

# Implementing sustainable water strategy through development industry engagement

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## Overview

*This paper covers the outcomes of a project undertaken to assist the City of Greater Dandenong in Metropolitan Melbourne. The project was to assist Council with the implementation of the Dandenong Sustainable Water Strategy. The project focused on integrating development WSUD measures into the building and planning approvals processes. The focus was on applying the 2016 Australian Rainfall and Runoff (ARR 2016 – Engineers Australia) urban catchment philosophy of Volume Management. Volume Management requires that stormwater design addresses multiple criteria. These multiple criteria are that peak flows are attenuated to reduce local flooding, as well as requiring volume reduction targets to be met to reduce downstream flood frequency, and to generally improve water quality outcomes across the catchment.*

*The Dandenong Sustainable Stormwater Strategy considers the impact of forecast urbanisation, increased catchment impermeability, and climate change. Future development is predicted to be the larger influence on water quality and stormwater infrastructure in the local catchment.*

*The creation of new growth areas and forecast infill development will result in an increase of impervious areas within the municipality. The catchment is predicted to be 90% covered in impervious surfaces by 2030 under a Business as Usual scenario. This will increase the total volume of stormwater runoff and pollutants discharging to the waterways, which will result in increased pressure on the existing drainage infrastructure. To avoid exponential increases in asset replacement costs, Council undertook a program to implement the building and planning related sections of the Sustainable Stormwater Strategy.*

*These were the Action Plan items to:*

- o Manage demand for new and improved drainage systems*
- o Investigate planning controls and market-based tools to alleviate impact of urban consolidation and infill development on existing drainage infrastructure*
- o Strengthen local planning policy and/or facilitate market-based tools to manage flood risk (where appropriate)*
- o Manage the interface between new and old drainage infrastructure*
- o Develop Guidelines to assist developers in the preparation of Stormwater Management Plans for new developments.*

*The project has allowed Council's environmental planners to map out and draw together the different areas of WSUD into one integrated approvals process that includes all stakeholders, leading to a more streamlined process for applicants, and more effective on-ground implementation of initiatives in development and redevelopment sites.*

*This project has also provided training to the various internal Council stakeholders including planners and the stormwater engineering team to achieve better WSUD outcomes during the planning application process. This will facilitate the engineering team to deliver the 2016 ARR Guideline's requirements of peak flow attenuation as well as volume reduction and improved water quality outcomes.*

*The project also involved refining and launching web-based design software ([www.insitewater.com.au](http://www.insitewater.com.au)) to assist civil engineers and other drainage designers in the Municipality to achieve Council's multiple criteria for stormwater design performance.*

*The streamlined process has allowed Council to understand how stormwater strategy goals can be met by working with the development community in a highly urbanised catchment. By setting clear goals and targets, providing easy to use web-based design tools and training, and by enforcing WSUD standards through the buildings approval processes, progress can be made to improve catchment water quality. In addition, Council will over time, be able to reduce asset upgrade costs through Volume Management and because of a reduction of directly connected impervious areas within the catchment.*

## 1. INTRODUCTION

This project was to assist council planning and engineering officers with the implementation of the Greater Dandenong Sustainable Stormwater Strategy (Greater Dandenong Council, 2017).

This project specifically aims to integrate Water Sensitive Urban Design (WSUD) measures into the building and planning approvals processes, in particular on private land infill or redevelopment projects.

## 2. PROJECT BACKGROUND

The Greater Dandenong Sustainable Stormwater Strategy considers the impact of forecast urbanisation and climate change, with future development predicted to be the larger influence on water quality and stormwater infrastructure. The creation of new growth areas and forecast infill development will result in a large increase of impervious areas within the municipality, as illustrated in figure1.

This will increase the total volume of stormwater runoff and pollutants discharging from private landholdings into council's stormwater drainage network, before entering local waterways. As a consequence, this increased runoff and velocity of flow will place increased pressure on existing drainage infrastructure. Furthermore, increased levels of pollutants will negatively impact on water quality and waterway health, which affects local amenity and regional biodiversity.

To avoid exponential increases in asset replacement costs, this project was to assist Council implement the building and planning related sections of the Sustainable Stormwater Strategy. This project aims to support Council implement the following strategic priorities of the Greater Dandenong Stormwater Strategy. These include:

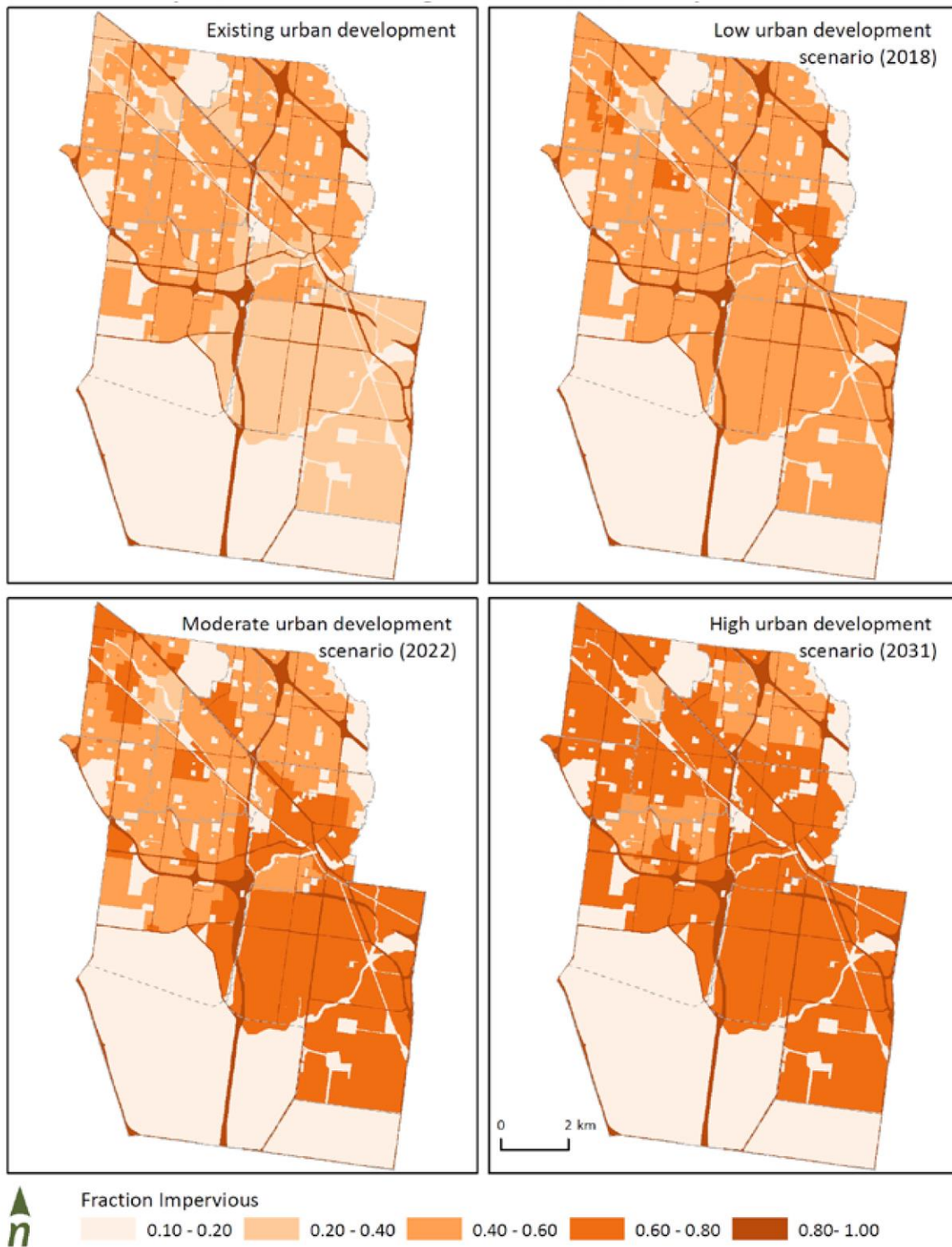
### **Manage demand for new and improved drainage systems**

- *Investigate planning controls and market-based tools to alleviate impact of urban consolidation and infill development on existing drainage infrastructure*
- *Strengthen local planning policy and/or facilitate market-based tools to manage flood risk (where appropriate)*

### **Manage the interface between new and old drainage infrastructure**

- *Develop Guidelines to assist developers in the preparation of Stormwater Management Plans for new developments*

The project was also to help integrate and streamline the assessment process involved in the assessment of development applications by relevant departments within council. This includes Statutory Planning, Civil Development, Asset Planning, Sustainability Planning and Building Services within Council.



**Figure 1 - Urban Development and Impervious Area** (taken from in figure 3 of the Greater Dandenong Draft Sustainable Stormwater Strategy)

### 3. DIRECTLY RELEVANT POLICY

The main policies considered during this project were as follows.

#### 3.1. Greater Dandenong Sustainable Stormwater Strategy

The Sustainable Stormwater Strategy outlines a 20-year framework for Council and the community to work together to identify, protect and improve Greater Dandenong’s stormwater assets, reduce flood risk, while welcoming sustainable growth and investment within the city.

This draft Strategy is structured around five key areas, based on the predominant land use areas including:

- Northern Catchments with specific emphasis on infill development
- New residential areas (Keysborough South)
- Commercial and industrial areas (e.g. Dandenong South)
- Green wedge (e.g. Bangholme).
- Parks, reserves and waterways

For each of these areas, key strategic objectives and targets have been identified. Implementation of the Strategy will be through a variety of means which require collaboration across a number of departments within Council as well as private stakeholders. The incorporation of WSUD features prominently in the Sustainable Stormwater Strategy. This includes incorporating WSUD elements into both public and private landholdings.

## WATER SENSITIVE URBAN DESIGN

Water Sensitive Urban Design (WSUD) integrates stormwater treatment into the urban landscape and offers an alternative to the traditional approach to stormwater management. It seeks to minimise the

extent of impervious surface and minimise alteration to the natural water cycle, by temporarily storing the water close to where it falls and slowly releasing it into the ground or natural waterways, or providing it for 'fit-for-purpose' uses.

WSUD provides numerous stormwater quality and/or flooding benefits if well designed, including:

- protecting the receiving natural water environment
- enhancing stormwater run-off water quality
- reducing run-off and peak flows
- enhancing amenity site value, while minimising development costs
- reintegrating water features within urban landscapes




**Figure 2** (WSUD) referenced in the Greater Dandenong Sustainable Stormwater Strategy.

WSUD plays a key role in the treatment and removal of pollutants found in surface runoff as well as mitigating peak flows.



### 3.2. Integrated Water Management Framework for Victoria – DELWP

The Victorian Government has recently developed the *Integrated Water Management Framework for Victoria - An IWM approach to urban Water planning and shared decision making throughout Victoria (DELWP 2018)*.

It provides a consistent process for collaborative integrated water management planning with clear roles and responsibilities to deliver effective urban water management, including water supply, wastewater, flood resilience, urban waterway health and management of public spaces.

The Framework outlines how greater community value can be delivered by consistent and strategic collaboration within the water sector – including water corporations, local governments and catchment management authorities – and through their links with organisations involved in land use planning.

Outcomes of the IWM framework that relate include:

- *Delivering greater community value.*
- *Encourage collaboration within the water sector – including water corporations, local governments and catchment management authorities.*
- *Links organisations involved in land use planning.*
- *The approach in the Framework works with and feeds into existing water and land planning processes.*

### 3.3. Dandenong Planning Scheme

Council has the ability to influence development to implement WSUD measures into their projects through the planning process. The Greater Dandenong Planning Scheme includes the following clauses directly relevant to stormwater management and WSUD.

### 3.4. Sustainable Design Assessment in the Planning Process Framework

Council implements the Sustainable Design Assessment in the Planning Process (SDAPP) as part of the statutory planning process. SDAPP provides applicants with a consistent reporting framework based on the scale and complexity of their proposal.

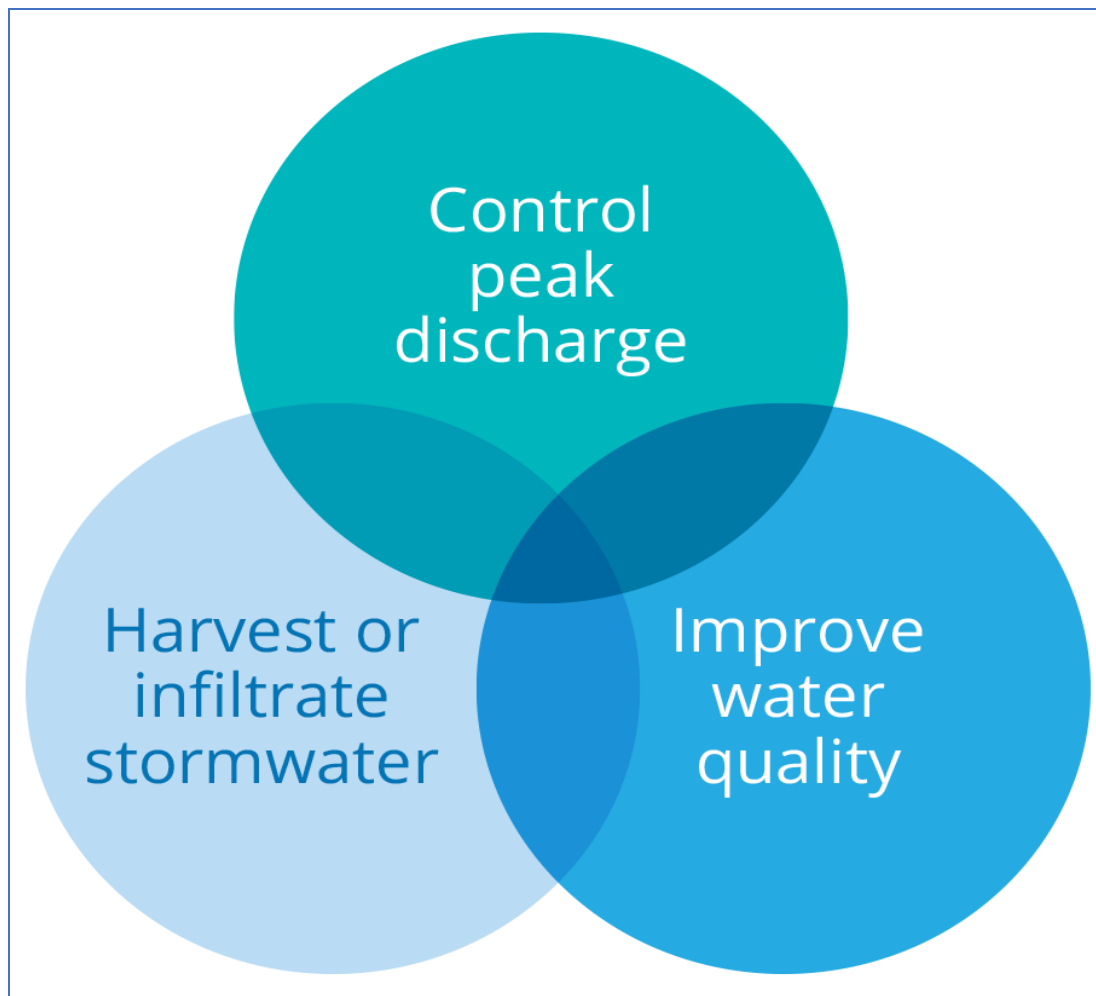
One key SDAPP Category directly relevant to this project is Stormwater Management. Council applies a best practice standard which is to “*Exceed Victoria’s best practice stormwater performance targets. Set in the Urban Stormwater Best Practice Environmental Management Guidelines (BEPMG)*”.

### 3.5. Australian Rainfall and Runoff (Engineers Australia)

While not a government policy, the ARR has set the standard for Civil Engineering drainage design and stormwater management in the engineering profession. This was recently overhauled for the first time in nearly 30 years. This represents a huge shift in what is considered as good design practice in the engineering design community.

The new guide emphasises the need to consider all of the three below criteria in drainage design and encourages an ‘at source’ management strategy: This employs small facilities, widely distributed across the catchment, many of which will only service a small catchment or single property.

Strategies of this type are most commonly part of a more comprehensive and integrated urban water strategy. See <http://arr.ga.gov.au/arr-guideline> for more details.



**Figure 3** - Australian Rainfall and Runoff (ARR 2016 figure 9.4.1.) diagram showing the multiple design criteria applicable to all urban Stormwater projects.

## 4. PROJECT IMPLEMENTATION

This project addressed current issues with the assessment of planning applications and how they meet our WSUD planning policy. Currently the WSUD elements of development applications are partially assessed across the engineering, asset planning and sustainability planning units at various stages of the planning process. In the majority of cases, WSUD elements are often assessed after planning permit issue - which is too late as the site layout is already finalised and approved, leaving no room for WSUD measures to be applied.

This project is to trial the assessment of planning applications to implement WSUD as part of the initial design stage. This ensures the proper siting and design of WSUD at an earlier stage during the planning application stage prior to permit issue.

### 4.1. Project outcomes

This project has allowed Council's sustainability planners to map out and draw together the different areas of stormwater management and treatment into one integrated approvals process that includes all internal stakeholders, leading to a more streamlined process for applicants, and more effective on-ground implementation of initiatives in development and redevelopment sites.

The project also provided training to the various internal Council stakeholders including our planners and our drainage and asset engineering team to achieve better stormwater management outcomes

during the planning application process. This will allow engineering to deliver peak flow attenuation as well as volume reduction and improved water quality outcomes. Peak flow attenuation reduces the need for expensive, unpopular and disruptive stormwater drainage asset upgrades.

The overall aim is to protect the City of Greater Dandenong's drainage infrastructure and deliver living rivers and waterways as outlined in our Sustainable Stormwater Strategy.

## 4.2. Process mapping, analysis and training.

A key component to this project was to undertake a process mapping exercise focusing on issues related to implementing WSUD requirements in the planning process.

Two process mapping and information gathering workshops were held involving all departments responsible for the assessment of planning applications and projects where WSUD, drainage and stormwater measures are assessed. The process mapping workshops were facilitated by Organica Engineering with support from the Sustainability Planning Unit with Melbourne Water (as the funding body) present. The workshops were structured in the order of:

### **Workshop One (Stakeholder consultation):**

The workshop confirmed that all departments have a specific role to play in the assessment of a development application including drainage, stormwater quality and implementation of WSUD elements of an application. Statutory planning and Sustainability planning are critical on guiding the WSUD outcomes in the application, before it reaches councils engineers.

### **Workshop Two (SWOT Analysis):**

Detailed review of the strengths and weaknesses of our existing assessment process of stormwater and drainage across relevant teams. Comments and process information were recorded on a whiteboard for all attendees to discuss through the SWOT analysis. SWOT analysis draws out strengths and weaknesses of current and potential internal processes around stormwater. The opportunities and threats look at external factors and risks that Council needs to address.

### **Workshop Three (Officer Training):**

The final workshop was an officer training exercise to provide officers with a greater understanding of WSUD treatments in development applications. This includes technical discussions around the application of engineering standards at the planning stage.

The workshop targeted officers from the asset planning, civil development and statutory planning units. The training covered the following subjects:

- Introduction to sustainable design assessment in the planning system.
- Introduction to WSUD best practices on measures on development sites.
- Sustainable Design Assessment in Planning Process (SDAPP) program used by most Melbourne metropolitan councils, as well as how environmental assessment tools such as BESS, STORM, InSite Water, MUSIC and Green Star can be used to efficiently generate and assess the stormwater sustainability of planning permit applications.
- Policy basis including Council's MSS, activity centre policy, VPP and LPP policies that support and require stormwater sustainability assessment of applications.
- Workshopping with planners the most efficient way to assess smaller applications, and discuss how to refer more complex applications for assessment.
- Workshopping with Asset Planners and Civil Development Engineers the value of stormwater design during the planning stage of a development, and how more rigorous engineering standards can still be applied using InSite Water.
- Workshopping with Asset Planners and Civil Development Engineers on how the principles of the Volume Management, and how the new ARR (Engineers Australia 2016) can be applied to Council drainage connection permits. The new ARR is significant because it is what the legal community will use when deciding cases of flood liability and professional malpractice.
- Detailed instruction on how to use InSite water software within Council as an integrated water management design and assessment framework.

### 4.3. Technical tool development (In-Site)

A technical assessment tool has been customised for use by Greater Dandenong Council for the assessment of drainage and stormwater quality, called "Insite". Insite has been created to streamline the planning and building assessment process and make the process of designing good quality WSUD features easier for applicants. Council's engineering services unit has subscribed to InSite which will be trialled by officers involved in the assessment of planning applications. The tool is web-based and is available online at [www.insitewater.com.au](http://www.insitewater.com.au)

The software was welcomed by civil development engineers as an assessment tool for planning applications. Its functionality means the addresses the sometimes-competing objectives of water saving, water quality and stormwater detention.

Further work was undertaken on how the InSite Water software can cater for Swinburne Method (OSD4) calculations and meet time of concentration thresholds - used by Civil Development when calculating LPD requirements.

## 5. KEY FINDINGS

Processes were identified where stormwater quality measures are applicable to a development application to improve outcomes for projects going through the planning application process.

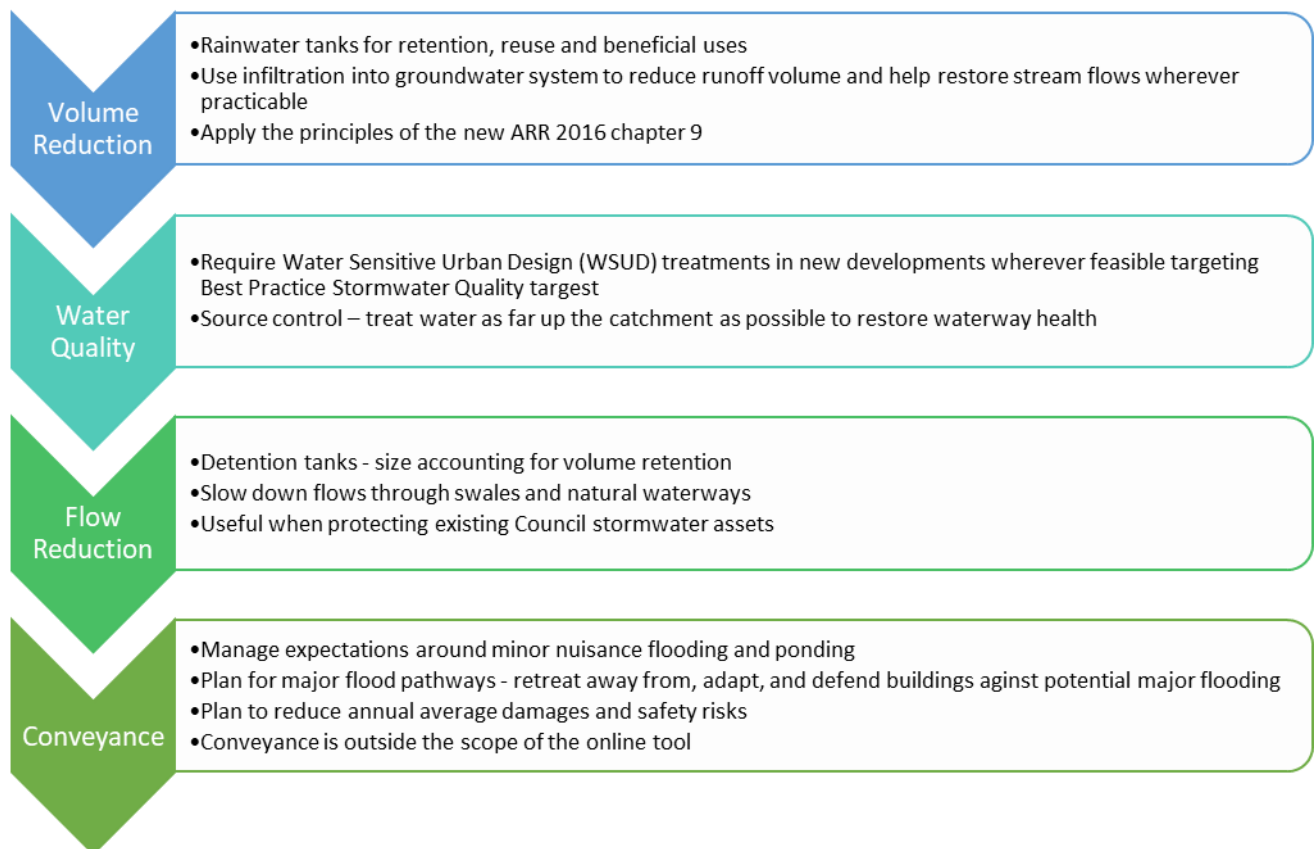
- If WSUD is left to the post permit stage, opportunities are often lost due to site layout already being finalised (there is no room left for WSUD measures).
- Civil development's focus is on Legal Point of Discharge (LPD) and On Site Detention analysis. After holding these workshops, there was an improved understand the need for WSUD to be integrated with drainage design
- The desired approach between planning, civil development and asset planning is for minimal touch points. The ideal solution is capturing drainage and WSUD at the earliest possible stage of assessing a development application, and then making sure the details are implemented as part of the Legal Point of Discharge (LPD) stage.
- Other solutions identified include:
  - Making it clear up-front of our expectations to developers.
  - Making it easier to address drainage design targets pre-permit using InSite software without appointment of engineer by applicant. This then transfers onto LPD requirements and appointing an engineer if applicable.
  - Education and tool-kits to support planners and civil development (including software for civil development)
  - Checking early town planning designs against standard guidelines and support for applicants addressing WSUD and drainage design.

The project has helped Council to ensure that Stormwater is adequately addressed for infill development and redevelopment through the planning and building approvals process. This will have a lower cost to Council and cause less disruption to the community than major upgrades and replacements of Council's existing stormwater system.

### Stormwater management hierarchy

The following hierarchy was refined to be applied to stormwater applications. This recognises best practice for stormwater design, while acknowledging that not all these actions are feasible for all sites, and that for some areas WSUD is best undertaken downstream. The intent of this hierarchy is that designers work through the below 4 steps with Council to determine the best strategy for a site.





**Figure 4 - Stormwater management hierarchy**

The streamlined process has allowed Council to understand how stormwater strategy goals can be met by working with the development community in a highly urbanised catchment with few opportunities for on-stream WSUD. By setting clear goals and targets, providing easy to use web-based design tools and training, and by enforcing WSUD standards through the buildings approval processes, progress can be made to improve catchment water quality. In addition, Council will over time, be able to reduce asset upgrade costs through Volume Management and because of a reduction of directly connected impervious areas within the catchment.

## 6. REFERENCES

DELWP (2018), *Integrated Water Management Framework for Victoria An IWM approach to urban water planning and shared decision making throughout Victoria*, Victorian Government, Melbourne.

Engineers Australia (2016)- *Australian Rainfall and Runoff Guidelines 2016*, Australian Government - Geoscience Australia, Canberra. <http://arr.ga.gov.au/arr-guideline>

Greater Dandenong Council (2017), *the Greater Dandenong Sustainable Stormwater Strategy 2017-37*, City of Greater Dandenong, viewed online in August 2018 at <http://www.greaterdandenong.com/document/29220/water-and-stormwater>.