ARMSTRONG CREEK

GEELONG'S GROWTH AREA

ARMSTRONG CREEK
Civil Interagency Infrastructure Delivery Plan (CIIDP)

Final Report – February 2009

Prepared by the City of Greater Geelong in consultation with : -

Barwon Water
Powercor
SP Ausnet
Victorian Department of Transport
VicRoads
Telstra

"For Essential Services & Civil Works"

State Government Victoria Department of Planning and Community Development

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ENDORSEMENT BY INFRASTRUCTURE AGENCIES

The Agencies involved in the preparation of this Interagency Infrastructure Delivery Plan (IIDP), endorse it as reflective of their strategic planning for trunk infrastructure delivery at Armstrong Creek, and commit to continuing to work in partnership with other members of the Interagency Infrastructure Working Group to ensure coordinated, timely and streamlined implementation of the plan.

Barwon Water

City of Greater Geelong

Powercor

SP AusNet

Telstra

VicRoads

Victoria Department of Transport

ACKNOWLEDGEMENTS

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CONTENTS

Waterways and catchments are the ecosystems supporting the livelihood, lifestyle and health of the total community

IIDP PURPOSE: A PLAN TO DELIVER SERVICED, DEVELOPABLE, LAND

This Interagency Infrastructure Delivery Plan (IIDP) provides an outline of the baseline concept plans of each of the agencies for an expedited roll out of the requisite trunk infrastructure to service the Armstrong Creek Urban Growth Area including:

- conventional reticulated potable mains water and sewerage services
- stormwater management
- movement and access (roads and access ways)
- electricity and gas supply systems
- rail and other public transport services
- telecommunications.

The IIDP outlines a conventional approach to the delivery of the trunk infrastructure necessary for developing a large scale greenfield urban growth area including a staged, agency dependent, implementation sequence on a precinct by precinct basis. Council considers this IIDP to be a baseline plan, "Plan A", and understands that significant potential exists for land developers to open up the supply of developable land more quickly. Council encourages developers to identify and propose alternatives delivery sequences (i.e. "Plan B") to the Interagency Infrastructure Working Group, as soon as is practically possible on a "whole-of-precinct" basis. The design, TBL considerations and business case for each proposal will be evaluated (along with resourcing and investment implications) to determine the appropriateness of the proposal.

The IIDP has been prepared by the City of Greater Geelong in collaboration with Barwon Water, Powercor, SP AusNet, Department of Transport and VicRoads, and with input from developers with land interest in the area.

This Interagency Infrastructure Delivery Plan (IIDP) is the baseline (conceptual) delivery plan for the Armstrong Creek Growth Area that:

- **Agencies will implement to deliver serviced / developable land, unless developers propose a suitable agency approved alternative; and**
- **Will be the baseline for comparison and evaluation of alternative plans that are proposed.**

An active lifestyle is critical to the development of a healthy society and communities. Access to attractive and integrated walking paths, cycle ways and public open space are fundamental in the development of new communities and long-term behaviour.

CONTEXT: REDUCED TIMELINES FOR INFRASTRUCTURE DELIVERY

Regional context positions Geelong as Victoria's sixth growth area

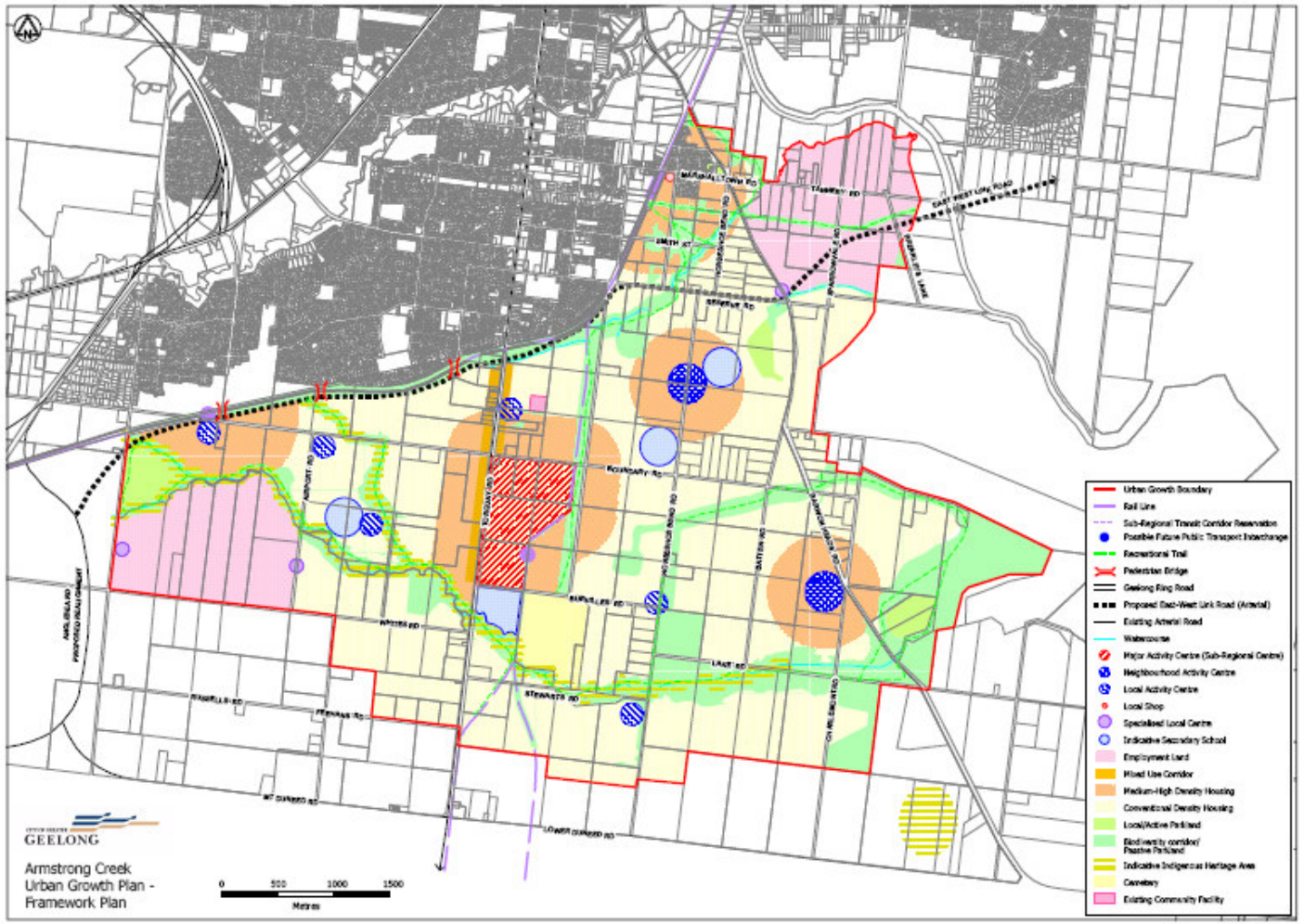
Geelong is Australia's eleventh largest city, Victoria's second largest city and its most important provincial centre. Geelong is the principle settlement and economic centre for the South West region of Victoria, providing access to important primary services such as hospitals, specialist medical, tertiary education, retail shopping and other community and commercial facilities. It is well serviced by major infrastructure including Geelong port and Avalon Airport; railway connections to Melbourne, Warrnambool and Ballarat; a road network which includes the Princes Freeway and Highway, Geelong Ring Road , the Hamilton Highway and the Midland Highway; significant health and education facilities including Deakin University; and a broad range of passive and recreational opportunities, ranging from regional to local scale, and including Skilled Stadium and the Waurn Ponds baseball and aquatic complex.

Greater Geelong is a municipality of contrasts with coastal, rural, urban and natural environments defining the landscape. The natural topography includes Corio Bay and the Barwon River, the hills of the Bellarine Peninsula and Barrabool, the Lovely Banks escarpment, the You Yangs and Brisbane ranges, the northern basalt plains, the lake and wetlands around Reedy Lake, Lake Connewarre and Swan Bay, coastal dunes and cliffs and Mt Duneed. Geelong itself is only a short distance the attractive beaches of the Surf Coast and the Bellarine Peninsula.

Geelong is only a short distance from Melbourne and is well connected by road and rail services. Whilst Geelong currently has a very limited supply of broad acre land for urban development it is anticipated to be an increasingly attractive urban growth area for Melbourne. A key priority for Council is, therefore, to rapidly increase the supply of developable land and the Armstrong Creek Urban Growth Area is one of the Council's largest and most important strategic projects. It aims to concentrate the majority of the urban growth of Geelong into a comprehensive community in the area south of the railway line at Grovedale and Marshall.

Whilst outside the five nominated Melbourne growth areas, Armstrong Creek is the largest contiguous development in Victoria, and one of the largest in Australia, and hence ranks as Victoria's sixth growth area. Council is likewise committed to the development of liveable new communities with the same goals as the Melbourne's growth areas: sustainable built and natural environments; high quality job opportunities and a thriving local economy; healthy, safe and socially connected communities; and affordable living.

Figure 1: Armstrong Creek Urban Growth Plan – Framework Plan



The Armstrong Creek Urban Growth Plan is for a sustainable and liveable community

The Armstrong Creek Urban Growth Area is approximately 2 600 hectares of greenfield (unserviced) farming land and provides Council with a unique opportunity to create a sustainable 'extension' of Geelong's urban area to accommodate the population expansion proposed for the region.

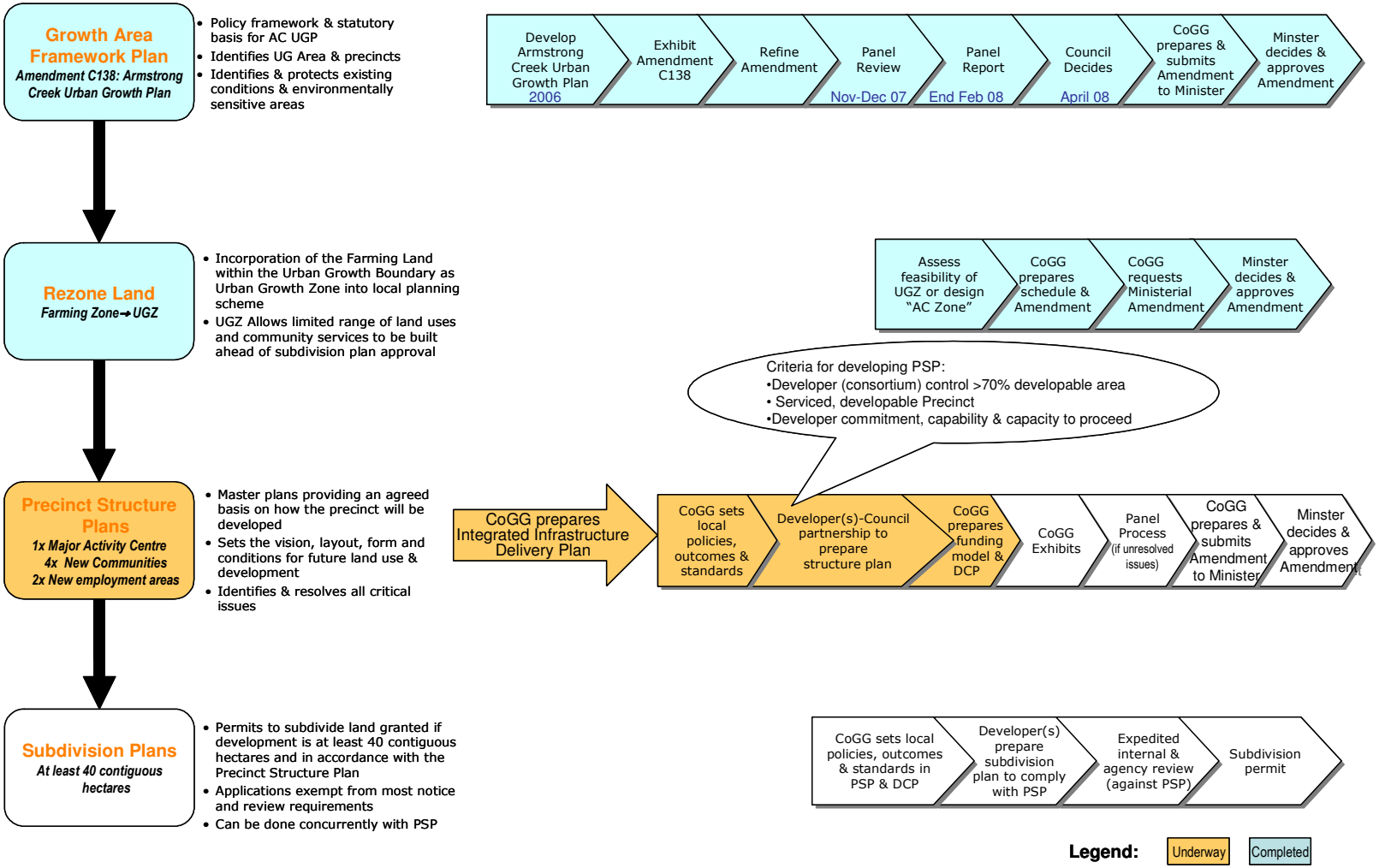
Armstrong Creek has great potential to be a sustainable, liveable community with existing railway services and good road links to Melbourne, central Geelong, Barwon Heads, Torquay and the Surf Coast. A new railway station is planned in the west of the growth area along with a significant upgrade of the existing Marshall Railway Station on the eastern side and a new north-south transit corridor through the centre of the growth area. It provides the opportunity for future residents to take advantage of the employment opportunities and services offered by Geelong city, and within the employment areas of Armstrong Creek, while being only a short distance from the attractive beaches of the Surf Coast and the Bellarine Peninsula. Armstrong Creek itself has the potential to be a key asset for the growth area and traverses east-west through the site. This, combined with the undulating topography of parts of the land makes the area very attractive for a healthy residential and business environment.

The Armstrong Creek Urban Growth Plan Framework Plan (refer Figure 1) shows that the area will ultimately be serviced by one Major Activity Centre, two Neighbourhood Activity Centres and a number of local centres. The area will have its own education and health facilities, 320 hectares of employment land and significant recreational areas. Ultimately it is conservatively estimated that Armstrong Creek will accommodate 22,000 dwellings, a population of 55,000 and will provide 22,000 jobs.

Council's vision is to develop Armstrong Creek as a demonstration of a community that is sustainable in all aspects – environmentally, socially and economically. With a progressive and innovative approach to planning and design, Armstrong Creek will be a smart, green community with enhanced lifestyle and amenity, meeting a range of community sustainability goals and, in particular, minimizing green house gas emissions. Natural and cultural features will be protected and enhanced to create a distinct urban rural identity with leading edge telecommunications.

Council's vision is for the Armstrong Creek Urban Growth Area to be developed into a sustainable community that set new benchmarks in best practice urban development, with natural and cultural features protected and enhanced to create a distinct "green" urban character.

Figure 2: Planning Process for urban development of Armstrong Creek



Streamlined planning process will reduce timelines for delivery of trunk infrastructure

Council has adopted the recently introduced streamlined planning process being applied to Melbourne's growth areas. The Armstrong Creek Urban Growth Boundary has been established via an Amendment process that has resulted in the *Armstrong Creek Urban Growth Plan, Framework Plan* (Figure 1) being included in the planning scheme and a Ministerial Amendment applying the new Urban Growth Zone to farming land within the Urban Growth Boundary. This simplifies the planning process and focuses attention on development of Precinct Structure Plans (PSPs) that are master development plans, merging the strategic planning and land rezoning approval processes into one step. Subdivisions stages can proceed concurrently with PSPs.

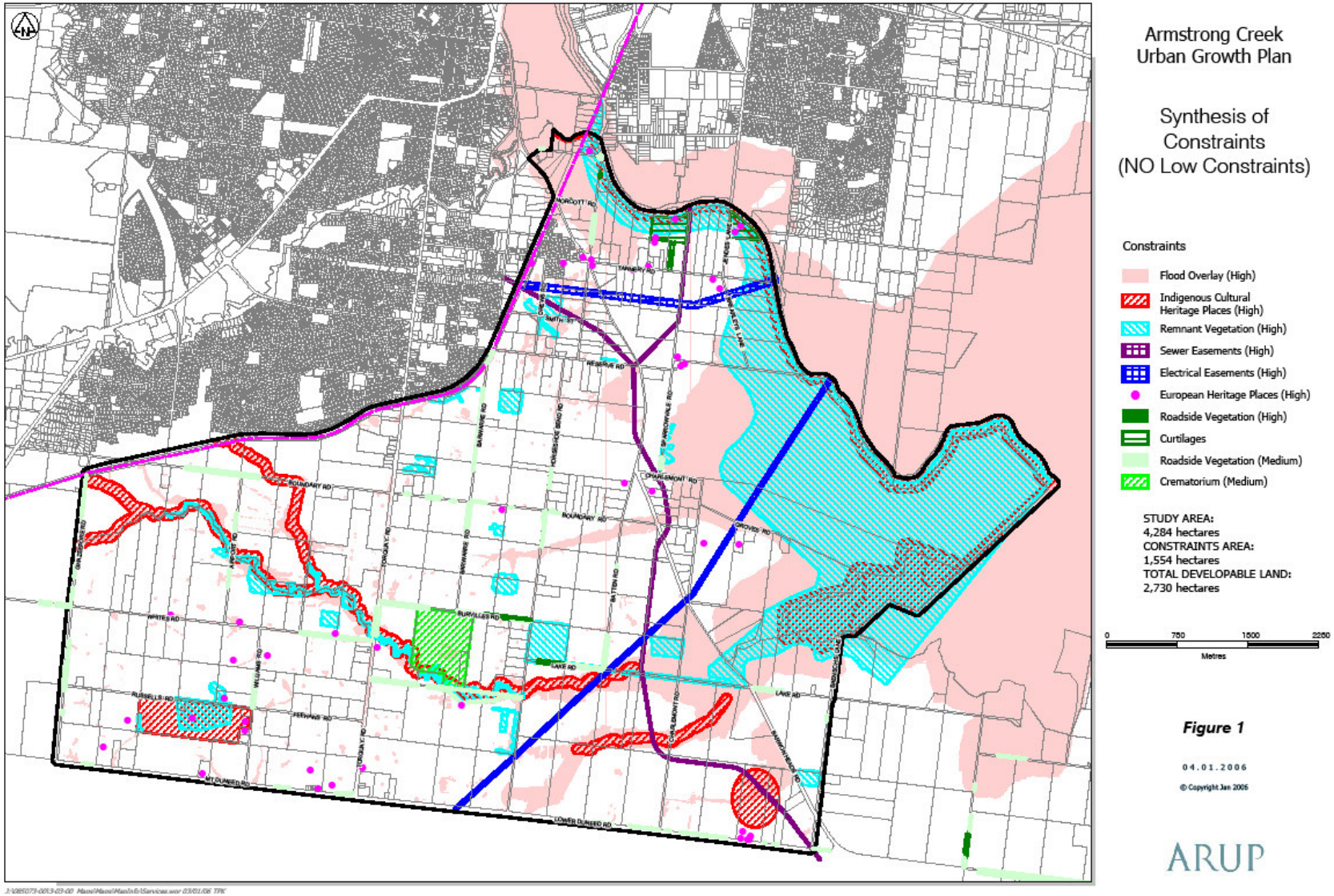
This planning process (outlined in Figure 2) will bring forward the urban development of Armstrong Creek by more than twelve months and shorten the timeline for the delivery of the essential services and civil works infrastructure that is required for land to be serviced for subdivision. Council's goal is to have at least 200 hectares of fully serviced residential land at Armstrong Creek available for urban development by the end of 2011 and for completion of the roll out of trunk infrastructure across the growth area by the end of 2019. This will then mean subdivisions (that meet the requisite permit conditions) could occur anywhere in the Urban Growth Area from 2020 onwards (note – this can be brought forward subject to agreement between the precinct consortium (developer) and the respective servicing authorities).

Sustainability of infrastructure delivery is important

As we move into a carbon constrained future, the City of Greater Geelong considers the delivery of the primary "whole of urban growth area" infrastructure to be critically important to the delivery of its sustainability agenda because of:

- the magnitude of benefits that can be planned into the growth area and not available at precinct/subdivision/allotment level;
- the considerable scale of the Armstrong Creek Urban Growth Area which provides significant leverage for economies of scale for investing in alternative approaches with significant upfront costs;
- the potential to demonstrate a step change in sustainable urban growth benchmarks that is replicable in other developments;
- the location provides the opportunity to set up Armstrong Creek in a "sustainability envelope" where agencies and developers collaborate to minimise the impact of the built environment on the surrounds and reduce its demands on regional infrastructure;
- encouraging developers to invest in leading edge sustainability approaches at the subdivision and lot scale levels to leverage the full potential of the value of the "green, smart, responsible" infrastructure in their target markets; and
- the social equity of obtaining affordable sustainability benefits for all members of the Armstrong Creek community (from the whole of the urban growth area infrastructure).

Figure 3: Map of Armstrong Creek Urban Growth Area Constraints



The Growth Area features : Opportunities and Constraints

The Urban Growth Area consists primarily of gently undulating rural land, although Mt Duneed provides a focus for the area and a green backdrop for future development. Natural features such as Mt Duneed, the Barwon River and Armstrong Creek are key assets for the area and will provide focal points for the development:

- **Natural systems:** The study area consists mainly of rural land. The associated drainage is via a number of drainage depressions and larger watercourses. Formal stormwater drainage infrastructure in the study area is limited to a small area of urban development in Marshall. Flooding is the major physical constraint of the Study Area and development. The Urban Growth Area spans a number of catchments and drain to the downstream Ramsar Wetlands located to the east of the urban growth boundary. Land use planning and drainage management for the study area are the responsibilities of the Council. Floodplain management is the responsibility of the Corangamite Catchment Management Authority (CCMA).
- **Flora and fauna:** A number of areas in the growth area have been identified for protection from development due to ecological values. The floodplains of the Barwon River and Armstrong Creek comprise most of the River Red Gum dominated grassy woodland in the study area and small pockets of Bellarine Yellow Gum woodland have been identified. There are also significant flora areas located along some roadsides and around streams and creeks. Where possible, Council has assumed the retention of existing vegetation that is "designed into" forming part of movement, access and biodiversity corridors in the preparation of detailed Precinct Structure Plans. A native vegetation management plan that meets the content requirements set out in Clause 52.17 will need to be prepared as part of the development of the Precinct Structure Plans.
- **Ownership and subdivision pattern:** Land ownership within the growth area is fragmented and the area consists of a number of titles of varying sizes. Land sizes in the majority of the growth area that is currently zoned farming, are typically larger holdings of 10-20 hectares or more whilst the Marshall area contains very small land titles of 1-5 hectares with a highly fragmented ownership pattern. A number of developers have commenced the land assembly process (other than in the Marshall area) and have control over significant areas of contiguous land, and approaching the 70% developable land of a precinct that is necessary to commence the Precinct Structure Planning process.
- **Heritage sites**: The area has significant Aboriginal heritage values, including historical associations with contemporary Wathaurong descendants. There are several known and potential Aboriginal heritage sites within the growth area with a total of 46 post contact cultural heritage sites identified, the majority of which are outside the areas identified for high-density residential development. Council is expecting Precinct Structure Plans to respond to Cultural Heritage Management Plans for that precinct. This is a critical path issue for delivery of some elements of the IIDP, in particular sewerage services.

“Only when the well is dry, will we know the worth of water” - Benjamin Franklin

Formation of the Interagency Infrastructure Working Group (IIGW) Partnership

There are multiple interdependencies between organisations and deliverables along the delivery path for the servicing the Armstrong Creek Growth Area. Council's deliverables are likewise interdependent with other organisations (eg agencies, developers) that will have significant impact on the timing and quality of the outcomes achieved. The Armstrong Creek project requires, therefore, a contemporary approach to develop ongoing productive partnerships between Council, State Government, Agencies and the developer community that:

- develops associations (e.g. strategic partnerships, networks, and working groups) that are established as strategic coalitions/alliances between organisations with a commitment to achieve a specific purpose and/or common goal.
- involves authentic participation and collaboration rather than mere communication, and recognises difference in perspectives whilst working together to define problems, critical issues and opportunities to work towards common goals.
- can evolve progressively in their possibilities, and develop mechanism for bridging organisational and interpersonal differences to achieve real value from the partnership.

In 2007 Council established the Armstrong Creek Interagency Infrastructure Working Group (IIWG) for civil works and essential services as a new partnership that builds on, and compliments, the existing arrangements within each agency for the provision of civil works infrastructure.

The aim of the Interagency Infrastructure Working Group is to coordinate the strategic planning and decision making required for *MORE TIMELY AND EFFECTIVE DELIVERY OF ESSENTIAL SERVICES AND CIVIL WORKS INFRASTRUCTURE* required for the current farming land to be serviced for subdivision and urban development.

The IIWG has also committed to working together to increase the State Government focus on the infrastructure priorities for Armstrong Creek. In addition to each agency progressing the dialogue and approval processes internally within their own organisations, a core channel for facilitating and expediting achievement of this objective is via the advocacy of the State Government appointed Partnership Broker to the Geelong planning partnership.

Council set design parameters to align Agency inputs to the IIDP

The IIDP is focused on achieving a clear vision for conventional delivery of trunk infrastructure to the growth area. It has been designed to ensure the area can be serviced in a timely and efficient manner, and obligations and responsibilities contained within the plan are clear.

Council nominated the ten year planning timeframe (commencing in the fiscal year 2009/2010), having regard to the shortages of developable urban land identified within the municipality and metropolitan Melbourne. Council's objective is to ensure that the supply of developable land is rapidly increased to allow urban development on multiple fronts driven by market demand that is not constrained by the availability of developable land.

Members of the IIWG have adopted Council's planning targets for their infrastructure delivery so that:

- each servicing authority/agency established their preferred staging for provision of infrastructure from first principles on a precinct by precinct basis, and have provided council with independent, business case driven decisions;
- at least 200 hectares of land will be serviced for subdivision by the end of 2011; and
- trunk infrastructure completely rolled out across the growth area so that subdivisions (that meet the requisite permit conditions) could occur anywhere in the urban growth area by the end of 2019.

Significant engineering concept and design work underpins the IIDP

The IIDP builds on various technical investigations, data collection, modelling for the area and concept studies that have been undertaken over the past year by the City of Greater Geelong and agencies including:

- detailed concept design and implementation plan for the provision of sewer and water infrastructure;
- traffic modelling for the Armstrong Creek network;
- cost estimate of movement and access works;
- stormwater management strategy.

Copies of these reports are available, and extracts included in the attachments to this document.

Detailed design and commissioning of infrastructure elements by each Agency

Each agency has their own internal planning processes for approval of funding and commissioning of detailed design and delivery of infrastructure. The integration of these works through the IIDP will be finalised in parallel with the development of the first PSP in late 2008 / early 2009. The finalised IIDP will then be a key input into the remaining Precinct Structure Plans.

Developer community has contributed to shaping the concept plans

Council has had ongoing discussions with the developer community to obtain input into this infrastructure delivery plan including:

- public developer forums on a monthly basis to brief , and obtain feedback on, the latest infrastructure delivery concepts and plans;
- individual consultations with developers who have declared a land interest in the Armstrong Creek Growth Area for frank advice on their appetite for the various options being considered;
- involvement of developers and their consultants, along with agencies in work shopping the 800 metre grid based collector road concept layout plans that replaced Council's previous diagonal road layout plan;
- briefing on, and seeking feedback prior to finalisation of the traffic modelling for the Armstrong Creek network and the recommended stormwater management strategy for Armstrong Creek; and
- briefing on, and seeking feedback prior to finalisation of this IIDP document.

Alternative servicing plans are encouraged

These concept plans have been prepared based on conventional baseline servicing of subdivisions – "Plan A". However, potential exists for land developers to open up the supply of developable land in advance of the baseline IIDP through the provision of alternative delivery sequencing and / or solutions. Council encourages developers to identify and propose alternatives ("Plan B") as soon as is practically possible to the IIWG. The design and business case for each proposal will be evaluated (along with resourcing and investment implications) on the extent to which the alternative:

- supports delivery of the intent of the Armstrong Creek Urban Growth Plan;
- decreases greenhouse emissions and/or demand on regional infrastructure from the baseline plan;
- expedites delivery of the baseline sequence of fully serviced precincts; and
- facilitates sustainable urban growth that is founded on good design.

CONCEPT PLANS FOR EACH OF THE INFRASTRUCTURE ELEMENTS

The concept plans for conventional trunk infrastructure to be delivered by each Agency is contained in the Attachments to this IIDP:

- Attachment 1: Barwon Water – Potable Mains Water & Sewerage
- Attachment 2: City of Greater Geelong – Stormwater Management
- Attachment 3: Combined City of Greater Geelong & VicRoads – Road Network and Access Cycle ways and Trails
- Attachment 4: Powercor – Electricity Network
- Attachment 5: SP Ausnet – Gas
- Attachment 6: Department of Transport – Railway Services

Integrated Water Cycle Management is a Council Objective

Sustainable water resource management is a key challenge for all proposed urban developments given predictions for a warmer, drier climate in south eastern Australia. The appropriate response is a systems based approach to integrated water management. This means designing developments to encourage efficient and sustainable water use at the household scale and to optimize opportunities to capture and reuse non potable water within the urban landscape.

Lack of significant rainfall over the past decade across south-eastern Australia has necessitated water corporations and local government to extensively review long term strategies for sustaining water security. Integrated water cycle management refers to the combination of two strategic responses to the water security challenge, ensuring adequate supply and managing demand. This approach is as relevant to the property and development scale as it is to the regional scale.

Across the region average stream flows have reduced and population growth is continuing, particularly in the coastal townships, and the region has had to adapt to doing more with less water. Barwon Water's Water Supply-Demand Strategy addresses the long term (50 year) water security needs in the region through an integrated water cycle management approach. The strategy outlines a significant commitment to water conservation but recognises that smart augmentation of some water supply systems will be necessary.

Major regional scale water augmentation projects will increase the regional water supply to 54,000 ML/yr by 2012 and secure water supply to the Geelong region for the next 50 years, including the proposed Armstrong Creek development. Key new supplies include Anglesea Borefield Project, Barwon Downs Borefield upgrade, interconnector between Melbourne to Geelong and Dewings Creek diversion reinstatement.

Conservation is a key strategy to cope with reduced water availability and to manage demand driven by population growth. Within the greater Geelong system, the residential sector uses 65% of supply whilst the non-residential sector (which includes business and industry), accounts for the remainder. Geelong's peak consumption occurred in the early 1980s at approximately 40,000 ML/year (serving a then population of approximately 150,000 people). Since then, there has been a steady decline in per capita residential, industrial and commercial consumption, from 464 litres per head per day in 1994/95 down to 275 litres per head per day in 2007/08. The 10-year average regional consumption for Geelong is approximately 34,000 ML/yr. This reduction is due to a range of demand management initiatives, including compulsory and permanent water saving measures (ie water restrictions), compulsory dual flush toilets, a stronger water conservation ethic, user pays pricing, a strong take up of water efficient fixtures, introduction of the Water and Energy Saving regulations adopted by Plumbing Regulation in 2004 (requires minimum flow rates for water fixtures in premises), and adoption of water efficient appliances including washing machines and dishwashers.

The Government has endorsed Barwon Water's regional target to reduce per capita water consumption by 25% by 2015 (348 l/p/d) and 30% by 2020 (324 L/p/d - based on the 1994/95 baseline). The State Government has recently announced the "Target 155 Campaign" which aims to reduce Melbourne's water demand to 155 litres / person / day.

In working toward these targets, water sensitive urban development is interpreted as a design concept that integrates a range of measures for sustainable water management in situ. This includes both the design and use of urban landscape form as well as the buildings and their use within that landscape. This broader interpretation of Water Sensitive Urban Development could include consideration of housing and building design that requires water efficient appliances and gardens, incorporates reuse of grey water and stormwater on site, as well as the traditional landscape approach to managing the quality and end use of urban stormwater .

Barwon Water is currently preparing a business case for a new recycled water facility to be developed at its Black Rock Water Reclamation Plant. The *Black Rock Recycled Water Strategy* is a regional strategy which is currently investigating the potential uses for high quality recycled water from the proposed new recycled water plant at Black Rock. Concept designs and cost estimates are currently being carried out for the new recycled water plant that will provide additional treatment to the existing Class C moderate salinity recycled water. Potential uses of high quality recycled water from the new plant could include:

- Existing irrigation and agricultural customers;
- New irrigation and agricultural customers;
- Private entities;
- Open space irrigation in Armstrong Creek and Torquay;
- Third pipe supply in Armstrong Creek and Torquay.

The strategy concept being considered is to construct the recycled water plant in two stages. The first stage would produce Class C low salinity recycled water to be used by existing and new irrigation and agricultural customers and potentially open space watering in Armstrong Creek and Torquay. Once a demand for either third pipe at Armstrong Creek and Torquay or other high quality uses is confirmed, a second stage could be added to improve the recycled water to Class A low salinity recycled water. This approach would enable some short-term objectives to be met (i.e. improving recycled water quality for existing customers) whilst allowing time to develop opportunities with a third party regarding the recycled water pipe network which could incorporate the Armstrong Creek development.

Council has set targets for residential and employment areas of Armstrong Creek as follows:

1. **Reduce the demand for potable water in line with Barwon Water's regional tagret (25% by 2015 and 30% by 2020)**
2. **Significantly decrease greenhouse emissions via both built form and personal transport.**

Achievement of Council's targets will require developers and/or third parties to invest in sustainable water and associated energy management solutions and to work closely with relevant agencies to develop these solutions.

KEY INTEGRATED WATER CYCLE MANAGEMENT DESIGN PRINCIPLES:

(Mains Water, Sewerage, Recycled Waste Water, Stormwater Management)

- **Sufficient mains water will be able to be supplied by Barwon Water to service the potable water demand.**
- **Sewerage infrastructure is largely gravity fed and needs to be built sequentially from the trunk sewer connection in the east, following the topography. The design of sewerage has allowed for flexibility to deliver other scenarios if required.**
- **Potential use of recycled waste water is being explored utilising recycled waste water from Black Rock reclamation plant.**
- **Flexible stormwater management strategy based on the restoration of natural streams and recognising the benefit of individual developer investment in water sensitive urban design, rainwater tanks and water efficient appliances.**
- **Downstream Ramsar Wetlands are environmentally sensitive and hence strict stormwater quality and quantity controls are required.**

CRITICAL ISSUES:

- A Cultural Heritage Management Plan will be required in order to construct the Armstrong Creek branch sewer that follows the alignment of Armstrong Creek and will ultimately service the majority of the development.

Supply of Potable Mains Water – Barwon Water

Barwon Water's potable mains water concept design consists of 3 zones supplied from Pettavel Basin via the Bellarine transfer mains. A high level zone will be supplied directly from the Bellarine transfer main. The augmentation of the Bellarine Transfer Mains (along the railway line) is planned to occur in two stages with the first stage to Torquay Road due to completed in the next couple of years.

Supply of Sewerage Services – Barwon Water

Barwon Water's sewerage infrastructure concept design includes 13 sub-catchments all of which ultimately connect to the outfall sewer that carries sewerage to the Black Rock Water Reclamation Plant (WRP). The majority of the development will be serviced by the Armstrong Creek branch sewer that follows the alignment of Armstrong Creek.

Supply of Recycled Wastewater – Barwon Water

Barwon Water is exploring the potential for utilising recycled waste water from Black Rock WRP and creating an opportunity to service Armstrong Creek for public open space, industrial or residential recycled water use.

Achievement of Council's targets will require the Federal or State Government, developers and/or third parties to invest in sustainable water and associated energy management solutions.

Stormwater Management – City of Greater Geelong

Council has developed a stormwater management strategy for Armstrong Creek that utilises an integrated water systems analysis to explore the performance of a range of stormwater management options for the Armstrong Creek development. It seeks to recognise the downstream benefits from investment upstream and to encourage developer investment in contemporary sustainable water cycle management design and construction practices, including the use of rainwater tanks and water sensitive urban design.

The details of the stormwater management strategy for Armstrong Creek and Council's Stormwater Management Policy are contained in Attachment 2. It has been designed to:

- Adopt an integrated approach to stormwater management that meets objectives for hydraulic capacity and water cycle management;
- Minimise the disturbance of waterways created by altered flow regimes and protect natural drainage and aquatic ecosystems;
- Maintain and protect the water quality in receiving waters, the down stream environment and the Ramsar wetlands;
- Enhance the value and public amenity of the existing stream corridors, biodiversity and environment of Armstrong Creek as a key asset of the urban growth area;
- Include the principles of water sensitive urban design and sustainable urban growth; and
- Allow the full range of urban design, water conservation and local stormwater infrastructure options likely to be proposed by developers.

The stormwater management policy proposes that the developer (or developer consortium) for a particular precinct can adopt one of the defined stormwater management strategies and provide the required additional detention and constructed wetland storage within the precinct. Alternatively a developer can elect to make a proportional financial contribution to construct detention basins and constructed wetlands at the nearest defined downstream location (including reimbursement of the land owner for the value of the land). All developers in a given catchment will as a proportion of land holding contribute to the cost of restoring streams within that catchment.

Energy supply and demand reduction strategies are also a Council goal

Urban growth areas are major centres for energy demand, requiring large quantities of energy in both construction and operation. Reducing greenhouse emissions will become a key priority as we move into a carbon constrained future which requires an integrated approach to energy demand reduction and renewable energy supply strategies as part of the master planning and preparation of Precinct Structure Plans.

The production of electricity generates more than 50% of Victoria's greenhouse gas emissions, with demand for electricity growing by approximately 1.5% per annum. In 2006 the Victoria Government announced the "Victorian Renewable Energy Target" which aims to provide 10% of Victoria's energy supply via renewable sources such as solar, wind, hydro, geothermal and biomass by the year 2016.

The renewable energy sources / opportunities currently available to the Geelong region (and Armstrong Creek) include continued wind farms expansion along the south-western coast line of Victoria, State / Federal Government funding assistance for household solar energy and solar hot water systems and geothermal energy generation.

A recent announcement by the company "Greenearth Energy Ltd" confirmed they were exploring opportunities to develop a geothermal energy plant in the Geelong region that utilises the hot sedimentary aquifers in the Armstrong Creek and Moriac area to create renewable energy. Hot water flowing under the Geelong region has the potential to supply 150 times Victoria's energy requirements. The project has already attracted $7M in Federal funding to assist in the development of the project, with a project's total cost being estimated at $20-24 M.

Council has set the goal of developing precinct based energy management plans, that includes both supply and demand strategies to deliver a "state of the art" approach to minimising the "development footprint". Council has set targets for residential and employment areas of Armstrong Creek to significantly decrease greenhouse emissions via both built form and personal transport.

KEY DESIGN PRINCIPLES:

- **Energy demand and supply management strategies are required in order to target significant reductions in the greenhouse emissions from the urban growth of Armstrong Creek.**
- **Underground or re-route electricity transmission lines to remove both the potential for harmful health impacts and the visual blight caused by the lines and, in particular, their pylons**
- **Design of the supply of gas is based on connection from the transmission line on to a central location for flexibility to service subdivisions as they are developed.**

CRITICAL ISSUES:

- Whilst it is standard practice to underground new power lines at a subdivision level, the "under grounding" or rerouting of existing transmission and feeder lines will need to be funded.
- At this stage, Council's goal of reducing greenhouse emissions from energy consumption in Armstrong Creek is aspirational and is dependent on the developer appetite for embracing a more sustainable approach to the built environment.
- SP Ausnet is the only provider of gas and at this stage is unable to provide a commitment to service Armstrong Creek.
- Augmentation of the gas transmission line would be required to service the full development of Armstrong Creek. This is a major and rare construction activity. As it is a licensed pipeline, Department of Primary Industry permits would be required to work on this asset. Allocation of this cost is still to be determined.

Electricity - Powercor

Powercor has a number of feeder lines passing through the Armstrong Creek Urban Growth Area and an ongoing 10 year plan to upgrade its network to meet the expected load growth and to improve reliability throughout the Region. It is, therefore, well positioned to be able to service the entire urban growth area of Armstrong Creek from 2013 when additional capacity will be provided in the feeder lines with the establishment of the new Torquay Zone Substation for Torquay/Jan Juc and a local substation with the Urban Growth Area. In the interim Powercor is able to service development of the Armstrong creek East Precinct and/or along the Surf Coast Highway.

Natural Gas – SP AusNet

SP AusNet is well positioned to supply natural gas to Armstrong Creek with transmission pipelines in Torquay Road and Mount Duneed Road. SP Ausnet has suggested construction of a central grid or core of supply mains that would enable the mains to be extended from the

central location to the various new estates as they develop. By the completion of the full development of Armstrong Creek SP AusNet would need to have in place additional supply capacity with the augmentation of their transmission gas line to the west of Armstrong Creek. At this stage SP AusNet has a fair degree of flexibility in their planning arrangements.

Movement and Access that encourage alternative forms of transport

Transport is crucial to managing growth, providing equity of access, reducing environmental impacts and maintaining a prosperous economy. Permeability and connectivity of movement and access is critical. In addition, a development of the scale of Armstrong Creek offers a rare opportunity to plan for modal shifts away from car dependency and for higher-quality public transport services. Council's goal is for smart land use planning for "walkable" neighbourhoods combined with a hierarchy and network of cycle access ways to encourage modal shifts away from car dependency for trips confined to within Armstrong Creek, particularly those of less than 5kms.

Council's objective is to work in partnership with the State Government to deliver integrated transport and land-use planning and development activities to develop Armstrong Creek as a sustainable, liveable community with a significant modal shift away from car dependency and higher density housing.

KEY DESIGN PRINCIPLES:

- **More frequent, narrow, collector roads at 800 metres taking traffic to the outer arterial roads. Maximise the flow of traffic on arterial roads with minimum numbers of intersections.**
- **Design to increase movement and accessibility through wide access ways for walking and cycling, and high frequency public transport to encourage modal shifts away from car dependency.**
- **Prioritised public transport movement on road systems to enable them to operate efficiently, frequently and on time.**

CRITICAL ISSUES:

- Establishing the final alignments for new/upgraded arterial roads and protection of future movement and access reservations.
- Establishing the State Government's early commitment to public transport facilities and services for Armstrong Creek so that this is built into precinct structure planning and subdivision planning to encourage higher density housing and encourage alternative forms of transport and reduced travel demand.

- Design of intermodal conflict points to maintain the attractiveness of the bicycle as a mode of transport (particularly for trips less than 5kms and facilities on the northern side of the rail way line) and manage the different needs of the different bicycle cohorts.
- Establishing a Native Vegetation Plan and bush broker scheme for all of Armstrong Creek. Many of the existing roads have quality vegetation on one side of the road and where possible this will be retained.
- Development of a construction and funding strategy.
- Achieving higher housing densities to ensure the commerciality of public transport services.

Arterial Roads – VicRoads

Armstrong Creek will be well serviced by existing and future Arterial Roads and with the completion of the Geelong Ring Road providing direct access to the freeway to Melbourne. The Arterial Roads proposed for Armstrong Creek are the:

- new East West Link Road (2 lanes each way with service roads and provision for third lane as dedicated transit route)
- upgraded Surf Coast Highway (3 lanes each way with service roads)
- upgraded Barwon Heads Road (2 lanes each way with service roads)
- Mount Duneed Road (likely to be classified as an Arterial Road – 1 lane each way)
- Lower Duneed Road (existing - 1 lane each way).

Collector Roads – City of Greater Geelong

In January 2008 Council held a road network concept workshop with VicRoads and the Developers to develop a consistent position on the road network plan that will service the Armstrong Creek area. As a result of this workshop Council has adopted an approach of more frequent, narrower, collector roads at 800 metres (based on the existing road layout) taking non local traffic to the arterial roads. These roads will be built by developers as urban development progresses and incorporate easements for the essential services. The design of the road alignment has utilised a regional network traffic analysis that was initially developed by Veitch Lister for VicRoad's design of the new Geelong Ring Road and has been developed with much more detail to support Council's concept planning (refer Attachment 3).

The detailed design of the collector roads will incorporate:

- retention of existing road reserve native vegetation as far as it is practically possible;
- details to ensure priority movement and access for public transport; and
- Intersection treatments that significantly prioritise pedestrian and cyclist movements.

Bicycle access ways – City of Greater Geelong

Council seeks to encourage modal shift away from cars with an extensive network of bicycle paths to cater for all cohorts from school children to the serious cyclists in training. The goals is for it to be easier to walk or cycle than drive for the majority of trips within Armstrong Creek that are less than 5 kms, and for accessing the facilities on the northern side of the Geelong-Warrnambool railway line (Waurn Ponds and Grovedale). This requires significant investment at conflict points to ensure they do not compromise the integrity of the network.

The objective is a "seamless" approach to the movement of pedestrians and cyclist through the Armstrong Creek development, and to target the early construction of under / overpass facilities to minimise conflicts with the developments arterial road and rail networks.

Public Transport – Victorian Department of Transport

A development of the scale of Armstrong Creek offers a rare opportunity to plan for and around higher-quality public transport services. It will be important that the new public transport infrastructure and services are established as early as possible in the life of the Armstrong Creek development, to 'capture' residents before they develop a car 'habit'. All arterial and collector roads are being designed for priority access for public transport.

Armstrong Creek has the potential to be well serviced by train services with proposals for:

- a considerably upgraded and expanded facility at Marshall with improved access from the South and car parking for up to 1000 cars;
- a new regional railway station near the end of Rossack Drive with car parking for up to 2000 cars; and
- a new central railway station on the eastern side of the major activity centre; initially to be developed as a transit route from Marshall Railway station with a high amenity terminal at the Major Activity Centre.

The Victorian Department of Transport advises that they can significantly increase the capacity of railway services on the Geelong to Melbourne line by the addition of train carriages to the existing services. A key issue is, however, obtaining commitment to these (and other public transport services) and the new/upgraded facilities along with contemporary planning that integrates the facilities with the surrounding community.

Telecommunications for a smart community – optic fibre to the premises

Armstrong Creek is planned to be a smart community with the highest level of "future-proofed" telecommunications serviced with optic fibre to the premises.

Telstra has advised that it is able to service a "smart community" for Armstrong Creek with 18 months notice. The works would require upgraded facilities and utilisation of the electricity trenches for the cable. Alternative providers are available for the installation of the optic fibre but needs to provide a similar level of maintenance and services (including content) as Telstra.

Given the scale of Armstrong Creek and the unwillingness of Telstra to pass on the economies of scale to the developers (that will ultimately be passed on to the resident) significant potential exists for the developer community to work together to develop an alternative delivery models.

KEY DESIGN PRINCIPLES:

- **All allotments to be serviced by optic fibre to the premises.**

CRITICAL ISSUES:

- The lack of a vibrant wholesale market and the corresponding high upfront costs.
- Ensuring ongoing maintenance and service levels for alternative delivery models.

Compared to the average family car, the average train passenger produces eight times less carbon emission per km per person, with light rail four times less and buses half as much.

INFRASTRUCTURE DELIVERY SEQUENCE FOR 200 HECTARES ASAP

Council need for expedited delivery timeframes

Initially Agencies were planning for the roll out of their trunk infrastructure to support a slow urban growth scenario of twenty five to thirty years for Armstrong Creek. There is an urgent need, however, given the considerable shortage of developable urban land in Geelong that has been identified by the State Government[1], to rapidly increase the supply of serviced land so that urban growth can proceed on multiple fronts, driven by market demand without the price premium imposed from a constrained supply.

In late 2007 Council nominated a ten year planning timeframe based on a high urban growth scenario and having regard to the shortage of residential land for development. In addition, Council's planning process (outlined in Figure 2) will bring forward the development of Armstrong Creek by more than twelve months and shorten the timeline for the delivery of the trunk infrastructure required for subdivision.

Members of the IIWG have accordingly adopted Council's targets for the planning for delivery of their trunk infrastructure so that:

- 200 hectares of fully serviced residential land at Armstrong Creek will be available for urban development by the end of 2011;
- the supply of developable land is opened up as quickly as possible;
- completion of the roll out of trunk infrastructure across the growth area within ten years (by the end of 2019) so that subdivisions (that meet the requisite permit conditions) could occur anywhere in the Urban Growth Area from 2020 onwards.

Each Agency developed a preferred baseline sequencing

Agencies typically prepare their delivery plans in response to specific development proposals but with Armstrong Creek, however, there are a number of potential delivery sequencing scenarios. So Council asked each agency to nominate their preferred baseline roll out sequence from first principles without consideration of where development might/might not start. The agencies preferred baseline sequencing for

[1] Geelong is falling well below this the Government set benchmark of 15 years supply of residential land across all growth areas, of which at least 10 years should be zoned to permit development. The City of Greater Geelong currently has a supply of zoned land for only 4 years. Low levels of residential land supply can create demand pressure in the housing market that can result in artificially inflated land and house prices, impacting on housing affordability

infrastructure delivery is outlined in the following table and they nominated the following criteria as significant in determining their design from first principles:

- Location of regional infrastructure to supply the urban growth area and timing of regional infrastructure projects;
- Optimisation of the Return on Investment for the Agency (i.e. greatest number of connections for capital investment);
- Concentration of investment in asset to support contiguous urban growth and greatest flexibility to respond to alternatives;
- Pragmatic construction considerations (e.g. the sewer is primarily gravity fed infrastructure and needs to be laid sequentially following the topography of the land from East to West); and
- Budget/resourcing constraints.

Figure 4: Preferred baseline sequencing of infrastructure delivery by each Agency

Infrastructure element	Major Activity Centre	Armstrong Creek East Precinct	Armstrong Creek West Precinct	Horseshoe Bend Precinct	Marshall Precinct	North East Industrial Precinct	Western Industrial Precinct	Comments
Potable Mains Water & Sewerage	3rd	1st	4th	2nd	7th	6th	5th	Potable Water Supply from Bellarine Transfer mains along railway line. Critical gravity sewer issue for connection into the Trunk Sewer to Black Rock WRP.
Roads	1st	7th	5th	3rd	2nd	4th	6th	Desire to utilise existing arterial roads. Early enhanced access to Marshall.
Stormwater	5th	1st	2nd	4th	6th	7th	3rd	Desirable to work from the bottom of each catchment. Highest topographical profile catchment is Armstrong Creek
Cycle Access ways	7th	3rd	5th	4th	1st	2nd	6th	Targeted at early links to key facilities and attractiveness to the community. Easement provision.
Electricity	4th	3rd	1st	5th	6th	7th	2nd	Even service distribution, weighted towards far west (Waurn Ponds Zone Substation)
Natural Gas	2nd	1st	5th	3rd	7th	6th	3rd	Network feed from the south and west. Note existing services already within Marshall and NE Industrial

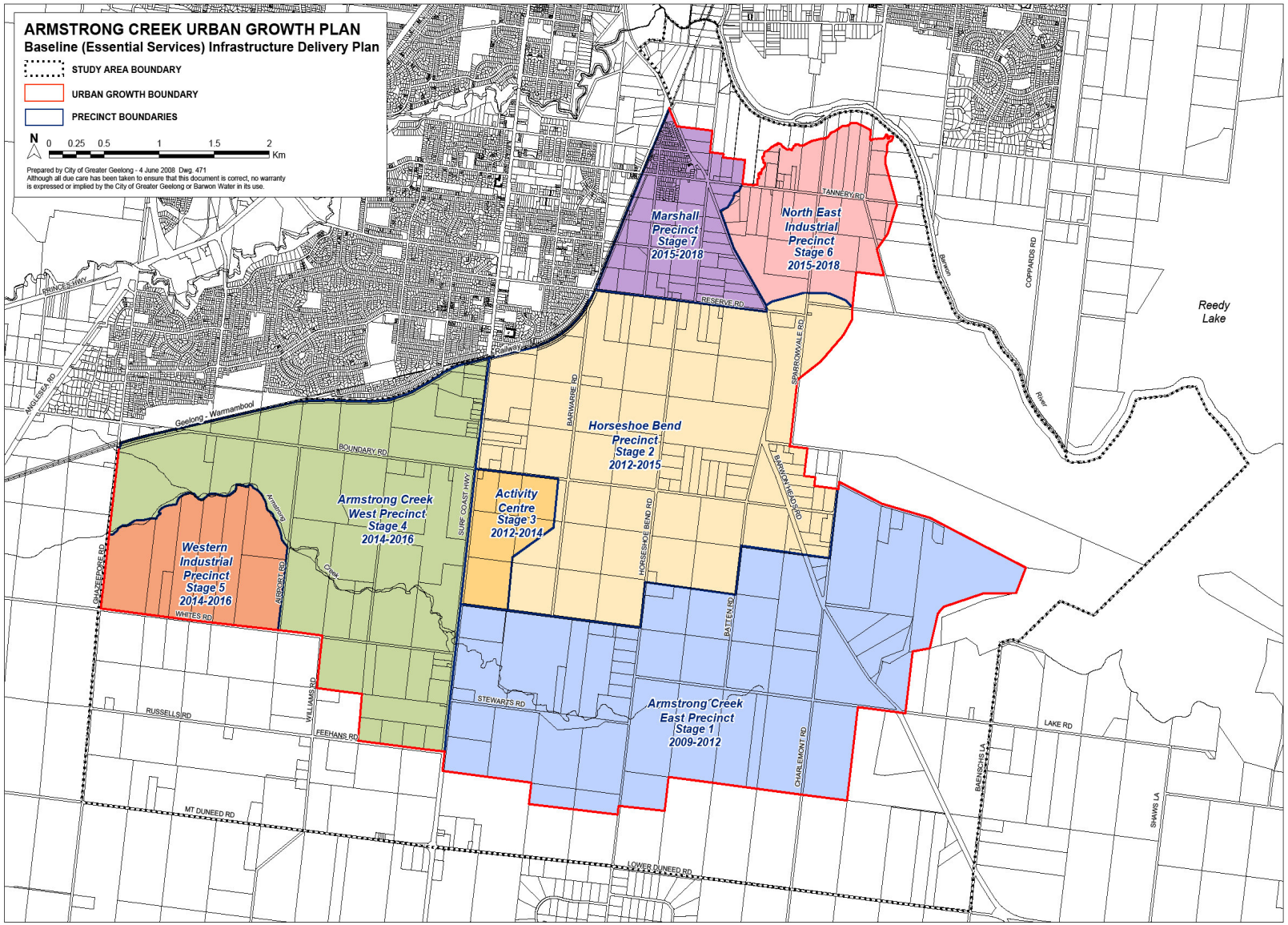
Coordinated interagency delivery sequencing to open up the land supply

Consistent with the preparation of sequencing of the individual agencies, the baseline IIDP sequence has not been determined by anticipating developer readiness to proceed. Rather it was determined by the IIWG based on a synthesis of individual agency cases for preferred staging plans:

- Overlaying the baseline sequences from each of the agencies to determine the sequence that provides the most effective and efficient delivery of infrastructure for urban development of the entire Armstrong Creek area;
    - all agencies are able to service the Armstrong Creek East Precinct relatively quickly
    - the existing service provision in Marshall provided by Barwon Water, Council and SP Ausnet had been on a local "end of line" basis and did not build in excess capacity and hence requires significant investment to expand to a broader area
- Overlaying the baseline sequences from each of the agencies to determine the sequence that provides the first 200 hectares of developable residential land the most quickly, and then quickly opens up the developable land supply significantly ; and
- Pragmatic construction considerations significantly biasing the weighting towards the sewer construction sequence
    - The sewerage system is largely gravity fed and needs to be built sequentially from connection to the existing Outfall Sewer (which transfers sewage to Black Rock WRP) in the East and progressing Westwards following the topography).

The coordinated interagency infrastructure delivery sequence was determined on a precinct by precinct basis and is outlined on the following page in Figure 5. Note that this is the sequence for the baseline roll out of infrastructure ("Plan A") that will be implemented unless an alternative ("Plan B") is proposed and endorsed by all Agencies.

Figure 5: Baseline sequence for Interagency Infrastructure Delivery



Out of sequence delivery of infrastructure is possible

A precinct that falls outside the nominated staging sequence may still be able to proceed ahead of the IIDP nominated sequence provided the proponent and agencies can work together to provide “out of sequence” delivery of infrastructure. This could involve alternative solutions, alternative delivery models, or the bringing forward of the existing plan but in all cases would be informed by robust economic and scientific analysis.

In order for development to proceed out of sequence the total precinct must be able to be serviced without affecting the baseline staging of service delivery reflected in this IIDP and:

- A formal written agreement from all servicing authorities is required. The servicing authorities who must provide formal written agreement to Council are: Barwon Water, Powercor, CoGG (drainage and collector roads), VicRoads, DoT (if precinct includes railway stations).
- The agreement must state that the servicing authority can service the proposed precinct in the agreed timeframes without compromising their delivery of the baseline staging plan reflected in the IIDP. This agreement must include:
    - a plan of the precinct being serviced
    - an outline of the planned location of trunk services and details of any deviation from the IIDP
    - any temporary or staged works
    - any easement or access issues requiring consideration.
    - any assumptions/constraints (e.g. potable water demand no greater “x”).
- Where alternative methods of service provision is proposed an “in principle” endorsement is required from the relevant authority that the proposed solution is realistic and deliverable. In particular, proposals that demonstrate decreased greenhouse emissions and/or demand on regional infrastructure will be favourably considered.

More than one billion dollars will be spent on the delivery of essential service and civil infrastructure for the new Armstrong Creek development.

Governance framework for delivery of the IIDP

Council will partner with the Agencies and developers with accountabilities for delivery of essential services and/or civil works infrastructure for a coordinated and expedited implementation. This partnering approach includes the elements outlined below.

Element	Focus
Geelong Planning Partnership for strategic oversight of progress of the IIDP	• State Government approvals, resourcing & problem solving to better manage the urban growth of Geelong • Includes a Geelong Partnership Broker role to provide a critical link between Council and other areas of Government, facilitating and expediting Agency approvals for, and delivery of strategic support and/or elements
Interagency Infrastructure Working Group for strategic planning, decision making and implementation of essential services and civil works infrastructure	• To ensure a coordinated and more timely delivery of the essential services and civil works infrastructure necessary for the land to be subdivided for urban development • Development of IIDP and leadership of its implementation and expedited interagency approvals/permits processes • Coordination of strategic planning and decision making including for evaluation of alternative proposals for out of sequence and/or locally based delivery of essential services and civil works infrastructure
Individual Agency Governance Frameworks still apply but will be monitored for opportunities to streamline/expedite processes	• Agency governance arrangements continue to apply • Agency or interagency permits processes will be monitored by the Interagency Infrastructure Working Group and where necessary, expedited
Precinct Structure Planning Partnerships with developer(s) who have 70% of the developable area	• Council will set the policies, standards and objectives for the Precinct • IIDP is a key input into the planning process • Developers have flexibility to propose solutions and master plan for the area • The IIDP will be further refined and developed during the structure planning for the first precinct to be developed. It will then be an input into subsequent Precinct Structure Plans.
Individual developer consultations for frank advice from the development community and input into IIDP element proposals	• To test and work up proposed solutions for infrastructure elements one-on-one with developers who have a land interest in Armstrong Creek
Public developer forums for briefing, and obtaining feedback from, the broader development community	• To ensure developers have early understanding and input into proposed options • To understand developer's critical issues and appetite for various options
Land owner briefings	• To keep land owners abreast of the urban growth development process. Number of mediums – correspondence, information forums, web site and email updates • Land owners in a particular precinct will be consulted during the master planning to develop the Precinct Structure Plan for their precinct.
Community consultation	• The public has been consulted through public exhibition and panel processes during the development and incorporation of the Urban Growth Framework Plan outlining the strategic intent for urban development of the area • The community will be consulted through a public exhibition and panel process for the incorporation of each Precinct Structure Plan

Importantly, the members of the Interagency Infrastructure Working Group have committed to its ongoing role in the strategic planning and leadership of the implementation of the IIDP along with expediting the interagency approvals/permits processes necessary for development of Armstrong Creek.

Funding of infrastructure finalised with the PSP

The funding model for infrastructure delivery for Armstrong Creek will be quite complex and include Government funding (mixture of federal/state/local), agency funding, essential services charges, developer contribution plans, and developer funded/delivered as construction works. Once the IIDP is finalised and quantified, cost estimates can be prepared and the funding model options established. The funding of infrastructure and Developer Contribution Plans for a precinct will be finalised with the preparation of Precinct Structure Plans.

The development of a DCP(s) for the Armstrong Creek development will be limited to Council controlled infrastructure, and will not include those services covered by the Essential Services Commission or specific state and / or federal funding. The IIDP items potentially covered by a DCP(s) include, but are not limited to:

- Collector Roads and major intersection treatments,
- Stormwater management and drainage and flood mitigation,
- Major pedestrian / cycle access ways and paths.
- Provision of arterial road reservation and first carriageway.

Delivery Accountabilities

There are some well defined accountabilities for delivery of infrastructure:

- developers provide all local infrastructure elements that are contained within the subdivision; and
- agencies provide regional infrastructure servicing areas beyond the Growth Area but may seek developer contributions in proportion to the contribution of the subdivision to the need for the element.

It is also possible for developers to construct infrastructure elements traditionally regarded as the realm of agencies for coordinative, expediency or efficiency reasons. These items will be established during the Precinct Structure Planning Process. The standard roles of agencies and developers as part of the delivery of essential services infrastructure is details in the below table.

Element	Agency	Developer
Potable Mains Water Sewerage	Where water and sewerage infrastructure is required to service 'multiple' developments, Barwon Water funds potable water infrastructure for pipe diameter > 150 mm and sewerage infrastructure for pipe diameter > 225 mm.	Infrastructure required to service a 'single' development, regardless of size of pipes, is the responsibility of the developer. Developers also provide for 'reticulation' assets which includes potable mains water infrastructure for pipe diameter < or =150 mm and sewerage infrastructure for pipe diameter < or =225 mm in accordance with Barwon Water's standards and requirements. Developers also pay a standard New Customer Contribution charge to Barwon Water per lot.
Stormwater	Council coordinates planning & delivery of trunk infrastructure	Developer provides all new assets required to service the specific development – additional developer contribution to area outside subdivision to be determined at Precinct Structure Planning stage
Future State Arterial Roads	VicRoads/Council/ Developer set reserve requirements. VicRoads provides roads for major through traffic of a regional / state significance when need arises.	Developer provides arterial road reservation and first carriageway, if development occurs ahead of the roads strategic need as an arterial road. Contributions would also be required for provision of service roads & local signalisation.
Collector Roads	Council sets the standards and objectives	Developer designs and delivers – additional developer contribution to area outside subdivision to be determined at Precinct Structure Planning stage
Electricity	Powercor delivers feeder lines to subdivisions and connections to houses	Developer designs and delivers subdivision servicing plans
Gas	SP Ausnet delivers natural gas riticulation to residences and commercial properties.	Developer applies to SP AusNet for gas supply to subdivision stages prior to construction. Developer delivers subdivision scale infrastructure and connection pipelines to the subdivision if SP AusNet will not

The prevalence of obesity in Australia has more than doubled in the past 20 years. Walking and access to quality public open space are seen as seen critical elements in combating this epidemic.

ATTACHMENTS – INDIVIDUAL AGENCY INFRASTRUCTURE PLANS

Attachment 1: Barwon Water – Potable Mains Water & Sewerage

Attachment 2: City of Greater Geelong – Stormwater Management

Attachment 3: City of Greater Geelong & VicRoads – Road Network & Cycle Paths

Attachment 4: Powercor – Electricity Network

Attachment 5: SP Ausnet – Gas

Attachment 6: Department of Transport – Railway & Public Transport Footprints

Attachment 7: Telstra – Telecommunications