



Stormwater Management Strategy

Template Guidance

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Glossary

Acronym	Definition
AEP	Annual Exceedance Probability
ANCOLD	Australian National Committee on Large Dams
ARR	Australian Rainfall and Runoff
DELWP	Department of Environment, Land, Water and Planning (now known as the Department of Energy, Environment and Climate Action)
DSS	Development Service Scheme
Ha	Hectare
MUSIC	Model for Urban Stormwater Improvement Conceptualisation
PSP	Precinct Structure Plan
RB	Retarding Basin
SWMS	Stormwater Management Strategy
SWQ	Stormwater Quality
VPA	Victorian Planning Authority

Purpose

This document provides essential guidance to developers and consultants on the template structure and high-level information requirements for a Stormwater Management Strategy in Greenfield development areas, for submission to Melbourne Water.

This document is intended to provide a helpful overview of the considerations that need to be made and type of information to be included when writing a Stormwater Management Strategy. The detail that is required within a Stormwater Management Strategy submission will be dependent on the site's complexity. The information is not exhaustive. Further assessments may be required particularly in complex proposals, to enable us to provide our referral authority functions.

The scope of this document is limited to Stormwater Management Strategies for developments in the Greenfield areas and does not extend to proposals that suggest material changes to Precinct Structure Plan assets and/or Development Services Scheme assets or Integrated Water Management Plans that consider broader water cycle components such as drinking water, recycled water, grey water and sewerage.

The document should be used in conjunction with all other applicable legal and policy requirements including requirements under the Planning and Environment Act 1987, Planning and Environment Regulations 2015 and relevant Planning Scheme, the Building Regulations 2018, DELWP's Guidelines for development in Flood Affected Areas (2019), Council requirements and other guidelines, drawings and checklists listed in the Melbourne Water website. These guidelines will be updated from time to time.

SWMS Objective

The primary objective of the Stormwater Management Strategy (SWMS) is to ensure that stormwater management is integrated into the early stages of land development to meet regulatory requirements and best practice standards. The SWMS aims to achieve effective drainage management by controlling surface and stormwater runoff, implementing stormwater quality treatments to reduce pollutants, and ensuring flood and erosion protection to safeguard property and infrastructure. Furthermore, the strategy seeks to protect and enhance waterways, promoting ecological health and prevent environmental degradation. By addressing these critical elements, the SWMS facilitates the sustainable design and resilience of developments while aligning with Melbourne Water's guidelines and the Australian Rainfall and Runoff (ARR) 2019 framework.

Melbourne Water will assess SWMSs having regard to relevant legislative and policy obligations and considerations, including but not limited to:

- Its functions as a drainage authority under section 199(1A) of the *Water Act 1989* which include to:
 - provide, manage, operate, protect and maintain drainage systems into all designated waterways and all designated land and works within its waterway management district;
 - develop and implement plans or schemes, and to take any action necessary— (i) to bring into operation new drainage systems; and (ii) to improve stormwater quality of water in drainage systems; and
 - perform its functions in an environmentally sound way.
- The requirements of statements of obligations under section 186A of the *Water Act* and section 4I of the *Water Industry Act 1994 (Vic)*, including the *Statement of Obligations (General)*;
- Its statutory role as a referral authority under the *Planning and Environment Act 1987*
- Considerations of climate change having regard to the *Climate Change Act 2017*, the *Statement of Obligations (Emission Reduction)* that applies to water corporations including Melbourne Water and Melbourne Water's emissions pledge;
- The *Environment Protection Act 2017*;
- DELWP's Guidelines for Development in Flood Affected Areas (Feb 2019);
- The relevant planning scheme;
- EPA Urban Stormwater Management Requirements;
- Urban Stormwater Best Practice Environmental Management Guidelines; (BPEMG);
- Australian Rainfall and Runoff: A guide to flood estimation;
- Stormwater management for urban development webpage – Department of Energy Environment & Climate Action;
- Melbourne Water's Land Development Manual;
- Melbourne Water's MUSIC Modelling Guidelines;
- Melbourne Water Design Manuals (e.g. Constructed wetland, Retarding Basin and Constructed Waterways);
- Melbourne Water's Shared Path Guidelines;

- Healthy Waterways Strategy; and
- Flood Management Strategy for Port Phillip and Westernport 2021-2023.

A SWMS is a document that provides sufficient background information, calculations and concept designs for the proposed stormwater management system to meet or exceed Melbourne Water's and/or Planning Scheme requirements. It must:

- Demonstrate that the proposed development can be adequately serviced by drainage, flood protection, waterway and stormwater quality treatment infrastructure to meet the relevant policy and regulatory requirements;
- Propose land areas to be set aside for waterways (existing and constructed), wetlands, retarding basins and other stormwater quality treatment or management infrastructure and appropriately incorporated within the proposed urban layout and the gazetted Precinct Structure Plan and/or council Development Plan;
- Consider and provide detail on site considerations, catchment areas, future and existing development and infrastructure, and how the proposed development complies with Melbourne Water's Development Services Scheme plan;
- Propose reasonable staging for the development and time frame for the delivery of the potential drainage assets for the ultimate and interim scenarios as required;
- Demonstrate how any offsite drainage works are secured; and
- Respond to and demonstrate how the relevant application requirements, objectives, standards and decision guidelines of the relevant Planning Scheme, and any other relevant planning controls, regulatory frameworks, and applicable guidelines are met.

The SWMS report should describe how these management objectives are to be met to the satisfaction of Melbourne Water and the Responsible Authority (typically Council but may vary based on the context of the application).

Template Guidance

Cover Page

The cover page of a SWMS document should include the project title or the subject site address and the revision date to reflect updates. Optionally, a site photo can be included to visually represent the area being assessed, providing context for the management strategy.

Document Revision Details

Inclusion of the revision details of the SWMS enables review of any changes made over time and ensures that the most up to date documentation is reviewed.

In instances where drainage assets are being designed within the SWMS, the approver of the document would be attesting to have reviewed the document and ensured that the information documented is true and correct and meets the regulatory requirements and standards.

Include the contact information of the key contact person or organisation for the SWMS to enable the reviewers to get in contact if there are any questions.

An example revision details table is shown below.

Table 1: Example Revision Details

Revision	Date	Description	Written by	Approved by
[A]	[DD/MM/YY]	[Nature of document or Key changes to the previous version of document]	[Author Name]	[Approver Name]

It is important that the version of the SWMS approved by Council as a part of a planning permit is the same version as that approved by Melbourne Water. Any subsequent modifications / revisions is subject to joint approval of the updated version of the document.

Project Summary

Provide a summary of the proposal to assist Melbourne Water with the triaging of the SWMS to the relevant internal Melbourne Water teams for review. An example summary table is provided below for guidance.

Table 2: Example proposal summary table

Proposal Summary	
Site location	[Site address]
Landowner, Developer and Consultant Details	<p>[Landowner: First Name, Last Name; Developer (if different from the landowner): Name Consultant : Name and key contact (if applicable)]</p>
Purpose of the SWMS	<p>[e.g. is the SWMS related to</p> <p>a. A current planning permit application <i>Include details when a planning permit application has been submitted (but not approved yet) or is being reviewed by Council at the time of the SWMS submission to Melbourne Water. Please also include the Planning permit reference number(s) directly related to the SWMS</i></p> <p>b. A condition on a planning permit application <i>Include details when a planning permit has been approved but a planning permit condition requires the submission of a SWMS or an amended SWMS. Please also include the Planning Permit reference number(s) directly related to the SWMS and also the relevant condition numbers that the submission seeks to satisfy.</i></p> <p>c. A pre-planning application advice <i>This section refers to all SWMS's that are submitted ahead of a planning application or not as a part of a planning application. Please also include the purpose of the submission for clarification (e.g. seeking preliminary advice ahead of a planning application).</i></p>

	d. other]
Current Planning status of the development or estate, including RA/Council reference numbers of any previous planning permits.	[Details on Planning Status] [Any relevant reference numbers]
Precinct Structure Plan/Council Development Plan name (as applicable)	
Relevant Development Services Scheme (if applicable)	
Zoning applicable to the site	[e.g. Residential/Commercial/Industrial]
Relevant overlay/s affecting the site	
Estate Name	[Insert the name of the estate where applicable, e.g. when the Strategy relates to a multi-lot development]
Estate Stages	[For multi-lot developments, what stages of the development does this SWMS relate to- e.g. 8-12]
Previous Stormwater Management Strategy details for the site (if any)	[Include Melbourne Water MWA reference numbers if applicable]
Proposal/development background	[Brief paragraph on the nature of the proposal-250 words max]
Required Development Services Scheme Assets (if applicable)	[Include a short summary of any Development Services Scheme assets to be constructed-250 words max]
Other proposed assets relevant to Melbourne Water (E.g. assets proposed for a site not within a PSP area)	[Include a short summary of any other drainage or drainage related assets that relate to Melbourne Water- 250 words max]
Is the proposal generally in accordance with the PSP and the DSS?	[Yes/No – If 'No', Please include a short description of the elements that deviate from the PSP/DSS-150 words max.

	<p>Please note that notable changes requiring amendments to the DSS or PSP should be submitted to Melbourne Water for assessment in advance of a planning permit application. This template does not provide guidance on additional information that is required as a part of change to the DSS.</p> <p>If the document includes details of a change to the DSS that Melbourne Water has previously reviewed through a separate application, the SWMS should reference the relevant Melbourne Water MWA reference number associated with the prior approval]</p>
<p>Site constraints and related key risks considered</p>	<p>[Dot points of any specific site constraints that have been considered when developing the SWMS. These may relate to but are not limited to:</p> <ul style="list-style-type: none"> -Interactions with Melbourne Water or other authority assets, e.g. existing waterway, railway culverts -Specialist investigations, e.g. cultural heritage matters, potential for sodic soils, contaminated land, biodiversity values]

Introduction

The introduction section of the project provides a brief overview of the proposal. Please include:

- **Purpose:** A concise sentence noting the purpose of the document.
- **Project description:** Overview of the project and the location.
- **History:** Details of any site drainage history and previous SWMS or planning permits for the site that is related to the current version.
- **Revision details:** Also include details on the nature of changes in this version of the SWMS when the SWMS relates to a new revision that is submitted to Melbourne Water.

Site Overview

Clearly identify the site location and provide sufficient detail for Melbourne Water to understand the features of the site that contribute to the proposed drainage strategy. Please include:

- **Site Area:** Total development site land area (in hectares) and the land area relevant for the SWMS (in hectares)
- **Proposed land use details:** The proposed land use of the site and approximate number of lots applicable to this SWMS. The relevant zoning, PSP, and DSS details can also be included here.
- **Status of the development:** Current Planning status of the development or estate and current land use. Any other developments that are relevant to the proposal can also be highlighted in this section.
- **Site Location Plan:** A site location plan or plans that can help locate the site. Identify adjacent and nearby land-uses that may be of interest.
- **Topography and drainage features:** General overview of the slope and terrain of the site. Please include any existing drainage features that are applicable to the SWMS (e.g. existing culverts, dams).
- **Site features:** Details of any natural site features or key site characteristics that have been considered when developing the SWMS. A few photos of the site highlighting key features of interest may also be helpful.
- **Relevant drainage assets:** In consideration of the Precinct Structure Plan where relevant and Development Services Scheme when available, highlight any drainage asset design, engineering requirements and land budget requirements that are to be achieved through the proposed SWMS. To inform this feasibility analysis, it is recommended to apply for pre-development advice from Melbourne Water prior to preparing the SWMS.
- **Interaction with other assets:** Details of all other assets, either owned by Melbourne Water or another authority within the subject site, or outside the subject site if works are proposed, must be included in this SWMS. Include the location and details of these assets for consideration.

Existing Conditions

Provide information and assessments relating to pre-developed catchment characteristics of the site. Please include:

- **Feature Survey:** A copy of the most recent Site Feature Survey showing existing pre-developed topography, elevation and contour information.
- **Catchment Plan:** A plan showing delineated natural catchment boundaries (including catchments external to the subject site based on the topography of the site). For Estates consisting of multiple stages, a delineated sub catchment

plan would also be helpful to calculate stormwater inflows. Clearly show the outfall location relevant to the subject site.

- **Catchment Outfall details:** Details of the ultimate outfall location(s) that are applicable to the relevant catchments of the property. In instances where the development of the property is ahead compared to the rest of the catchment or if it's not practical to achieve the ultimate outfall for an extended period please detail why and how an interim SWMS proposal is to be facilitated.
- **Capacity of relevant existing drainage infrastructure:** Identify existing upstream and downstream drainage infrastructure and undertake a technical assessment to determine the capacity, discuss the results.
- **Existing Site Constraints:** Any existing site constraints that affect the stormwater drainage design or has been considered within the development of the strategy is to be reported. Examples may include:
 - Topography (e.g. flow direction of runoff, high/low points, locations of steep/flat grading, locations of crests, ridges and/or valleys)
 - Geotechnical Conditions (e.g. groundwater levels, soil types or contamination that may affect stormwater retention or infiltration)
 - Flood Risk Zones (e.g. Whether the site is within a floodplain, has a history of flooding, or is in an area with specific flood risk management requirements)
 - Proximity to existing services or assets (e.g. gas mains, water mains, drinking water reservoirs, wetlands, waterways)
 - Boundaries of existing/historical land-uses (e.g. quarry, landfill, contaminated land)
 - Existing drainage infrastructure (e.g. invert levels/size/condition)
 - Fixed levels (Drains/Roads/Infrastructure previously constructed, now fixed)
 - Existing overland flows entering the site (overland flow paths)
 - Designated transport corridors (e.g. railway lines, road embankments)
 - Environmental and/or cultural heritage requirements (e.g. conservation reserves, existing vegetation species to be protected, existing natural waterways)
 - Land tenure/ownership (e.g. works proposed within limited road reserves, works in adjacent land owners property, utility easements)
 - Any existing infrastructure relevant to the design of stormwater infrastructure for the property (e.g. through a Dial Before You Dig request or advice from relevant authority).

Assessment of relevant planning controls

This section should detail any relevant planning controls pertaining to stormwater management, drainage, waterway management and flooding (including the planning scheme, approved development plan (if applicable), and/or approved Precinct Structure Plan (if applicable)), and how the SWMS responds to these provisions.

Hydrologic and Hydraulic Analysis

This section should ensure comprehensive hydrologic and hydraulic analysis to support the overall SWMS. The Hydrologic and Hydraulic Assessment section of the SWMS outlines the analysis required to quantify and manage stormwater flows for both pre and post-development conditions. This includes flood hydrology and flood hydraulics assessments.

- **Pre-development conditions:** Conduct hydrologic modelling to estimate stormwater flows in the pre-development scenarios of the site corresponding to the delineated catchments, and prepare a table summarising the existing flows at key locations (including supporting calculations and/or computations). Summarise the land use and fraction impervious assumptions. At the initial stage of a site development, the Regional Flood Frequency Estimation Model (RFFE) can be used to calculate flows of a site.
- **Post-development conditions:** Conduct hydrologic modelling to estimate stormwater flows in the post-development scenarios. Provide a copy of the runoff-routing model (RORB) or rational method calculations for smaller local catchments as indicated in AR&R 2019. Where RORB is not used for hydrological modelling, an explanation on why an alternate modelling method is proposed and preferred.
Ensure that the hydrologic modelling adheres to industry standards, such as AR&R 2019, and avoids single event modelling in favour of ensemble or Monte Carlo methodologies. The preparation of the SWMS should be done by qualified engineers and hydrologists suitably experienced in RORB.
- **Catchment area details:** Provide details on the future development density and details on catchment and sub catchment areas.
- **Hydrographs and Peak Flow Estimates:** When using a Catchment rainfall-runoff model, hydrographs are to be provided for critical events at key locations, along with a comparison between pre and post-development (peak flow and timing of the peak). Additionally, the duration of the critical storm must be provided.
- **Flood Hydraulics modelling:** For small local sites at the top of the catchment, hydraulic modelling can be performed using engineering software programs like 12D and HEC-RAS. For larger sites interacting with regional catchments or for

multi-directional catchment flows, more detailed hydraulic models may be required, and it is recommended to use software such as HEC-RAS-2D or TUFLOW.

Proposed Drainage Strategy

This section outlines the design and implementation of the proposed drainage assets, stormwater management, and flood mitigation measures to be applied to the development site. It is informed by the hydrologic, and hydraulic assessments.

- **Minor Drainage System:** Include a description of the proposed design for the minor drainage system and how it will manage frequent, smaller storm events through a network of underground pipelines and drainage assets, ensuring efficient conveyance of stormwater. The design must meet minor drainage standard of 'For all storm events up to an including 20% Average Exceedance Probability (AEP)
 - stormwater flows should be contained within the drainage system
 - ponding on roads should not occur for longer than one hour after the cessation of rainfall.'

How the design meets the minor drainage standards is to be demonstrated through the relevant design calculations and road cross sections as detailed in the DELWP Guidelines for Development in Flood Affected Areas (2019) and Australian Rainfall and Runoff (2019).

10% AEP storm events are to be considered for industrial/commercial subdivisions.

The road reserve design is to be designed to safely convey the gap flow in accordance with DELWP's overland flow flood safety criteria.

For any minor drainage system design proposing pipelines greater than a 20% AEP (residential areas) or 10% (industrial commercial areas), reasoning as to the purpose for upsizing the pipelines must be provided, plus a full downstream impact assessment on future downstream asset size and depths must also be included. Note: upsizing of drainage pipelines to solely suit the development layout (due to proposed inefficient overland flow paths) will not be accepted.

- **Major Drainage System:** Include a description of the major drainage systems designed to handle larger, less frequent storm events by incorporating overland flow paths, including roadways, open channels, and detention areas, which will safely convey excess stormwater.

All new lots are to be free from inundation unless otherwise agreed to a lesser standard by Melbourne Water. The freeboard requirements specifically applicable to the subject site can be clarified from Melbourne Water via the website through a pre-development advice application ahead of the SWMS submission. Ensure

that streets, footpaths and cycle paths that are subject to flooding meet the flood safety criteria as documented in the DELWP's Guidelines for development in Flood Affected Areas (2019).

- **Layout plan of proposed strategy:** create a clear design response layout plan of the proposed flow paths and drainage infrastructure that includes
 - Pipelines: Location and alignment of underground drainage pipes sized appropriately to handle the minor system flows.
 - Overland Flow Paths: Designated flow paths through roads and open spaces for excess stormwater during major storm events, with roads sized to safely convey runoff.
 - Existing and Constructed Waterways: Incorporation of natural and constructed watercourses with adequately sized waterway corridors to manage stormwater flow and reduce flood risks.
 - Retarding Basins: Design and sizing of retarding basins to hold stormwater, for release at controlled rates to prevent downstream flooding.
 - Stormwater Quality Treatment Assets: Identification of reserves for assets like wetlands or bio-retention areas to meet stormwater quality objectives.
 - Stormwater Harvesting Infrastructure: Where applicable, the proposed strategy includes stormwater harvesting systems for reuse within the development.
 - Interface with Other Infrastructure: Ensure integration and coordination with other essential services, such as sewer systems and road crossings.Multiple catchment plans may be necessary to differentiate between minor and major flow path systems.
- **Outfall Status:** Clarify the drainage outfall condition, including required improvements or extensions to prevent downstream impacts. Detail of the drainage outfall is to be provided clearly outlining the extent of the outfall and where the flows ultimately discharge to. Outline any specific access requirements through any neighbouring properties and demonstrate how the outfall can be obtained in a practical sense.

Flow management and Mitigation Measures

This section is to detail minor and major flow management and the necessary mitigation measures considered within the proposal to address the risks identified through the investigations.

- **Flood Conveyance:** Identify and design flood conveyance assets, including appropriately sized road reserves, to manage overland flows when the minor drainage system capacity is exceeded. Where necessary, the strategy proposes dedicated floodways or overland flow routes to safely convey floodwaters.

- **Ultimate Drainage Works:** Include the requirements for the ultimate drainage layout. This includes free-draining outfall and any necessary extension of drainage works downstream to avoid impacts on neighbouring properties.
- **Interim Drainage Works:** When it's not practical to achieve the ultimate outfall, include the relevant capacity calculations and considerations made to ensure that the proposed solution does not impact on the delivery of the ultimate drainage infrastructure. Clearly describe the difference between interim and ultimate conditions and include plans that clearly identify the relevant temporary infrastructure as separate to any ultimate infrastructure. Include details on how an interim outfall is obtained including any necessary extensions of drainage works downstream to avoid impacts on neighbouring properties. See section below on Risk assessment and mitigation measures for further information that is to complement this section.
- **Risk Assessment and mitigation measures:** When interim works are proposed, identify potential flood risks and hazards to future occupants, adjacent properties, or public safety. In some instances detaining flows to pre-development flow rates may not sufficiently demonstrate that there will be no detrimental downstream impact. Based on the characteristics of the downstream drainage system and its functionality, it is important to account for the effects of prolonged duration of flow rates through increased flow volumes. Propose mitigation measures in accordance with industry standards, including recommendations on development controls such as minimum lot levels and ensuring roadways act as safe flood pathways during extreme events. Mitigation for downstream and upstream affected properties from flooding and frequent flows are a key consideration. Risk assessment is to consider:
 - Flood event management
 - Management of increased volume of flows and
 - Changes to frequency of flooding events.
- **Supporting Models and Calculations:** Include all supporting models, calculations, and technical documentation used in the assessment, attached in the Appendix. Provide detail as to what information has been used, where the models have been sourced or how they have been developed, as well as any assumptions made in creating any models or when making any calculations.

Development Services Scheme (or Strategy) asset design

This section is applicable where there are assets to be designed and constructed as a part of a Development Services Scheme or Strategy.

Include conceptual level details of proposed drainage assets related to the development. Provision of concept plans showing asset arrangements and alignment, longitudinal sections showing ability for infrastructure to drain through the site and downstream as well as high level critical cross-sections for all assets that take up drainage land (sediment ponds, wetlands, waterways, regarding basins) confirming assets can be appropriately sited within proposed land footprints.

Any proposed land take that deviates from the DSS and/or the relevant PSP must be documented as a separate application and the change is to be pre-approved by Melbourne Water ahead of the Stormwater Management Strategy submission.

The design may consist of one or more of the following asset types :

- **Pipelines:** Include details of the pipe alignment, capacity, size and approximate length of the proposed asset. Identify if floodway criteria has been achieved for the overland flows and provide relevant modelling and calculations to verify the above. DSS scheme pipes are to be located within road reserves unless otherwise advised by Melbourne Water.
- **Sediment Pond:** Calculations to determine sizing and a concept level plan is required to identify the areas of the sediment pond and associated dry-out area and the proposed location. Include details of the relevant design calculations and proposed bypass arrangements.
- **Constructed Waterways:** Concept-level information is required to determine the initial waterway corridor width to meet Melbourne Water and PSP requirements. This includes concept plans showing the reach length, proposed alignment, corridor width, and key waterway and landscape features, such as vegetation, road crossings, and interfaces with other services. Typical cross-sections should illustrate 1% AEP flood levels and freeboard, invert levels and batter slopes, while longitudinal sections should show the existing surface and design invert grade. Paths and maintenance tracks must be detailed in cross-sections and layout plans. Please refer to the Melbourne Water Constructed Waterway Manual for further guidance on the level of information to be provided.
- **Constructed Wetland:** Concept-level information is required to confirm that the land area matches the PSP land area designation and where no PSP is in place the estimation of initial land area proposed meets Melbourne Water requirements. This includes showing the layout, cross-sections, and longitudinal sections with normal and top water levels. The area should account for the system, including sediment treatment. Additionally, the location of the high flow bypass and diversion arrangement must be identified. A copy of the MUSIC

model and relevant design calculations should be provided to complement the conceptual design. Sufficient information is required to confirm the land take for the proposed drainage asset during the Concept Design submission within the SWMS to demonstrate accordance with the land area set aside in the PSP (where relevant). Please refer to the Melbourne Water Constructed Wetland Manual for further guidance on the level of information to be provided.

- **Retarding Basin:** The design of retarding basins should include concept plans, detailing layout, cross-sections through the embankment, and spillway design as detailed in the Melbourne Water Retarding Basin guidelines. The outlet and spillway arrangement must specify location, capacity, and configuration to ensure proper discharge of stormwater. Sufficient area should be allocated for the hydraulic asset, including batters, freeboard, maintenance access, and necessary buffers. Sufficient information is required to confirm the land take for the proposed drainage asset during the Concept Design submission within the SWMS to demonstrate accordance with the land area set aside in the PSP (where relevant).
- For Retarding Basins proposed with embankments >0.5m above natural surface, a preliminary Consequence Assessment should be undertaken to inform the level of ANCOLD assessment that would be required for the project during the Functional Design stage. Further guidance on the consequence assessment is contained in the ANCOLD consequence assessment guidelines, which outline a process for assessing the consequences of failure in order to assign a consequence category.

Stormwater Quality Treatment

This section will detail the Best Management Practices proposed for the management of stormwater quality and how stormwater runoff will be treated before discharged into receiving waterbodies.

- **Treatment Approach:** In this section, detail the configuration of the proposed treatment system. The design is to be generally in accordance with the relevant Development Services Scheme (DSS) and demonstrate its treatment performance against the current best practice performance objectives for stormwater quality as contained in the Urban Stormwater - Best Practice Environmental Management Guidelines (Victorian Stormwater Committee, 1999).
- **Site plan:** Provide a site plan that shows the location of the proposed treatment assets.
- **Relevant modelling information:** Present the modelled performance of the treatment system for the asset and the overall DSS against best practice objectives using MUSIC software. Present a schematic of the MUSIC model and how the nodes and catchments relate to subdivisional stages and catchment

locations. Include an electronic copy of the MUSIC model and a copy of the MUSIC Auditor report with the overall submission. For further information and guidance, please refer to the 2024 MUSIC guidelines.

Works Sequence, staging plan and timing

This section is particularly relevant to multi-stage developments and developments that trigger Development Services Scheme or strategy works to be constructed. This section outlines the proposed staging of drainage works for the subdivision, considering core requirements such as drainage outfall status and interim works.

Key elements are to include:

- **Staging Plan :** Provide an indicative staging plan that includes the catchment related to each stage and the proposed development timing.
- **Delivery Schedule:** Provide a schedule for the proposed delivery of drainage infrastructure in line with the staging plan. Identify key delivery milestones related to the delivery of ultimate infrastructure and how that relates to the delivery of the staging. Clearly highlight which stages will trigger Development Services Scheme works (when applicable) and which stages are proposed to be the hold point for completion of the works. The trigger for ultimate works is to be identified in consideration of the maximum developable area that a temporary outfall arrangement is able to support.
- **Safety considerations:** The staging plan should clearly show how civil works are to be completed prior to the release of adjoining lots. It must ensure that lots are not staged to achieve a Statement of Compliance prior to the completion of adjacent civil works and where ongoing civil works could pose considerable safety risk to newly released lots in both traffic movement and lot-scale building works.
- **Works Method Statement:** If the construction footprint for drainage works extends beyond the designated project area, provide a works method statement detailing how ecological, cultural, and environmental values will be protected. The statement should address measures to minimise soil erosion and sedimentation during and after construction, along with other environmental protection considerations.

Conclusion

In this section summarise how the proposed SWMS:

- Achieves regulatory compliance for drainage provision, flow conveyance, flood protection, waterway management, and stormwater quality treatment; and
- Meets Melbourne Water's Development Services Scheme or Strategy requirements (where applicable) for the design and construction of specified drainage assets in alignment with the proposed development.

Reasons for any deviations from the above should also be summarised where relevant.

Supporting Investigation Summaries

This section will summarise all investigations carried out in preparing the development of the site and the concept design for drainage assets to be constructed. Key outcomes from each of the investigations are to be summarised in this section, with reference to a separate document or appendices that will detail the relevant reports and any relevant calculations.

The investigation types listed below are intended to be a guide only and are not an exhaustive list. Further investigations may be applicable based on the site context and the nature of proposal. Specialist investigations may only be applicable in instances where there are Development Services Scheme or Strategy assets located within the site or are proposed to be constructed as a part of the drainage solution for the site.

Geotechnical Investigation

Summarise the findings of the desktop assessment and the necessary design considerations and controls. Soil types and subsurface conditions are to be considered based on available data. The key factors affecting drainage design and site-specific investigations or mitigation measures to be implemented in the design or construction phases are to be summarised. This assessment should cover the entire footprint of where works are proposed.

Sodic soil and groundwater information and considerations are to be made if relevant for that area. Where known risks are identified, this information should inform the concept design and any high level work methodologies to be proposed. Sources of information, maps and further details can be annotated as a supplementary report or included in the appendix.

Contaminated Land assessment

Summarise the findings of the desktop assessment and any site investigations that have been undertaken. Highlight any areas of concern such as landfills or chemical storage that can affect soil and groundwater quality. Identify how contaminants may affect the proposed drainage system in relation to infiltration risk, subsurface water quality and subsurface movement/pathways of contaminants. Summarise the regulatory and environmental requirements, along with any further investigation and/or remediation measures that are to be undertaken when drainage assets are to be constructed.

Cultural Heritage Values Assessment

Summarise the findings of the desktop cultural heritage values assessment related to areas where drainage assets are to be constructed. Highlight if a Cultural Heritage Management Plan is required for locations where values have been identified in the vicinity of where drainage assets are required. Summarise the key findings for those

locations if a Cultural Heritage Management Plan has been completed. Detail if further complex assessments or site investigations are required or if management measures are required for the design or construction of the drainage assets. This assessment should cover the entire footprint of the site where the drainage works are proposed.

Flora and Fauna Assessment

Summarise the findings of the desktop assessment and identify if there are any protected species, habitat or environmentally sensitive areas to be considered in the design of drainage assets. Detail if further complex assessments or site investigations are required or if management measures are required for the design or construction of the drainage assets. This assessment should cover the entire footprint where the drainage works are proposed.

References and Appendices

In this section, include any references, supporting documents, detailed calculations, stakeholder correspondence and other investigation details as required. Modelling results summary can be attached in conjunction with the submission of the copies of the modelling files as attachments.

Consider submitting detailed investigation reports that complement the SWMS as separate documents to reduce the overall document file size where practical. This may be particularly relevant when the details of the document have already been summarised in the body of the document.

Document History

Date	Reviewed/ Actioned By	Version	Action
October 2024	Mission Lead- Housing Statement	1	Release for industry feedback

Disclaimer

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