



Roadside Drainage Strategy 2019

*PLANNING FOR OUR PEOPLE
OUR PLACE OUR FUTURE*

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Document Control Table

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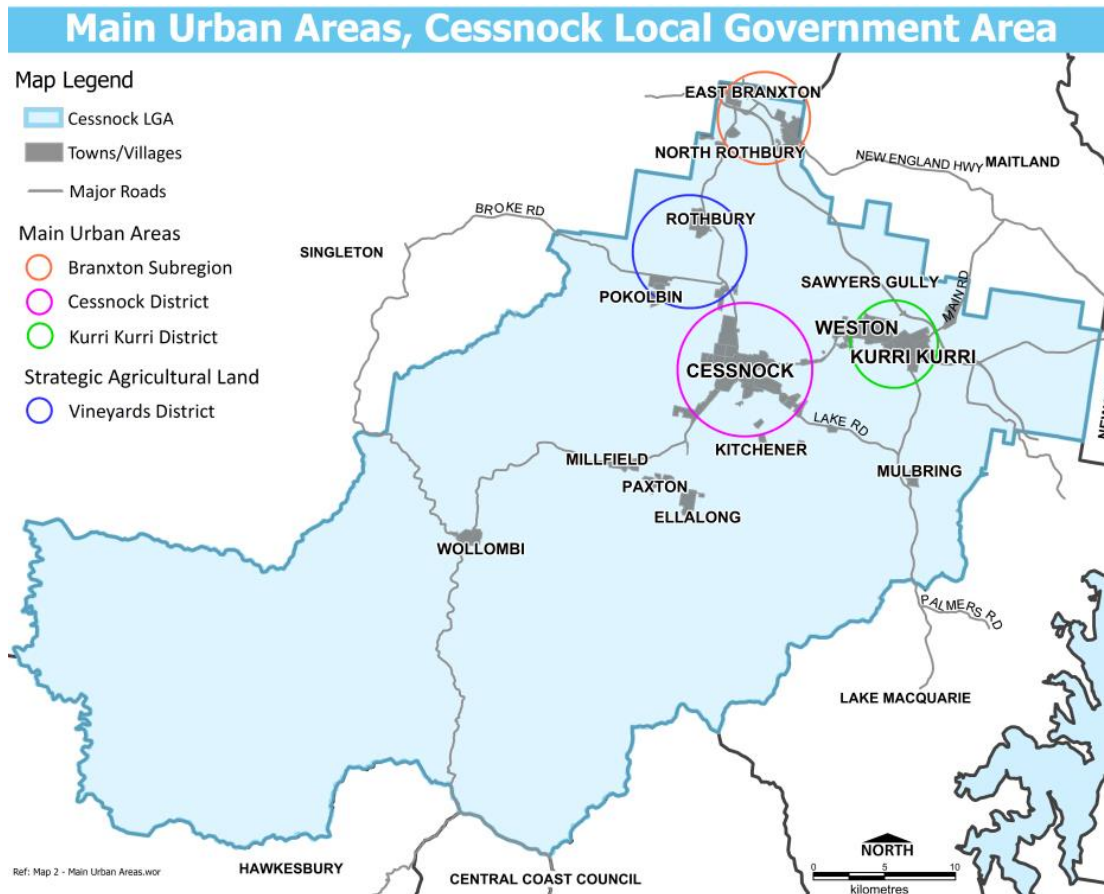
Section 1

Introduction

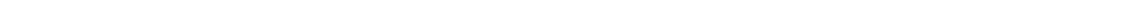
1.1 Background

The Cessnock LGA encompasses approximately 1,950 square kilometres within the Lower Hunter Region of New South Wales. The population of the LGA is approximately 56,500 people (2016 ABS Census), the majority of whom reside in a thin urban belt between the townships of Cessnock and Kurri Kurri. The LGA contains three main urban areas, being the Branxton, Cessnock and Kurri Kurri districts or subregions. The general location of the main urban areas is shown in Figure 1.

Figure 1 - Main Urban Areas, Cessnock Local Government Area



The LGA's main urban areas are expected to grow significantly in the coming years, primarily as a result of greater housing affordability and in response to major infrastructure projects, such as the Hunter Expressway, which have made the LGA more accessible to employment centres, tourism and community services and facilities in the Upper and Lower Hunter. As a result, the LGA is expecting significant urban and economic growth and a shift from primary and secondary industries, such as mining and rural industries, to an increased range of service industries.



The Roadside Drainage Issue

In recent years the Cessnock LGA has seen the demolition of older homes and reconstruction new dwellings with higher densities and increased imperious areas. With a projected increase in development pressure and population growth in the Cessnock area, as forecast in the Hunter Regional Strategy 2036, this “knockdown-rebuild” trend is likely to continue.

Cessnock City Council provides a sealed road network of 680 km with approximately 360 lineal km of kerb and gutter. Many of streets within the urban areas of the Cessnock LGA do not have standard kerb and gutter. Where “knockdown-rebuild” development occurs within these established urban areas and there is no kerb and gutter at the road frontage, Council has required the developer to construct the kerb and gutter.

The objective of this approach was to, over time, install a kerb and gutter to the urban streets of Cessnock where a development intensification warrants the construction of new infrastructure to meet the future demand and use. However, this kerb and gutter installation approach has led to:

- Ad hoc and disconnected installation of kerb and gutter;
- Stormwater runoff impacts along the road reserve with no connection to a stormwater network,
- Stormwater runoff impacts into private property from the road reserve;
- A misalignment of the kerb and gutter with a proposed road pavement alignment, requiring kerb and gutter removal;
- Inappropriately located kerb and gutter creating an undesirable impact on the future character of an area;
- Increased Council maintenance intervention at the interface between to new kerb and gutter and the existing informal roadside drainage system; and
- Frustration within the community for the imposition of a development condition that is seen as costly and unnecessary.

In response to ongoing issues associated with infill development requirements to construct kerb and gutter, Council, during its meeting of 1 October 2014 resolved to adopt interim requirements for the conditioning of kerb and gutter on development applications, as follows:

- *For dual occupancy, granny flats and 2 lot residential subdivisions, a condition of consent requiring the construction of kerb and gutter, will only apply in circumstances where kerb and gutter exists immediately adjacent the subject site;*
- *For residential subdivision of 3 lots or more, and multi-dwelling development and any other form of residential development (with the exception of single dwellings), a condition of consent requiring the construction of kerb and gutter, will apply in all circumstances; and*
- *For all commercial and industrial development, a condition of consent requiring the construction of kerb and gutter, will apply in all circumstances.*

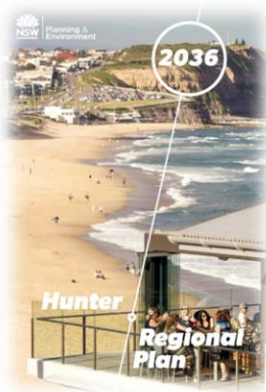
Kerb and gutter is necessary to formalise the road edge, protect the road pavement and to collect and convey stormwater to a suitable discharge point. However, alternative options may also be effective.

In areas where table drains or swales are functioning as part of an overall drainage system, an alternative solution is provided. This is a concrete edge strip to formalise the road edge and protect the road pavement along with formalising the table drain into a grass swale. This allows the table drain to have in a positive impact on water quality, while not reducing its drainage capacity or impacting existing function of the road reserve. This solution was adopted by Council 19 September 2018 as an amendment to the interim kerb and gutter requirements, refer Appendix 1.

It is estimated that the cost to provide kerb and gutter to the residential roads in the Cessnock LGA where kerb and gutter is currently not present, is in the order of \$89 million. Council does not have sufficient financial resources to implement a forward works plan to renew or upgrade existing, or provide new kerb and gutter (or roadside drainage) in urban areas. Some new works have been completed, but this has been carried out in conjunction with road renewals or where utilities have been located from the road to the edge of the road reserve.

1.2 Policy Context

Hunter Regional Plan 2036



The Hunter Regional Plan 2036 provides the overarching framework to guide the NSW Government's land use planning priorities and decisions to 2036.

It is anticipated that a considerable proportion of the dwellings and jobs required in Greater Newcastle by 2036 will be accommodated through the renewal, diversification and connection of the Region's strategic centres.

This projected growth will be delivered through a combination of infill greenfield development as well as a small portion of rural residential development.

The Cessnock LGA has a current population of over 56,500 and a projected population in 2036 of 69,250. To accommodate this population, an additional 6,350 dwellings will be required. These dwellings will be delivered through a combination of infill and greenfield development. Further, the impacts of the Hunter Expressway by improving the accessibility of the LGA to key centres for recreation and employment as well as housing affordability is likely to accelerate the demand for housing.

The Greater Newcastle Metropolitan Plan 2036

The Greater Newcastle Metropolitan Plan 2036 was launched on 17 September 2018 by the Minister for Planning Anthony Roberts MP.

As Australia's seventh largest city and global gateway for northern NSW, Greater Newcastle faces a new future with investment in aviation, transport, education, health and tourism.

This first-ever Metropolitan Plan for Greater Newcastle, and first for a non-capital city in Australia, aims to capitalise on this investment through a collaborative approach.

The Plan sets out strategies and actions that will drive sustainable growth across Cessnock City, Lake Macquarie City, Maitland City, Newcastle City and Port Stephens communities, which together make up Greater Newcastle.

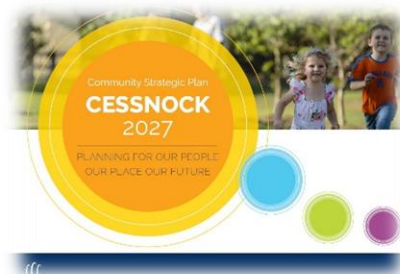


The Plan also helps to achieve the vision set in the Hunter Regional Plan 2036 - for the Hunter to be the leading regional economy in Australia with a vibrant new metropolitan city at its heart.

Cessnock 2027 Community Strategic Plan

The Cessnock 2027 Community Strategic Plan was endorsed by Council on 21 June 2017 and provides an outline of what the community has told Council it would like the LGA to look like by the year 2027.

Development of the Community Strategic Plan involved extensive community engagement and together residents, visitors, property owners, business owners, community organisations and government committed to the desired outcomes and strategic directions of the Plan. A section in the Community Strategic Plan - Accessible Infrastructure, Services and Facilities links to this Strategy with the stated objectives being:

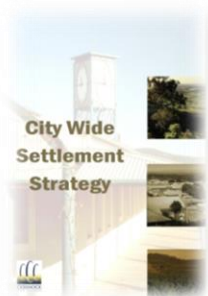


1. Better Transport Links.
2. Improving the Road Network.
3. Improving Access to Health Services Locally.

The Community Strategic Plan establishes the following vision for the future of the Cessnock LGA:

Cessnock will be a cohesive and welcoming community living in an attractive and sustainable rural environment with a diversity of business and employment opportunities supported by accessible infrastructure and services which effectively meet community needs.

City Wide Settlement Strategy 2010



The City Wide Settlement Strategy 2010 sets out strategic directions that were used to inform the preparation of the Cessnock Local Environmental Plan 2011 and implement a number of the outcomes and actions arising from the Lower Hunter Regional Strategy 2006. A fundamental action of the City Wide Settlement Strategy is the need to contain the urban footprint of the Cessnock LGA to that identified in the Lower Hunter Regional Strategy 2006.

The City Wide Settlement Strategy will be replaced by a new planning strategy to address and manage the growth as outlined in the adopted Hunter Regional Plan

2016.

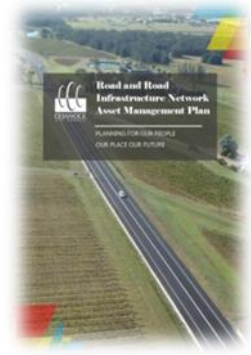
Road and Road Infrastructure Asset Management Plan 2017

The kerb and gutter network sits within the adopted Road and Road Infrastructure Asset Management Plan.

An Asset Management Plan is required to demonstrate responsive management of assets (and services provided from assets), compliance with regulatory requirements, and to communicate funding needed to provide the required levels of service over a 20 year planning period.

Council has acquired infrastructure assets by 'purchase', by contract, construction by Council staff and by donation of assets constructed by developers and others.

Council's goal in managing infrastructure assets is to meet the defined level of service in the most cost effective manner.



Contributions Levied for Kerb and Guttering Construction Policy 1995

Under Section 217 of the Roads Act 1993, the owner of land adjoining a public road is liable to contribute to the cost incurred by a roads authority in constructing or paving any kerb, gutter or footway along the side of the public road adjacent to the land. This amount cannot be more than 50% of the cost to carry out the work. This Policy outlines the process for collecting funds in accordance with the Roads Act, with contribution rates provided in Council's adopted Fees and Charges schedule.

Cessnock Engineering Requirements for Development 1994

This guideline and its referenced documents provide the minimum requirements for the design and construction of civil works associated with development. The Engineering Requirements for Development 1994 are currently under review. The new guidelines will include, amongst others, requirements and standards for best practice design and construction in roads, kerb and gutter, driveways, stormwater, floodplains, water sensitive urban design (WSUD), and waterway rehabilitation.

Stormwater, Waterways and Floodplain Strategy 2018



This Strategy provides direction for the sustainable management of stormwater, waterways and floodplains across the Cessnock LGA, to address the environmental, social and economic impacts and guide civic leadership associated with a growing urban and rural community. The Strategy sets guiding principles, directions and an implementation plan to deliver best practice water management outcomes that utilising planning, development, engineering and asset management guidelines and requirements.

The Roadside Drainage Strategy is an implementation action of the Stormwater, Waterways and Floodplain Strategy.

1.3 Purpose of the Roadside Drainage Strategy

In response to Council's management of its roadside drainage assets, as discussed previously in Section 1.1, the purpose of this Strategy is to provide direction to efficiently and sustainably manage the provision of a new, and maintenance of an existing roadside drainage network within the Cessnock LGA.

To support this Strategy the following guiding principles have been developed:

- Improve public safety and mitigate risk;
- Guide best practice development and engineering design guidelines and construction standards and development controls for existing and new roadside drainage infrastructure;
- Integrate asset management principles for road and stormwater infrastructure assets;
- Manage the impact of stormwater flows within the road reserve and on the environment; and
- Financial sustainability.

1.4 Roadside Drainage Elements in Cessnock

Roadside drainage elements are incorporated into the road reserve in order to facilitate the interception, conveyance and disposal of road surface stormwater runoff to an appropriate discharge point. This may be the constructed stormwater system, an overland flowpath or a natural waterway.

The roadside drainage elements also assist in sustaining the condition of the road pavement by protecting it from excess moisture that may affect the integrity of the pavement structure. Further, asset maintenance costs are reduced, safe conveyance of stormwater and traffic management is improved, along with increasing safety for pedestrians and property. Typical roadside drainage elements in Cessnock LGA include those listed as follows. Note that this is a typical representation of the different roadside drainage elements likely to be encountered, not a comprehensive list.

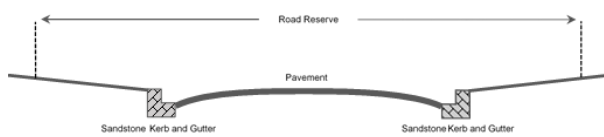
Concrete Kerb and Gutter



Standard concrete kerb and gutter found through the urban area of Cessnock LGA. Generally SA or RT type concrete barrier often provided at the edge of a sealed road.



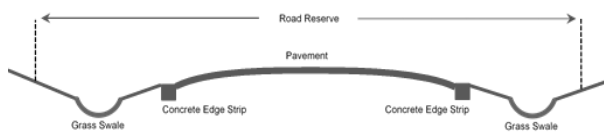
Sandstone Kerb and Gutter



Heritage listed in various suburbs in Cessnock LGA. Specific construction and maintenance requirements



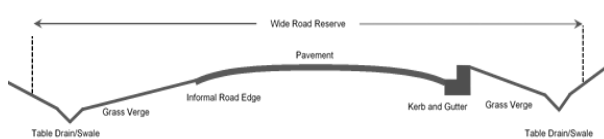
Water Sensitive Swale



Water sensitive swale design in conjunction with structural road edge strip, driveway crossings and stormwater infrastructure (ref Appendix 1).



Wide Road - Kerb and Gutter with a Table Drain

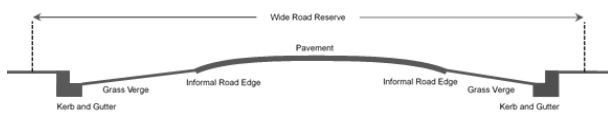


Generally associated with a wide road verge and a table drain. In some instances kerb and gutter is constructed at the road pavement edge requiring a drainage connection to stormwater infrastructure.

The road pavement edge is often fretted and there can be issues with flow along the table drain entering adjacent property and impacting road safety.



Wide Road – Kerb and Gutter with Grass Verge



Wide road reserve with concrete kerb and gutter and grass or earth verge.

The road pavement edge is often fretted. Council relies on property owner to maintain the verge.



Table Drain



Runoff captured and conveyed along table drain within grass or earth inverts, to a stormwater pit inlet or waterway/flowpath.



Table Drain and no drainage element



Table Drain and informal road edge.

There is no effective capture of flow along the informal road edge. When the table drain is overwhelmed runoff may flow across the road into private property.



No Roadside Drainage Element



No roadside drainage present.

Stormwater flows along the interface with the pavement and nature strip. This can lead to overland flow into private property on the downslope of the road reserve.



Section 2

Infrastructure

2.1 Asset Overview

Cessnock City Council provides a sealed road network of 680 km with approximately 360 lineal km of kerb and gutter. The LGA has a significant number of streets built in the 1950s, 1960s and 1970s without kerb and gutter or appropriate street drainage. This represents approximately a quarter of the road network being kerbed and guttered.

The current total replacement value of existing kerb and gutter network is over \$51 million. The cost to provide full kerb and gutter to the sealed road network within residential zoned areas (R1 General Residential, R2 Low Density Residential, R3 Medium Density Residential and R5 Large Lot Residential) is estimated at \$89 million, not including design and installation of any underground stormwater drainage and associated road rehabilitation costs.

Figures 2 to 4 below show the general extent of the kerb and gutter network across the main urban areas of the LGA. Colour coding indicates the condition rating of the asset as assessed in 2015.

No condition rating along a road indicates that there is no kerb and gutter asset present. Other roadside drainage elements function in these areas.

Refer to Table 2 for a description of Council's asset condition rating.

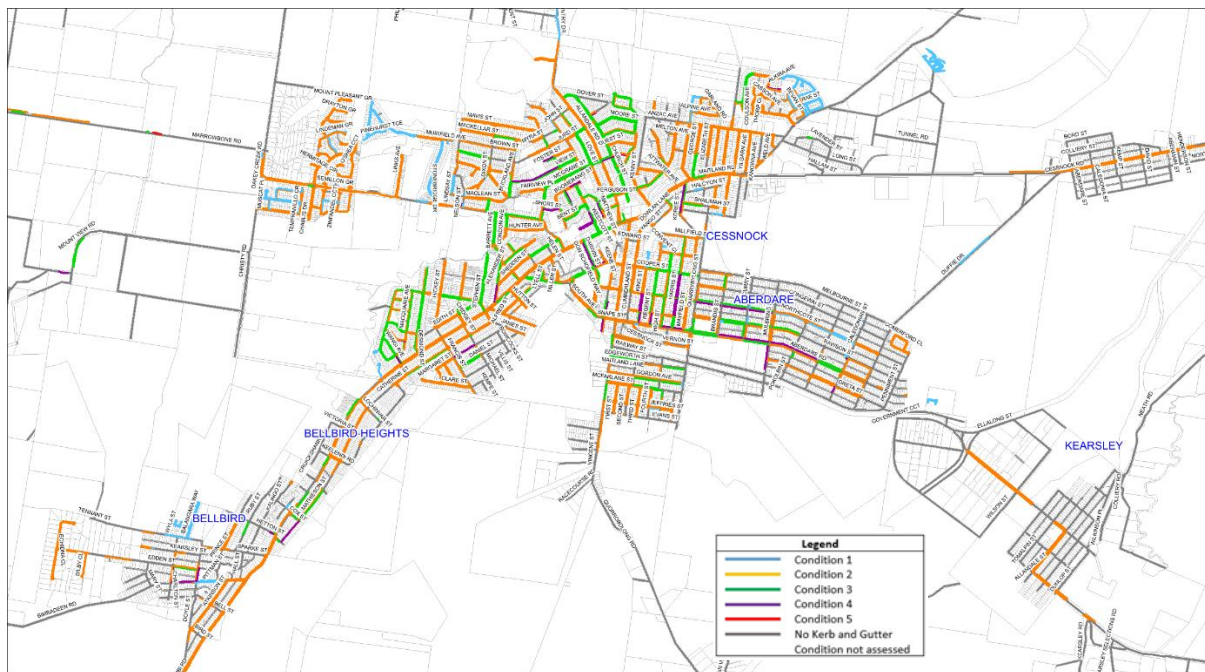


Figure 2 - Extent of Kerb and Gutter - Cessnock/Aberdare

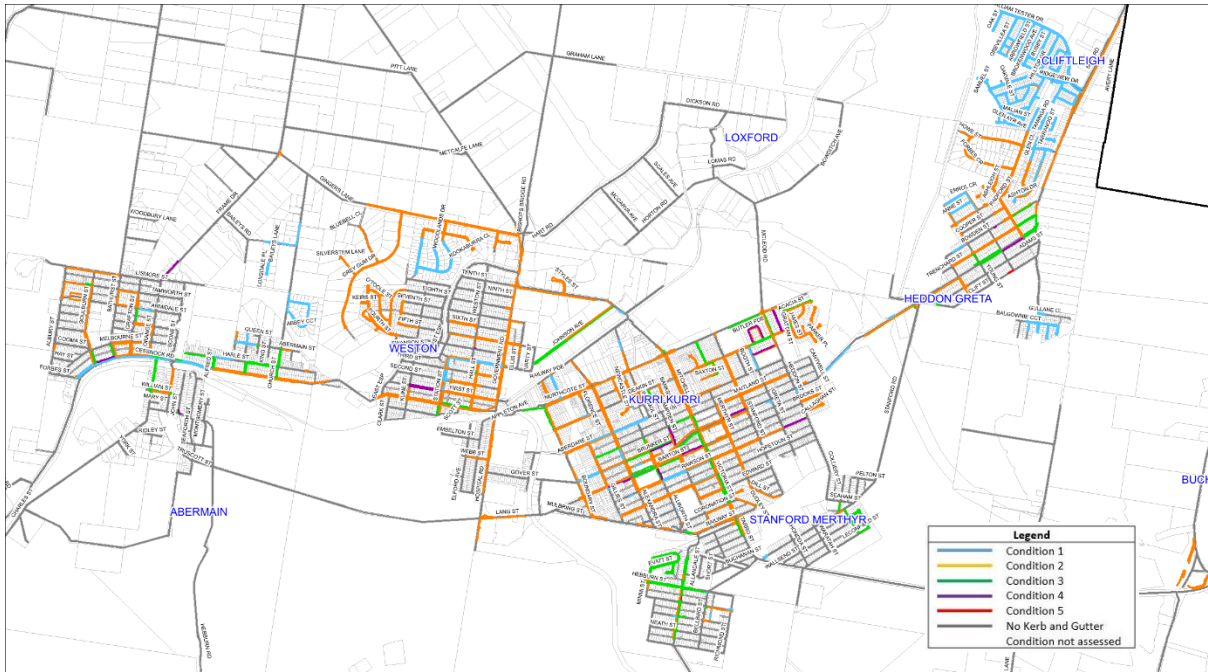


Figure 3 - Extent of Kerb and Gutter - Kurri Kurri/Weston

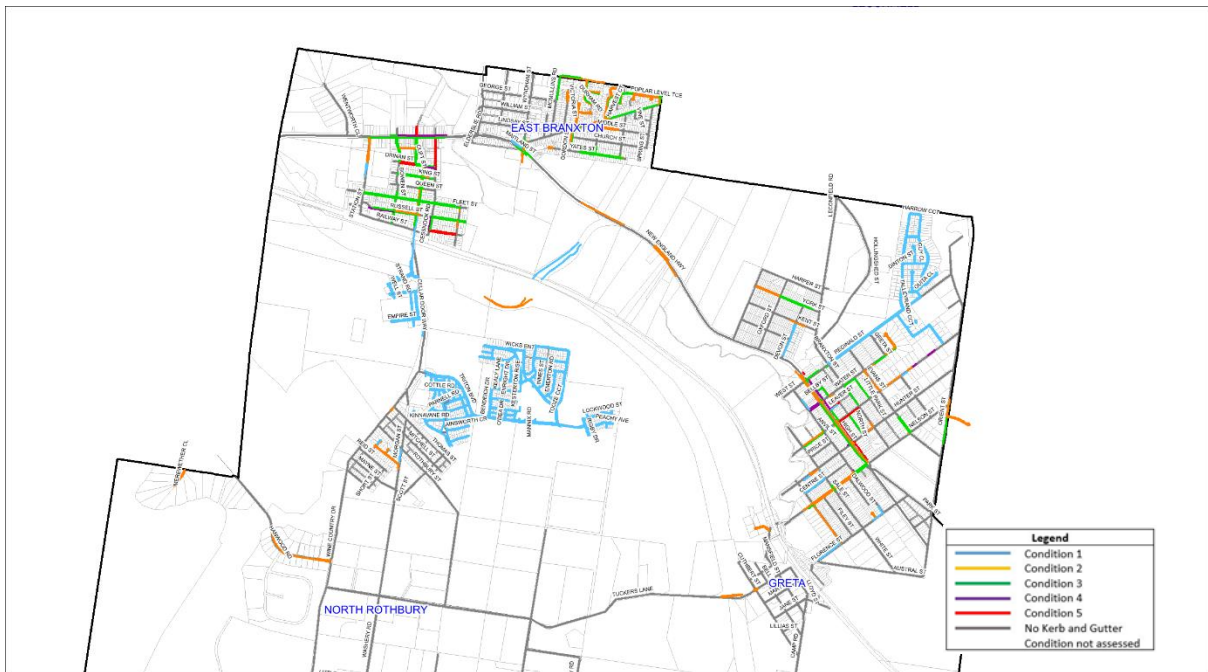


Figure 4 - Extent of Kerb and Gutter - Branxton/Greta/North Rothbury

2.2 Kerb and Gutter Assets

In June 2017 Council adopted the Road and Road Infrastructure Network Asset Management Plan. Kerb and gutter assets form a component of this Asset Management Plan. Council's goal in managing infrastructure assets is to meet the defined level of service (as amended from time to time) in the most cost effective manner for present and future consumers. The key elements of infrastructure asset management are:

- Providing a defined level of service and monitoring performance
- Managing the impact of growth through demand management
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet the defined level of service
- Identifying, assessing and appropriately controlling risks, and
- Having a long-term financial plan which identifies required, affordable expenditure and how it will be financed.

Community Expectations and Consultation

In March 2015 community consultation was undertaken as part of the asset management planning process to determine what the community considers as an acceptable condition of the assets. The concluding evidence from this survey found "The majority of residents indicated that 'Condition 3 or better' was the acceptable condition for all assets".

Council has also undertaken Community Satisfaction Research during 2014, 2016 and 2019 to examine community attitudes and perceptions about the local government area and the services and facilities provided by Council. A comparison of the highest ranked resident Importance and Satisfaction levels reported in the Community Research, specifically for road network services and facilities, is provided in Table 1 below.

Table 1 – Road Network Services Community Importance and Satisfaction - 2014, 2016 and 2019

Service and Facility	Importance															Satisfaction																						
	Not at all			Not very			Somewhat			Important			Very			Not at all			Not very			Somewhat			Important			Very										
	2014	2016	2019	2014	2016	2019	2014	2016	2019	2014	2016	2019	2014	2016	2019	2014	2016	2019	2014	2016	2019	2014	2016	2019	2014	2016	2019	2014	2016	2019								
Cycleways *																																						
Developing and maintaining the road network **																																						
Footpaths *																																						
Kerb and Gutter																																						
Regulating traffic flow																																						

* In the 2019 Community Satisfaction Research report cycleways and footpaths were combined into "The provision of footpaths and cycleways"

** In the 2019 Community Satisfaction Research report Developing and maintaining the road network was considered as "Maintaining Sealed Roads" and "Maintaining Unsealed", separately.

With regard to kerb and gutter, over the three reporting periods, the community has maintained a high importance for kerb and gutter and have not been satisfied with Council's performance.

Specifically considering the latest 2019 Community Satisfaction Research report the following key findings, focussing on kerb and gutter, have been highlighted below:

- Kerb and gutter has the 6th highest performance gap. This is associated with how important this kerb and gutter is to the community as compared to the communities level of satisfaction with Council's provision of kerb and gutter. This ranking is compared to 38 services and facilities provided by Council, with 'maintaining sealed roads' having the greatest performance gap (p. 19).
- It was identified that kerb and gutter has a relatively lower priority within the community (the word 'relatively' should be stressed – the community still considers kerb and gutter important). (pp. 21 and 22)
- Considering the LGA as a whole, residents believe road maintenance/quality is the highest priority issue impacting the community. Secondary issues relate to crime and safety in the area as well as unemployment. Provision of adequate infrastructure e.g. car parking, kerb and guttering etc. is also considered a secondary issue (p. 31)
- Within the 'Infrastructure' service area, 'maintaining sealed roads' is deemed the most important service provided by Council. Whilst still important for almost three quarters of residents, kerb and gutter is considered the least important. (p. 63)
- Satisfaction with Council's delivery in the Infrastructure service area is highest for 'regulating traffic flow' and lowest for 'maintaining sealed roads', with kerb and guttering also being towards the bottom end of community satisfaction (p 65)
- In comparison to previous community research from 2016 kerb and gutter has maintained its importance and satisfaction levels. (p. 72)

Asset Condition and Statistics

In managing Council's kerb and gutter asset a condition assessment has been undertaken as part of the Asset Management Plan. The condition assessment defines the state of the asset at the time of assessment which assists in determining Council's renewal and upgrade program. Table 2 describes Council's condition rating with Figure 5 illustrating the proportion of kerb and gutter assets in each condition rating.

Table 2 - Condition Rating Description

Condition	Description
1 As New	Newly Constructed, Very Good Condition – only planned maintenance required
2 Good	Good Condition – Minor Defects Only
3 Fair	Fair to Moderate Condition – Maintenance Required to Return to Accepted Level of Service
4 Poor	Poor Condition – Consider Renewal
5 Very Poor	Very Poor Condition – Approaching Unserviceable

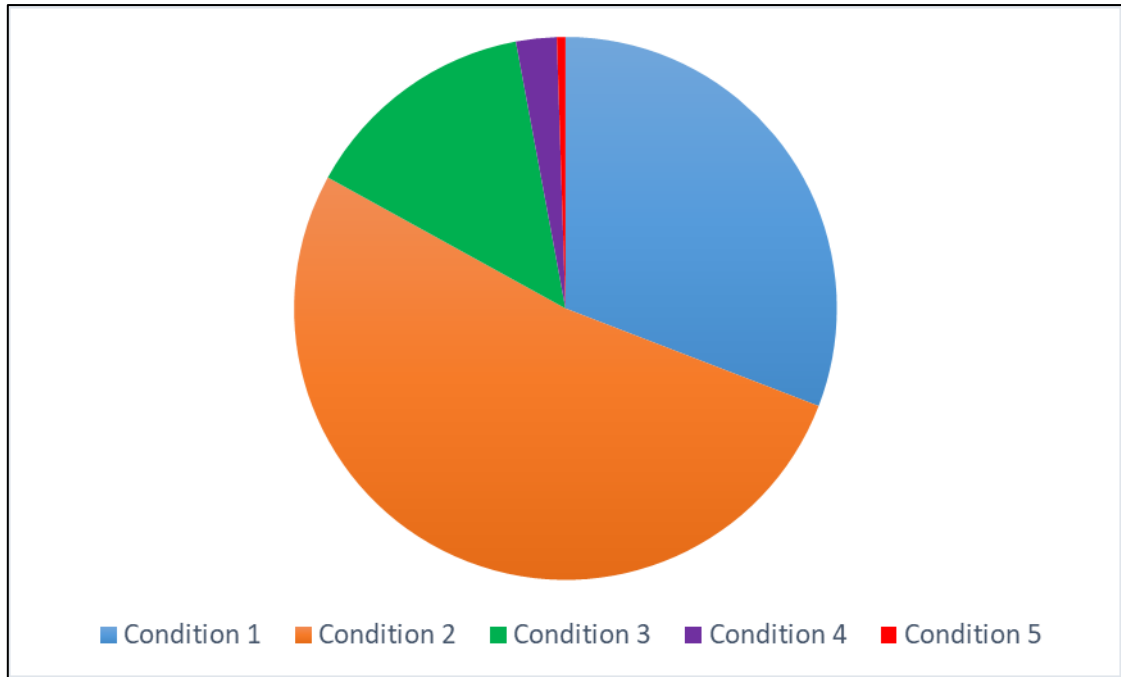


Figure 5 - Condition of Kerb and Gutter Assets, 2014/15

Table 3 provides a breakdown of the kerb and gutter asset with regard to its length within certain suburbs, the type of material and length of the asset associated with its condition rating.

Table 3 - Kerb and Gutter Asset Statistics, 2014/15

Suburb	Length of Kerb and Gutter (km)
Branxton	34.5
Cessnock	167.7
Kurri Kurri	110.7
Other	48.9
Total Length	361.8

Material	Length (km)
Sandstone	5.0
Concrete	356.8

Condition	Length (km)
1	36.4
2	242.0
3	68.4
4	12.4
5	2.6

Asset Renewal Value Condition 4 and 5 Assets	\$2.1 Million
Total Replacement Value	\$51.3 Million

The kerb and gutter asset information is based on the constructed concrete asset. Table 4 provides the length of urban road and the associated suburbs where no kerb and gutter roadside drainage elements have been constructed. If Council were to install kerb and gutter to all its urban roads it is estimated the cost would be in the order of \$89 million.

Table 4 - Length of Urban Roads with No Kerb and Gutter, 2014/15

Suburb	Length of Road with No Kerb and Gutter (km) *
Aberdare	30.7
Abermain	24.7
Bellbird	17.9
Bellbird Heights	4.5
Branxton	10.6
Cessnock	58.0
East Branxton	16.2
Greta	38.7
Heddon Greta	11.6
Kurri Kurri	31.6
Pelaw Main	9.3
Stanford Merthyr	7.4
Weston	28.1
Total Length	289.3
Total Cost to Install Kerb and Gutter	\$89.0 Million

* Based on total length of sealed road in each suburb, multiplied by 2 (for each side of the road) and subtracting known linear metres of kerb and gutter from the asset data base. Laneways, state roads and unsealed roads have been excluded.

The Strategy

3.1 The Aim of the Strategy

The aim of this Strategy is to provide a framework for the management, enhancement and planning of the roadside drainage assets which establishes guiding principles to deliver an asset network that is fit for purpose and meets the community's agreed service level expectations.

3.2 Guiding Principles

To support the aim of the Strategy, the following Guiding Principles have been developed. In the development of these Principles following key issues were considered:

- Community expectations for the ongoing construction and maintenance of roadside drainage;
- The uncertainty around the construction of roadside drainage with new development;
- The impact of inappropriate roadside drainage elements on renewal and maintenance activities within the road reserve;
- An environmentally sustainable approach to the management of stormwater runoff from the road reserve that also considers broader climate change issues;
- Planning and funding of a future Delivery Program within a limited funding and resource base; and
- Council managing an ongoing reactive and scheduled roadside drainage maintenance burden.

Improve public safety and mitigate risk

- Road safety requirements, safe design outcomes and reduced overland flow hazard is integrated into roadside drainage planning, works and maintenance; and
- The risk to people is balanced against the risk to infrastructure, property and the environment.

Guide best practice development and engineering design guidelines and construction standards and development controls for existing and new roadside drainage infrastructure

- Landuse planning and development approval proposes deliver development outcomes that have a focus on the appropriate type and effective management of roadside drainage elements;
- Conditions of consent are applied in accordance with latest version of Council's Development Control Plan and Engineering Requirements for Design and Construction;
- The type of roadside drainage is in line with the latest best practice road, stormwater management and water sensitive urban design principles and guidelines;



-
- The type of roadside drainage element installed meets the environment and site constraints within the road reserve; and
 - Development approvals, capital improvement and maintenance intervention is sympathetic to kerb and gutter heritage and the local character of an area.

Integrate asset management principles for road and stormwater infrastructure assets

- The community's level of service expectations is maintained through capital improvement, development requirements and proactive maintenance;
- Roadside drainage renewal and upgrade is integrated into future road and stormwater capital improvement programs; and
- Capital improvement and maintenance intervention is defined and programmed where roadside drainage assets are in poor condition.

Manage the impact of stormwater flows within the road reserve and on the environment

- Network improvement will not create or transfer existing stormwater impacts to new locations;
- Water sensitive urban design principles will be considered in the maintenance and upgrade of the roadside drainage network;
- Stormwater flows meet the appropriate engineering standards and safe hazard criteria as defined in the latest best practice guidelines;
- Roadside drainage is to mitigate the impacts of street runoff on adjoining properties;
- Provision of new infrastructure will not adversely impact properties downstream;
- Changes to the stormwater flow regime as a result of roadside drainage improvement are considered and any environmental impacts mitigated; and
- Climate change is considered in a sustainable water management approach.

Financial Sustainability

- Roadside drainage works and maintenance will be managed within the financial resources available to Council;
- Future roadside drainage works and maintenance intervention will be funded based on the number of similar projects listed in a future works program, competing priorities and available funding;
- Provision of new roadside drainage infrastructure in association with new development will be funded in accordance with the appropriate Council policy, guideline or development contribution plan; and
- Responsibility for funding of new roadside drainage infrastructure will not be transferred from the owner or developer to the broader community.

3.3 Existing Urban Areas

The construction of roadside drainage elements may be installed by Council where:

- The street has an existing permanent sealed surface;
- A drainage investigation has determined that stormwater drainage installation or improvements are required and where street drainage is necessary to collect and deliver hazardous or nuisance runoff to the stormwater drainage system; or
- A road upgrade or renewal is required and roadside drainage elements will assist in sustaining the lifecycle of the new or rehabilitated road asset.

If new kerb and gutter is installed as the appropriate roadside drainage element, property owners will be required to contribute to the cost of providing kerb and gutter in accordance with Council's Kerb and Gutter Contributions Policy.

The choice of the roadside drainage element to be constructed will be based on stormwater and road engineering considerations, environmental and site constraints, estimated cost, available funding, character and landuse of the locality and any heritage listing or value. Projects will be added to a Recommended Works List and prioritised accordingly for incorporation into a future Delivery Program.

Where development occurs in an existing urban area, the developer will be required to meet the Roadside Requirements for Development, refer Appendix 1. The conditions will apply to developments where a new or replacement dwelling is proposed to be constructed on a single lot. This condition will also apply to subdivision of land from one lot into two or more lots.

Council may consider alternative roadside drainage approaches, such as water sensitive swales or table drains where appropriate justification demonstrates no adverse impact to the road asset or stormwater drainage network as a result of the installation of an alternate roadside drainage element.

Where a property owner requests kerb and gutter to be installed at the front of their property as a result of asset maintenance requirements, stormwater drainage impacts or personal preference, the request will be recorded on a Recommended Works List and prioritised in accordance with criteria outlined in Section 4 of this Strategy.

3.4 Greenfield Sites – Urban Release Areas

All new Urban Release Areas will be required to have kerb and gutter or water sensitive roadside drainage designed and installed in accordance with Council's Engineering Requirements for Development. Urban Release Areas are identified in the Cessnock Local Environmental Plan 2011 and are for larger scale developments or continuous with existing urban areas.

3.5 Rural Living

The character of rural living areas is less formal than that of a traditional town area, with properties being large, having a low density and open landscape. Formal kerb and gutter may be considered inappropriate in these areas and would not only adversely impact on the desired character of the area, be expensive to construct due to long frontages on individual properties and have no connection to a constructed stormwater drainage network.

Alternate solutions utilising water sensitive swales may be specified. Infrastructure such as swales is functional and sympathetic to the rural character of the area. Roadside drainage infrastructure in rural living areas is to be designed in accordance with Council's Engineering Requirements for Development.

3.6 Industrial & Commercial Development

All industrial and commercial development will have kerb and gutter designed in accordance with the Engineering Requirements for Development, unless an alternate WSUD approach is justified through an appropriate WSUD assessment and stormwater management modelling. This includes new and infill developments.

3.7 Heritage and Character

Cessnock is unique in its settlement patterns and the City Wide Settlement Strategy 2010 advocates a residential (density) hierarchy through land use zones and associated land use to differentiate between various forms of permissible housing types.

Kerb and Gutter Heritage

The heritage conservation areas of Wollombi and Sawyers Gully (incorporating the culverts associated with the Great North Road) and the proposed heritage conservation areas in Branxton and Greta each have their own unique characteristics. The collective existence of buildings, individual heritage items, trees, open spaces, views and landmarks, and smaller items such as sandstone kerb and gutters all contribute to the areas historic value.

There are several heritage listed sandstone kerbs and gutters that are a significant part of the heritage in Abermain, Branxton, Greta, Kurri Kurri, Neath and Weston, listed in Table 5. Specialise treatment of these roadside elements is required in order to maintain their condition and heritage significance.

There are also sandstone kerb and gutter along other roads with Cessnock that have no heritage listing. These kerb and gutter also have a significance to the area and should be managed as a heritage item.

Table 5 - Heritage Listed Sandstone Kerb and Gutter

Location	Suburb	Heritage Listing	Listing No.	Gazette Date	Gazette No.	Database No.
165 Cessnock Rd, 140 metres west of David St	Neath	LEP		23/12/11	1152	1340773
High, Anvil, Wyndam, Bellby, Chapman, and Water Streets	Greta	LEP	1100	23/12/11		1340004
Station St and First St	Weston	LEP		23/12/11	1911	1340847
Corner of Cessnock St and Bathurst St	Abermain	LEP		23/12/11	114	1340844
Both sides of John St	Branxton	LEP		23/12/11	130	1340845
Allworth St	Kurri Kurri	LEP	1114	23/12/11		1340846

Local Area Character

The characteristics described below will assist in determining the roadside drainage elements that are appropriate in each landuse zone.

Towns - More than 1000 households

Town settlements provide extensive services and a focus for a sub-regional catchment. This may include primary and pre-schools, high schools, a TAFE college, post office, police station, churches, hotels, community buildings and sports facilities, a 'main street' shopping centre and perhaps a comprehensive shopping centre and district hospital. Reticulated water and sewer is in existence.

Towns include Cessnock (including Aberdare and Bellbird/Bellbird Heights), Kurri Kurri/Weston and the Branxton (including Huntlee) area.

In the Cessnock LGA, towns typically have a land zoning of General (R1), Medium (R3) and Low density (R2) residential with perhaps large lot residential (R5) at the fringe. Most roads in these zones are sealed at least in the main vehicle path. A formalised system of concrete kerb and gutter is an appropriate roadside drainage treatment in this area. Some streets with wide road verges may also use water sensitive swales, where appropriate consideration is given to the risk associated with traffic and pedestrians and the adequate conveyance of stormwater.

Villages 30 to 1000 households

Village settlements provide some services and a focus for several rural precincts or a district sub-catchment. A mix of residential, retail and other uses and may include a central school, post office, police station, churches, hotel, community hall or centre, sub-district or local sports complex, small business centre, some health services and outreach community services, reticulated water, often common sewerage treatment, with regular bus services to higher order centres.

There are a number of settlement areas identified as village across the LGA, however, the characteristics of these areas vary considerably. Some village areas, such as Abermain, Greta and Neath, are located on main transport corridors, while others are located in relative proximity to established urban areas, such as Kearsley, Kitchener and North Rothbury. Other village areas such as Abernethy, Ellalong, Millfield, Mulbring, Paxton and Wollombi are more isolated and, with the exception of Paxton and Ellalong and parts of Millfield, do not have access to a reticulated sewerage system.

Opportunity for village growth is limited to providing support to the redirection of settlement growth into clustered urban areas and a lifestyle choice for residents. Villages that are un-sewered are not identified as having the potential for any growth.

Villages are considered to be the discrete residential settlements scattered throughout the LGA on many of the connecting roads intersecting the region. Typical villages have some sealed roads but often without sealed edges or kerb and gutter.

Some streets at the fringes of towns may be characterised as urban (due to zoning) but be set out or located in such a way as to have a rural rather than urban character. In these cases, a formalised system of concrete kerb and gutter may not be desirable. Water sensitive swales may be an appropriate roadside drainage element within these areas. These elements may assist in preserving the rural character of villages and settlements.

Enclave 5 to 30 households

Based on a preferred area for rural and large lot residential settlement, enclaves can be a group of small holdings, organised development or subdivision. Enclaves generally have a community focused facility, e.g. rural hall, historic rural school or service station. Development needs to be clustered to achieve common facilities and services, waste disposal and sealed roads. School bus services exist to higher order centres.

As enclaves are small, and surrounded almost exclusively by rural or semi-rural lands, formalised kerb and gutter may not be an appropriate roadside drainage treatment. Water sensitive swales or table drains that divert overland flow toward a natural flowpath, are a more economical and environmental response and can be sympathetic to the character of the area.

Dispersed Households, Single Households or Attached Dual Occupancy

This type of settlement is associated with full-time farming or other rural land uses (e.g. rural retreat). Isolated concessional lots feature in a range of sizes and are generally self-contained. School buses link to higher order centres.

No formalised kerb and gutter would be considered in this area. Water sensitive swales may be, however, table drains are generally the most appropriate roadside drainage element in this type of settlement.

3.8 Landuse Zones and Roadside Drainage Elements

In general, the nature of roadside drainage will depend on road and stormwater engineering requirements. Where possible, water sensitive urban design features will be incorporated into a final solution. Table 6 below provides a range of roadside drainage elements considered appropriate for the

corresponding landuse zones within the Cessnock LGA. In determining the implementation of an appropriate roadside drainage element, consideration should also be given to the nature of any existing development and the character of the locality.

Table 6 - Landuse Zones and Roadside Drainage Elements

Landuse Zone	Roadside Drainage Element Type (with consideration to the local character of the area)				
	Concrete Kerb and Gutter	Sandstone Kerb and Gutter	Water Sensitive Swale - with road edge strip	Table Drain - no road edge strip	Kerb and Gutter with Grass Verge
RU2 - Rural Landscape	no	Yes - If heritage listed or present	yes	yes	no
RU3 - Forestry	no	Yes - If heritage listed or present	no	yes	no
RU4 - Primary Production (Small Lots)	no	Yes - If heritage listed or present	yes	yes	no
RU5 Village	yes	Yes - If heritage listed or present	yes	yes	yes
R1 - General Residential	yes	Yes - If heritage listed or present	yes	no	yes
R2 - Low Density Residential	yes	Yes - If heritage listed or present	yes	no	yes
R3 - Medium Density Residential	yes	Yes - If heritage listed or present	yes	no	yes
R5 - Large Lot Residential	no	Yes - If heritage listed or present	yes	yes	no
B1 - Neighbourhood Centre	yes	Yes - If heritage listed or present	Through a water sensitive urban design assessment	no	no
B2 - Local Centre	yes	Yes - If heritage listed or present	Through a water sensitive urban design assessment	no	no
B3 - Commercial Core	yes	Yes - If heritage listed or present	Through a water sensitive urban design assessment	no	no
B4 - Mixed Use	yes	Yes - If heritage listed or present	Through a water sensitive urban design assessment	no	no
B7 - Business Park	yes	Yes - If heritage listed or present	Through a water sensitive urban design assessment	no	no
IN1 - General Industrial	yes	Yes - If heritage listed or present	Through a water sensitive	no	no

			urban design assessment		
IN2 - Light Industrial	yes	Yes - If heritage listed or present	Through a water sensitive urban design assessment	no	no
IN3 - Heavy Industrial	yes	Yes - If heritage listed or present	Through a water sensitive urban design assessment	no	no
SP3 - Tourist	yes	Yes - If heritage listed or present	yes	yes	yes

Implementation

4.1 Implementation Plan

This Strategy influences the works, infrastructure, planning and development functions of Council. Implementation of the Strategy will require cross Council and community input to deliver effective, equitable and sustainable outcomes which are achievable into the future.

The following actions in Table 7 are provided for implementation as part of the Strategy.

4.2 Strategy Implementation Actions

Table 7 - Implementation Actions

Action	Rationale	Priority and Estimate Cost
1. Update Council's Engineering Requirements for Development and Development Conditions for Roadside Drainage Elements		High In house cost
	<ul style="list-style-type: none"> The current interim development conditions adopted by Council are retained with the consideration of water sensitive swale construction in lieu of new kerb and gutter, refer Appendix 1. Appropriate justification is to be demonstrated, showing no adverse impact to the road asset, stormwater drainage network or private property as a result of the installation of an alternate roadside drainage element. The update should include the standard kerb and gutter engineering requirements and stand drawings, along with best practice water sensitive design techniques for alternate roadside drainage approaches. The update should include development requirements that directs the type of roadside drainage element to be installed based on the landuse zone, local character of an area and any heritage consideration. 	
2. Update Council's Standard Driveway Profile Engineering Requirements		High In house cost
	<ul style="list-style-type: none"> Update and formalise Council's driveway engineering requirements and approval process to provide guidelines for residents when constructing new driveways or those who are impacted by runoff from the road, in order to assist in mitigating road surface runoff entering private property. 	
3. Review and update Contributions Levied for Kerb and Guttering Construction Policy		High In house cost
	<ul style="list-style-type: none"> Policy was originally adopted in 1995 and was last reviewed in 2013. Review and update the Policy to reflect any changes in legislation and guidelines that allow Council to impose a contribution charge for the installation of new kerb and gutter. 	

4. Develop Community Information about Roadside Drainage	High \$5,000
	<ul style="list-style-type: none"> Develop a fact sheets, website information and customer service scripts that delivers information to the community about Council's roadside drainage assets, engineering development requirements, driveway engineering requirements and Council's customer response to roadside drainage maintenance and nuisance flooding issues.
5. Review and prioritise current and new customer request for consideration of a maintenance response or listing for future capital works.	Medium In house cost
	<ul style="list-style-type: none"> Review current roadside drainage customer requests and priorities for maintenance intervention or reallocate for future works as part of individual roadside drainage work or through the future road or stormwater works programs. Correlate roadside drainage installation priorities with Council's future road upgrade and stormwater drainage upgrade programs Review current roadside drainage customer requests and known hotspot location for inclusion in future road or stormwater works projects.
6. Define all roadside drainage elements within an asset management plan	Medium \$20,000
	<ul style="list-style-type: none"> Kerb and gutter is the only roadside drainage element that Council considers in its asset management planning. Asset classes should be determined for each type of roadside drainage element as they have a function in the road reserve and drainage network. There are costs associated with the maintenance and renewal for these assets. The condition, function and capacity of these assets should be defined and considered in Council's asset management plan, forward works program and long-term financial plan. As part of the road pavement asset condition assessment, review all roadside drainage element's type, features, length, location and condition.
7. Develop Roadside Drainage Forward Works and Scheduled Maintenance Program.	Low In house
	<ul style="list-style-type: none"> Utilising asset data obtained in defining a roadside drainage asset class, develop a prioritised program for the long-term installation of new roadside drainage and the program of routine scheduled maintenance of the existing network. This should be carried out in conjunction with any urban overland flow investigations, where the capacity of the road reserve and roadside drainage may be identified through flood modelling.
8. Review the Section 7.11 and 7.12 Contribution Plans for opportunities to fund the installation of new roadside drainage elements within the Cessnock LGA.	Low In house cost
	<ul style="list-style-type: none"> Opportunities to fund roadside drainage work from Contribution Plans is limited due to the ability to define a nexus for any roadside drainage work in a Section 7.11 Plan and the

	<p>amount of funds generated and the competing Council priorities for expenditure in a Section 7.12 Plan.</p> <ul style="list-style-type: none">• As Contribution Plans are reviewed, any opportunities to justify a nexus or prioritise the collection of contributions to install new roadside drainage elements should be considered.
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4.3 Recommended Works List

Where a property owner requests or has previously requested kerb and gutter to be installed at the frontage of their property or where Council identifies a need to carry out roadside drainage works, the request or project will be recorded on a Recommended Works List and prioritised in accordance with criteria outlined in Section 4.4 – Prioritising Recommended Works Projects, of this Strategy.

Criteria for prioritisation seeks to minimise risk and maximise benefit. The prioritised Recommended Works List will be updated regularly as requests are received and will be consulted when preparing the 4 year Delivery Program. Scheduling of projects on the Recommended Works List will also be subject to available funding. Where kerb and gutter installation is programmed, property owners will be required to contribute to the cost of providing kerb and gutter in accordance with the Kerb and Gutter Contributions Policy.

4.4 Prioritising Recommended Works Projects

A weighted points system will be used to objectively prioritise potential roadside drainage projects. This will be applied when considering new installation as well as replacement or upgrading of existing assets. This will ensure the areas with the highest need or projects that demonstrate the greatest benefit, receive priority consideration.

The criterion is based on the following principles:

- The level of public and pedestrian risk
- Where a specific stormwater drainage requirement has identified the need for roadside drainage.
- Protection of existing infrastructure and property.
- The frequency of customer requests to address issues related to kerb and gutter will be taken into account.
- Consideration is given to the cost/benefit to be gained by the work.

The criteria are set out in the Table 8 below and are used as a guide in determining the priority of potential street drainage projects. Table 9 provides an explanation of the Prioritisation Criteria.

Table 8 - Project Prioritisation Criteria

Prioritisation Criteria	Available Points	Score
School Frontage (+ 1 block on each approach road)	30	
Regular Bus Route	20	
Frontage to other public facility	10	
Missing Link	5	
Location is on the current 4 year drainage construction program	20	
Location is on the current 4 year road construction program	10	
Benefit to Capital Assets (roads)		
Minor	5	
Intermediate	10	
Significant	15	
Environmental Benefit		
Minor	5	
Intermediate	10	
Major	15	
Traffic		
0 - 300 vpd	5	
300 - 800 vpd	10	
>800 vpd	15	
Width of Shoulder		
>4m	5	
3m - 4m	10	
<3m	15	
Catchment Development Density		
<49%	5	
50% - 74%	10	
75% - 94%	15	
95% - 100%	20	
Proximity of Trunk Drainage to Proposed Discharge Point		
Distant (over 300m)	5	
Medium (100m to 200m away)	10	
Relatively Close (within 100m)	15	
Demonstrated Support		
Single Request	1	
Multiple Requests	3	
Petition/Progress Association/Precinct Committee Request	5	

Table 9 - Explanation of Prioritisation Criteria

Prioritisation Criteria	Explanation
School Frontage	High numbers of pedestrians with limited ability to traverse nuisance surface flow unassisted would be expected to be active adjacent to a school.
Bus Route	An increased number of pedestrians are likely to frequent streets serving as bus routes. Additionally, bus patrons are somewhat more likely to be elderly, particularly young or have limited mobility. Formalised kerb and gutter as well as drainage on bus routes increases access to transport for those users.
Frontage to other public facility	As above, higher numbers of pedestrians are expected near community facilities. These facilities include community halls, medical facility (or similar) & shops.
Missing Link	Some weighting is provided to a projects priority where it will link existing kerb and gutter or will allow direct connection to existing trunk drainage.
Current Drainage program	There are economic efficiencies to be gained from installing kerb and gutter concurrently with the installation of trunk drainage.
Current road/other works program	As above, kerb and gutter should be considered where there is extensive road rehabilitation planned or where public utilities are being re-located.
Benefit to capital assets	<p>Where the road surface shows signs of deterioration due to poor drainage, consideration should be given to reducing the overall capital cost burden to Council by installing kerb and gutter. Aerial photography can assist with monitoring edge cracking and alligator cracking which are symptoms of poor drainage.</p> <ul style="list-style-type: none"> • Minor benefit – no evidence of cracking or potholes • Intermediate benefit - some evidence of cracking and some potholing. • Significant benefit - where there is extensive cracking and potholing
Environmental benefit	<p>Steep streets with no kerb and gutter present the greatest possibility of higher flows generating turbulence that increases scour and therefore sediment entering the stormwater system and ultimately natural streams.</p> <ul style="list-style-type: none"> • A project is considered to provide a minor environmental benefit where the street has a crowned road (run off is split to each side of the road and managed separately by the street drainage system) and the slope is less than 5% over the distance being considered. • An intermediate environmental benefit is considered to be a provided where a road has a slope of 5% or less and a single cross fall (all of the water falling to one side of the road). • A major environmental benefit is gained where a road has a slope over 5% and single cross fall. <p>A road is considered to have a single cross fall if all of the drainage on one side is conveyed via culvert or other means directly to the other side where kerb and gutter is being considered (even if the actual road is crowned).</p>
Traffic	The amount of traffic using a road indicates its relative level of importance. Safety is increased where rainfall on busy roads is conveyed directly (or as soon as possible) into the street drainage system. It is also expected that busier roads would have more vehicles stopping and parking and therefore higher rates of vehicles using the shoulder. Increased use of the shoulder accelerates wear and is likely to mean higher numbers of persons entering and exiting vehicles.
Width of Shoulder	Very wide shoulders (often found in the Cessnock LGA) often result in complicated and expensive street drainage solutions. A wide shoulder usually requires a drainage system in the middle of the nature strip in addition to the sub-surface drains required at the kerb and gutter interface.
Catchment development density	A highly developed catchment has a greater potential to generate runoff than an undeveloped catchment as well as a lesser opportunity to discharge the collected runoff. The development density estimation refers to the proportion of urbanisation as a percentage of the total catchment at the likely point of discharge of the project being considered.
Proximity of discharge point	A kerb and gutter project will provide a higher cost/benefit ratio to the community where a proposed project can easily be connected to existing discharge point.
Demonstrated support	Single requests for kerb and gutter may indicate a drainage issue but could also be a request for aesthetic reasons. Multiple requests for kerb and gutter in a locality are

Prioritisation Criteria	Explanation
	often an indication that the street drainage is inadequate. Where resident/s have taken the time to organise a petition or approached a political representative indicates a persistent or concerning drainage issue. A search of the Councils correspondence records will assist in determining the level of community support for a particular project.

Section 5

Funding

5.1 Delivery Program

Roadside drainage provision is not a specifically funded program in Council's Delivery Program and Operational Plan. However, where feasible, works being undertaken in the general vicinity of an area such as road or shoulder construction, flooding mitigation works or downstream drainage works may operate opportunistically by resolving other infrastructure issues such as gaps in the kerb and gutter network or upgrade of roadside drainage elements, at the same time.

The list of proposed road and drainage projects should be checked against the Roadside Drainage Recommended Works List to determine the financial and practical feasibility of including roadside drainage upgrades in the scope of works for those projects.

The four year Capital Works Program is presented to Council as part of the Delivery Program. All projects, including any kerb and gutter projects, in the Program may change as projects are developed and priorities and funding change.

5.2 Intergenerational Equity

The current street drainage environment across the LGA has suffered from long term limitations in funding and an inconsistency in approach to the management and planning of this asset. Conditions of consent to construct kerb and gutter consistent within the Engineering Requirements for Development have also been removed via amendments to the consent at the request of the owner and developer.

These practices have created cost shifting to be borne by future generations. To ensure the cost burden of growth delivered by development of all scales is fairly attributed, equitable conditions of consent need to be applied at the time when there is uplift in the value of the site. This financial benefit through the uplift in property values resulting from developments such as dual occupancy, multi dwelling housing or subdivision developments should not be shared with the community or ratepayers. Therefore it is unreasonable that the cost of improvements to the stormwater network should become the financial burden of the ratepayers of Cessnock.

Intergenerational equity has already been compromised with regard to the current roadside drainage network, however consistent application of this Strategy, the Kerb and Gutter Contributions Policy, Engineering Requirements for Development and associated development conditions, should ensure the burden is not exacerbated.

5.3 Funding for new development

For new multi-lot subdivisions and multi dwelling developments, the developer is required to provide and/or upgrade infrastructure to current standards (including roads, trunk drainage as well as kerb and gutter) at their full cost. This requirement is enacted through Section 4.17 Imposition of Conditions under the Environmental Planning and Assessment Act, 1979. This ensures that appropriate infrastructure is provided

to the community without the costs being borne unfairly by ratepayers. These requirements will be applied as a condition of development consent.

In some instances, if land holdings are fragmented, a development contributions plan is prepared to systematically collect funds as each development occurs. This allows Council to construct the infrastructure at a time in the future when all funds are available rather than placing the burden on the initial development. It should be noted that funds collected under these circumstances are required by legislation to be spent for the purpose collected and not redirected into other projects.

Contributions are only collected for kerb and gutter as part of the construction costs of the primary assets being the road. Individual contributions are not collected for kerb and gutter.

Isolated “one off” developments or re-developments in existing urban areas

The condition to provide kerb and gutter on a development, should be directly attributable to the development being considered by Council. Investigations may be undertaken to allow consideration of a number of issues:

- Will the development result in an intensification of land use?
- Will the development cause an increase in stormwater flows due to an increased hard surface area?
- Is there kerb and gutter and/or stormwater drainage infrastructure in proximity to the proposed development with sufficient spare capacity?
- Is there are risk to existing infrastructure downstream if kerb and gutter is provided?

Generally, installation will not be mandated for re-developments or infill developments in existing urban areas where kerb and gutter does not exist at the time of lodgement of the Development Application. However, where kerb and gutter exists immediately adjacent to the proposed development, and there is a suitable point of connection to the trunk drainage system, Council may impose the provision of kerb and gutter as a condition of development.

It is important that these conditions be applied at the point of uplift in the land value due to land use intensification rather than the cost being borne by ratepayers at a later date.

The only exception to this approach would be where the developer can demonstrate that there is no kerb or gutter in close proximity and no suitable connection point to the trunk drainage system. In this instance, alternate stormwater management will need to be considered to ensure there are no impacts downstream. This matter would be resolved as part of the development assessment process and reflected in the conditions of development consent.

Isolated “one off” developments in otherwise undeveloped areas

For these developments, it is recommended that kerb and gutter only be required upon consideration of future piped drainage systems, recognising that these measures will tend to be longer term as full development will occur over a longer period.

5.4 Fees and Charges

In accordance with Section 217 (1) of the Roads Act 1993 - *“the owner of land adjoining a public road is liable to contribute to the cost incurred by a roads authority (Council) in constructing or paving any kerb, gutter or footway along the side of the public road adjacent to the land”*.

The Kerb and Gutter Contributions Policy establishes Council's processes with regard to levying property owners for the provision of kerb and gutter along their frontage. The *NSW Roads Act (1993)* allows Council to seek a contribution from property owners towards the cost of kerb and gutter construction on a public road. The amount charged can be up to a maximum of 50% of the cost of kerb and gutter construction along the property frontage. Council's per linear metre contribution rate is provided in the adopted Fees and Charges schedule. Regardless of the complexity or scale of installation, all property owners pay the same rate.

It should also be noted that there is some concern that the fee charged under this condition may not accurately reflect the actual costs of providing the infrastructure, especially where the scope is small. Significant cost can arise from the need for an underground drainage system and associated road works to ensure that the kerb and gutter system works effectively.

Contributions would be sought from property owners where major road refurbishments were taking place or where a trunk drainage system was already in existence or scheduled for installation for the purposes of stormwater management. It would also apply where a resident or group of residents made a specific request for kerb and gutter in their street. Any such requests would be ranked in accordance with the criteria in Section 4.4 of this Strategy and prioritised in accordance with available funding.

In the unlikely event a property owner or group of owners wanted street drainage to be constructed and were prepared to pay the full cost of installation, Council would provide an itemised quotation to perform the work. This would include all associated ancillary works such as survey, design, traffic control, earthworks, trunk drainage installation or upgrading, utility relocation/protection (if required) and road pavement reconstruction.

Where kerb and gutter exists in front of an individual property and is fit for purpose, that property will be exempt from making a contribution even where the kerb and gutter must be removed and replaced to satisfy revised drainage levels or new design requirements.

5.5 Development Contributions

Development contributions (Section 7.11 of the *Environmental Planning and Assessment Act, 1979*) are collected by Council as a result of the intensification of land use, to support new growth. These contributions must be spent for the specific purpose they are collected. Development contributions cannot be used to retrospectively provide infrastructure or services to cater for the existing population. Any shortfall in facilities and services are at the expense of Council. If there is no nexus between the need for kerb and gutter and the proposed development, Council cannot collect for this purpose. If Council determines that there is a need to provide kerb and gutter, it would be considered as a standard requirement to effectively deliver the development and managed through Section 4.17 of the Act as a condition of consent.

In limited cases, developer contributions and planning agreements provide specifically for kerb and gutter. However these are most often regarded as being ancillary to the requirements of a road. If a contributions plan provides for this infrastructure, a condition would be imposed on the development consent requiring the payment of the applicable monetary contribution.

If an existing contributions plan or planning agreement does not provide for monetary contributions towards kerb and gutter, a condition could not legally be imposed on the development consent.

A Section 7.12 plan does enable fixed development levies to be imposed for infrastructure authorised by a contribution plan as a percentage of the development cost. A Section 7.12 plan is not restricted through a nexus as are other contribution plans, however, Council would only be able to levy one plan at a time (either

Section 94 or Section 7.12 but not both) and would see the significant loss of funds for required infrastructure such as parks and playgrounds identified in existing plans.

Council's Section 7.12 plan was adopted in December 2017. This plan will be restricted to levying development such as industrial and commercial development with residential development generally covered under existing Section 7.11 plans and planning agreements. Roadside drainage is not identified in the Section 7.12 plan works schedule and is therefore not eligible for funding.

Any review of the Section 7.12 Plan may consider roadside drainage in its works program. However, this will need to be considered against Council's current implementation priorities of public domain works, pathway construction and public art, which are currently being funded by the plan.

5.6 Alternative Funding Options

A special rate variation could be requested from the Independent Pricing and Regulatory Tribunal (IPART), but this is a complex process requiring extensive consultation with residents and ratepayers. Council would need to demonstrate to IPART there is:

- Community awareness of their plans;
- A demonstrated need for higher increases to charges;
- A reasonable impact on ratepayers;
- A sustainable financing strategy; and
- A history of well-documented Council productivity improvements.

Additional loan borrowings may provide an interim opportunity to provide the financial resources to fund a kerb and gutter program. However, loans also have a negative impact on Council's finances.

Appendix 1 – Roadside Drainage Requirements for Development

Kerb and gutter is necessary to formalise the road edge, protect the road pavement and to collect and convey stormwater to a suitable discharge point.

The following development conditions are provided (as adopted by Council 1 October 2014 and 19 September 2018):

- For dual occupancy, granny flats and 2 lot residential subdivisions, a condition of consent requiring the construction of kerb and gutter, will only apply in circumstances where kerb and gutter exists immediately adjacent the subject site;
- For residential subdivision of 3 lots or more, and multi-dwelling development and any other form of residential development (with the exception of single dwellings), a condition of consent requiring the construction of kerb and gutter, will apply in all circumstances; and
- For all commercial and industrial development, a condition of consent requiring the construction of kerb and gutter, will apply in all circumstances.
- In areas where table drains or swales are functioning as part of an overall drainage system a concrete edge strip to formalise the road edge and protect the road pavement along with formalising the table drain into a water sensitive grass swale may be considered.

The water sensitive grass swale should be in accordance with Australian Runoff Quality, A Guide to Water Sensitive Urban Design in order to treat urban stormwater runoff to meet water quality objectives and preserve the natural hydrological regime of catchments.

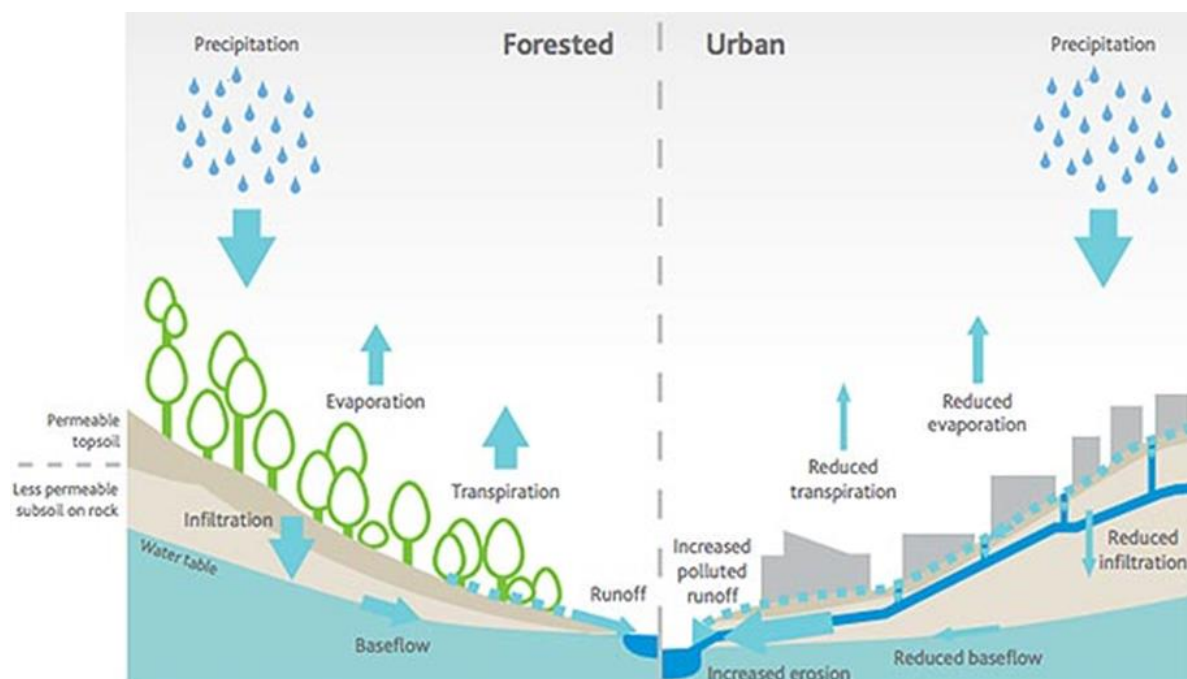
Appendix 2 – What is Water Sensitive Urban Design?

Stormwater is rainwater that has fallen onto roads or roofs and often contains chemicals or pollutants. Water sensitive urban design (WSUD) is an approach to planning and designing urban areas to make use of this valuable resource and reduce the harm it causes to our rivers and creeks.

Impacts of stormwater on waterways

In natural environments, rainwater mostly evaporates, gets absorbed by plants or soaks into the ground. Urban development dramatically changes these processes, clearing land of vegetation and covering it with 'hard' or impervious surfaces that cannot let water through.

As a result, rainwater runs off these surfaces, through stormwater drains and straight into our waterways as polluted stormwater in a very short time. This changes the timing, speed and volume of water flows, which can affect our waterways and bays.



Some of these impacts include:

- Causing waterways to have reduced flows most of the time and higher, unnatural flows for a few hours after it rains;
- Changing the habitat of platypus, fish and aquatic animals, and affecting their breeding habits; and
- Eroding stream banks and degrading streams.

Water sensitive urban design approach

Water sensitive urban design (WSUD) uses better urban planning and design to reuse stormwater, stopping it from reaching our waterways by mimicking the natural water cycle as closely as possible.

WSUD options

WSUD works at all levels – lot, street and precinct – as well as regional scales. It includes a range of treatment options.



Source: Introduction to WSUD, <https://www.melbournewater.com.au/planning-and-building/stormwater-management/introduction-wsud>, Melbourne Water, Accessed 4 June 2019.

Water Sensitive Swales

Water Sensitive Swales are the primary WSUD technique being utilised as part of Council's Roadside Drainage approach. The following is a brief explanation of how swales are likely to benefit the management of Council's roadside drainage.

Swales are linear, depressed channels that collect and transfer stormwater. They can be lined with grass or more densely vegetated and landscaped.

Treatments and contaminants

Primary and secondary treatment includes:

- Physical screening of sedimentation (coarse and fine); and
- Infiltration of stormwater into soils

Typical retained contaminants include:

- Gross pollutants;
- Coarse sediments; and
- Some nutrient removal.



How swales work

Swales can convey stormwater and screen and remove gross pollutants, such as litter and coarse sediment.

Swales initially immobilise pollutants by binding them to organic matter and soil particles, then remove them by settling, filtration and infiltration into the subsoil.

Certain pollutants, such as hydrocarbons, may be digested and processed by soil microorganisms in the filter strip. To optimise pollutant removal, swales need adequate contact time between the run-off and the vegetation and soil surface.

When to use swales

In urban areas, swales may be used as an alternative to:

- Conventional street nature strips;
- Centre median strips of roads; and
- Run-off collection points in car park areas.

In rural areas with enough space and slope, swales may be used with the sealing of rural roads to reduce negative impacts from increased stormwater run-off.

Advantages and limitations

Advantages of swales are that they:

- Reduce and delay stormwater run-off;
- Retain particulate pollutants close to source;
- Are more aesthetically appealing than kerb and gutter; and
- Are relatively inexpensive to build.

Limitations of swales are that they:

- Have limited removal of fine sediment and dissolved pollutants
- Use more land area than kerb and gutter, and restrict certain activities like car parking
- Require a sunny aspect for plant growth, which limits their application in shaded areas
- Are only suitable for gentle slopes of less than 5% gradient
- Require regular inspections

Tips and advice

Infiltration and treatment performance can be improved by:

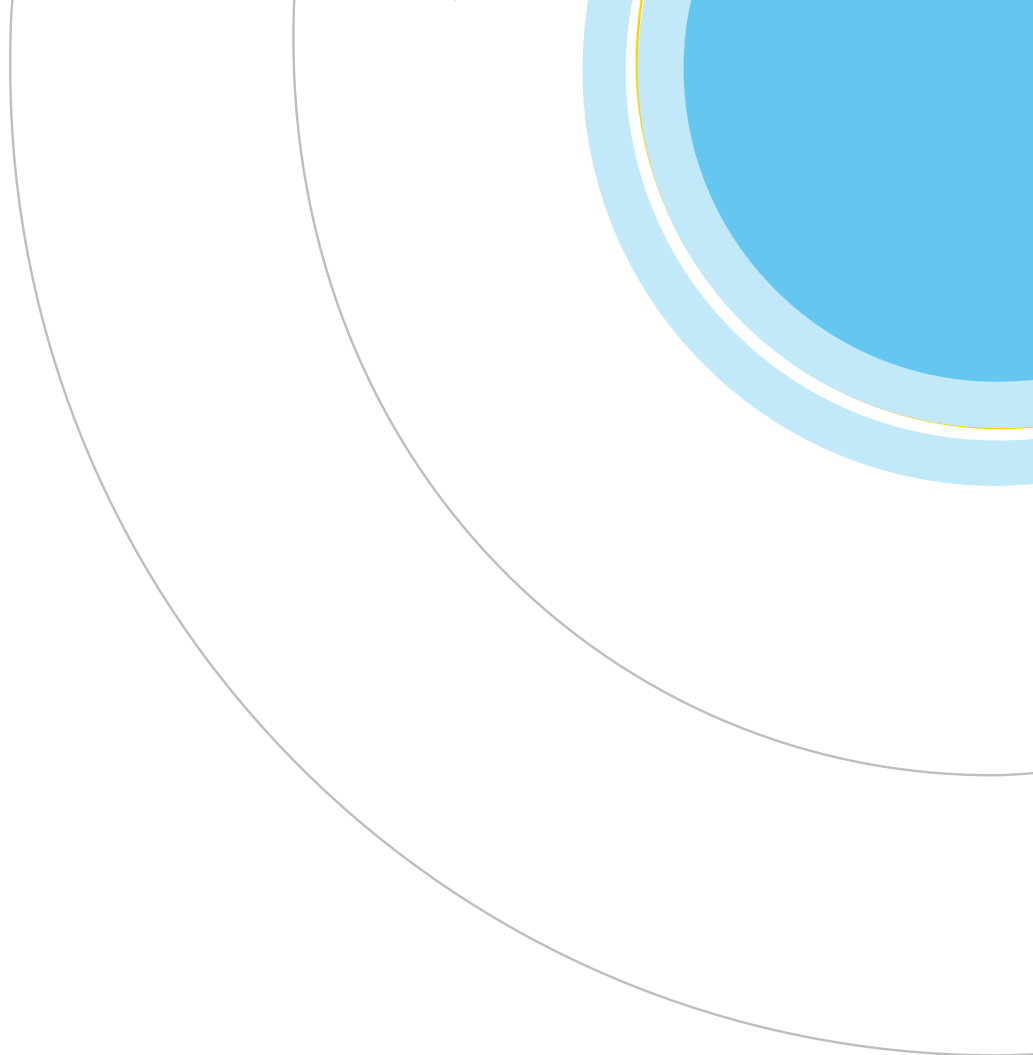
- Elevating the outlet slightly to facilitate detention and infiltration
- Using of gentle slopes
- Areas of slight depression

Check if dams can be used to retard and slow the flow along longer sloping sections.

For more information on the design of swales, refer to Chapter 8 'Swales and buffer strips' in the WSUD Engineering Procedures available for purchase from CSIRO Publishing.

Source: Swales, <https://www.melbournewater.com.au/planning-and-building/stormwater-management/options-treating-stormwater/swales>, Melbourne Water, Accessed 4 June 2019





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