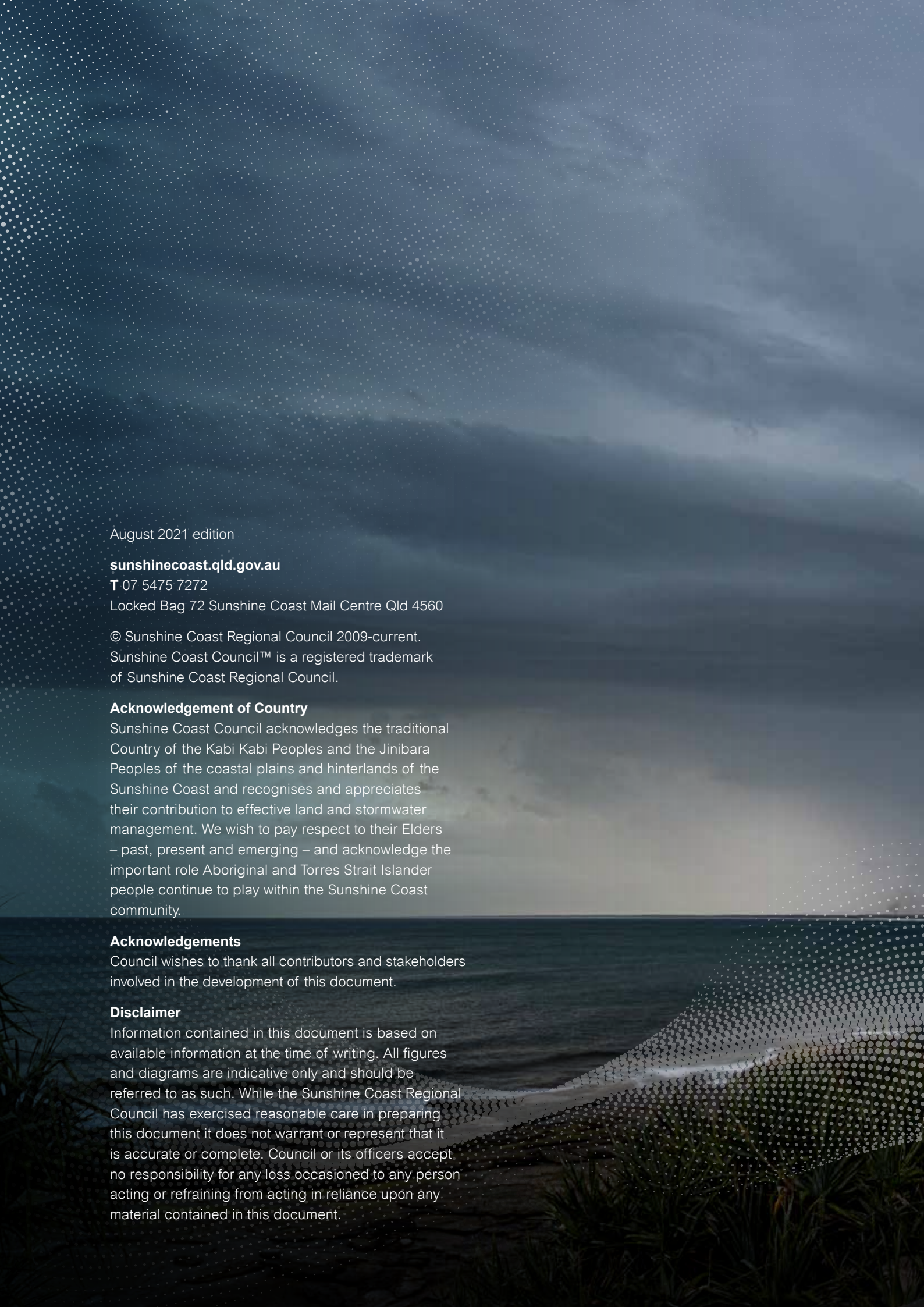
Sunshine Coast Council

Stormwater Management Strategy Part B

AUGUST 2021

Sunshine Coast COUNCIL

Our region.
Healthy. Smart. Creative.



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Acknowledgement of Country
Sunshine Coast Council acknowledges the traditional Country of the Kabi Kabi Peoples and the Jinibara Peoples of the coastal plains and hinterlands of the Sunshine Coast and recognises and appreciates their contribution to effective land and stormwater management. We wish to pay respect to their Elders – past, present and emerging – and acknowledge the important role Aboriginal and Torres Strait Islander people continue to play within the Sunshine Coast community.

Acknowledgements
Council wishes to thank all contributors and stakeholders involved in the development of this document.

Disclaimer
Information contained in this document is based on available information at the time of writing. All figures and diagrams are indicative only and should be referred to as such. While the Sunshine Coast Regional Council has exercised reasonable care in preparing this document it does not warrant or represent that it is accurate or complete. Council or its officers accept no responsibility for any loss occasioned to any person acting or refraining from acting in reliance upon any material contained in this document.

Contents

COUNCIL'S STORMWATER ROLES AND RESPONSIBILITIES 5

DETAILED ACTIONS 9

DESIRED STANDARDS OF SERVICE 17

Council's stormwater roles and responsibilities

The specific roles and responsibilities of different teams or branches within Council who contribute to stormwater management have been summarised.

Stormwater Services

- Manage operational issues associated with the stormwater network and respond to customer enquiries.
- Identify, investigate and scope deficiencies in the existing stormwater network.
- Asset manager for all stormwater infrastructure with the exception of table drains and kerb and channel.
- Develop and administer the asset management plan for the stormwater network, including levels of service.
- Conduct condition assessments and CCTV surveys.
- Manage drainage reserves and easements.
- Manage development and building applications in respect of the Queensland Development Code (QDC) MP1.4 – Building over or near relevant infrastructure.
- Plan and deliver renewals of existing stormwater network infrastructure, with the exception of vegetated channels and table drains.

Flooding and Stormwater Policy and Planning

- Develop and administer Council policy and Planning Scheme guidance for the stormwater network.
- Develop and oversee implementation of the Stormwater Management Strategy.
- Provide strategic advice and undertake flood impact assessment for Council projects.
- Plan trunk stormwater infrastructure to service growth.
- Develop and maintain computer models to understand the performance of the stormwater network.
- Prepare mapping of overland flow paths.
- Prepare flood information searches which provide local flood levels and minimum floor levels.
- Maintain local flood level and rainfall gauges and flooded road sensors.
- Provide disaster management advice during local storm events.

Environment and Sustainability Policy

- Responsible for policy associated with the receiving waterways that urban stormwater discharges into.
- Responsible for policy associated with erosion and sediment control practices affecting waterways.
- Responsible for leading development of climate change adaptation strategies and sustainable design guidelines.
- Responsible for public open space planning.

Asset Management

- Provides the framework for effective asset management of the stormwater network.

Civil Asset Management

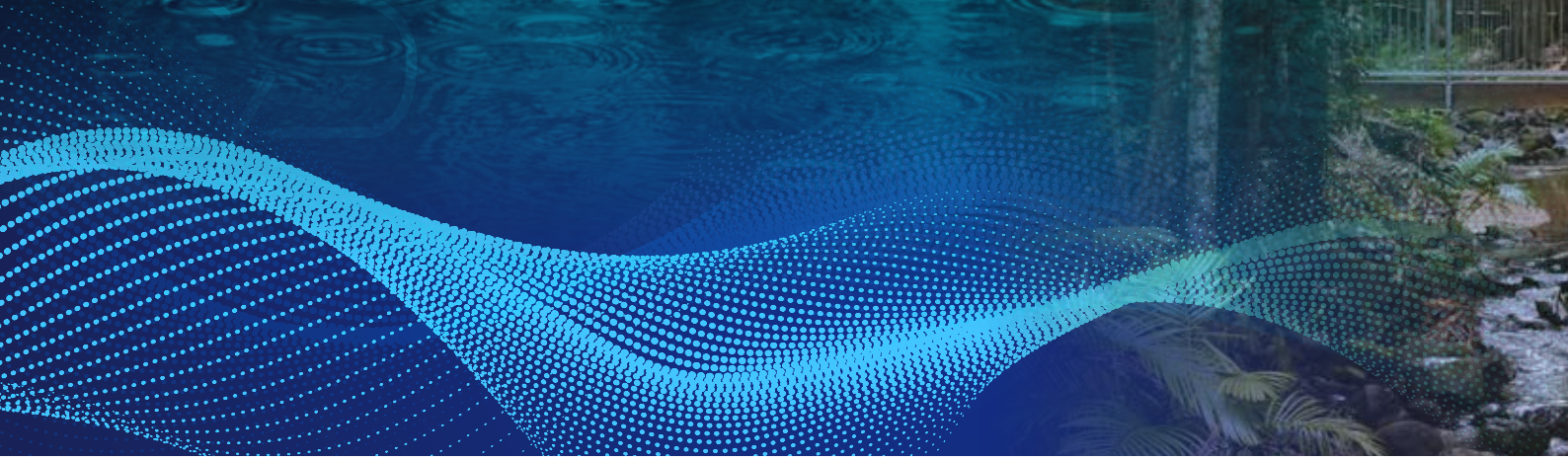
- Maintenance manager and service manager for all stormwater conveyance infrastructure and gross pollutant traps, excluding vegetated channels.
- Asset manager for table drains and kerb and channel.

Parks and Gardens

- Maintenance manager and service manager for vegetation providing natural treatment in stormwater quality infrastructure within parks and road reserves.
- Maintenance of allotment drains within parks.

Development Services

- Implements Council policy and provides guidance in development of the Planning Scheme.
- Approves designs for new development, inspects and accepts contributed stormwater assets provided by developers.
- Reviews and assists the development of improved policy and guidance material from development assessment learnings.



Strategic Planning

- Responsible for the Planning Scheme, including the timing of the release of a new Planning Scheme and Planning Scheme amendments.
- Responsible for land use zonings and considering stormwater implications associated with rezoning.

Customer Response

- Enforces compliance against local laws and state laws, such as those relating to works altering drainage, flowpaths or easements.
- Prevents erosion and sediment control issues from private property and regulates the use of Council controlled land such as public footpaths.
- Responds to environmental health complaints which may be associated with stormwater.
- Provides relevant stormwater management and local flooding information directly to customers.
- Directs customer enquiries relating to stormwater and local flooding to relevant Council officers.

Environmental Operations

- Maintenance manager and service manager for stormwater quality infrastructure using natural treatment processes, not in parks and road reserves. This also extends to vegetated channels providing a stormwater conveyance function.
- Facilitates and supports community environmental programs.

Project Delivery

- Supports design as required and oversees delivery of renewals, new and upgraded stormwater infrastructure on behalf of the asset manager and network planner.

Design and Placemaking Services

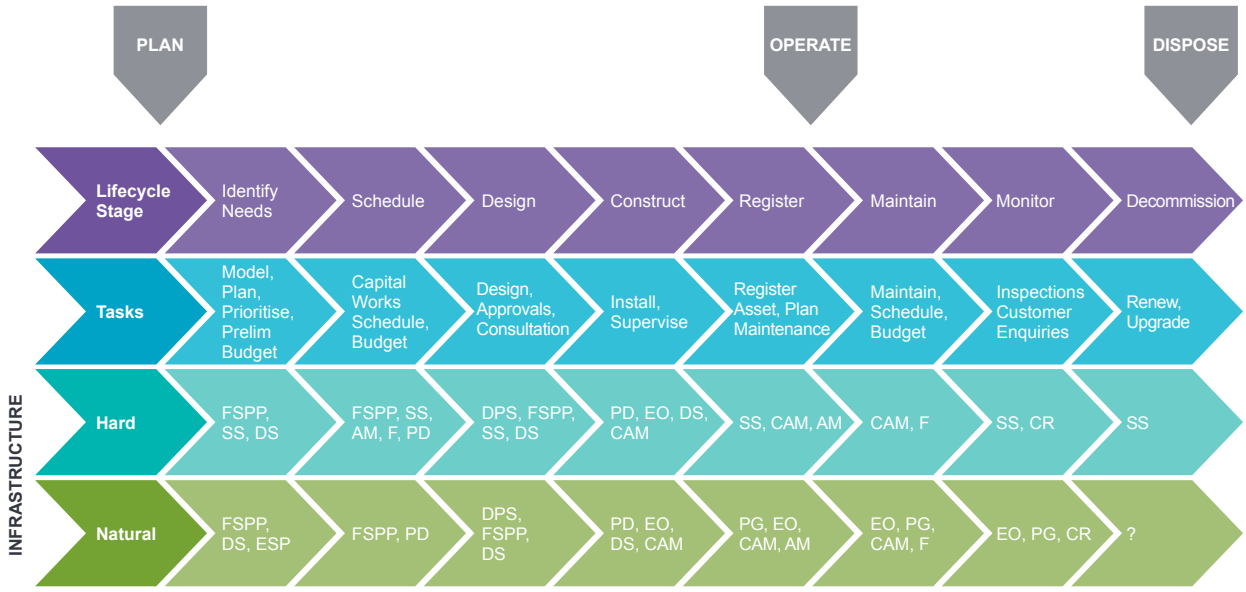
- Delivers detailed designs for renewals, new and upgraded stormwater infrastructure in partnership with the Project Delivery branch, and on behalf of the asset manager and network planner.
- Undertakes placemaking projects to improve the activation at those locations and incorporate stormwater quality and conveyance considerations in the design.
- Offer design advice and undertake concept design work where a natural approach is needed for stormwater treatment.
- Development of the Sunshine Coast Design Strategy, which provides design guidance on ways to protect Sunshine Coast's green character, and enhance the liveability of the Sunshine Coast.

Finance

- Responsible for asset accounting and implementing advice from asset managers on the serviceable life of stormwater assets.
- Responsible for ensuring that capital and operational funding is provided to support the stormwater program.

Life cycle of traditional and natural stormwater infrastructure

The roles of different teams within Council through the typical life cycle of a stormwater asset are summarised in the image below.



Council teams

SS – Stormwater Services, FSPP – Flooding and Stormwater Policy and Planning, ESP – Environment and Sustainability Policy , AM – Asset Management, CAM – Civil Asset Management, PG – Parks and Gardens, DS – Development Services, SP – Strategic Planning, CR – Customer Response, EO – Environmental Operations, PD – Project Delivery, DPS – Design and Placemaking Services, F – Finance

Detailed actions

Detailed actions for each key objective have been determined and provided in the following tables.

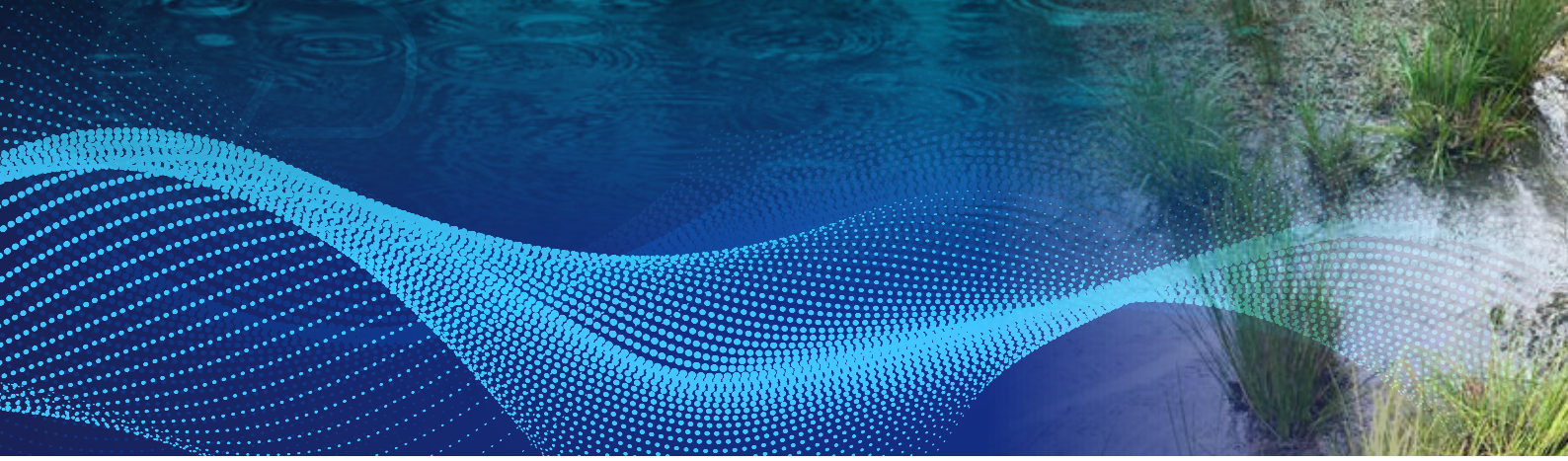
The priority levels assigned to each detailed action are:

- **High:** completed by 2025
- **Medium:** completed by 2030
- **Low:** completed by 2041
- **Continual:** completed by 2025 and conducted on a regular basis.

An estimate of the funding requirements of each detailed action has also been completed:

- **Minor:** < $50,000
- **Moderate:** < $150,000
- **Major:** > $150,000.

The ability to implement these detailed actions will be subject to Council's budget processes.



Objective 1: Resilient and smart

Wellbeing and resilience are enhanced by increased stormwater awareness, clever planning and good design.

The strategic directions that relate to this objective are:

1.1. Understanding stormwater flood risk and stormwater network performance.

1.2. Strategic identification and designation of land and assets.

1.3. Sustainable, smart and functional design.

The detailed actions that support the 'resilient and smart' strategy objective and strategic directions are outlined in the table below.

ID	Description	Priority*	Investment Indicator^
1.1.1	Prepare fact sheets to support the community understanding of drainage issues such as overland flow paths.	High	Minor
1.1.2	Prepare service to provide automated Flood Information Searches with stormwater flood information.	Medium	Moderate
1.1.3	Overland flow path mapping is made publicly available.	High	Moderate
1.1.4	Suitable evacuation routes during local storm events are identified and information made available to Disaster Management.	Medium	Moderate
1.1.5	Provide targeted education for members of the community vulnerable to stormwater flood risks.	Continual	Moderate
1.1.6	Complete and maintain the currency of detailed overland flow and stormwater network modelling throughout region.	Continual	Major
1.1.7	Prepare MDPs to identify required infrastructure upgrades.	Medium	Major
1.1.8	Revise completed MDPs with desired standards of service in order to assist the prioritisation process.	High	Major
1.1.9	Review staging of MDP works to ensure impacts to existing properties are minimised.	High	Major
1.1.10	Ensure details of stormwater network capacity are provided in a format that is easily accessible for Council officers.	Continual	Minor
1.1.11	Maintain database of customer complaints relating to stormwater to help identify hotspots and requirements for upgrades or renewals.	Continual	Moderate
1.1.12	Identify properties that have building footprints inundated during minor and moderate local flood events based on overland flow mapping.	High	Minor
1.1.13	Undertake floor level surveys of properties affected by overland flow inundation and properties subject to customer complaints relating to stormwater inundation.	Continual	Major

* High (2021-2025), Medium (2025-2030), Low (2030-2041), Continual (2021-2041)
^ Minor (<$50K), Moderate (<$150K), Major (>$150K)

ID	Description	Priority*	Investment Indicator^
1.1.14	Develop a database of floor levels of surveyed properties to assist with Disaster Management and climate change adaptation planning.	Medium	Moderate
1.1.15	Identify locations where flood depth markers for stormwater drainage concerns should be installed.	Low	Moderate
1.2.1	Review of unsuitably zoned land.	High	Moderate
1.2.2	Identify and appropriately designate Council land or assets that serve a stormwater function.	Medium	Moderate
1.2.3	Strategic identification of land required for regional stormwater quality treatment, protection or rehabilitation.	High	Moderate
1.2.4	Strategic identification of land required for improved overland flow paths, highlighting areas which could also provide Open Space or transport network uses.	High	Moderate
1.2.5	Strategic identification of stormwater upgrade projects and easements identified in MDPs, backflow analysis or by the asset manager.	Continual	Major
1.2.6	Identify suitable backflow prevention locations and devices. Check sensitivity of stormwater network to proposed modifications.	Medium	Moderate
1.2.7	Identify stormwater infrastructure that will require protection from increased saltwater inundation due to climate change.	Medium	Minor
1.2.8	Identification of areas requiring bank stabilisation works.	High	Moderate
1.3.1	Review the Planning Scheme and Flooding and Stormwater Management Guidelines to ensure they align with the vision and objectives of Stormwater Management Strategy and that overland flow path requirements are properly considered.	High	Moderate
1.3.2	Review Fast Track development application process for adequacy in addressing stormwater management issues.	High	Minor
1.3.3	Regularly review guidelines and tools supporting Council's Planning Scheme to ensure relevance and practicality.	Continual	Moderate
1.3.4	Prepare guidance on how existing and new properties can improve resilience to stormwater flooding.	High	Moderate
1.3.5	Consider a Flood Resilient Homes Program and determine appropriateness and potential for implementation on the Sunshine Coast.	High	Major
1.3.6	Prepare guidance on how infill development should consider overland flow paths (in areas with and without a MDP) and incorporate good Sunshine Coast design.	High	Moderate
1.3.7	Prepare additional technical notes and guided examples that may assist the development industry with stormwater design.	Continual	Moderate
1.3.8	Explore opportunities to incentivise the uptake of sustainable design (in particular an increase in pervious areas, passive irrigation and rainwater harvesting).	High	Moderate

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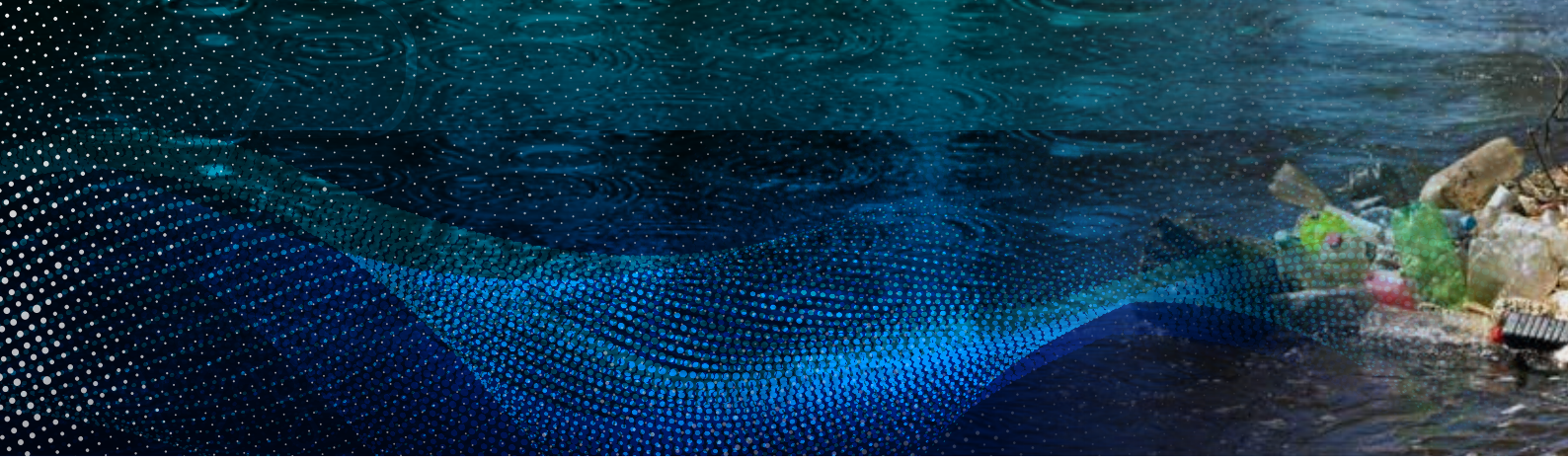

Objective 2: Protected and healthy

Stormwater management protects the natural and built environment and supports healthy communities and ecosystems.

The strategic directions that relate to this objective are:

2.1 Effective stormwater treatment and water quality management.

2.2 An informed and engaged community and industry.

2.3 Compliance and accountability.

The detailed actions that support the 'coordinated and well managed' strategy objective are outlined in the table below.

ID	Description	Priority*	Investment Indicator^
2.1.1	Promote use of passively irrigated street trees throughout the region to increase urban cooling and improve tree health.	High	Minor
2.1.2	Undertake additional analysis to prioritise locations of regional stormwater treatment, rehabilitation and waterway stabilisation.	Medium	Moderate
2.1.3	Review appropriateness of the generic State Planning Policy design objectives for stormwater quality.	High	Moderate
2.1.4	Consider State Planning Policy – Water Quality review recommendations	High	Moderate
2.1.5	Review street sweeping operations and expand as required to improve regional stormwater quality and stormwater flooding outcomes.	Continual	Moderate
2.1.6	Review provision of public bins in litter hot spots.	Continual	Moderate
2.1.7	Scour protection and bank stabilisation works are conducted where necessary.	Continual	Major
2.1.8	Ensure staff are appropriately trained in Erosion and Sediment Control.	Continual	Minor
2.1.9	Ensure staff demonstrate best-practice stormwater management in operational activities.	Continual	Minor
2.1.10	Develop and implement a comprehensive Urban and Rural Erosion and Sediment Control Program	High	Major
2.2.1	Prepare and update fact sheets and Council website information that will assist Customer Response to respond appropriately to enquiries from the public.	High	Moderate
2.2.2	Prepare fact sheets about the importance of effective stormwater quality management, the function of WSUD devices and the role of the community.	High	Minor
2.2.3	Ensure information on stormwater management and links to other useful websites is provided in a centralised location on Council's website.	Medium	Moderate
2.2.4	Council communications are to include education around stormwater management, stormwater hazards, local and state laws, Council initiatives and projects and actions the community can take and activities of environmental groups.	Continual	Moderate
2.2.5	Provide education and guidance material to the development industry to assist with implementation of SCC guidelines and Planning Scheme requirements.	Continual	Minor

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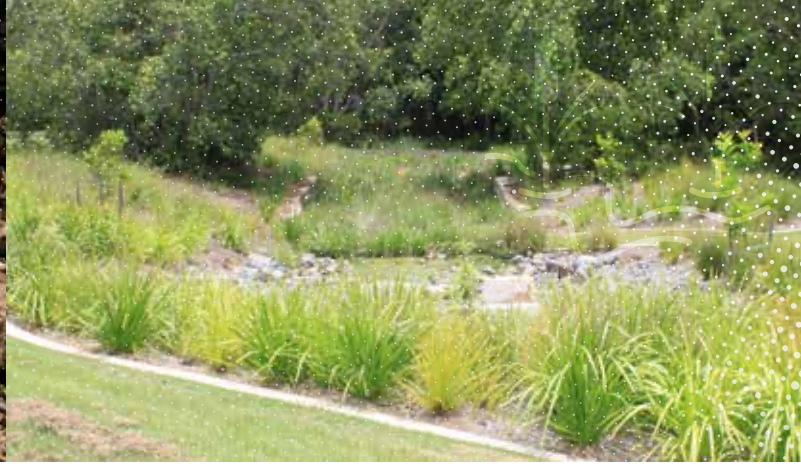

ID	Description	Priority*	Investment Indicator^
2.2.6	Foster partnerships to help deliver effective stormwater management.	Continual	Major
2.2.7	Promote and facilitate community-led litter reduction initiatives.	Continual	Minor
2.2.8	Continue litter education campaigns.	Continual	Moderate
2.2.9	Provide educational signage for drainage reserves and stormwater infrastructure.	Continual	Moderate
2.2.10	Update mapping of waterways to improve accuracy.	High	Moderate
2.2.11	Ensure mapping of high ecological value waterways is more publicly available.	High	Minor
2.2.12	Prepare additional guidance on off-site stormwater treatment offset alternatives and how they can be applied.	Medium	Major
2.2.13	Prepare additional guidance on acceptable stormwater harvesting infrastructure.	Medium	Moderate
2.2.14	Investigate initiatives and incentives that would promote effective stormwater management in the region.	Continual	Major
2.2.15	When appropriate, collaborate with Unitywater on their nutrient off-setting program.	Continual	Moderate
2.2.16	Apply for state and federal grants to assist with the delivery of effective stormwater management.	Continual	Moderate
2.2.17	Advocate to state and federal governments for grants to manage stormwater infrastructure to be impacted by climate change.	Continual	Moderate
2.3.1	Review and revise local laws relating to stormwater management so that clearer guidance is provided and infringement penalties are scalable and appropriate.	Medium	Moderate
2.3.2	Determine additional water quality monitoring requirements, undertake regular monitoring.	Continual	Major
2.3.3	Undertake regular water quality monitoring.	Continual	Major
2.3.4	Maintain compliance with Planning Scheme and local law requirements and prosecute clear non-compliances.	Continual	Major
2.3.5	Ensure contributed assets are certified as constructed as per design and functioning fit for purpose prior to hand over by appropriately qualified professionals	Continual	Minor
2.3.6	Refer RPEQs to Board of Professional Engineers Queensland (BPEQ) if design or certification does not adequately reflect industry standards required by an RPEQ or if a design is found to be deficient.	Continual	Major
2.3.7	Undertake consistent compliance monitoring and enforcement during the construction phase of development.	Continual	Major
2.3.8	Undertake regular auditing and enforcement of site management plans for construction phase erosion and sediment control.	Continual	Major
2.3.9	Review other LGA WSUD Compliance Programs for privately owned assets.	High	Minor
2.3.10	Undertake regular auditing and enforcement of conditions relating to maintenance and operation of private stormwater quality assets	Continual	Major

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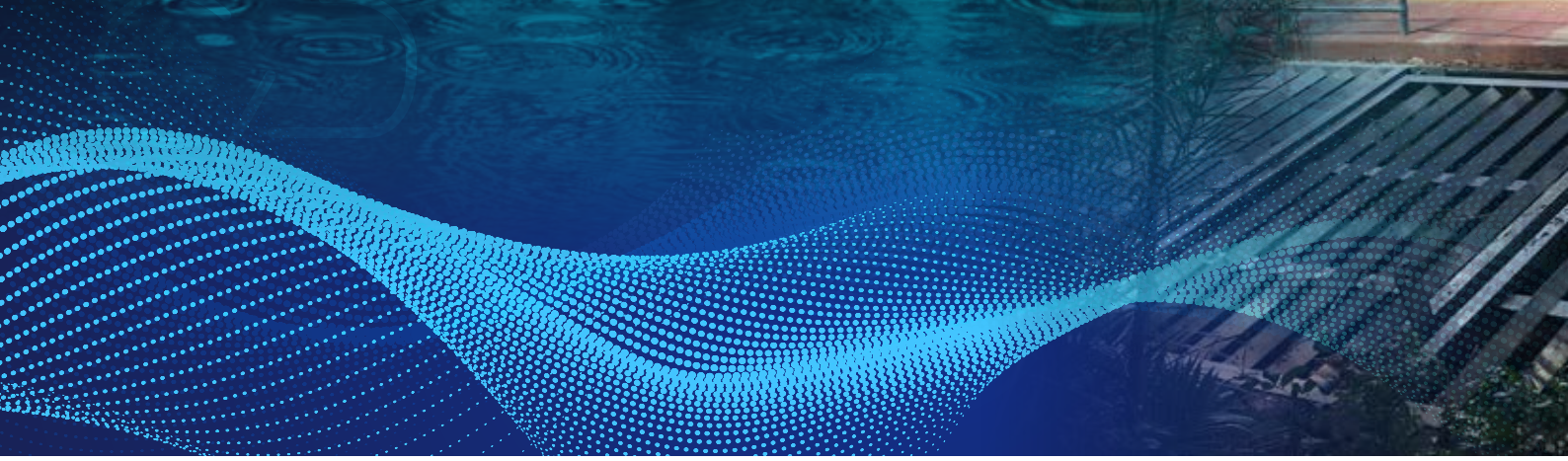
^ Minor (<$50K), Moderate (<$150K), Major (>$150K)



Objective 3: Coordinated and well managed

Stormwater assets are effective and responsive to a changing environment.

The strategic directions that relate to this objective are:

3.1 Coordinated management and maintenance of stormwater assets.

3.2 Sustainable levels and standards of service that are fit for purpose.

3.3 Improved asset management and knowledge of stormwater assets.

3.4 Prioritised and coordinated delivery of works.

The detailed actions that support the 'coordinated and well managed' strategy objective are outlined in the table below.

ID	Description	Priority*	Investment Indicator^
3.1.1	Update asset management matrix to better define responsibilities, particularly for WSUD assets.	High	Minor
3.1.2	Review organisational structure to ensure the importance of stormwater management is suitably recognised.	High	Minor
3.1.3	Review effectiveness of Customer Request Management (CRM) process in relation to stormwater management issues.	High	Minor
3.1.4	Develop WSUD guidelines within the Sunshine Coast Open Space Landscape Infrastructure Manual in coordination with key stakeholders.	High	Minor
3.1.5	Establish a system to track stormwater assets about to come "off maintenance" in order to inform budget and resource planning.	High	Minor
3.1.6	Monitor critical and high risk assets to ensure continuous functionality.	Continual	Major
3.1.7	Flood and drainage models are capitalised with depreciation funding renewal.	Medium	Minor
3.1.8	Develop methodology for capitalisation of natural stormwater assets.	Medium	Moderate
3.1.9	Prepare standard maintenance procedures and checklists for WSUD assets.	Medium	Minor
3.1.10	Implement maintenance management system for each asset class with regular inspections.	Continual	Major
3.1.11	Regularly review maintenance programs for stormwater assets in vulnerable areas.	Continual	Major
3.1.12	GeoHub layer of LGIP projects is prepared and maintained.	Continual	Minor
3.1.13	Develop and participate in working groups to encourage collaboration and knowledge sharing within Council.	Continual	Moderate
3.1.14	Identify inefficient and/or defective WSUD assets.	Medium	Moderate
3.1.15	Identify structures prone to blockage that require modification works.	Medium	Moderate
3.2.1	Desired standards of service are prepared for all stormwater assets. They reflect the practical and financial capabilities of Council.	High	Moderate
3.2.2	Develop levels of service for management and maintenance of stormwater assets.	Medium	Moderate
3.2.3	Adopt and implement 'fit for purpose' designs where appropriate for low risk assets.	Continual	Moderate

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^ Minor (<$50K), Moderate (<$150K), Major (>$150K)

ID	Description	Priority*	Investment Indicator^
3.3.1	Develop a critical asset database.	High	Minor
3.3.2	Database and GeoHub layer of required stormwater renewals and upgrade projects is maintained.	Continual	Minor
3.3.3	Prepare a process to easily flag data discrepancies or missing data.	Medium	Minor
3.3.4	GeoHub layer of passively irrigated street tree installations is prepared.	Medium	Minor
3.3.5	Identify high risk assets.	Continual	Moderate
3.3.6	Identify discrepancies or missing data in stormwater dataset and notify asset manager.	Continual	Minor
3.3.7	Undertake survey of missing stormwater assets identified in MDPs.	Medium	Moderate
3.3.8	Ensure internal and external stakeholders provide all relevant information to asset information officers to assist with ongoing management and maintenance of stormwater assets.	Continual	Minor
3.3.9	Incorporate site survey conducted as part of development or Council works into corporate datasets.	Continual	Minor
3.3.10	Incorporate state owned stormwater infrastructure into the corporate dataset.	Medium	Moderate
3.3.11	Establish and maintain a database of privately owned stormwater quality infrastructure to assist property owners and Council with maintenance and compliance.	Low	Major
3.3.12	Flood and drainage models are capitalised with depreciation funding renewal.	Medium	Minor
3.3.13	Conduct detailed condition survey of stormwater infrastructure where required to improve quality of corporate dataset.	Continual	Major
3.3.14	Deliver targeted training across Council to improve implementation of Planning Scheme stormwater requirements; awareness of stormwater overland flow paths; purpose of the Strategy; asset management awareness etc.	Continual	Major
3.4.1	A Multi Criteria Assessment prioritisation framework to assess projects is prepared.	High	Minor
3.4.2	Results of updated MDPs (with consistent standards of service), regional stormwater quality projects, renewal and upgrade projects are assessed with the prioritisation framework. List of projects to be reviewed every 10 years. Prioritisation to be reviewed every 3 years.	Continual	Major
3.4.3	Progress concept designs of stormwater projects identified in prioritisation framework.	Continual	Major
3.4.4	List scheduled stormwater projects on Works Hub.	Continual	Minor

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^ Minor (<$50K), Moderate (<$150K), Major (>$150K)

Desired standards of service

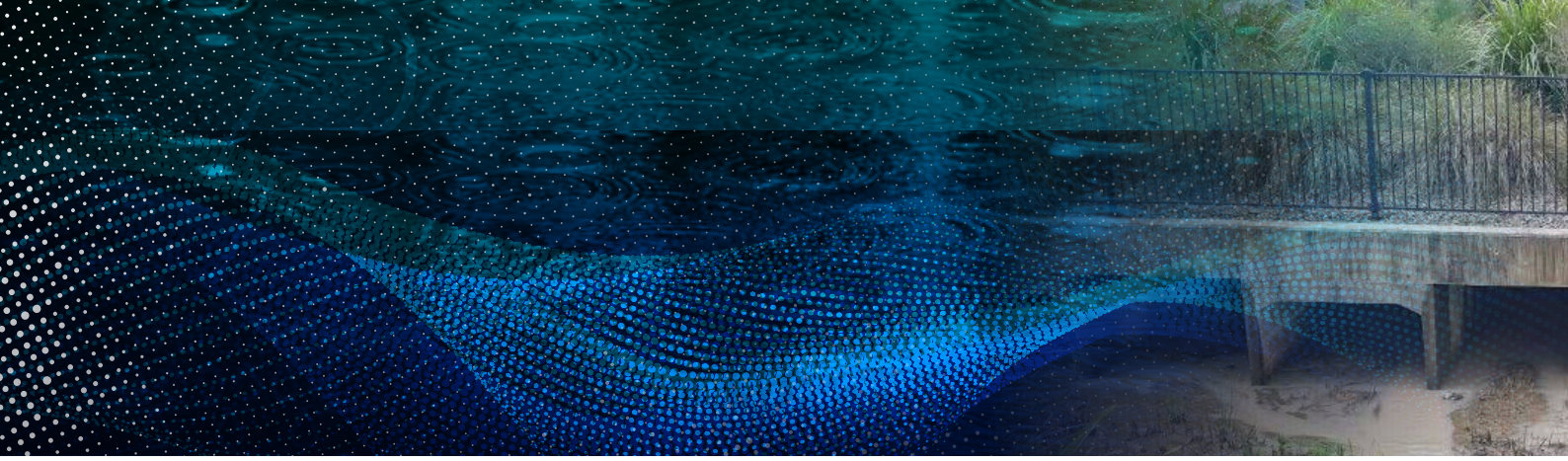
Desired standards of service (DSS) must ensure that sufficient safety and amenity are provided to the community. However, DSS must also be balanced with the:

- financial and resourcing capacity of Council
- increased volume and diversity of assets requiring maintenance
- increasing pressures on the stormwater network due to forecast impacts of climate change.

DSS are varied between existing, infill and new development areas in order to ensure they are appropriate and sustainable. The proposed DSS for these different areas are summarised in the following table.

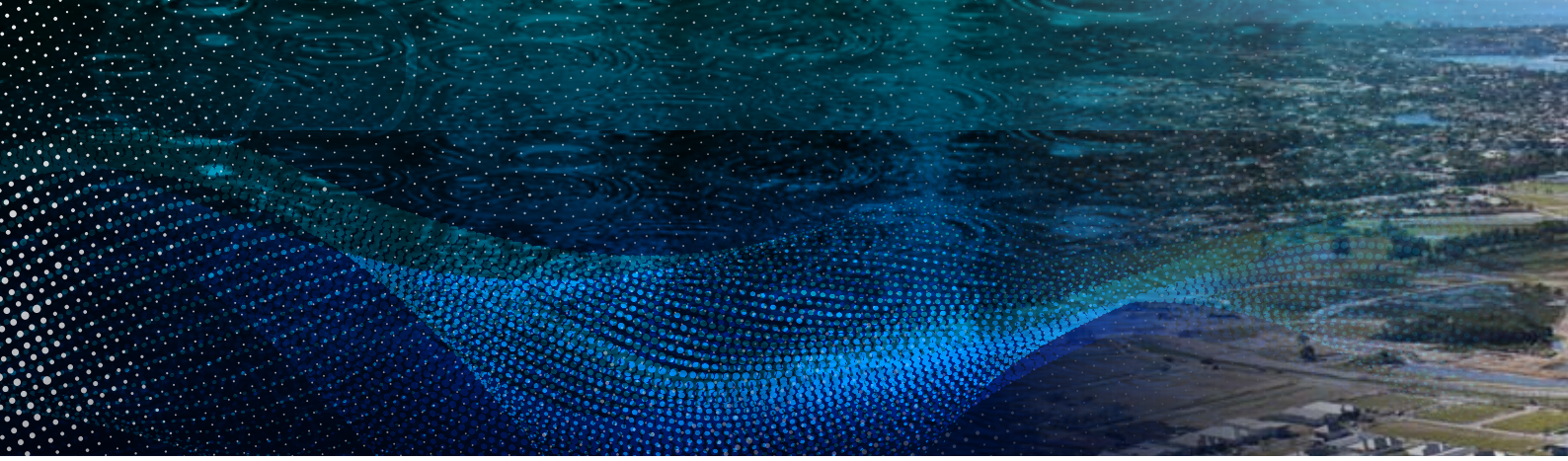
The DSS are different to the levels of service (LOS) referred to in the Asset Management Plan. LOS are a combination of parameters which reflect social, political, environmental and economic outcomes that Council delivers for the stormwater network. The parameters can include safety, customer satisfaction, quality, quantity, capacity, reliability, responsiveness, environmental impact, legislative requirements and cost. The DSS outlined below will be used to inform some of the targets in the LOS.

<table>
<tr><th colspan="2"></th><th>Existing</th><th colspan="2">Infill Development</th><th>Greenfield Development</th></tr>
<tr><th colspan="2"></th><th>All Residential</th><th>Low Density Residential</th><th>Medium/High Density</th><th>All Residential</th></tr>
<tr><td rowspan="5">Lot and Floor Level</td><td>Habitable Floor Level (Drainage)</td><td rowspan="5">Due diligence investigations recommended prior to purchase. All costs associated with mitigating regional flooding or local stormwater flooding that would naturally occur on property are the responsibility of the property owner. Where the impact or nuisance is a result of capacity issues associated with the trunk stormwater network, trunk upgrades or alternative resilience measures will be considered and prioritised using a MCA</td><td colspan="2">Maximum of 1% AEP (2100) + 0.3m OR 1% AEP (2100) with complete blockage OR 0.05% (2100). 600mm of freeboard required if building on structure within an overland flow path classified as having acceptable risk.</td><td>Maximum of 1% AEP (2100) + 0.3m OR 1% AEP (2100) with complete blockage OR 0.05% (2100)</td></tr>
<tr><td>Non-Habitable Floor Level (Drainage)</td><td colspan="2">1% AEP (2100) + 0.1m. 400mm of freeboard required if building on structure within an overland flow path classified as having acceptable risk.</td><td>1% AEP (2100) + 0.1m</td></tr>
<tr><td>All Floor Levels (Regional)</td><td colspan="2">Maximum of 1% AEP (2100) + 0.5m OR 0.2% AEP (2100)</td><td>Maximum of 1% AEP (2100) + 0.5m OR 0.2% AEP (2100)</td></tr>
<tr><td>Lot Level (Drainage)</td><td>Overland flow paths classified as having</td><td>Overland flow paths classified as having unacceptable risk located outside of lot boundary and provided under easement at time of redevelopment.</td><td>1% AEP (2100) when building above top of kerb and channel or adjacent to overland flow path. QUDM requirements when building below top of kerb and channel.</td></tr>
<tr><td>Lot Level (Regional)</td><td colspan="2">1% AEP (2100) provided under easement. When reconfiguring a lot, entire lot at 1% AEP (2100) + 0.5m</td><td>1% AEP (2100) + 0.5m</td></tr>
</table>



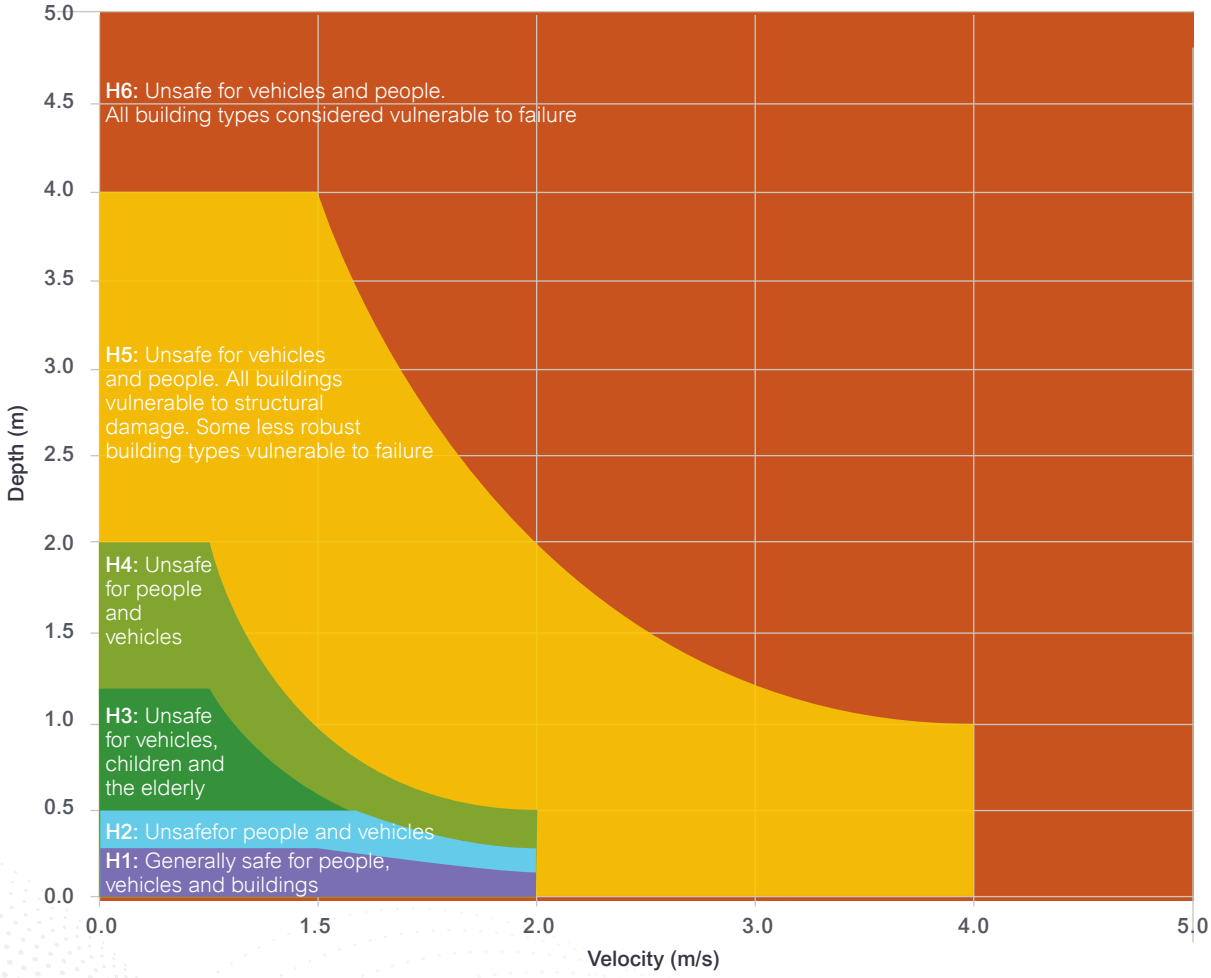
		Existing	Infill Development		Greenfield Development
		All Residential	Low Density Residential	Medium/High Density	All Residential
Local Roads	Maximum Flood Depth and Hazard	Floodways to have 'road subject to flooding' signage and depth markers. Where depth at kerb invert exceeds 250mm or Hazard > H1 in 39% AEP (2100) event trunk drainage upgrades will be considered and prioritised using a MCA. < 36 hours (after cessation of rain)	Floodways to have 'road subject to flooding' signage and depth markers. Where depth at kerb invert exceeds 250mm or Hazard > H1 in 39% AEP (2100) event trunk drainage upgrades will be considered and prioritised using a MCA.		QUDM Requirements (e.g. depth at kerb ≤ 250mm in 2% AEP event for longitudinal flow)
	Duration of flooding on road		< 36 hours (after cessation of rain)		< 9 hours (after cessation of rain)
	Debris	Street sweeping generally conducted twice yearly as per Street Sweeping Schedule.			
Major Roads	Maximum Flood Depth and Hazard	Floodways to have road subject to flooding signage and depth markers. Where depth at kerb invert exceeds 250mm or Hazard > H1 in 10% AEP (2100) event trunk drainage upgrades will be considered and prioritised using a MCA.	Floodways to have road subject to flooding signage and depth markers. Where depth at kerb invert exceeds 250mm or Hazard > H1 in 10% AEP (2100) event trunk drainage upgrades will be considered and prioritised using a MCA.		QUDM Requirements (e.g. still water depth at road sag ≤ 300mm in 1% AEP for transverse flow)
	Duration of Flooding on Road	< 12 hours (after cessation of rain)	< 12 hours (after cessation of rain)		< 6 hours (after cessation of rain)
	Debris	Street sweeping generally conducted twice yearly as per Street Sweeping Schedule if maintained by Council.			
Internal Development Roads and Carparks	Maximum Flood Depth and Hazard	n/a	QUDM Requirements: Basement entry: 1% AEP (2100) + 0.5m		QUDM Requirements asement entry: 1% AEP (2100) + 0.5m
Public Carparks	Maximum Flood Depth and Hazard	Where depth exceeds 250mm or Hazard > H1 in 39% AEP (2100) event upgrades will be considered and prioritised using a MCA. Consideration should also be given to likelihood of flood warnings, the use of warning signs, safety risks and the ability to evacuate.	QUDM Requirements: 300mm depth in 1% AEP (2100), dV ≤ 0.3 m2/s. Basement entry: 1% AEP (2100) + 0.5m		QUDM Requirements: 300mm depth in 1% AEP (2100), dV ≤ 0.3 m2/s. Basement entry: 1% AEP (2100) + 0.5m

		Existing	Infill Development		Greenfield Development
		All Residential	Low Density Residential	Medium/High Density	All Residential
Stormwater Impacts	Public Infrastructure Works	The frequency of flooding above floor level of existing private infrastructure shall not be increased. Changes to stormwater behaviour are not to cause an actionable nuisance on private land.	The frequency of flooding above floor level of existing private infrastructure shall not be increased. Changes to stormwater behaviour are not to cause an actionable nuisance on private land.		New development is to manage stormwater flood impacts within the boundaries of the project. Water level affluxes less than 10mm for all AEPs up to the 1% AEP (2100) are acceptable.
	Private Development	Property owners must design, maintain and defend their properties in a manner that does not unreasonably prevent neighbouring properties from enjoying the normal use of their land.	New development is to manage stormwater flood impacts within the property boundary. Water level affluxes less than 10mm for all AEPs up to the 1% AEP (2100) are acceptable.		
Emergency Management		Due diligence investigations recommended prior to purchase. All costs associated with mitigating risk are the responsibility of the property owner.	Progressive evacuation route to off-site evacuation centre located above the PMF, determined based on regional and drainage 1% AEP (2100) OR place of safe refuge on-site that has PMF immunity and safe to withstand hydraulic forces in PMF.		Progressive evacuation route to off-site evacuation centre located above the PMF, determined based on regional and drainage 1% AEP (2100) OR place of safe refuge on-site that has PMF immunity and safe to withstand hydraulic forces in PMF.
Sports Grounds and Recreation Parks	Flood Immunity and Hazard	Existing land below the 5% AEP (Regional and Drainage) level are to ensure uses are complementary with stormwater function. If required to mitigate existing flood issues 39% AEP immunity and Hazard < H3 in 5% AEP is acceptable.	Located above 5% AEP (2100) (Regional and Drainage). Key infrastructure and activity areas above 2% AEP (2100) Buildings/structures above 1% AEP (2100).		Located above 5% AEP (2100) (Regional and Drainage). Key infrastructure and activity areas above 2% AEP (2100) Buildings/structures above 1% AEP (2100).



		Existing	Infill Development		Greenfield Development
		All Residential	Low Density Residential	Medium/High Density	All Residential
Constructed Channels/ Drains/	Duration of Flooding	Works will not occur to reduce ponding for channels < 0.5% slope or where backwatering occurs	< 24 hours (after cessation of rain) unless backwatered		< 24 hours (after cessation of rain)
	Minimum Slope	n/a	0.5%		0.5%
Bio-retention Basins	Plants	> 80% vegetation coverage of filter surface. Plants healthy.	Floodways to have road subject to flooding signage and depth markers. Where depth at kerb invert exceeds 250mm or Hazard > H1 in 10% AEP (2100) event trunk drainage upgrades will be considered and prioritised using a MCA.		QUDM Requirements (e.g. still water depth at road sag ≤ 300mm in 1% AEP for transverse flow)
	Duration of flooding / Hydraulic	< 24 hours (after cessation of rain). No obvious impermeable layer on surface.	< 12 hours (after cessation of rain)		< 6 hours (after cessation of rain)
	Litter	Regularly cleaned as per Parks and Gardens scheduling.			
	Sediment forebays	<75% full. No erosion around entrance.			
GPTs and Litter Baskets	Litter	Cleaning as per manufacturer's guidelines			
	Function	Free from faults and blockages			

The referenced flood hazard categories are as defined by the Australian Institute for Disaster Resilience with the following flood hazard vulnerability curves.



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