Planning a clever and creative water future: Northern and Western Geelong Growth Areas Integrated Water Management Plan

A. Dowling & C. Morgan[1,*], R. Bennett[2] & J. Hinch[3]

[1]*E2Designlab, Suite 904 289 Flinders Lane, Melbourne, Victoria, 3000, Australia*

[2]*Barwon Water, PO BOX 659, Geelong, Victoria, 3220, Australia*

[3]*City of Greater Geelong, PO BOX 104, Geelong, Victoria, 3220, Australia*

**Corresponding author email: aaron@e2designlab.com.au*

Highlights

- A rare blank canvas for strategic planning– the context presents a unique opportunity for IWM
- IWM will shape the success of the new growth areas, driving greening and liveability
- Iconic water solutions for quarry remediation, potable supply and environmental flows

Introduction

Geelong is a regional city in Victoria which is experiencing extensive and rapid population growth, of which the Northern and Western Geelong Growth Areas (NWGGA) constitutes a major portion – over 40,000 new houses and 112,000 people will call the two growth areas home over the next 40 years. This constitutes a 56% increase to the population of Geelong today.

This scale of growth introduces substantial challenges to the city – spanning beyond the resilience of servicing networks and infrastructure, extending to the city's identity itself – a city that celebrates and cherishes the role of water in the environment. An Integrated Water Management (IWM) Plan to service future development will leverage the water cycle to not only retain this key feature of the city's identity, but build upon this narrative by exploring clever and creative approaches to harnessing and using water. The greenfield nature of proposed growth, early status of precinct structure planning and consolidated land ownership highlights the significant opportunity to plan for IWM: a blank canvas, an IWM planner's dream.

As a growing regional city, Geelong's economic context is also changing. The City is experiencing solid growth in its services sector, where many local and state-run organisations are servicing the growing population of Regional Victoria. Tourism, recreation, health and education are also foundational economies for the City, placing important emphasis on the quality of new development environments as a place to live, work and play. Accordingly, the creation of a greener city, and a focus on liveability has come to the fore.

While traditionally water services in a city are hidden and often taken-for-granted, integrated water management provides a platform for greater celebration of the water cycle within the urban form, utilising water resources to enhance urban greening, recreational assets and amenity. Accordingly, integrated water management can become a key tool in the delivery of a greener and cooler Geelong with measures such as enabling greater tree canopy cover and a reduction in the urban heat island effect. This, along with other IWM initiatives presents an opportunity to enhance biodiversity, resilience, local economic opportunities and desirability of the City.

A unique feature of the NWGGA is the environmental context - preservation and enhancement of the particularly high value receiving environments is central to the success of the IWM Plan and new development context. These values include:

- The Moorabool River – The most flow stressed river in Victoria, the natural flow regime of the Moorabool is heavily influenced by Lal Lal Reservoir in its headwaters, agricultural extractions throughout the Moorabool Valley Irrigation District and historical modifications to its natural form. The Moorabool commands a large cohort of passionate stakeholders, spanning both the public and private sectors, who value its significant biodiversity and cultural values.
- The Batesford Quarry – Large scale resource extraction is currently occurring from a quarry pit central to the Western Geelong Growth Area. The future of the quarry pit in an urbanised context relies on the successful establishment of an urban lake facility that encourages biodiversity, public amenity and recreation. Water is a key enabler for the success of this important feature, including planning for the final built form of the lake – in terms of water quality and impact on Moorabool River flows - and careful management of the quarry pit filling period.
- Sensitive downstream values – The impacts of such large scale urbanisation are not contained to just the immediate areas within and surrounding the growth areas. Significant values further downstream will be at risk should the water cycle be inadequately managed. This includes the iconic Barwon River – a key community asset with high recreation and community amenity value that flows into the RAMSAR-listed Lake Connewarre .

Typically, the opportunities and recommendations identified in IWM plans are considered aspirational targets. However, preservation and enhancement of particularly high value receiving environments, and their role in maintaining the City's identity when faced with change, make successful implementation an imperative. This IWM Plan establishes a new approach to servicing greenfield development that is driven by careful strategic planning and broad stakeholder consultation to forge a new avenue of implementation.

This Plan draws on a range of existing visions, strategies, plans, tools and reports to inform the development of the IWM Plan. Crucially, the IWM Plan incorporates the perspectives of a wide range of stakeholders including developers, residents, environmental action groups and water and planning authorities.

Methodology

Vision and objectives

Through an extensive stakeholder consultation process, the objectives of the IWM Plan are established to capture the diverse range of interests and opportunities the impending growth presents. An overarching vision is established to guide the Plan outcomes and specific indicators for each objective are identified to provide a balanced and encompassing assessment framework.

Water and pollutant balance

Quantification of the water and pollutant balance acts as an inventory of the water supply, stormwater and wastewater resources as they pertain to the subject area. This understanding establishes an appreciation of potential outcomes that can be achieved with careful IWM planning and is used to inform the preliminary assessment of a long list of IWM options.

Preliminary assessment

The objective indicators and water balance are used to inform the preliminary assessment of locally relevant IWM options and provide a measure of the performance of the option in relation to a servicing base case. Each option also undergoes an assessment of key risks and cost factors that affect implementation.

This preliminary assessment process facilitates a high level understanding of the relevance and potential of individual options to deliver on the identified objectives of the IWM Plan. It serves as an information base to inform selection of priority options and an understanding of their implications to affected stakeholders, whether that be authorities who will own and maintain future assets, developers who will likely construct the required infrastructure or the community who will be the ultimate beneficiary.

Detailed assessment and economic analysis

The short listed IWM options identified in the preliminary assessment are organised into portfolios of complementary options and undergo detailed assessment, including concept design and economic analysis. The assessment goes beyond just the measurable: it establishes the benefits and costs across multiple criteria to capture the unique high values present in the NWGGA context. Such approach is particularly pertinent in this context – significant values pertaining to the context and the opportunities present are particularly difficult to quantify and therefore a range of innovative tools are used to gain a better appreciation of an IWM options performance.

Results and discussion

With the unique context and timing of the IWM Plan, the constraints usually encountered in a typical IWM Plan fade and the more aspirational measures start to garner attention. IWM options that become attractive responses to the urban development context include:

- Urban water supply catchments – harvest stormwater from house roofs, roads and gardens to top up water supply reservoirs, improving the network resilience in the face of a challenging water supply future. There is potential to inject more than 8 GL/year of additional water into the potable water supply network.
- Wastewater and stormwater to benefit the river – treated wastewater from a new water recovery plant and harvested stormwater from new urban areas can not only help reduce the demand for new water resources locally but can be used to improve flow conditions in the highly flow-stressed Moorabool River. These alternative water resources can also play a vital role in establishing the Batesford Quarry urban lake by accelerating the time taken to fill the lake.
- Naturalisation and restoration of the concreted sections of the Moorabool River diversion channel will significantly improve flows by preventing losses to underground flow paths, restoring a more natural flow regime, improving water quality and removing a significant barrier to habitat connectivity. These represent substantial opportunities to increase biodiversity in and around the urban development area.
- Measures such as passively irrigated street trees and modified constructed waterway forms to incorporate constructed billabongs can promote retention of water in the landscape by encouraging greater infiltration and evaporation losses.

The delivery of such aspirational IWM initiatives is supported by the early status of the planning framework and the strong, united perspectives of affected stakeholders. Everyone wants to see a cool, green, liveable development area within a thriving natural environment context. The successful delivery of IWM in the future Geelong growth areas can leverage the planning framework, building on the identity of Geelong as a city that celebrates water.

Conclusions and future work

Careful planning for Integrated Water Management can deliver on a range of outcomes that can provide benefits beyond the water cycle, stretching into liveability, biodiversity, waterways, urban greening and cooling. The benefits can be realised through early planning for greenfield areas and collaboration with key stakeholders. Importantly, identification of the natural environment as a key stakeholder has enabled an integrated pathway towards protecting and enhancing the identity of an iconic city on the pathway to becoming a water sensitive city.

References