



Kerb & Gutter

Community Assets – At the Core of Your Neighbourhood

Willoughby City Council 20 Year Asset Management Plans

2013/2014



WILLOUGHBY CITY COUNCIL

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1. Executive Summary

This Asset Management Plan is to be read in conjunction with Council's Asset Management Policy & Strategy.

1.1. What does council provide?

Willoughby City Council has constructed kerb and gutter to meet the primary objectives of conveying stormwater run-off from road carriageway and adjoining footpath and property, and discharge it into the stormwater network. Kerb and gutter also supports the edge of road pavement and is effective in preventing vehicles parking on footway and grass verges.

Council is responsible for the care and control of approximately 372 km of constructed kerb and gutter with a current replacement value of \$80.3M. This does not include berms constructed with asphalt or in-situ materials. Kerb and gutter along state roads are maintained in partnership with the Road and Maritime Services and neighbouring Councils.

1.2. What does it cost?

Kerb and gutter renewal is funded from a dedicated Priority Improvement Projects. The kerb and gutter general administration funding is used for both maintenance and renewal works, and there is also a separate funding for stone kerb in conservation area. Additionally, there are other sources of funding where a bigger project incorporates some kerb and gutter works, such as kerb and gutter rehabilitation in conjunction with adjacent pavement renewal, or as part of a shopping centre improvement program.

Total funding for kerb and gutter amounts to approximately \$375,000 p.a. in the current financial year and rising with CPI (assumed 3%) thereafter. Over 20 years, this translates to a life cycle expenditure of approximately \$535K p.a. compared to lifecycle cost of \$585K p.a. This indicates a funding gap of approximately \$50K p.a. However, given that the modelling is dependent on assumptions, current funding is deemed to be adequate. The accuracy of these forecasts will continue to be monitored as updated data and assumptions are refined.

1.3. How do we measure performance?

Currently Council's performance in kerb and gutter provision and maintenance is measured primarily from the asset's condition. Based on the current target intervention level, only 1% of kerb and gutter assets require treatment works. Other factors, such as functionality and capacity have not been included in the assessment at this stage.

1.4. What are the risks?

Risk management criteria are the base of prioritising kerb and gutter renewal works. In the past, prioritisation method for kerb and gutter followed that of footpaths. However, during the 2012/2013 financial year, Council developed a more robust rating process specifically for kerb and gutter, taking into account factors such as condition and material of the kerb and gutter, flooding history in the area and the type of properties that would be affected if the kerb and gutter is ineffective. This risk analysis has been applied only on kerb and gutter assets that are already at or beyond the set intervention level, resulting in capital works program for future years. The result of the risk analysis is then used to determine Council's future capital works program.

1.5. Community consultation

Community consultation specifically relating to asset management of footpaths and other asset classes was completed in 2013 as part of Council's community engagement strategy. Council also has a broad understanding of community expectations in the context of kerb and gutter due to the regular direct contact between community members and Council.

Consultation has resulted in one change in the way kerb and gutter defects are assessed. This followed the results of the public consultation survey which indicated that the community's expectations were lower than Council's initial threshold. Apart from this change in assessment method, target levels of service that were assumed by staff initially have remained unchanged following the consultation process, as the community's expectations about asset condition generally align with that of Council's.

1.6. What does the future hold?

Planning processes and budgeting for kerb and gutter are now considered to be robust following years of refinements to the processes. In addition, given that the lifecycle gap calculated from the modelling is minimal, it can safely be assumed that Council's current asset management strategy for kerb and gutter would continue as planned. The quality and accuracy of Council's reporting on its Asset Management plans will further improve when the Asset Management System is linked with future asset construction and renewal programs via the works order process.

2. Introduction

This Asset Management Plan (henceforth referred to as the *Plan*) forms part of Council's Resourcing Strategy under the NSW Integrated Planning and Reporting Framework. It is to be read in conjunction with Council's Asset Management Policy and Improvement Strategy (AMIS), to which frequent reference is made to avoid repetition within the Plan. The AMIS should be consulted for relationships between this Plan and other documents in the Integrated Planning & Reporting Framework.

2.1. Background

The purpose of this Plan is to demonstrate the sustainable provision and maintenance of all of the assets covered in the Plan and the services that rely on those assets. This Plan is a working document that spells out in detail the current state of assets, future plans for their management, associated costs and performance targets. It is designed so that it may be referred to by Council staff and members of the community alike.

Willoughby City Council is responsible for the provision and maintenance of 372.2km of constructed kerb and gutter within the road reserves with a total replacement value of \$80.3M. The breakdown of the lengths of each type of kerb and gutter assets is shown in the figure below.

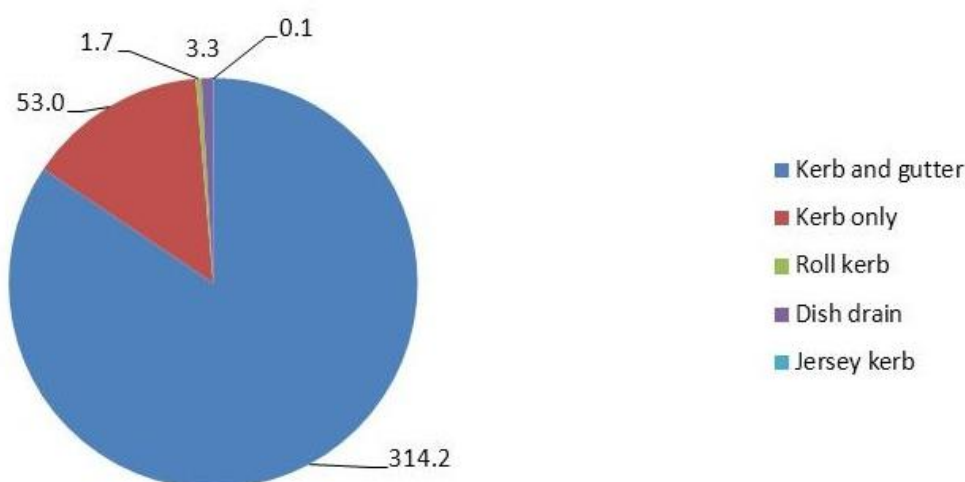


Figure 2.1 Types and lengths (km) of kerb and gutter assets

In addition to the above, there are approximately 26km of kerb constructed of in-situ material that is currently classified as "not required" in the immediate future. This constitutes a mere 6% of the total kerb and gutter within the LGA.

Some kerb and gutter assets are not covered in this plan. Table 2.1 lays out responsibilities for those assets excluded in this Plan.

Table 2.1 Assets NOT covered by this plan.

Asset category	Plan covering asset category	Division/branch responsible
Dish drain	Stormwater Asset Management Plan	Engineering Services
Other kerb and gutter within the Open Space area	Relevant Open Space Asset Management Plan depending on the kerb and gutter location	Open Space

Key stakeholders in the preparation and implementation of this plan and their respective roles are listed in Table 2.2.

Table 2.2 Key stakeholders and roles relating to asset management planning

Stakeholder	Role
Asset Management Controller	Coordinates preparation of plan, ensures links are retained between relevant asset management planning documents, assists with information flows into and from this Plan.
Infrastructure Services Director	Approval of capital programs, maintenance and inspection schedules and risk management.
Engineering Assets Group	Preparation of Plan, data collection and update, long term planning and prioritisation of works.
Engineering Works Services Group	Supervision and construction of assets.
Engineering Projects Group	Design and consultation.
Financial Services Branch	Receipt of fair value valuations at end of financial year, provision of budgets from the long term financial plan, receipt of projections relating to expenditure gaps, budget administration.
Progress associations, community	Determination of service level targets, feedback about new/upgraded assets
Councillors	Financial and planning decisions, community representation
Insurers and risk management staff	Risk management

2.2. Goals and objectives of asset management

The overarching principle, goals and objectives of asset management are those described in the AMIS and are not repeated here. Council's community strategic plan – the Willoughby City Strategy – identifies a number of outcomes in order to achieve the overall vision for the community, and any of the strategies for achieving these outcomes rely on asset management strategies. The outcomes as they relate to the assets covered in this Plan are listed in Table 2.3 along with the strategies for achieving those outcomes.

Table 2.3 Outcomes and Strategies from the Willoughby City Strategy as they relate to achieving those outcomes

Outcome as listed in the Willoughby City Strategy	Strategies within this Plan that will assist in achieving the outcome
4.1.1 Planning, maintenance and operation of infrastructure	Maintaining kerb and gutter in a condition that is effective in carrying out its function, such as conveying stormwater run-off into the stormwater network and as part of a wider flood mitigation program. Consider whole of life cycle costs for all existing and proposed kerb and gutter. Assessing kerb and gutter assets in line with projected demographic changes and community need.

This Plan contains the works programs, maintenance and inspection regimes and actions for improvement that should be followed to ensure the outcomes in the Willoughby City Strategy, as they relate specifically to the assets covered by the Plan, are achieved.

2.3. Plan framework

This Plan contains the following information that will enable Council to achieve sound strategic management of its vast asset stock:

- Current and target levels of service provision and strategies to address gaps (Section 3)
- The impacts of current and future demand on the delivery of services and strategies to address them (Section 0)
- Activities associated with managing Council's assets throughout their life cycles (Section 5)
- A summary of the funds required to provide services and meet targets (Section 6)
- A summary of current business processes and asset management practices (Section 7)
- Actions to ensure improved management of the assets covered by this Plan (Section 8)

2.4. Core and advanced asset management

The difference between core and advanced asset management is explained in the AMIS.

This Plan has been prepared using an advanced, or bottom-up, approach. Data is available concerning the dimensions, condition and value of all assets covered by this Plan, and this data has formed the basis for all planning and financial projections. Data concerning the performance of Council's assets will improve assumptions relating to financial projections, but these data are not currently available. This Plan will therefore become more advanced each time it is revised.

3. Levels of Service

The level to which services are provided by Council, termed *levels of service*, is an important factor in asset management planning. Council needs to know the type of assets required to deliver certain services, how many of them are needed, where they should be located, the quality that is expected from them, the level of maintenance required and the level of risk that might be considered acceptable. There are financial implications for all of these decisions.

The AMIS provides all necessary detail about Council's approach to determining target levels of service. Only information relating specifically to the assets covered by this Plan can be found in this Section.

3.1. Legislative requirements

While most levels of service are set in consultation with the community, the provision of certain services and assets must take place according to existing legislation. The legislative requirements that relate to this Plan are listed in Table 3.1

Table 3.1 Legislative requirements impacting on management of assets covered by this Plan

Legislation	Impact on management of assets
NSW Local Government Act 1993	Sets out role, purpose, responsibilities and powers of local governments including the preparation of a long term financial plan and Resourcing strategy in conjunction with asset management plans for sustainable service delivery.
Roads Act 1993	Sets out the role and responsibilities of road authorities and the rights of members of the public who use public roads.
Road Transport (General) Act 2005	Provides for the administration and enforcement as well as review of the road transport legislation, ultimately aiming to improve road safety and transport efficiency.
Road Transport (Safety and Traffic Management) Act 1999	Provides for a system of safety and traffic management, ultimately aiming to improve safety and efficiency of transport on roads and road related areas, and the efficiency of road transport administration.
Disability Services Act 1993	Sets out principles to be applied with respect to persons with disabilities and objectives for service providers and researches, and provides for funding of appropriate disability services and research and development activities.
Disability Discrimination Act 1992 Disability Discrimination and Other Human Rights Legislation Amendment 2009	Sets out responsibilities to ensure persons with disabilities have the same rights and access to the provision of goods, facilities and services.
Occupational Health and Safety Act 2000	Sets out responsibilities to secure the health, safety and welfare of persons at work.
Environmental Planning and Assessment Act 1979 Environmental Planning and Assessment Regulation 2000	Sets out the responsibilities for environmental planning between the different levels of government in the state in managing, developing and conserving resources to promote social and economic welfare of the community and a better environment.

3.2. Customer research and expectations

Council has undertaken a comprehensive community engagement program to determine the community's level of satisfaction with, and expectations for, Council's assets. The results of a detailed survey in 2013

indicated that levels of satisfaction with each major asset class were overwhelmingly high. These are summarised in Figure 3.1 below.

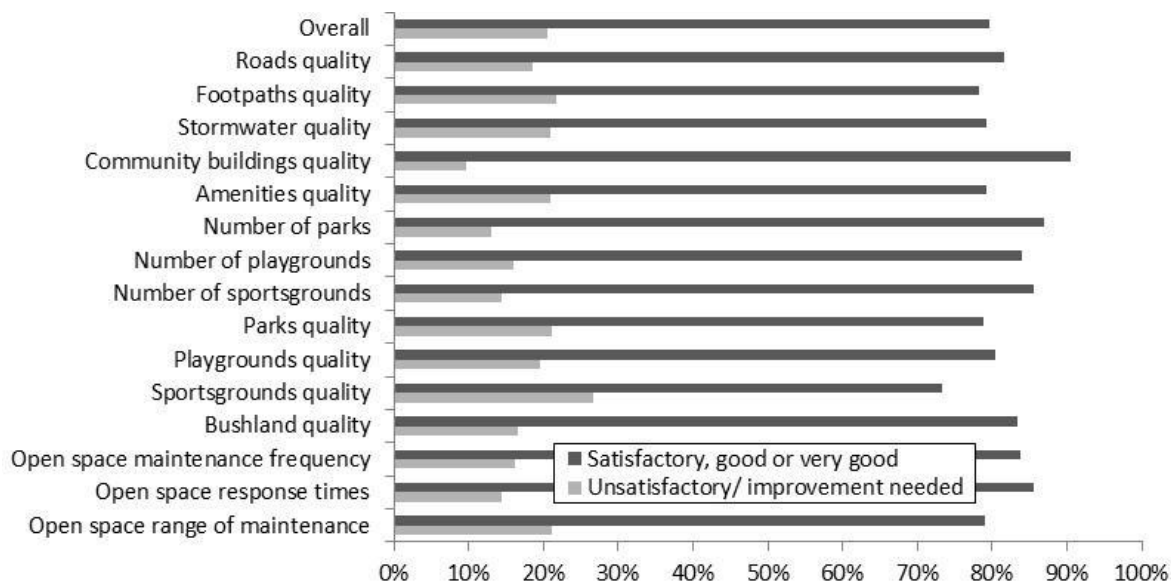


Figure 3.1 Levels of satisfaction with Council's assets (100+ surveys completed in 2013)

Expectations for assets were determined through comments from the same detailed survey as well as an online forum with high participation and consultation with a panel of 40 community members who had the opportunity to become well informed about Council's assets and asset management processes.

3.3. Target levels of service

Based on the results of the community engagement throughout 2013, target levels of service have been adopted by Council for assets covered by this Plan. These targets relate to the physical condition and appearance of assets, and drive renewal or rehabilitation programs.

More detailed findings on the intervention point for kerb and gutter assets have resulted in a change of condition assessment method. The new method of condition assessment has been employed for all financial forecasts.

Figure 3.2 Target levels of service for assets covered by this Plan.

Asset type, category or hierarchy	Target level of service
Kerb and gutter (all types)	Intervention is triggered when kerb and gutter has degraded to Condition 4 or worse, subject to prioritisation of works.

Levels of service also need to be identified for factors other than physical condition and appearance. For the assets covered by this Plan, measures of service delivery that have not yet been developed but which are relevant include:

- Quantity & location
- Capacity
- Functionality
- Responsiveness
- Legislative compliance

- Australian Standard Compliance
- Conservation items

These factors are already taken into account informally in everyday management, but have not been formally documented or measured. In broad terms the targets for these measures of service delivery are described and compared to current performance in Table 3.2 **Error! Reference source not found.** in the next section.

3.4. Current levels of service

Target level of service which has been formally documented and applied in Council's operation is to intervene when a kerb and gutter segment reaches condition 4 or worse. Currently less than 1% of kerb and gutter segments are at or beyond this intervention level.

Other measures of level of service have not yet been developed, but the table below describes these measures in general sense with a target level and compare them to the current performance.

Table 3.2 Target and Current Levels of Service

Service Criteria	Level of Service	Measurement Scale	Technical Performance Target	Current Performance
Quality	Physical condition	0-5 rating scale based on % of kerb and gutter length affected by defects	By 2034, no road segments have more than 50% of kerb and gutter length affected by defects (Condition 4)	Less than 1% of the kerb and gutter segments currently has more than 50% of kerb and gutter length affected by defects
	Aesthetic condition	Repairs are currently undertaken based on physical condition and risk, which will be determined in future levels of service	To be determined in future levels of service	To be determined in future levels of service
Quantity	New Kerb and gutter construction	If deemed appropriate to meet the primary objectives of installation K&G.	To meet community demand for kerb and gutter where appropriate in response to Customer Service Request	Only 1% of asset-related CSR is for kerb and gutter as of last analysis for the 2011/2012 financial year.
Capacity	Ability to convey stormwater or stop vehicles from mounting footway.	Height of K&G	Minimum 150mm high (adopted universal standard)	Survey indicates that non-conforming height kerbs do exist. These will be programmed for replacement.
Functionality	Fitness for purpose	K&G type is appropriate for location.	Appropriate K&G for location.	CSR number reflects good performance
Responsiveness	Inspect, make-safe or repair	Response times and number of insurance claims received by Council	High-risk safety issues* attended to within 24 hours Other cases to be inspected within 2 weeks, and if appropriate works will be prioritised within allocated budget. No insurance claims received by Council	Number of claims received by Council over the last three years is to be reviewed.

Service Criteria	Level of Service	Measurement Scale	Technical Performance Target	Current Performance
Conservation items	Maintain conservation status	Y, N or N/A	To maintain or replace existing sandstone kerb with new sandstone kerb in the Griffin conservation area.	Sandstone is replaced as budget permits. Additional funding will apply for this conservation area.
Legislative compliance	Whether compliant or not	Y, N or N/A	Y	Any new K&G constructed are based on relevant Standards and hence are compliant. Some existing K&G, due to site constraints, may not meet all contemporary standards.

*High risk safety issues refer to defects with a magnitude of 3 and has a risk score of 9 or 10. It should be noted that there is a backlog of these issues and it will take several years to remove them all depending on available budget and resources.

4. Future demand

This section assesses current and likely future demand, and presents demand management strategies to ensure that the needs of the community continue to be met.

4.1. Demand forecast

Factors affecting demand include population change, changes in demographics, seasonal factors, vehicle ownership, consumer preferences and expectations, economic factors, environmental awareness, changing land use, etc.

The NSW Department of Planning, through the NSW State Plan, the Sydney Metropolitan Strategy, and the Inner North Subregional Strategy, has identified requirements for Willoughby Council to provide for increased population and employment capacity. The Inner North Subregional Strategy in particular has identified Chatswood as a major shopping and business centre. This may require zoning changes in Council's Local Environmental Plan (LEP). The population is forecast to increase to approximately 78,000 between 2010 and 2031, which equates to a total increase of 13.40%¹. Employment is expected to increase by approximately 16,000 during the same period.

Table 4.1 Population Growth

Demand factor	2010	2030	% change
Population			
0 to 4 years	4,878	5,055	+3.6
5 to 11 years	5,519	6,010	+8.9
12 to 17 years	4,294	4,857	+13.1
18 to 24 years	6,330	7,249	+14.5
25 to 34 years	11,206	12,109	+8.1
35 to 49 years	16,467	17,252	+4.8
50 to 59 years	8,248	9,517	+15.4
60 to 69 years	5,773	7,195	+24.6
70 to 84 years	4,954	7,404	+49.5
85 and over years	1,462	1,532	+4.8
Total Population	69,133	78,181	+13.1

Table 4.1 above shows more details in the forecast of population growth in Willoughby LGA. However, demands for kerb and gutters are more due to the factors such as development and aesthetic upgrade. Where kerb and gutter is required as part of a development, developers will generally be responsible for providing the kerb and gutter, however the increased quantity of kerb and gutter will require more maintenance and renewal budgets in the future. Population increase may lead to construction of new roads, which in turn will lead to construction of new kerb and gutter. However, considering the urbanised state of Willoughby LGA, it is anticipated that the increasing population will have minor impacts on this asset class.

¹ Willoughby City Council Population Forecasts (<http://forecast2.id.com.au/Default.aspx?id=234&pg=5000>)

4.2. Demand management plan

Demand for new services will be catered for through a combination of managing and upgrading of existing assets and/or providing new assets. Demand management practices include non-asset solutions, which may include but are not limited to policy changes, and customer education.

Opportunities identified to date for demand management are shown in Table 4.2 below. Further opportunities will be developed in future revisions of this asset management plan.

Table 4.2 Demand Management Plan Summary

Service Activity	Demand Management Plan
Provision of new kerb and gutter	Developing a policy that establishes criteria to determine when construction of new kerb and gutter is warranted. Development applications will be assessed to ensure that new kerb and gutter is warranted. Construction of new kerb and gutter may be a condition of consent for the development. Upgrade of the adjacent kerb and gutter may be necessary.
Upgrade of existing kerb and gutter	New development applications may result in a change of vehicle or pedestrian activity. An assessment of the appropriateness of the existing kerb and gutter will be made as part of the application review, and as a result an upgrade of the kerb and gutter may be required as part of the conditions of consent of the development. E.g. previous asphalt formed into a "hump" to act as a kerb may require replacement with permanent concrete kerb and gutter.
Upgrade of existing kerb and gutter (aesthetic)	Aesthetic upgrades of footpaths are generally targeted at commercial precincts, such as the current Strip Shopping Centre upgrade program, as it may have an impact on the social and economic growth of the area. Generally the kerb and gutter is replaced at the same time the footpath is replaced in commercial precincts if it is in poor condition or if adjustment of the kerb and gutter position or level is required to improve the footpath condition. Aesthetic upgrade of kerb and gutter is not generally carried out in residential areas.

4.3. Changes in technology

Technology changes are forecast to affect the delivery of services covered by this plan in the following areas.

Table 4.3 Changes in Technology and Forecast effect on Service Delivery

Technology Change	Effect on Service Delivery
Implementation of electronic asset management system	Key areas of concern in service delivery will be identified and addressed as implementation progresses and more data becomes available on level of service criteria. Service provision is also expected to become more efficient, enabling increased service delivery.
Improvements in data capture, analysis and monitoring	Accurate and up-to-date asset registers will lead to more accurate works planning and financial data. This will facilitate a more pro-active approach in asset management.
Changes in construction and material technology	Improved construction and/or material technology could potentially extend the life of kerb and gutter assets and may result in more cost-efficient repair methods.

4.4. New assets from growth

In general, there are several drivers for the construction of new kerb and gutter. These are development works, in order to capture and direct stormwater flows or to discourage vehicles from parking on a footway area.

New development works, particularly in the CBD areas as highlighted in the NSW Inner North Subregional Strategy, will inevitably generate an increase of pedestrian and vehicle activity. Kerb and gutter may need to be upgraded by developers to cater for this and may be part of the condition of development consent.

As development occurs in predominantly residential areas where buildings did not previously exist close to the road pavement, the developer may be required to install new kerb and gutter to both capture and direct stormwater flows to the nearest stormwater pit; and discourage vehicles from parking on the footway.

Constructing these new K&G assets will require ongoing operational and maintenance funding requirements. These funding requirements will have to be included in the future kerb and gutter operating, maintenance, and renewal budgets.

4.5. Aesthetic Upgrade of Assets

A special maintenance funding, Construction of Streetscape – Improvement and Neighbourhood Shopping Centre, has specifically been allocated for aesthetic upgrade of footpaths in strip shopping centres. This funding is subject to a different prioritisation process from general maintenance and renewal, and is driven primarily by the physical condition of the footpaths. Current level of funding for this project is approximately \$100,000 p.a.. Kerb and gutter renewal works may be carried out as part of these footpath upgrades. A proportion of the strip shopping centre upgrade funding has been included in the total rehabilitation and maintenance figures in the following analysis.

4.6. Sandstone Kerb in Conservation Area

Special mention should be made of kerb and gutter within the Griffin conservation area. There are approximately 2.5 km of sandstone kerb within this area (shown in Figure 4.1). Approximately one-third of this total length is affected by defects. Sandstone kerb currently costs approximately 70% more than concrete (\$363/m vs. \$215/m), yet the expected life of sandstone kerb (20 years) is much shorter than that of concrete (70 years).



- Border of the Griffin Conservation Area
- Kerb and gutter within the Griffin Conservation Area (all materials)
- Kerb and gutter outside the Griffin Conservation Area (all materials)

Figure 4.1 Griffin Conservation Area, Castlecrag

Rehabilitation works on this sandstone kerb conservation area are costly and significantly reduces the amount of works that are able to be undertaken elsewhere using concrete K&G. Given that sandstone also has a shorter life it impacts on the general maintenance budget for kerb and gutter for the entire LGA.

A separate budget has been allocated for the replacement of sandstone kerb in the Griffin conservation area starting from the 2011/2012 financial year. In 2013/2014 financial year, the amount budgeted for this was \$26,000. As in the previous Asset Management Plan, it is recommended that these funds be placed in a reserve or be made available to carry out repairs as necessary. The deterioration rate of the kerb will be monitored and the funding plan adjusted as required. It is also recommended that sandstone kerb outside this conservation area is only replaced with concrete kerb and gutter in order to optimise expenditure on this asset class. Such practice is generally becoming more acceptable in other metropolitan Councils.

5. Lifecycle management plan

This section details how Council plans to manage and operate the assets covered by this Plan to achieve target levels of service (Section 3.3).

5.1. Background data

5.1.1. Physical parameters

Council is responsible for 372km of kerb and gutter, 314 of which is kerb and gutter constructed in concrete. Other materials include stone kerb, flagging, and to a lesser extent, timber logs.

For a summary of the quantity of different types of kerb and gutter, refer to section 2.1.

Data collection for the assets covered by this Plan has been completed but confidence in the data varies depending on method of collection. The types of assets covered and the status of asset data are provided in Table 5.1.

Table 5.1 Data available for the assets covered by this Plan.

Asset category	Data confidence	Status of data
Kerb and gutter within road reserve	95%	Asset register is approximately 95% complete. Data is continually being updated as works are carried out throughout the year. On a few occasions in the past, inaccuracies have been found especially where works have been carried out by external parties instead of Council staff, e.g. as part of development conditions.

5.1.2. Asset capacity and performance

Council's services are generally provided to meet design standards where these are available. Over time, some road pavements including the gutter may have had layers of asphalt laid over it, commonly known as a pavement overlay. This is carried out to reduce pavement renewal expenditure required to strengthen a road pavement. While this is a cost effective method of pavement repair, it may reduce the kerb height and in turn reduce its performance in respect to the volume of storm water it can convey and the ability of the kerb to deter people from parking on the footway. Sandstone kerbs are prone to wear and tear due to their relatively lower strength than concrete. Gaps in the kerb and the height of sandstone kerb will reduce over time.

5.1.3. Asset condition

The distribution of condition ratings amongst the assets covered by this Plan is shown in Figure 5.1. Council rates the physical conditions based on a standard 0-5 scale, where zero represents a brand new asset and five is the end of the expected life. For detail regarding the condition rating scale, see the AMIS.

For valuation purposes, each condition state is expressed as a percentage of the kerb and gutter length affected by defects. The table below shows the definition of each condition range:

Table 5.2 Kerb and gutter condition range

Condition	Percentage affected by defects	Condition	Percentage affected by defects
0	Affected Length < 2%	3	20% ≤ Affected Length < 50%
1	2% ≤ Affected Length < 15%	4	50% ≤ Affected Length < 70%
2	15% ≤ Affected Length < 20%	5	70% ≤ Affected Length < 100%

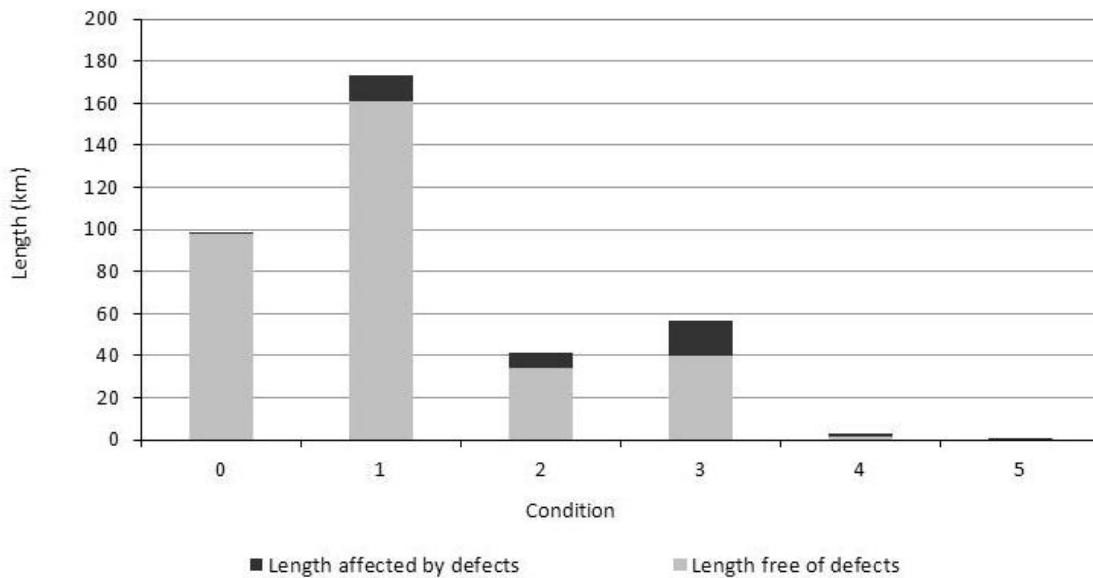


Figure 5.1 Distribution of physical condition ratings

Using this methodology gives an average condition of the kerb and gutter of 1.4 as of 30 June 2013. As shown in the figure above, only a very small percentage of the kerb and gutter (about 1%) is beyond the intervention level of condition 4 or worse. This does not mean that there are no defects in the rest of the kerb and gutter; but simply that the extent of the defects is within what is deemed to be acceptable and does not trigger an intervention or treatment.

5.1.4. Asset valuations

Council values all assets at Fair Value. The assumptions and calculation methods associated with valuations are documented in Council’s Asset Valuation Methodology. Valuations for the assets covered by this Plan are provided in Table 5.3.

Table 5.3 Valuations for assets covered by this plan

Asset type	Current replacement cost	Depreciated replacement cost (fair value)	2012/13 depreciation expense
All assets covered by this Plan	\$ 80.3M	\$ 69.4M	\$ 852k

Indicators of Council’s financial sustainability can be derived from fair value figures. These are reported in Table 5.4.

Table 5.4 Financial sustainability indicators for assets covered by this Plan

Indicator	Calculation method	Working	Result
Asset consumption	2012-2013 depreciation / depreciable amount * 100%	= \$852k / \$72,300k x 100%	1.2%
Asset renewal	2012-13 renewal spend / depreciable amount * 100%	= \$202k / \$72,300k x 100%	0.3%
Asset upgrade	2012-13 capital spend / depreciable amount * 100%	= 0 / \$72,300k x 100%	0%

The ratios in the table above indicates that kerb and gutter assets are currently being renewed at a rate only approximately a quarter of the rate at which it is being consumed, which means it will not be sustainable in the long term. However, feedback on the community engagement indicated that they largely agree with the intervention level set by Council. This is further confirmed by the low number of kerb-related CSRs that Council receives. There are several possible reasons for this discrepancy between asset consumption and renewal:

- Incorrect classification of maintenance and renewal.
Works are classified into maintenance and renewal based only on a capital threshold guide. The capital threshold may have been too high, thereby putting some works under maintenance rather than renewal, causing an overly low asset renewal rate.
- Current intervention level will not be sustainable in the long term.
The average condition as of 30 June 2013 is 1.4, whereas the intervention level set by Council, which the community agrees with, is condition 4. There was even one kerb and gutter defect assessment that had been moved to a less severe category following the community engagement process. There is a possibility that condition 4 is accepted because most of the kerb and gutter is currently in good condition and there is a general consensus that it can be allowed to deteriorate further before intervention is required. However, this may change in the future when the effects of the deterioration become more visible, which means that current funding is actually not sustainable. A further refinement of future condition rating of this asset may therefore be appropriate.
- The useful life of kerb and gutter is under-estimated.
A typical concrete kerb and gutter has been assumed to have a useful life of 70 years in this modelling. An over-estimated useful life would significantly inflate the depreciation value of the assets, which means asset consumption rate should have been lower and more in line with the asset renewal rate.

These issues will be addressed as part of plan improvement and monitoring (see section 8).

5.2. Risk management plan

An assessment of risks associated with service delivery from infrastructure assets has identified critical risks to Council. The risk assessment process is documented in the AMIS and identifies credible risks, likelihood of risk events occurring and consequences should the event occur. Risk ratings have been developed so that risks may be evaluated.

Risk management forms the basis of prioritisation method for kerb and gutter renewal works. In the past, prioritisation method for kerb and gutter was following that of footpaths. However, during the 2012/2013 financial year, Council has developed a more robust method developed specifically for kerb and gutter, taking into account various factors such as condition and material of the kerb and gutter, flooding history in the area and the type of properties that would be affected if the kerb and gutter is ineffective. Risk analysis has been performed only on the kerb and gutter that are already at or beyond the adopted intervention level, resulting in capital works program for future years. Details on this risk-based prioritisation method can be found in Appendix C – Risk Analysis and Prioritisation methodology.

5.3. Expenditure plan

Funding for kerb and gutter sources come from several sources, some of these are specific to kerb and gutter and others as part of other projects. The following table lists these funding sources as well as its budgeted amounts for the 2013/2014 financial year.

Table 5.5 Funding sources for kerb and gutter assets

Funding type	Funding sources	2013/2013 budget
Kerb and gutter specific	General kerb and gutter maintenance funding The main source of funding for kerb and gutter works	\$ 187k
	Priority Improvement Project (PIP) funding For programmed kerb and gutter renewal works	\$ 185k
	PIP funding – Castlecrag sandstone kerbs This PIP funding is specifically reserved for the replacement of sandstone kerb in the Walter Burley Griffin Conservation Area	\$ 26k
Other funding sources	Construction of Streetscape – Improvement and Neighbourhood Shopping Centre Although primarily a footpath related project, this streetscaping project may also identify the need for kerb and gutter works, and a portion of the fund may be allocated for this. As this will vary project by project, based on staff's previous experience, a certain % of this funding is assumed to be spent on kerb and gutter works.	Amount varies
	Kerb and gutter – pavement works A fixed sum is allocated every year for kerb and gutter rehabilitation undertaken in conjunction with pavement works. If kerb and gutter works can be coordinated with pavement works, this will be more cost effective as this will eliminate the need for costly pavement restoration, which would normally apply. However, this needs to be identified correctly so that Council is not replacing kerb and gutter in a manner that does not maximise its useful life.	\$ 12k
	Roads to Recovery Program This program operates across Australia and is primarily for road pavement works, but funds may be spent on kerb and gutter also if it is related to the pavement works. However, the program runs on a 4-year cycle, with the current cycle finishing in 2013/2014. Continuation of this program in to the future depends on Federal Government's longer term road funding policies and hence has not been included in Council's budget.	Nil
	Developer Contributions Developer contribution would generally apply if the developer is unable to renew the K&G at the time. This may be due to various reasons, e.g. if planned road pavement renewals which will also require adjustment of the K&G are due the following year. Generally renewals are undertaken by the developer rather than a contribution toward future works.	Amount varies
	Restorations Restoration funding is spread across several asset classes and amounts may vary throughout the year depending on utility authority's projects affecting Council's assets.	Amount varies

It should be noted that kerb and gutter works completed under general funding, general PIP and neighbourhood shopping centre have a higher unit rate due to the restoration of the adjacent pavement that may be necessary. Kerb and gutter works in conjunction with pavement and under the R2R program do not have restoration included in the unit rates, since pavement works are undertaken at the same time.

Council currently has no dedicated funding for the construction of new kerb and gutter. When requests for new kerb and gutter arise and the need has been verified, it will be added as a Priority Improvement Project in the budget. These new works, however, draw from the overall sum provided for maintenance and renewal works. It is recommended that when Council deems a new kerb and gutter project to be necessary, new works are given additional funding in addition to the maintenance and renewal sums.

Expenditure is calculated over a 20 year period based on current levels of expenditure and projections of funds required to meet target levels of service.

Two levels of funding are considered:

- (1) the base case, where expenditure follows current trends;
- (2) the sustainable case, where target levels of service are achieved and funding shortages may exist.

The types of expenditure covered include maintenance and operational, renewal, upgrade, new and disposal. These are defined in the AMIS. The method of predicting future expenditure to achieve target levels of service and the assumptions applied to modelling techniques are also explained in the AMIS.

All maintenance, renewal, upgrade and new work is carried out in accordance with the following standards and specifications:

- Willoughby City Council’s Standard Specifications and Drawings
- Relevant Australian Standards
- Willoughby City Council’s Development Control Plans
- Sound engineering practice

5.3.1. Maintenance and operational expenditure projections

Activities included as maintenance and operational expenditure are defined in the AMIS. The past *actual* maintenance expenditure (as opposed to the allocated maintenance budget) trend for the assets covered by this Plan is shown in Figure 5.2 and Table 5.6 and does not include operational expenditure.

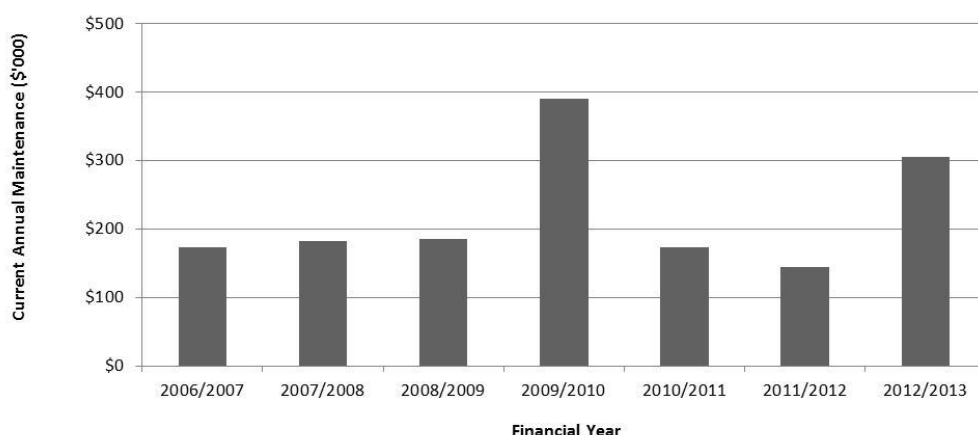


Figure 5.2 Maintenance Expenditure History

The actual figures are shown in the table below, with comments and explanation.

Table 5.6 Actual maintenance expenditure history

Financial year	Maintenance expenditure (\$'000)	Comments
2006-2007	173	Includes maintenance and renewal
2007-2008	182	Includes maintenance and renewal
2008-2009	185	Includes maintenance and renewal
2009-2010	391	Includes maintenance and renewal
2010-2011	174	Includes maintenance and renewal
2011-2012	144	Maintenance only
2012-2013	305	Change in Special Schedule 7 reporting method, includes: - Maintenance \$100k - Renewal \$202k - Restorations \$3k

Note that the currently adopted capitalisation threshold for footpath assets was not adopted until the 2011/2012 financial year. Up until this year, renewal and maintenance expenditures were not clearly distinguished and a lot of renewal works were included as maintenance. When the renewal works were separated out in 2011/2012, this caused a decrease in maintenance expenditure that year.

Annual maintenance expenditure (excluding renewal and restoration) is currently equivalent to 0.4% of the total replacement value reported in Table 5.3. On average, this is considered sufficient for the current asset stock, as reflected by the community feedback and the low number of kerb and gutter Customer Service Requests.

Maintenance expenditure is expected to increase in line with increases to asset stock through upgrade and new capital works. Council tends to focus on renewal of existing kerb and gutter rather than addition of new ones. However, new kerb and gutter may be added to the asset stock through, for example, a new development. In order to be financially sustainable, maintenance expenditure needs to be maintained at least at the current level of total asset stock replacement value. The difference between current funding levels (base case) and projected required maintenance funding (sustainable case) is shown in Figure 5.2.

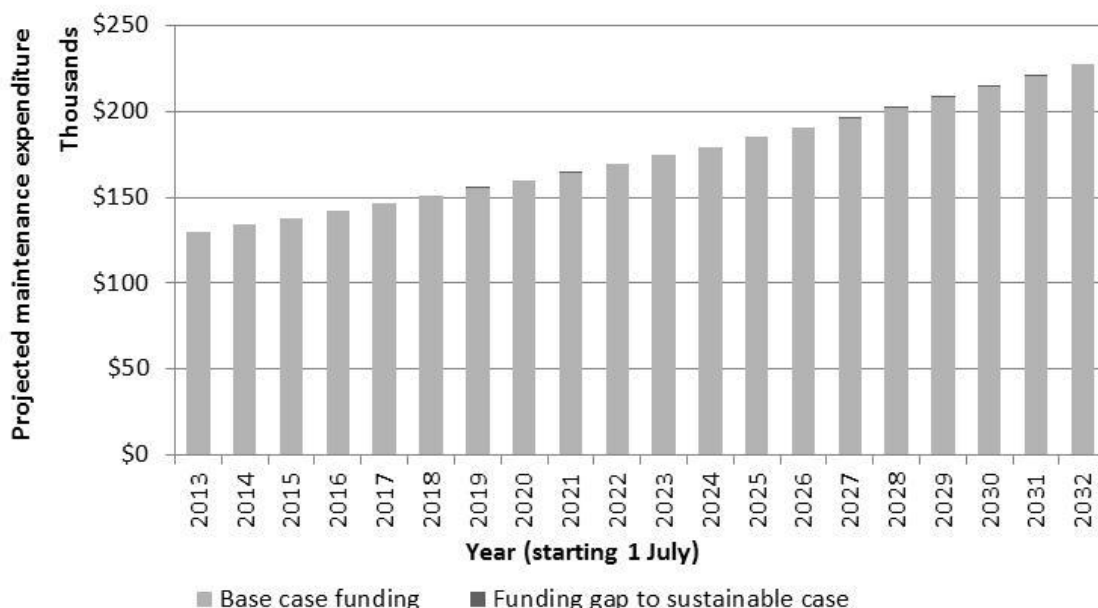


Figure 5.3 Projected maintenance expenditure under the base and sustainable cases

Maintenance expenditure is also expected to increase as asset condition declines. The link between maintenance expenditure and asset condition will be determined following further data analysis.

5.3.2. Renewal expenditure projections

Renewal expenditure depends on levels of service and projections are calculated using modelling techniques and assumptions documented in the AMIS. As of 30 June 2013, there are approximately 30km of kerb and gutter segments affected by defects, however only 3km of this is in Condition 4 or worse. Using the unit rate of a typical kerb and gutter section, this translates to approximately \$650,000 worth of works, or double the current annual funding. Regardless of existing backlogs, additional renewal expenditure may be required in the future as a large number of assets reach their intervention point at the same time. Planning for these periods of intense expenditure is crucial. The modelling technique does have limitations which are also documented in the AMIS but still provides a good estimate of long term average funding requirements.

For the assets covered by this Plan, the cost of renewals is based on the replacement costs for the lengths affected by defects. This means kerb and gutter may be partially renewed under the model, however it does not take into account that such treatments may, in reality, result in patchwork treatment over the years. The difference between current funding levels (base case) and projected required renewal funding (sustainable case) is shown in Figure 5.4.

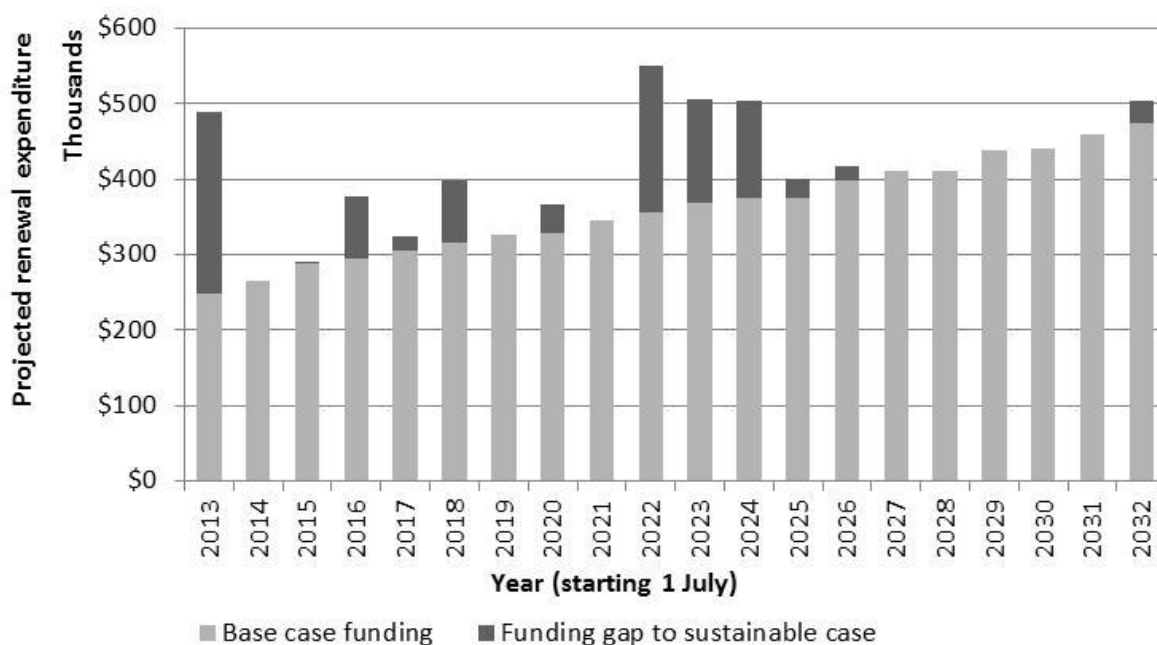


Figure 5.4 Projected renewal expenditure under the base and sustainable cases

The results from the financial modelling forecasts indicate that current base level funding falls slightly short of the sustainable case scenario. In some years it is the same, but in others it fluctuates depending on the number of asset deterioration reaching intervention level. In reality works will be spread across the years to achieve a smoother and uniform level of funding. The funding gap for the sustainable case is calculated to be, on average, approximately \$50,000 p.a.

Where funding shortages mean that renewals cannot be completed in a timely fashion, the asset pool is expected to decline in condition overall. Figure 5.5 shows the expected degradation in the average condition of the asset pool, as well as the distribution of condition by length. Deteriorated kerb and gutter would not be as effective in conveying stormwater run-off which may cause local ponding and may even accelerate degradation of adjacent pavement.

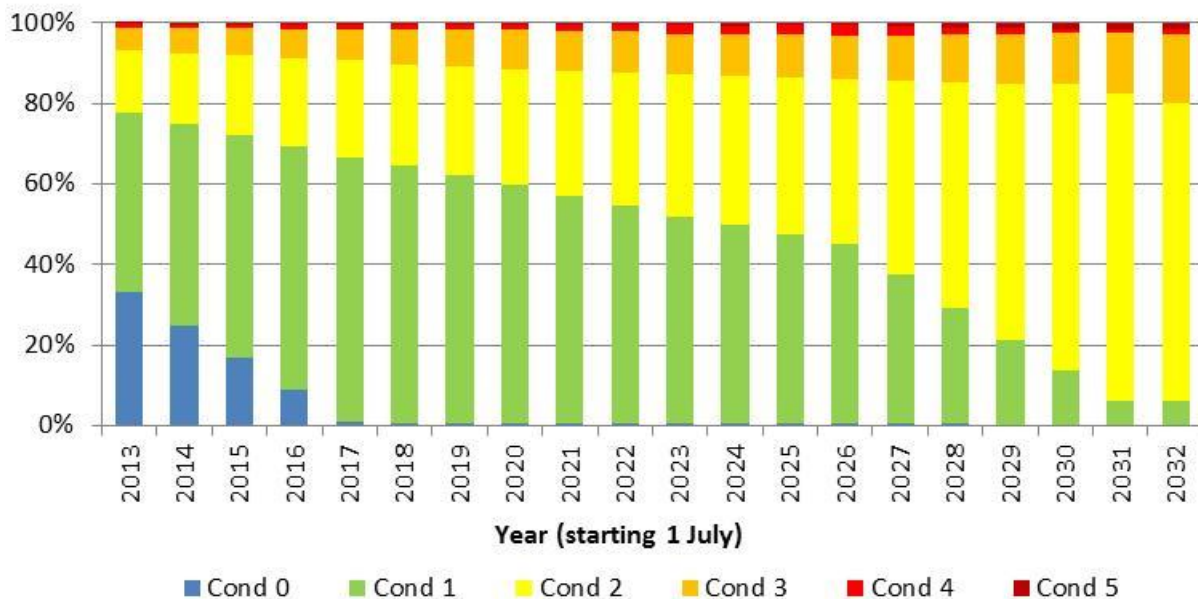


Figure 5.5 Projected asset average condition and distribution under the base case funding

Where renewal funding falls short of requirements, a prioritisation method is applied to ensure that the highest risk and highest priority assets are renewed first or, in the absence of high risk assets, renewals are carried out in the most financially efficient manner possible. Prioritisation method for kerb and gutter is based on risk management, the details of which can be found in section Appendix C – Risk Analysis and Prioritisation methodology.

Low cost renewal methods will be used wherever practical. For example, when sandstone kerbs are being replaced, where possible some of the stones may be re-used.

5.3.3. New and upgrade expenditure projections

New or upgrade capital works are defined in the AMIS. For the assets covered by this Plan, there is currently no plan for new and upgrade works, as Council tends to focus on the renewal of existing kerb and gutter rather than new construction. However, new kerb and gutter may still be added to the added stock through, for example, new development.

It should be noted that, had there been plans for new and upgrade works which would add to the asset stock, increases in maintenance and probably also operational expenditure can be expected in conjunction with all capital projects.

5.3.4. Disposal plan

Disposals are defined in the AMIS. Assets identified for possible decommissioning and disposal are shown in Table 5.7 below.

Table 5.7 Assets identified for disposal

Asset	Reason for disposal	Timing	Cash flow from disposal*
Kerb and gutter on Abbot Rd between Barton St and McMillan Rd	Acquisition by other government body	To be determined	To be determined

*Plus sign indicates a profit; negative sign indicates a cost to Council.

5.4. Summary of future costs

For each of the funding scenarios (base case and sustainable case) the total projected expenditure is displayed in Figure 5.6 and Figure 5.7. Base case funding for maintenance and renewal works indicates that Council is facing a small funding gap for the assets covered by this Plan. Over the 20 year period, this gap amounts to a total of \$1M or an average of \$50,000 per year.

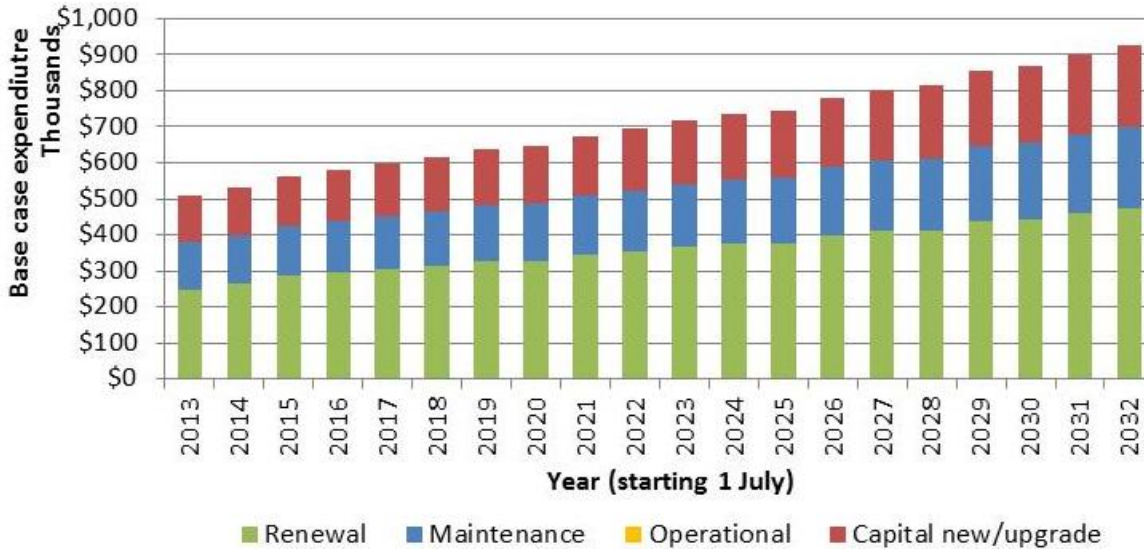


Figure 5.6 Projected 20 year asset expenditure under the base case

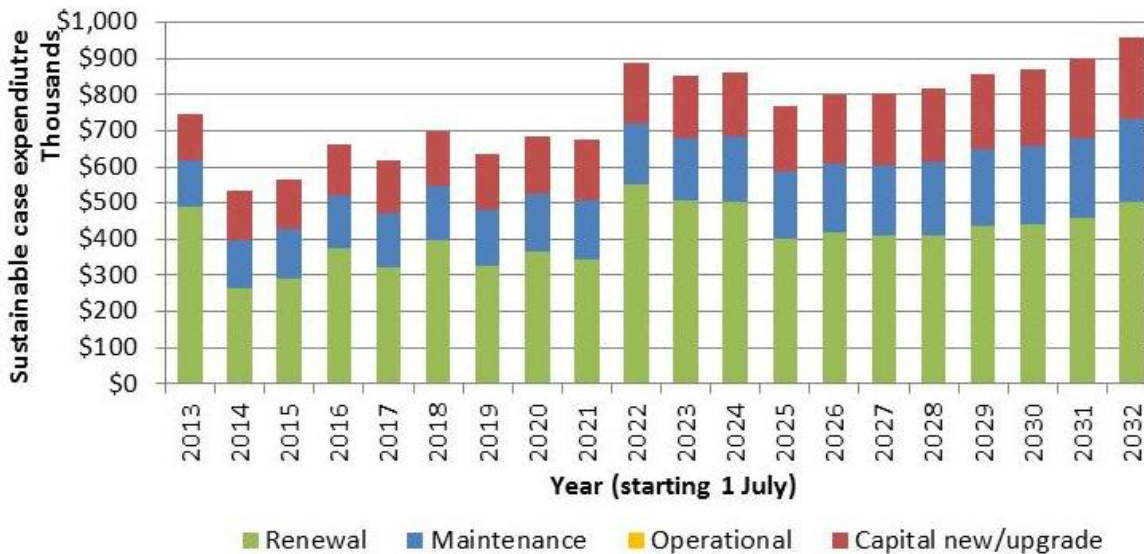


Figure 5.7 Projected 20 year asset expenditure under the sustainable case

The expenditure pattern in the sustainable case fluctuates from year to year as the financial model applies treatments to ALL assets that reach intervention level. In reality, funding *generally* changes at a constant rate, and therefore works may be deferred or brought forward to match the available funding. Some renewal works may also be better deferred to achieve economies of scale when combined with other works.

These financial projections involve many assumptions, as detailed in the AMIS, and will be continually refined. Modelling software identifies what need to be done each year and apply treatment, and does not take into account that in reality, works may be delayed or brought forward to smooth out the pattern of funding requirements.

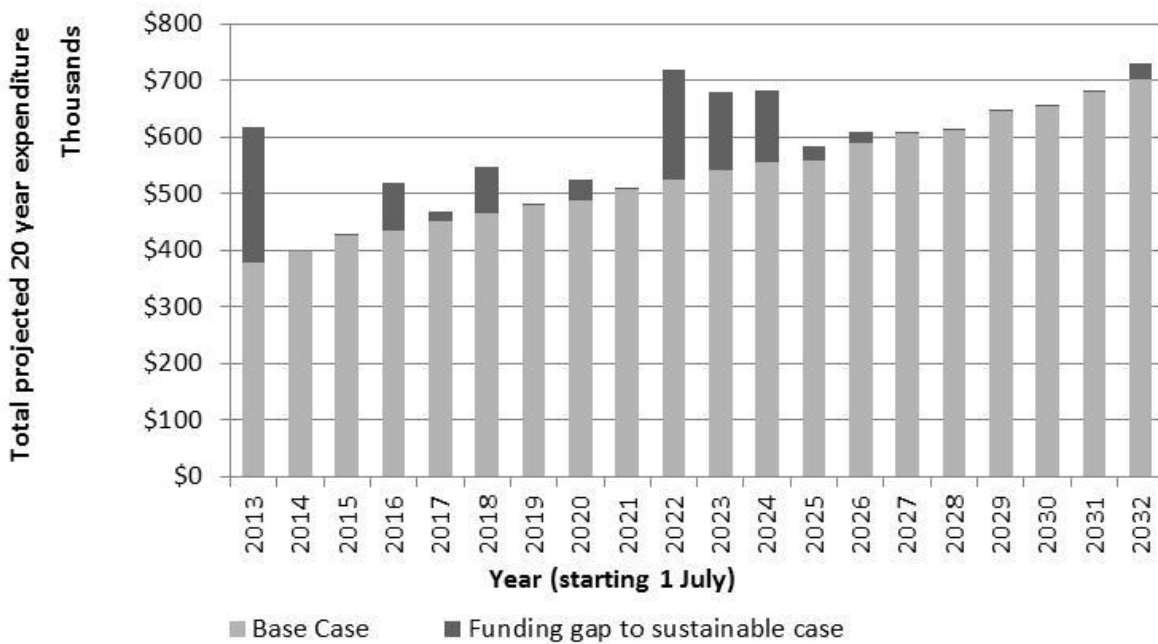
6. Financial summary

This section contains the financial requirements resulting from all the information presented in the previous sections of this asset management plan.

6.1. Financial statements and projections

Total projected expenditure under each of the two financial scenarios is presented on a single set of axes in Figure 6.1. Expenditure is not broken down into types.

Figure 6.1 Projected 20 year expenditure for assets covered by this Plan



Inflation has been applied at a rate of 3% per annum but no allowance for discount rates has been made.

6.2. Life cycle costs and sustainability

Life cycle cost is the average annual cost of meeting target service levels. Life cycle costs include periodic asset renewals and regular maintenance, and operational expenditure where relevant. Life cycle cost can be calculated on an individual asset basis, and the total compared to current levels of expenditure for an indicator of financial sustainability.

A gap between life cycle cost and current expenditure gives an indication of whether the community is currently paying their share of the assets being consumed. Life cycle costing will be refined with each reiteration of this Plan as more information is collected about asset inventories, treatment costs and asset degradation. Life cycle costs for the assets covered by this Plan are provided in Table 6.1.

Table 6.1 Life cycle cost analysis

Life cycle cost (annual)	Life cycle expenditure (annual)	Life cycle gap
\$ 585k	\$ 535k	\$ 50k

As shown above, the life cycle cost and life cycle expenditure is very close, with only a difference of \$50,000 p.a. on average. Note that this has not included the extra maintenance costs from any addition to kerb and gutter asset stock that may be constructed as part of new developments. In general this means that current funding for kerb and gutter assets is adequate to achieve their sustainability, and monitoring will continue over the years to compare the validity of the assumptions made in the modelling against actual performance, e.g. the degradation rate and useful lives of the assets.

This Plan is the key to addressing the life cycle gap because it provides guidance on future levels of service and resources required to provide those services.

6.3. Funding strategy

The information from this Plan, including funding gaps, feeds directly into Council’s Long Term Financial Plan (LTFP). The LTFP should be consulted for all funding strategies.

6.4. Valuation forecasts

Asset replacement values will increase as additional assets are added to the asset stock. For kerb and gutter assets, there are no immediate plans or programmes for Council to construct new kerb and gutter, and works are generally more focused on maintenance or renewal of existing assets. However, new kerb may be added to the asset stock through other projects, e.g. as part of a new development.

Depreciation expense will vary according to the expenditure level, since depreciation patterns vary throughout the life cycle of assets. Fair value is expected to increase in line with additions to the new asset stock, but if assets are not renewed as indicated in the modelling, the overall fair value is more likely to drop. Table 6.2 compares the current and projected total replacement cost, depreciation expense and written down value of all assets covered by this Plan under each of the two expenditure cases (base and sustainable).

Table 6.2 Asset valuation forecasts under the base and sustainable cases

Financial case	Year	Replacement cost	Annual depreciation expense	Written down value (fair value)
Base case	1	\$ 80,354k	\$ 539k	\$ 75,280k
	20	\$ 80,354k	\$ 751k	\$ 66,149k
Sustainable case	1	\$ 80,354k	\$ 539k	\$ 75,280k
	20	\$ 80,354k	\$ 751k	\$ 66,121k

The funding strategy for sustainable case was optimised to maintain threshold of condition 4, and the base case funding scenario is essentially adequate to achieve this objective.

By the end of the 20 year period, the forecasted written down value in the sustainable case is almost the same as that of the base case, and the base case scenario satisfies the objective of maintaining the threshold of condition 4. Generally the written down value in sustainable case at the end of the 20-year period is expected to be higher than the base case, however for kerb and gutter, the two cases are very similar, as demonstrated in the lifecycle gap previously.

6.5. Key assumptions made in financial forecasts

The broad assumptions applied to all asset classes in producing financial forecasts are described in the AMIS. Assumptions that relate specifically to this asset class are as follows:

- Repair or renewal work results in asset condition being restored to condition 1, unless if condition prior to treatment was condition 5, then assume full replacement which results in the asset condition being restored to condition 0.
- Repair cost is based on the length affected by defects, the type and material of the kerb and gutter, and the NAAASRA classification of the roads that the kerb and gutter is adjacent to.
- Stone kerb outside the conservation area is assumed to be replaced with concrete.

Accuracy of future financial forecasts may be improved in future revisions of this asset management plan by the following actions:

- Continued revision of assumptions relating to valuations such as useful life, pattern of consumption and residual values.
- Comparison with IPART cost benchmarking which is due to be published during the 2013/2014 financial year and making adjustments as necessary.
- Comparison with other Councils and discussions in Asset Management forums, bearing in mind that factors like useful life, residual values and replacement costs may vary from Council to Council depending on the location and renewal policy of each one.

7. Asset Management Practices

This section summarises Council's current asset management practices in terms of software systems and business processes. All information that applies to Council as a whole can be found in the AMIS. Only information relating specifically to the assets covered by this Plan is covered here.

7.1. Accounting/financial systems

Some funding sources in kerb and gutter are already allocated to specific types of works that can be classified easily, e.g. the PIP or kerb and gutter constructed in conjunction with pavement works is generally used exclusively for renewal works. However, the general kerb and gutter administration is used for both maintenance and renewal works depending on the capital threshold. Council has been using historical data to determine the proportion of expenditure between the two types of works, and this knowledge should enable future modelling to be more accurate.

The majority of kerb and gutter works are similar in nature, i.e. partial replacement, which tends to blur the distinction between maintenance and capital renewal works. Therefore, starting from 2011/2012 financial year, capital thresholds have been developed for the assets covered by this Plan to distinguish between the two. This information is held in Council's asset valuation methodology.

7.2. Asset management systems

Council is in the process of implementing Infor Public Sector Suite as its corporate asset management system. Details of Council-wide implementation, including integration with other Council systems, can be found in the AMIS.

The status of asset management system implementation for the assets covered by this Plan is near completion and accurate in terms of asset register. Defects data, which affect condition rating and therefore prioritisation system, are also continually being updated by a dedicated officer and synchronised in the system as works are carried out. However, major collection of the defect data encompassing the whole Council LGA was last carried out in 2010 and a new round of data collection is due to be carried out during the 2013/2014 financial year.

Major renewal works of kerb and gutter are updated towards the end of the financial year, although starting from 2013/2014 financial year, the plan is to update them as works are completed.

When work orders system is eventually integrated with the asset management systems, it would be possible to distinguish better between maintenance and capital renewal works, rather than using a general threshold rule.

7.3. Information flow requirements and processes

The key information flows *into* this asset management plan are:

- Data from the asset register on size, age, value, condition, remaining life (see asset valuation methodology);
- Unit rates for treatments/replacements and asset consumption patterns (see asset valuation methodology)
- Adopted service levels (Section 3.3 of this Plan)
- Projections of various factors affecting future demand for services (Section 4.1 of this Plan)

- Available budgets from the long term financial plan
- Long term capital project planning
- Outputs from renewal modelling
- Data on new assets acquired by Council and future disposals

The key information flows *from* this asset management plan are:

- The works program
- The annual operational plan and budget
- The 4 year delivery program
- Required funding to address any renewal and maintenance gaps for the long term financial plan

7.4. Standards and guidelines

This Plan has been prepared under the Division of Local Government's Integrated Planning & Reporting Framework with guidance from the IPWEA International Infrastructure Management Manual.

8. Plan Improvement and Monitoring

This section deals with the improvement of this Plan and the management of assets covered by this Plan, including performance measures, an action plan for improvement and review procedures.

8.1. Performance measures

The effectiveness of this Plan can be measured in the following ways:

- Integration of the contents of this Plan with the other documents that constitute the Integrated Planning and Reporting Framework, particularly the Resourcing Strategy.
- The level of deviation from previously published capital works programs and budgets.
- Improvement in data confidence.

Previous generation of this Asset Management Plan has listed, as one of the plan improvements, a bi-weekly inspection of newly repaired and built footways to continuously update the asset conditions. A dedicated Asset Inspector now undertakes this duty so condition data is up to date

8.2. Action plan for improvement

Actions that can be undertaken to ensure this Plan is improved in the future are listed in Table 8.1

Table 8.1 Action plan for improvement

Task #	Task description	Officer Responsible
1	Review modelling parameters.	Engineering
2	Integrating the asset management data with the work orders	AM Project Team with relevant supervisors and officers
3	Review the deterioration pattern to confirm assumptions made in the modelling	Engineering
4	Review capital threshold	Engineering and Finance

Improvement in Council-wide asset management practices, business processes, workflows and systems is detailed in the AMIS.

8.3. Monitoring and review procedures

This Plan will be reviewed in November and December annually during the preparation of the annual budget and amended to recognise any changes in levels of service and/or resources available to deliver those services as a result of financial decisions in the long term financial plan.

9. References

NSW DLG Integrated Planning and Reporting Manual

<http://www.dlg.nsw.gov.au/dlg/dlghome/Documents/Information/Intergrated%20Planning%20and%20Reportin%20Manual%20-%20March%202013.pdf>

Willoughby City Strategy 2013-2029

<http://www.willoughby.nsw.gov.au/Community/Community-Planning/Willoughby-City-Strategy/>

Willoughby City Council Delivery Program 2013-2017 and Operation Plan

<http://www.willoughby.nsw.gov.au/About-Council/Forms-Policies---Publications/delivery-program-and-operational-plan-2010-2014/>

Willoughby City Council Resourcing Strategy

<http://www.willoughby.nsw.gov.au/About-Council/Forms-Policies---Publications/resourcing-strategy/>

10. Appendix A – Capital works program

This appendix lists all capital works projects identified in asset management plans for the five years beginning 2013/14. The types of works included are renewal of existing assets, upgrade of existing assets and purchase/construction of new assets. These are presented according to the two financial cases covered by the Long Term Financial Plan:

- **Base Case** – works that will almost certainly take place if funding continues at present levels
- **Sustainable case** – works that either could not be carried out, or would be carried out later than is ideal, without a special rate variation.

Whilst reviewing this list of works, it is very important to note that it does not represent a prescriptive capital works program. The proposed year of works is listed against each item based on current priorities. As asset degradation and use profiles can only ever be estimated rather than accurately predicted, it is likely that priorities will shift over time. Each proposed work will require on-site investigation before determining its final inclusion in the works program, and the condition of many assets will be reassessed in this financial year. This may result in considerable variation of proposed works, depending on actual asset degradation.

It is standard practice for Council staff to review such lists of Capital works at budget time each year, and often much more frequently for network assets such as footpaths. As such, this list should be considered an indicator of the *quantity* and *distribution* of works that are likely to be undertaken. The accuracy of these capital works programs decreases with each subsequent year. Nonetheless, long-term planning and identification of these projects is an essential part of ensuring that Council attains financial sustainability.

The following table provides the 5-year total expenditure for kerb and gutter works by ward. These have been compiled to provide an overview by ward.

Table 10.1 Summary of capital works by ward

Asset class	Ward	Projects total value over 5 years (Base case)	Additional projects value over 5 years (Sustainable case)
Kerb & gutter	West Ward	\$240,004	\$113,389
	Sailors Bay Ward	\$528,794	\$57,684
	Middle Harbour Ward	\$530,786	\$156,624
	Naremburn Ward	\$100,582	\$41,964

Works are divided into asset classes, and presented in a tabular fashion by year. “Year 1” is the 2013/14 financial year, “Year 2” is the 14/15 financial year, and so on. All proposed works consist of partial or complete renewal at the locations listed. The proportion of kerb and gutter replaced at the time of works will depend on the physical condition of the asset at the time.

10.1. Base Case

Street	Ward	Year	Value
Chowne Place	Middle Harbour Ward	1	\$22,138
Robert Street	Middle Harbour Ward	1	\$6,087
Victoria Avenue	Middle Harbour Ward	1	\$8,393

Street	Ward	Year	Value
Central Street	Naremburn Ward	1	\$24,169
Hampden Lane	Naremburn Ward	1	\$5,312
Shepherd Road	Naremburn Ward	1	\$53,426
Baringa Road	Sailors Bay Ward	1	\$22,864
Dalmeny Road	Sailors Bay Ward	1	\$17,751

Street	Ward	Year	Value
Daniel Murphy Lane	Sailors Bay Ward	1	\$8,309
Lower Cliff Avenue	Sailors Bay Ward	1	\$8,898
Minimbah Road	Sailors Bay Ward	1	\$21,625
Sunnyside Crescent	Sailors Bay Ward	1	\$25,299
Dulwich Road	West Ward	1	\$5,383
Moola Parade	West Ward	1	\$2,578
Pearl Avenue	West Ward	1	\$16,344
High Street	Middle Harbour Ward	2	\$28,819
Summerville Crs	Middle Harbour Ward	2	\$74,420
Victoria Avenue	Middle Harbour Ward	2	\$4,432
Francis Street	Naremburn Ward	2	\$5,540
Baringa Road	Sailors Bay Ward	2	\$15,293
Harris Lane	Sailors Bay Ward	2	\$27,517
Narooma Road	Sailors Bay Ward	2	\$7,783
Small Street	Sailors Bay Ward	2	\$5,540
Dulwich Road	West Ward	2	\$3,666
Fehon Road	West Ward	2	\$16,250
Whitton Road	West Ward	2	\$75,405
Chaley Street	Middle Harbour Ward	3	\$19,809
Deepwater Road	Middle Harbour Ward	3	\$8,679
High Street	Middle Harbour Ward	3	\$6,608
Robert Street	Middle Harbour Ward	3	\$13,085
Warrane Road	Middle Harbour Ward	3	\$76,923

Street	Ward	Year	Value
Hawkins Street	Naremburn Ward	3	\$9,362
Lane W92	Naremburn Ward	3	\$9,059
High Street	Sailors Bay Ward	3	\$12,962
Linden Way	Sailors Bay Ward	3	\$46,127
The Citadel	Sailors Bay Ward	3	\$40,506
Wyvern Avenue	West Ward	3	\$44,534
Hercules Street	Middle Harbour Ward	4	\$42,177
Macquarie Street	Middle Harbour Ward	4	\$25,854
French Street	Naremburn Ward	4	\$51,430
Martin Street	Naremburn Ward	4	\$23,828
Frenchs Road	Sailors Bay Ward	4	\$2,728
Narooma Road	Sailors Bay Ward	4	\$13,220
Sunnyside Crescent	Sailors Bay Ward	4	\$38,392
Avro Road	West Ward	4	\$39,365
View Street	West Ward	4	\$57,018
Alexander Avenue	Middle Harbour Ward	5	\$24,917
Rosebridge Avenue	Middle Harbour Ward	5	\$40,260
Victoria Avenue	Middle Harbour Ward	5	\$28,713
Waratah Street	Middle Harbour Ward	5	\$18,612
Warrane Road	Middle Harbour Ward	5	\$30,537
Hampden Lane	Naremburn Ward	5	\$74,449
Wollombi Road	Sailors Bay Ward	5	\$19,939
Findlay Avenue	West Ward	5	\$64,713
Park Avenue	West Ward	5	\$3,124

10.2. Sustainable Case

Street	Ward	Year	Value
Ferndale Street	West Ward	2	\$15,617
Warrane Road	Middle Harbour Ward	3	\$12,303
Barton Road	Naremburn Ward	3	\$28,192
Colwell Crescent	West Ward	3	\$26,276
Rembrandt Drive	Middle Harbour Ward	4	\$32,782

Street	Ward	Year	Value
Rosebridge Avenue	Middle Harbour Ward	4	\$25,758
Kershaw Lane	Naremburn Ward	4	\$13,772
Dalkieth Street	Sailors Bay Ward	4	\$26,426
Linden Way	Sailors Bay Ward	4	\$31,258
Centennial Avenue	West Ward	4	\$24,423







Street	Ward	Year	Value
Crispe Lane	West Ward	4	\$10,289
Deepwater Road	Middle Harbour Ward	5	\$29,162
Glover Street	Middle Harbour Ward	5	\$30,821






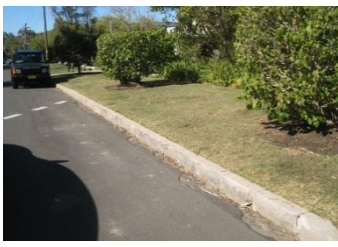





Street	Ward	Year	Value
Power Lane	Middle Harbour Ward	5	\$7,593
Spearman Street	Middle Harbour Ward	5	\$18,205
Wood Street	West Ward	5	\$15,082
Wyvern Avenue	West Ward	5	\$21,703


11. Appendix B - Asset assessment manual

Council currently performs regular condition inspection to allow better understanding of the kerb and gutter within the Council area. To allow objective, repeatable assessment of the K&G, a number of defect types have been identified and a rating assigned depending on the magnitude of the defect, as shown in the following table.

Figure 11.1 Kerb and gutter defects

Defect Type	Magnitude (mandatory)		
	1	2	3
Low Height	 0-50mm	N/A	N/A
Sunken	N/A	 Sunken (hidden)	Sunken + Pavement affected
Raised	N/A	 Raised (hidden)	Raised + Pavement affected
Cracking (Average / mtr)	 1 per metre	 2 per metre	 >2 per metre

Defect Type	Magnitude (mandatory)		
	1	2	3
Missing Section	N/A	 300-1000 mm	 >1000 mm
Damaged Stormwater Kerb Outlet		N/A	N/A
Offset Section (misalignment)	N/A	 15-50mm	 >50mm
Stone kerb state	  Level with good stone	  Level with worn stone	  Irregular height with gaps

Defect Type	Magnitude (mandatory)		
	1	2	3
In-situ material Defects		 <p>Minor issue, e.g. Minor erosion of road shoulder, no kerb and gutter present.</p>	<p>Urgent issue, e.g. Major erosion of road shoulder, no kerb and gutter present.</p>

In addition, during the inspection, it is also noted for each defect whether:

- the pavement is also affected by the defect, in which case the magnitude increases by 1; and
- the defect is caused by tree root lifting.

For valuation purposes, kerb and gutter are condition rated on a scale ranging from 0 to 5, 0 being brand new, 1 in very good condition and 5 at intervention point. For a general description of this condition rating, see section **Error! Reference source not found.** The condition of the kerb and gutter is expressed as a percentage of the total kerb and gutter length affected by defects within that particular kerb and gutter segment.

Table 11.1 Kerb and Gutter Condition Assessment

Condition	% Kerb and Gutter Length Affected by Defects within the Kerb and Gutter Segment
0	Affected Length < 2%
1	2% ≤ Affected Length < 15%
2	15% ≤ Affected Length < 20%
3	20% ≤ Affected Length < 50%
4	50% ≤ Affected Length < 70%
5	Affected Length ≥ 70%

Regardless of whether the kerb and gutter is affected by minor or major defects, the rehabilitation method is generally the same, which is section replacement. Therefore, the percentage of length affected is the factor used to indicate the condition rather than the severity of the defects.

In-situ materials such as stone cutting form part of the kerb and gutter assets, but are not included as part of the valuation. Subsequently, defects relating to in-situ materials are also not included in generating the above 0-5 condition rating. However, as part of total asset management, the information collected is used to note these defects so that any urgent issues are highlighted and can be addressed as soon as practically possible.

12. Appendix C – Risk Analysis and Prioritisation methodology

The risk rating of a kerb and gutter is determined by its risk score which is calculated by the formula below. The higher the likelihood and consequence scores, the higher the resulting risk score. Kerb and gutter segments with higher risk scores will be given a higher priority when kerb and gutter works are being planned. However, in addition to the prioritisation scores, there are other factors taken into account in works listing, e.g. some works may be deferred or taken off the listing if it is known that there will be a new development proposed in the area of if a utility provider is carrying out works in the near future. Practical consideration is also given on a project by project basis, for example kerb and gutter may be repaired at the same time works are being done to the adjacent pavement or footpath.

$$\text{Risk} = \text{Likelihood of Failure (L)} \times \text{Consequence of Failure (C)}$$

Likelihood of Failure (L)

The likelihood score is determined by several criteria relating to factors such as the location, condition, defect types, material, the height of the kerb and gutter and flooding history. If there are multiple defect types in a kerb and gutter section, than the defect with the highest factor would apply to that section. For example, if some parts of the kerb and gutter have lifted due to tree roots (score 1) AND the location is prone to flooding due to low points in the road (score 3), the low points would be the determining factor and the score would be 3.

Likelihood		
Factor	Score	Comment
Physical Condition (K&G Score)		These values are taken from the kerb and gutter rating database.
No K&G	5	
10 000 to 30 600 Condition 5	5	
1 000 to 10 000 Condition 4	4	
500 to 1 000 Condition 3	3	
200 to 500 Condition 2	2	
0 to 200 Condition 1	1	
Material of K&G		These values are taken from the kerb and gutter rating database and verified by site inspection.
Aged concrete or sandstone	1	
No K&G	1	
Bitumen or Concrete	0	
Defect weightings		The kerb and gutter are given additional points if it is affected by any of the following.
No K&G	3	If there is no formed kerb and/or gutter.
Multiple high and low points in K&G so that water is ponding	3	Determined by viewing the contours and verified by site inspection.
one high and low point in K&G so that water is ponding	2	Determined by viewing the contours and verified by site inspection.
Low height <100mm high K&G	2	Determined by site inspection.

Trees lifting kerb more than 50mm	1	Determined by site inspection.
No Additional	0	If the kerb and gutter does not have any additional defects.
K&G Grade		To be determined initially from contours in GIS systems and then confirmed at site inspection.
Low point in K&G or fairly flat $\leq 1\%$ approx grade	2	
No K&G	2	
On-Grade one way cross fall	1	
On-Grade (no Low point)	0	
Average Kerb Height		Determined by site inspection.
No Kerb	3	No formed kerb.
$\leq 50\text{mm}$	2	
51-99mm	1	
$\geq 100\text{mm}$	0	
Flooding History of location		
Kerb located in known flooding area in street	1	
History of flooding unknown in street	0	

Consequence of Failure (C)

The consequence of failure factors are related to the possible outcomes due to flow not being guided to downstream pits by the kerb and gutter. The criteria that influence the consequence score are what type of property and road is in the downstream vicinity of the kerb and gutter.

Consequence	Score	Comment
Consequence of K&G condition on road		With higher volume traffic, the consequence is higher if kerb and gutter fails and the road is flooded. Determined by viewing road network database.
State Road		Responsibility of RMS.
NAASRA - Class 6	5	
NAASRA - Class 7	4	
NAASRA - Class 8	3	
NAASRA - Class 9	2	
NAASRA - Class 9 & Road Laneway	1	
Road in Open Space - park	1	
Road in Open Space - bushland	1	
Type of property affected on the low side of the road due to water overtopping kerb		This criterion only applies for the low side of the road as it is more likely to be affected than the high side. Also the consequences are greater for the low side.

Special uses on LEP	5	Includes educational establishments, hospitals, public transport services, fire stations.
Rail corridor	5	Train services would be affected.
Large commercial property	5	A large land area(>750 m2) would be affected.
Land with utilities	5	Power substations, telecommunications, Sydney Water pumping stations
Small commercial property	4	Affected land area is <750m2.
Large or more than two Residential properties affected downstream	4	Affected lane area is >750m2 land area, or it is an apartment block, villa, townhouses.
Small Residential properties	3	Affected land area is <750m2.
Footpath area affected	2	
Not affected, low side of road	2	
Open Space - park	1	
Open Space - bushland	1	
Not affected, high and low side same levels	1	
High side of Road	0	

Risk Rating and Associated Scores

The risk range is from Low Risk to Very High Risk and the score ranges from 1-200.

		Consequences (C)				
		Insignificant	Minor	Moderate	Major	Catastrophic
Score		1-2	3-4	5-6	7-8	9-10
Likelihood (L)						
Rare	1-5	L (1-10)	L (3-20)	M (5-30)	M (7-40)	H (9-50)
Unlikely	6-10	L (6-20)	L (18-40)	M (30-60)	M (42-80)	H (54-100)
Possible	11-15	L (11-30)	M (33-60)	H (55-90)	H (77-120)	H (99-150)
Likely	16-20	M (16-40)	M (48-80)	H (80-120)	H (112-160)	VH (144-200)
Almost Certain	21-25	M (21-50)	M (63-100)	H (105-150)	VH (147-200)	VH (189-250)

Level Risk		Action Required
VH	Very High Risk	Immediate corrective action required
H	High Risk	Prioritised action required
M	Medium Risk	Planned action required
L	Low Risk	Manage by routine procedures

Prioritisation is firstly based on the risk level (VH / H / M / L). The risk score is then calculated to further prioritise works within the same risk level.

Example

- The first kerb and gutter has the total Likelihood score of 9 and the total Consequence score of 5.

The Likelihood is **Possible** and Consequence is **Moderate**, from the matrix this classifies the first kerb and gutter as **High Risk**.

- The second kerb and gutter has the total Likelihood score of 11 and the total consequence score of 6.

The Likelihood is **Possible** and the Consequence is **Moderate**, from the matrix, this classifies the second kerb and gutter as **High Risk**.

Since these two kerbs and gutters have the same risk rating (both “High Risk”), the work is prioritised by calculating the risk score of each one.

$$\text{Risk} = \text{Likelihood of Failure (L)} \times \text{Consequence of Failure (C)}$$

For the first kerb and gutter:

$$\text{Risk} = 9 \times 5 = 45$$

For the second kerb and gutter:

$$\text{Risk} = 11 \times 6 = 66$$

Based on the risk scores, the second kerb and gutter has higher priority than the first kerb and gutter despite both of them having the same risk rating.