Attachment 1: Barwon Water Mains Water Supply & Sewerage Services

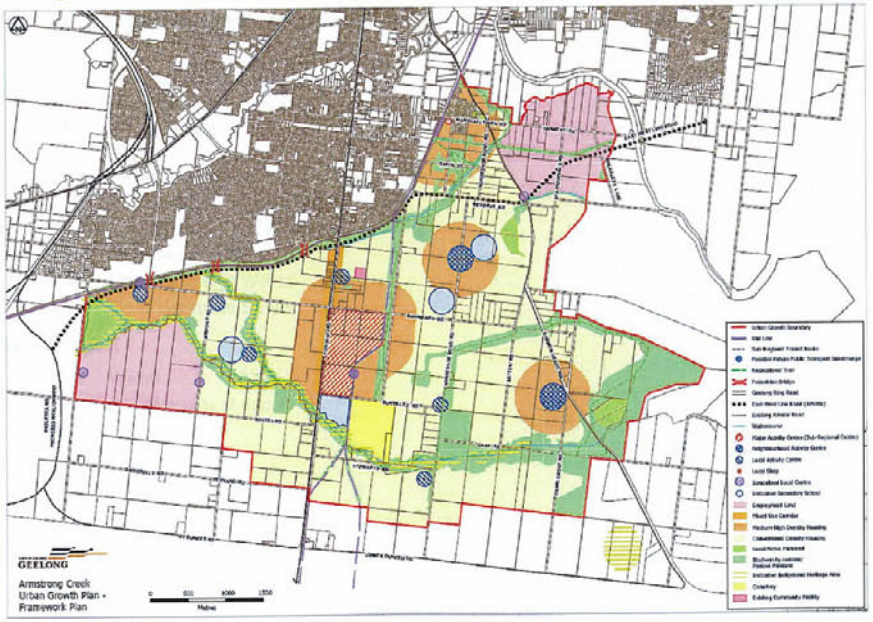
1. Executive Summary

Introduction

Armstrong Creek Urban Growth Area (the Growth Area) is a mixed use development, situated approximately 10 kilometres south of the Geelong CBD. It covers 2350 Ha of land and will accommodate 22,000 residential dwellings. It will also include employment zones, activity centres, mixed use corridors, active parkland and passive open space which together with the residential areas are estimated to require approximately 7 GL of water per annum. The exhibited Armstrong Creek Urban Growth Plan (UGP) is shown in Figure 1 below.

Barwon Water requires concept designs of water and sewer systems to accommodate development in the Growth Area. This report contains a review of existing documentation, development scenarios (sequencing, yields and rates), water demands and sewage load estimates, servicing plans, an implementation plan, concept designs and a cost estimate.

Figure 1 Armstrong Creek Framework Plan (COGG May 2008)



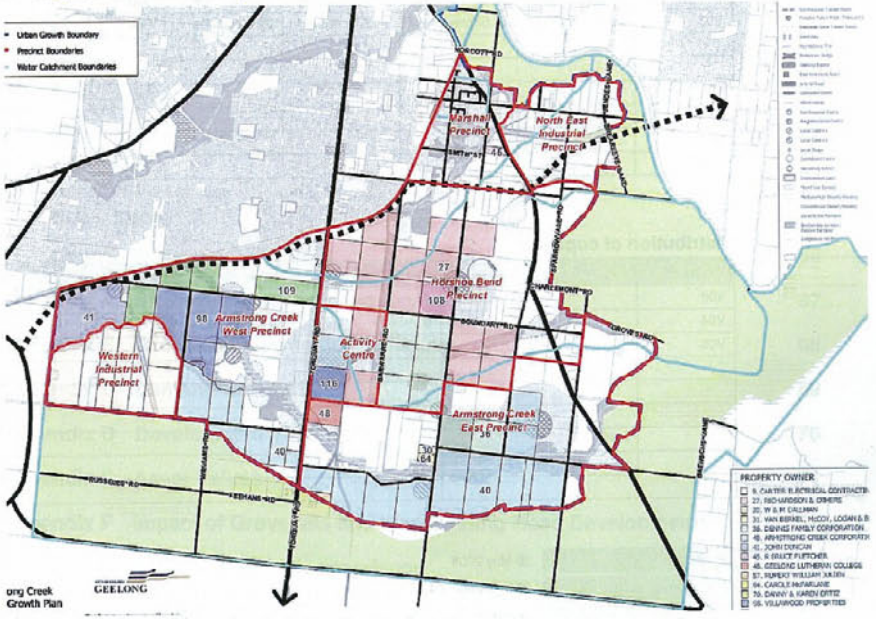
Note: The analysis for the concept designs shown in this report are based on City of Greater Geelong's November 2007 Urban Growth Plan.

SINCLAIR KNIGHT MERZ

Development Characteristics

The Growth Area consists of seven precincts which have been delineated by the City of Greater Geelong in its Precinct Plan and as shown in the figure below.

Figure 2 Draft Armstrong Creek Precinct Plan (COGG 2007)



The Marshall Precinct and the North East Industrial Precinct are situated in the north east corner of the development area and contains a number of relatively fragmented land holdings.

The Horseshoe Bend Precinct is immediately below the Marshall Precinct and the North East Industrial Precinct. It is a relatively large precinct which will contain predominantly residential areas and activity centres. It stretches from Torquay Road (also known as the Surf Coast Highway) at its western boundary to past Barwon Heads Road on its eastern Boundary. Land holdings in this Precinct have been consolidating through recent acquisitions by property developers.

Armstrong Creek East Precinct is in the south eastern corner of the Growth Area. It is a large precinct which essentially matches the Armstrong Creek catchment east of Torquay Road. Land holdings in this precinct have been consolidating through recent acquisitions by property developers.

The Activity Centre Precinct is a small precinct in the centre of the Growth Area and includes a major Activity Centre. This is anticipated to be the primary shopping and entertainment area within the Growth Area. The Precinct is immediately east and adjacent to Torquay Road.

Armstrong Creek West Precinct is in the north western corner of the development and will include primarily residential land. It is one of two precincts on the western side of Torquay Road and includes all the land immediately adjacent to the western side of Torquay Road.

The Western Industrial Precinct is in the south western corner of the development and will include primarily industrial land. It generally includes the land south of the Armstrong Creek.

Development Staging

Whilst the staging of development will be determined by the City of Greater Geelong, the timing and order of release of the precincts was qualitatively assessed against criteria established by Barwon which considered the needs of Barwon Water, Developers and the City of Greater Geelong. Both the City of Greater Geelong and Barwon Water participated in the assessment process. Based on the assessment it was determined from a water and sewerage servicing perspective that precincts should be released in the following order;

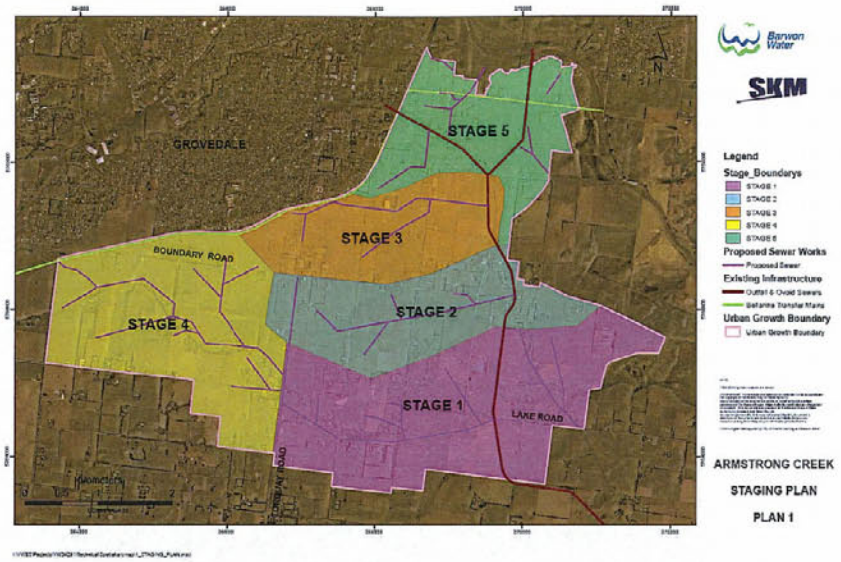
- Armstrong Creek East Precinct
- Horseshoe Bend Precinct
- Activity Centre
- Armstrong Creek West Precinct
- Marshall Precinct
- Western Industrial Precinct
- North East Industrial Precinct

The City of Greater Geelong advised that the Growth Area will be fully developed within a period of 10 years and therefore some of the smaller precincts were combined or incorporated into larger precincts to create a more realistic stage plan as shown in the list below and in Figure 3.

- Stage 1 – Armstrong Creek East Precinct
- Stage 2 – Horseshoe Bend Precinct (South) and Activity Centre Precinct
- Stage 3 – Horseshoe Bend Precinct (North)
- Stage 4 - Armstrong Creek West Precinct and Western Industrial Precinct
- Stage 5 – Marshall Precinct and North East Industrial Precinct

Notwithstanding the above preferred staging sequence, the concept designs have been developed with sufficient flexibility to accommodate other staging scenarios.

- Figure 3 Stage Plan



Design Criteria

The water concept design was developed to ensure that customers receive water pressure within a range of 20 metres and 50 metres. The sewer concept design was developed to ensure that sewers are capable of accommodating a 1 in 5 year storm event. The concept designs considered a range of inputs including;

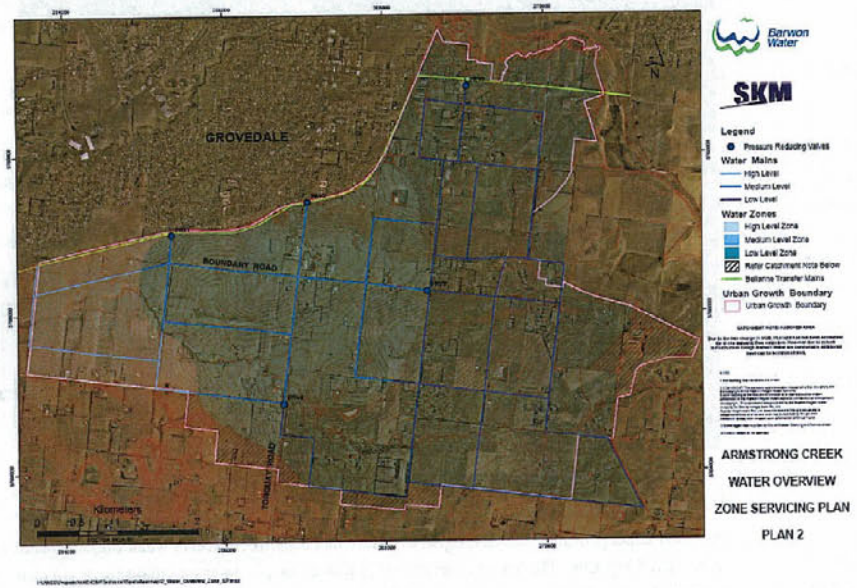
- the location of the Bellarine Transfer Main and Barwon Water's previous strategic water planning,
- the location of the Ovoid and Outfall Sewer and Barwon Water's previous strategic sewer planning,
- known biodiversity sites (based on data from City of Greater Geelong's UGP),
- known European heritage sites (based on data supplied by the City of Greater Geelong), and
- known cultural heritage sites (based on a database supplied by the City of Greater Geelong).

A more detailed description of the design criteria and design approach used is discussed later in this report.

Water Infrastructure Requirements

The water concept design is shown in the figure below.

Figure 4 Water Concept Plan



The water concept design consists of 3 zones which will be supplied from Pettavel Basin via the Bellarine Transfer Mains. A high level zone will be supplied directly from the Bellarine Transfer Main. A medium level zone will be supplied by 2 Pressure Reducing Valves (PRVs) which are likely to be located adjacent to the Bellarine Transfer Main near Airport Road (PRV1) and Torquay Road (PRV2). A low level zone will be supplied by 3 PRV's which will be located adjacent to the Bellarine Transfer Main (PRV3), at the intersection of Horseshoe Bend Road and Boundary Road (PRV4) and near the intersection of Torquay Road and Armstrong Creek (PRV5).

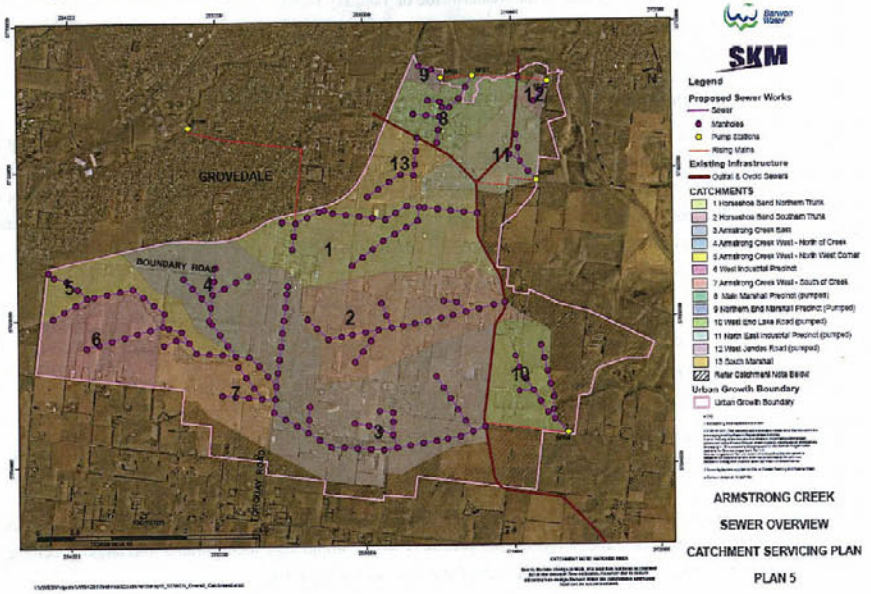
It is estimated that it will cost $48.3M to construct the water supply system including the cost of pipe assets and PRV's internal to the Growth Area and the cost of the next stage of the Bellarine Transfer Main, but excluding the cost of reticulation assets (to be funded by developers) and other works external to the Growth Area such as the Pettavel Basin.

SINCLAIR KNIGHT MERZ

Sewer Infrastructure Requirements

The sewer concept design is shown in the figure below.

Figure 5 Sewer Concept Plan



The sewer concept plan includes 13 sub-catchments all of which ultimately connect to the Outfall Sewer, which carries sewage to the Black Rock Water Reclamation Plant (WRP). Due to the alignment of the Outfall Sewer which cannot hydraulically control the lowest areas of the Growth Area it is required to install four sewage pumping stations (SPSs) and rising mains. Three of the SPSs are located in the northern section of the development, with the other SPS to be located in the south east corner. The majority of the development will be served by the Armstrong Creek Branch Sewer which follows the alignment of Armstrong Creek. This sewer will serve areas west of Torquay Road and most of the area south of Boundary Road. The remaining area will be served by three separate branch sewers.

It is estimated to cost $33.8M to construct the sewer system including the cost of pipe assets and SPSs internal to the Growth Area and the works required to connect development at Grovedale, but excluding the cost of

reticulation assets (to be funded by developers), Outfall Sewer upgrade costs and costs associated with connecting hypothetical development west of the Ring Road.

Implementation Plan

A program was developed for the implementation of the water and sewer concept designs based on completing the following activities;

- DTF Approval
- Land Access Negotiations
- Investigations (including Flora & Fauna, Heritage, Geotech & Town Planning)
- Design
- Construction Tender, Construction, Commissioning & Hand Over.

Based on the program developed release dates were determined for each of the 5 stages previously discussed. Table 1 below shows the completion dates of the five stages. Note that work on later stages will be undertaken prior to earlier stages being completed, e.g. consideration is being given to immediately undertaking the detailed design of Stage 2 works in addition to Stage 1 works.

- **Table 1: Staging Completion Dates**

Stage Number	Target Completion Date	Serviceable Land Opened (Ha)
1	2011/12	475
2	2013/14	485
3	2014/15	327
4	2015/16	679
5	2017/18	384

Cost Estimate

A conceptual cost estimate was produced for both the water and sewer concept design which included all assets greater than basic size (> DN150 for water and > DN225 for sewer). The cost estimate is shown over the page.

Attachment 2: CoGG - Stormwater Management

Armstrong Creek - Stormwater Management Policy

Some of the most profound opportunities for sustainable urban development occur in the early or strategic phases of the planning process. This section outlines water cycle management objectives and standards to be used to inform the planning process for the Armstrong Creek urban growth area.

The stormwater management policy for the Armstrong Creek growth area is multi-facited, providing performance based objectives for general stormwater management, responsible water use, flood protection and measures to protect the health and amenity of waterway ecosystems.

Precinct Structure Plans (PSPs), Subdivisions and Development will all be assessed according to the extent to which the objectives outlined in this policy are satisfied. This policy also provides guidance on standards to be employed to meet objectives.

Policy - General

The primary aim of the urban stormwater management system is to ensure stormwater generated from developed catchments causes minimal nuisance, danger and damage to people, property and the environment. This requires the adoption of a multiple objective approach, considering issues such as:

- ecosystem health, both aquatic and terrestrial;
- flooding and drainage control;
- public health and safety;
- economic considerations;
- recreational opportunities;
- social considerations;
- aesthetic values.

The above issues have been developed into a list of broad stormwater management ***Objectives***. All of the objectives and their respective standards presented below may not be relevant in all circumstances and individual objectives may need to be expanded to highlight site-specific issues. All sites will be assessed on a case-by-case basis.

No.	OBJECTIVES	STANDARD
	These objectives setout the broad requirements for sustainable stormwater and floodplain management that must to be achieved or satisfied as part of the preparation of a Precinct Structure Plan, subsequent subdivision and/or development.	***These standards are for the design or application of best practice stormwater and floodplain management. These provide guidance on how objectives can be met.***
1	**STORMWATER / FLOOD MANAGEMENT - LEGISLATION** Precinct Structure Plans, subsequent subdivision and/or development must address all requirements and legislative obligations as setout within appropriate Federal, State and Local Government policies and controls. These include: • Acts of parliament • State and Local planning controls • Local government policy • Federal or State Government policies and guidelines • Federal, State or Local Authority / agencies policy, strategy, policy and / or guidelines. Precinct Structure Plans, subsequent subdivision and/or development must address all requirements of applicable current best practice and relevant Engineering Standards and guidelines	**Precinct Scale** Any Precinct Stormwater Management Strategy and subsequent subdivision and/or development must consider, as appropriate: • State Planning Policy Framework • Local Planning Policy Framework • Municipal Strategic Statement, and • Local Planning Policies. • Greater Geelong Planning Scheme Specific consideration must be given, as appropriate, to the following references: • Clause 22.12, 56 and 65 of the City of Greater Geelong Planning Scheme • The provisions of all future underlying Planning Zones • Corangamite Catchment Management Authority ▪ Floodplain management Strategy ▪ Regional Catchment Strategy ▪ River Health Strategy ▪ Salinity Action Plan • Urban Stormwater: Best Practice Environmental Management Guidelines • WSUD Engineering Procedures – Stormwater • Australian Rainfall and Runoff • Royal Surf Life Saving Victoria: Guidelines for Water Safety in Urban Water Developments • VicRoads Road Design Guidelines • Infrastructure Design Manual, 2008 - City of Greater Geelong • Applicable Australian Standards Any Precinct Stormwater Management Strategy , subsequent subdivision and/or development shall also consider, as appropriate, the objectives and principles setout in section 1.09 of the Queensland Urban Drainage Manual, 2007.

2	**STORMWATER MANAGEMENT – GENERAL**	
	a) Protect and/or enhance downstream environments, including recognised social, environmental and economic values, by appropriately managing the quality and quantity of stormwater runoff.	**Precinct Scale** • Minimise changes to the quality and quantity of the natural flow regime of urban waterways. • Identify and control the primary sources of stormwater pollution. • Develop stormwater systems based on a preferred management hierarchy. • Develop robust stormwater treatment systems that do not rely on a single treatment system or focus on a single target pollutant.
	b) Limit flooding of public and private property to acceptable or designated levels.	• Preserve the alignment and capacity of major drainage corridors such as waterways and major overland flow paths.
	c) Provide a drainage system with sufficient capacity to service development.	• Provide 1 in 10 year ARI capacity to all underground drainage systems. • Provide underground drainage systems to service all developed areas
	d) Ensure stormwater and its associated drainage systems are planned, designed and managed with appropriate consideration and protection of community health and safety standards, including potential impacts on pedestrian and vehicular traffic.	• Establish and maintain a safe, affordable and socially equitable and acceptable level of urban drainage and flood control. • Design stormwater systems to acccord current best practice which minimises risks to the public arising from use or maintenance of the facilities
	e) Adopt and promote “water sensitive” design principles, including appropriately managing stormwater as an integral part of the total water cycle, protecting natural features and ecological processes within urban waterways, and optimising opportunities to use rainwater/stormwater as a resource.	• Minimise the quantity of directly connected impervious surface area. • Identify and optimise opportunities for stormwater to be valued and used as a resource • Maintain and protect natural drainage systems and their ecological health.
	f) Appropriately integrate stormwater systems into the natural and built environments while optimising the potential uses of drainage corridors.	• Ensure adopted stormwater management systems are appropriate for the site constraints, land use and catchment conditions. • Appropriately integrate both wildlife and community land use activities within urban waterway and drainage corridors.
	g) Ensure stormwater is managed at a social, environmental and economic cost that is acceptable to the community as a whole and that the levels of service and the contributions to costs are equitable.	• Assess the economics of stormwater management systems on the basis of their full lifecycle costs (i.e. capital and operational costs). • Ensure adopted stormwater management systems are economically sustainable. • Ensure appropriate protection of stormwater treatment measures during the construction phase.
	h) Enhance community awareness of, and participation in, the appropriate management of stormwater.	• Engage the community in the development of parameters for the development and evaluation of stormwater management solutions.

3	**RESPONSIBLE WATER USE** a) Aim to meet objectives for stormwater management whilst reducing demand for mains water b) Minimise adverse impacts on the natural water cycle. c) Encourage water conservation, rainwater and stormwater harvesting, and wastewater reuse. d) Reduce the annual average volumes of stormwater runoff from developed catchments by a minimum of 30%.	**Precinct scale** • A Precinct Water Demand Strategy that indicates the likley water demand "hot spots" within the precinct (eg: open space, schools, industry, etc) and implements strategies to sustainain demand. • Incorporate landscape design which minimises use of water, fertilisers and pesticides. • Incorporate landscape design which promotes the capture, retention and infiltration of stormwater runoff using WSUD treatment train approaches. • Include, where possible, facilities for stormwater harvesting and irrigation of active open space areas to reduce demand for mains water. • Include, where possible, reuse of treated wastewater for irrigation of active open space areas to reduce demand for mains water. **Allotment scale** • Utilise water efficient appliances, including efficient toilets, washing machines and plumbing in both residential dwellings and commercial buildings. • use water efficient gardens including native plants, mulching and infiltration. • Collect roof runoff in rainwater tanks for indoor and outdoor purposes, such as laundry, toilet and garden water uses.
4	**FLOOD MANAGEMENT** a) Allotments must be protected from inundation by a 1% AEP flood event b) Mitigate stormwater runoff from all storm events up to and including 1% AEP flood.event c) Precinct Structure Plans must define the ultimate extent of flooding resulting from the fully developed catchments. d) Peak stormwater discharges from developed catchments must not be greater than peak discharges from the same catchments subject to existing conditions. e) Satisfy acceptable risk management standards for public safety and flood protection. f) Where applicable, include the extent of the 1% AEP flood events from the Barwon River. g) Account for any change in the extent of flooding created by the potential for climate change. h) Mitigate the impact of development runoff on waterway ecosystem health, amenity and biodiversity.	**Precinct scale** • Provide a Precinct Stormwater Management Strategy that integrates a range of flood management measures at a variety of scales; from allotment to precinct. • Implement solutions which represent current best practice. • Provide detention basins which are designed to minimise aesthetic and ecological impacts on stream corridors and receiving environments. • Drainage structures shall not be placed within waterways. • Set backs from stream corridors must satisfy biodiversity and flood hazard criteria. • Provide restoration works and / or management of any degraded ephemeral streams which targets improvement of ecosystem health, biodiversity and hydraulic capacity. **Allotment scale** It is acknowledged that rainwater tanks provide a contribution to urban stormwater detention, however Council does not support the use of rainwater tanks as part of the stormwater management strategy for mitigation of the 1% AEP flood event.

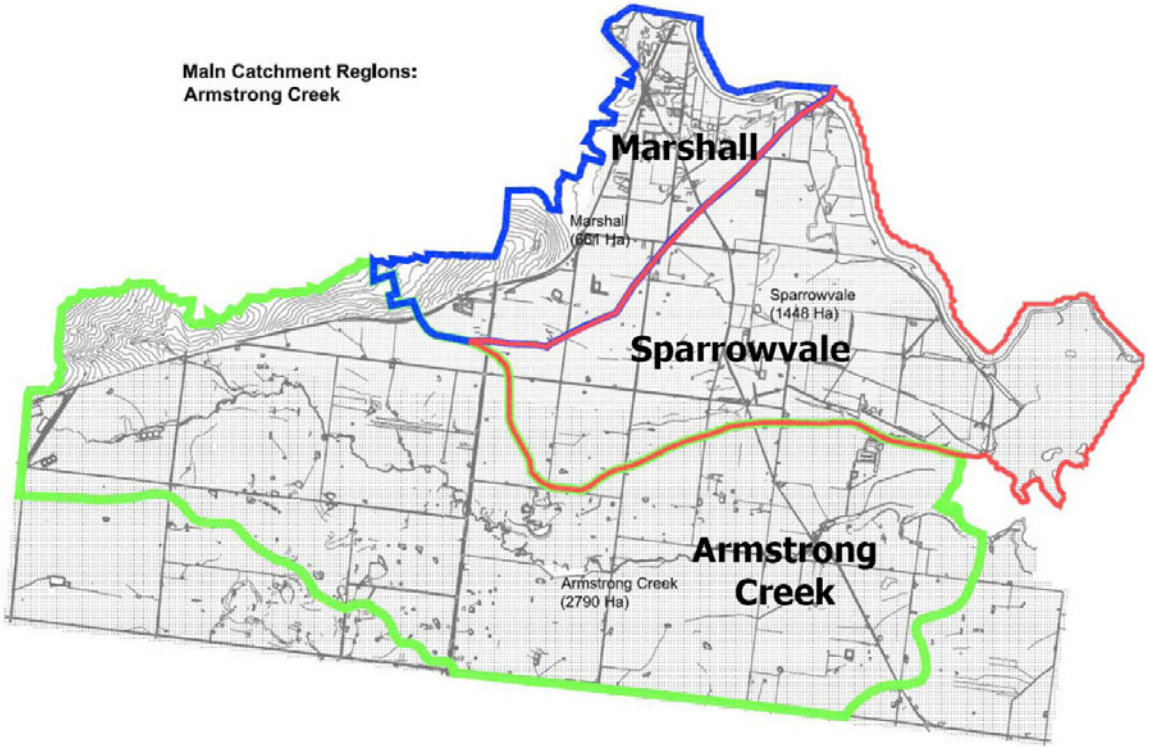
5	**PROTECTING THE HEALTH AND AMENITY OF WATERWAY ECOSYSTEMS** • Mitigate the impacts of development on waterways and downstream environments. • Precinct Structure Plans must include stormwater management strategies to mitigate potential impacts on waterways • Meet "Best Practice" guidelines for stormwater quality to remove all litter, reduce loads of suspended solids by 80%, total nitrogen by 45%, total phosphorus by 45% and litter by 70%. • Compliance with "Best Practice" guidelines to reduce erosion and sedimentation by limiting peak stormwater discharges from 1 year and 2 year ARI storm events to predevelopment levels. • Reduce the annual average volumes of stormwater runoff from developed catchments by a minimum of 30%. • Impervious surfaces and pipe drainage systems should not be directly connected to waterways. • Minimise the extent of impervious areas within the catchment**.**	**Precinct scale** • A Precinct Stormwater Management Strategy that integrates a range of water treatment and quality management measures at a variety of scales; from allotment to precinct. • Constructed wetlands are designed to avoid aesthetic and ecological impacts on stream corridors and receiving environments. **Water Sensitive Urban Design (WSUD)** • A Water Sensitive Urban Design (WSUD) strategy (included within a Precinct Stormwater Management Strategy) must be developed that ensures compliance with relative policy objectives and various best practice guidelines. • Design Details of the specific WSUD treatment types proposed must include a performance assessment, outline maintenance requirements, a safety assessment and estimation of life cycle costs.

Key References:

- Institution of Engineers, Australia, 1997, ***Australian Rainfall and Runoff***.
- City of Greater Geelong, 2008, ***Armstrong Creek Urban Growth Plan, Volume 1***.
- City of Greater Geelong , 2008, ***Infrastructure Design Manual***.
- Victorian Stormwater Committee, 1999, ***Urban Stormwater: Best Practice Environmental Management Guidelines***.
- Melbourne Water, 2005, ***WSUD Engineering Procedures: Stormwater***
- Melbourne Water, 2003, ***Guidelines for Development in Flood Prone Areas***.
- Melbourne Water, Land Development Manual.
- Department of Natural Resources & Water, Institute of Public Works Engineering Australia, Queensland Division Ltd. and Brisbane City Council., 2007, ***Queensland Urban Drainage Manual***
- Roads Corporation, 1994, ***VicRoads Road Design Guidelines, Part 7, Drainage***
- Royal Surf Life Saving Victoria, ***Guidelines for Water Safety in Urban Water Developments***

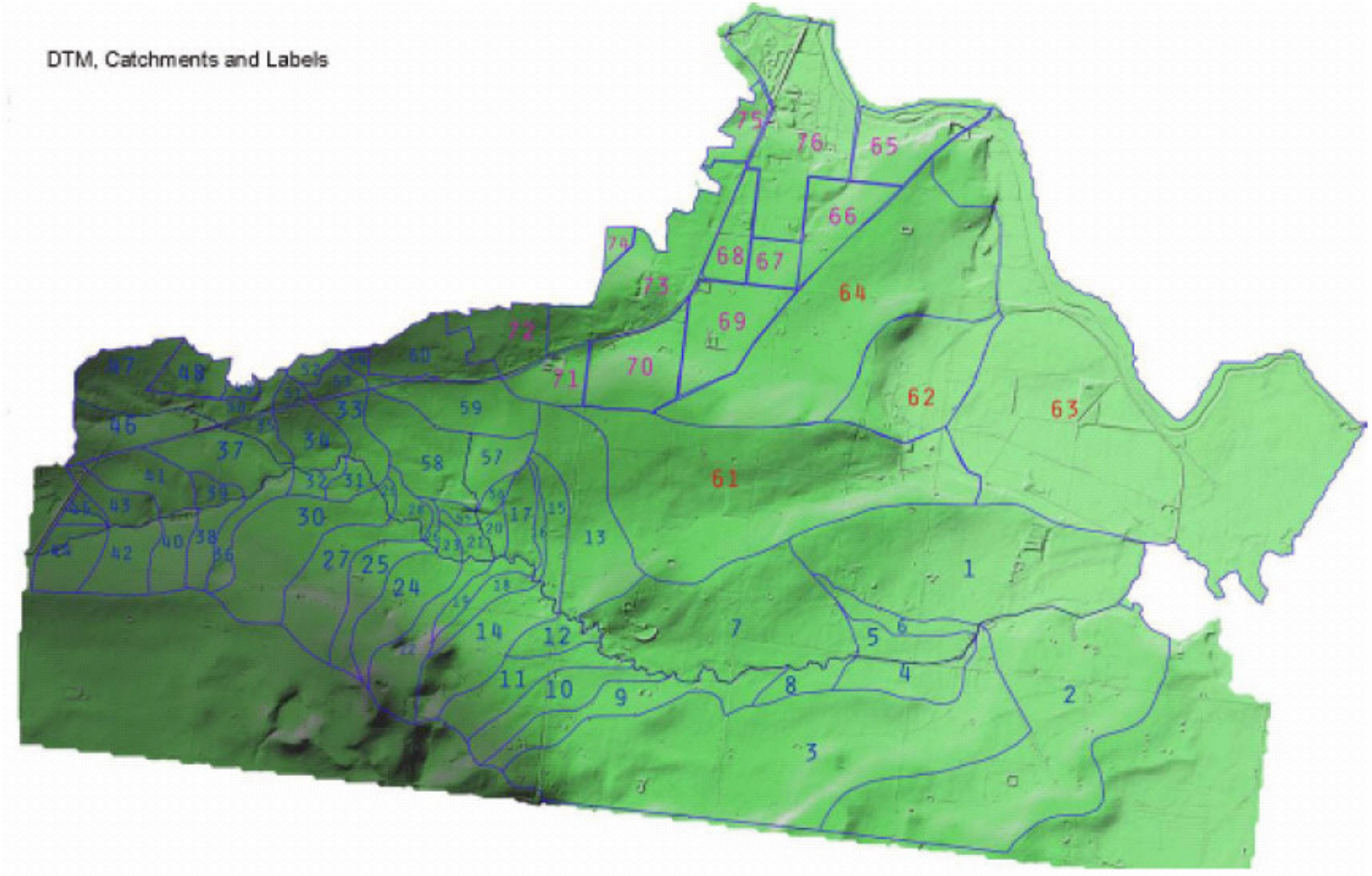
Drainage Catchment Plan:

Armstrong Creek Urban Growth Area Major Catchments



ARMSTRONG CREEK -

Digital Terrain Model And Minor Drainage Catchment



Attachment 3: Council of Greater Geelong & VicRoads – Road Network & Cycle Access ways

VicRoads – ARTERIAL ROADS

The Minister for Planning's Assessment of the Environment Effects Statement for Section 3 of the Geelong Ring Road determined that strategic recognition should be provided in the Greater Geelong Planning Scheme for future links from the Geelong Ring Road to the Princes Highway West and to the Surf Coast Highway (considering and compatible with a future link to the Bellarine Peninsula).

VicRoads has been implementing the Minister's decision by undertaking a planning study, in consultation with stakeholders, to define alignment and land requirements for:

- Princes Highway West Link (Section 4B), from the Geelong Ring Road to the Princes Highway West, and
- Surf Coast Highway Connection (Section 4C), from the Realigned Anglesea Road to the Surf Coast Highway, compatible with the Armstrong Creek Urban Growth Plan's planning objectives.

The above road links are shown in Attachment 1.

In conjunction with Council, VicRoads is examining a possible East-West Connection, extending from the Surf Coast Highway to the Barwon River compatible with the Armstrong Creek Urban Growth Plan's planning objectives and a future link to the Bellarine Peninsula. This can also be seen in Attachment 1.

This paper covers (in two sections) the details of the latter two future arterial roads, which are located within the confines of the Armstrong Creek Urban Growth Area.

A) SURF COAST HIGHWAY CONNECTION

Traffic modelling has indicated that traffic volumes on the Surf Coast Highway Connection are expected to be in the range 12,000 - 20,000 vehicles per day in year 2021 with the Armstrong Creek Urban Growth Area fully developed, indicating that the Connection will, for the foreseeable future, be predominantly utilised to support local and regional trips and movements within and to/from the Armstrong Creek Urban Growth Area as it is developed.

The Surf Coast Highway Connection (Section 4C) has been planned, in consultation with the City of Greater Geelong, as a medium speed (80 km/hr) arterial road with limited at-grade signalised intersections, controlled access and initially as a four lane divided roadway. Provision has been made for future widening to six lanes if necessary (including dedicated public transport lanes), with a possible long-term interchange at Surf Coast Highway that makes provision for a grade separation of the Geelong-Warrnambool railway line.

The route defined for the Surf Coast Highway Connection provides for a possible new passenger railway station at Waurn Ponds, a pedestrian extension of Rossack Drive into the railway station and connections from the Armstrong Creek Urban Growth Area internal road network. The route is located close to the railway line to provide one general transport corridor and to maximise land use availability for the growth area, as well as minimising aboriginal and post-settlement cultural heritage impacts as determined from specialist investigations.

The alignment of the Surf Coast Highway Connection is within the planning scheme Development Plan Overlay gazetted as part of Amendment C113 to the Greater Geelong Planning Scheme to protect a wide corridor in which the future road link could be developed.

Within the Armstrong Creek Urban Growth Area a fully directional interchange has been allowed for at the Surf Coast Highway, as part of a possible future ultimate development. The alignment for this interchange was determined in consultation with the City of Greater Geelong and provides for a single elevated grade separation of Surf Coast Highway over the Geelong-Warrnambool railway line and a possible future East West Connection to the Bellarine Peninsula.

An alternative interchange arrangement, with the Surf Coast Highway Connection located approximately 150 metres further south and having two elevated grade separations was considered, but not supported, as it did not maximise land use proposals associated with the Armstrong Creek Urban Growth Plan.

The type cross section adopted for the Surf Coast Highway Connection, as well as the cross section for the ultimate development of Surf Coast Highway within the limits of the Armstrong Creek Urban Growth Area, are shown in Attachment 2.

A reservation, setting out the land required for the Surf Coast Highway Connection, has been defined based on ultimate 6 lane development, with provision for bicycle lanes, landscaping, noise amelioration and water sensitive road design (drainage) measures as necessary. The reservation plans have been provided to Council.
The Surf Coast Highway Connection reservation is approximately 4.2 km long and varies in width between 75 and 90 metres. The ultimate development cross section for the 3.8 km length of Surf Coast Highway, within the limits of the Armstrong Creek Urban Growth Area, is 60 metres wide.

It is intended to include a Public Acquisition Overlay in the Greater Geelong Planning Scheme to reserve the land required for the Surf Coast Highway Connection.

The estimated construction cost for the development of the Surf Coast Highway Connection (initial four lanes divided roadway development with at-grade intersections) is $72 million (2008 dollars).

Whilst State Government funding has been provided for the current planning study to define the alignment and land requirements for the Surf Coast Highway Connection, there has been no commitment to funding the construction of the Surf Coast Highway Connection, nor is there a timeframe for commencement.

B) POSSIBLE EAST WEST CONNECTION FROM THE SURF COAST HIGHWAY TO THE BELLARINE PENINSULA.

VicRoads has carried out a preliminary investigation to assist in defining the alignment and land requirements for a possible future East-West Connection, from the Surf Coast Highway to the Barwon River, within the confines of the Armstrong Creek Urban Growth Plan and consistent with its land use planning objectives.

Traffic modelling has indicated that traffic volumes on a possible East West Connection, between the Surf Coast Highway and the Barwon River, would be in the order of 20,000 - 24,000 vehicles per day in year 2021 with the Armstrong Creek Urban Growth Area fully developed. The possible East West Connection would predominantly be utilised to support local and regional trips and movements within and to/from the Armstrong Creek Urban Growth Area as it is developed.

VicRoads considers construction of an East-West Connection, from the Surf Coast Highway to the Bellarine Peninsula, to be a long term proposal and aligned more with the need to service future land use change and to support local and regional trips.

The corridor for the possible future connection has been aligned adjacent to the Geelong-Warrnambool railway line, utilising the Reserve Road alignment and crossing the Barwon River at the only feasible location, being a relatively narrow section immediately outside the Lake Connewarre State Game Reserve, at the bottom end of Wilson's Road.

The possible East West Connection has been planned, in consultation with the City of Greater Geelong, as a medium speed (80 km/hr) arterial road, with limited at-grade signalised intersections, controlled access and initially as a four lane divided roadway. Provision has been made for future widening to six lanes, with a possible future interchange at Barwon Heads Road.

The type cross section adopted for the possible East West Connection, as well as the cross section for the ultimate development of Barwon Heads Road within the limits of the Armstrong Creek Urban Growth Area, are shown in Attachment 2.

A reservation, setting out the land required for the possible East West Connection, has been defined as part of Councils land use planning strategy based on ultimate 6 lane development, with provision for bicycle lanes, landscaping, noise amelioration and water sensitive road design (drainage) measures as necessary, as well as a possible ultimate development interchange at Barwon Heads Road.

The possible East West Connection reservation is approximately 4.5 km long and generally of 75 metres in width. The ultimate development cross section for the 5.8 km length of Barwon Heads Road, within the limits of the Armstrong Creek Urban Growth Area, is 60 metres wide.

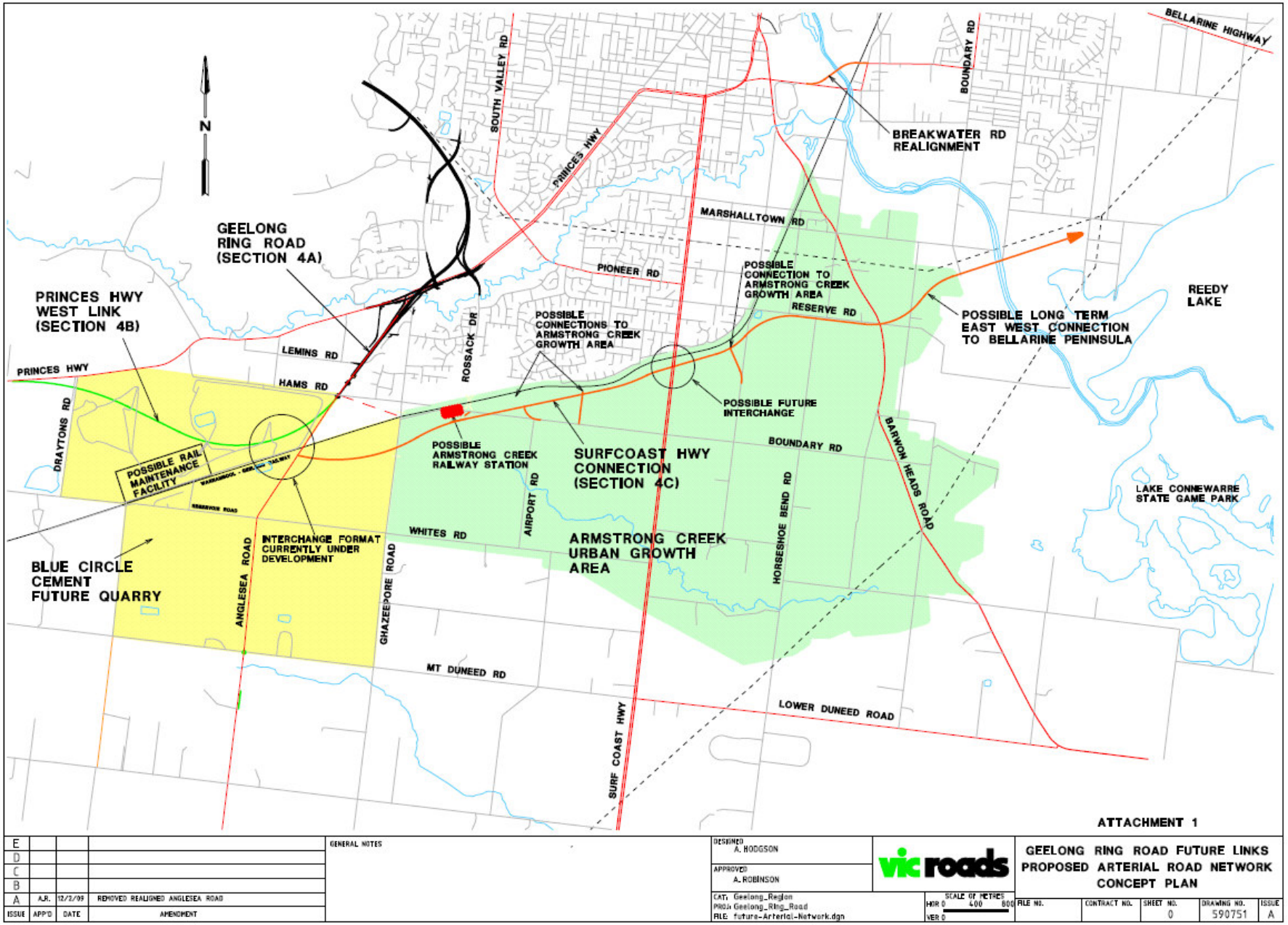
It is intended that land required for the East West Connection, east of Surf Coast Highway, be protected in the Greater Geelong Planning Scheme within the confines of the Armstrong Creek Urban Growth Area as part of precinct planning activities.
There has been no detailed planning for the East West Connection, east of the Barwon River. The City of Greater Geelong has included a potential transport corridor for the route in its Geelong Eastern Boundary Review. Detailed planning would require commitment to an additional planning study and budget.

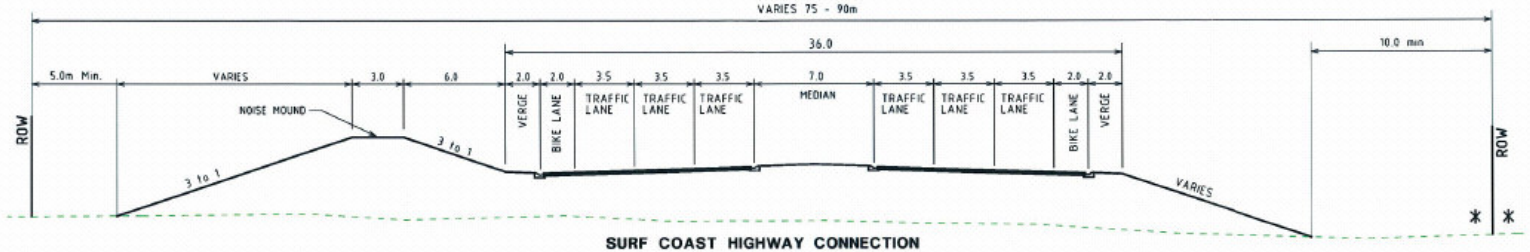
There has been no commitment regarding responsibility for the development of the possible East West Connection, east of the Surf Coast Highway, nor is there a timeframe for commencement of construction.

C) OTHER ROADS

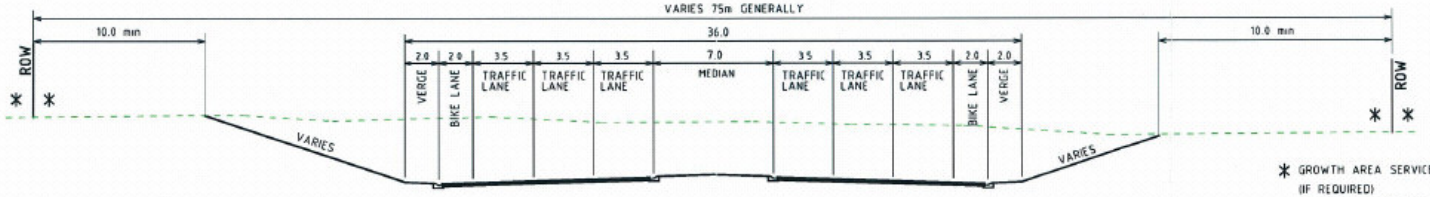
VicRoads will liaise with Council, local community groups and other stakeholders concerning proposals to truncate sections of local roads and to discuss the impacts on the surrounding local road network arising from the construction of the new arterial roads.

DUNCAN ELLIOTT
REGIONAL DIRECTOR,
SOUTH WESTERN VICTORIA
VICROADS
February 2009


N
GEELONG RING ROAD (SECTION 4A)
PRINCES HWY WEST LINK (SECTION 4B)
PRINCES HWY
LEMINS RD
HAMS RD
DRAYTONS RD
POSSIBLE RAIL MAINTENANCE FACILITY
BLUE CIRCLE CEMENT FUTURE QUARRY
INTERCHANGE FORMAT CURRENTLY UNDER DEVELOPMENT
ANGLESEA ROAD
GHAZEEPORE ROAD
WHITES RD
MT DUNEED RD
SURF COAST HWY
LOWER DUNEED ROAD
SOUTH VALLEY RD
PRINCES HWY
ROSSACK DR
PIONEER RD
MARSHALLTOWN RD
BOUNDARY RD
BREAKWATER RD REALIGNMENT
BELLARINE HIGHWAY
POSSIBLE CONNECTIONS TO ARMSTRONG CREEK GROWTH AREA
POSSIBLE CONNECTION TO ARMSTRONG CREEK GROWTH AREA
RESERVE RD
POSSIBLE LONG TERM EAST WEST CONNECTION TO BELLARINE PENINSULA
REEDY LAKE
POSSIBLE FUTURE INTERCHANGE
POSSIBLE ARMSTRONG CREEK RAILWAY STATION
SURFCOAST HWY CONNECTION (SECTION 4C)
BOUNDARY RD
AIRPORT RD
HORSESHOE BEND RD
BARWON HEADS ROAD
LAKE CONNEWARRE STATE GAME PARK
ARMSTRONG CREEK URBAN GROWTH AREA
ATTACHMENT 1
GENERAL NOTES
DESIGNED A. HODGSON
APPROVED A. ROBINSON
CAT: Geelong_Region
PROJ: Geelong_Ring_Road
FILE: future-Arterial-Network.dgn
SCALE OF METRES
HOR 0 400 800
VER 0
GEELONG RING ROAD FUTURE LINKS
PROPOSED ARTERIAL ROAD NETWORK
CONCEPT PLAN
FILE NO.
CONTRACT NO.
SHEET NO. 0
DRAWING NO. 590751
ISSUE A
E
D
C
B
A A.R. 12/2/09 REMOVED REALIGNED ANGLESEA ROAD
ISSUE APP'D DATE AMENDMENT

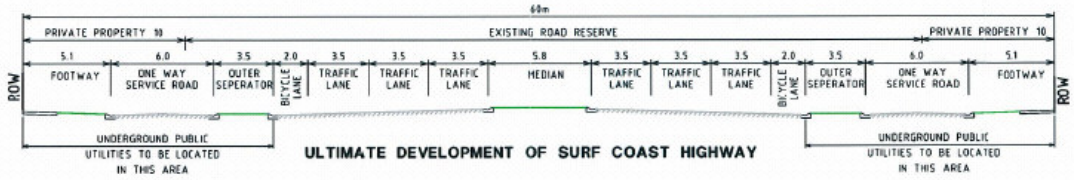


SURF COAST HIGHWAY CONNECTION

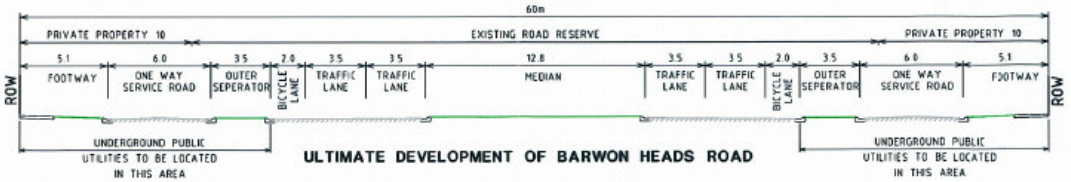


POSSIBLE EAST-WEST CONNECTION TO BELLARINE PENINSULA

* GROWTH AREA SERVICE ROADS (IF REQUIRED) COULD BE ACCOMODATED IN PART INSIDE OR OUTSIDE OF ARTERIAL ROAD RESERVE



ULTIMATE DEVELOPMENT OF SURF COAST HIGHWAY



ULTIMATE DEVELOPMENT OF BARWON HEADS ROAD

ATTACHMENT 2

ISSUE	APP'D	DATE	AMENDMENT
E			
D			
C			
B			
A			

GENERAL NOTES

DESIGNED A. HODGSON
APPROVED A. ROBINSON
CAT: Geelong_Region
PROJ: Geelong_Ring_Road
FILE: Arterial-Rd-Typ-X-Sect.dgn
SCALE OF METRES HOR 0 VER 0

vicroads

GEELONG RING ROAD FUTURE LINKS ARTERIAL ROAD TYPE CROSS SECTIONS (WITHIN GROWTH AREA)

FILE NO.	CONTRACT NO.	SHEET NO.	DRAWING NO.	ISSUE
			590752	

City of Greater Geelong – COLLECTORS ROADS

BACKGROUND:

In January 2008 a road network workshop was held with VicRoads, Developers and Council staff to develop a consistent position on the road network plan that will service the Armstrong Creek area. The workshop's main outcome was the utilisation of the existing one mile road grid (1.6km), however to avoid large four lane roads through the development and imporve pedestrian and public amenity this one mile grid would be broken down into a grid of half mile collector roads (2 lane, if possible).

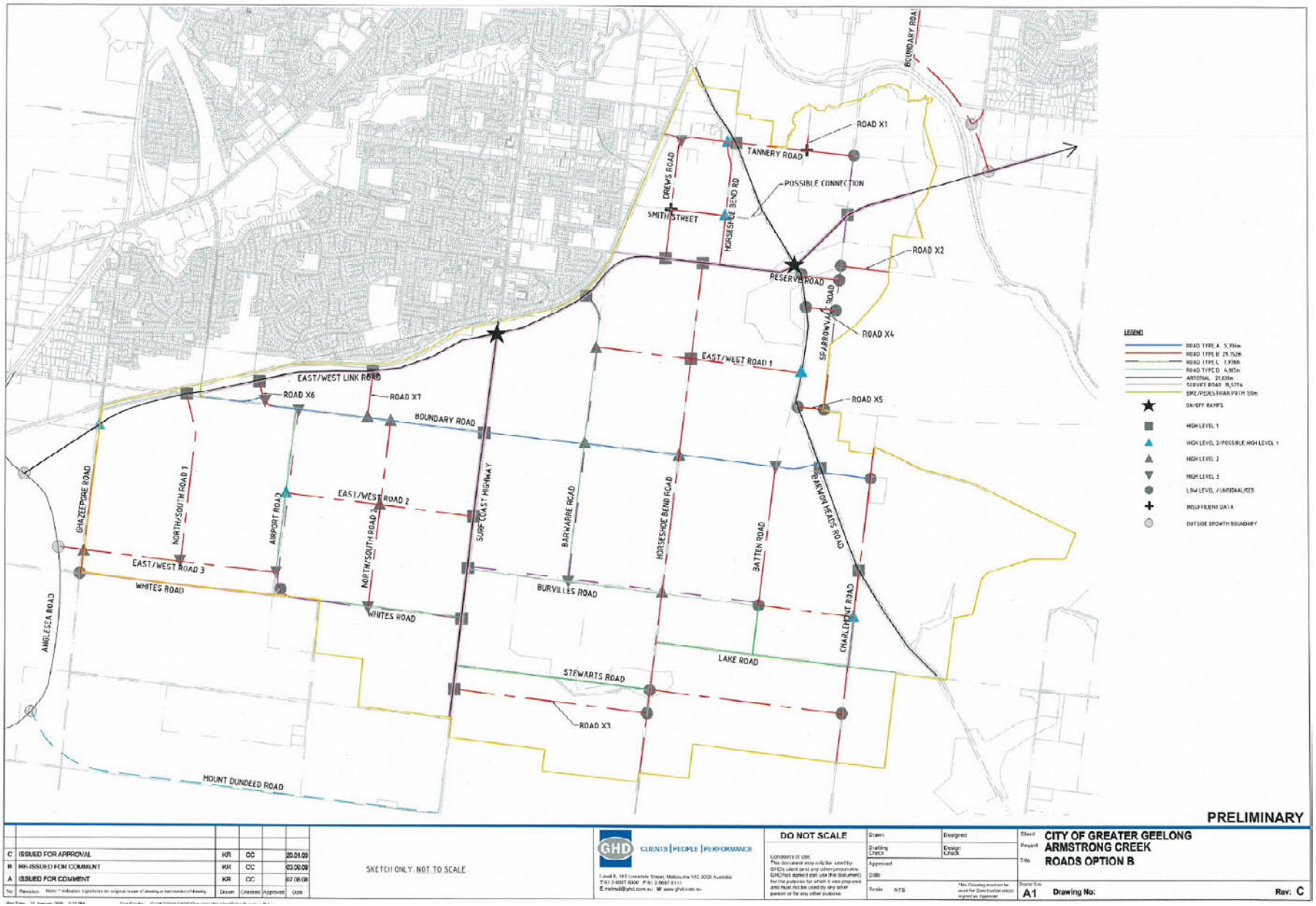
This strategy has since been refined through further development with VicRoads, relating to the proposed East West Link Rd, and within Council relating to the general functionality and connective of the network.

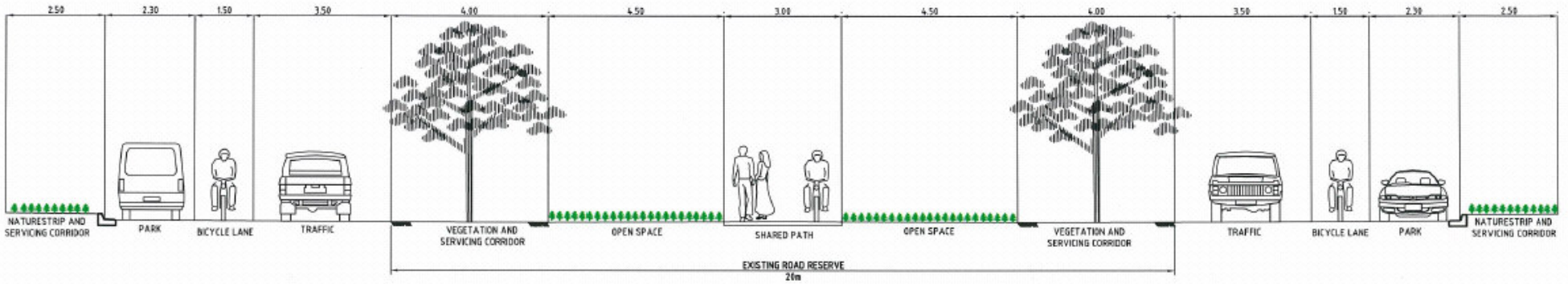
The final Road Network Plan is shown on the following pages, including preliminary road cross sections.

ROAD DESIGN - GHD

GHD was engaged by Council to prepare preliminary cross sections for various road types within the development, then evaluate the full cost to deliver the proposed road network.

The attached Road Network Plan reflects GHD's final plan adopted by the City of Greater Geelong, including the colour coding of the various road cross sections that integrate the abutting native vegetation (existing road reserve) into the future transport corridor.

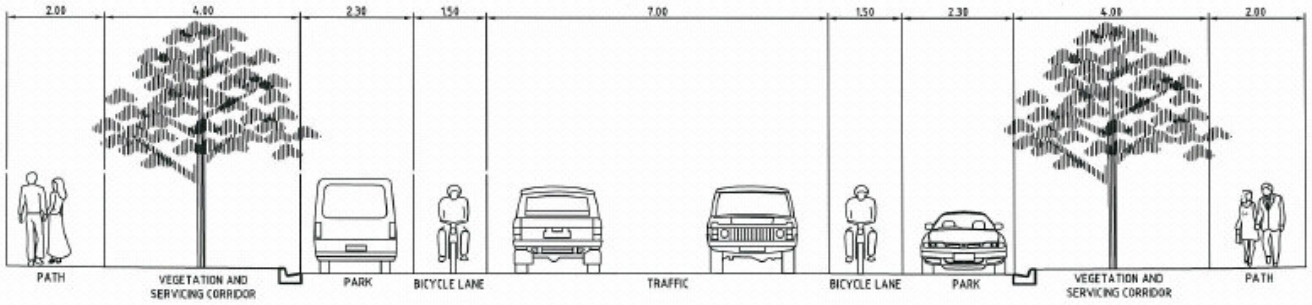

BOUNDARY ROAD
ROAD X1
TANNERY ROAD
POSSIBLE CONNECTION
DREWS ROAD
SMITH STREET
HORSESHOE BEND RD
ROAD X2
RESERVE ROAD
SPARROWHAWK ROAD
ROAD X4
EAST/WEST ROAD 1
ROAD X5
EAST/WEST LINK ROAD
ROAD X6
ROAD X7
BOUNDARY ROAD
GHAZEEPORE ROAD
NORTH/SOUTH ROAD 1
AIRPORT ROAD
EAST/WEST ROAD 2
NORTH/SOUTH ROAD 2
SURF COAST HIGHWAY
BARWARRE ROAD
HORSESHOE BEND ROAD
BATTEN ROAD
BARWON HEADS ROAD
EAST/WEST ROAD 3
WHITES ROAD
WHITES ROAD
BURVILLES ROAD
CHARLEMONT ROAD
ANGLESEA ROAD
LAKE ROAD
STEWARTS ROAD
ROAD X3
MOUNT DUNDEED ROAD
LEGEND
ROAD TYPE A 5,794m
ROAD TYPE B 29,752m
ROAD TYPE C 7,978m
ROAD TYPE D 4,965m
ARTERIAL 21,839m
SERVICE ROAD 18,107m
BIKE/PEDESTRIAN PATH 33m
ON/OFF RAMPS
HIGH LEVEL 1
HIGH LEVEL 2/POSSIBLE HIGH LEVEL 1
HIGH LEVEL 2
HIGH LEVEL 3
LOW LEVEL / UNSIGNALISED
INSUFFICIENT DATA
OUTSIDE GROWTH BOUNDARY
PRELIMINARY
C ISSUED FOR APPROVAL KR CC 20.01.09
B RE-ISSUED FOR COMMENT KR CC 03.09.08
A ISSUED FOR COMMENT KR CC 07.08.08
SKETCH ONLY. NOT TO SCALE
GHD CLIENTS | PEOPLE | PERFORMANCE
DO NOT SCALE
CITY OF GREATER GEELONG
ARMSTRONG CREEK
ROADS OPTION B
A1
Drawing No:
Rev: C



TYPICAL CROSS SECTION OF ROAD TYPE A

39.6m RESERVE

SCALE 1:100



TYPICAL CROSS SECTION OF ROAD TYPE B

26.6m RESERVE

SCALE 1:100

PRELIMINARY

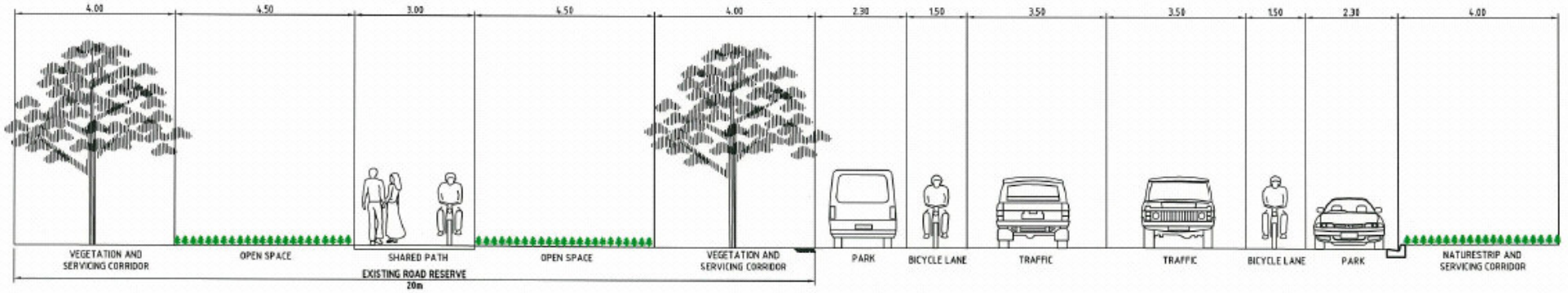
rev	description	app'd	date
B	ISSUED WITH COST PLAN		
A	INITIAL ISSUE		

CITY OF GREATER GEELONG
ARMSTRONG CREEK ROAD
TYPICAL CROSS SECTIONS
ROAD TYPES A & B

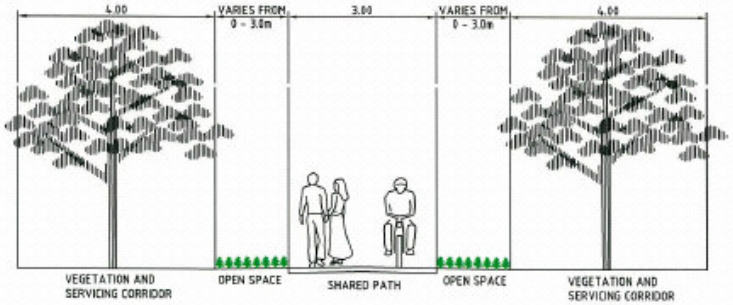
GHD CLIENTS | PEOPLE | PERFORMANCE

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

scale	1:100 for A3	job no.	31-22324
date	JULY 2008	rev no.	B



TYPICAL CROSS SECTION OF ROAD TYPE C
38.6m RESERVE
SCALE 1:100



TYPICAL CROSS SECTION OF ROAD TYPE D (GREENWAY)
17.0m RESERVE
SCALE 1:100

PRELIMINARY

rev	description	app'd	date
B	ISSUED WITH COST PLAN		
A	INITIAL ISSUE		

CITY OF GREATER GEELONG
ARMSTRONG CREEK ROAD
TYPICAL CROSS SECTIONS
ROAD TYPES C & D

GHD CLIENTS | PEOPLE | PERFORMANCE

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

scale	1:100 for A3	job no.	31-22324
date	JULY 2008	rev no.	B

TRAFFIC MODELLING – VEITCH LISTER

The below traffic modelling summary is an extract from the Veitch Lister report titled "Phase 1 Traffic Modelling report - Armstrong Creek Movement and Access Infrastructure Feasibility"

INTRODUCTION

Veitch Lister Consulting Pty Ltd (VLC) was engaged by the City of Greater Geelong to assist it in its finalisation of plans for the Armstrong Creek Urban Growth Area.

This assistance is provided in two phases:

- Phase 1 - Development and assessment of a base level of transport infrastructure provision; and
- Phase 2 - Sensitivity testing of public transport servicing levels and resultant road network changes

This report focuses on Phase 1.

LAND USE ASSUMPTIONS

The Council has advised that modeling is to occur on the basis that the Armstrong Creek Urban Growth Area is fully developed by 2019. The Council has also provided an overview of the demographic data which is presented in Figure 6-1.

Land Use	Land Area (ha)	5 years (2013)		10 years (2018)		Fully developed (2019)	
		Dwellings	Population	Dwellings	Population	Dwellings	Population
Activity centres (incl. primary schools & local sporting facilities)	90						
Secondary schools	30						
Employment land	270						
Mixed use corridor	30						
Shop top apartments				530	1300	660	1,620
Higher density housing	60			1410	3465	1,760	4,330
Medium density housing	205	500	1,250	3250	7990	4,060	9,990
Conventional density housing	1100	4,000	9,840	13905	34,210	15,450	38,010
Regional sports facilities	20						
Biodiversity corridor/passive parkland	390						
Detention basin/ wetlands	95						
Cemetery	20						
East-West link road reserve	40						
TOTAL	**2350**	**4,500**	**11,090**	**9,385**	**46,965**	**21,930**	**53,950**

Figure 6-1: Armstrong Creek Demographic Overview

The data presented in Figure 6-1 above has been supplemented by information contained within the ***Armstrong Creek Urban Growth Plan Volume 1, Public Exhibition Version, 16 October, 2006*** and, more particularly, the ***Armstrong Creek Urban Growth Plan Volume 2: Precinct Plans, Public Exhibition Version, 16 October 2006***.

VLC has modelled Armstrong Creek for the year 2021. With respect to surrounding areas the model retains assumptions made in 2004 on the extent of development and the population expected to be in place in 2021.

ROAD NETWORK ASSUMPTIONS

Modeling has been undertaken on the assumption that by 2021 the Geelong Ring Road Sections 1, 2, 3, 4A and 4B have been constructed. This is a logical assumption given that these road improvements are either currently under construction or funds are currently committed for their construction.

With respect to the Anglesea Road deviation, Geelong Ring Road Section 4C, and the possible extension of Section 4C to the Bellarine Highway or Geelong-Portarlington Road, there is no such commitment. However, there is strong support from Blue Circle Southern Cement and the Department of Primary Industries for the Anglesea Road deviation to occur in the short to medium term and previous traffic modeling has indicated that the need for the Geelong Ring Road Section 4C and its extension relate mainly to the development of Armstrong Creek. Accordingly, it has been assumed that these road network improvements will also be in place by 2021.

Figure 6-2 and 6-3 both show the road network assessed in this report. Figure 6-2 shows the assumed capacity of each road, whereas Figure 6-3 shows the assumed free flow speeds.

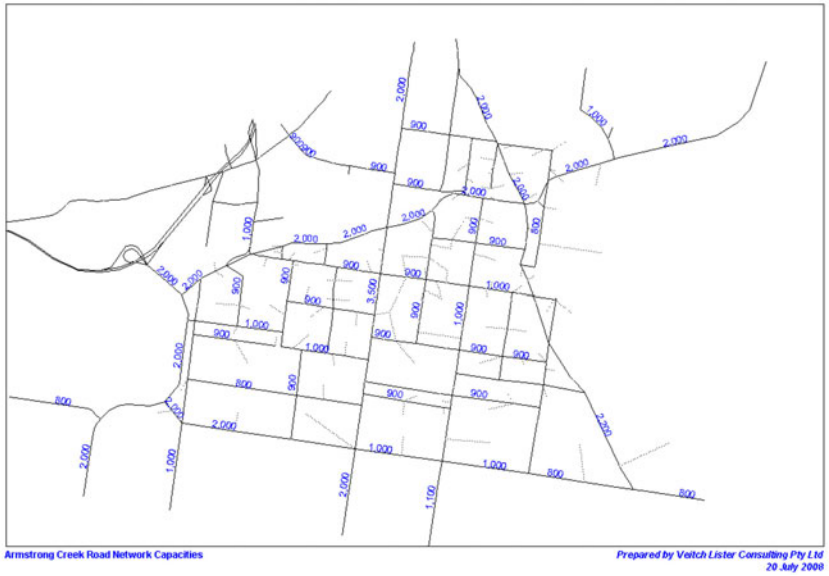


Figure 6-2: Armstrong Creek Road Network Assumed Capacities

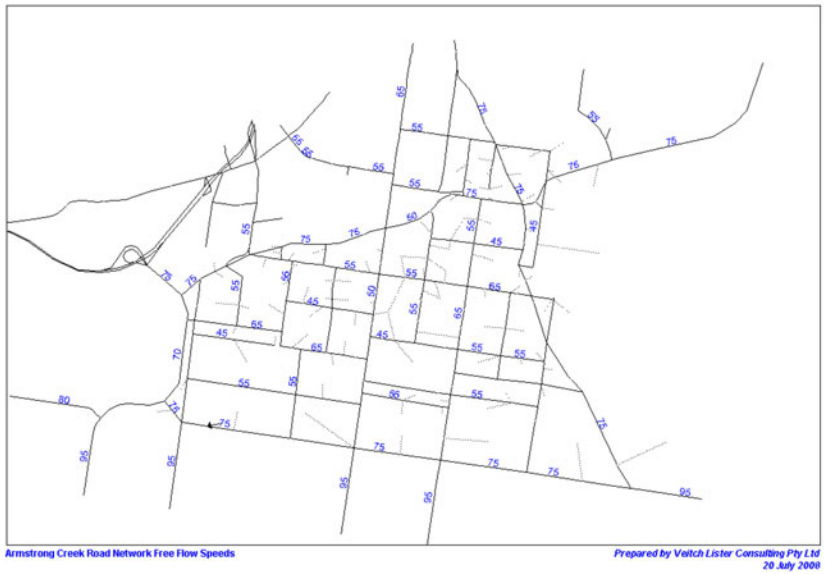


Figure 6-3: Armstrong Creek Road Network Assumed Free Flow Speeds

MODEL RESULTS

Modeling was undertaken in two stages. In the first stage, the road network modelled was similar to that shown in Figure 4-2 (refer full report – original concept 800m grid network). Select-link analysis was undertaken during this stage to provide an understanding of vehicular movement through and within the Armstrong Creek Urban Growth Area. The results of this first stage of modeling are not presented in this report. The results were used, however, to refine the proposed connectivity of the road network. As a result of this work, the road network was refined as shown on Figures 4-3, 6-2 and 6-3.

As discussed in Section 4.5 (refer full report), two options for the road network were modelled – with and without a road link to Rossack Drive. The modelled outputs for 24 hrs on a normal weekday for each option are presented in Figures 6-4 and 6-5.

CONCLUSIONS

The modeling outputs indicate a good distribution of traffic from the development area with most roads carrying a volume of traffic that is consistent with their intended place in the road hierarchy.

Exceptions are:

- ***Reserve Road, west of Drews Road***. This collector road forms part of the most direct route between Grovedale and the Bellarine Peninsula
- ***Boundary Road, between Surf Coast Highway and Barwarre Road.*** This collector road provides an important access function for the Principal Activity Centre and, therefore, higher traffic volumes are to be expected.

The modeling of the Rossack Drive link indicates that significant volumes of through traffic will not be introduced to the Rossack Drive area. This outcome is very different to previous modelling of a more direct link undertaken for VicRoads which indicated that Rossack Drive would become the preferred route between Armstrong Creek and the Geelong Ring Road. If Council wishes to consider this link further, it is recommended that sensitivity testing be undertaken as the consequences for residents of the Rossack Drive area could be significant.

RECOMMENDATIONS

The modelling undertaken assumes that Armstrong Creek will be fully developed by 2021 and that growth in the surrounding areas will occur at rates considered reasonable in 2003. 2021 is a short to medium term planning horizon and consideration should be given to longer term growth, particularly in the Torquay area. It is recommended that, in order to establish ultimate road reserve widths for Anglesea Road, Ghazeepore Road, the Surf Coast Highway and Horseshoe Bend Road, modelling be undertaken that assumes full development of the Torquay/Jan Juc and Spring Creek Structure Plan areas.

The modelling of the Rossack Drive link has yielded very different results to modelling undertaken previously for VicRoads on a more direct link. If Council intends to seriously consider this link it is recommended that further modelling be undertaken to identify the sensitivity of use of the link to its alignment and other road network characteristics.

The modelling undertaken assumes that the only public transport improvement on existing conditions is the extension of the rail service to a new station in the vicinity of Rossack Drive. Further modelling should be undertaken to identify the effects of additional public transport improvements, in particular new bus services that will undoubtedly be put in place to service the growth area.

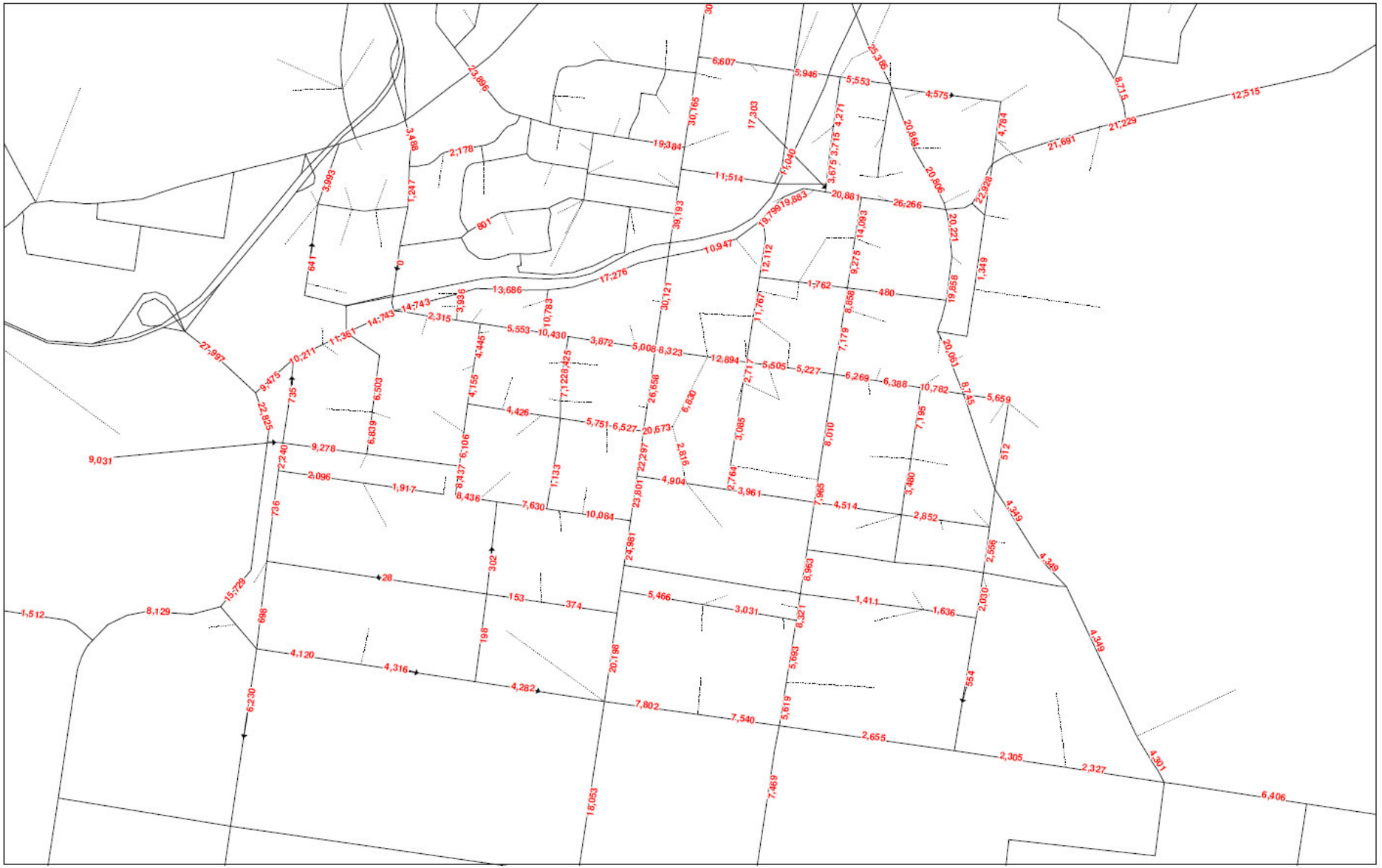


Figure 6-4: Armstrong Creek 2021 (Full Development) 24 hr traffic volumes (No Link to Rossack Drive)

Figure 6-5: Armstrong Creek 2021 (Full Development) 24 hr traffic volumes (With Link to Rossack Drive)

City of Greater Geelong - PEDESTRIAN & CYCLING PATHS

PURPOSE:

The purpose of including pedestrian and cycling paths within the framework of infrastructure planning is to meet the objectives set out in the Armstrong Creek Urban Growth Plan 1 for the need to link the new urban centres, railway stations, schools and key community facilities with a web of leisure trails and more direct walking and cycling paths that contribute to the formation of a healthy and integrated community.

A high standard network of paths was encouraged to have a walkable / cycling community that does not rely on motor vehicles as a primary mode of transport.

ASSUMPTIONS:

The primary assumption used for the development of the Pedestrian / Cycling Network Plan are detailed below.

- The Armstrong Creek Urban Growth Plan – Framework Plan, detailing recreational trails, is seen as concept only and does not reflect new road network development and a web network within the growth area.
- Movement of people from their home to railway stations, activity centres, schools, employment areas and open space facilities is a key design criteria
- All recreational trail construction is assumed to be constructed of asphalt or concrete at a width of 3m. This is seen as an appropriate standard for a high use shared paths catering for cyclists, pedestrians, dog walkers, wheel chairs, etc, as well as the asset life cycle needs of such paths.
- It is assumed that approx. 50% of the developed recreation trails will include dedicated path lighting to improve amenity (these sites are yet to be determined and will be based on high profile / usage paths within the growth area).
- All costs associated with connecting the recreation trails directly with local sporting and community facilities as not cover within this pedestrian and cycling network plan.
- All costs associated with the provision of road crossings are assumed to be addressed as part of subdivsion road design and construction, and must be considered during detailed design of all new roads.

CONSTRAINTS / RISKS:

The primary constraints and risk associated with the development and delivery of this network plan are details below:

- The cost of asphalt being impacted by increasing market cost of oil.
- The trails will need to include flexibility associated with their exact location, particularly relating to conflicts with flora and cultural heritage sites, and integration with precinct road and footpath networks.
- Intersection and road crossing will need to have a strong focus on encouraging the movement of pedestrians and cyclist through these conflict points. This will maximise the attractiveness of these paths for both social and commuter users.

DELIVERY:

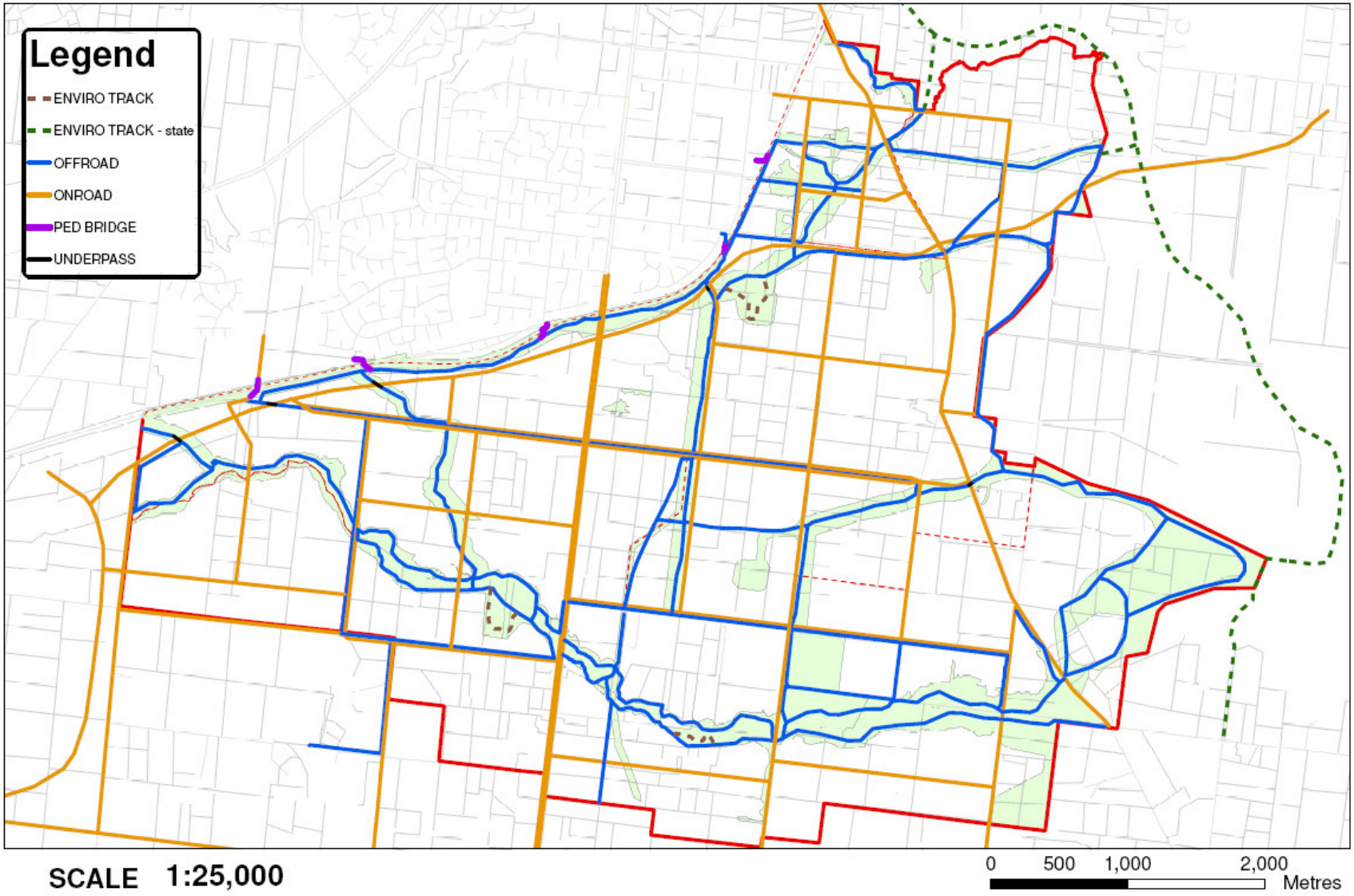
One of the essential components to the effective delivery of the proposed pedestrian and cycling network will be the ability to deliver key links early in the development of these new communities. This means that rather than rollout small segments of the network as development occurs, early triggers should be established to deliver larger section of the network as early as possible. This will be essential in establishing community behaviour and discourage the reliance of households on motor vehicle usage.

This rollout will need to be a key consideration during the preparation of Precinct Structure Plans and the staging for infrastructure delivery.

CRITICAL INFRASTRUCTURE:

The critical component of the pedestrian and cycling network wil most certainly be the Armstrong Creek corridor. This is the growth area's name sake and will be the most notable feature that links the community from east to west (similar to the Barwon River trails). Early establishment of this corridor is linked to a higher likelihood of success in developing a healthy and non-vehicle reliant community. The second critical corridor within the growth area will be the Barwarre Road urban forest path. This path will provide an essential north south link from the southern tip of the growth area, past the major activity centre, right through to Marshall Railway Station.

Armstrong Creek
Pedestrian & Cycle Paths



Attachment 4: Powercor - Electricity Network Plan

POWERCOR DISTRIBUTION NETWORK

Powercor operates the 66kV subtransmission lines that commence at the Geelong Terminal Station in Cox Rd, Norlane and supply Zone Substations throughout the Geelong Region. In turn, predominantly overhead inter-connected 22kV feeders from these Zone Substations supply local towns and areas.

Powercor has an ongoing 10-year Plan to upgrade the Network to meet expected load growth and improve reliability throughout the Region.

WAURN PONDS GROWTH CORRIDOR

The Waurn Ponds growth corridor, encompassing the Armstrong Creek urban area south to Torquay, is the major growth area in the Geelong Region. This area is currently supplied by 22kV feeder lines from the Waurn Ponds Zone Substation at the corner of Hams Road and Ghazeepore Road. The existing load demands on the Zone Substation provide limited scope for the continuing load growth.

To meet the load growth in the area, Powercor as part of its 10 year development plan, is upgrading the transformer capacity at this Zone Substation in 2008 with a further upgrade planned for 2009.

The Armstrong Creek urban area initial load developments will be supplied by 22kV interconnected feeder lines, two from the Waurn Ponds Zone Substation and one from the Geelong East Zone Substation that are either adjacent to, or pass through the developer owned land parcels.

The feeder lines from the Waurn Ponds Zone Substation currently supply the Torquay area and are nearing capacity while the feeder from the Geelong East Zone Substation is currently less loaded. These feeder lines will be reconfigured to distribute the load across the network to meet the initial load growth. The tracts of developer subdivisions in Armstrong Creek will need to be connected to these feeder backbones.

Feeder developments on the eastern side of Armstrong Creek will take account of future Vic Roads plans for Barwon Heads Road.

Powercor's next stage of development is to establish the new Torquay Zone Substation for the Torquay/Jan Juc and coastal area load which in turn provides capacity back in the existing feeder lines which pass through the Armstrong Creek development.

A second 66kV subtransmission line is required for the Torquay Zone Substation reliability and this line is planned to be constructed as a second circuit by overbuilding the existing powerline on Anglesea Road between Waurn Ponds and Torquay.

It is important that the coordination of this new line at the Waurn Ponds end occurs with Vic Roads and Blue Circle Cement due to the planned realignment of Anglesea Road.

EAST GEELONG TERMINAL STATION

The new East Geelong Terminal Station is planned to be established on SPAusnet owned land at the corner of Woods Road and Coppards Road, St Albans Park. This new Terminal Station is required in the medium to long term to cater at transmission level for load growth in the southern part of the Geelong Region including the Armstrong Creek urban growth area.

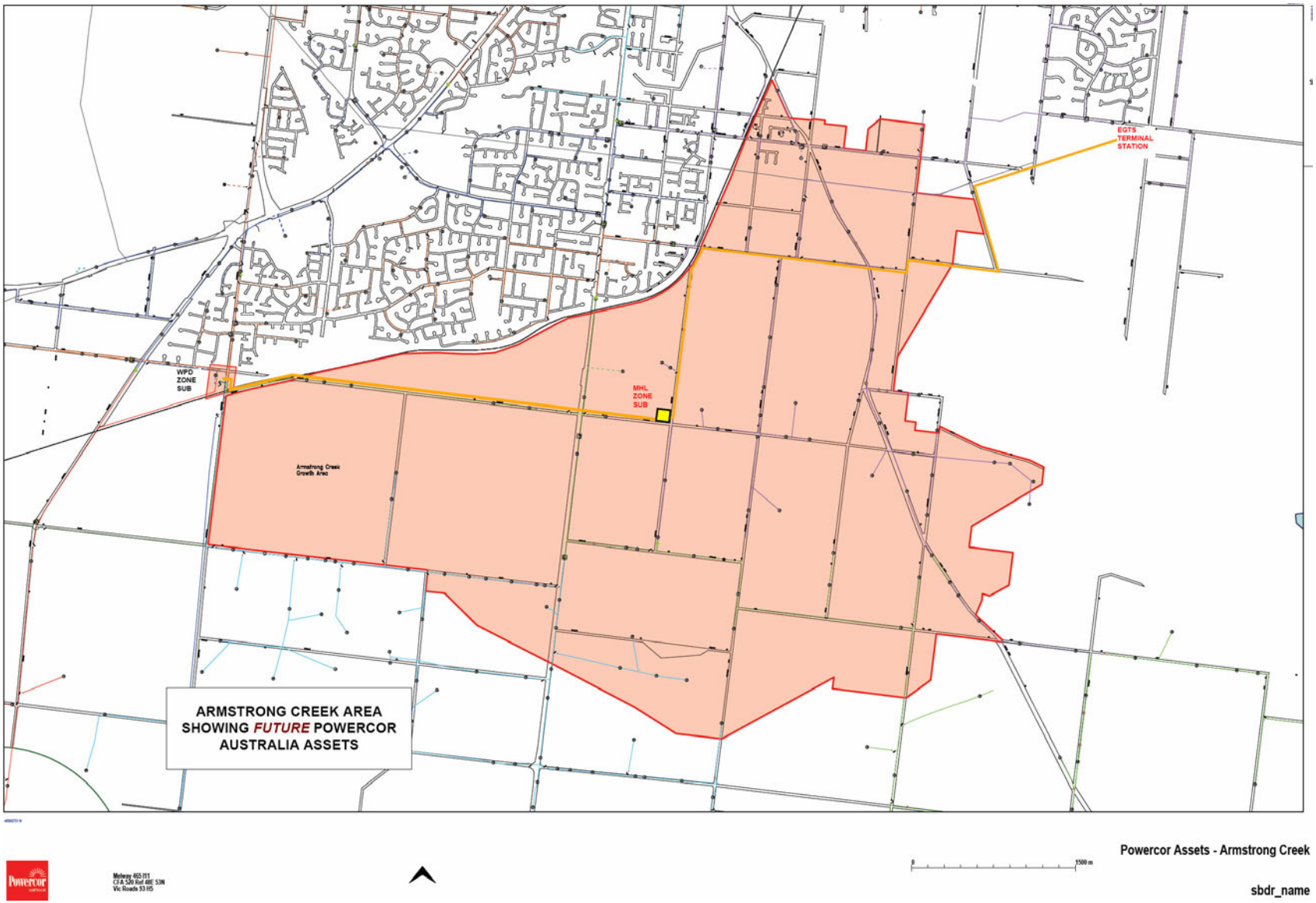
It is important that the coordination of this new Terminal Station and 66kV overhead subtransmission lines occurs with Vic Roads in regards to future line routes for the East West road link.

MARSHALL ZONE SUBSTATION

Ultimately it is planned to establish a Marshall Zone Substation around the intersection of Boundary Road and Barrwarre Road in Armstrong Creek depending on load developments. This Zone Substation would be supplied via overhead subtransmission lines from the East Geelong Terminal Station and the Waurn Ponds Zone Substation.

The powerline line routes to Marshall Zone Substation will be investigated considering also opportunities for developing these in line with the planned East West road link and the North South transit corridor.

John Garvey,
Powercor Australia – Geelong Branch,
June 2008


EGTS
TERMINAL
STATION
WPD
ZONE
SUB
MHL
ZONE
SUB
Armstrong Creek
Growth Area
ARMSTRONG CREEK AREA
SHOWING FUTURE POWERCOR
AUSTRALIA ASSETS
Powercor Assets - Armstrong Creek
sbdr_name

Attachment 5: SP AusNet Gas - Infrastructure Plan

SP Ausnet has provided a preliminary concept for the supply of natural gas to the proposed Armstrong Creek Urban Growth Area based on the information provided by the City of Greater Geelong.

Based on the planning information provided (approximately 22,000 dwellings) it has been determined that a 180mm supply main grid will be required to service the growth area. These new mains will require the installation of two new field regulators from one from the existing Transmission Pipeline along Lower Duneed Road and one from the existing 160mm main in Mount Duneed.

Our gas design plan shows how SP AusNet could construct a central grid of core supply mains that enables mains to be extended from a central location to the various new estates being established by the multiple developers that will be acquiring parts of Armstrong Creek.

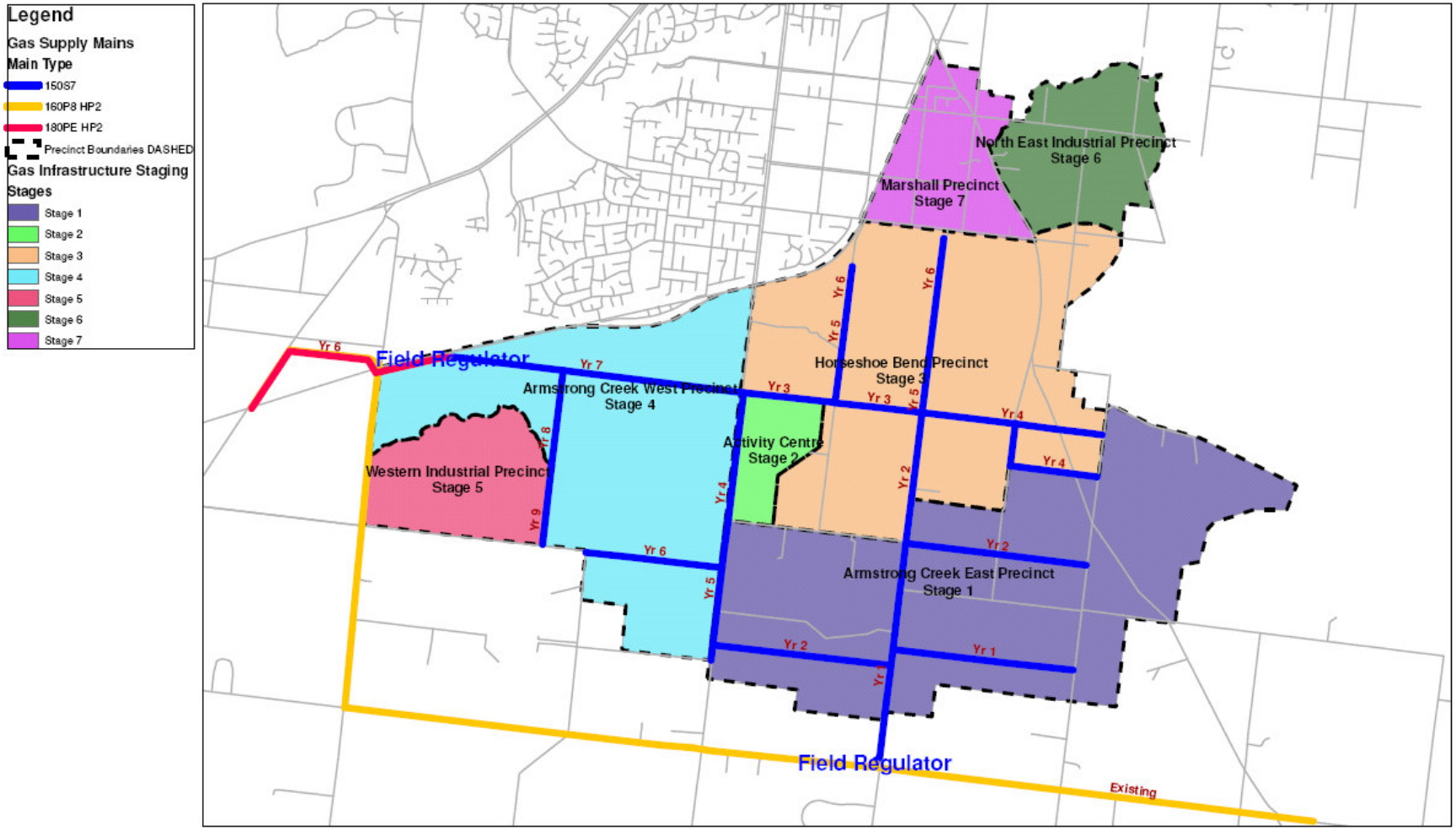
Servicing of the Marshall and North East Industrial Precincts are assumed to be via connection to, or extension fo the existing gas network in the area. Currently there is limited supply capacity available from this network. Connection from this area to the proposed Armstrong Creek gas main grid will be required to provide additional supply capacity in the future.

Councils planning arrangements for Armstrong Creek are not confirmed and the arrangements SP AusNet is proposing are reasonably flexible. At this time we believe this is the best way for SP AusNet to meet the planning needs of the Armstrong Creek stakeholders.

The information provided by SP Ausnet is for planning purposes only and is not to be regarded as an offer or commitment to complete the proposed works at this time.

Paul O'Brien
Senior Project Consultant
SP AusNet – Melbourne
February 2009

GAS - SP Ausnet
PROPOSED GAS INFRASTRUCTURE PLAN
2009 - 2019



Attachment 6: Victorian Department of Transport - Railway Station Footprints & Public Transport

INTRODUCTION

The Armstrong Creek Urban Growth Area is currently serviced via both heavy rail and bus services that utilise the:

- Geelong-Warrnambool railway line
- Marshall railway station, and
- The Torquay-Geelong bus services

The aim of the public transport strategy is to provide Armstrong Creek with the best opportunities for the future community to be non-reliant on the family car. This requires the development of user friendly pedestrian and cycle paths and the provision of high amenty bus stops and services, railway stations and carparking and end of line public transport facilities.

MARSHALL STATION

The Marshall railway station, located on Marshaltown Road, has been flagged as providing two critical roles during the life the development and the initiation of community behaviour changes.

The stations initial role will provide park and ride facility, and a well connected railway station, that can serve the needs of the early stages of development.

The stations long term role will be a neighbourhood station that includes moderate park and ride facilities, and a much greater focus around the provision of neighbour amenities and high levels of pedestrian and cycling connectivity. This may include provision of mixed use shops (i.e: corner store, café, etc) along with a significant bus terminal for connection to Armstrong Creek, Geelong, Barwon Heads and Torquay.

In relation to the first stage of infrastructure provision at Marhall Station, the Department of Transport (DoT) is focused around the provision of 1,000 additional carparking spaces, involving the acquisition of approximately 4 hectares of farm land.

The exact footprint for this station is still being finalised by the DoT, but a concept layout is reflected on the attached map.

ARMSTRONG CREEK (WAURN PONDS) STATION

A new railway station has been proposed as part of the planning for Armstrong Creek and has been included within the ***Armstrong Creek Urban Growth Plan*** as a critical new asset for the future Armstrong Creek community, the existing urban areas north of the railway line and the local region.

The new station will be located at the southern end of Rossack Drive and approximately 500m east of Gazepoore Road, and will incorporate station interfaces on both the northern and southern sides of the existing railway line.

The new station is still contingent on the future funding and will require ongoing lobbying to highlight the short and long term community benefits of such a project.

The proposed first stage of the stations development would see a car park and minor rail facilities developed on the northern side (Waurn Ponds) to service the established urban area and broader park and ride users. This would accommodate approximately 1,200 car spaces.

The long term development of the station would see the construction of a southern car park to serve the new Armstrong Creek community. This would include another 1,300 car spaces and provide high quality park and ride, bus terminal and station facilities. It would also look to integrate the station with the proposed Local Activity Centre and provide a sense of place and destination for all user groups and the local community (e.g.: shops, cafes, pedestrian and cycle paths, etc).

ARMSTRONG CREEK NORTH-SOUTH TRANSIT CORRIDOR

The development of the north-south transit corridor has been an integrated part of the Armstrong Creek Urban Growth Plan from the starts of the plans development and is seen as a critical piece of strategic planning for the future heavy rail needs of the Armstrong Creek and Torquay communities.

The transit corridor runs from the intersection of Reserve Road and Barwarre Road in the north, through the Major Activity Centre and then south the Lower Duneed Road. For much of the corridors length it runs in parallel with the proposed urban forest (open space) that hugs the western side of Barwarre Road.

The Department of Transport (DoT) sees this corridor as playing a critical role in the provision of long term opportunities for heavy rail to Torquay and avoid the need to retro fit such a project through the middle of a future community.

The corridor has been flagged by the DoT as serving two primary functions during its life. The first being an integrated transit bus corridor between Marshall Station and central Armstrong Creek to link the new community with heavy rail services.

This first stage of development would see the corridor for the provision of bus services. This stage will require a range of design consideration to determine the level of integration with the new road network and its ultimate transition to heavy rail (e.g.: grade separation)

Long term the corridor would be transformed into a heavy rail transport link between Torquay, Geelong and Melbourne. This stage of development is likely to require the new railway line to be “sunk” into the ground to provide appropriate noise attenuation and public amenity.

In both the short and long term phases of the corridors development, the Major Activity Centre would include a transport node. This means the development of an appropriate bus terminal in stage one, and then a full railway station in the ultimate arrangement. In both these cases the station would be design around a local walking / cycling user group and not provide large scale carparking facilities.

ADJUSTMENT TO THE TRANSIT CORRIDOR ALIGNMENT

As part of the Independent Panel review for amendment C138, the panel recommend the adjustment of the Major Activity Centre boundary (eastern side) to reflect a kink in the alignment to define its eastern boundary. This adjustment has made it through to the Framework Plan currently before the Minister for Planning for approval.

Long term this kink presents a problem for the provision of heavy rail due to design curve requirements..

At the southern end of the corridor, the panel confirmed the inclusion of two options south of Armstrong Creek (waterway) due to the uncertainty relating to future links to Toquay. The two options reflected in the Framework Plan include an alignment abutting Surf Coast Hwy (eastern side) and one 750m east of the Surf Coast Hwy.

The Interagency Working Group (IIWG), including the DoT and representatives from Surf Coast Shire evaluated these two issues during a June 2008 workshop, with a aim of resolving these corridor problems.

The workshop determined that the corridor alignment should maintain a straight north-south alignment until Lower Duneed Road and allow future planning by Surf Coast Shire and the DoT to evaluate the best route south of this point.

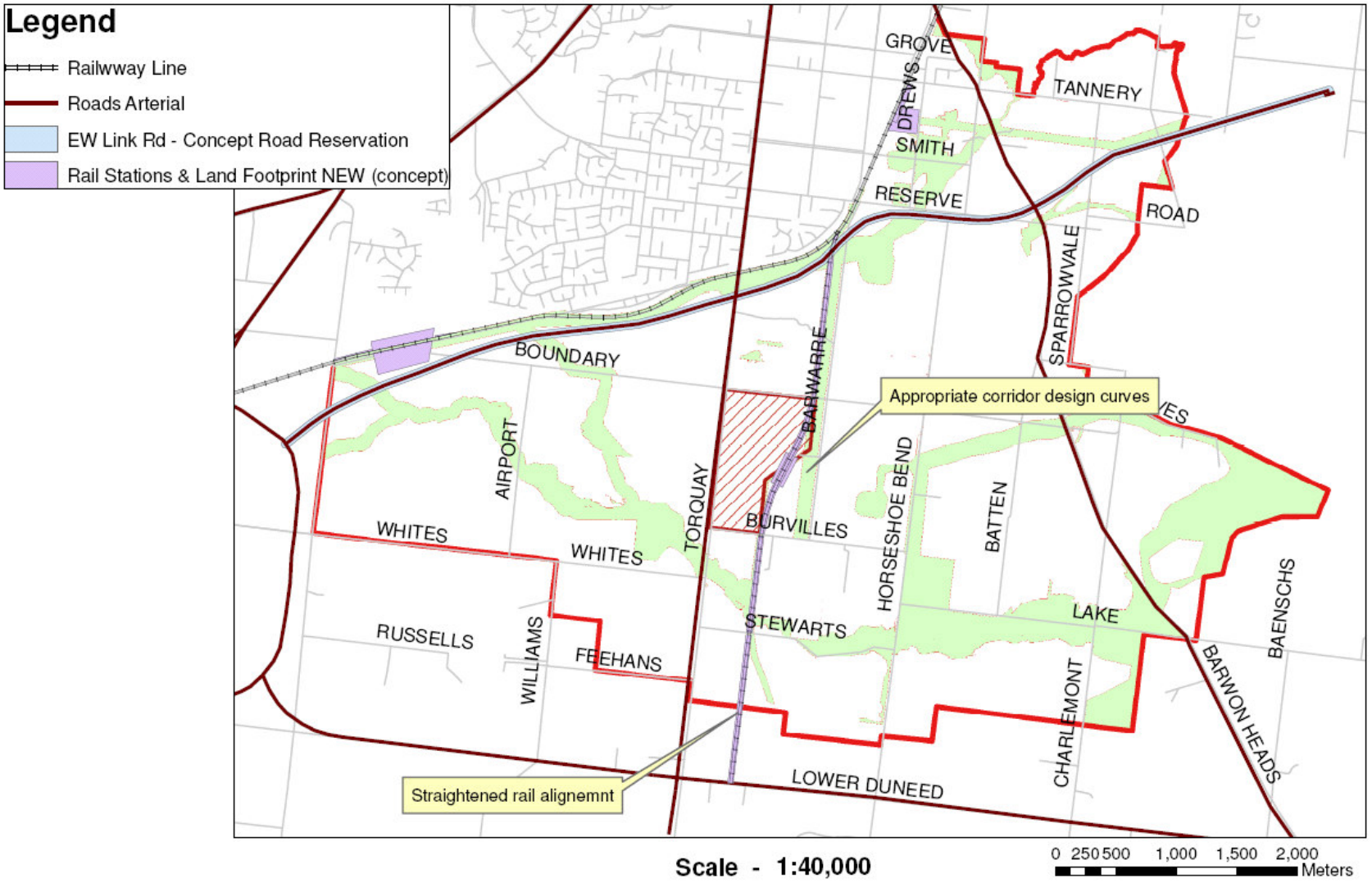
The reasons noted for this straight alignment were:

- Grade and upgrade issues associated with the Lower Duneed Road / Surf Coast Hwy intersection
- Access control along Surf Coast Highway
- The possibility of a future Torquay station being located west of Surf Coast Highway
- The distance form the current Torquay urban growth boundary (approximately 7km)

In relation to the “kinked” corridor alignment through the Major Activity Centre the DoT confirmed the need to meet a minimum of 80kmh design speed for any future heavy rail alignment.

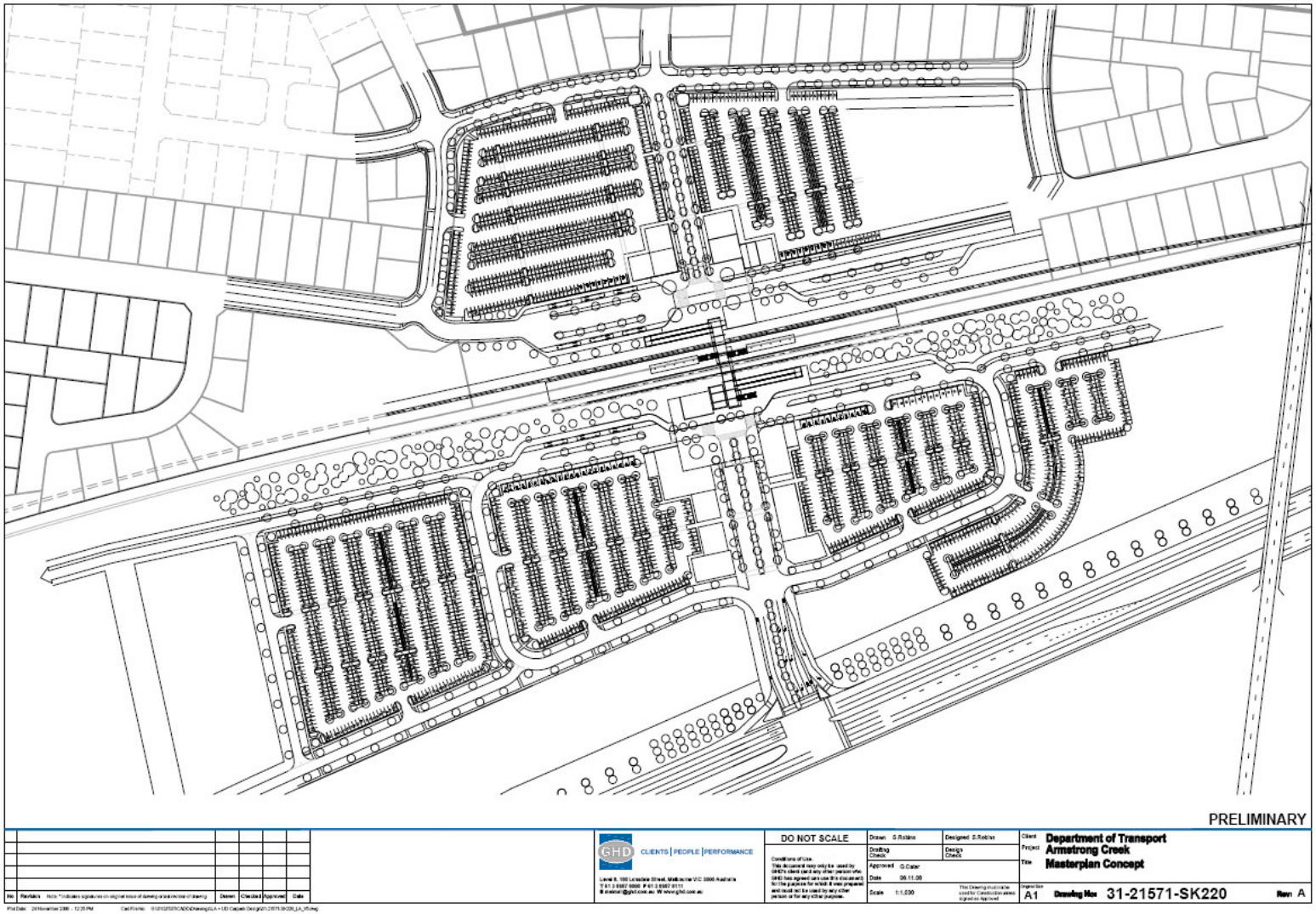
The adjustment of these corridor issues is shown in the attached map, Proposed Rail Alignment and Footprints.

Armstrong Creek - Rail Infrastructure
PROPOSED RAIL ALIGNMENT & LAND FOOTPRINT



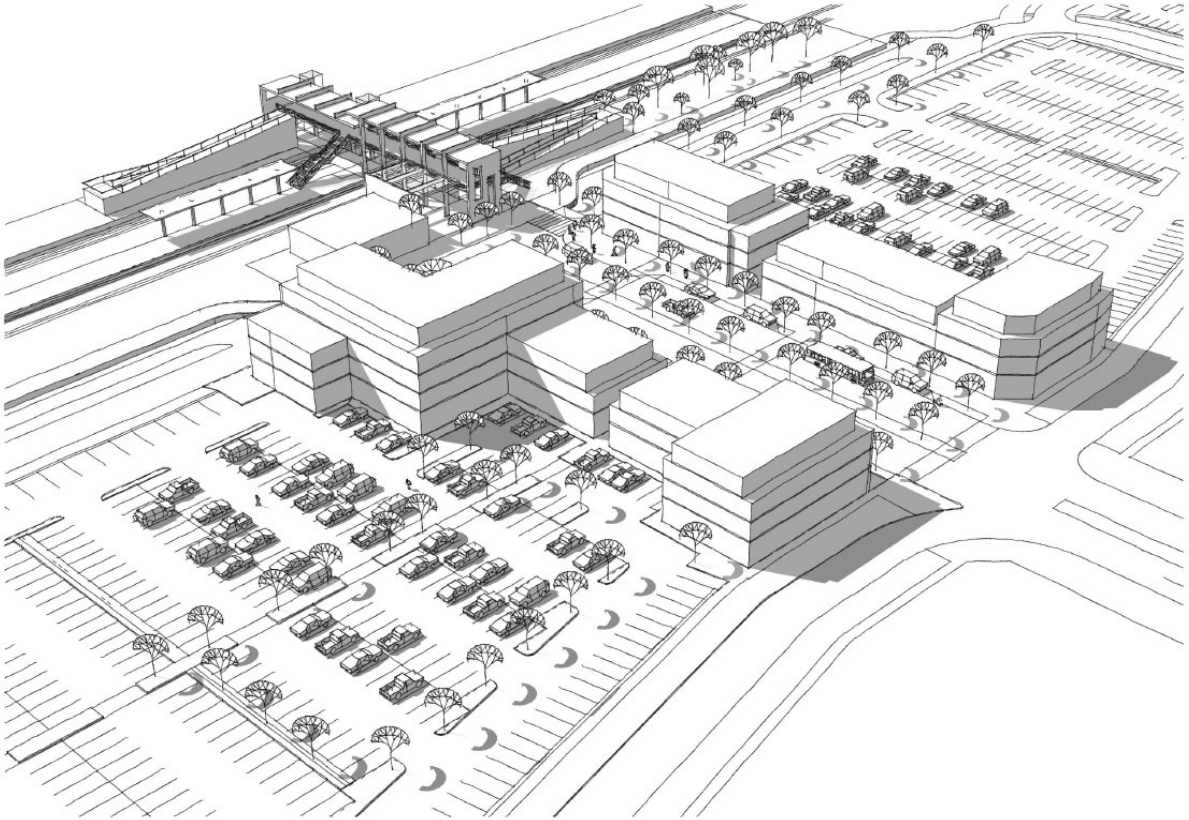
Armstrong Creek Railway Station

Concept Layout Design (GHD)



Armstrong Creek Railway Station

Concept Activity Centre Design (GHD)



** The above aerial sketch is a view of the proposed station activity centre from the the south-west (conecept only)*

Attachment 7: Telstra - Telecommunications

Telstra has engaged an Armstrong Creek working party within Telstra, which consists of the Urban Development Group, a local area representative and also our fundamental planning manager to provide telecommunications support to the Armstrong Creek development plan. As the development is not due to break ground until 2009, this analysis is a preliminary feasibility study.

The study consists of two components for the provision of copper and also Telstra Velocity (fibre to the home). The Armstrong Creek Urban Development Plan covers sites in the following Exchange Service Area's:

- Belmont.(BELM)
- Grovedale.(GROX)
- Mt Duneed(MTDU)
- Most of the residential development will be in the Mt Duneed exchange area.

The Grovedale exchange is the site for any Telstra Velocity (fibre to the home) developments in the area. This decision is on the basis that sufficient floor space can be made available in the exchange to accommodate for Telstra Velocity equipment and sufficient power will be available via a power up-grade taking place currently. Telstra Velocity is available to developers for a cost which can range anywhere between $2500- $5000 per lot depending on the size and location of the development.

Standard copper deployment (non-Velocity) developments will be done by the technology of the day from the relevant existing Exchange Service Area's. Under Telstra's Universal Service Obligation, Telstra will deploy copper services to the area at no cost to the developer; this will be to provision for standard fixed telephone lines and the availability for ADSL availability for residents. Depending on the current broadband debate and recent change in government, fibre to the node (FTTN) may become an option if available in the future.

Currently, without the developer requirements and a full staging plan and timelines, it is too early to say what the exact planning brief will be for the site and Telstra looks forward to establishing this with Council as the development progresses. We are undergoing an internal strategy on offering Telstra Velocity to developers within Armstrong Creek, as we are committed to ensuring that developers have every ability to take advantage of this future ready technology.

Julian Nachmias
Urban Development Manager (Vic/SA/NT)
Telstra
December 2007