

Figure 5 - Proposed new Sewer Infrastructure (Stage 1 & 2)

Trunk Mains shown in Figure 5 will need to be constructed in both major road reserves to allow for servicing. Sizing of these assets has been estimated assuming a development density of 20 Lots/Ha. Parts of stages 3 and 4 will need to be serviced from the western boundary of the precinct, due to the topography of the land. It is proposed that new sewer assets will need to be constructed along Cummins Road and connected into existing CHW infrastructure on Howe Street, Miners Rest.

An upgrade of the existing Burrumbeet SPS is required to accommodate growth in the precinct and has been confirmed by CHW. This is project has been allocated as part of the PR23 CAPEX program. The proposed servicing arrangement for Stages 4 & 5 has not been confirmed at this point in time but are currently being investigated. This area will require potential new SPS assets or augmentation of existing SPS. There is currently no servicing strategy for Miners Rest and the expanded Northern Growth Area (Stage 5). See figure 6 below that shows potential sewer alignments and connectivity for servicing proposed Stages 3, 4 and 5. It should be noted that this servicing arrangement is considered indicative at this point in time and does not form part of an approved servicing arrangement from CHW.

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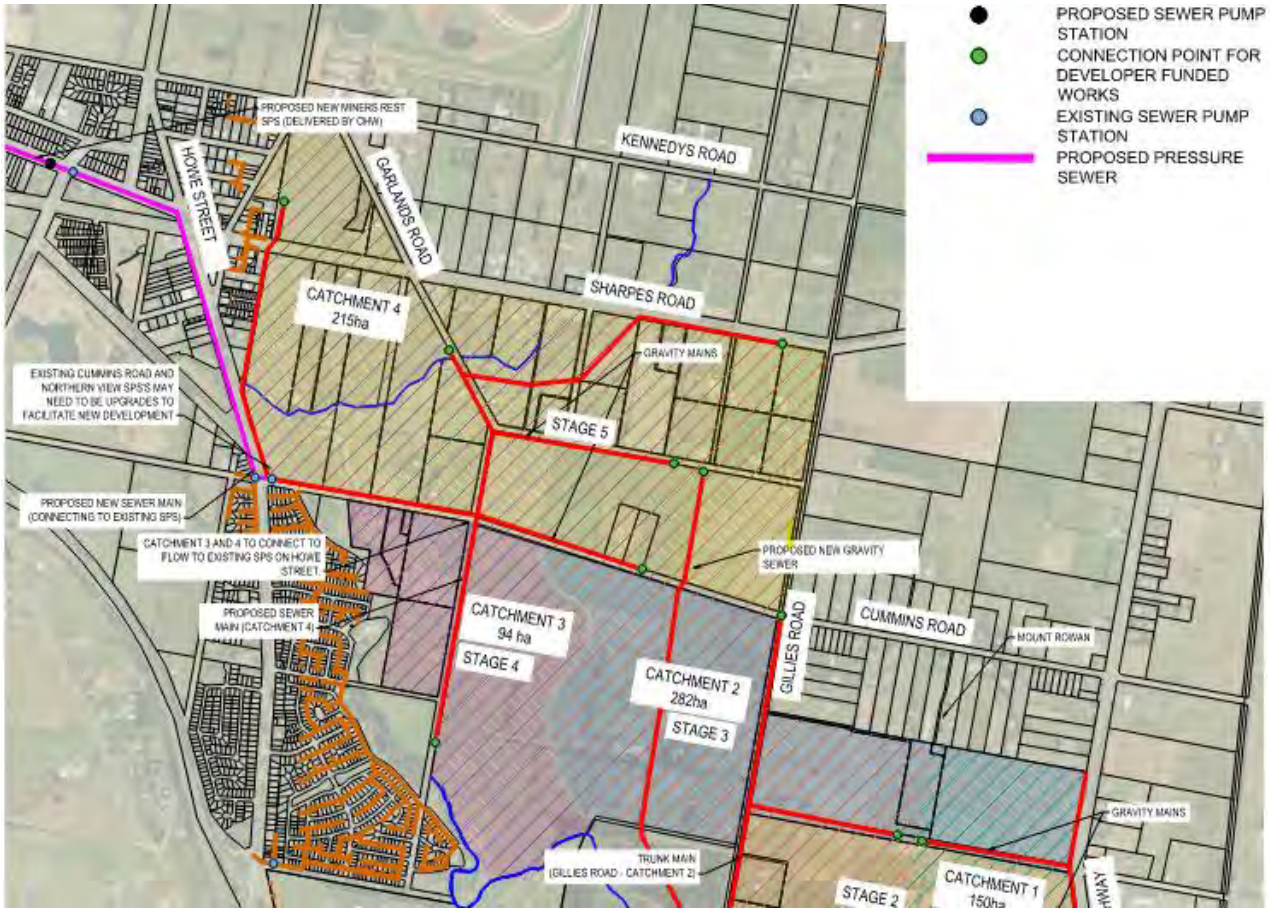

Figure 6 - Stage 3, 4 and 5 connection options

Any proposed works within the precinct will need to be planned and designed with consideration of the Environmental Significance Overlay currently in place around the WRP and the adjacent waterways. These will be considered in planning and may impact the construction methodologies used and location of new assets.

The proposed sewer trunk assets shown in Figures 5 and 6 will be developer delivered with potential for upsizing reimbursements negotiated with CHW.

6.1.3 Existing Infrastructure

CHW is the authority responsible for the provision of water reticulation services in the area. There are currently multiple DN150 and 225 assets within and immediately surrounding the development area. CHW have indicated that the water network will required upgrades with larger diameter water mains extended to augment the supply to support the future development. Such works will form part of CHW planned capital works programs and be delivered in partnership with developers. Suitable integrated water management strategies are being considered for the precinct.

There are also existing assets along the western boundary of the proposed precinct, which service the surrounding developments near Howe Street and on the eastern side of the midland highway.

There is multiple large water assets located along the Western Freeway which serve as connection points for reticulated water asset extensions currently within the development precinct.

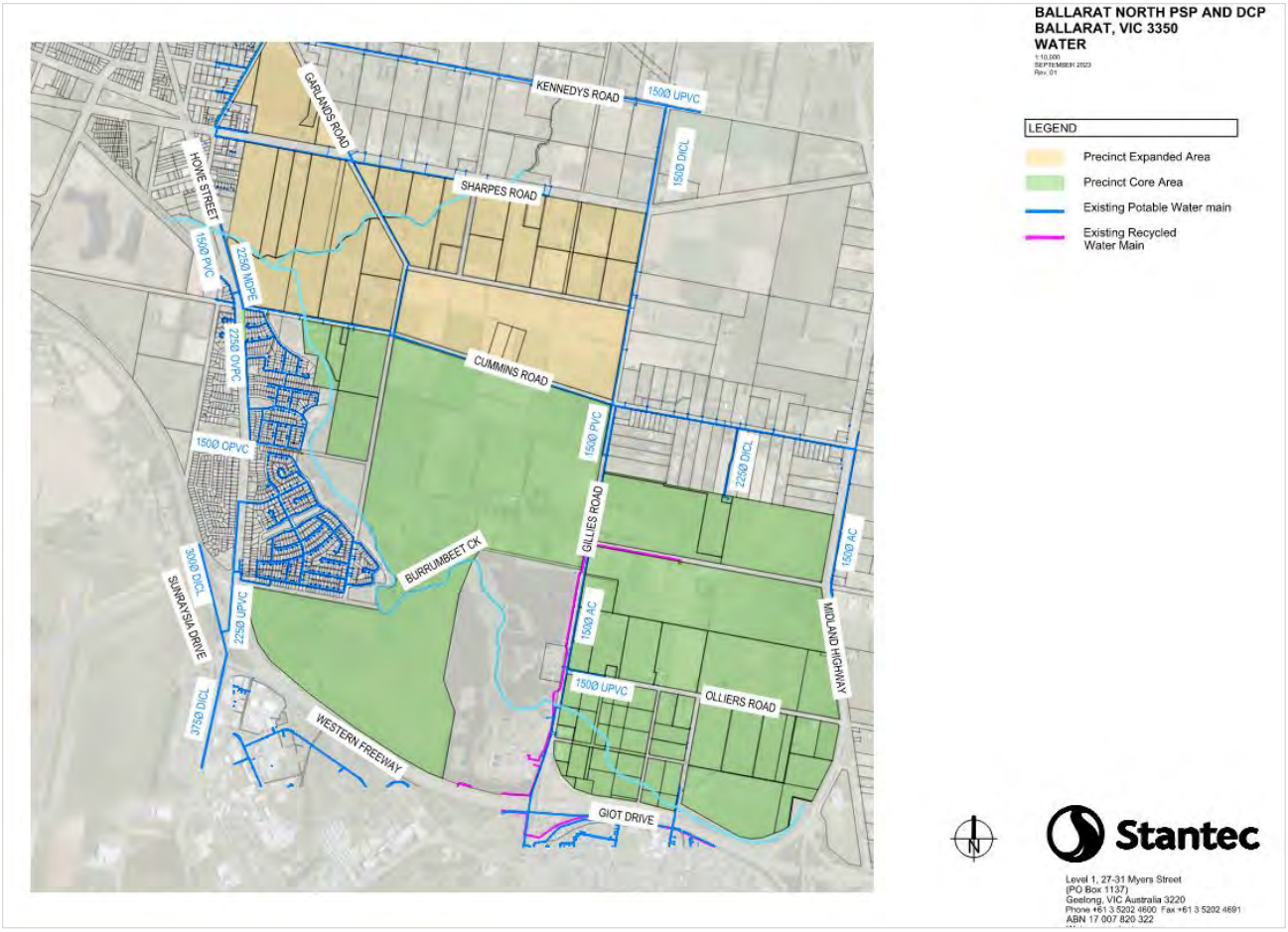

Figure 7- Ballarat North Existing Water Assets

Water supply to the precinct will be supplied from the White Swan Water Treatment Plant and Invermay Trunk mains. CHW have also advised that multiple large scale water assets have been proposed for the area as part of their capital works program, however the delivery times for these assets are yet to be confirmed. The trunk main from the White Swan Water Treatment Plant is required for the ultimate Ballarat growth scenarios. Without the Invermay Trunk main duplication further connections to water within the precinct would be limited to approximately 1000 to 1500 lots.

6.1.4 Proposed Servicing Strategy

Water infrastructure will need to be constructed to meet servicing requirements for the proposed PSP area. It is proposed that a trunk main be installed along Gillies Road (Location to be confirmed with CHW) which will act as a key trunk main for

servicing the precinct. This will allow for connections along Olliers Road and provide servicing to stages 1, 2 and Part of stage 3. Refer to Figure 8 Below for an illustration of the proposed new infrastructure.

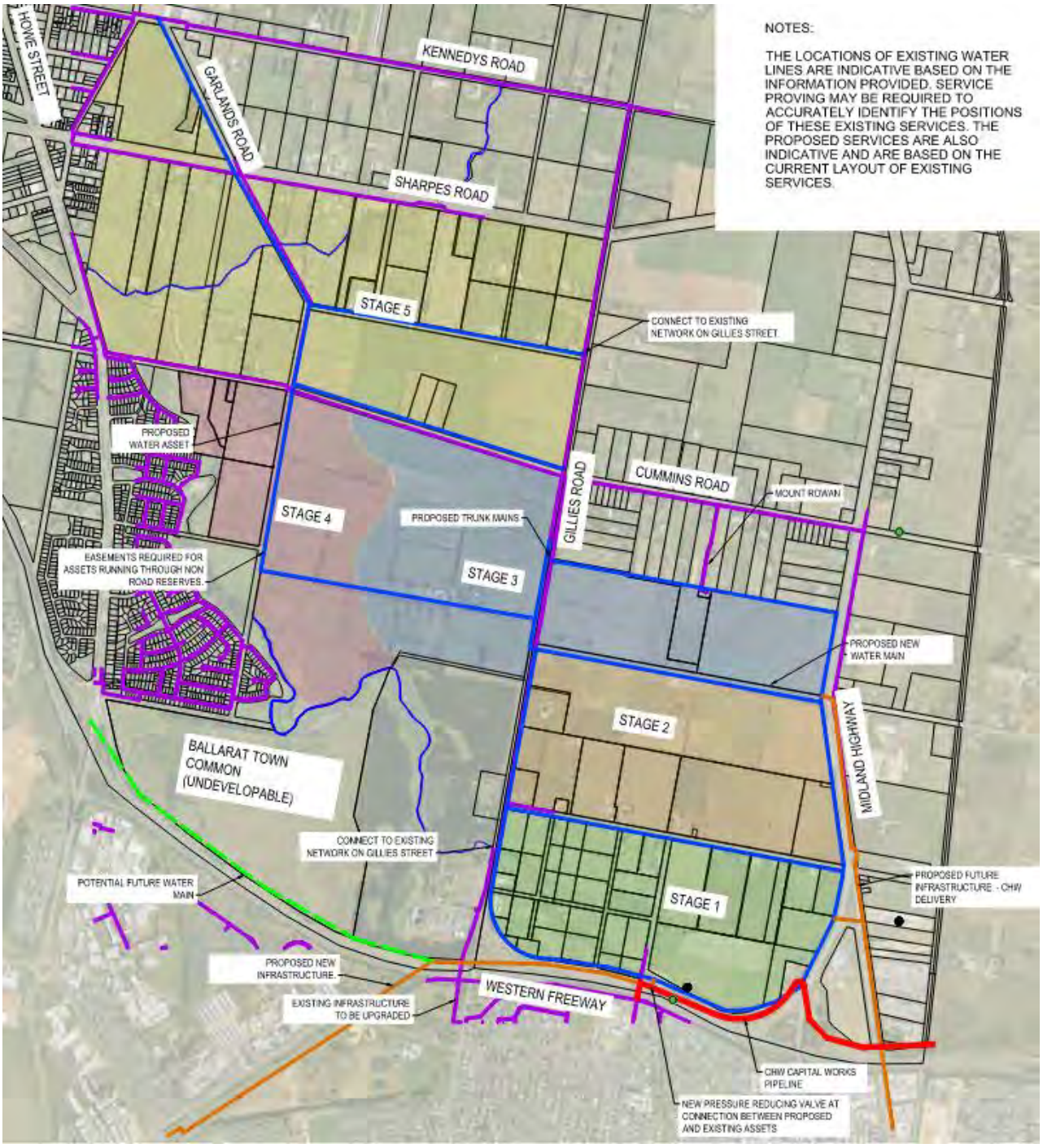

Figure 8 – Proposed Water Assets

New trunk mains will also need to be installed along Cummins Road to provide servicing to the western portion of stage 3, the entirety of stage 4 and stage 5. Smaller local water mains and arrangements are to be confirmed during the detailed design phase once road alignments for the development have been confirmed and in conjunction with CHW. Sizing of water mains requires a detailed hydraulic model of the catchment to ensure the appropriate sizing is provided to ensure reliability of supply.

The water assets noted in Figure 8 will be developer driven and potential for upsizing reimbursements for these assets will be negotiated with CHW. The Ballarat North precinct will be reliant on the CHW delivered Invermay Trunk main to be delivered to ensure reliability of supply to the area.

CHW have a Class A recycled water plant at the WRP. CHW is investigating the potential for a range of Integrated Water Management to be implemented within the precinct, including expanding the use of Class A water. CHW has also advised that the other IWM measures being considered include, tanks, passive irrigation of street trees, impervious surfaces and 'leaky wetlands', with the aim of reducing demand which aligns with the objective of the "Ballarat City Integrated Water Management Plan (2018)". The target for new urban development that CHW has set is a water use is of 124 l/p/day.

The recycled water network would be similar to the water network and being developer led projects. Refer to Figure 9 below with a proposed recycled water network.

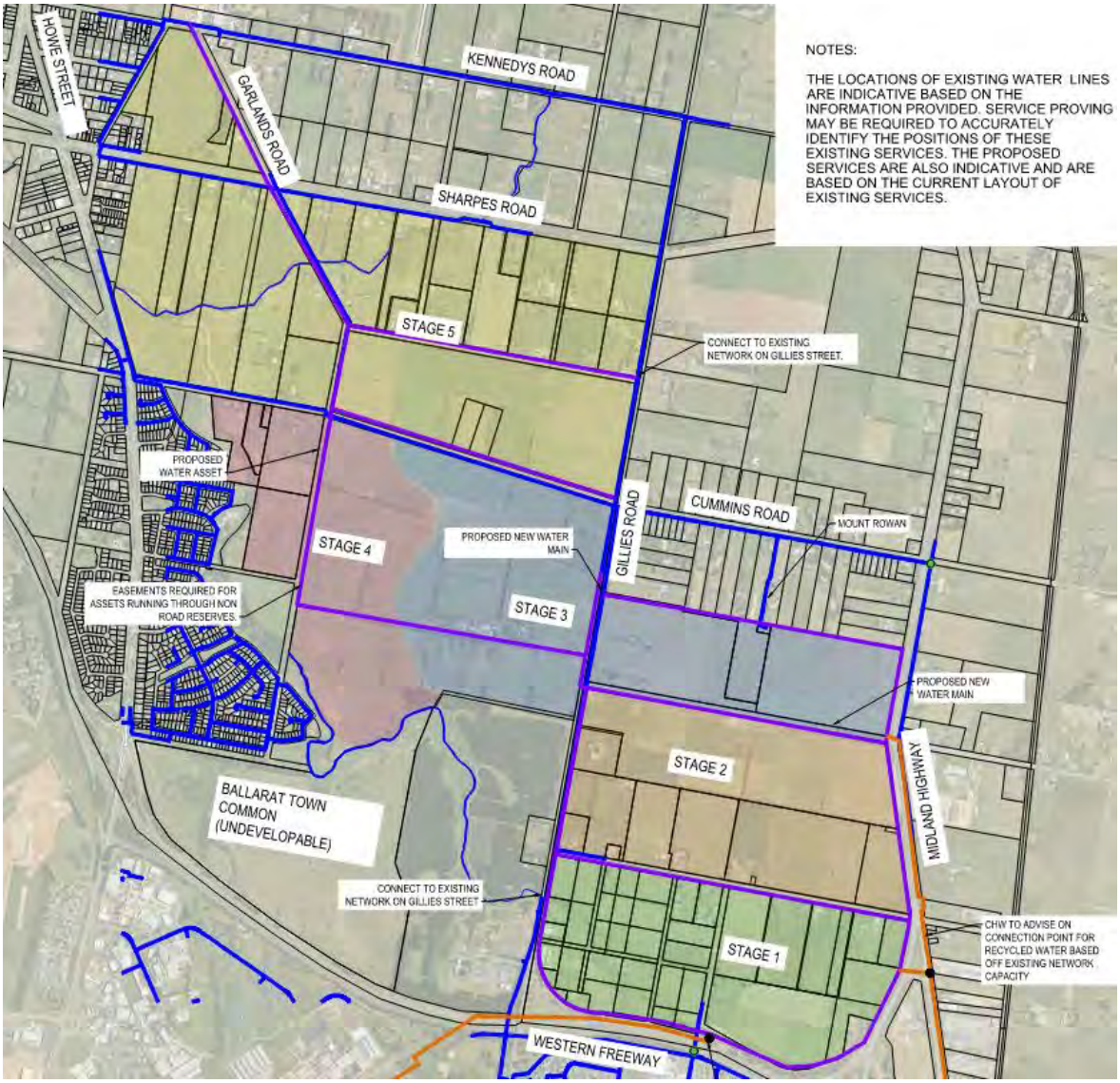

Figure 9 - Proposed Recycled Water Network

6.2 Gas

6.2.1 Existing infrastructure

APA Group Transmission is responsible for high-pressure gas transmission assets and energy supplier AusNet Gas is the authority responsible for the provision of gas reticulation services in the area. The assets are currently feeding the existing properties in the area. Refer to Figure 10 below for the existing gas assets currently in the precinct.

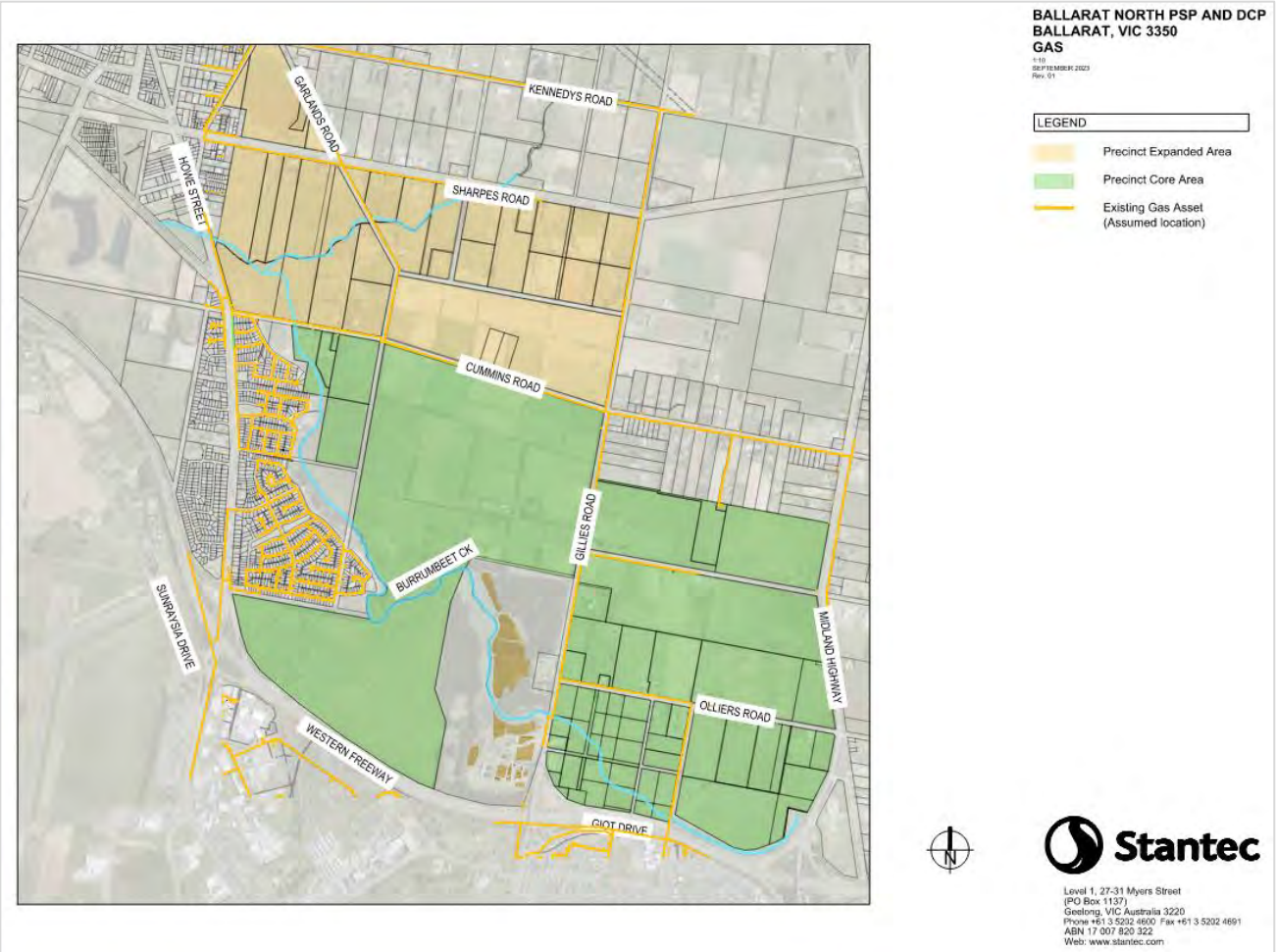

Figure 10 - Ballarat North Existing Gas Assets

AusNet have advised that the Ballarat High Pressure Gas Network does have capacity supply constraints. Given recent legislative changes and the timing of the development, there will be no new gas connections required in the residential area. Despite the current capacity constraints and legislative changes, gas may still play a crucial role in the energy mix for Neighbourhood and Local Activity Centres within the precinct. These centres often house a variety of businesses and community facilities, such as restaurants, cafes, and recreational spaces, which may rely on gas for cooking, heating, and other operational needs. Ensuring a reliable gas supply can support the economic vitality and functionality of these centres, providing a comfortable and efficient environment for both businesses and residents. Therefore, strategic planning and potential infrastructure upgrades may be necessary to accommodate future gas requirements in these key areas.

The Transmission Pipeline that supports the High-Pressure Network is limited to its current operating pressure which during winter peak the operating pressure deteriorate. At this point in time, AusNet have advised they do not have any plans to augment the Pipeline at this stage.

Prior to the commencement of construction, it is advised that service locating be undertaken to ensure that no gas mains; specifically, high-pressure transmission mains are impacted by the proposed development.

6.3 Electricity

6.3.1 Existing Infrastructure

Powercor is the authority responsible for the provision of electricity services to the area. Analysis of plans obtained from Dial Before You Dig (DBYD) and a site visit confirms that high voltage overhead assets are present throughout the precinct. Refer to figure 11 below for the existing assets. There are also some existing underground electrical assets in the nearby developed areas, specifically along Olliers Road.

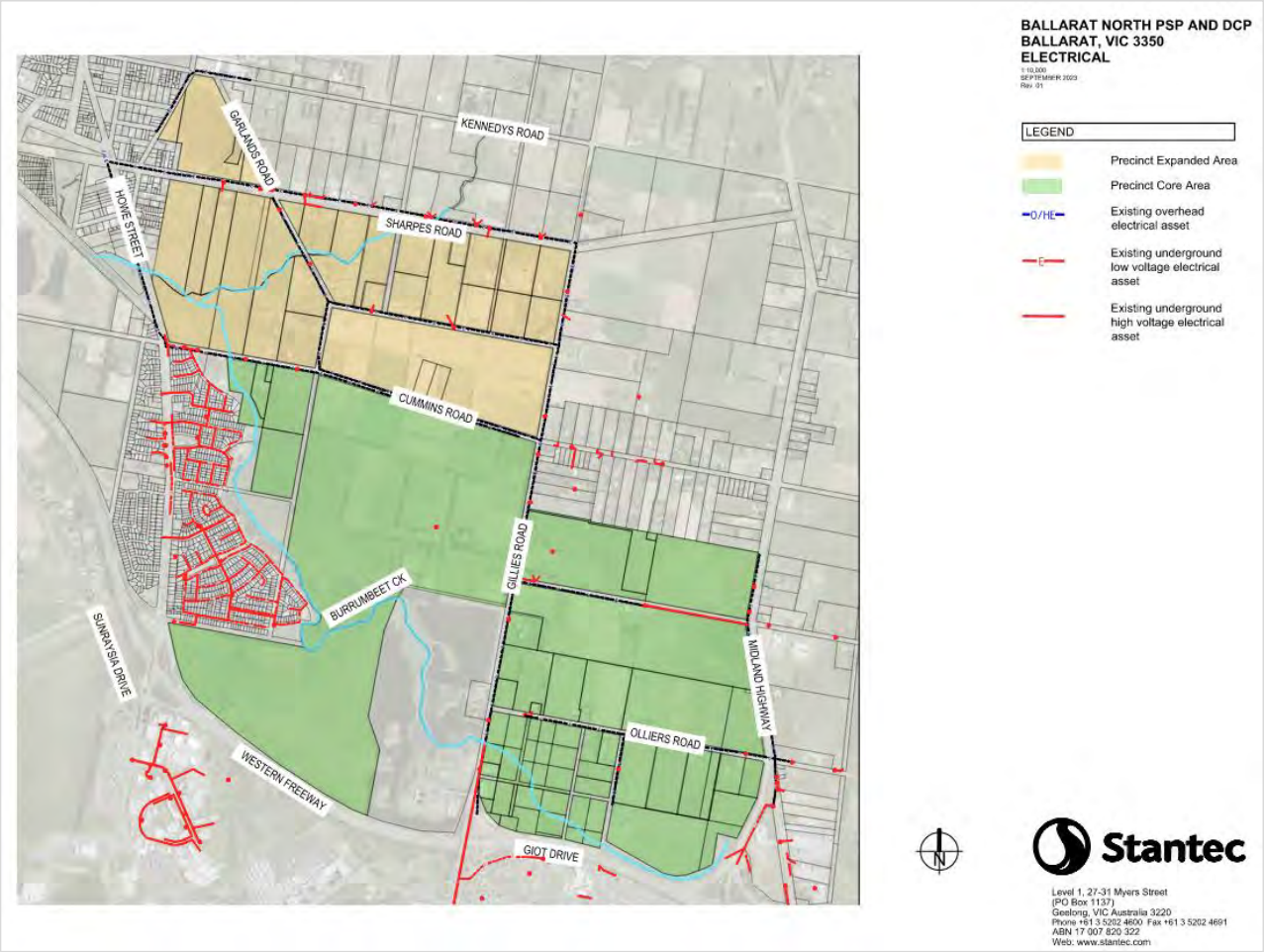

Figure 11 - Ballarat North Existing Electrical Assets

There is planning in place to develop the Powercor owned land along York Street in the east of Ballarat with a new zone substation. Internal approval is expected to take place in the next 3 months. This will ultimately add more capacity to the network and would enable a rearrangement to service the precinct when completed.

6.3.2 Potential Connection and Servicing Strategy

Powercor has advised there is limited supply available to the precinct, and that the current network would not be able to service the entirety of the precinct. They have advised that the network would be able to service the early stages of the precinct should development begin on the western side of precinct rather than the east.

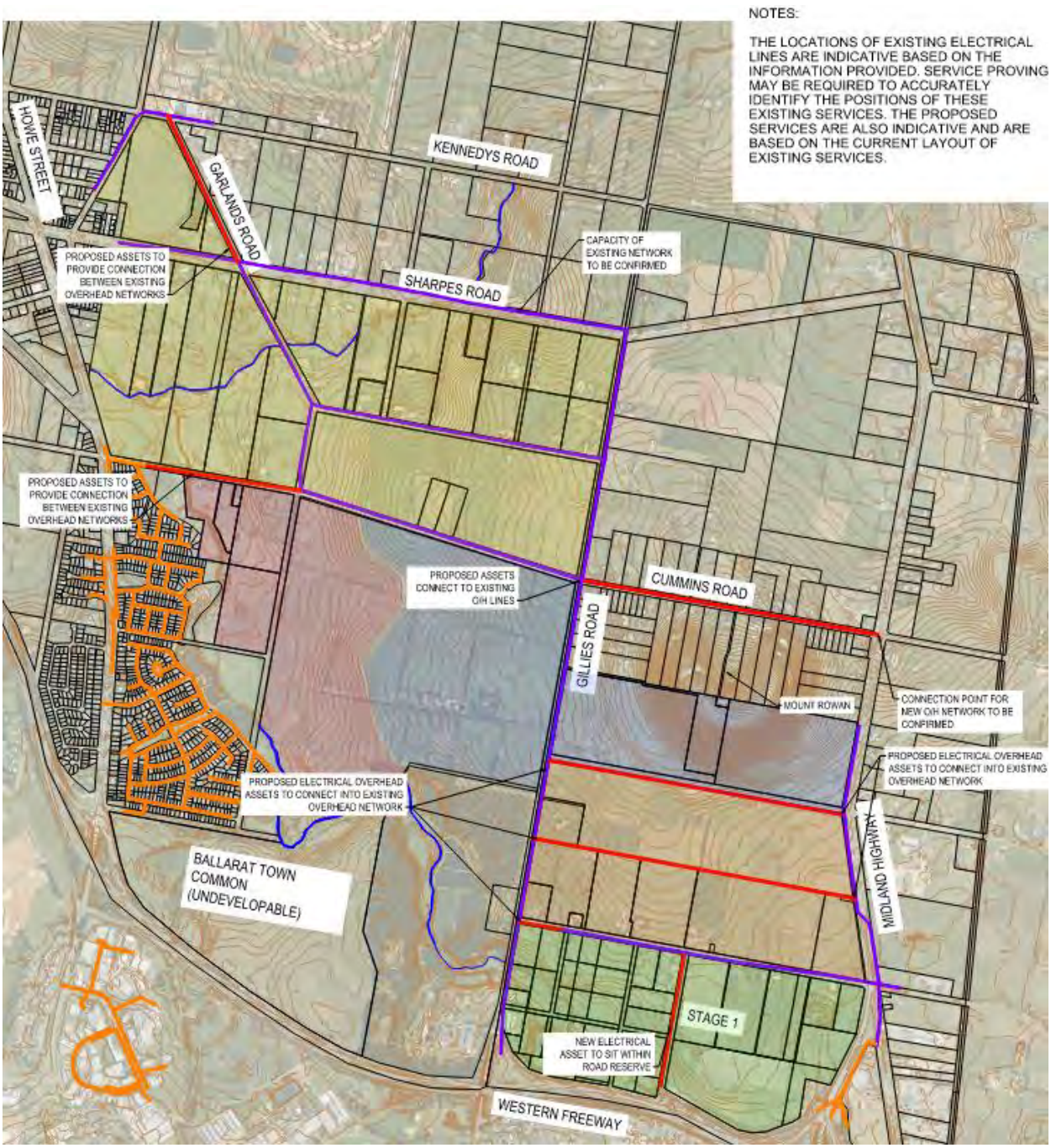

Figure 12 - Ballarat North Proposed Electrical Assets

Powercor has also indicated that there may be a need of a new Ballarat West Kiosk Substation should the proposed Ballarat east development not be able to meet demand. Given this it is expected that a singular 22kv feeder line to the development would be sufficient to service the development. In 2023 Power has advised that "Planning for new zone substation construction in Ballarat over the next 2-3 years – business case being collated in the east of Ballarat in York Street to develop the Powercor owned land with a new zone substation. Infrastructure upgrades are included in Powercor's 10-year plan to accommodate growth.

Most power upgrades and internal development assets will be developer funded and led.

6.4 Telecommunications

6.4.1 Existing infrastructure

Telstra and NBN are the principal authorities providing telecommunications services within the PSP area.

NBN has been provided to sections of the precinct, and services are available in areas east of Gilles Road as well as south of the Burrumbeet Creek. It is expected that the NBN rollout will have been completed by the time urbanisation of this region occurs.

There are existing telecommunication assets along the western border of the precinct that currently service the surrounding development near Howe Street. The precinct is within the Wireless & Satellite footprint of the NBN network. These assets could potentially be utilised to support the proposed precinct. The precinct currently does not support FTTP or any other form of fixed line technology. Any connection to the existing telecommunications resources will need to be confirmed by the relevant authority.

At present, NBN have advised that there are no plans to install or upgrade any infrastructure within this precinct. NBN does not anticipate any issues or limitations regarding future standard infrastructure installation. There are no plans to extend the network into the precinct area unless driven by customer demand.

NBN Co. believes it is highly unlikely that new key infrastructure will be required.

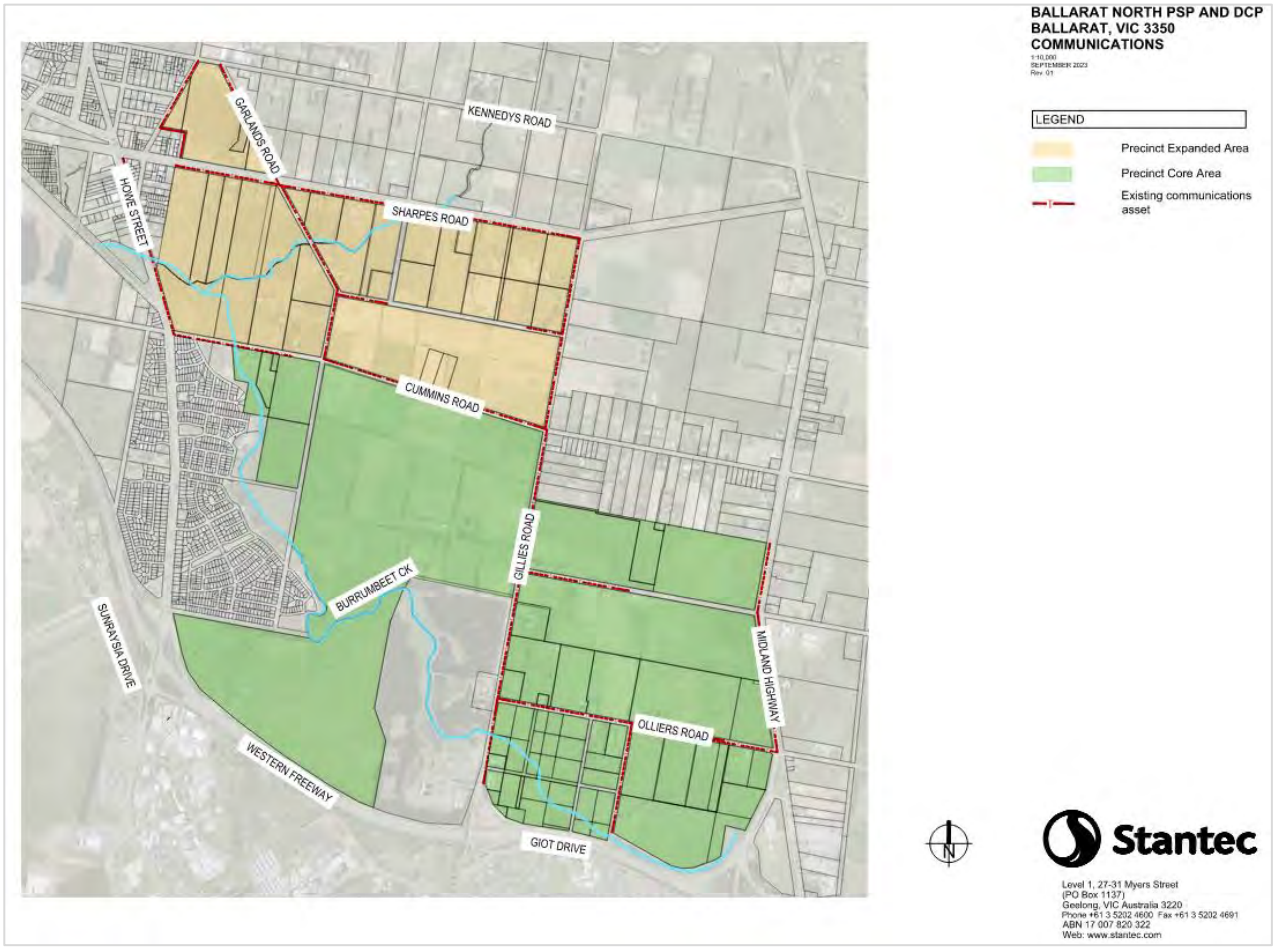

Figure 13 - Ballarat North Existing Communications Assets

6.4.2 Mobile Network Coverage

Currently, the precinct has 4G LTE coverage, providing connectivity for most residents and businesses. However, the expansion of the PSP area has highlighted a gap in 5G coverage. While central Ballarat benefits from 5G technology, the newly proposed areas in the Ballarat North PSP are yet to be included in the 5G rollout plans. This means that residents and businesses in the expanded area will not have access to the faster speeds and lower latency that 5G offers, potentially impacting their ability to leverage advanced mobile applications and services. Addressing this gap will be crucial for ensuring that the entire region can benefit from the latest advancements in mobile technology.

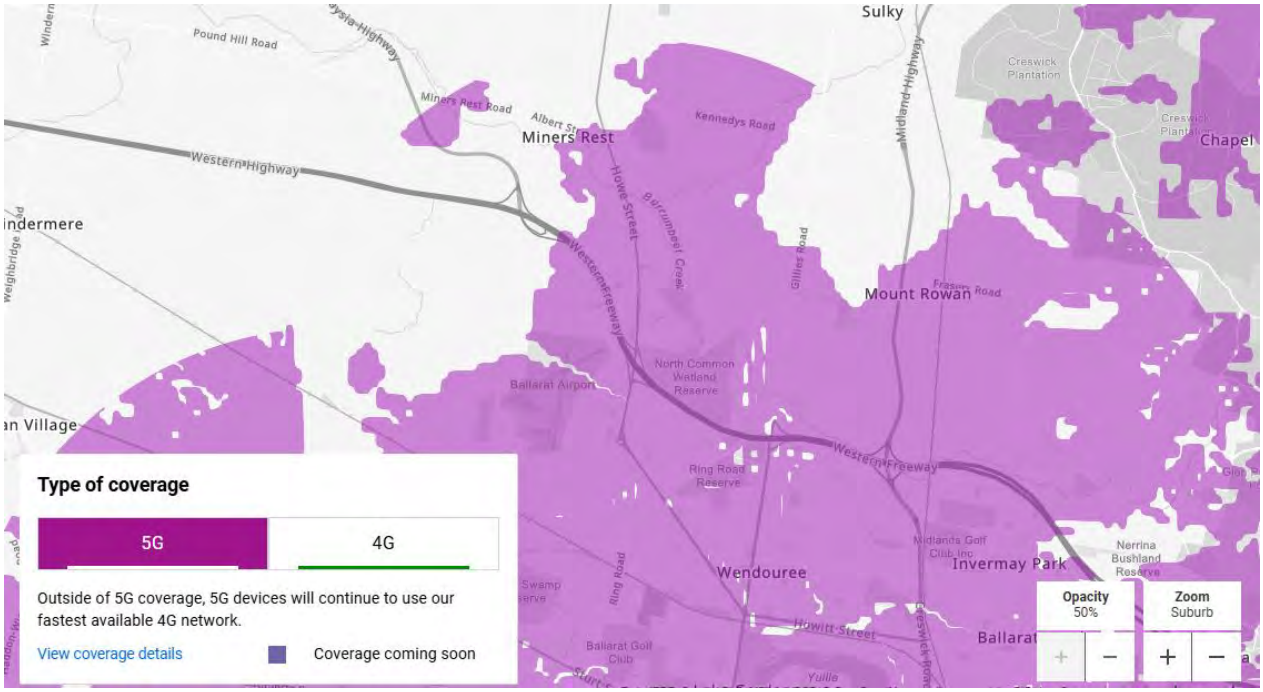

Figure 14 - Telstra 5G Coverage Map

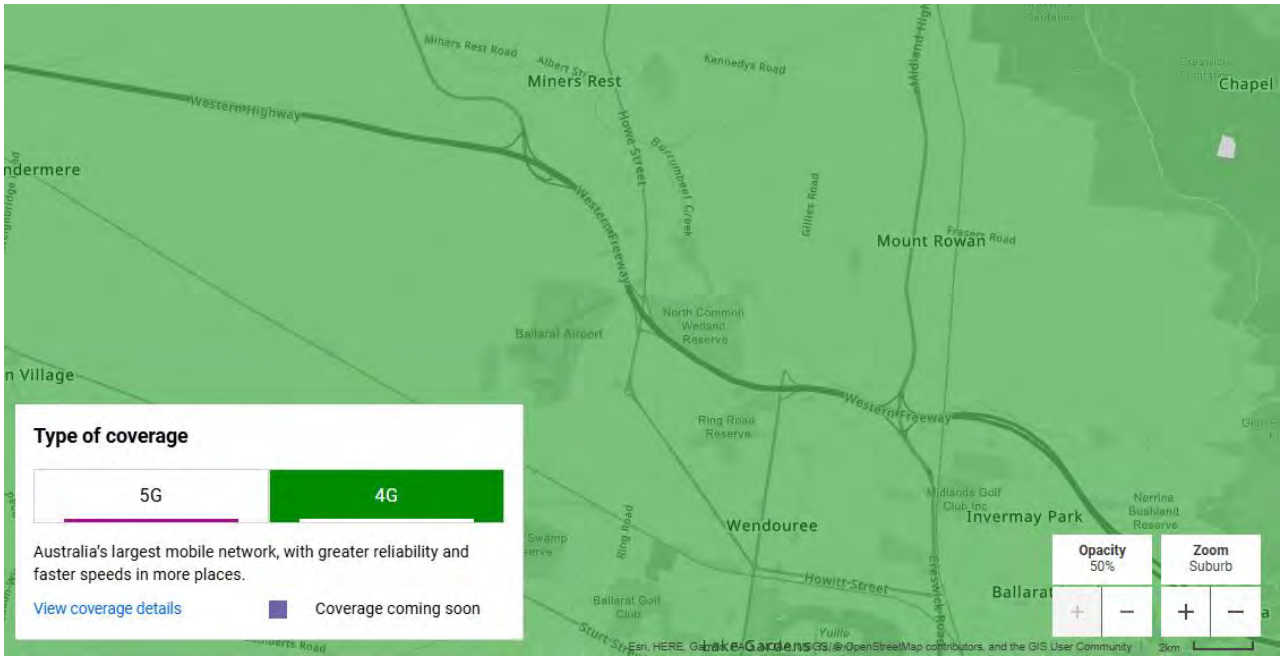

Figure 15 - Telstra 4G Coverage Map

6.4.3 Key issues and opportunities

NBN typically provide limited information until such time as development is within the statutory planning phase. New telecommunications assets will need to be installed as part of the proposed development works and detailed design will need to occur to confirm the extent of overhead vs underground assets required in the area.

NBN Co. has expressed its willingness to collaborate with other utility service providers, governments, and organizations to foster growth within the Precinct. They are open to making substantial one-off investments, if needed, to support future development. Opportunities may arise for trench sharing with local councils, road authorities, or other utility providers.

There are certain challenges related to the NBN network crossing the Western Freeway (at the southern end of the precinct) near Gillies Rd and Noble Ct, as well as the Midland Highway (at the southeast end) near Olliers Rd and the Freeway reserve. NBN Co. is keen to be involved in any additional service crossings that may take place. Physical barriers such as railways, freeways, and waterways limit the network, so new crossings would strengthen its resilience.

Refer to Figure 16 below with NBN Co. proposed fixed line connection routed in in the precinct and Figure 17 the proposed Telecommunications network plan.

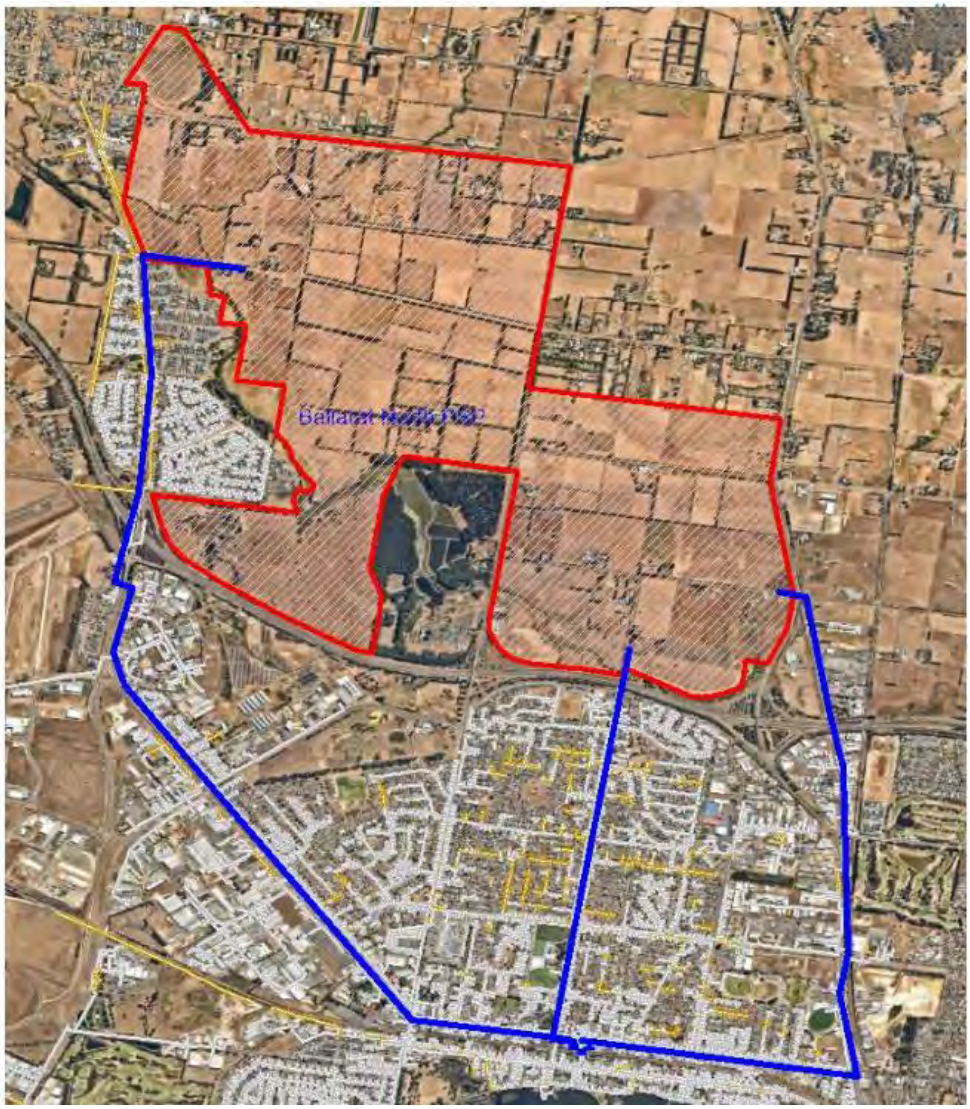

Figure 16 - NBN Co. Planned Fixed Line connection routes

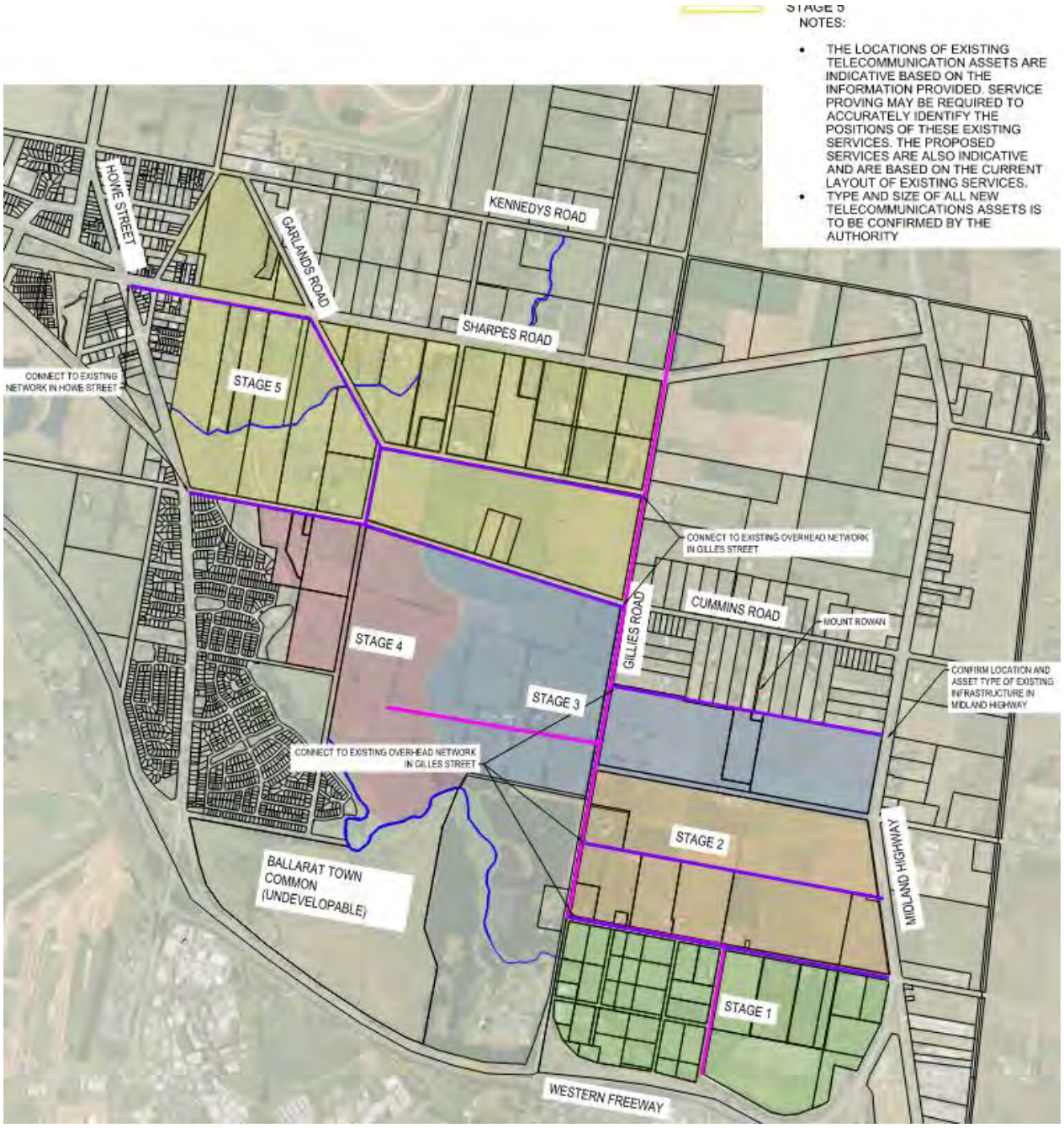

Figure 17 - Proposed Telecommunications Network

6.5 Stormwater

6.5.1 Existing infrastructure

DBYD investigations have indicated there is currently minimal existing drainage infrastructure in the precinct. Existing properties in are areas predominantly drain into existing spoon drains on major roads which overland flow into adjacent streams and water ways. The development adjacent to the precinct currently drains into an existing swale and waterway system before discharging into the Burrumbeet creek.

There are also existing underground drainage assets within the Midland highway and the Western Freeway however the exact location, depth and sizes are unknown at the time this report was written. Refer Figure 15 below which displays nearby underground drainage assets in the precinct.

6.5.2 Servicing Strategy

To accommodate the development stages, multiple new drainage assets will need to be constructed throughout the precinct. In the current draft-based plan, the stormwater runoff from the proposed precinct will be effectively managed through a combination of newly established drainage basins and the existing waterways, specifically Burrumbeet Creek, to ensure proper discharge and maintain the hydrological balance of the area.

As outlined in Figure 15, the approximate locations of the drainage basins are strategically positioned to capture runoff from impervious surfaces and direct it into the proposed basins, where it will be temporarily stored before being released in a controlled manner. These basins will need to be designed to prevent the direct flow of stormwater into surrounding environments, thereby reducing the risk of flooding, erosion, and water quality degradation.

After the initial capture and retention, the stormwater will gradually discharge into Burrumbeet Creek and other designated waterways. However, to maintain water quality for flows, stringent water quality measures will be implemented. These measures include the use of sediment basins, water quality systems, and vegetative basins/swales to treat the water before it enters the natural watercourses. Additionally, the flow rates and discharge volumes will be regulated to prevent downstream flooding or the alteration of the natural flow regime in the Burrumbeet Creek.

The entire stormwater management system will be designed in accordance with best practice guidelines and regulatory requirements, ensuring that any post-development runoff is treated to meet water quality standards. The ongoing maintenance of these systems will also be crucial to ensure their long-term effectiveness in controlling both the quantity and quality of stormwater runoff in the area.

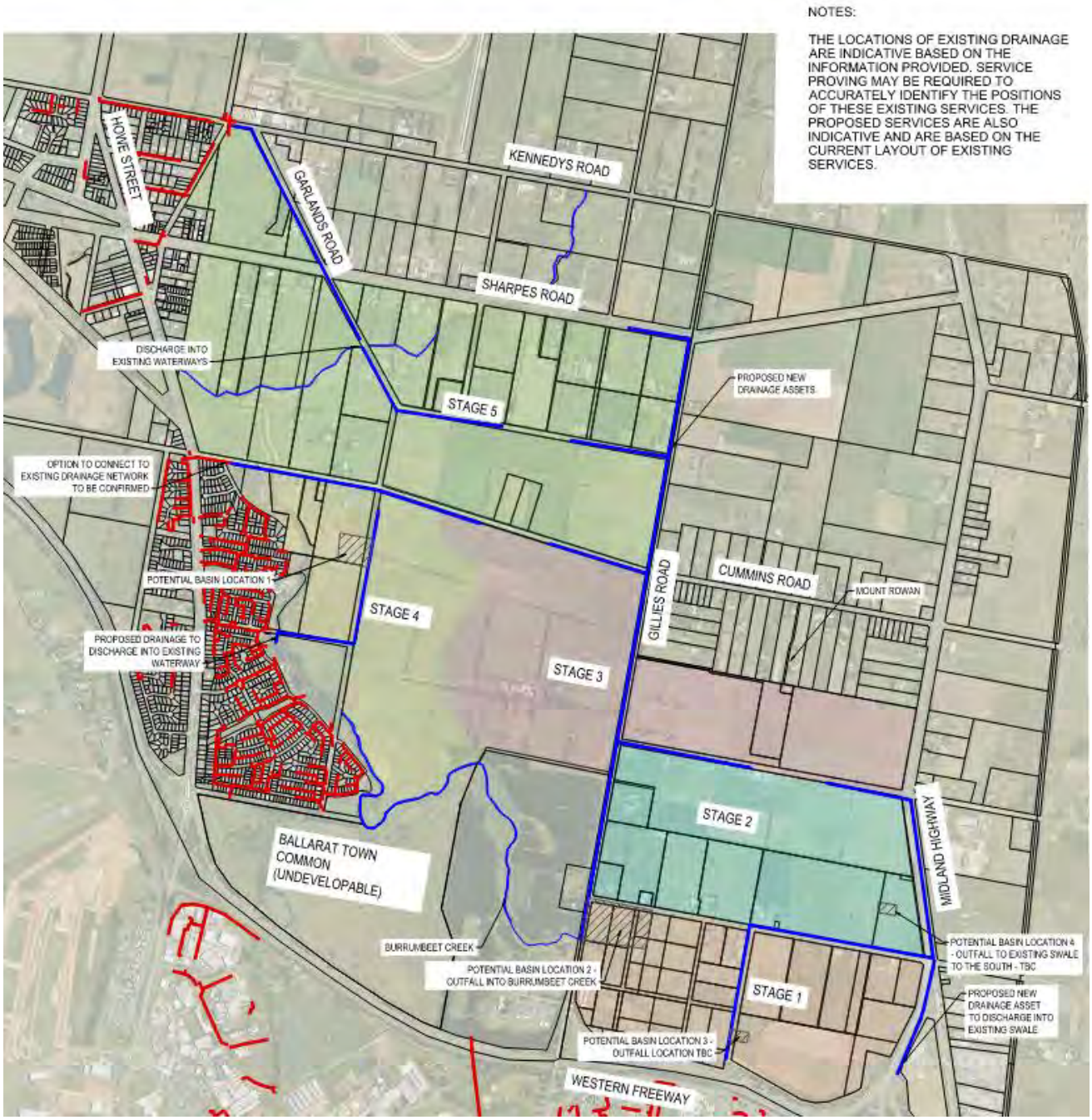

Figure 18 - Drainage Plan

7. Typical Utility Cross Sections

Stantec have prepared concept road cross-sections that comply with the current Infrastructure Design Manual (IDM) and particularly Ballarat City Council's requirements. These cross sections provide potential locations for utility assets within the proposed road reserve profile. Figures 16, 17, 18, 19 and 20 display the Typical Cross sections for the precinct. These Cross sections align with the relevant utility spacing regulations and the precinct standard requirements.

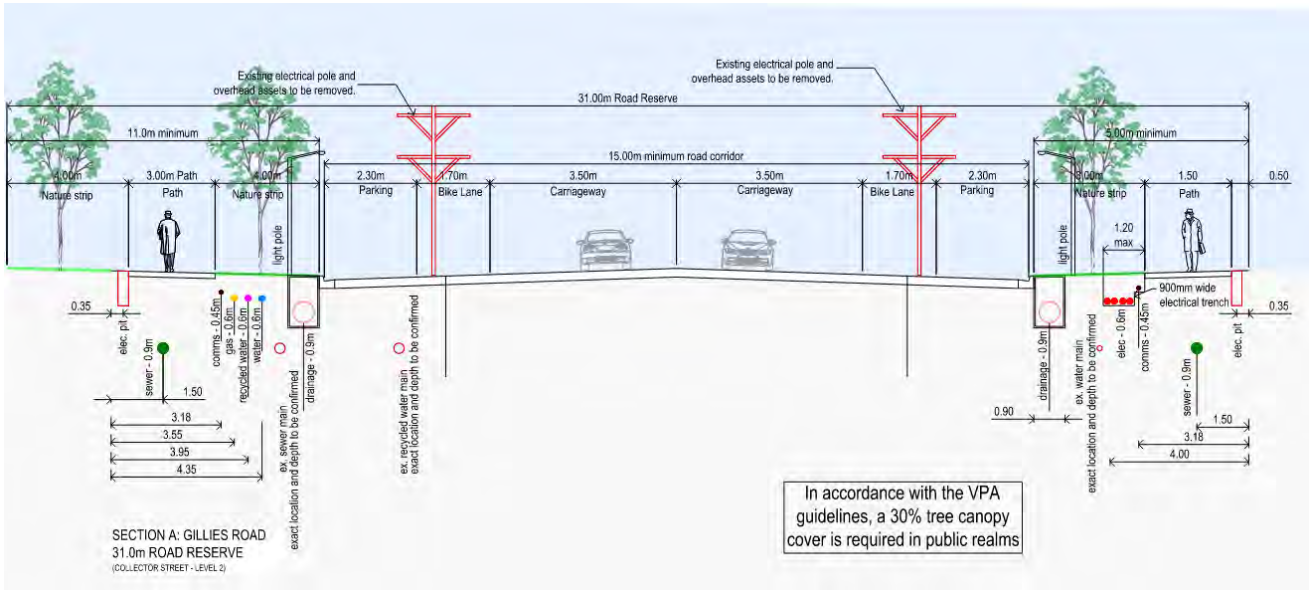

Figure 19 - Typical Cross Section - Collector Street Level 2

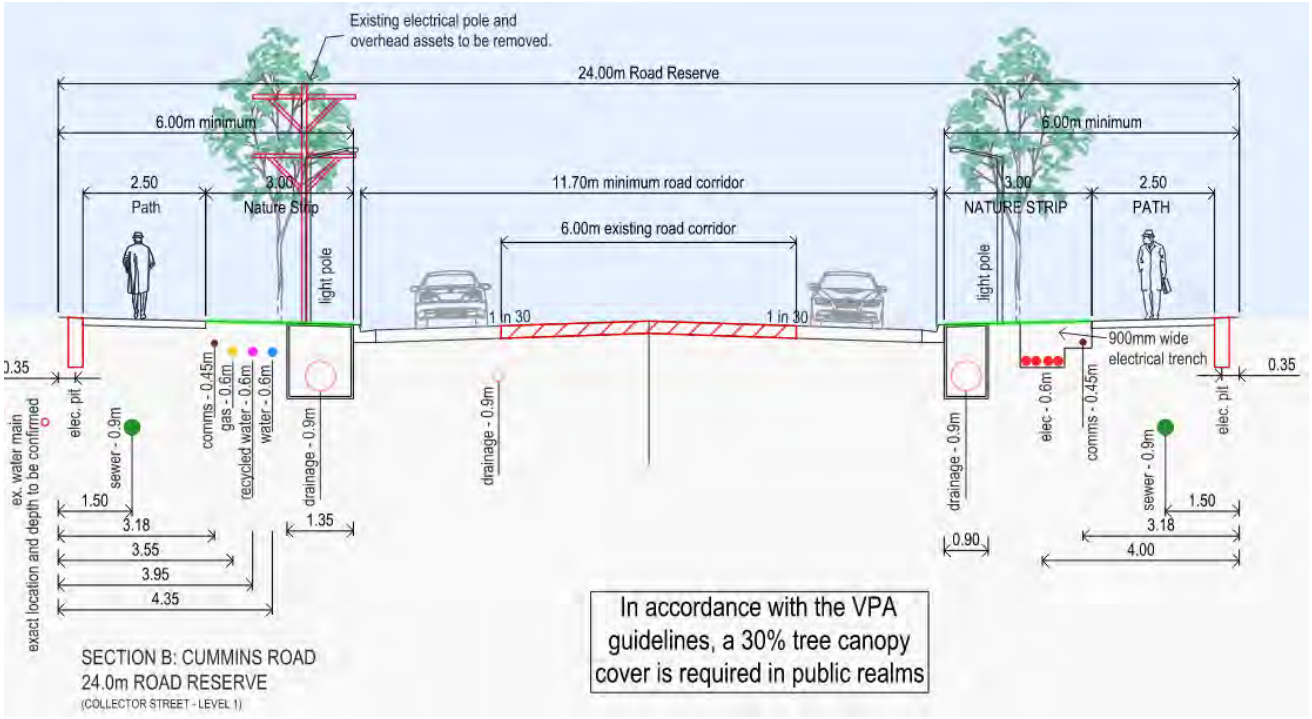

Figure 20 - Typical Cross Section - Collector Street Level 1 (Cummins Road)

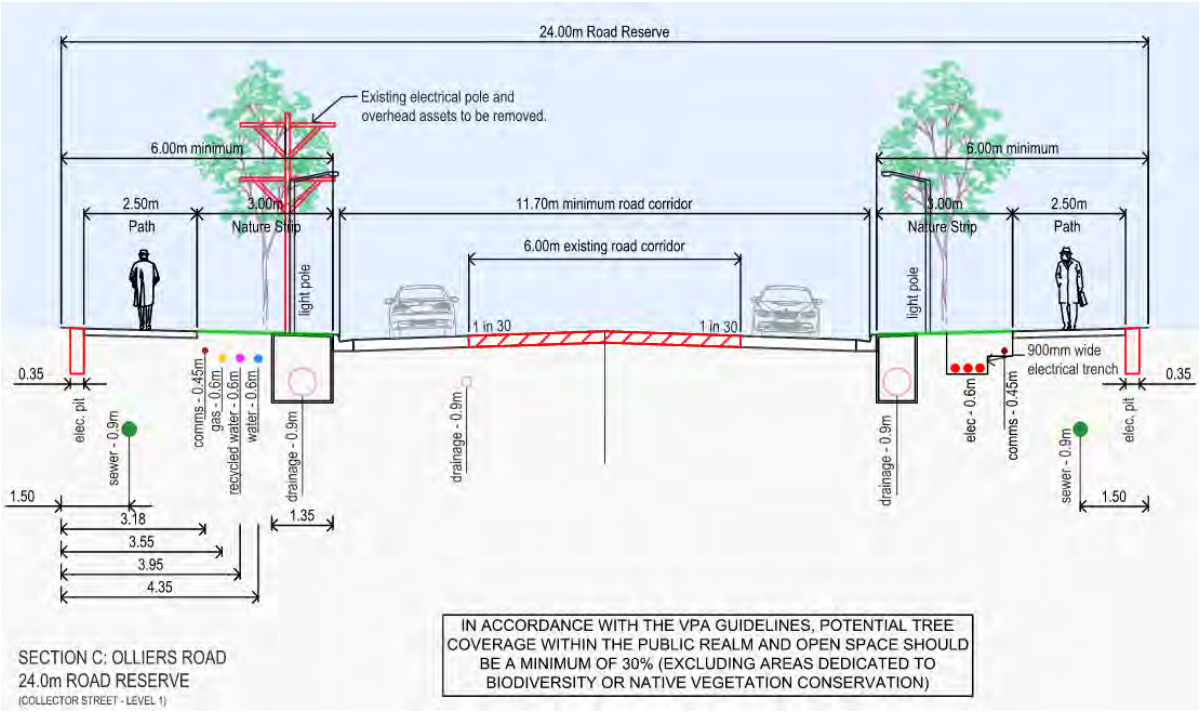

Figure 21 - Typical Cross Section - Collector Street Level 1 (Olliers Road)

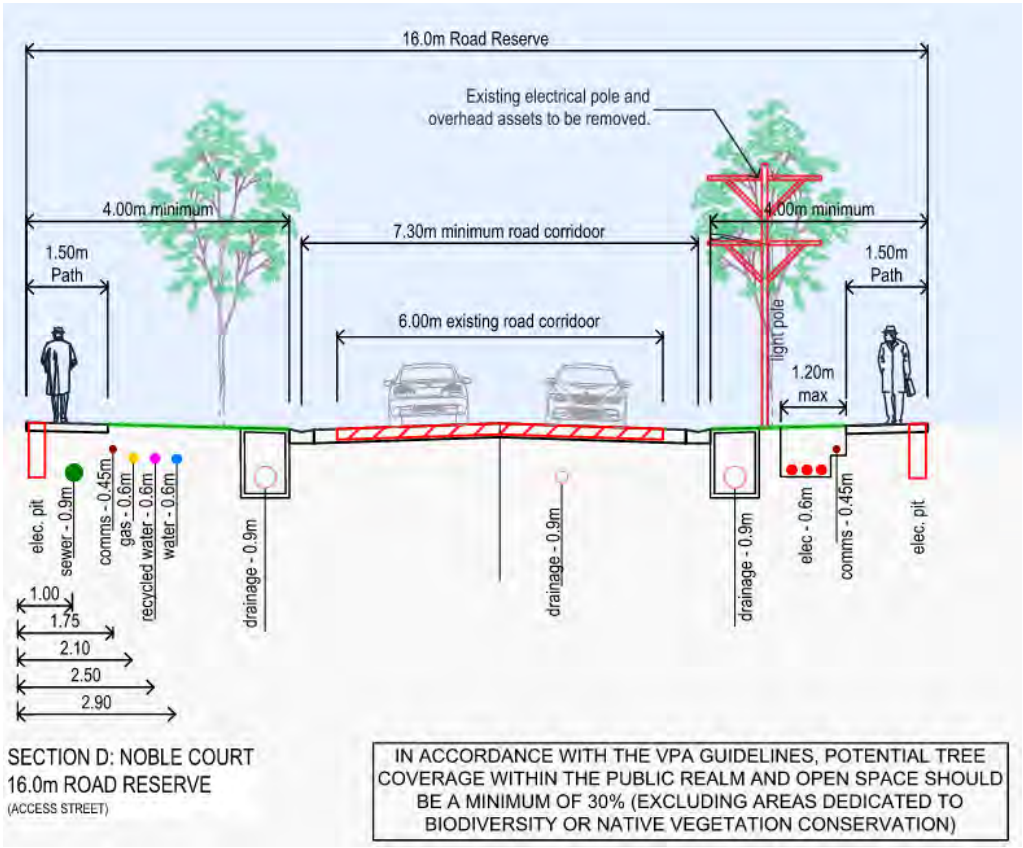

Figure 22 - Typical Cross Section Access Street (with reserve on 1 side) – 16m

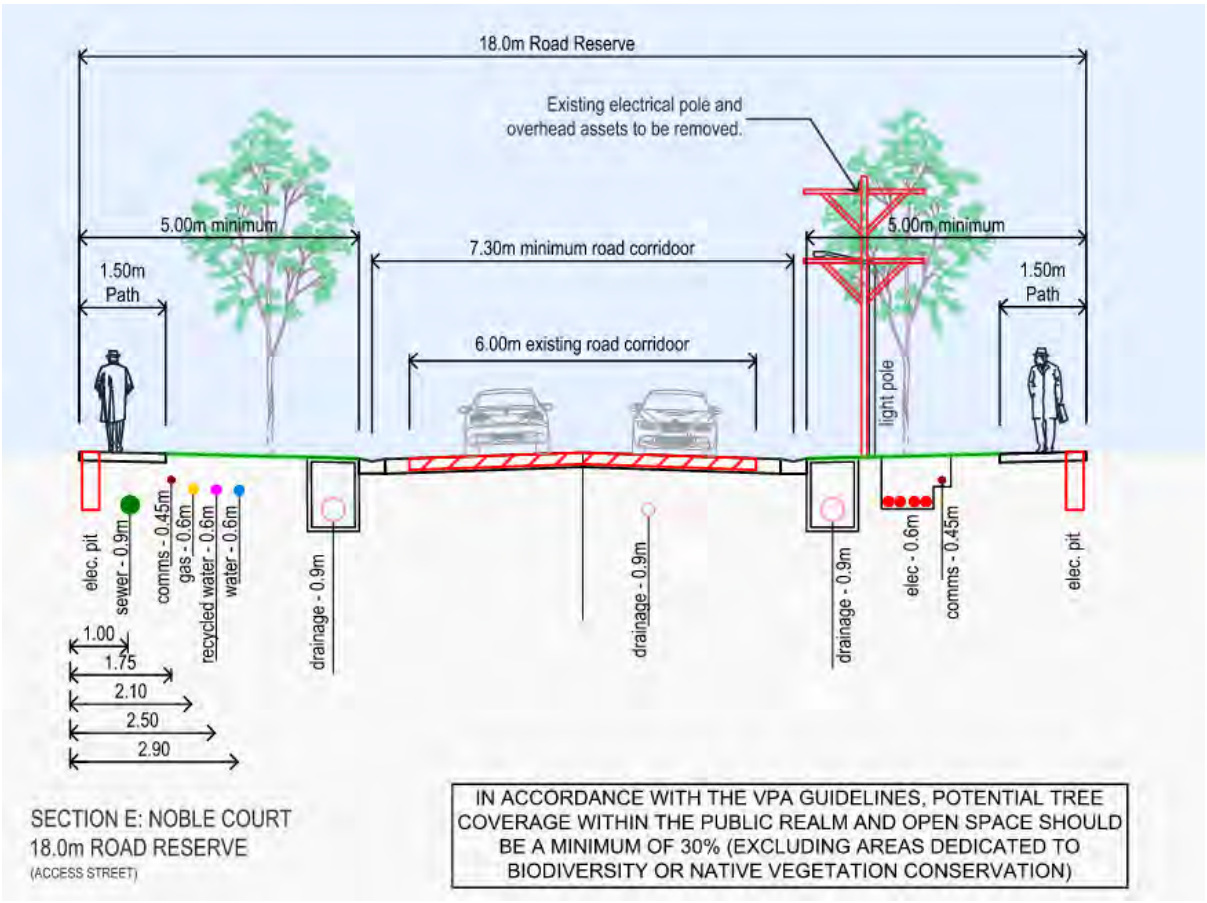

Figure 23 - Typical Cross Section Access Street – 18m

8. Development Cost Considerations

8.1 Key Cost Items

The main drivers for development costs of the precinct will be as follows

- **Existing Infrastructure:** The existing sewer and water networks within the precinct have limited capacity, which will not support the entire proposed development. The cost of upgrading or installing new infrastructure to meet the requirements of the precinct will be a significant factor in determining the overall development costs. This will likely include the installation of new sewer, water, and stormwater infrastructure, along with necessary capacity upgrades to ensure long-term serviceability. The cost impact will be further influenced by the need to connect to or extend these services from surrounding areas, as well as any associated works to accommodate the required infrastructure.
- **New and Existing Roads:** Consideration will need to be given to the upgrading of existing roads, particularly Gillies, Cummins, and Ollier Roads, which will act as the primary collector roads through the precinct. These roads will need to be designed and built to accommodate higher traffic volumes and meet local and regional transport standards. This may include widening, resurfacing, and potentially realigning sections of the roads, as well as the integration of necessary infrastructure such as signage, lighting, and traffic management systems. In addition, the cost of providing access to key areas within the precinct and ensuring suitable connections with the surrounding road network will be a significant consideration.
- **Wetlands and Drainage Basins**: The existing drainage infrastructure within the precinct is limited, and as a result, new stormwater management systems, including wetlands, sedimentation basins, or swales, are likely to be required. These systems will need to be designed to meet Water Sensitive Urban Design (WSUD) guidelines, which may involve significant investment in land acquisition, engineering design, and implementation. The inclusion of wetlands or large-scale basins for stormwater management could add considerable cost to the development, not only for construction but also for ongoing maintenance and management of the systems to ensure compliance with environmental regulations.
- **Bulk Earthworks:** The undeveloped nature of much of the site means that extensive bulk earthworks will be required to prepare the land for development, particularly for the proposed road networks and key infrastructure. This could involve large-scale excavation, cut-and-fill operations, and grading to create suitable levels and contours for roadways, stormwater management systems, and building platforms. The scale of earthworks will depend on the specific topography of the site and the requirements for meeting engineering standards, which could result in significant costs for both equipment and labour. Moreover, soil stability and drainage considerations may affect the scope and cost of the earthworks.
- **Electrical:** Stantec has not assessed Powercor costs for the Ballarat North Precinct Structure Plan (PSP) at this stage as the focus has been on identifying the necessary infrastructure upgrades and ensuring the overall feasibility of the proposed developments. High level cost assessments for specific service providers like Powercor require comprehensive technical studies and precise project scopes, which are typically conducted in later stages of the planning process.

8.2 Cost Estimate

Stantec has developed a high-level cost estimate shown in Figure 24 below. The cost estimate has been divided into the proposed five stages. The cost estimates have been calculated based on current day prices and benchmarked against similar projects to ensure accuracy and reliability.

Ballarat North PSP & DCP - Utility Service Cost Estimate

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Sewer	*$2,987,882.60*	*$3,954,488.16*	*$4,214,343.59*	*$5,201,255.46*	*$8,771,784.59*
Water	*$1,763,259.20*	*$1,192,282.40*	*$1,296,428.00*	*$557,462.80*	*$1,856,055.20*
Recycled Water	*$1,745,626.61*	*$1,180,359.58*	*$1,283,463.72*	*$551,888.17*	*$1,837,494.65*
Telecommunications	*$1,309,077.14*	*$1,337,721.16*	*$1,770,513.74*	*$1,128,455.02*	*$4,341,829.50*
Electrical	*Not Assessed*	*Not Assessed*	*Not Assessed*	*Not Assessed*	*Not Assessed*
Drainage	*$23,763,572.99*	*$8,832,331.35*	*$4,011,810.89*	*$10,737,521.34*	*$8,887,139.06*

Accuracy: This cost estimate is based on the information available at the time of preparation (VPA Ballarat North PSP & DCP Utility Service Assessments) and is subject to change as additional details are provided or project conditions evolve.

Exclusions: The estimate does not include costs for unforeseen circumstances, force majeure events, or scope changes not explicitly outlined.

Liability: This estimate is for preliminary planning purposes only and should not be considered a guarantee. No liability is accepted for decisions made based on this estimate.

Market Rates: Cost estimates are based on current market rates. Future price fluctuations are not accounted for.

Figure 24 - High Level Cost Estimate

9. Further Investigations

We recommend that the Victorian Planning Authority (VPA) conduct further investigations into Cultural Heritage Management, Flooding Issues, and Geotechnical Engineering for the precinct. These investigations are crucial to preserving the area's cultural heritage, mitigating flood risks, and ensuring the stability and safety of the land for future development. By addressing these aspects, the VPA can ensure that the Ballarat North PSP is developed in a way that respects its historical significance, protects its residents from natural hazards, and provides a solid foundation for sustainable growth. See a further breakdown below:

Cultural Heritage Management

- Conduct a Cultural Values Assessment to identify and document Aboriginal and post-contact heritage sites.
- Engage with local Indigenous communities to ensure their cultural heritage is respected and preserved.
- Develop management plans to protect significant cultural sites during and after development.
- Integrate cultural heritage considerations into the planning and design of new developments.

Flooding Issues

- Update flood modelling and mapping to reflect current and future flood risks.
- Identify areas prone to flooding and implement appropriate land use controls.
- Design and construct stormwater management systems to mitigate flood risks.
- Collaborate with relevant agencies to ensure coordinated flood risk management.

Geotechnical Engineering

- Conduct geotechnical investigations to assess soil stability and suitability for development
- Identify potential geotechnical hazards such as landslides or soil erosion.
- Develop engineering solutions to address identified geotechnical issues.
- Ensure that all new developments are designed and constructed to meet geotechnical safety standards.

These investigations and upgrades are crucial for supporting Ballarat's growth and ensuring the community has access to reliable and efficient services. By addressing these needs proactively, the city can continue to thrive and provide a high quality of life for its residents.

10. Conclusion

Stantec has undertaken an assessment of the utility infrastructure requirements for the Ballarat North Precinct Structure Plan. This evaluation has highlighted the current limitations in utility services and the upgrades needed to support the projected growth. Refer to the figure below for an image of the Core and Expanded Area's that were considered part of the evaluation.

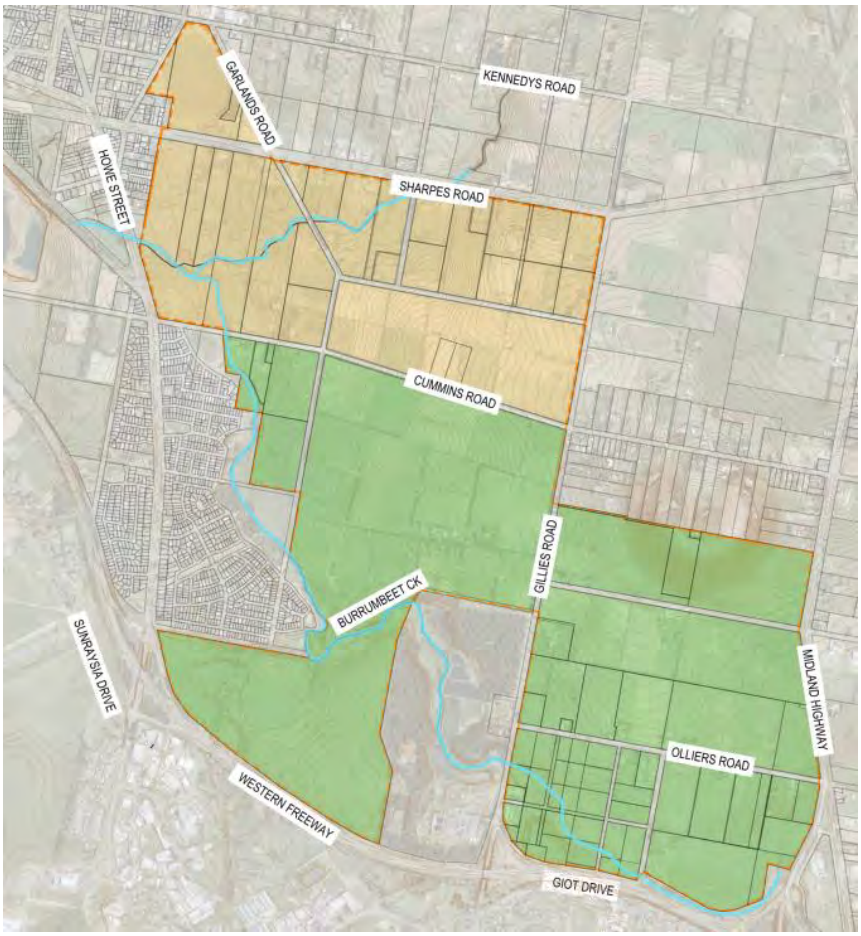

Figure 25 - Ballarat North Precinct Evaluation Area

The precinct currently has limited utility infrastructure, necessitating substantial upgrades to accommodate the projected growth outlined in the Precinct Structure Plan (PSP). The existing sewer and water systems will require significant augmentation to larger assets to service additional development, and the area's drainage infrastructure is minimal due to its current agricultural use.

However, several planned infrastructure upgrades in the surrounding areas, led by relevant authorities, are expected to provide the necessary network capacity to service the precinct. Key upgrades include the proposed sewer and water networks outlined in Central Highlands Water's (CHW) Capital Works Plan and Powercor's planned enhancements to the Ballarat East Substation. Once these projects are completed, initial assessments suggest that the networks will have the additional capacity required to support the growth within the precinct.

Preliminary servicing strategies indicate that using Gillies Road as the primary collector road for the precinct would simplify the connection of trunk infrastructure. This approach would facilitate efficient integration with both existing and proposed major utilities near the Western Freeway. Additionally, other collector roads, such as Cummins Road and Olliers Road, would serve as key conduits for trunk utilities, aiding the distribution of services to future stages of development. Refer to Appendix B for the proposed road cross sections with the precinct.

Should the development sequence differ from the staging proposed by Stantec, alternative servicing options will need to be considered. Regardless of the sequencing, significant upgrades to infrastructure will be necessary throughout the development process. We have identified projects that must be delivered by utility agencies; however, there will also be substantial infrastructure costs borne by developers. Refer to the image below for Stantec propsed stage plan. For a high resolution staging plan refer to Appendix D.

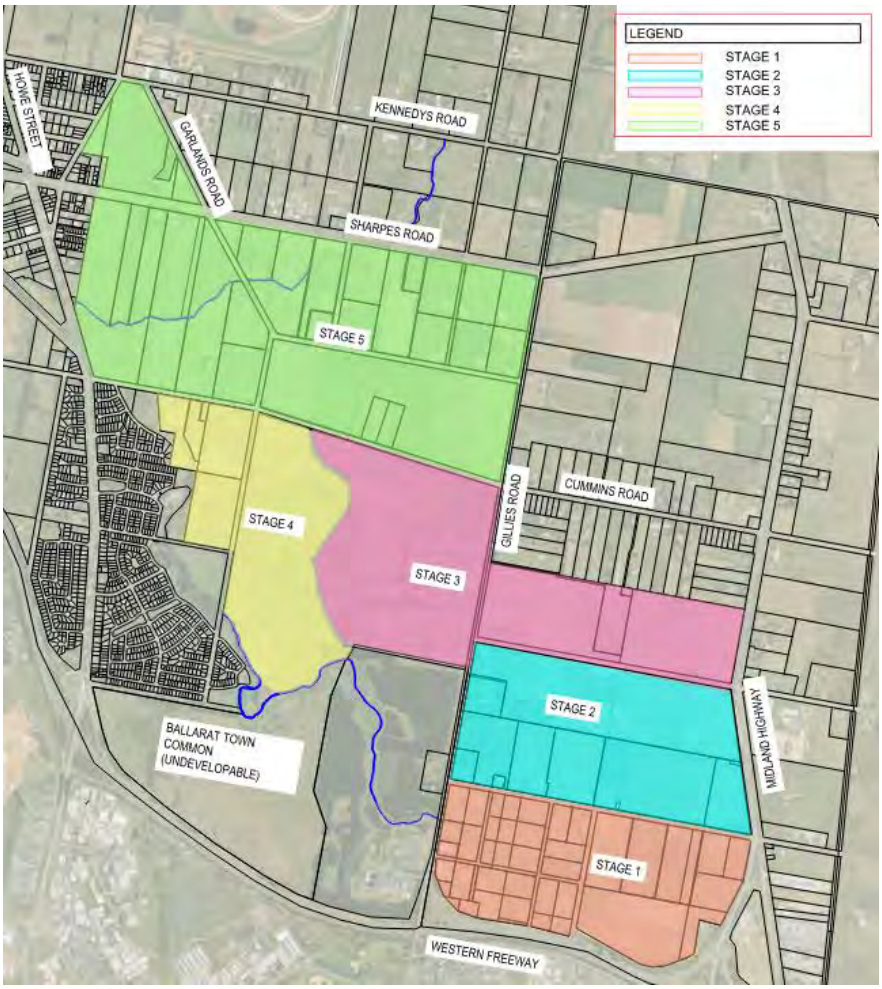

Figure 26 - Proposed Precinct Staging Plan

Based on the available information and initial feedback from authorities, Stantec has prepared servicing strategy sketches that outline potential alignments for new services. These sketches, found in Appendix C, focus on essential infrastructure and consider the existing capacity of the networks. However, they do not consider aspects such as construction sequencing or other external factors outside the scope of this report.

Appendix A Current Services Drawings

BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
LOCALITY

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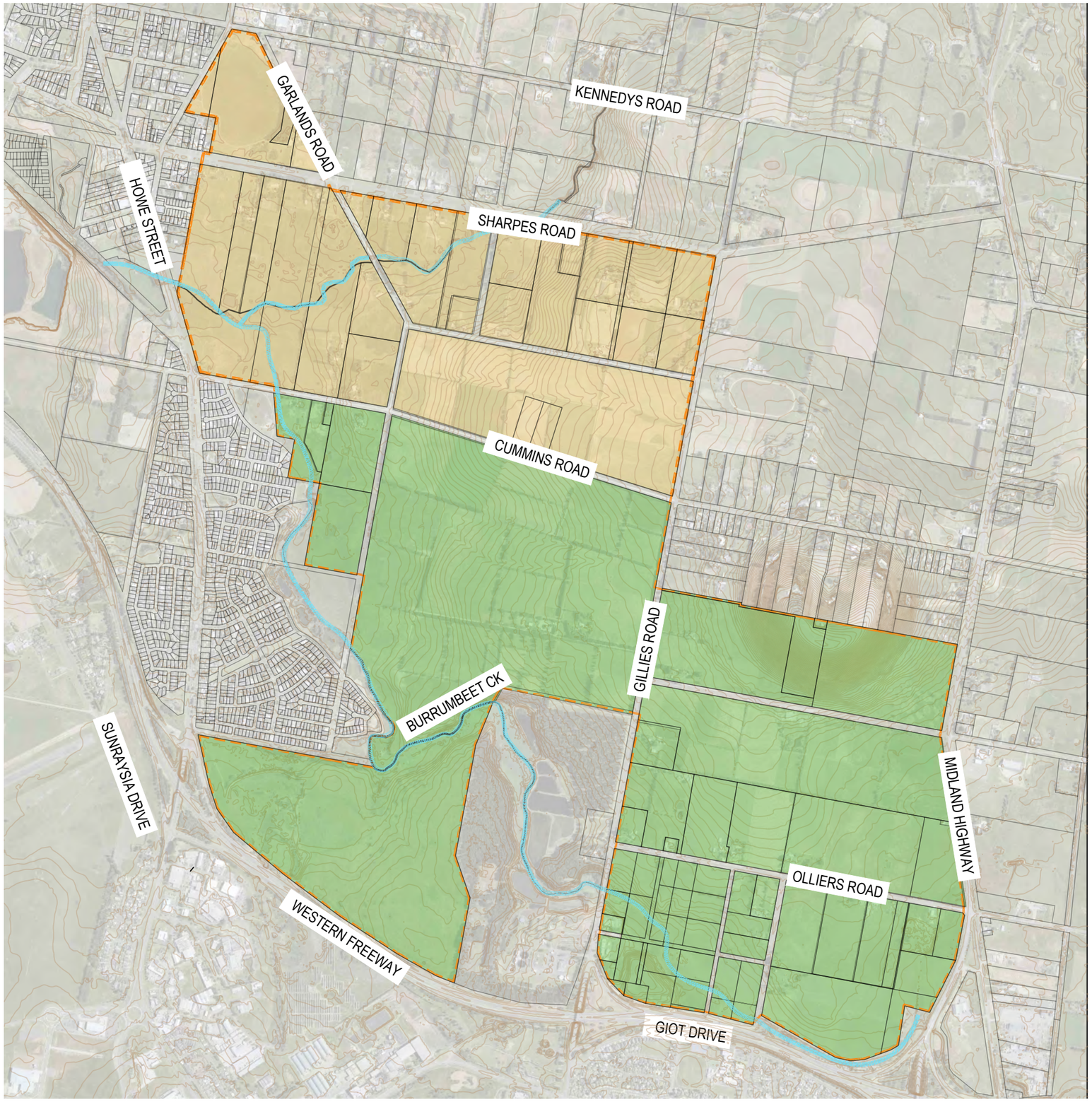

LEGEND

- Precinct Expanded Area
- Precinct Core Area
- Precinct Boundary

N

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BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
WATER

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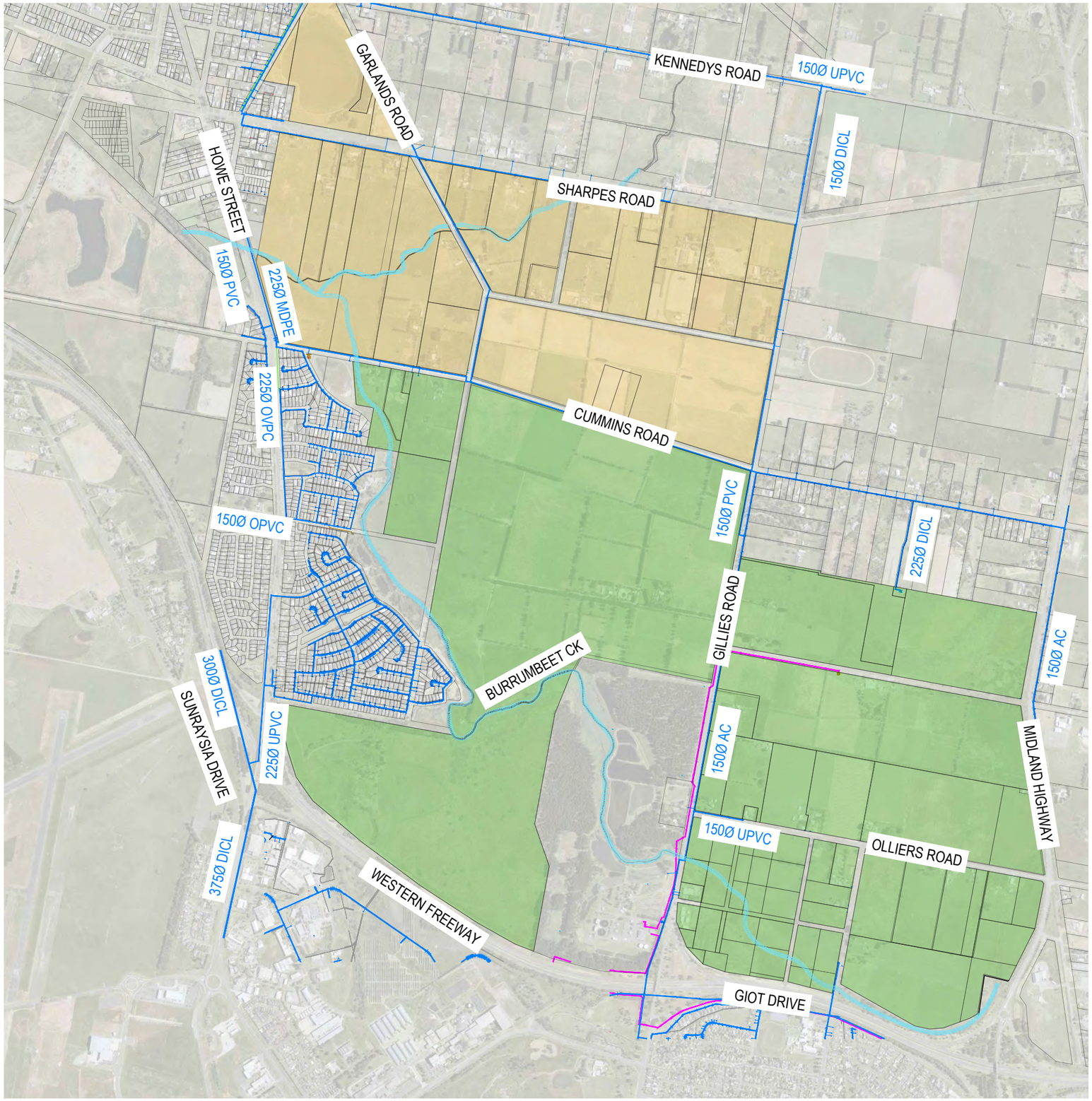

LEGEND

- Precinct Expanded Area
- Precinct Core Area
- Existing Potable Water main
- Existing Recycled Water Main

N

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BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
SEWER

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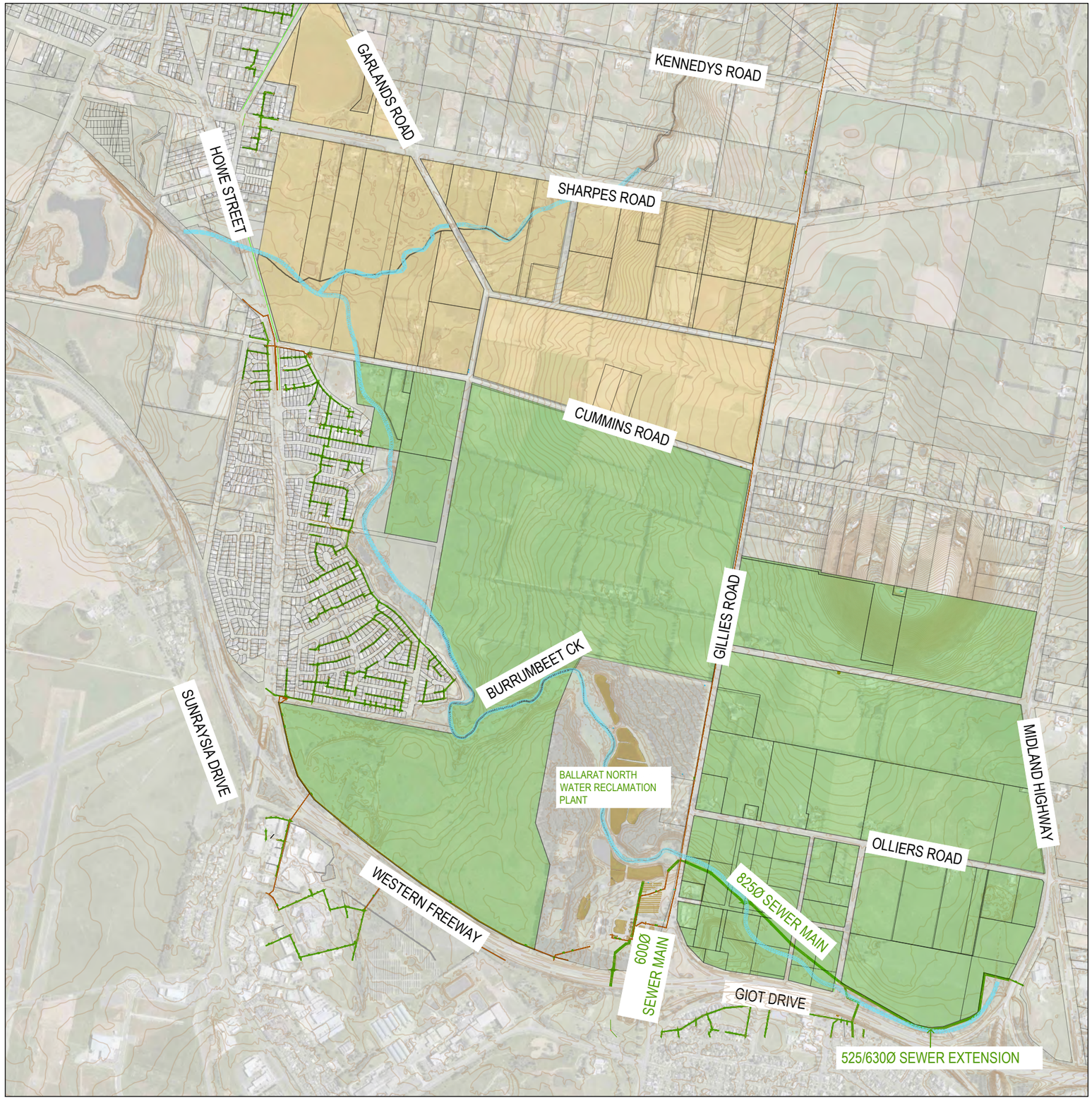

LEGEND

- Precinct Expanded Area
- Precinct Core Area
- Existing Sewer Main
- Existing Pressure/Rising Main

N

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BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
GAS

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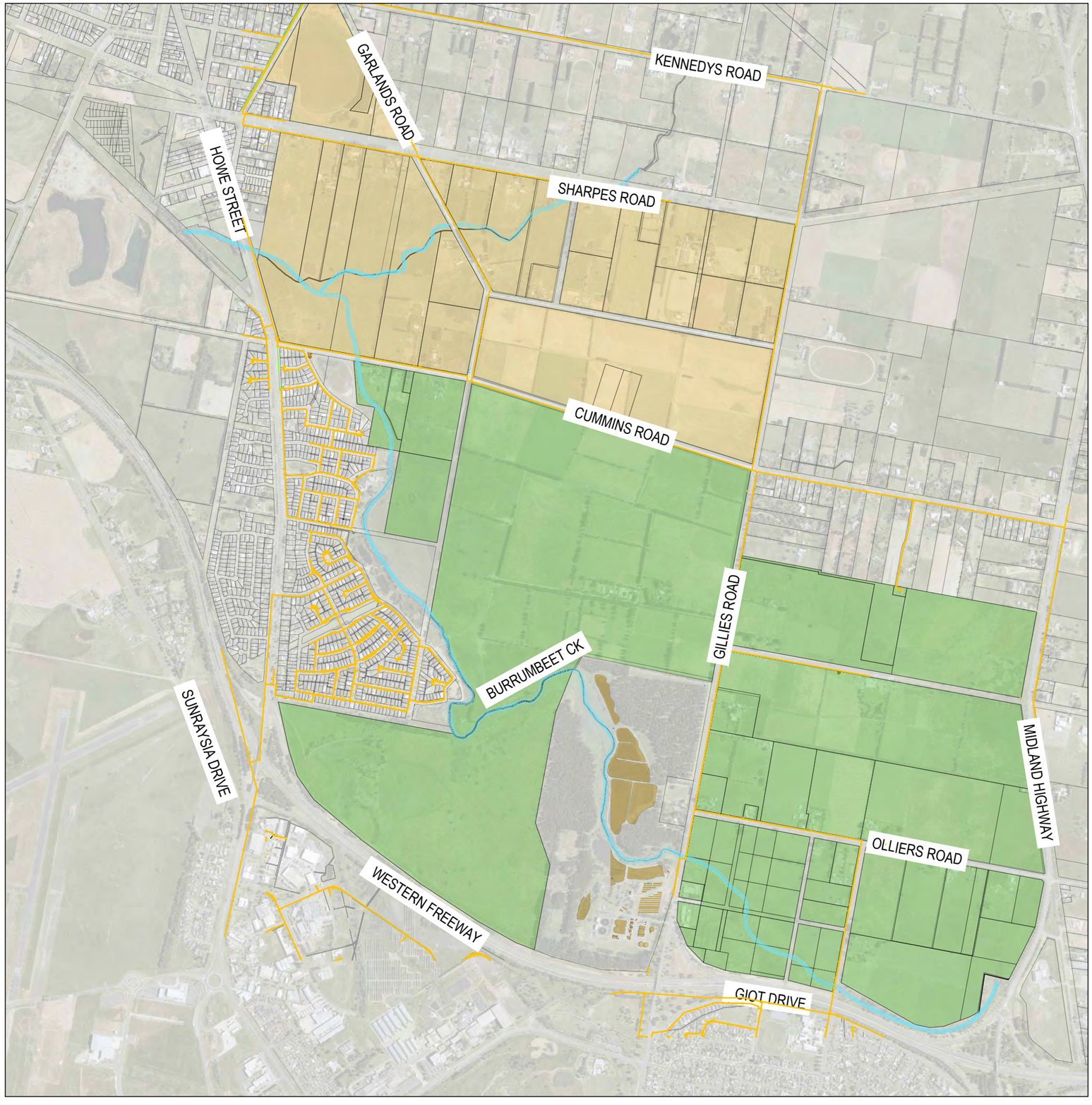

LEGEND

- Precinct Expanded Area
- Precinct Core Area
- Existing Gas Asset (Assumed location)

N

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BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
ELECTRICAL

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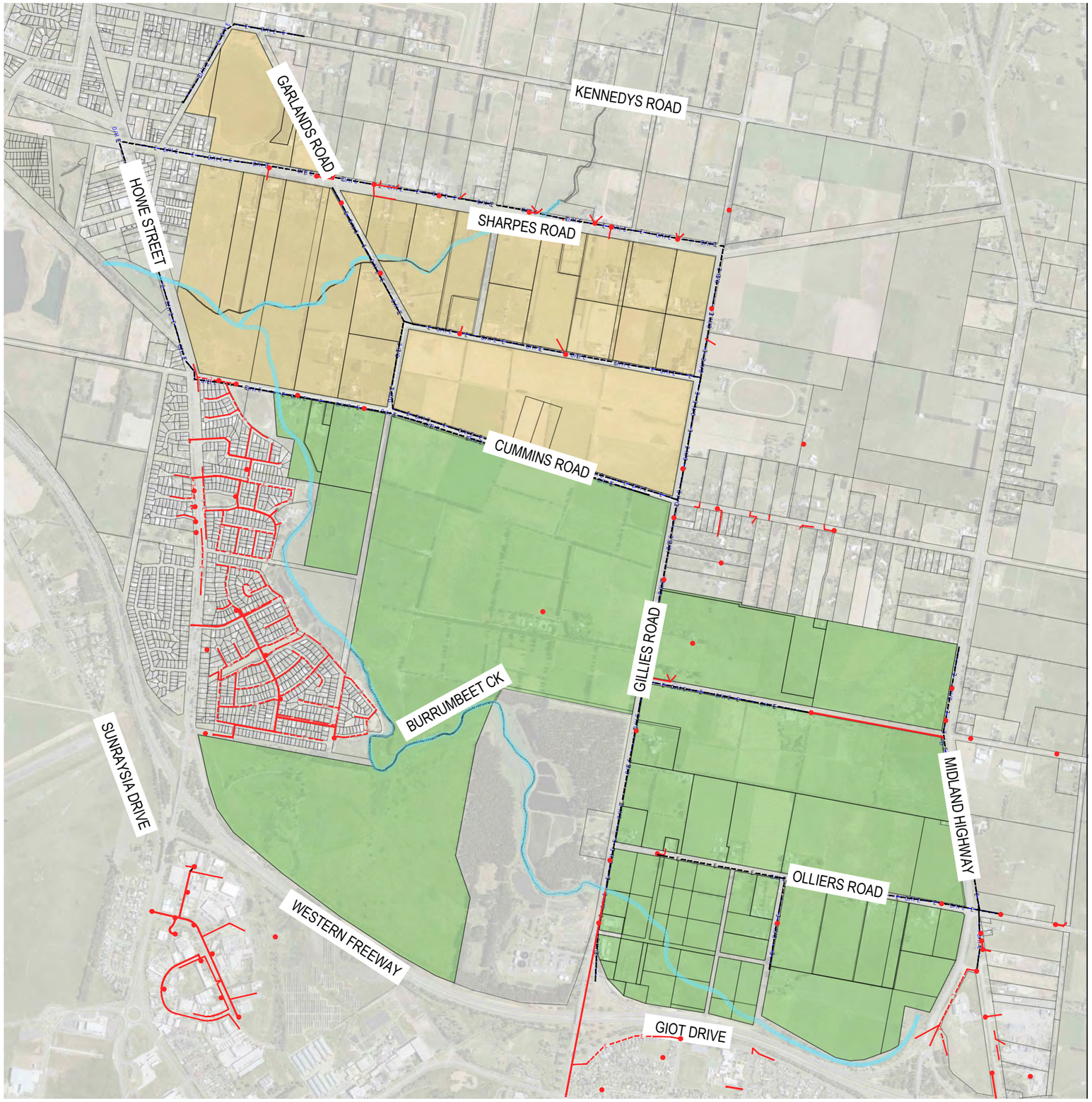

LEGEND

- Precinct Expanded Area
- Precinct Core Area
- −O/HE− Existing overhead electrical asset
- −E− Existing underground low voltage electrical asset
- Existing underground high voltage electrical asset

N

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BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
COMMUNICATIONS

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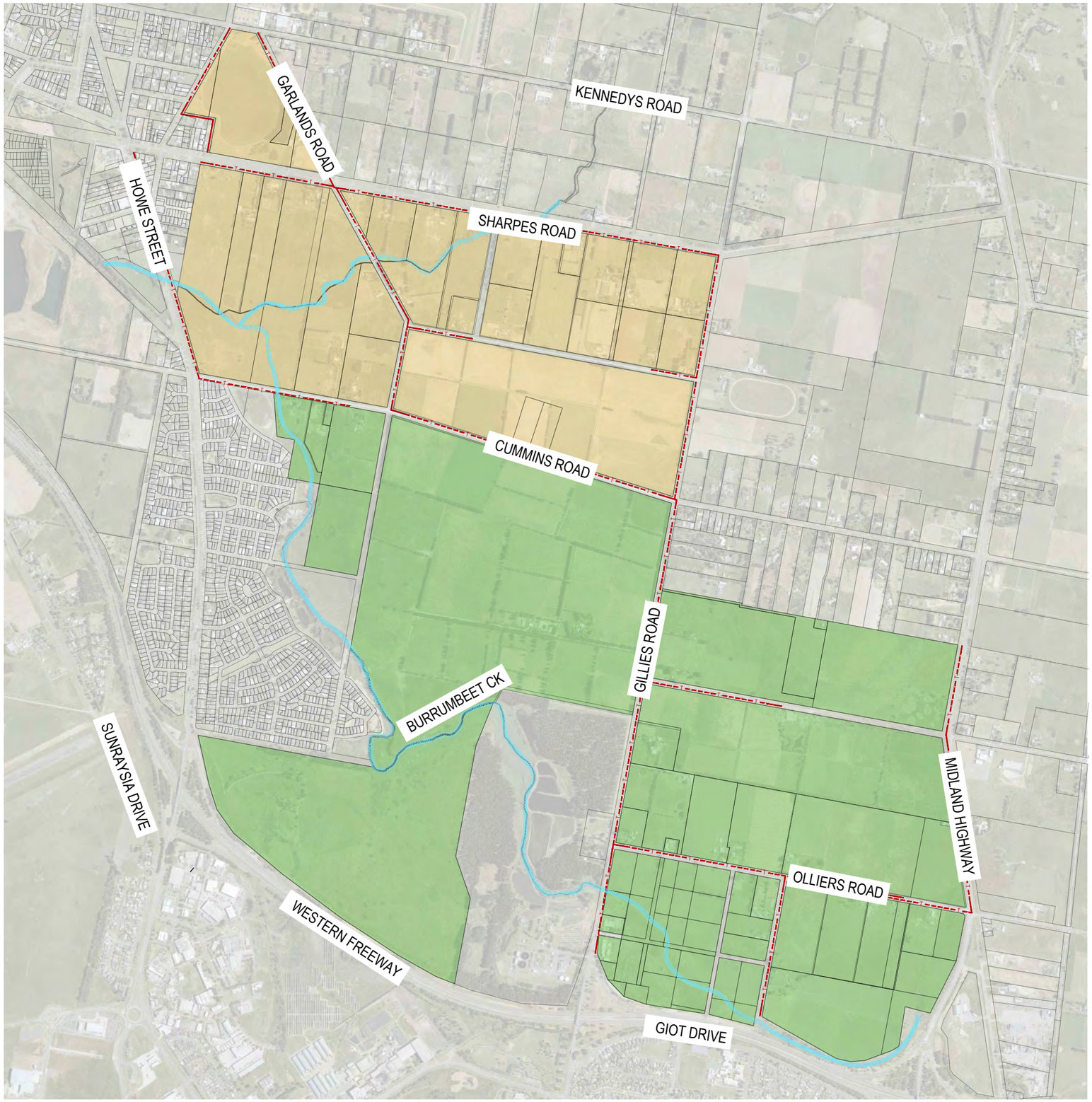

LEGEND

- Precinct Expanded Area
- Precinct Core Area
- Existing communications asset

N

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BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
STORMWATER DRAINAGE

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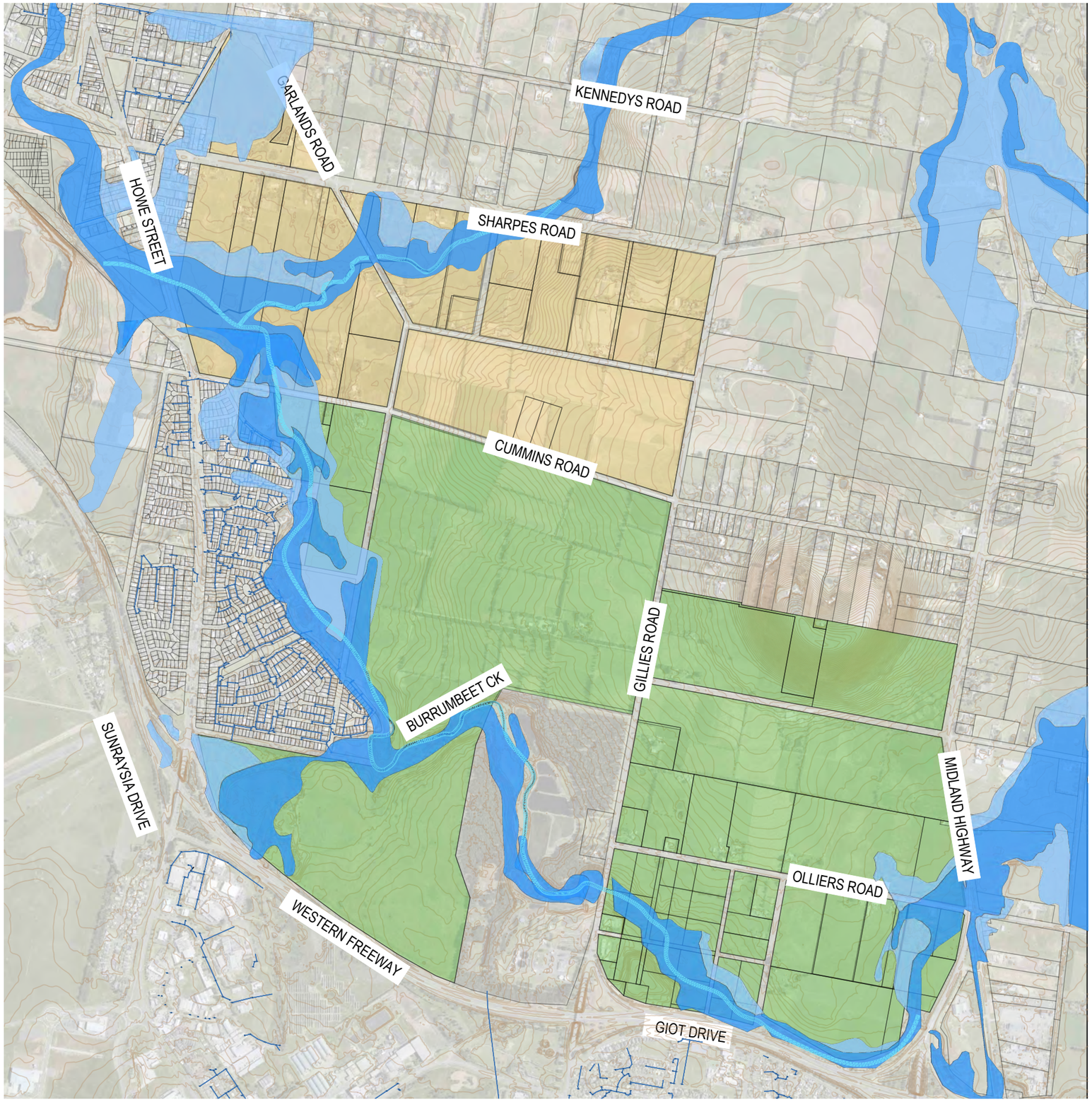

LEGEND

- Precinct Expanded Area
- Precinct Core Area
- Existing Stormwater Drain
- Floodway Overlay
- Land Subject to Inundation Overlay

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Appendix B Typical Cross Sections

BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
TYPICAL SECTIONS - 01

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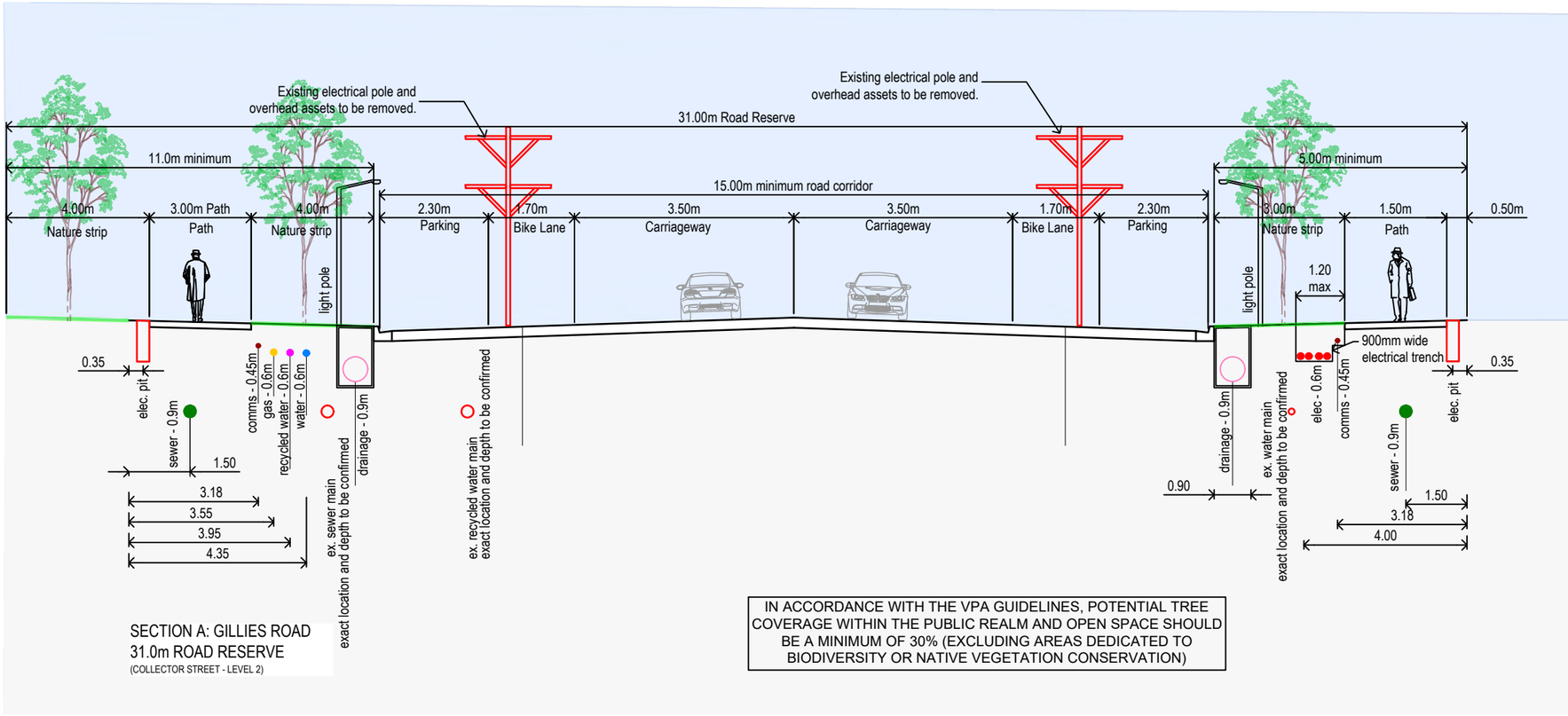
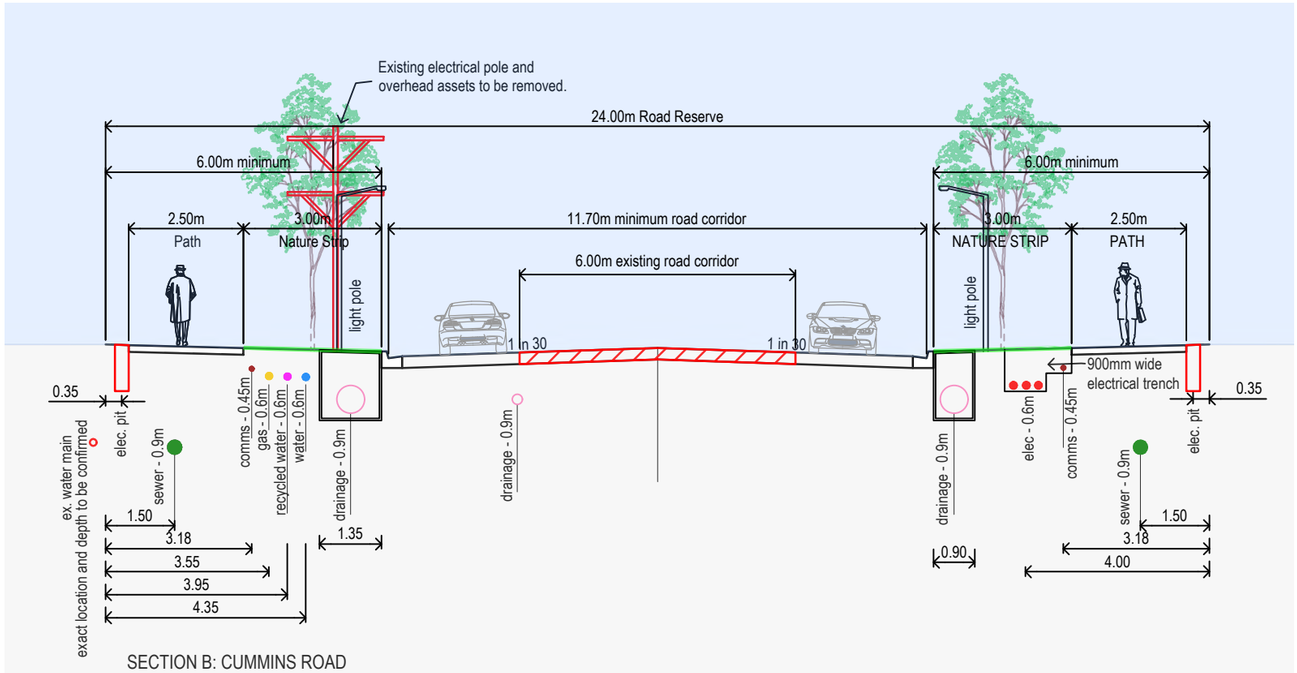


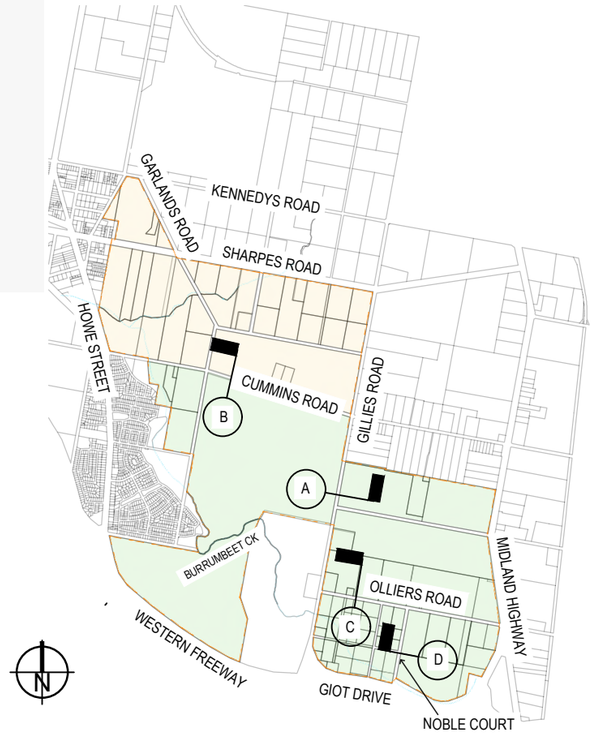
SECTION A: GILLIES ROAD
31.0m ROAD RESERVE
(COLLECTOR STREET - LEVEL 2)

IN ACCORDANCE WITH THE VPA GUIDELINES, POTENTIAL TREE COVERAGE WITHIN THE PUBLIC REALM AND OPEN SPACE SHOULD BE A MINIMUM OF 30% (EXCLUDING AREAS DEDICATED TO BIODIVERSITY OR NATIVE VEGETATION CONSERVATION)



SECTION B: CUMMINS ROAD
24.0m ROAD RESERVE
(COLLECTOR STREET - LEVEL 1)

IN ACCORDANCE WITH THE VPA GUIDELINES, POTENTIAL TREE COVERAGE WITHIN THE PUBLIC REALM AND OPEN SPACE SHOULD BE A MINIMUM OF 30% (EXCLUDING AREAS DEDICATED TO BIODIVERSITY OR NATIVE VEGETATION CONSERVATION)



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BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
TYPICAL SECTIONS - 02

NOT TO SCALE
MARCH 2025
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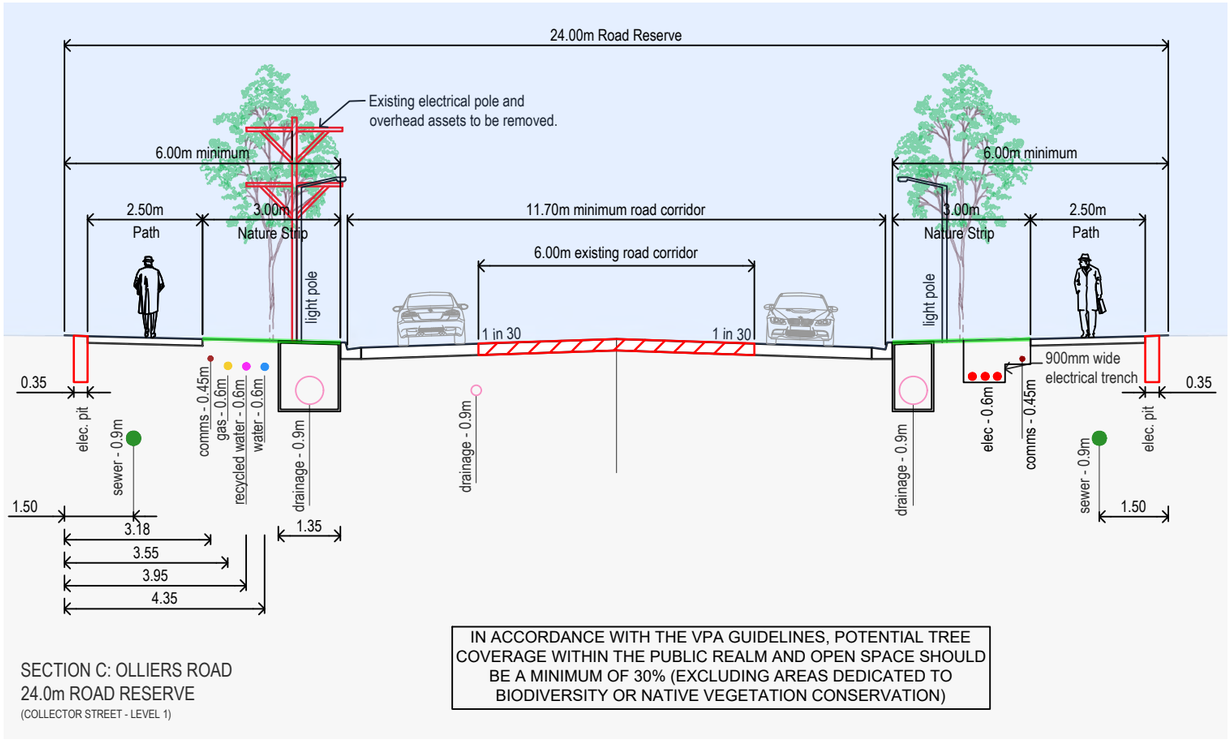
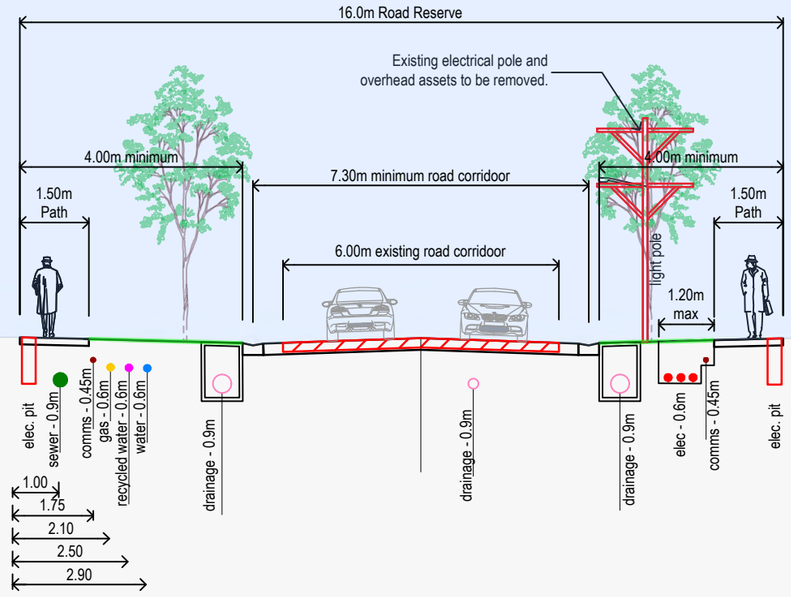


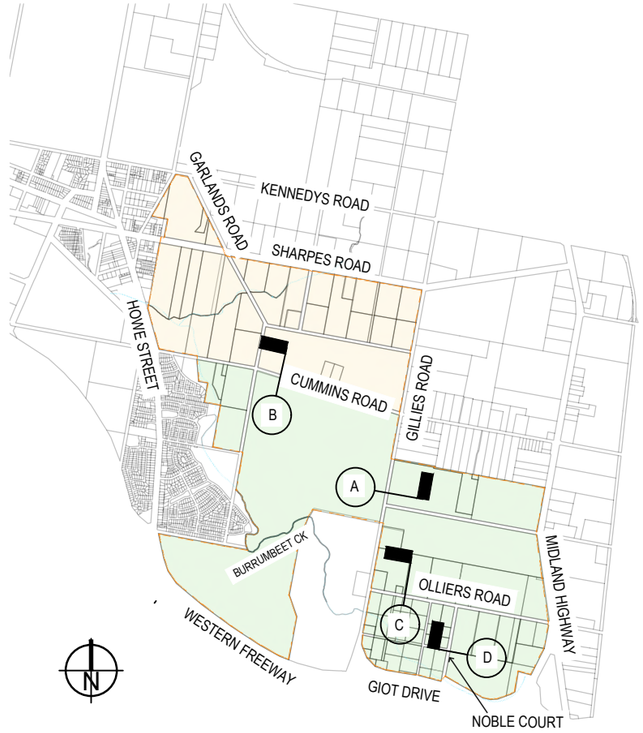
SECTION C: OLLIERS ROAD
24.0m ROAD RESERVE
(COLLECTOR STREET - LEVEL 1)

IN ACCORDANCE WITH THE VPA GUIDELINES, POTENTIAL TREE COVERAGE WITHIN THE PUBLIC REALM AND OPEN SPACE SHOULD BE A MINIMUM OF 30% (EXCLUDING AREAS DEDICATED TO BIODIVERSITY OR NATIVE VEGETATION CONSERVATION)



SECTION D: NOBLE COURT
16.0m ROAD RESERVE
(ACCESS STREET)

IN ACCORDANCE WITH THE VPA GUIDELINES, POTENTIAL TREE COVERAGE WITHIN THE PUBLIC REALM AND OPEN SPACE SHOULD BE A MINIMUM OF 30% (EXCLUDING AREAS DEDICATED TO BIODIVERSITY OR NATIVE VEGETATION CONSERVATION)



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BALLARAT NORTH PSP AND DCP
BALLARAT, VIC 3350
TYPICAL SECTIONS - 03

NOT TO SCALE
MARCH 2025
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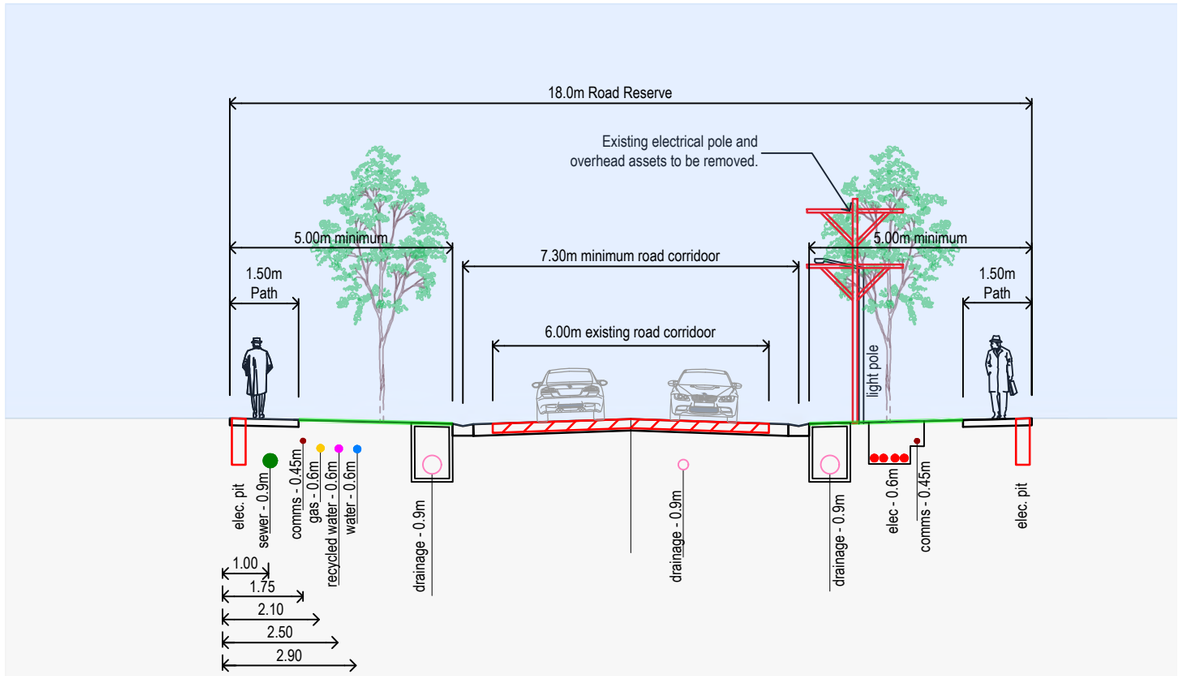
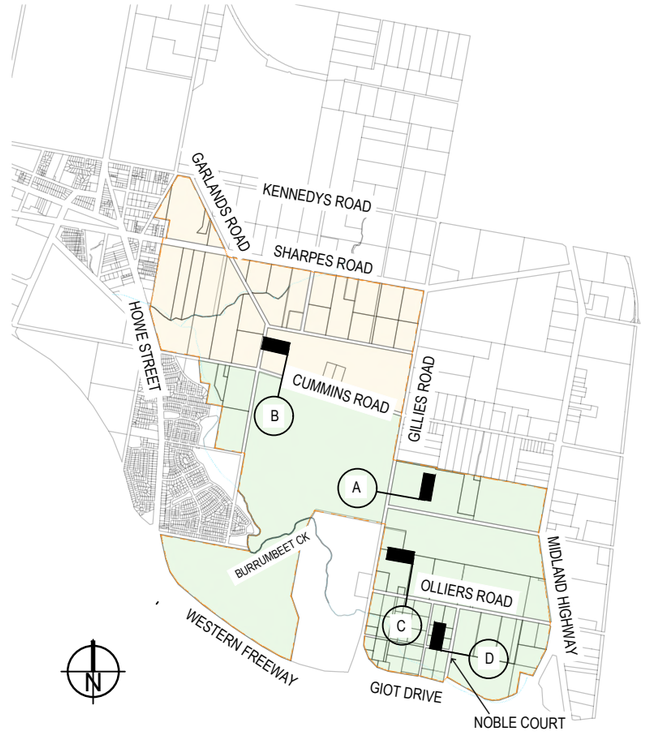


SECTION E: NOBLE COURT
18.0m ROAD RESERVE
(ACCESS STREET)

IN ACCORDANCE WITH THE VPA GUIDELINES, POTENTIAL TREE COVERAGE WITHIN THE PUBLIC REALM AND OPEN SPACE SHOULD BE A MINIMUM OF 30% (EXCLUDING AREAS DEDICATED TO BIODIVERSITY OR NATIVE VEGETATION CONSERVATION)



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Appendix C Proposed Services Plans

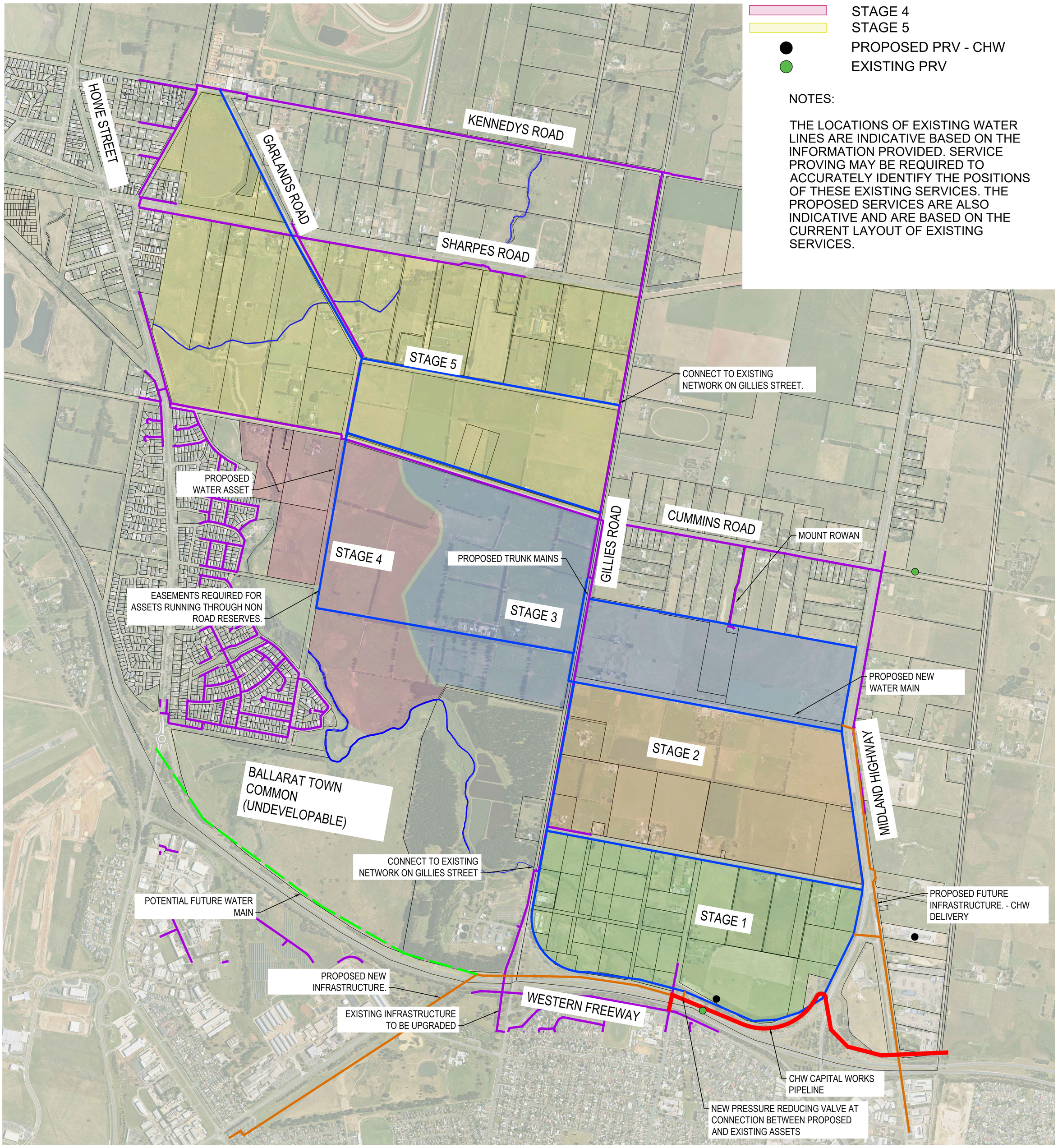
DATE PLOTTED: 5 February 2025 10:48 AM BY : THAPA, SAJAN

LEGEND

- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- PROPOSED WATER MAIN - INVERMAY DUPLICATION PROJECT
- PROPOSED WATER MAIN BY OTHERS
- POTENTIAL FUTURE WORKS
- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4
- STAGE 5
- PROPOSED PRV - CHW
- EXISTING PRV

NOTES:

THE LOCATIONS OF EXISTING WATER LINES ARE INDICATIVE BASED ON THE INFORMATION PROVIDED. SERVICE PROVING MAY BE REQUIRED TO ACCURATELY IDENTIFY THE POSITIONS OF THESE EXISTING SERVICES. THE PROPOSED SERVICES ARE ALSO INDICATIVE AND ARE BASED ON THE CURRENT LAYOUT OF EXISTING SERVICES.



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VICTORIAN PLANNING AUTHORITY
BALLARAT NORTH PSP & DCP
UTILITY SERVICE ASSESMENT
WATER

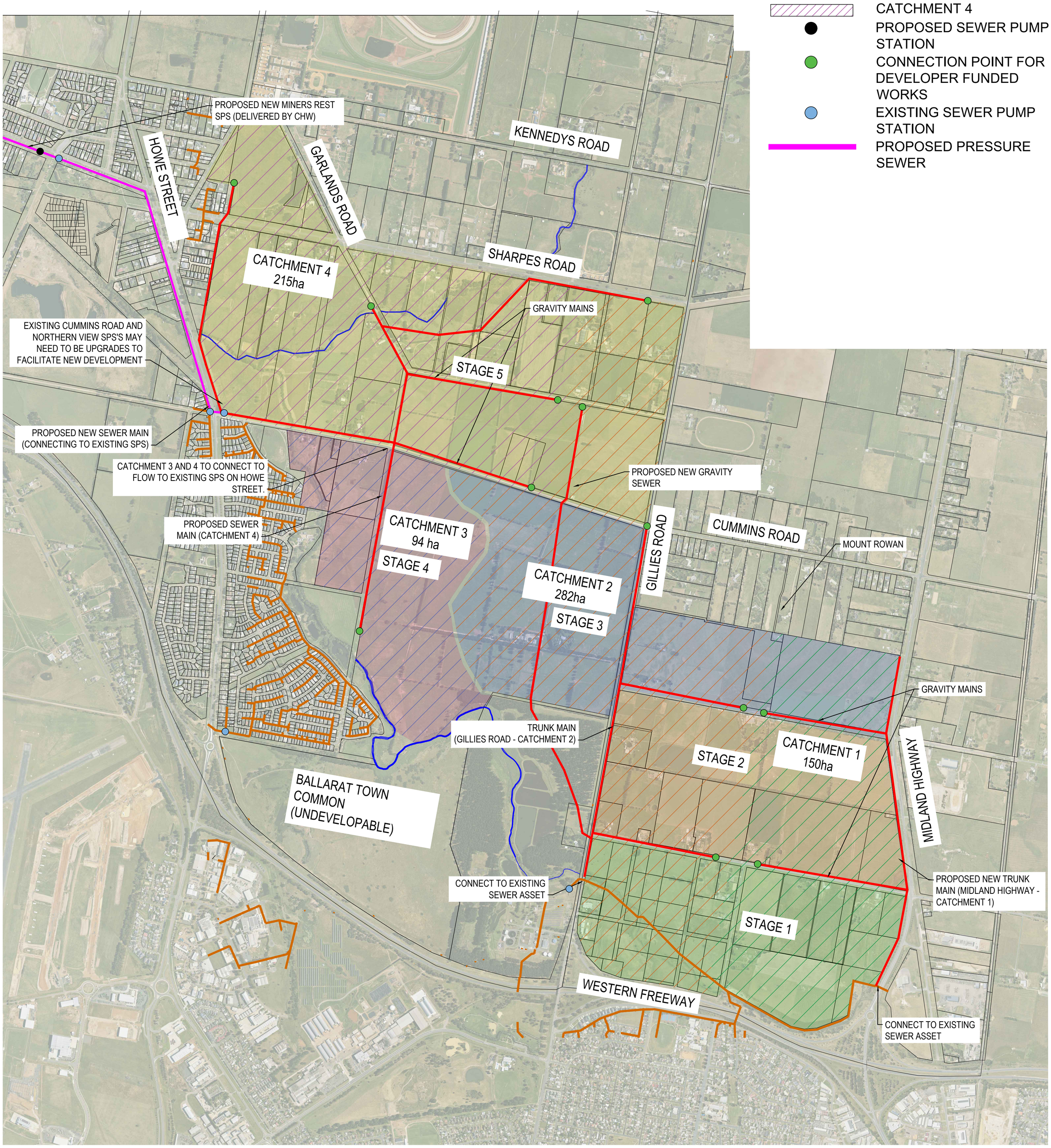
Datum	Date	Scale	Size
A.H.D.	04.02.2025	AS SHOWN	A1

Drawing Number: 304401104-SK02 | Revision: 2

XREFs: XR-Xref (contours); XR-xref (existing); Water
CAD File: \\Au2039-ppfss01\shared_projects\304401104\100_xxx\drawings\304401104-SK02-WATER.dwg

NOTES:

1. THE LOCATIONS OF EXISTING SEWER LINES ARE INDICATIVE BASED ON THE INFORMATION PROVIDED. SERVICE PROVING MAY BE REQUIRED TO ACCURATELY IDENTIFY THE POSITIONS OF THESE EXISTING SERVICES. THE PROPOSED SERVICES ARE ALSO INDICATIVE AND ARE BASED ON THE CURRENT LAYOUT OF EXISTING SERVICES.
2. CONSTRUCTION OF MAINS AND PUMP STATIONS SHOWN ARE TO BE LED BY THE DEVELOPER IN CONJUNCTION WITH RELEVANT AUTHORITY
3. SIZING OF MAINS IS TO BE CONFIRMED AT DETAILED DESIGN PHASE. SIZES SHOWN ARE ASSUMING 20 LOTS PER HA AND SIZED IN CONJUNCTION WITH WSA SEWER CODE APPENDIX B
4. ALIGNMENTS SHOWN ARE BASED OFF AUTHORITY ADVICE AT THE TIME AND ARE INDICATIVE ONLY. DETAILED DESIGN OF PROPOSED NEW ASSETS IS REQUIRED AND IS TO BE APPROVED BY THE AUTHORITY



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VICTORIAN PLANNING AUTHORITY
BALLARAT NORTH PSP & DCP
UTILITY SERVICE ASSESMENT
SEWER

Datum	Date	Scale	Size
A.H.D.	04.02.2025	AS SHOWN	A1

Drawing Number	Revision
304401104-SK01	2

DATE PLOTTED: 5 February 2025 11:00 AM BY : THAPA, SAJAN

LEGEND

EXISTING TELECOMMUNICATION ASSET

PROPOSED TELECOMMUNICATION ASSET

STAGE 1

STAGE 2

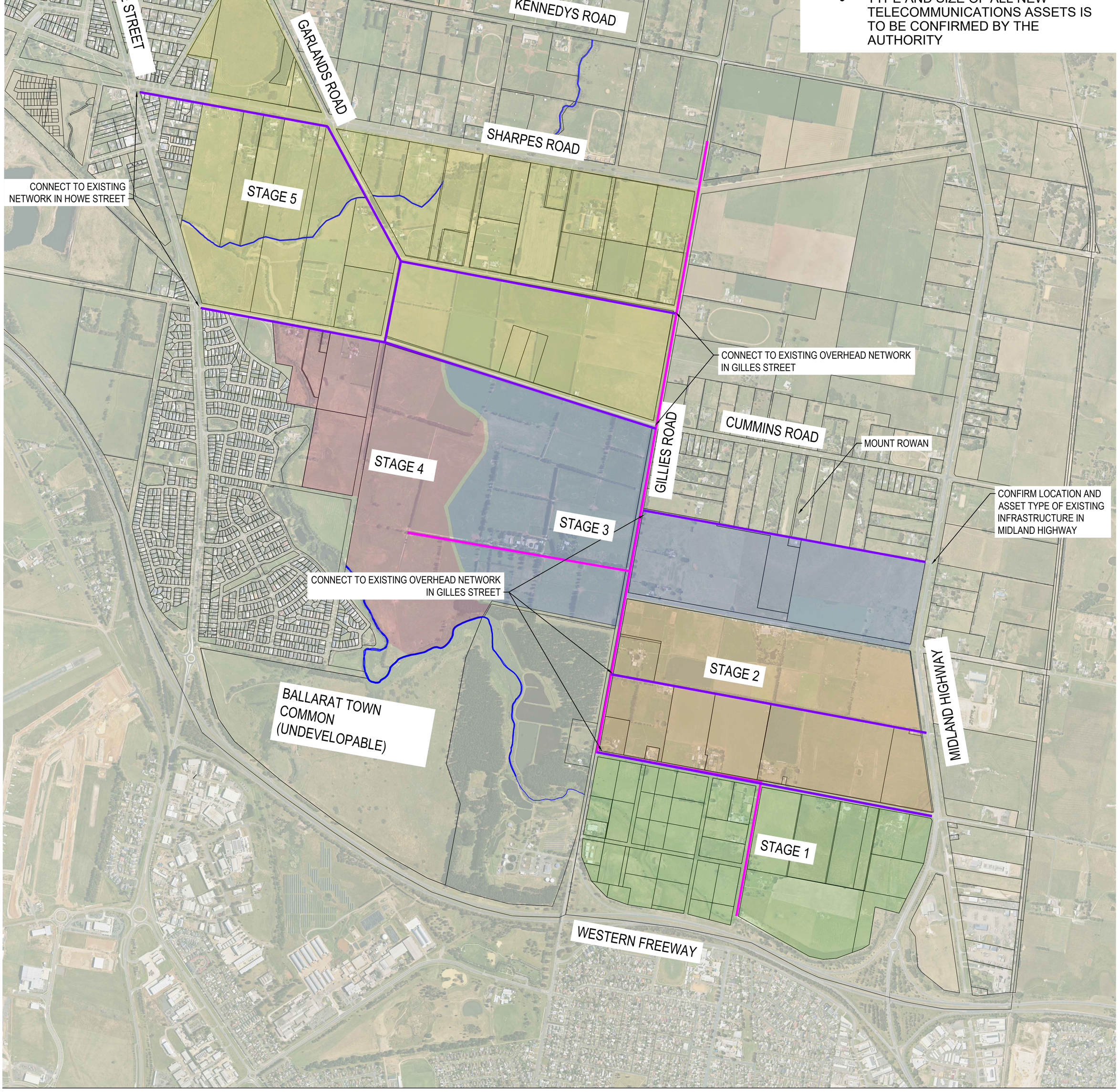
STAGE 3

STAGE 4

STAGE 5

NOTES:

- THE LOCATIONS OF EXISTING TELECOMMUNICATION ASSETS ARE INDICATIVE BASED ON THE INFORMATION PROVIDED. SERVICE PROVING MAY BE REQUIRED TO ACCURATELY IDENTIFY THE POSITIONS OF THESE EXISTING SERVICES. THE PROPOSED SERVICES ARE ALSO INDICATIVE AND ARE BASED ON THE CURRENT LAYOUT OF EXISTING SERVICES.
- TYPE AND SIZE OF ALL NEW TELECOMMUNICATIONS ASSETS IS TO BE CONFIRMED BY THE AUTHORITY



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VICTORIAN PLANNING AUTHORITY
BALLARAT NORTH PSP & DCP
UTILITY SERVICE ASSESMENT
TELECOMMUNICATIONS

Datum	Date	Scale	Size
A.H.D.	04.02.2025	AS SHOWN	A1

Drawing Number	Revision
304401104-SK03	2

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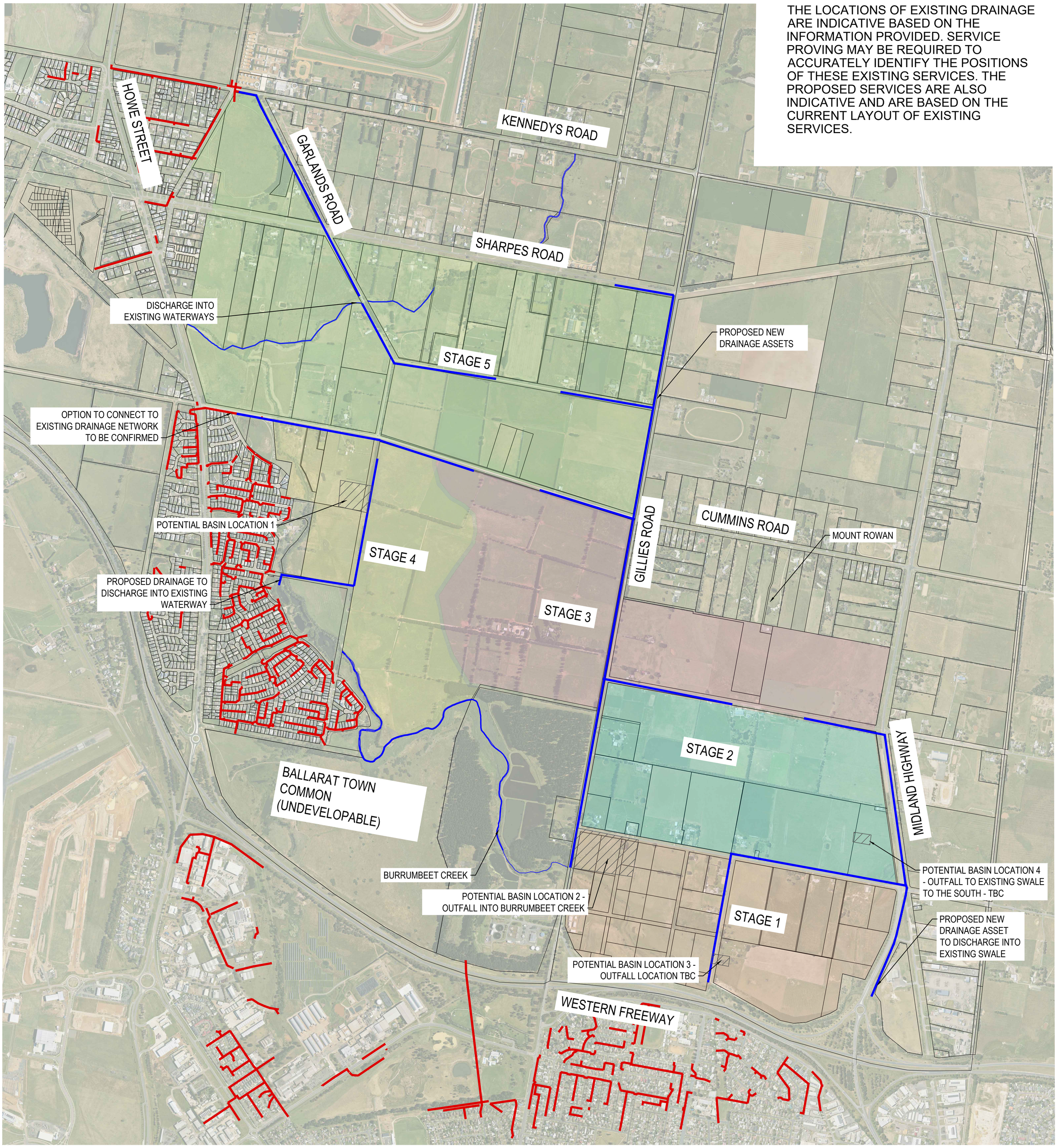
CAD File: \\Au2039-ppfss01\shared_projects\304401104\100_xxx\drawings\304401104-SK03-TELCOM.dwg

LEGEND

- EXISTING DRAINAGE
- PROPOSED DRAINAGE
- DRAINAGE BASIN CONCEPT
- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4
- STAGE 5

NOTES:

THE LOCATIONS OF EXISTING DRAINAGE ARE INDICATIVE BASED ON THE INFORMATION PROVIDED. SERVICE PROVING MAY BE REQUIRED TO ACCURATELY IDENTIFY THE POSITIONS OF THESE EXISTING SERVICES. THE PROPOSED SERVICES ARE ALSO INDICATIVE AND ARE BASED ON THE CURRENT LAYOUT OF EXISTING SERVICES.



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VICTORIAN PLANNING AUTHORITY
BALLARAT NORTH PSP & DCP
UTILITY SERVICE ASSESMENT
DRAINAGE

Datum	Date	Scale	Size
A.H.D.	04.02.2025	AS SHOWN	A1

Drawing Number	Revision
304401104-SK05	2

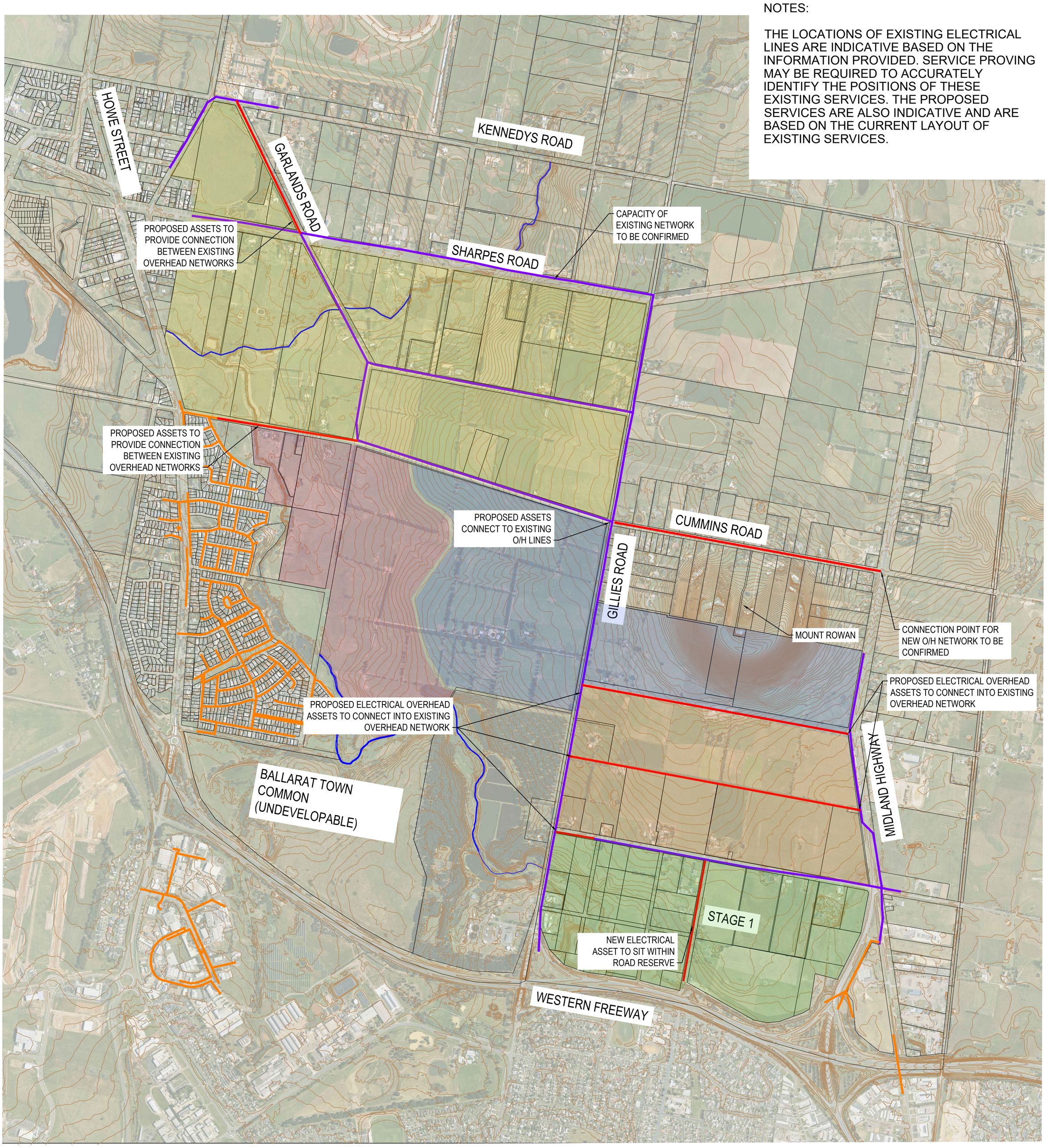
DATE PLOTTED: 5 February 2025 10:52 AM BY : THAPA, SAJAN

LEGEND

- EXISTING ELECTRICAL (TYPE UNKNOWN)
- EXISTING ELECTRICAL OVERHEAD
- PROPOSED OVERHEAD ELECTRICAL
- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4
- STAGE 5

NOTES:

THE LOCATIONS OF EXISTING ELECTRICAL LINES ARE INDICATIVE BASED ON THE INFORMATION PROVIDED. SERVICE PROVING MAY BE REQUIRED TO ACCURATELY IDENTIFY THE POSITIONS OF THESE EXISTING SERVICES. THE PROPOSED SERVICES ARE ALSO INDICATIVE AND ARE BASED ON THE CURRENT LAYOUT OF EXISTING SERVICES.



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VICTORIAN PLANNING AUTHORITY
BALLARAT NORTH PSP & DCP
UTILITY SERVICE ASSESMENT
ELECTRICAL

Datum	Date	Scale	Size
A.H.D.	04.02.2025	AS SHOWN	A1

Drawing Number	Revision
304401104-SK04	2

XREF's: XR-Xref (contours); XR-xref (existing); EX ELEC
CAD File: \\Au2039-ppfss01\shared_projects\304401104\100_xxx\drawings\304401104-SK04-ELEC.dwg

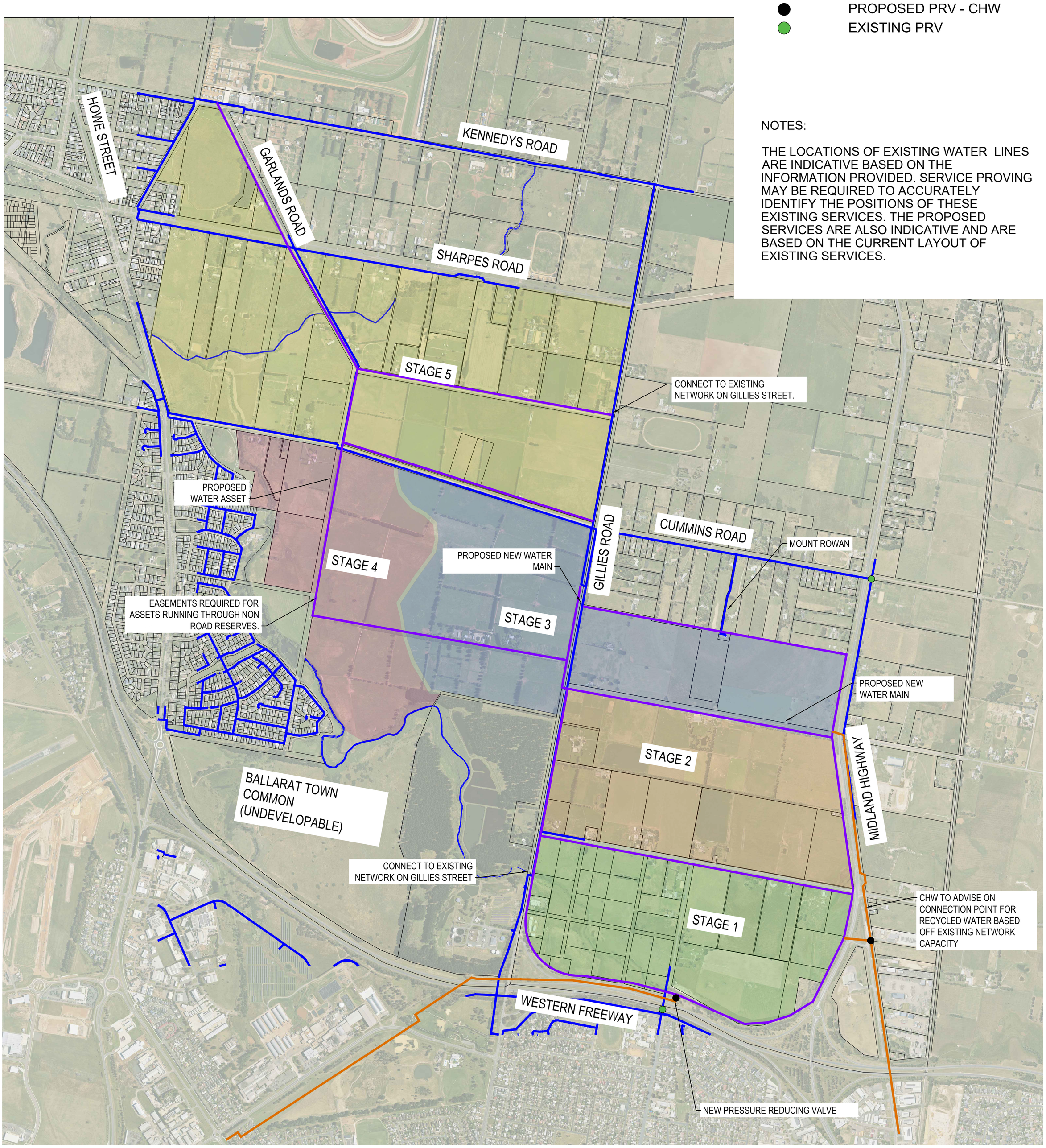
DATE PLOTTED: 5 February 2025 10:46 AM BY : THAPA, SAJAN

LEGEND

- EXISTING WATER MAIN
- PROPOSED RECYCLED WATER MAIN
- PROPOSED WATER MAIN BY OTHERS
- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4
- STAGE 5
- PROPOSED PRV - CHW
- EXISTING PRV

NOTES:

THE LOCATIONS OF EXISTING WATER LINES ARE INDICATIVE BASED ON THE INFORMATION PROVIDED. SERVICE PROVING MAY BE REQUIRED TO ACCURATELY IDENTIFY THE POSITIONS OF THESE EXISTING SERVICES. THE PROPOSED SERVICES ARE ALSO INDICATIVE AND ARE BASED ON THE CURRENT LAYOUT OF EXISTING SERVICES.



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VICTORIAN PLANNING AUTHORITY
BALLARAT NORTH PSP & DCP
UTILITY SERVICE ASSESMENT
RECYCLED WATER

Datum	Date	Scale	Size
A.H.D.	04.02.2025	AS SHOWN	A1

Drawing Number	Revision
304401104-SK02	2

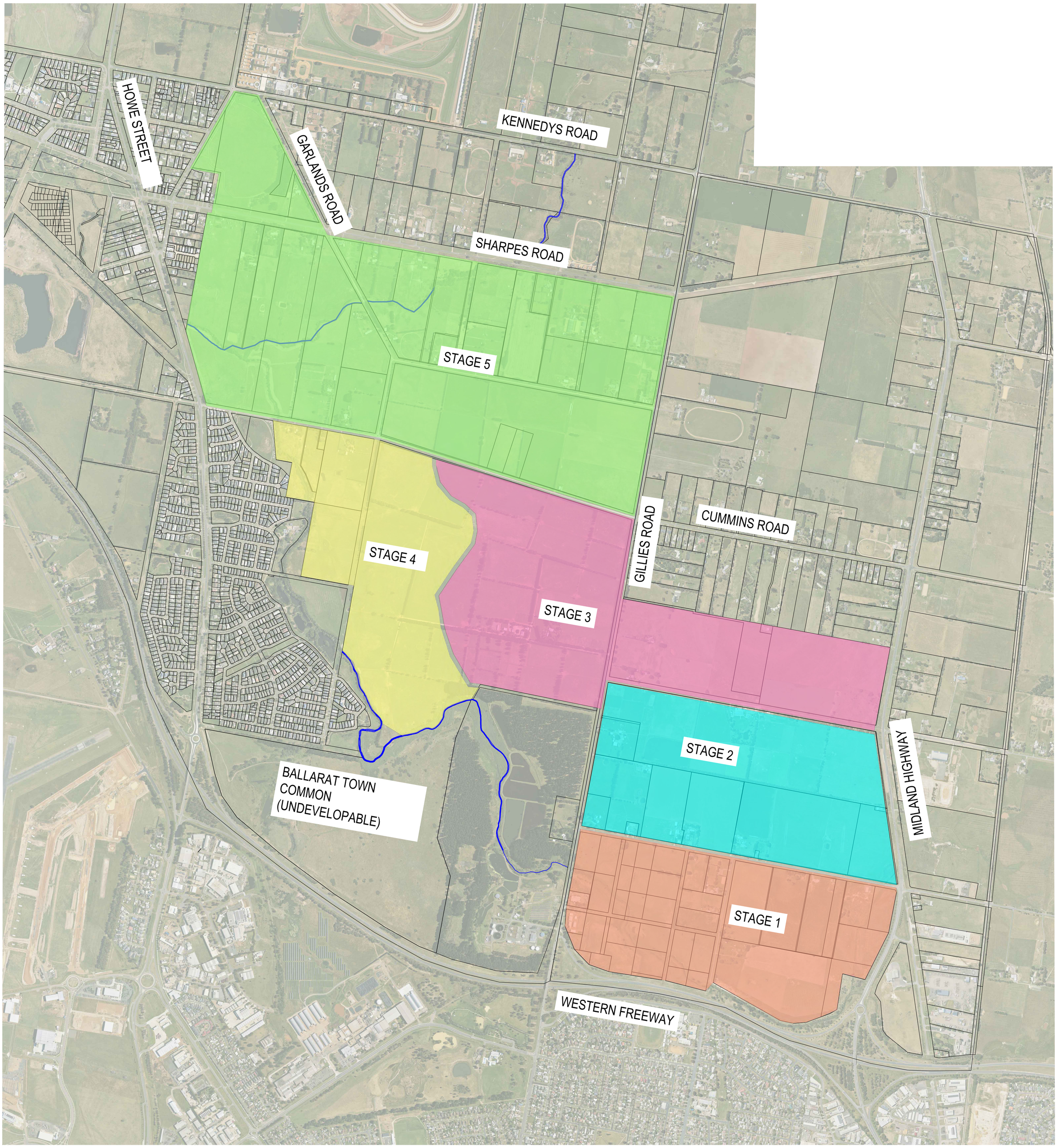
XREFs: XR-Xref (contours); XR-xref (existing); Water
CAD File: \\Au2039-ppfss01\shared_projects\304401104\100_xxx\drawings\304401104-SK02-REC WATER.dwg

Appendix D Staging Plan

DATE PLOTTED: 5 February 2025 11:04 AM BY : THAPA, SAJAN

LEGEND

STAGE 1
STAGE 2
STAGE 3
STAGE 4
STAGE 5



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VICTORIAN PLANNING AUTHORITY
BALLARAT NORTH PSP & DCP
UTILITY SERVICE ASSESMENT
STAGES

Datum	Date	Scale	Size
A.H.D.	04.02.2025	AS SHOWN	A1

Drawing Number: 304401104-SK06
Revision: 1

XREFs: XR-Xref (contours); XR-xref (existing)
CAD File: \\Au2039-ppfss01\shared_projects\304401104\100_xxx\drawings\304401104-SK06-Stages.dwg

Appendix E Written Authority Correspondence

Ballarat North PSP - Core and Expanded Area

nbn-Confidential: Commercial | 3WEN | Rev 0.1 | 11/04/2024
Owner:

Strategic notes for Ballarat North PSP - Core and Expanded Area

Scope

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

Existing Network

This area is within the Wireless & Satellite footprint of the NBN network.
Currently no NBN fixed line network exists in the identified area. The area currently does not support FTTP or any other form of fixed line technology.

Proposed network upgrades

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

Servicing the precinct area

Any extension of the Fixed line footprint to Ballarat North PSP core and expanded precinct areas will connect to the NBN co-located FAN site in Howitt St, Wendouree. The FAN site currently has capacity to service the Precinct.
Servicing of the Precinct would be planned on a case by case application basis and driven primarily by customer-initiated demand. New infrastructure would be deployed utilising a mixture of existing Telstra, new NBN build also developer supplied & shared trenching arrangements. Any new build (conduits and cable) to this precinct is planned to connect via Western Freeway (South end), Midland Highway (South-East end) or Howe Dr via Cummins Rd at the North-West end of the Precinct depending on stage sequencing. It is envisioned that new pit & pipe infrastructure is required within the entire precinct.

Opportunities

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

Some of the opportunities that would benefit NBN are:

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

Risks-Issues

Staged sequencing – Multiple Road access builds

Heritage overlays

Environmental overlays

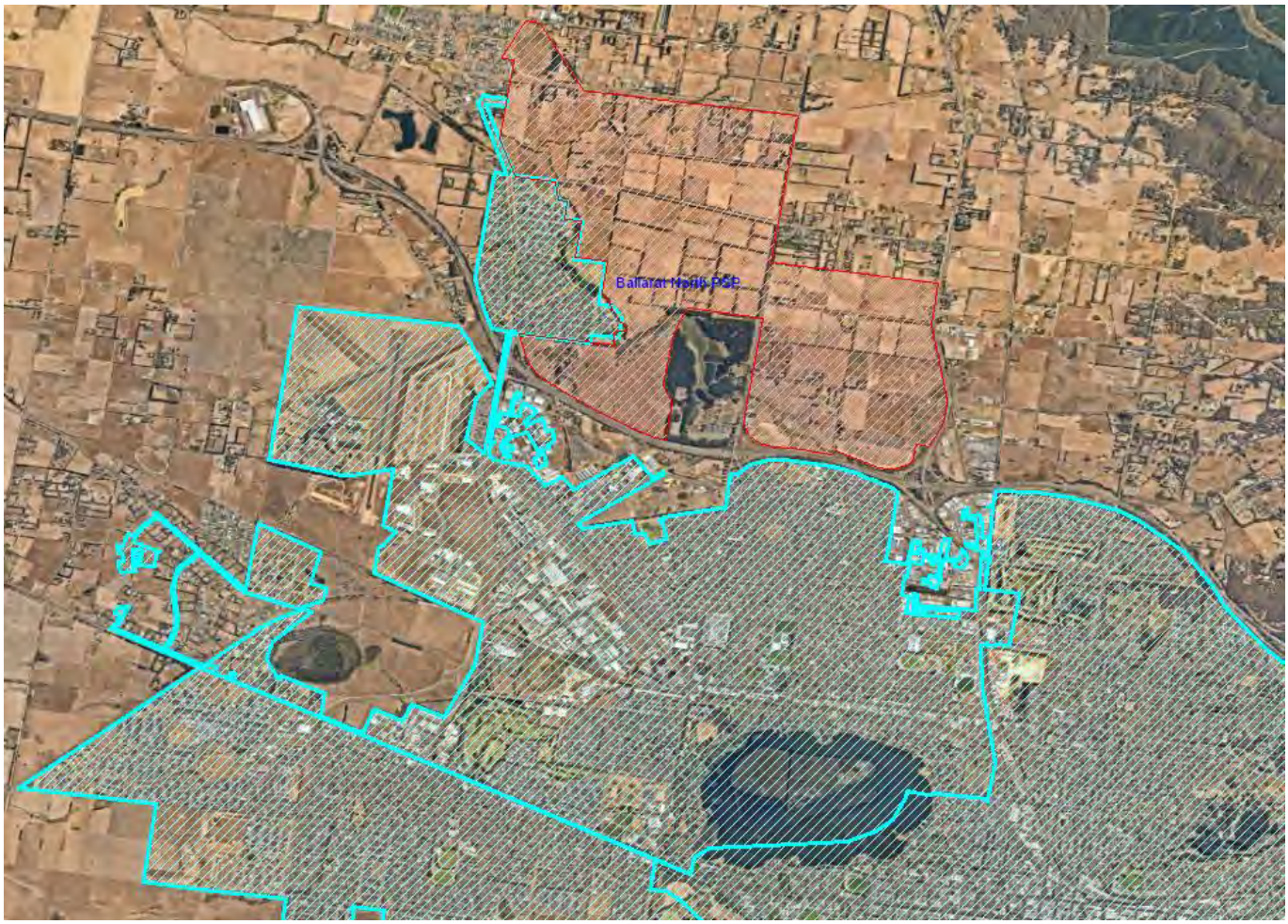

Figure 1. NBN Service area-rollout map showing Ballarat North PSP and DCP

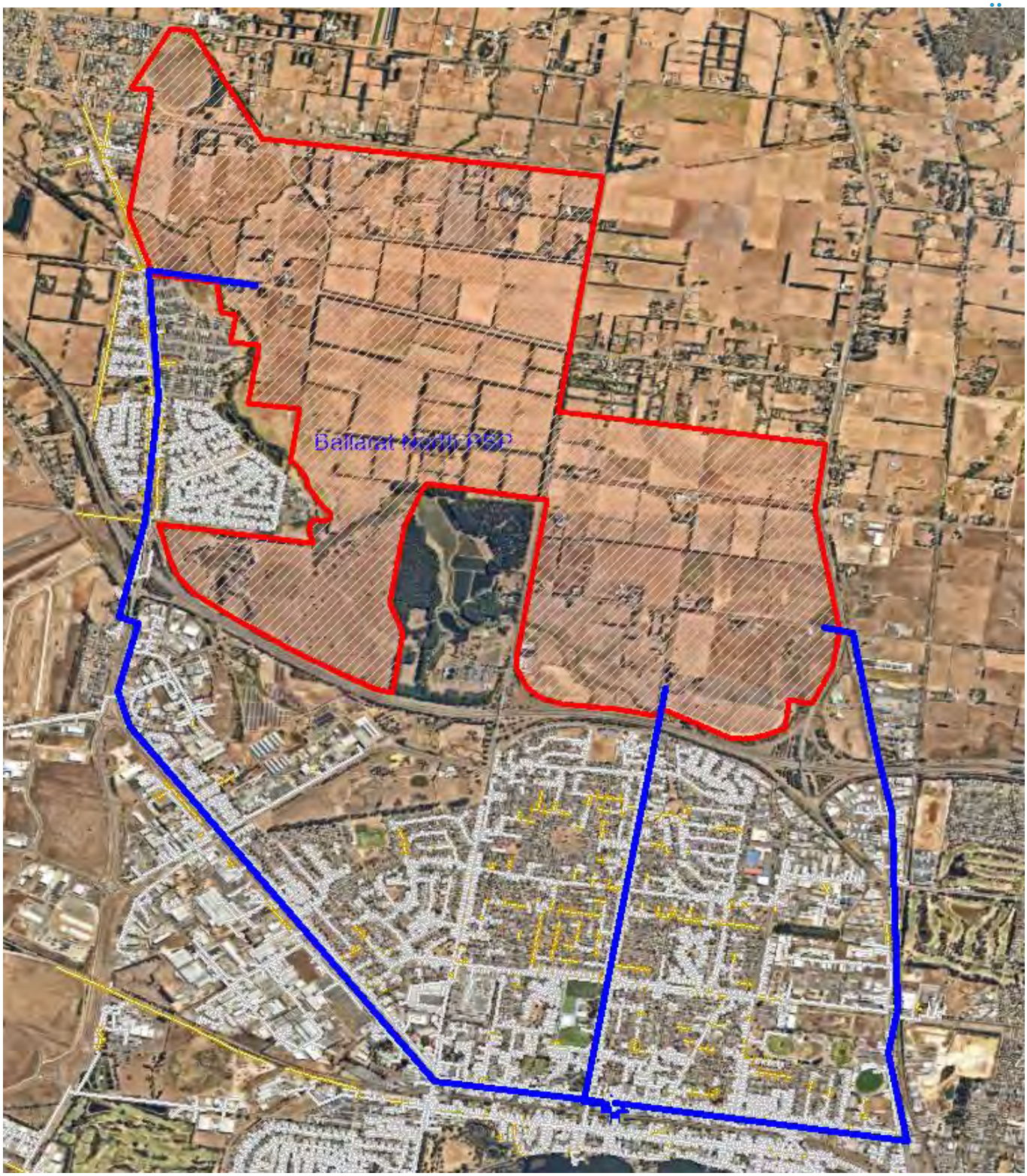

Figure 2. Planned Fixed Line connection routes

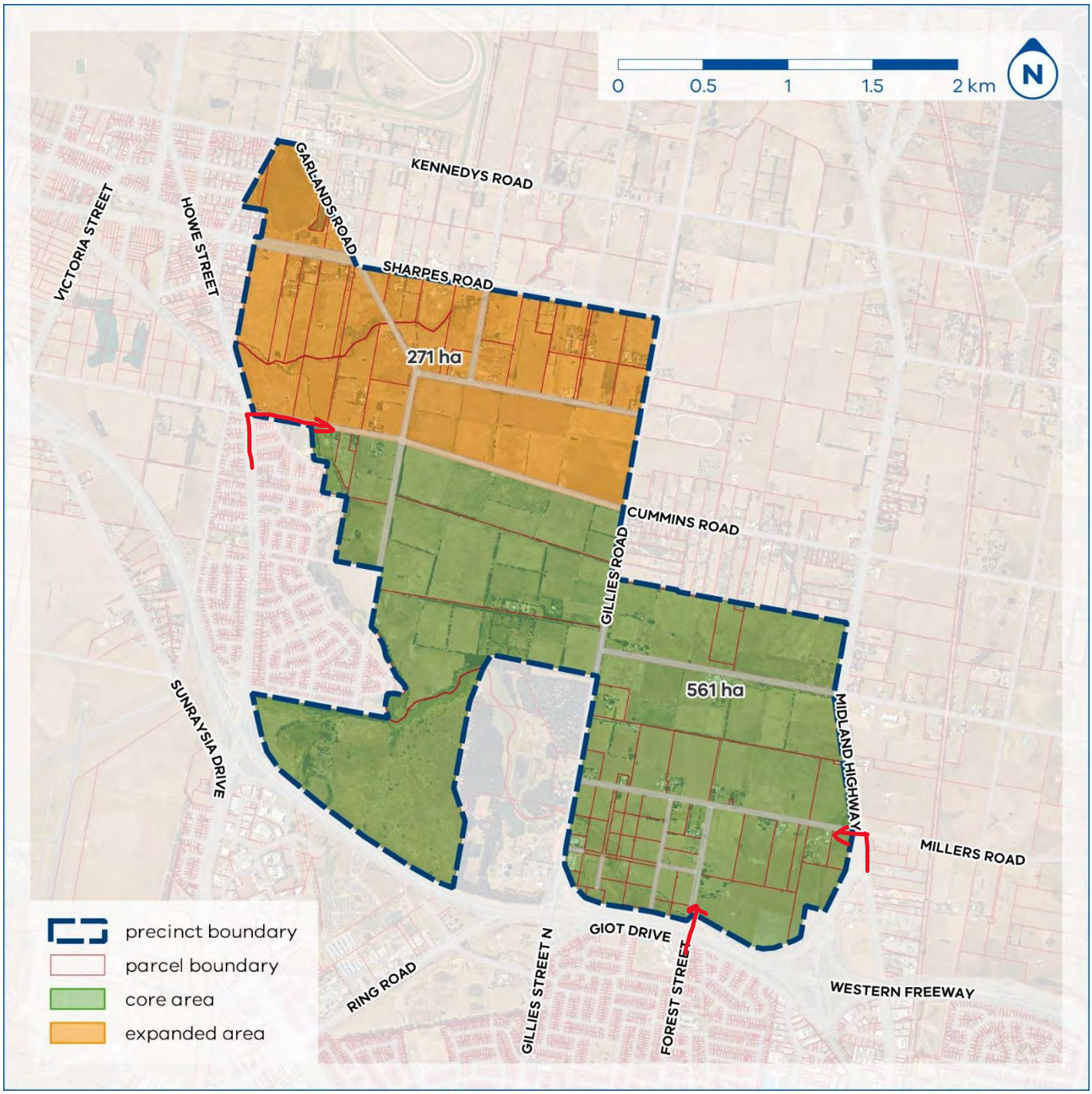

Figure 3. Ballarat North PSP – Core and expanded precinct areas with proposed entry marking.

Appendix F High Level Cost Estimate

Ballarat North PSP & DCP - Utility Service Cost Estimate

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Sewer	*$2,987,882.60*	*$3,954,488.16*	*$4,214,343.59*	*$5,201,255.46*	*$8,771,784.59*
Water	*$1,763,259.20*	*$1,192,282.40*	*$1,296,428.00*	*$557,462.80*	*$1,856,055.20*
Recycled Water	*$1,745,626.61*	*$1,180,359.58*	*$1,283,463.72*	*$551,888.17*	*$1,837,494.65*
Telecommunications	*$1,309,077.14*	*$1,337,721.16*	*$1,770,513.74*	*$1,128,455.02*	*$4,341,829.50*
Electrical	*Not Assessed*	*Not Assessed*	*Not Assessed*	*Not Assessed*	*Not Assessed*
Drainage	*$23,763,572.99*	*$8,832,331.35*	*$4,011,810.89*	*$10,737,521.34*	*$8,887,139.06*

Accuracy: This cost estimate is based on the information available at the time of preparation (VPA Ballarat North PSP & DCP Utility Service Assessments) and is subject to change as additional details are provided or project conditions evolve.

Exclusions: The estimate does not include costs for unforeseen circumstances, force majeure events, or scope changes not explicitly outlined.

Liability: This estimate is for preliminary planning purposes only and should not be considered a guarantee. No liability is accepted for decisions made based on this estimate.

Market Rates: Cost estimates are based on current market rates. Future price fluctuations are not accounted for.

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BALLARAT VIC 3350

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