Mosman COUNCIL

ASSET MANAGEMENT Roads

Adopted by Council 4 June 2013

1 Introduction

There are approximately 90 kilometres of Council managed roads in the Mosman local government area. Roads are classified as local, regional or state roads. State roads are also known as arterial roads. Council manages and maintains local and regional roads and the Roads and Maritime Services (RMS) maintains the state roads (i.e. Spit Road, and Military Road between Spit Road and Spofforth Street).

In 2010 Mosman Council (Council) engaged Complete Urban to develop the Asset Management Plan (AMP) for their road assets in order to conform to the NSW Department of Local Government (DLG) requirements. An extensive data collection and condition assessment exercise was conducted in 2010 followed by a review of selected sample by Council engineers in 2012.

Council now has a near 100% understanding of the extent and condition of all road assets. Road assets include road pavement, footpaths, kerb and gutters and various other road related assets.

1.1 Background

The purpose of this AMP is to have a tool which assists Council to achieve its asset management outcomes which are consistent with MOSPLAN, the Council's Community Strategic Plan.

This AMP outlines the broad approach that Council will be adopt to manage the condition of and use of road assets over the next 12 years, as well as direction for use, safety and maintenance.

1.2 Goals and Objectives

Council's goal in managing infrastructure assets is to meet the required level of service in the most cost effective manner for present and future consumers. The key elements of infrastructure asset management are:

- Taking a life cycle approach;
- Developing cost-effective management strategies for the long term;
- Providing a defined level of service and monitoring performance;
- Understanding and meeting the demands of growth through demand management and infrastructure investment;
- Managing risks associated with asset failures;
- Sustainable use of physical resources; and
- Continuous improvement in asset management practices.

Council's Asset Management Strategy outlines how the asset portfolio supports the service delivery needs of the community into the future. It includes:

- An outline of Council's asset hierarchy, current asset management practices (processes, asset data and information systems) and resourcing;
- An outline of asset management objectives;
- An overview of specific issues such as asset management planning, risk management, roles and responsibilities;
- Specific actions to be undertaken to achieve asset management objectives and improve or enhance Council's asset management capability, including resource requirements; and
- A review framework.

1.3 Asset Inventory

This roads AMP covers the following infrastructure assets:

Table 1.1: Assets covered by this Plan (as at 30 June 2013)

Asset category	Dimension	Current Replacement Value
Formation	377,000 m^3 of earthworks (cut + fill)	$7,584,358
Road Pavements	1,486,179 m^2 of road pavement including rigid concrete and asphalt sealed flexible pavements	$118,139,929
Footpath	128,078 m (212,477 m^2) of footpath including concrete, asphalt and paving brick footpaths	$20,578,117
Kerb and Gutter	156,847 m of various types including kerb and gutter, kerb only, dish gutter, mountable kerb	$25,008,918
Physical Traffic Devices	6,421 m^2 of various types including roundabouts, pedestrian crossings, kerb blister and median islands.	$2,982,066
Carparks	14 At-grade carparks including 27,313 m^2 carpark road pavement 17,342 m^2 asphalt surface course (seal) 9,971 m^2 paving brick surface	$4,729,737

Asset category	Dimension	Current Replacement Value
Street Furniture	Including 10,877 m fencing/handrailing, 1,839 m guardrail, 1 bus shelter, 156 seats, 46 traffic visibility mirrors, 705 bollards, 47 bins, 24 parking meters	$3,597,854
Lines and Signs	Including 3,898 traffic signs 1,854 street directional signs 3,591 painted symbols 1,112 m^2 painted chevrons, pedestrian crossings and piano keys 48,456 m linemarking	$1,086,689
Steps	396 sets of steps (many with multiple sections of steps) covering 2,537 m in length and 3,120 m^2 in area	$4,263,890
Retaining Walls	1,133 retaining structures (walls/ embankments) covering 77,047 m^2 in area and 41,625 m in length. (Note: excludes 430 structures in arterial roads, structures considered to be private ownership and/or structures less than 1m in height)	$36,413,291
Vehicle Crossings	- 5,134 vehicle crossings of total area 67,334 m^2 - 261 gutter crossings of total length 1,048 m	$6,494,510
Pram Ramps	646 in number, 777 m in length	$338,447
Formation	377,000 m^3 of earthworks (cut + fill)	$7,584,358
TOTAL (excluding formation)		**$223,633,447**

Road pavements, kerb and gutters and regulatory signs and lines on state roads (Spit Road and Military Road (from Spit Road to Spofforth Street)) are managed by the RMS and are not considered in this plan. Similarly, roads and associated facilities within national park areas and defence lands are not considered in this plan.

2 Levels of Service

Council conducts a Community Survey every two years to determine community attitudes towards the services and facilities it provides. This provides Council with feedback about the quality and appropriateness of each of its services. This information is used in the development of the Delivery Program to ensure areas that are not meeting community expectations are reviewed and forms the basis of the suite of indicators used to measure Council's performance.

2.1 Community Consultation and User Satisfaction

The latest Mosman Community Survey was conducted in June 2012 (the 2012 Community Survey Results may be accessed from Council's website http://mosplan.mosman.nsw.gov.au/projects/2012-mosman-community-survey). 400 randomly selected residents from across Mosman participated in this telephone survey.

Residents were asked a series of questions about Council performances and their views on key local issues and community well-being. This feedback informs reviews of service delivery standards and level of service used in the development and review of Strategic Management Plans (eg MOSPLAN, Delivery Program, Operational Plan and Resourcing Strategy) and Asset Management Plans to ensure areas that are not meeting community expectations are reviewed. Community feedback also provides guidance in developing priorities for management attention and in allocation of resources in the budget.

Of relevance, the provision and maintenance of footpaths rated highly as services and facilities with the highest performance gap (the difference between what residents perceived as important and resident satisfaction).

Residents also identified the maintenance and upgrade of roads and footpaths as one of the top issues facing Mosman in the next 10 years.

2.2 Levels of Service

Community and Technical Levels of Service are detailed in Tables 2.1 and 2.2 by asset group.

Community Levels of Service relate to how the community receives the service in terms of safety, quality, quantity, reliability, responsiveness, cost/efficiency and legislative compliance.

Supporting the community service levels are operational or technical measures of performance developed to ensure that the minimum community levels of service are met. These technical measures relate to service criteria such as:

Service Criteria	Technical measures may relate to
Quality	Smoothness of park
Quality	Area of parks per resident
Availability	Distance from a dwelling to a sealed road
Safety	Number of injury accidents

The levels of service for road users are a combination of Council's current service levels and service levels based on community input and feedback from recent community surveys, the Community Strategic Planning process and the Mosman Asset Management Reference Group (AMRG).

The AMRG was formed in September 2011 to provide advice on asset intervention levels and provide comment on some service levels. This group included Council staff and five residents of Mosman with expertise in the field of accounting, infrastructure, engineering and State Government Policy.

Table 2.1: Road Assets – Community Levels of Service

Asset Category	Key Performance Measures	Level of Service	Performance Measure Process	Performance Target	Current Performance
Road Pavement	Quality	Provide sealed road with smooth ride appropriate to road type and speed limits	Customer satisfaction survey	80% surveyed customers satisfied with road condition	2012 Community Survey – 94% surveyed satisfied with the provision and maintenance of local roads
	Safety	Provide roadways free from hazards	Insurance claims/incidents	Less than 10 road pavements related claims/incidents per year	- 5 incidents reported 2009/10 - 9 incidents reported 2010/11 - 8 incidents reported 2011/12
Kerb and Gutter	Function	Barrier provides effective roadside drainage and prevents stormwater from entering properties	Customer service requests	Less than 25 requests/ complaints with regards to hazards/ defects per year	Specific statistics not yet available
	Safety	All roads have even and consistent kerb and guttering free from hazards	Customer service requests	Less than 25 requests/complaints with regards to hazards/defects per year	Specific statistics not yet available

Asset Category	Key Performance Measures	Level of Service	Performance Measure Process	Performance Target	Current Performance
			Insurance claims/incidents	Less than 10 kerb and gutter related claims/incidents per year	- 5 incidents reported 2009/10 - 1 incidents reported 2010/11 - 6 incidents reported 2011/12
Footpaths	Quality and Safety	Footpath surfaces are smooth and free from hazards	Customer satisfaction survey	80% surveyed customers satisfied with footpath condition	2012 Community Survey – 88% surveyed satisfied with the provision and maintenance of footpaths
			Customer service requests	Less than 25 requests/ complaints with regards to hazards/ defects per year	Specific statistics not yet available
			Insurance claims/Incidents	Less than 25 footpath related insurance claims/incidents per year	- 21 incidents reported 2009/10 - 24 incidents reported 2010/11 - 25 incidents reported 2011/12
	Function	Facilitate efficient pedestrian access and movement	Customer satisfaction survey	80% surveyed customers satisfied with footpath condition	2012 Community Survey – 88% surveyed satisfied with the provision and maintenance of footpaths

Asset Category	Key Performance Measures	Level of Service	Performance Measure Process	Performance Target	Current Performance
Cycleways	Quality / Safety / Function	Provide safe and accessible cycling facilities	Customer satisfaction survey	75% surveyed customers satisfied with both on and off-road cycleway access and movement on Council roads	2012 Community Survey – 89% surveyed satisfied with the provision and maintenance of bike paths
Traffic Facilities	Quality / Safety / Function	Facilitate safe and efficient traffic and pedestrian access and movement	Customer satisfaction survey	80% surveyed customers satisfied with traffic management on Council roads	2012 Community Survey – 88% satisfied with traffic management
		Customer requests	Less than 25 requests/complaints with regards to facility hazards and defects per year	Specific statistics not yet available	Customer requests
Carparks	Quality / Function	Provide adequate public parking to meet user needs	Customer satisfaction survey	70% surveyed customers satisfied with adequacy of public parking	2012 Community Survey – 87% satisfied with provision of car parking
	Safety	Provide car parking facilities free from hazards	Customer service requests	Less than 25 requests/ complaints re hazards/ defects per year	Specific statistics not yet available

Asset Category	Key Performance Measures	Level of Service	Performance Measure Process	Performance Target	Current Performance
			Insurance claims/incidents	Less than 4 carpark related insurance claims/incidents per year	- 1 incidents reported 2009/10 - 1 incidents reported 2010/11 - 2 incidents reported 2011/12
Street Furniture	Function/Safety	Provide fencing and guardrail as effective barriers between areas	Customer service requests	Less than 25 requests/ complaints re hazards/ defects per year	Specific statistics not yet available
Retaining Walls	Function / Safety	Provide safe and effective structural division between areas of significant level difference	Customer service requests	Less than 25 requests/complaints with regards to hazards/defects per year	Specific statistics not yet available
			Insurance claims/incidents	Less than 10 retaining wall related insurance claims/incidents per year	- 1 incidents reported 2009/10 - 1 incidents reported 2010/11 - 0 incidents reported 2011/12
Steps	Function / Safety	Provide safe and effective pedestrian access and movement between areas of significant level	Customer service requests	Less than 25 requests/complaints with regards to adequacy/hazards/defects per year	Specific statistics not yet available

Asset Category	Key Performance Measures	Level of Service	Performance Measure Process	Performance Target	Current Performance
		difference	Insurance claims/incidents	Less than 6 step related insurance claims/incidents per year	- 1 incidents reported 2009/10 - 4 incidents reported 2010/11 - 2 incidents reported 2011/12
Pram Ramps	Function / Safety	Provide safe and effective access for all pedestrians at appropriate road crossing points	Customer service requests	Less than 25 requests/complaints with regards to hazards/defects per year	Specific statistics not yet available
Lines and Signs (Council Controlled)	Function	Provide adequate communication of traffic regulations	Customer service requests	Less than 25 requests/complaints with regards to hazards/defects per year	Specific statistics not yet available
	Function	Provide appropriate information, warning, guidance and directions	Customer service requests	Less than 25 requests/complaints with regards to hazards/defects per year	Specific statistics not yet available

Table 2.2: Road Assets – Technical Levels of Service

Asset Category	Key Performance Measures	Level of Service	Performance Measure Process	Performance Target	Current Performance
Road Pavement	Function / Condition / Safety	Provide smooth sealed road surface free from hazards	Condition rating (carried out on a 4 yearly cycle)	95% of all road seals in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	99% of all road seals in satisfactory condition based on 2012 condition assessment
				95% of all concrete road pavements in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	100% of all concrete road pavement in satisfactory condition (based on 2012 condition assessment)
Kerb and Gutter	Function / Condition / Safety	Provide effective roadside drainage free from hazards	Condition rating (carried out on a 4 yearly cycle)	95% of all kerb and gutter in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	99% of all kerb and gutter in satisfactory condition (based on 2012 condition assessment)
Footpaths	Function / Condition / Safety	Provide accessible footpath free from hazards	Condition rating (carried out on a 4 yearly cycle)	95% of all footpaths in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	99% of all footpaths in satisfactory condition (based on 2012 condition assessment)

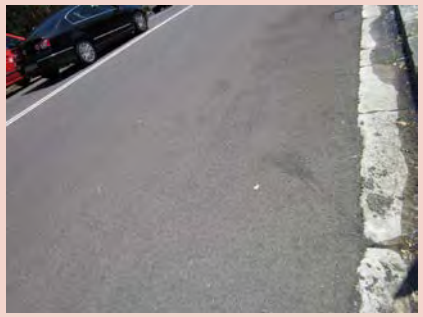
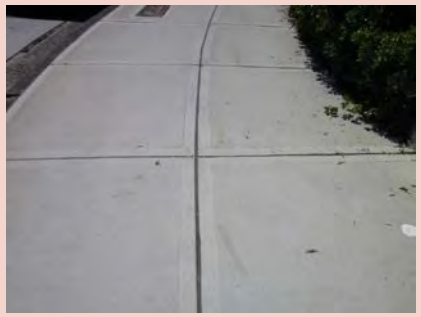
Asset Category	Key Performance Measures	Level of Service	Performance Measure Process	Performance Target	Current Performance
Traffic Facilities	Function / Condition / Safety	Facilitate safe and efficient traffic and pedestrian access and movement	Condition rating (carried out on a 4 yearly cycle)	95% of all traffic facilities in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	100% of all traffic facilities in satisfactory condition (based on 2012 condition assessment)
Carparks	Condition / Safety	Provide car parking facilities free from hazards	Condition rating (carried out on a 4 yearly cycle)	95% of all carpark facilities in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	100% of all carpark facilities in satisfactory condition (based on 2012 condition assessment)
Street Furniture	Condition/ Safety	Street furniture provided free from hazards and defects	Condition rating (carried out on 4 yearly cycle)	80% of all street furniture, excluding fencing and handrail, in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	85% of all street furniture, excluding fencing and handrail, in satisfactory condition (based on 2012 condition assessment)
	Condition/ Safety	Provide fencing and guardrail provided free from hazards and defects	Condition rating (carried out on 4 yearly cycle)	90% of all road related fencing and handrail in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	94% of all road related fencing and handrail in satisfactory condition (based on 2012 condition assessment)

Asset Category	Key Performance Measures	Level of Service	Performance Measure Process	Performance Target	Current Performance
Retaining Walls	Condition / Safety	Provide retaining walls free from hazards and defects	Condition rating (carried out on a 4 yearly cycle)	90% of all retaining walls in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	94% of all retaining walls in satisfactory condition (based on 2012 condition assessment)
Steps	Function / Condition / Safety	Provide accessible steps free from hazards	Condition rating (carried out on 4 yearly cycle)	90% of all steps in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	93% of all steps in satisfactory condition (based on 2012 condition assessment)
Pram Ramps	Function / Condition / Safety	Provide accessible pram ramps free from hazards	Condition rating (carried out on 4 yearly cycle)	95% of all pram ramps in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	99% of all pram ramps in satisfactory condition (based on 2012 condition assessment)
Line and Signs (Council Controlled)	Function / Condition / Safety	Provide adequate communication of traffic regulations	Condition rating (carried out on 4 yearly cycle)	95% of all regulatory signs in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	96% of all regulatory signs in satisfactory condition (based on 2012 condition assessment)
	Function / Condition / Safety	Provide appropriate information, warning, guidance and directions	Condition rating (carried out on 4 yearly cycle)	95% of all signs, excluding regulatory signs, in satisfactory condition i.e. rated condition 3 or better (on a rating scale of 1-5)	95% of all signs, excluding regulatory signs, in satisfactory condition (based on 2012 condition assessment)

2.3 Asset Condition and Levels of Service

The condition rating scale of Council's road network is detailed below in Table 2.3. The road network was assessed in June 2010 and selectively reassessed in September 2012 using this rating scale. Service levels are linked to condition levels as this determines at what condition the asset should be in before it is renewed. Photographs indicating various asset class and conditions are detailed in this section of the report. It should be noted that these photographs are purely illustrative and a detailed assessment is required prior to making a condition assessment.

Condition	Rating	Description of Asset Condition
1	Excellent	As new – no need for intervention. No risk to public safety. Only normal maintenance required.
2	Good	Some sign of wear and tear – no immediate intervention required. Minor defects only. Minor maintenance required. Note for review at next inspection.
3	Average	Some areas of defects – generally able to be addressed through routine/scheduled maintenance required to return to accepted Level of Service. Some risk to public safety and amenity.
4	Poor	Poor condition – extensive wear and tear requiring replacement of large sections. Significant risk to public safety and amenity.
5	Failed	Asset unserviceable - significant defects both in terms of severity and extent. Requires replacement if significant part if not all of asset. High risk to public safety and amenity.

	‘Satisfactory’		‘Unsatisfactory’
	Condition 1-2	Condition 3	Condition 4-5
Road Pavement			
Footpath			

	‘Satisfactory’		‘Unsatisfactory’
	Condition 1-2	Condition 3	Condition 4-5
Kerb and Gutter			
Retaining Walls			

3 Future Demand

The community of Mosman generates the demand for the services provided by the assets considered in this plan. This section discusses the predictions of changes in the population, and the likely corresponding changes in demand for these services. Factors affecting demand include population change, changes in demographics, vehicle ownership, consumer preferences and expectations, etc.

Mosman is almost fully developed and the projected population growth is minimal. Therefore for the purpose of this AMP, it has been assumed that there will be no new construction of roads assets due to the factors that will be discussed below. Funding therefore has not been forecast for new capital works or flow-on recurrent costs for operation, maintenance and construction.

In future this AMP will be reviewed and if there is a requirement to acquire new assets due to growth, then these new assets will commit Council to fund ongoing operations and maintenance costs for the period that the service provided from the assets is required. These future costs will then be identified and considered in developing forecasts of future operating and maintenance costs.

3.1 Demand Forecast and New Assets from Growth

3.1.1 Population

The estimated population of Mosman as of 30 June 2011 was 29,475 people (http://profile.id.com.au/mosman). Council has a vision for population growth in Mosman and plans for a maximum population in 2050 of 30,000 people (Mosplan, 2012). The maximum population growth rate on average is 42 people per year until 2050. This very modest population growth forecasted will likely place slightly higher demands on infrastructure.

However, given the high degree of urbanisation already within Mosman it is most likely that the demands will not be for major extension of the infrastructure network, but will more likely be on the levels of service provided by the existing infrastructure. Increase in population will require improvements to public transport infrastructure and services.

It is important to note that population growth in the northern beaches areas, north of the Mosman local government area (LGA) is likely to be more significant. This is likely to generate increased traffic through the Mosman LGA along Spit Road and Military Road and also there will be increased filtering of traffic through Mosman streets. Increased traffic will cause more rapid deterioration of roads. This growth will also place higher demands on public transport and the need for high standard public transport corridors.

3.1.2 Demographics

An ageing population will mean greater need for aged care facilities and disability access. Increase in age of population will also require improvements to public transport infrastructure and services.

There will be increased emphasis on providing quality accessible facilities e.g. footpaths, walking routes, accessible steps. There will be increased demand for street furniture such as seating, handrailing, bus shelters and signage such as wayfinding signage.

Change in make-up of households will have minimal impact although density increase around Mosman Central area will likely put pressure on infrastructure including footpaths, traffic facilities and parking in and around the commercial/shopping centre precinct. Decreasing road traffic efficiency will place increased focus on traffic facilities, public transport, walking and cycling.

There will likely be continuation of the trend of increasing high incomes and professional households. Work from home is likely to increase. There will be continued expectation of a quality environment and quality infrastructure and high levels of service. The trend toward increasingly more litigious society may continue particularly with increased education and professional population.

3.1.3 Transport

The main change to 2031 is forecast to be slight increase in private motor vehicle ownership. For residents, there will be greater reliance upon public transport, particularly for journey to work in Sydney City and inner metropolitan employment and aged person travel. Work from home percentages are also forecast to increase.

3.1.4 Environmental and Economic Factors

There is increasing importance being placed on environmental management and sustainability and environmental impact minimisation. Initiatives include focus on reduced water consumption; promotion of use of environmentally friendly energy sources; use of environmentally friendly materials and recycling.

Importance will continue to grow and it is likely communities will encourage local initiatives and look to sustainable methodologies and outcomes.

There is potential increased cost of service provision due to increased cost of materials, equipment, works management and environmental initiatives. Increased environmental impact mitigation requirements will place time, cost and feasibility pressures on works and projects particularly including planning and approvals.
There will be increased focus on public transport and related infrastructure and facilities provided to remain relatively affordable.

3.1.5 Climate Change

There is continuing discussion about changing climatic conditions, increased rainfall, rising sea levels, fluctuations in wet/dry season and periods. Continued variation in weather patterns and extremes is forecast to occur.

This is likely to impact on condition of assets, place pressure on asset lifecycle costs and potentially reduce asset life, e.g. increased moisture in ground and road pavements. There is also potential for more frequent asset failure, e.g. failure in retaining walls and embankments due to increased water runoff/infiltration and infrastructure damage due to wind events etc.

3.1.6 Changes in Technology

Technology changes are forecast to affect the delivery of services including plant, equipment and product improvements to allow for more cost and time efficient construction. Improved technology for conducting condition surveys will also provide for a simpler and more efficient information transfer.

4 Lifecycle Management Plan

The Lifecycle Management Plan details how Council plans to manage and operate assets at an agreed level of service whilst minimising lifecycle costs and exposure to risk and loss. Lifecycle Management Plans for each asset group can be found in Appendices E1-E11.

4.1 Background Data

4.1.1 Physical Parameters

A roads hierarchy plan illustrating the extent of roads in Mosman is included in Appendix A. The assets covered by this AMP are outlined in Section 1.3.

4.1.2 Asset Capacity and Performance

Council's services generally meet required design standards. However there are some locations with known deficiencies in service performance. These are detailed in Table 4.1.

Table 4.1: Known Service Performance Deficiencies

Location	Service Deficiency
Steps	Some steps, pram ramps and refuge islands in the Council area do not comply with current accessibility standards. The extent of non-compliance is yet to be identified. A review is planned in the near future subject to funding.
Pram Ramps	
Refuge Islands	

The above service deficiencies were identified from the asset data collection and asset inspection exercise carried out in mid-2010, from officer knowledge and history of local issues.

4.1.3 Asset Condition

Condition profiles for each asset group are included in the Lifecycle Management Plans in Appendices E1-E11 with analysis having been carried out to understand the impacts of various funding levels on future road asset condition.

4.1.4 Asset Valuations

The value of all roads assets (excluding formation) as at 30 June 2013 covered by this AMP is summarised in Table 4.2. Assets were last valued at 30 June 2010 and have been adjusted each financial year accordingly.

Table 4.2: Road Assets Valuations (as at 30 June 2013)

Asset Group	Current Replacement Cost	Depreciable Amount	Accumulated Depreciation as at 30 June 2013	Annual Depreciation	Depreciated Replacement Cost
Road Pavement	$118,139,929	$118,139,929	$56,695,641	$1,612,212	$61,444,288
Footpath	$20,578,117	$20,578,117	$5,891,430	$244,340	$14,686,687
Kerb and Gutter	$25,008,918	$25,008,918	$12,303,320	$277,877	$12,705,598
Retaining Walls	$36,413,291	$34,723,196	$19,073,630	$269,566	$17,339,660
Physical Traffic Devices	$2,982,066	$2,982,066	$1,124,340	$76,968	$1,857,725
Lines and Signs	$1,086,689	$1,086,689	$708,456	$88,490	$378,234
Street Furniture	$3,597,854	$3,597,854	$2,409,530	$149,090	$1,188,324
Steps	$4,263,890	$4,263,890	$2,515,792	$80,184	$1,748,097
Carparks	$4,729,737	$4,729,737	$1,855,604	$95,112	$2,874,133
Vehicle Crossings	$5,428,828	$5,428,828	$2,784,881	$121,330	$2,643,947
Pram Ramps	$338,447	$338,447	$83,901	$3,921	$254,546
TOTAL	**$223,658,002**	**$220,877,669**	**$105,446,252**	**$3,019,090**	**$124,705,239**

Asset useful lives and unit rates are included in the individual asset group Lifecycle Management Plans in Appendix E1 – E11. Typical unit rates are derived from Council's existing Civil Works contract. Useful lives are based on various published engineers documents and other sources.

Mosman utilises a Brownfield approach when reporting valuations. A Brownfield valuation takes into account the total cost of replacing that asset. This can include the additional cost of removal, excavation and disposal of existing assets already in-situ. Greenfield valuation does not take into account the cost of existing infrastructure. Council's auditors and AMRG are all of the view that Brownfield values should be reported.

4.2 Deterioration Profile

An initial generic infrastructure deterioration profile has been developed from limited available asset data and relevant asset management/industry information. The deterioration profile is included in Appendix C.

The profile is based on the assumption that infrastructure assets generally deteriorate slightly more rapidly in its initial years after construction, with deterioration becoming reasonably constant over its mid-life, and finally deteriorating reasonably rapidly in the latter period of its life.
The deterioration profile has been used to assess the rate of deterioration, remaining useful life and renewal intervention for Council's infrastructure assets.

4.3 Recent Expenditure Profile

Maintenance and renewal are funded from general revenue, including the Infrastructure Levy rate increase that provides funding for infrastructure asset renewal.

Recent expenditure profiles for all categories of road assets are detailed in Appendix E1-E11.

4.4 Risk Management Plan

Council has drafted an initial assessment of risks associated with service delivery from roads assets.

The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, and develops a risk rating to evaluate the risk and develop a risk treatment plan for non-acceptable risks.

The document is currently being developed and will form part of this plan when completed. It is included in Council's Improvement Plan.

4.5 Disposal Plan

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. Currently there are no assets identified for possible decommissioning and disposal.

Assets that are identified for possible disposal in the future will be further investigated to determine the required levels of service and see what options are available for alternate service delivery, if required. Cashflow projections from any future proposed asset disposals will be developed when necessary and included in future revisions of this AMP.

4.6 Maintenance Plan

Maintenance is the regular on-going work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again. Maintenance includes reactive, planned and cyclic work activities.

Reactive maintenance is unplanned repair work carried out in response to service requests and management/supervisory directions. Traditionally, assessment and prioritisation of reactive maintenance is undertaken by Council staff using experience and judgement, within some basic maintenance management frameworks. A comprehensive maintenance management framework is currently being developed with works to be included in Council's Improvement Plan (Section 7.2).

Planned maintenance is repair work that is identified and managed through a maintenance management system (MMS). Under the AMP it would be proposed that MMS activities include inspection, assessing asset condition against failure/breakdown, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history to improve maintenance and service delivery performance.

Due to current funding levels, formal condition inspections/assessments are conducted on a two-year basis. However, it is proposed to increase this schedule. This will be subject to funding and is identified in Council's Improvement Plan.

Cyclic maintenance is replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting street furniture eg seating and traffic facilities eg speed humps/platform edge strips etc. This work generally falls below the capital/maintenance threshold.

4.6.1 Maintenance Expenditure

Current/historical maintenance expenditures are shown in Table 4.3. Figures are estimates only based on historic data and includes restoration expenditures.

Table 4.3: Current/Historical Maintenance Expenditure

Year	Maintenance Expenditure
2007/08	$886,000
2008/09	$713,000
2009/10	$536,000
2010/11	$527,000
2011/12	$883,000
Average Annual	$709,000

This includes approximately $200,000 p.a. for public utility restoration.

Initial financial modelling indicates that in order to meet the agreed level of service, maintenance expenditure is required to increase from current annual average level of $709,000 p.a. to $748,000 p.a. This is illustrated in Figure 4.1.

Note that all costs are shown in 2012 dollar values. It is acknowledged that if renewal funding/expenditure increase in line with that recommended, required maintenance expenditure may be able to be reduced in the medium to long term. This will need to be re-assessed several years into any increased renewal program.

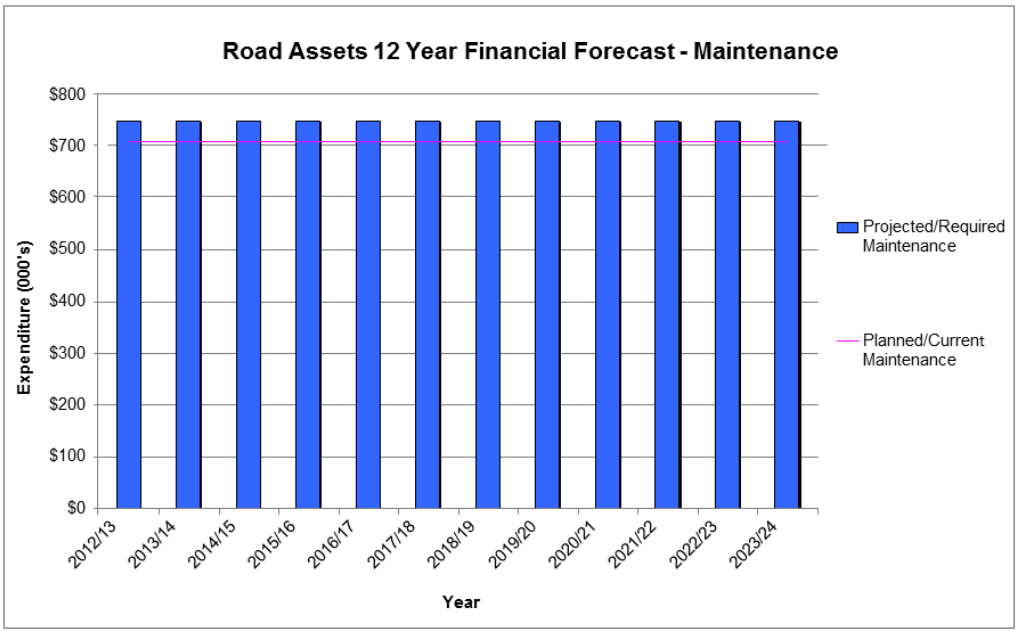


Figure 4.1: Projected Maintenance Expenditure

More detailed information regarding maintenance for each individual asset group is contained in the Asset Lifecycle Management Summary table in Appendix B and in the Lifecycle Management Plan section in Appendices E1-E11.

Future revision of this AMP will include more detailed analysis linking required maintenance expenditures with required service levels.

4.6.2 Maintenance Methods and Work Program

Maintenance is funded from Council's Operational program. Some funding also comes from restoration charges but these funds are generally targeted at repair or reconstruction of footpaths excavated/opened by service authorities and developers in laying underground services.

Generally all maintenance, restoration and renewal/reconstruction work is carried out by works contractors via schedule of rates contracts procured by Council. Minor 'make safe' works (such as pothole repairs, linemarking, furniture and sign replacement) are sometimes carried out by Council's day labour 'Core Group' works team as necessary.

4.6.3 Standards and specifications

Maintenance work is carried out in accordance with the following standards and specifications:

- Relevant Australian Standards;
- Relevant Roads and Marine Structure (RMS) standards and specifications;
- Building Code of Australia; and
- Natspec/AUS-Spec specifications and guidelines.

4.7 Renewal/Replacement Plan

Renewal expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is upgrade/expansion or new works expenditure.

Assets requiring renewals are to be funded from Council's capital works program and grants where available. This is further discussed in Section 5.2.

Substantial renewal work has commenced on Council's road assets in recent years, and funding has generally been increased (including via the recent Infrastructure Levy rate increase) with a view to better manage risk and making this category of assets sustainable in the long term.

Council has a methodology for assessing and monitoring the condition of road assets and prioritising replacement and maintenance of work. However, due to lack of resources, Council does not have a full time road asset inspector to carry out these assessments in full. It is proposed to review and modify this strategy to provide for more responsive maintenance and defect intervention and to more robustly and proactively meet and manage footpath service levels.

A key issue will be to monitor short and long term funding requirements and asset performance and to balance maintenance and renewal funding within the service level parameters established.

4.7.1 Renewal Expenditure

Current/historical renewal expenditures are shown below in Table 4.4.

Table 4.4: Historical Renewal Expenditure Trends

Year	Renewal Expenditure
2007/08	$1,350,000
2008/09	$1,350,000
2009/10	$1,350,000
2010/11	$1,194,000
2011/12	$1,536,000
Average Annual	$1,356,000

It is intended that the renewal intervention be at condition 4 to effectively provide the proposed desired level of service, mitigate risk and optimise maintenance and renewal expenditure. Condition 4 renewal intervention corresponds to the 'unsatisfactory' condition threshold. Council's aim is to minimise assets in an 'unsatisfactory' condition and therefore a renewals intervention strategy which proposes asset renewal as the asset falls into condition 4 is considered desirable.

Initial levels of service were initially prepared by Council's consultant based on engineering technical guidelines and relevant Australian Standards. As discussed in Section 2.2, these levels of service were further refined by Council staff and input was sought from the community based Asset Management Reference Group.

If renewal funding is not provided at the desired 'optimal' level for 'condition 4 intervention' then Council's road assets will continue to deteriorate through to condition 5. Increased maintenance works (as opposed to renewal works) will be required, risk will increase and there will be a need to boost maintenance funding.

Whilst Council seeks to have no road assets fall into condition 5, it is acknowledged in reality that there will be a minimal percentage of road assets which fall from condition 4 to condition 5 each year. Generally works will be carried out on those road assets in subsequent annual programs.

A projected level 4 intervention scenario and current expenditure level is summarised in Table 4.5 and illustrated in Figure 5.2. The expenditure requirements are forecast to increase over time as the asset stock ages over the 12 year planning period. All costs are shown in 2012 dollar values.

Table 4.5: Forecast Renewal Expenditure Based on Intervention Level 4

Roads Assets Consolidated 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	1,950	1,950	2,157	2,309	2,226	2,544	2,583	2,583	2,583	2,583	2,583	2,583
Planned/Current Expenditure	2,796*	1,356	1,356	1,356	1,356	1,356	1,356	1,356	1,356	1,356	1,356	1,356
Funding Gap	-846	594	801	953	870	1,188	1,227	1,227	1,227	1,227	1,227	1,227
Cumulative Funding Gap	-846	-252	549	1,502	2,372	3,560	4,787	6,014	7,241	8,468	9,695	10,922

*2012/2013 planned/current spend is inclusive of a one-off $1,140,000 expenditure on road pavements and footpaths under the NSW Government Local Infrastructure Renewal Scheme (LIRS).

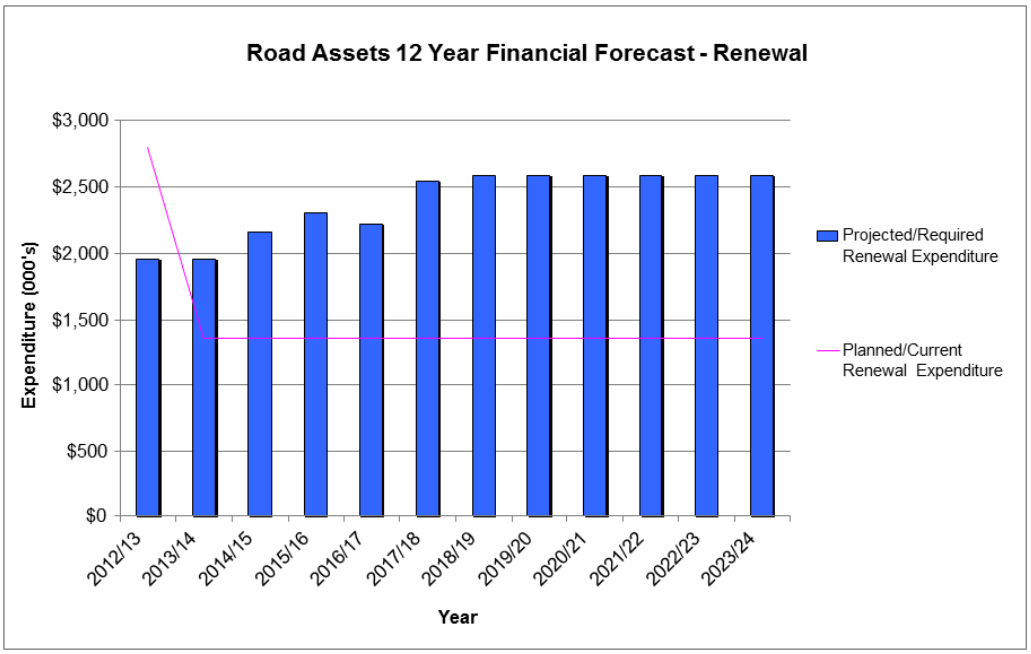


Figure 4.2: Projected Capital Renewal Expenditure

More detailed information regarding asset renewal for each individual asset group is contained in the Road Asset 12 Year Lifecycle Financial Forecast table in Appendix B and in the Lifecycle Management Plan in Appendices E1-E11.

Various renewal expenditure scenarios have been considered and analysed with a view to sustaining Council's road assets and maintaining an appropriate service level into the future. The analysis takes into account the useful life, remaining useful life, replacement costs and rate of deterioration of the assets.

For the purposes of this report only intervention level 4 scenario has been reported. If Council were to raise service standards, funding levels will be required to increase. Utilising 2012 funding levels, the future projected condition of Council's road assets is illustrated below in Figure 4.3. This has been compared to 2012 condition.

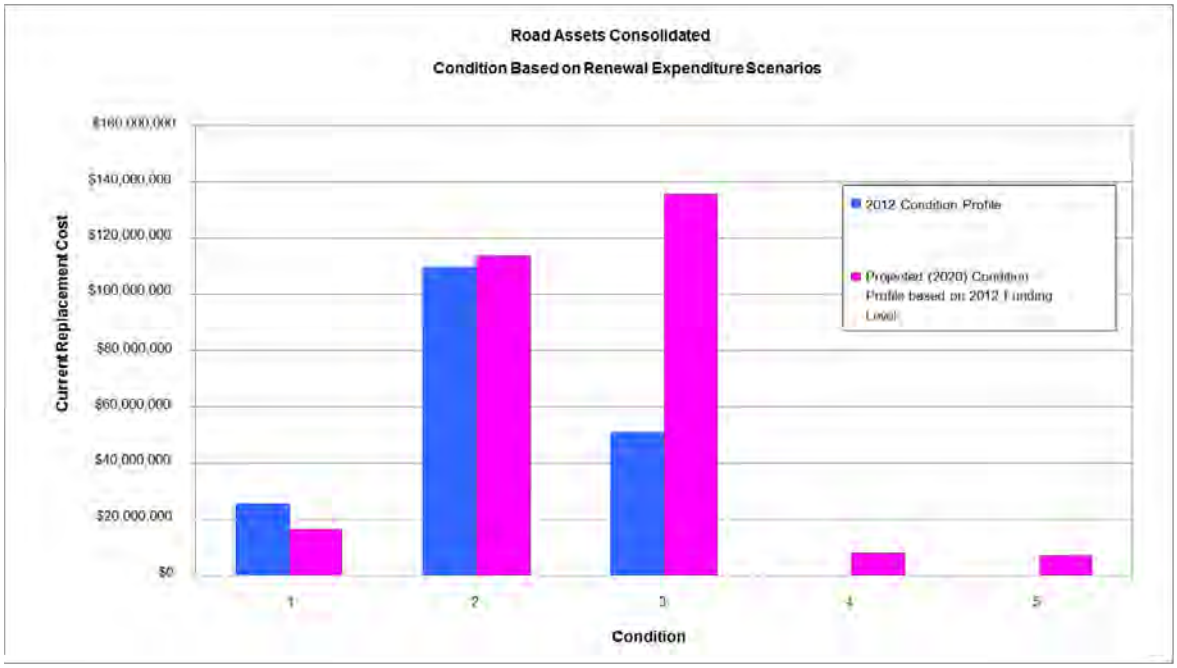


Figure 4.3: Comparison of 2012 and Projected Road Asset Condition Profile

Preliminary modelling forecasts that:

- A higher proportion of assets will deteriorate into an unsatisfactory condition if expenditure levels continue with 2012 spends. Risk to the public will subsequently be increased, which may require higher levels of maintenance and inspections. There could likely be increased exposure to insurance claims due to the increased risk.
- Under the condition 4 intervention strategy, it is estimated in 8 years time approximately 90% of assets are forecast to be in condition 1 to 3, whilst 10% of assets are forecast to be in condition 4 to 5.
- Under the 2012 funding scenario, it is estimated in 8 years time 85% of assets are forecast to be in condition 1 to 3, whilst 15% of assets are forecast to be in condition 4 or 5.
- It is forecast that maintenance expenditure will need to be increased to manage the increased risk and provide appropriate Levels of Service. Initial analysis suggests that maintenance allocation increases in the order of 40% to 70% will be required.

4.7.2 Renewal Methods and Work Program

Road asset renewals are undertaken generally using 'like for like' replacement strategies within capital renewal funding allocations. 'Low life cycle cost' methods are utilised where practical. The aim of 'low-cost' renewals is to restore the service potential or future economic benefits of the asset by renewing the assets at a cost less than replacement cost.

Examples of low cost renewal include:

- Recycling/re-use of road pavement materials;
- Reconstructing kerb/gutter in concrete rather than sandstone where appropriate;
- Narrowing road carriageway or footpath widths where appropriate;
- Recycling asset components where appropriate eg fence posts or railing, sign posts;
- Reconstructing retaining walls in alternative materials where appropriate eg reinforced concrete block or interlocking block in lieu of stone walls;
- In areas where retaining walls are on the boundary of private and public property, if the private property benefits from the retaining wall then its maintenance/renewal will be the responsibility of the private property; and
- Pathways accessing single or two residences when reaching its useful life will be removed or only reinstated with costs to be met by residents benefiting from the pathway.

In developing the asset renewal program, an initial strategy was implemented in 2010. Estimates of remaining life, asset condition and intervention timing were identified by Council's consultants and a 10 year asset renewal program was developed. Candidates requiring priority renewal were inspected by Council staff to verify accuracy of remaining life estimates.

The first 2 years of the proposed 10 year work program has been completed by Council. In 2012, assets previously identified in 'unsatisfactory' condition were reassessed by Council staff based on the adopted Condition Rating Scale. Verified proposals are ranked by priority and available funds and scheduled in future works program.

Council has since extended the work program to 2021/2022. Proposed asset renewals programs are included in the Lifecycle Management Plans in Appendices E1-E11 for each asset group.

Unforseen works have also been allowed for in the work program.

The Renewals Prioritisation Framework (Priority Ranking Criteria) table for all assets (excluding lines and signs, street furniture, vehicle crossings and pram ramps) is included in Appendix D.

4.7.3 Renewal Standards and Specifications

Renewal work is carried out in carried out in accordance with the following standards and specifications:

- Relevant Australian Standards;
- Relevant Roads and Maritime Services (RMS) standards and specifications;
- Building Code of Australia; and
- Natspec/AUS-Spec specifications and guidelines.

4.7.4 Capitalisation Policy

Council is currently working to develop a Capitalisation Policy, including guidelines and processes for asset data collection, condition assessment, valuation and reporting. This work is included in Council's Improvement Plan.

4.8 Sustainability Modelling

There are two key high level indicators for financial sustainability that have been have been considered in the analysis of the services provided by this asset category, these being long term life cycle costs and medium term costs over the 12 year financial planning period.

A sustainability ratio is also used to provide an indicator of financial sustainability. A sustainability ratio of 1.0 indicates that the current funding provided is equal to the required lifecycle funding estimates. A sustainability ratio of less than 1.0 indicates a funding gap.

A summary of long and medium term sustainability values can be found in Section 5.1.1.

4.8.1 Long Term – Life Cycle Cost

Life cycle costs (or whole of life costs) are the average costs that are required to sustain the service levels over the longest asset life. Life cycle costs include maintenance and asset consumption (depreciation expense).

Life cycle costs can be compared to life cycle expenditure to give an indicator of sustainability in service provision. Life cycle expenditure includes operations, maintenance plus capital renewal expenditure. Life cycle expenditure will vary depending on the timing of asset renewals.

A gap between life cycle costs and life cycle expenditure gives an indication as to whether present consumers are paying their share of the assets they are consuming each year. The purpose of this AMP is to identify levels of service that the community needs and can afford and develop the necessary long term financial plans to provide the service in a sustainable manner.

To sustain the condition and serviceability of Council's assets Council will consider providing funding to match the projected renewal expenditure requirements. Further in completing future condition audits a better understanding of expected useful lives of assets will be developed which will assist in managing the gap.

4.8.2 Medium Term – 12 Year Financial Planning Period

This AMP identifies the estimated maintenance and capital expenditure required to provide an agreed level of service to the community into a 12 year financial plan to provide the service in a sustainable manner.

This may be compared to existing or planned expenditure to identify any gap. In a core AMP, a gap is generally due to increasing asset renewals.

Given that long term modelling over the life of an asset can at times produce inaccuracies due to the assumptions, it is considered the medium term sustainability should be more heavily relied on.

5 Financial Summary

This section contains the financial requirements resulting from all the information presented in the previous sections. The financial projections will be improved as further information becomes available on desired levels of service and current and projected future asset performance.

5.1 Financial Statements and Projections

The 12 year financial projections are shown in Figure 5.1 for planned operating (operations and maintenance) and capital expenditure (renewal and upgrade/expansion/new assets). Tabulated figures can be found in Appendix B. Note that 2012/2013 current expenditure is inclusive of a one-off $1,440,000 expenditure on road assets under the NSW Government Local Infrastructure Renewal Scheme (LIRS). All costs are shown in 2012 dollar values.

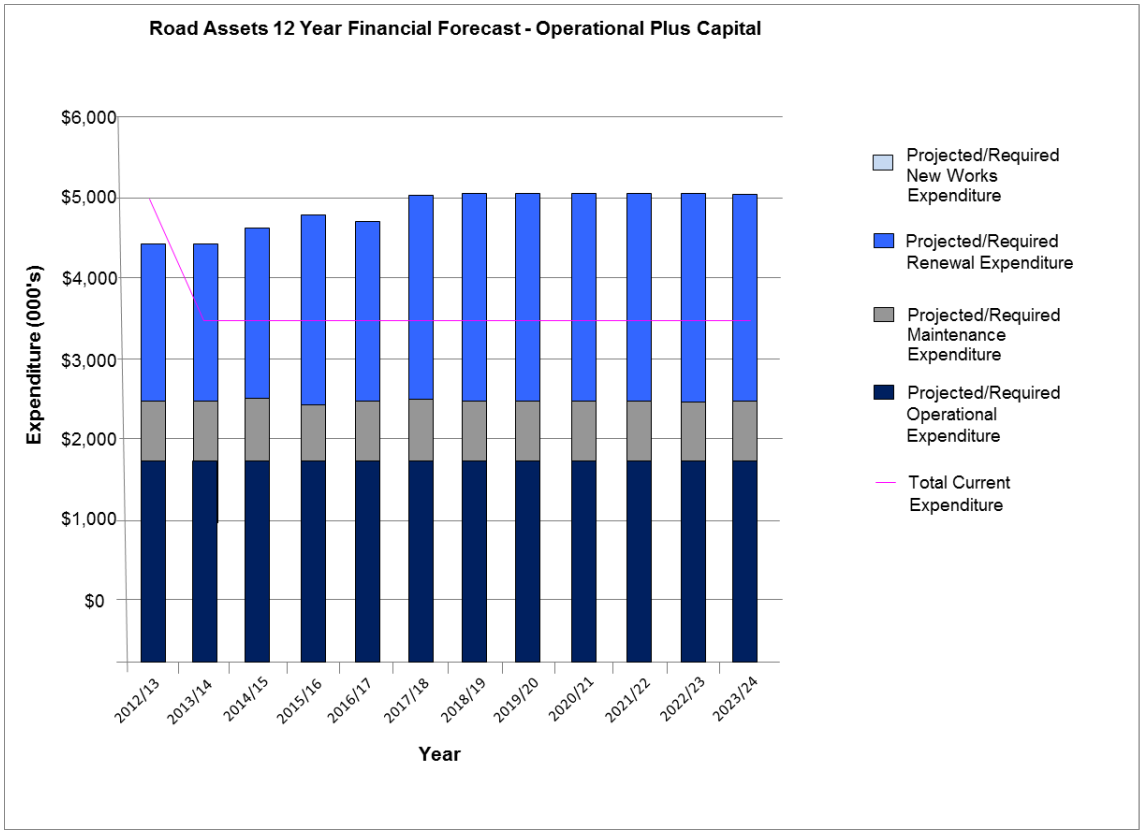


Figure 5.1: Planned Operating and Capital Expenditure

5.1.1 Sustainability of service delivery

As detailed in Section 4.8, a summary of the long and medium term sustainability of all roads assets is provided in Table 5.1 (excluding restoration costs).

Table 5.1: Long and Medium Term Financial Sustainability (as of June 2012)

Long Term		Medium Term	
Life Cycle Cost[1]	$5,303,000 pa	Required Expenditure[3]	$3,134,000 pa
Life Cycle Expenditure[2]	$4,855,000 pa	Current Expenditure[4]	$2,065,000 pa
		Funding Gap	$1,069,000 pa
		Sustainability Ratio	0.66

[1] Consultant's annual figures averaged over the entire life of the asset.
[2] Required annual operations, maintenance and renewal ('sustainable' assets case) expenditure averaged over the 12 year financial period.
[3] Required annual maintenance and renewal ('sustainable' assets case) expenditure averaged over the 12 year financial period.
[4] Current annual maintenance and renewal expenditure averaged over the past 5 years.

A gap between projected/required and current/planned renewal expenditure indicates that further work is necessary to manage service levels and available funding. Council will manage the funding gap by developing this AMP to provide guidance on:

- Future service levels;
- Resources required to provide these services; and
- Framework to manage and maintain assets all related risk issues.

5.2 Funding Strategy

Projected expenditure identified in Figure 5.1 and detailed in lifecycle financial forecasts in Appendix B is to be funded from Council's operating and capital budgets.

Achieving the financial strategy will require additional funding from a combination of:

- Review/rationalisation of current expenditure across all asset classes;
- Investigation and implementation of alternative funding sources e.g. conversion of Mosman's Community Environmental Contract into infrastructure levy. (The CEC is a program that involves environmental management, rehabilitation and remedial work which expires in 2016/17);
- Redirect potential income from advertisement on Bridgepoint pedestrian bridge to infrastructure levy;
- Stormwater Levy;
- Additional borrowings under the NSW Local Infrastructure Renewal Scheme; and
- Additional grant funding from higher levels of Government.

5.3 Valuation Forecasts

Asset values are forecast to increase as additional assets are added to the asset stock from construction and acquisition by Council and from assets constructed by land developers and others and donated to Council. However as identified in this AMP, there is forecast at this stage to be nil to limited new assets created over the next 12 years.

The depreciated replacement cost (or 'Fair Value' – current replacement cost less accumulated depreciation) will vary over the forecast period depending on the rates of addition of new assets, disposal of old assets and consumption and renewal of existing assets.

5.4 Key Assumptions made in Financial Forecasts and Valuation

This section details the key assumptions made in presenting the information contained in this AMP and in preparing forecasts of required operating and capital expenditure and asset values, depreciation expense and carrying amount estimates. It is presented to enable readers to gain an understanding of the levels of confidence in the data behind the financial forecasts.
Key assumptions made in this AMP are:

- Financial forecasts are based on providing defined levels of service;
- Council will seek to fully fund required asset renewal requirements into the future;
- Capital renewal programs are designed to maintain the service potential of existing assets;
- Unit rates and are derived from Council's existing 2012 Civil Works contract. Previously, assets were brought to account based on Council's 2006 Civil Works contract. Council staff has since re-valued its assets to reflect current market rates;
- Upon review of surrounding Councils depreciation rates, for the reporting period of 2011/12, a 1% per annum depreciation was applied across all road assets. This was endorsed by the Asset Management Reference Group and Council Audit Committee. For the reporting period of 2012/13 useful lives are to be based on various engineering documents. These useful lives are detailed in Appendices E1-11;
- Operations and maintenance costs are based largely on historical expenditure. It is assumed there will be no significant increase in the cost of providing these services except in the instances of creation of a new assets e.g. a slight one off increase provided for street lighting cost on a new pedestrian crossing due increased electricity charges; and
- Financial forecasts are based on 2012 dollars with the inherent assumption that costs will increase in the future in line with the consumer price index (CPI). This may not be the case as material costs and/or salaries and wages may increase (or decrease) at rates other than CPI. No sensitivity analysis has been carried out at this stage to identify how this may impact costs in the future.

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

- Better alignment with Council's Community Strategic Plan and Long Term Financial Plan;
- Improved understanding of demand forecasting and future required new works/upgraded assets e.g. commercial centre upgrades;
- More advanced strategic analysis of the data and information particularly considering levels of service, asset capacity, asset performance and demand; and
- Understanding and analysing the many financial and economic influences which may potentially impact upon the cost of provision of services (sensitivity analysis).

6 Asset Management Practices

6.1 Accounting/Financial Systems

Council's financial system is CIVICA AUTHORITY. The financial system is managed by Council's finance and information management division. Financial reporting is prepared in accordance with the requirements of the Local Government Act 2003 and relevant Australian Accounting Standards.

6.2 Asset Management Systems

Council's asset management system is the Authority Module – Asset Infrastructure Management System (AIM).

The AIM system provides a computer based asset management system to deal with high volume of detailed information as well as connectivity with other corporate data-bases, such as Council's financial management system AUTHORITY and document management system Dataworks.

The AIM system is yet to be fully implemented and operational. Implementation of the system is ongoing with other asset data being established. Recently collected road data is currently being uploaded from established spreadsheet inventories.

Accountability for the operation and management of the asset management system is corporate and requires both the technical, operational and financial areas of Council to be closely involved.

6.3 Information Flow Requirements and Processes

The key information flows into this AMP are:

- The asset register data on size, age, value, remaining life of the network;
- The unit rates for categories of work/material;
- The adopted service levels;
- Projections of various factors affecting future demand for services;
- Correlations between maintenance and renewal, including decay models; and
- Data on new or upgraded assets acquired by council.

The key information flows from this AMP are:

- The assumed Works Program and trends;
- The resulting budget, valuation and depreciation projections; and

- The useful life analysis.

These will impact the Resourcing Strategy (Long Term Financial Plan), Strategic Business Plan, annual budget and departmental business plans and budgets.

7 Plan Improvement and Monitoring

7.1 Performance Measures

The effectiveness of the AMP can be measured in the following ways:

- The degree to which the required cashflows identified in this AMP are incorporated into Resourcing Strategy, Council's long term financial plan and Strategic Management Plan;
- The degree to which adopted organisation 1 to 12 year detailed works programs, budgets, business plans and organisational structures take into account the 'global' works program trends provided by the AMP; and
- Community acceptance including levels of service and risk management plan.

7.2 Improvement Plan

Mosman Council is currently putting in place 'best appropriate' asset management strategies and practices. This means that Council will continually be developing and improving its knowledge, systems and processes and strategies to ensure it is providing the level of asset management necessary to competently, responsibly and sustainably manage the community's assets now and into the future.

Council's current status:

- Comprehensive valuation exercise completed in June 2010 including collection of asset location, attribute and condition data for all roads assets (Data Confidence Grade A (ref IIMM 2006 Sec 3.7.5));
- Basic historical and lifecycle data including cost data now available;
- Condition, renewals, new works, operations, maintenance, cost, utilisation and performance data for all assets collected and recorded on an ongoing basis;
- Road assets rated condition 4 or worse reassessed by Council staff in September 2012;
- Road asset data being uploaded to Civica AIM asset management system;
- Initial levels of service developed to be reviewed on an ongoing basis;
- Basic demand forecasting and demand management considerations taken in roads AMP;
- Comprehensive 12 year asset works programs developed;
- Robust financial forecasting including alternate funding scenarios testing in place;
- Initial integration of asset long term financial forecasts into organisation long term financial planning and resourcing strategies;
- Basic initial asset management policy and strategy adopted;

- Establishment of Asset Management Reference Group;
- Asset management development linked strongly with the Integrated Planning (IP&R) process and MOSPLAN;
- Unit rate and useful life data finalised in October 2012 for all roads assets;
- Spatial data collected for all major roads asset types with GIS (MapInfo) used for spatial location of road pavements and footpaths;
- Basic defect inspection and condition monitoring processes in place; and
- Draft risk assessment and planning work completed.

The following outlines list of tasks in Council's Improvement Program. This will be dependent on budget and time constraints.

Table 7.2: Council's Improvement Program

Improvement Plan	Priority	Timeline
Develop and implement a documented condition monitoring and defect inspection processes in accordance with the Roads AMP	High	Dec 13 – Jan 14
Develop formal documented project management and contract management guidelines	Medium	Jan 14 – Dec 14
Develop a Capitalisation Policy including guidelines and processes for asset data collection, condition assessment, valuation and reporting	High	Dec 13 – Jan 14
Further develop use of GIS for asset management including integration of Civica Aim with GIS	High	Dec 13 – Sep 14
Further develop organisation long term works and financial strategy to incorporate asset management forecasts.	High	Dec 13 – May 14
Formalise Civica AIM Asset Management asset hierarchy/classification guidelines and processes	Medium	Dec 13 – Jan 14
Further develop Civica AIM system for Asset Management including finalisation of asset register and development of asset hierarchy	Medium	Dec 13 – Dec 14
Review and update asset valuation and depreciation data/calculations	High	Jun Qtr Each Yr
Investigate mobile computing and use of data loggers for information transfer and data capture	Low	Jun 14 – Jan 15
Develop process for input of Work Orders to Civica AIM	Medium	Jan 14– Jun 14

Improvement Plan	Priority	Timeline
Undertake risk analysis/assessment and develop risk registers for all assets and implement risk management systems and processes for critical/major assets.	Medium	Jun 14 – Dec 14
Review service deficiencies associated with steps, pram ramps and refuge islands that do not comply with current accessibility standards.	Medium	Jun 14 – Dec 14
Review and develop a more comprehensive maintenance management framework	Medium	Dec 13 – Dec 14

7.3 Monitoring and Review Procedures

This AMP will be reviewed during annual budget preparation and amended to recognise any changes in service levels and/or resources available to provide those services as a result of the budget decision process.

The Plan has a life of 4 years and is due for revision and updating within 2 years of each Council election aligned with review of Council's Community Strategic Plan and Delivery Program.

References

- Mosman Community Strategic Plan (MOSPLAN)
- Mosman Council Asset Management Policy 2009
- Mosman Council Asset Management Strategy 2009
- Planning a Sustainable Future – Planning and Reporting Guidelines for Local Government in NSW 2010
- Planning a Sustainable Future – Planning and Reporting Manual for Local Government in NSW 2010
- IPWEA, 2006, 'International Infrastructure Management Manual', Institute of Public Works Engineering Australia, Sydney, www.ipwea.org.au
- Australian Infrastructure Financial Management Guideline 2009

Roads

Appendices

Appendix A – Roads Hierarchy Plan

Appendix B – Road Assets 12 Year Lifecycle Financial Forecasts

Funding required based on a condition 4 renewals intervention strategy

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
	1	2	3	4	5	6	7	8	9	10	11	12
	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)
OPERATIONS												
TOTAL OPERATIONS	**1,721**	**1,721**	**1,721**	**1,721**	**1,721**	**1,721**	**1,721**	**1,721**	**1,721**	**1,721**	**1,721**	**1,721**
MAINTENANCE												
Footpath	187	187	187	187	187	187	187	187	187	187	187	187
Road Pavement	265	265	265	265	265	265	265	265	265	265	265	265
Kerb and Gutter	39	39	39	39	39	39	39	39	39	39	39	39
Carparks	23	23	23	23	23	23	23	23	23	23	23	23
Physical Traffic Devices	101	101	101	101	101	101	101	101	101	101	101	101
Street Furniture	16	16	16	16	16	16	16	16	16	16	16	16
Retaining Walls	47	47	47	47	47	47	47	47	47	47	47	47
Steps	23	23	23	23	23	23	23	23	23	23	23	23
Lines and Signs	31	31	31	31	31	31	31	31	31	31	31	31
Vehicle Crossings	8	8	8	8	8	8	8	8	8	8	8	8
Pram Ramps	8	8	8	8	8	8	8	8	8	8	8	8

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
	1	2	3	4	5	6	7	8	9	10	11	12
	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)	($000s)
TOTAL MAINTENANCE	**748**	**748**	**748**	**748**	**748**	**748**	**748**	**748**	**748**	**748**	**748**	**748**
NEW WORKS												
TOTAL NEW WORKS	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
RENEWALS												
Footpath	362	362	362	362	362	393	393	393	393	393	393	393
Road Pavement	648	648	855	855	855	1090	1090	1090	1090	1090	1090	1090
Kerb and Gutter	268	268	268	268	268	268	268	268	268	268	268	268
Carparks	3	3	3	104	21	21	21	21	21	21	21	21
Physical Traffic Devices	43	43	43	43	43	95	95	95	95	95	95	95
Street Furniture	104	104	104	155	155	155	194	194	194	194	194	194
Retaining Walls	302	302	302	302	302	302	302	302	302	302	302	302
Steps	73	73	73	73	73	73	73	73	73	73	73	73
Lines and Signs	73	73	73	73	73	73	73	73	73	73	73	73
Vehicle Crossings	69	69	69	69	69	69	69	69	69	69	69	69
Pram Ramps	4	4	4	4	4	4	4	4	4	4	4	4
TOTAL RENEWALS	**1,950**	**1,950**	**2,157**	**2,309**	**2,226**	**2,544**	**2,583**	**2,583**	**2,583**	**2,583**	**2,583**	**2,583**

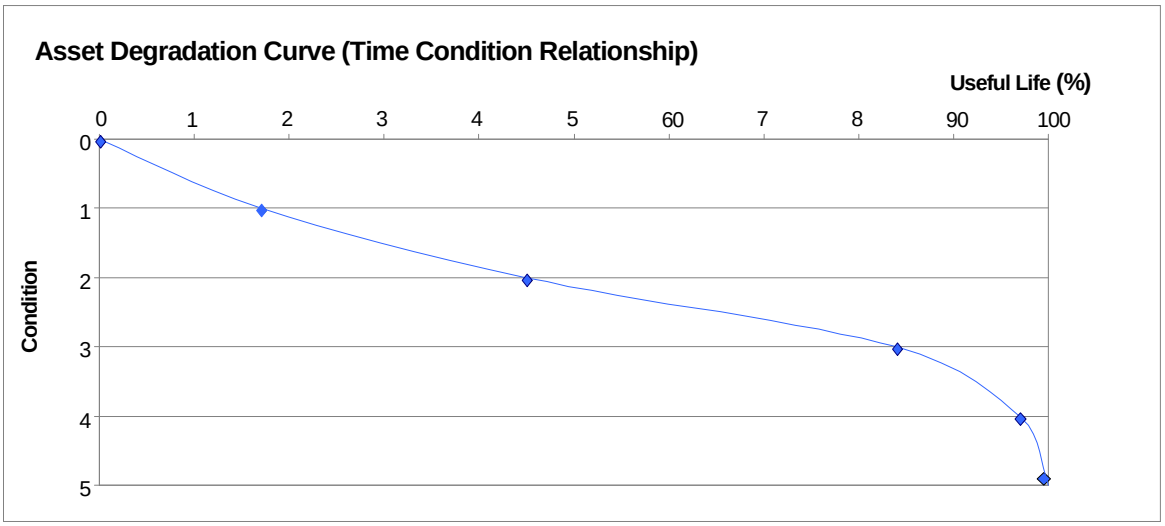
Appendix C – Deterioration Profile

The following deterioration profile has been used to assess the rate of deterioration, remaining useful life and renewal intervention for Council's road assets.

The profile is based on the assumption that infrastructure assets generally deteriorate slightly rapidly in its initial years after construction, with deterioration becoming reasonably constant over its mid-life, and finally deteriorating reasonably rapidly in the latter period of its life.

Further work will be done to more robustly analyse the pattern of deterioration for each asset group, however the currently derived profile is considered appropriate for the current asset planning work across the various asset groups.

Condition	% Life Consumed	Cumulative % Life Consumed at Start Condition Range	Cumulative % Life Consumed at Mid Condition Range	% Life Remaining from Start of Condition Range	% Life Remaining from Mid of Condition Range
1	31	17	24	83	76
2	28	45	52	55	48
3	33	84	88	16	12
4	8	97	98.5	3	1.5
5	0	100	100	0	0



Appendix D – Renewals Prioritisation Framework (Priority Ranking Criteria)

Criteria	Description/Importance/Criticality					Score	Weighting (%)
	Road/K&G/Traffic Devices	Footpath	Retaining Walls	Steps	Carparks		
Community - Function	Critical Function - Other dependencies - Arterial/Regional	Critical Function - Other dependencies - Category 1	Critical Function - Other dependencies	Critical Function - Other dependencies - Category 1	Critical Function - Other dependencies - Category 1	10	20
	Moderate Function - Other dependencies - Collector	Moderate Function - Other dependencies - Category 2	Moderate Function - Other dependencies	Moderate Function - Other dependencies - Category 2	Moderate Function - Other dependencies - Category 2	8	
	Basic Function - Minimal other dependencies - Local	Basic Function - Minimal other dependencies - Category 3	Basic Function - Minimal other dependencies	Basic Function - Minimal other dependencies - Category 3	Basic Function - Minimal other dependencies - Category 3	7	
Community - Quality	High Profile/Shopping Centre/Heritage	High Profile/Shopping Centre	High Profile/Shopping Centre/Heritage	High Profile/Shopping Centre/Heritage	High Profile/Shopping Centre	10	10
	Medium Profile/Arterial/ Regional	Medium Profile/Arterial/ Regional	Medium Profile	Medium Profile	Medium Profile	8	

Criteria	Description/Importance/Criticality					Score	Weighting (%)
	Road/K&G/Traffic Devices	Footpath	Retaining Walls	Steps	Carparks		
	Low Profile/Collector/Local	Low Profile/Other	Low Profile	Low Profile	Low Profile	6	
Technical - Condition	Failed - 5	Failed - 5	Failed - 5	Failed - 5	Failed - 5	10	30
	Very Poor - 4	Very Poor - 4	Very Poor - 4	Very Poor - 4	Very Poor - 4	8	
	Poor - 3	Poor - 3	Poor - 3	Poor - 3	Poor - 3	6	
Technical - Safety	Risk of Failure - Imminent/Significant Consequences	Risk of Failure - Imminent/Significant Consequences	Risk of Failure - Imminent/Significant Consequences	Risk of Failure - Imminent/Significant Consequences	Risk of Failure - Imminent/Significant Consequences	10	30
	Risk of Failure - Imminent/Moderate Consequences	Risk of Failure - Imminent/Moderate Consequences	Risk of Failure - Imminent/Moderate Consequences	Risk of Failure - Imminent/Moderate Consequences	Risk of Failure - Imminent/Moderate Consequences	9	
	Risk of Failure - Near Future/ Significant Consequences	Risk of Failure - Near Future/ Significant Consequences	Risk of Failure - Near Future/ Significant Consequences	Risk of Failure - Near Future/ Significant Consequences	Risk of Failure - Near Future/ Significant Consequences	8	
	Risk of Failure - Imminent/ Minor Consequences	Risk of Failure - Imminent/ Minor Consequences	Risk of Failure - Imminent/ Minor Consequences	Risk of Failure - Imminent/ Minor Consequences	Risk of Failure - Imminent/ Minor Consequences	7	
	Risk of Failure -	Risk of Failure -	Risk of Failure -	Risk of Failure -	Risk of Failure -	6	

Criteria	Description/Importance/Criticality					Score	Weighting (%)
	Road/K&G/Traffic Devices	Footpath	Retaining Walls	Steps	Carparks		
	Near Future/ Moderate Consequences	Near Future/ Moderate Consequences	Near Future/ Moderate Consequences	Near Future/ Moderate Consequences	Near Future/ Moderate Consequences		
	Risk of Failure - Near Future/Minor Consequences	Risk of Failure - Near Future/Minor Consequences	Risk of Failure - Near Future/Minor Consequences	Risk of Failure - Near Future/ Minor Consequences	Risk of Failure - Near Future/ Minor Consequences	5	
Technical-Operating/ Maintenance and Lifecycle Costs	Very Significant/ Ongoing without renewal	Very Significant/ Ongoing without renewal	Very Significant/ Ongoing without renewal	Very Significant/ Ongoing without renewal	Very Significant/ Ongoing without renewal	10	10
	Significant without renewal	Significant without renewal	Significant without renewal	Significant without renewal	Significant without renewal	9	
	Moderate without renewal	Moderate without renewal	Moderate without renewal	Moderate without renewal	Moderate without renewal	8	
	Minor without renewal	Minor without renewal	Minor without renewal	Minor without renewal	Minor without renewal	6	
	Negligible without renewal	Negligible without renewal	Negligible without renewal	Negligible without renewal	Negligible without renewal	5	

Appendix E – Lifecycle Management Plans

E.1 Footpaths

E1.1 Description of Footpath Network

Footpaths and cycleway in this plan are either within road reservations or adjacent to roadways. Footpaths in parks are included in Council's Open Space Asset Management Plan.

The Spit to Pearl Bay Avenue cycleway is included in the road footpath network given its transport function.

This Lifecycle Management Plan also excludes all footpaths associated with steps; this has been incorporated into Appendix E8 STEPS.

There are 128,078 m (212,477 m^2) of footpath (along road and cycleway) including:

- 119,022 m (188,075 m^2) concrete footpath;
- 3,405 m (6,454 m^2) asphalt footpath;
- 5,468 m (16,815 m^2) paving brick footpath;
- 104 m (1,040 m^2) sandstone paved footpath; and
- 79 m (92 m^2) other footpaths including gravel and timber.

Typical footpath unit rates and useful lives are as follows:

Footpath Type		Unit	Useful Life (yrs)	Unit Rate
Concrete	75mm thick unreinforced	m^2	90	$96.81
Asphalt	25mm	m^2	40	$45.72
Paving Bricks	average quality, inc sand bed on compacted gravel base course (say 100-150mm)	m^2	60	$116.05
Paving Bricks	average quality inc sand bed on leanmix concrete base course (say 75mm)	m^2	60	$118.05
Gravel / Dirt		m^2	20	$10.00
Timber		m^2	30	$100.00

Roads

The break up of footpaths along roads (including Spit cycleway) into material type is as follows:

Material Type	Current Replacement Cost	Depreciable Amount	Accumulated Depreciation as at 30 June 2013	Annual Depreciation	Depreciated Replacement Cost
Concrete	$18,207,594	$18,207,594	$5,342,575	$202,307	$12,865,019
Asphalt	$295,077	$295,077	$101,346	$7,377	$193,731
Paving Bricks	$1,951,454	$1,951,454	$431,533	$32,524	$1,519,921
Sandstone	$120,692	$120,692	$15,288	$2,012	$105,404
Other (incl. gravel and dirt)	$3,300	$3,300	$688	$121	$2,612
TOTAL	**$20,578,117**	**$20,578,117**	**$5,891,430**	**$244,340**	**$14,686,687**

Although concrete in recent times has been the preferred form of construction due to its optimal capital and maintenance costs, Council has an active policy of installing paving bricks in high commercial pedestrian use areas of Mosman. Asphalt is sometimes used to reconstruct sections of the footpath including where ongoing significant movement due to tree roots is a problem.

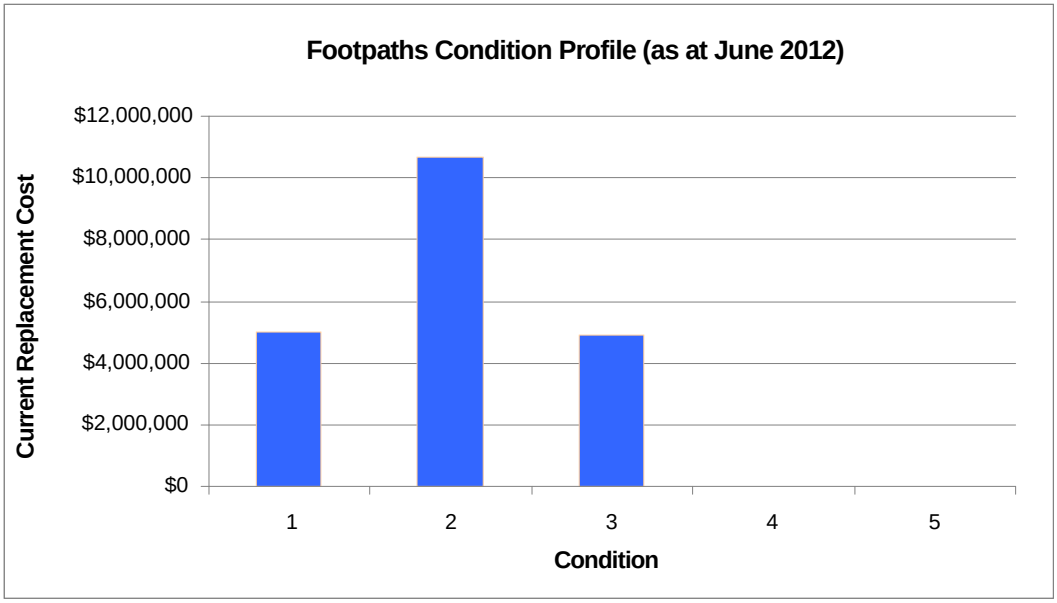
Council has categorised footpaths into three (3) categories based on location and environment. Footpath categories are:

Category 1	Category 2	Category 3
Commercial and other high pedestrian use areas including areas within close proximity to aged persons' housing	Areas with medium pedestrian use such as footpaths leading to commercial areas and ferry wharves etc	All other footpaths with light pedestrian use

A more comprehensive maintenance management framework is currently being developed (see Improvement Plan in Section 7.2). It will identify which footpaths fall into the various categories. The categorisation guides maintenance service levels including maintenance intervention levels and response times.

E1.2 Footpath Condition

The condition profile (June 2012) of the footpath network is as follows:



E1.3 Renewal Intervention

As at June 2012, road related footpaths valued at $18,105 (approximately 0.09% of footpath network) are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A footpath maintenance priority list has been prepared to repair defects in footpaths. Identified defects are repaired subject to available resources. Additionally, footpath assets in or approaching condition 4 and 5 are prioritised for renewal in the Footpath Renewal Program.

It should be noted that the condition of an asset is not defined solely by the number of defects. Assets are assessed based on its overall condition including defects with footpaths categorised in segments usually from intersection to intersection. A footpath with defects does not necessarily mean the whole segment is in an 'unsatisfactory' condition.

E1.5 Current Maintenance and Renewal Strategies

Typical footpath maintenance includes:

- Reconstructing broken or lifted slabs or short sections of path;
- Placing asphalt correction 'wedges' to eliminate trips at joints;
- Reconstructing some short sections of concrete path in asphalt where significant and ongoing tree root lifting occurs;
- Re-laying sections of paving brick paths to eliminate unevenness and trips;
- Mechanical grinding of concrete path joint lifted lips/trips will be trialled in future to gauge effectiveness; and
- Restoration of footpath openings.

Footpath renewals includes, for example, replacing paving brick footpaths with concrete or asphalt or rationalising footpath widths (minimum footpath widths of 1.4 metres have been adopted in many locations where appropriate).

E1.6 Recent Expenditure Profile

Footpath expenditure ($000s, excluding restoration expenditure) over the last few years is outlined in the following table:

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	144	70	102	65	139	104
Renewals	348	416	499	313	384	392
New Work	35	70	209	0	0	63
TOTAL	**527**	**556**	**810**	**378**	**523**	**559**

The above listed 'New Works' were associated with the Spit to Pearl Bay Avenue cycleway (including funding from grants).

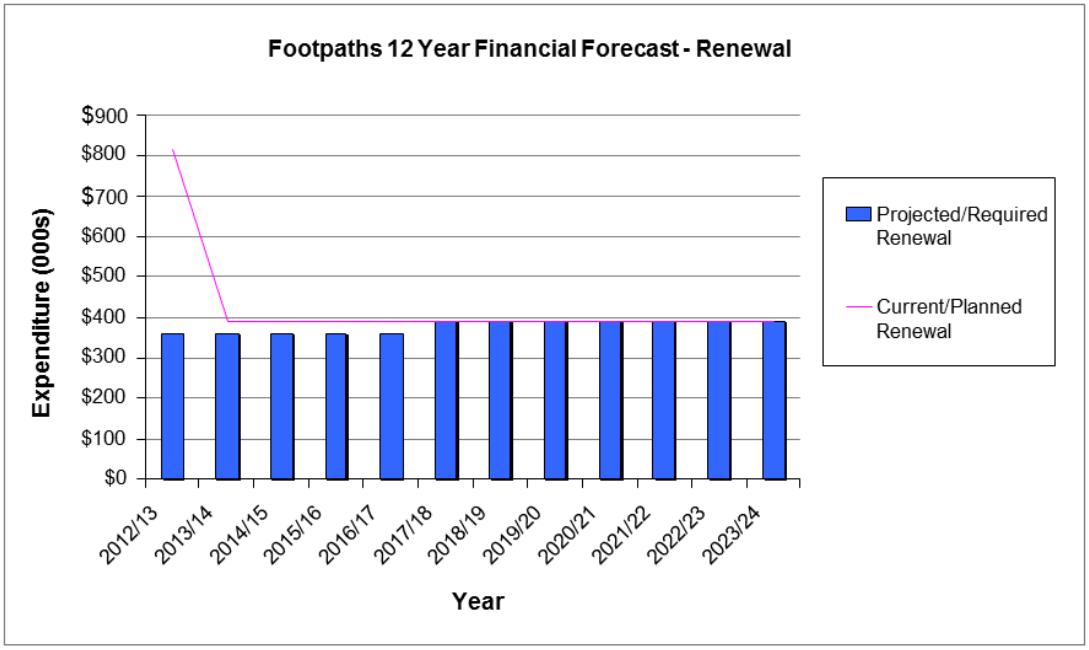
Approximately 370 metre of cycleway, fully funded by the RMS is scheduled to be installed on Spit Road in 2013/14. This new work will be added to Council's asset register.

E1.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to increase over time as the asset stock ages. All costs are shown in 2012 dollar values.

Footpath 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	362	362	362	362	362	393	393	393	393	393	393	393
Planned/Current Expenditure	817*	392	392	392	392	392	392	392	392	392	392	392
Funding Gap	-455	-30	-30	-30	-30	1	1	1	1	1	1	1
Cumulative Funding Gap	-455	-485	-515	-545	-575	-574	-573	-572	-571	-570	-569	-568

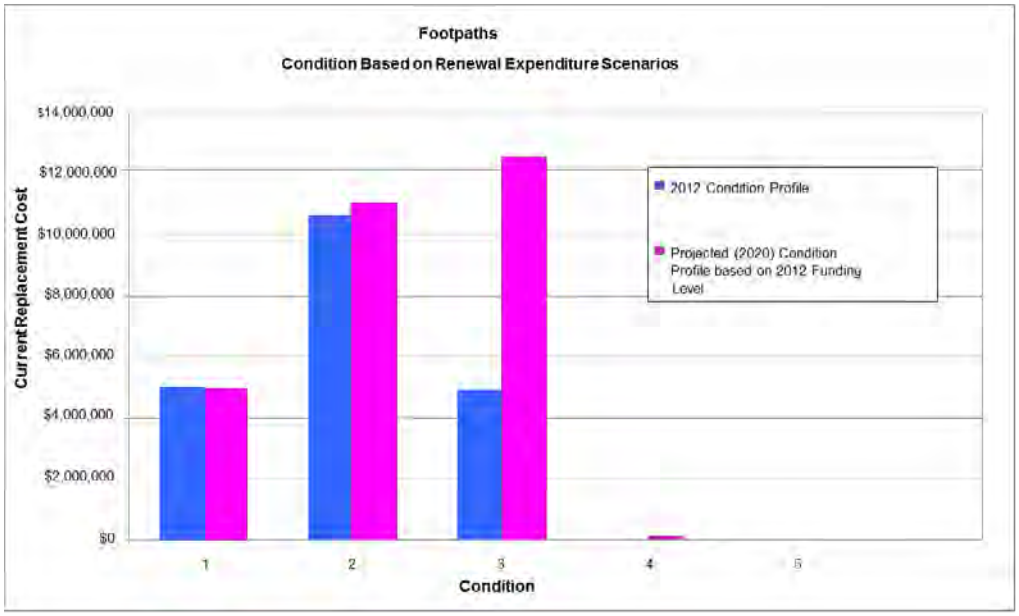
*2012/2013 planned/current spend is inclusive of a one-off $425,000 expenditure on footpaths under the NSW Government Local Infrastructure Renewal Scheme (LIRS).



It is also proposed that the above annual renewals funding be complemented by an increase in the footpath maintenance allocation to $187,000 per year to support a more responsive and appropriate defect management system.

E1.8 Projected Condition

Utilising 2012 funding levels, the future projected condition of Council's footpaths in 2020 are as follows. This has been compared to the condition of assets in 2012.



If Council continues to fund footpaths renewals at 2012 level there will be some deterioration over the next 8 years including a significant percentage of falling into the condition 3 range.

E1.9 10 Year Work Program (Foot and Step Paths)

A 10 year footpath assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed.

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Awaba Street	Footpath	R-Awaba St: Moruben Rd to Spit Rd	Concrete	116	1.8	2012/2013
Prince Albert Street	Footpath	L-Prince Albert St: Milner St to Bradleys Head Rd	Concrete	18	1.8	2012/2013
Prince Albert Street	Footpath	L-Prince Albert St: Milner St to Bradleys Head Rd	Concrete	104	1.8	2012/2013
Avenue Road	Footpath	R-Avenue Rd: Noble St to Military Rd	Concrete	84	1.8	2012/2013
Upper Spit Road	Step Path	R-Upper Spit Rd: Spit Rd to End	Concrete	18	0.9	2012/2013
Boyle Street	Step Path	R-Boyle St: Dead End, Mosman Bay to Dead End	Asphalt	164	1.1	2012/2013
Burrawong Avenue	Step Path	L-Burrawong Ave: Iluka Rd to Dead End	Asphalt	50	1.2	2012/2013
Mosman Street	Step Path	R-Mosman St: Trumfield Ln to Badham Ave	Asphalt	60	1	2012/2013
Quakers Road	Step Path	L-Quakers Rd: Kerb at End to Bullecourt Ave	Asphalt	34	1.2	2012/2013
Rosherville Road	Step Path	R-Rosherville Rd: Kirkoswald Ave to Hopetoun Ave	Asphalt	76	1.2	2012/2013
Raglan Street	Step Path	R-Raglan St/Cullen Ave to Gibson Rd	Concrete	25	1.5	2012/2013
Rickard Avenue	Step Path	R-Rickard Ave/Junction to End	Concrete	25	0.9	2012/2013
The Grove	Step Path	L-The Grove: Edwards Bay Rd to Stanton Ave	Concrete	8	1	2012/2013
Cyprian Street	Footpath	L-Cyprian St: Concrete Pavement to Parriwi Rd	Asphalt	142	2	2012/2013
Bickell Road	Footpath	R-Bickell Rd: Ryrie St to Bay End Concrete	Asphalt	70	1.6	2012/2013
Fairfax Road	Footpath	R-Fairfax Rd: 5 Fairfax to Kirkoswald Ave	Concrete	68	1.8	2012/2013

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Burrawong Avenue	Step Path	L-Burrawong Ave: Dead End to Iluka Rd	Asphalt	16	1.5	2012/2013
Stanton Road	Step Path	L-Stanton Rd: Fairfax Rd to Wyargine St	Asphalt	6	0.8	2012/2013
Mosman Street	Step Path	R-Mosman St: Trumfield Ln to Badham Ave	Concrete	4	0.9	2012/2013
Cowles Road	Footpath	L-Cowles Rd: Military Rd to Ourimbah Rd	Paving Brick	60	3	2012/2013
Wyong Road	Footpath	R-Wyong Rd: Macpherson St to Dead End	Concrete	20	1.2	2012/2013
Spofforth Street	Footpath	R-Spofforth St: Boyle St to Concrete Pavement	Concrete	73	1.4	2012/2013
Spofforth Street	Footpath	R-Spofforth St: Concrete Pavement to Rangers Road	Concrete	56	1.4	2012/2013
Gooseberry Lane	Step Path	R-Gooseberry Ln: Pretoria Ave to Dead End	Gravel	30	0.9	2012/2013
Kirkoswald Avenue	Footpath	R-Kirkoswald Ave: Upper Fairfax Rd to Burrawong Ave	Concrete	222	2.3	2012/2013
Spencer Road	Footpath	L-Spencer Rd: Cowles Rd to Bardwell Ln	Concrete	234	1.4	2012/2013
Brady Street	Footpath	L-Brady St: Military Rd for 94 metres	Asphalt	34	3.6	2012/2013
Hampden Street	Footpath	L-Hampden St: Stanton Rd to Dead End	Concrete	62	2	2012/2013
Spencer Road	Footpath	R-Spencer Rd: Cowles Rd to Bardwell Ln	Concrete	234	1.4	2012/2013
Queen Street	Footpath	R-Queen St: Prince Albert St to Milner Ln	Concrete	48	1.5	2012/2013
Queen Street	Footpath	R-Queen St: Milner Ln to Raglan St	Concrete	44	1.8	2012/2013
Prince Albert Street	Footpath	L-Prince Albert St: Queen St to Milner St	Concrete	93	1.6	2012/2013
Mandolong Road	Footpath	R-Mandolong Rd: Lavoni St to Superba Pde	Concrete	183	1.5	2012/2013
Clifford Street	Footpath	L-Clifford St: Moruben Rd to Spit Rd	Concrete	287	1.5	2012/2013

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Prince Albert Street	Footpath	R-Prince Albert St: Elfrida St to Union St	Concrete	155	1.8	2012/2013
Morella Road	Step Path	L-Morella Rd/Bend Near Kardinia Rd to Dead End	Concrete	107	1.2	2012/2013
Raglan Street	Footpath	L-Raglan St: Canrobert St to Milner St	Asphalt	40	1.5	2012/2013
Middle Head Road	Footpath	R-Middle Head Rd: Cobbittee St to Kahibah Rd	Asphalt	10	1.4	2012/2013
Effingham Street	Footpath	R-Effingham St: King Max St to Middle Head Rd	Asphalt	28	1.4	2012/2013
Avenue Road	Step Path	R-Avenue Rd: Reid Park to Upper Avenue Rd	Paving Brick	12	0.9	2012/2013
Sverge Street	Footpath	R-Sverge St/Moran St to Clanalpine St	Concrete	56	1.8	2012/2013
Sirius Cove Road	Footpath	R-Sirius Cove Rd: Kallaroo St to Elfrida St	Concrete	90	1.8	2012/2013
Redan Street	Footpath	R-Redan St: Raglan St to Balmoral Ave	Concrete	114	1.5	2012/2013
Redan Street	Footpath	R-Redan St: Raglan St to Balmoral Ave	Concrete	130	2	2012/2013
Killarney Street	Footpath	L-Killarney St: Spit Rd for 34 metres	Concrete	32	1.8	2012/2013
Redan Street	Footpath	L-Redan St: Raglan St to Balmoral Ave	Concrete	333	1.5	2012/2013
Prince Albert Street	Footpath	R-Prince Albert St: Whiting Beach Rd to CS at Lennox St	Concrete	10	1.8	2013/2014
The Esplanade	Footpath	L-The Esplanade: Awaba St to End	Concrete	132	1.8	2013/2014
Queen Street	Footpath	L-Queen St: Milner Ln to Raglan St	Concrete	85	1.7	2013/2014
Queen Street	Footpath	L-Queen St: Milner Ln to Raglan St	Concrete	56	1.8	2013/2014
Whiting Beach Road	Footpath	R-Whiting Beach Rd/Major St to Dead End	Concrete	56	1.8	2013/2014

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Clifton Gardens	Step Path		Asphalt	28	1.2	2013/2014
Illawarra Street	Step Path	L-Illawarra St: Dead End to Raglan St	Asphalt	5	1	2013/2014
McLeod Street	Step Path	L-McLeod St: Dead End to Musgrave St	Asphalt	42	1.4	2013/2014
Morella Road	Footpath	L-Morella Rd: Iluka Rd to Kardinia Rd	Concrete	48	1.8	2013/2014
Morella Road	Footpath	L-Morella Rd: Iluka Rd to Kardinia Rd	Concrete	7	1.8	2013/2014
Markham Close	Footpath	R-Markham Cl: Dead End to Middle Head Rd	Concrete	127	1.4	2013/2014
Lower Almora Street	Footpath	R-Lower Almora St: The Esplanade to Ryan St	Concrete	126	1.2	2013/2014
Little Street	Footpath	R-Little St: Mandolong Rd to Lower Punch St	Concrete	123	1.8	2013/2014
Kahibah Road	Footpath	R-Kahibah Rd: Middle Head Rd to Wolseley Rd	Concrete	121	1.5	2013/2014
Iluka Road	Footpath	R-Iluka Rd (Upper) to Morella Ln	Concrete	114	1	2013/2014
Iluka Road	Footpath	R-Iluka Rd (Upper) to Lane End	Concrete	147	1	2013/2014
Holt Avenue	Footpath	R-Holt Ave: Cowles Rd to Bardwell Ln	Concrete	230	1.4	2013/2014
Effingham Street	Footpath	L-Effingham St: King Max St to Middle Head Rd	Concrete	40	1.9	2013/2014
Clifton Street	Footpath	R-Clifton St: Dead End to Burrawong Ave	Concrete	18	1.1	2013/2014
Clifton Street	Footpath	R-Clifton St: Dead End to Burrawong Ave	Concrete	46	1.5	2013/2014
Clifton Street	Footpath	L-Clifton St: Dead End to Burrawong Ave	Concrete	94	1.5	2013/2014
Clanalpine Street	Footpath	L-Clanalpine St: Raglan St to Mistral Ave	Concrete	145	1.8	2013/2014

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Bickell Road	Footpath	R-Bickell Rd: Ryrie St to Bay St-End Concrete	Concrete	70	1.5	2013/2014
Almora Lane	Footpath	R-Almora Ln: Almora St to Beach Ln	Concrete	11	0.9	2013/2014
Boyle Street	Step Path	R-Boyle St: Dead End, Mosman Bay to Dead End	Conc/Asphalt	22	1	2013/2014
Fairfax Road	Step Path	L-Fairfax Rd: Balmoral Beach to Stanton Rd	Concrete	50	1.5	2013/2014
Kahibah Road	Step Path	R-Kahibah Rd: Wolseley Rd to Coronation Ave	Concrete	25	1.1	2013/2014
Parriwi Road	Step Path	L-Parriwi Rd: No.17 to End of Concrete Kerb	Concrete	12	0.8	2013/2014
Plunkett Road	Step Path	L-Plunkett Rd: Beaconsfield Rd to Coronation Ave	Sandstone	1	1	2013/2014
Royalist Road	Step Path	L-Royalist Rd/Boyle St to Dead End	Concrete	0.6	0.6	2013/2014
Bickell Place	Footpath	R-Bickell Pl: Bay St to End	Gravel	55	1.2	2013/2014
Iluka Road	Footpath	L-Iluka Rd (Lower): Morella Ln	Concrete	98	1	2013/2014
Iluka Road	Footpath	L-Iluka Rd (Lower): Morella Ln	Concrete	48	1	2014/2015
Iluka Road	Footpath	L-Iluka Rd (Lower): Lane End	Concrete	127	1	2014/2015
Iluka Road	Footpath	L-Iluka Rd (Lower): Lane End	Concrete	66	1	2014/2015
Elfrida Street	Footpath	R-Elfrida St: Prince Albert St to Cabban St	Concrete	110	1.8	2014/2015
Burrawong Avenue	Footpath	R-Burrawong Ave: Kardinia Rd to Clifton St	Concrete	62	1.8	2014/2015
Burrawong Avenue	Footpath	L-Burrawong Ave: Kardinia Rd to Clifton St	Concrete	30	1.8	2014/2015
Kallaroo Street	Footpath	R-Kallaroo St: Dead End to Clanalpine St	Asphalt	18	1.2	2014/2015

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
James King Lane	Footpath	R-King James Ln: Union St to Queen St	Asphalt	45	1	2014/2015
James King Lane	Footpath	L-King James Ln: Union St to Queen St	Asphalt	164	1.2	2014/2015
Bradleys Head Road	Footpath	R-Bradleys Head Rd: King Max St to Military Rd	Concrete	288	1.5	2014/2015
Bradleys Head Road	Footpath	L-Bradleys Head Rd: King Max St to Military Rd	Concrete	20	2.5	2014/2015
Prince Albert Street	Footpath	R-Prince Albert St: Milner St to Bradleys Head Rd	Concrete	100	1.7	2014/2015
Prince Albert Street	Footpath	R-Prince Albert St: Milner St to Bradleys Head Rd	Concrete	34	1.7	2014/2015
Raglan Street	Step Path	L-Raglan St: Dead End to Curraghbeena Rd	Asphalt	48	1.4	2014/2015
Short Street	Footpath	L-Short St: Harbour St to Cowles Rd	Concrete	81	1.5	2014/2015
Thompson Street	Footpath	L-Thompson St/Bradleys Head Rd to Prince Albert St	Concrete	35	1.8	2014/2015
Morella Road	Footpath	L-Morella Rd: Kardinia Rd CS	Concrete	5	1.5	2014/2015
Fairfax Road	Step Path	L-Fairfax Rd: Balmoral Beach to Stanton Rd	Asphalt	4	1.5	2014/2015
Park Avenue	Step Path	L-Park Ave: Rangers Ave to Dead End	Asphalt	82	1	2014/2015
Bullecourt Avenue	Step Path	R-Bullecourt Ave: Dead End to Bickell Rd	Dirt/Timber Log	50	0.8	2014/2015
Musgrave Street	Step Path	R-Musgrave St: Dead End to CS Concrete	Asphalt	7	1.2	2014/2015
Rangers Avenue	Step Path	R-Rangers Ave: Avenue Rd to Oswald St	Asphalt	23	1	2014/2015
Moss Lane	Step Path	R-Moss Ln: Dead End to End of Concrete	Gravel	10	1	2014/2015
Military Road	Footpath	L-Military Rd: Hale Rd to Twin Towers Walk	Asphalt	76	3.6	2014/2015

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Military Road	Footpath	L-Military Rd: Hale Rd to Twin Towers Walk	Asphalt	15	1.2	2014/2015
Military Road	Footpath	L-Military Rd: Twin Towers Walk to Spofforth St	Asphalt	35	4	2014/2015
Ourimbah Road	Footpath	L-Ourimbah Rd: Brady St to Cowles Rd	Concrete	139	1.5	2014/2015
Ourimbah Road	Footpath	L-Ourimbah Rd: Congewoi Rd to Macpherson St	Concrete	208	1.8	2014/2015
Ourimbah Road	Footpath	R-Ourimbah Rd: Brady St to Cowles Rd	Concrete	142	1.5	2014/2015
Spofforth Street	Footpath	R-Spofforth St: Concrete Pave to Rangers Rd	Asphalt	18	3.5	2015/2016
Spofforth Street	Footpath	R-Spofforth St: Rangers Rd to Military Rd	Asphalt	30	1	2015/2016
Raglan Street	Footpath	L-Raglan St/Gibson Rd to The Esplanade	Asphalt	45	1.4	2015/2016
Avenue Road	Footpath	L-Avenue Rd: Rangers Rd to Noble St	Asphalt	34	1.8	2015/2016
Macpherson Street	Footpath	R-Macpherson St: Ourimbah Rd to Wyong Rd	Concrete	44	1.8	2015/2016
Lower Almora Street	Footpath	L-Lower Almora St: The Esplanade to Ryan Ave	Asphalt	8	1.4	2015/2016
Heydon Street	Footpath	R-Heydon St: Ourimbah Rd to Dead End	Asphalt	55	1.5	2015/2016
Cardinal Street	Footpath	R-Cardinal St: Bend to Concrete Pavement	Asphalt	158	1.2	2015/2016
Cardinal Street	Footpath	L-Cardinal St: Bend to Concrete Pavement	Asphalt	107	1.2	2015/2016
Superba Parade	Footpath	R-Superba Pde: Lower End to Mandolong Rd	Concrete	72	2.3	2015/2016
Morella Road	Footpath	R-Morella Rd: David St to Concrete Section	Concrete	100	1.8	2015/2016
Morella Road	Footpath	R-Morella Rd: David St to Concrete Section	Concrete	15	1.8	2015/2016

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Almora Lane	Footpath	R-Almora Ln: Almora St to Beach Ln	Asphalt	95	0.9	2015/2016
Avenue Road	Footpath	R-Avenue Rd: Rangers Ave to Noble St	Concrete	150	1.6	2015/2016
Ourimbah Road	Footpath	R-Ourimbah Rd: Cowles Rd to Roseberry St	Concrete	164	1.8	2015/2016
Bradleys Head Road	Footpath	L-Bradleys Head Rd: Thompson St to Union St	Concrete	285	2	2015/2016
Sarah's Walk	Step Path	R-Sarah's Walk/Morella Rd to Dead End	Concrete	50	2	2015/2016
Park Avenue	Step Path	R-Park Ave: Rangers Ave to Dead End	Concrete Paver	47	1.2	2015/2016
Queen Street	Footpath	R-Queen St: Milner Ln to Raglan St	Concrete	124	1.7	2015/2016
Queen Street	Footpath	R-Queen St: Milton Ave to Prince Albert St	Concrete	40	1.8	2015/2016
Queen Street	Footpath	L-Queen St: Milton Ave to Prince Albert St	Concrete	122	1.8	2015/2016
Prince Albert Street	Footpath	R-Prince Albert St: Queen St to Milner St	Concrete	122	1.8	2015/2016
Earl Street	Footpath	R-Earl St: Bond St to Countess St	Concrete	90	1.5	2016/2017
Cowles Road	Footpath	RR-Cowles Rd: Ourimbah Rd to Awaba St	Concrete	168	1.5	2016/2017
Bradleys Head Road	Footpath	R-Bradleys Head Rd: Thompson St to Union St	Concrete	93	1.8	2016/2017
Bradleys Head Road	Footpath	L-Bradleys Head Rd: Whiting Beach Rd to Thompson St	Concrete	234	2	2016/2017
Avenue Road	Footpath	R-Avenue Rd: Rangers Ave to Noble St	Concrete	137	1.8	2016/2017
Arbutus Street	Step Path	R-Arbutus St: Almora St to Mandolong Rd	Concrete	3	0.8	2016/2017
Fairfax Road	Step Path	L-Fairfax Rd: Burran Ave to No.5 Fairfax Rd	Concrete	15	1.5	2016/2017
Queen Street	Footpath	R-Queen St: Bradleys Head Rd to Milton St	Concrete	65	1.8	2016/2017

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Vista Street	Footpath	R-Vista St: Belmont Rd to Military Rd	Concrete	225	1.2	2016/2017
Queen Street	Footpath	R-Queen St: Milton Ave to Prince Albert St	Concrete	93	1.8	2016/2017
Queen Street	Footpath	L-Queen St: Bradleys Head Rd to Milton Ave	Concrete	59	1.9	2016/2017
Belmont Road	Footpath	L-Belmont Rd: Noble St to Gladstone Ave	Concrete	250	1.5	2016/2017
Cowles Road	Footpath	R-Cowles Rd: Awaba St to Wyong Rd	Concrete	73	1.5	2016/2017
Prince Albert Street	Footpath	R-Prince Albert St: Union St to Queen St	Concrete	148	1.8	2016/2017
Mandolong Road	Step Path	R-Mandolong RdL No.25 to Arbutus St	Concrete	38	0.8	2016/2017
Pretoria Avenue	Step Path	R-Pretoria Ave: Wolseley Rd to Dayrell Ave	Concrete	22	1.1	2016/2017
Pretoria Avenue	Step Path	R-Pretoria Ave: Wolseley Rd to Dayrell Ave	Concrete	110	1.1	2016/2017
Prince Albert Street	Footpath	L-Prince Albert St: Union St to Queen St	Concrete	167	1.8	2017/2018
Parriwi Road	Footpath	R-Parriwi Rd: No.4 to No.17 Parriwi Rd	Concrete	61	1.5	2017/2018
Parriwi Road	Footpath	R-Parriwi Rd: No.17 to End of Concrete Kerb	Concrete	150	1.5	2017/2018
Awaba Street	Footpath	R-Awaba St: Countess St to Congewoi Rd	Paving Brick	85	1.35	2017/2018
Wolseley Road	Footpath	R-Wolseley Rd (Lower)/Mulbring St to Cullen Ave	Concrete	38	1.1	2017/2018
Union Street	Footpath	R-Union St/Bradleys Head Rd to Milton Ave	Concrete	115	1.5	2017/2018
Union Street	Footpath	R-Union St/Milton Ave to Prince Albert St	Concrete	123	1.8	2017/2018
Union Street	Footpath	L-Union St/Bradleys Head Rd to Milton Ave	Concrete	95	1.7	2017/2018
Union Street	Footpath	L-Union St/Milton Ave to Prince Albert St	Concrete	140	1.7	2017/2018
Redan Street	Footpath	R-Redan St: Raglan St to Balmoral Ave	Concrete	10	2	2017/2018

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Raglan Street	Footpath	R-Raglan St: Calypso Ave to Canrobert St	Concrete	183	1.4	2017/2018
Raglan Street	Footpath	R-Raglan St: Canrobert St to Milner St	Concrete	127	1.4	2017/2018
Prince Street	Footpath	R-Prince St: Military Rd to Macpherson St	Concrete	115	1.5	2017/2018
Morella Road	Footpath	R-Morella Rd: Kardinia Rd to David St CS	Concrete	35	1.5	2017/2018
Milner Street	Footpath	R-Milner St: Prince Albert St to Milner Ln	Concrete	59	1.8	2017/2018
Middle Head Road	Footpath	R-Middle Head Rd: Cobbittee St to Kahibah Rd	Concrete	76	1.8	2017/2018
Methuen Avenue	Footpath	R-Methuen Ave: Middle Head Rd to Wolseley Rd	Concrete	57	1.5	2017/2018
Melrose Street	Footpath	R-Melrose St: Bardwell Rd to Military Rd	Concrete	40	1.3	2017/2018
McLeod Street	Footpath	R-McLeod St: Trumfield Ln to Dead End	Concrete	75	1	2017/2018
Shadforth Street	Footpath	R-Shadforth St: CS past Hamlet Ln to Avenue Rd	Concrete	81	1.3	2017/2018
Prince Albert Street	Footpath	R-Prince Albert St: Lennox St to Elfrida St	Concrete	85	1.5	2017/2018
Prince Albert Street	Footpath	R-Prince Albert St: Lennox St to Elfrida St	Concrete	85	1.8	2017/2018
Prince Albert Street	Footpath	L-Prince Albert St: Elfrida St to Union St	Concrete	156	1.8	2017/2018
Cabramatta Road	Footpath	L-Cabramatta Rd: Bardwell St to Spofforth St	Concrete	412	1.5	2018/2019
Buena Vista Avenue	Footpath	R-Buena Vista Ave: Dead End to Thompson St	Concrete	23	1.8	2018/2019
Magic Grove	Footpath	L-Magic Grove: Mistral Ave to Calypso Ave	Concrete	27	0.8	2018/2019
Lennox Street	Footpath	R-Lennox St: Prince Albert Street to Dead End	Concrete	115	1.8	2018/2019

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Lennox Street	Footpath	L-Lennox St: Prince Albert St to Dead End	Concrete	115	1.8	2018/2019
Kirkoswald Avenue	Footpath	R-Kirkoswald Ave: Tivoli St to Bend	Concrete	163	1.5	2018/2019
King Max Street	Footpath	R-King Max St: Bradleys Head Rd to Middle Head Rd	Concrete	15	2.3	2018/2019
King Max Street	Footpath	R-King Max St: Bradleys Head Rd to Middle Head Rd	Concrete	133	1.4	2018/2019
Kardinia Road	Footpath	L-Kardinia Rd: Morella Rd to Lane	Concrete	15	1.8	2018/2019
Illawarra Street	Footpath	R-Illawarra St: Dead End to Raglan St	Conc/Asphalt	18	3.5	2018/2019
Holt Avenue	Footpath	L-Holt Ave: Cowles Rd to Bardwell Ln	Concrete	230	1.4	2018/2019
Harston Avenue	Footpath	R-Harston Ave: Dead End to Carrington Ave	Concrete	10	1.4	2018/2019
Edwards Bay Road	Footpath	R-Edwards Bay Rd: Wyargine St to The Grove	Concrete	202	1.8	2018/2019
Countess Street	Footpath	R-Countess St: Ourimbah Rd to Wyong Rd	Concrete	305	1.8	2018/2019
Countess Street	Footpath	L-Countess St: Ourimbah Rd to Wyong Rd	Concrete	304	1.8	2019/2020
Clanalpine Street	Footpath	L-Clanalpine St: Magic Grove to Queen St	Concrete	38	1.8	2019/2020
Calypso Avenue	Footpath	R-Calypso Ave: Clanalpine St to Magic Grove	Concrete	51	1.8	2019/2020
Balmoral Avenue	Footpath	L-Balmoral Ave: Raglan St to Redan St	Concrete	112	1.1	2019/2020
Calypso Avenue	Footpath	L-Calypso Ave: Magic Grove to Raglan St	Concrete	77	1.8	2019/2020
Cabban Street	Footpath	R-Cabban St: Elfrida St to Sirius Cove Rd	Concrete	100	1.8	2019/2020
Stanton Road	Footpath	R-Stanton Rd: Tivoli St to Spit Rd	Concrete	292	1.8	2019/2020
Stanton Road	Footpath	L-Stanton Rd: Tivoli St to Spit Rd	Concrete	303	1.8	2019/2020

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Spit Road	Footpath	R-Spit Rd: Military Rd to Ourimbah Rd	Concrete	30	3.4	2019/2020
Spit Road	Footpath	L-Spit Rd: Military Rd to Ourimbah Rd	Concrete	25	3.5	2019/2020
Raglan Street	Footpath	L-Raglan St: Want St to Military Rd	Concrete	111	1.9	2019/2020
Government Road	Footpath	L-Government Rd: Bend to Dead End	Concrete	26	1.5	2019/2020
Raglan Street	Footpath	L-Raglan St: Milner St to Want St	Concrete	216	1.9	2019/2020
Spit Road	Footpath	L-Spit Rd: Medusa St to Pearl Bay Ave	Asphalt	26	1.8	2019/2020
Spit Road	Footpath	R-Spit Rd: Ourimbah Rd to Medusa St	Concrete	125	1.5	2019/2020
Raglan Street	Footpath	L-Raglan St: Military Rd to Cullen Ave	Concrete	100	1.6	2019/2020
Ourimbah Road	Footpath	L-Ourimbah Rd: Cowles Rd to Roseberry St	Concrete	168	1.8	2020/2021
Bradleys Head Road	Footpath	L-Bradleys Head Rd: Union St to King Max St	Concrete	25	2.5	2020/2021
Belmont Road	Footpath	L-Belmont Rd: Military Rd to Bardwell Rd	Concrete	263	1.5	2020/2021
Belmont Road	Footpath	R-Belmont Rd: Military Rd to Bardwell Rd	Concrete	274	1.5	2020/2021
Illawarra Street	Footpath	R-Illawarra St: Curlew Camp Rd to Dead End	Concrete	65	1.8	2020/2021
Mosman Street	Footpath	R-Mosman St: Trumfield Ln to Badham Ave	Concrete	6	1	2020/2021
Brady Street	Footpath	L-Brady St: Telecom Entry to Ourimbah Rd	Concrete	62	1.5	2020/2021
Beauty Point Road	Footpath	R-Beauty Point Rd: Marsala St to Pindari Ave	Concrete	112	1.8	2020/2021
Balmoral Avenue	Footpath	R-Balmoral Ave: Raglan St to Redan St	Concrete	161	1.6	2020/2021
Inkerman Street	Step Path	R-Inkerman St: Dead End to Carrington Ave	Concrete	34	1.8	2020/2021
Moran Street	Step Path	L-Moran St: Sverge St to Dead End	Concrete	28	1.3	2020/2021
Mulbring Street	Step Path	R-Mulbring St: Wolseley Rd to Dugald Rd	Concrete	39	1	2020/2021

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
David Street	Footpath	L-David St: Morella Rd to Burrawong Ave	Concrete	31	1.8	2020/2021
Dalton Road	Footpath	R-Dalton Rd/Dead End to Cowles Rd	Concrete	397	1.65	2020/2021
Kahibah Road	Step Path	R-Kahibah Rd: Coronation Ave to Dead End	Dirt	80	0.8	2020/2021
Pulpit Lane	Step Path	R-Pulpit Ln: Bay St to Reserve	Dirt	30	0.7	2020/2021
Warringah Road	Step Path	L-Warringah Rd: No.1 to Bend	Dirt	5	1	2020/2021
Wyong Road	Footpath	L-Wyong Rd: Macpherson St to Dead End	Asphalt (brick edge)	15	1.8	2020/2021
Belmont Road	Footpath	R-Belmont Rd: Gladstone Ave to Military Rd	Asphalt	120	1.3	2020/2021
Spofforth Street	Step Path	R-Spofforth St: Creek to Boyle St	Asphalt	62	1.1	2020/2021
Upper Spit Road	Step Path	R-Upper Spit Rd: Spit Rd to End	Asphalt	51	0.9	2020/2021
Reginald Street	Footpath	L-Reginald St: Oswald St to No.13 Reginald St	Asphalt	60	1	2020/2021
Musgrave Street	Footpath	R-Musgrave St: McLeod St to Raglan St	Asphalt	40	1	2020/2021
King Max Street	Footpath	R-King Max StL Bradleys Head Rd to Middle Head Rd	Asphalt	15	3	2020/2021
Orlando Avenue	Step Path	R-Orlando Ave: Boyle St to Dead End	Asphalt	62	1.1	2020/2021
Fairfax Road	Step Path	L-Fairfax Rd: Stanton Rd to Burran Ave	Gravel	20	1	2020/2021
Newton Lane	Footpath	R-Newton Ln: Medusa St to Dead End	Asphalt	49	2.4	2021/2022
Martens Lane	Footpath	R-Martens Ln: Middle Head Rd to Raglan St	Asphalt	3	1	2021/2022
Bardwell Lane	Footpath	R-Bardwell Ln: Spencer Rd to Cabramatta Rd	Asphalt	20	1.2	2021/2022

Street Location	Type	Segment	Material	Length (m)	Width (m)	Forecast Renewal Year
Ruby Street	Footpath	R-Ruby St/Thompson St to Union St	Concrete	17	1.7	2021/2022
Holt Avenue	Footpath	R-Holt Ave: Bardwell Ln to Spofforth St	Concrete	290	1.4	2021/2022
Whiting Beach Road	Footpath	R-Whiting Beach Rd/Bradleys Head Rd to Prince Albert St	Concrete	107	1.9	2021/2022
Vista Street	Footpath	L-Vista St: Belmont Rd to Military Rd	Concrete	225	1.2	2021/2022
Spofforth Street	Footpath	R-Spofforth St: Boyle St to Concrete Pavement	Concrete	125	1.4	2021/2022
Spit Road	Footpath	R-Spit Rd: Ourimbah Rd to Medusa St	Concrete	216	1.4	2021/2022
Spit Road	Footpath	L-Spit Rd: Ourimbah Rd to Medusa St	Concrete	177	1.3	2021/2022
Spit Road	Footpath	L-Spit Rd: Ourimbah Rd to Medusa St	Concrete	50	1.4	2021/2022
Spit Road	Footpath	L-Spit Rd: Ourimbah Rd to Medusa St	Concrete	88	1.5	2021/2022
Spit Road	Footpath	L-Spit Rd: Ourimbah Rd to Medusa St	Concrete	44	1.5	2021/2022
Spencer Road	Footpath	R-Spencer Rd: Bardwell Ln to Spofforth St	Concrete	207	1.5	2021/2022
Raglan Street	Footpath	R-Raglan St/Cullen Ave to Gibson Rd	Concrete	8	3	2021/2022
Mandolong Road	Footpath	L-Mandolong Rd: Lavoni St to Superba Pde	Concrete	192	1.5	2021/2022
Mandolong Road	Footpath	L-Mandolong Rd: Superba Pde to Little St	Concrete	94	1.5	2021/2022
Mandolong Road	Footpath	L-Mandolong Rd: Little St to Moruben Rd	Concrete	105	1.2	2021/2022
Mandolong Road	Footpath	R-Mandolong Rd: The Esplanade to Lavoni St	Concrete	180	1.5	2021/2022

E.2 Road Pavements

E2.1 Description of Road Pavement Network

Council's road network is based on the following road hierarchy:

- Arterial
- Regional
- Collector
- Local

Council is responsible for the care and management of regional, collector and local roads. Arterial road pavements are under the control of the Roads and Maritime Services (RMS). The RMS also provides some supporting maintenance funding for regional roads via grants.

There is currently some dispute with the RMS regarding some arterial roads (Military Road between Spit and Bradleys Head Road, Bradleys Head Road and Athol Wharf Road) in terms of management and maintenance responsibility.

A plan illustrating Council's road hierarchy is attached in Appendix A.

There are 1,486,179 m^2 of road pavement including:

- 17,110 m (100,558m^2) rigid concrete pavements;
- 82,220 m (692,674m^2) flexible (road base) pavements;
- 83,014 m (691,523m^2) asphalt surface course (seals); and
- 303 m (1,423m^2) paving brick surfaces.

Typical footpath unit rates and useful lives are as follows:

Road Pavement Type		Unit	Useful Life (yrs)	Unit Rate
AC Surface Course	30mm	m^2	35	$23.00
	40mm	m^2	35	$28.00
	50mm	m^2	35	$33.00
Flexible Pavement	150 thick	m^2	90	$72.00
	200 thick	m^2	90	$92.00
	250 thick	m^2	90	$112.00

Road Pavement Type		Unit	Useful Life (yrs)	Unit Rate
	300 thick	m^2	90	$132.00
	350 thick	m^2	90	$152.00
Reinforced Concrete	200 thick	m^2	120	$181.00
	150 thick	m^2	120	$205.00
	100 thick	m^2	120	$114.00
Paving Bricks	pavers (interlocking) excl underlying pavement	m^2	50	$116.05

The break up of road pavements into material type is as follows:

Material Type	Current Replacement Cost	Depreciable Amount	Accumulated Depreciation as at 30 June 2013	Annual Depreciation	Depreciated Replacement Cost
Concrete	$17,325,776	$17,325,776	$8,368,438	$144,381	$8,957,339
Flexible	$80,820,889	$80,820,889	$41,533,075	$898,010	$39,287,814
Seal	$19,828,078	$19,828,078	$6,740,165	$566,517	$13,087,913
Paving Brick	$165,186	$165,186	$53,962	$3,304	$111,223
TOTAL	**$118,139,929**	**$118,139,929**	**$56,695,641**	**$1,612,212**	**$61,444,288**

A range of flexible road pavement materials have been used including railway ballast and sandstone quarried from the local area. There are also a significant number of road pavements which were constructed of reinforced and in some cases unreinforced concrete, many of which have been overlaid with asphalt surfacing over the last few decades. Asphalt seals have generally been applied and renewed periodically over the last few decades as funds permit and condition warrants.

Roads

Council has categorised road pavements into three (3) categories based on location and environment:

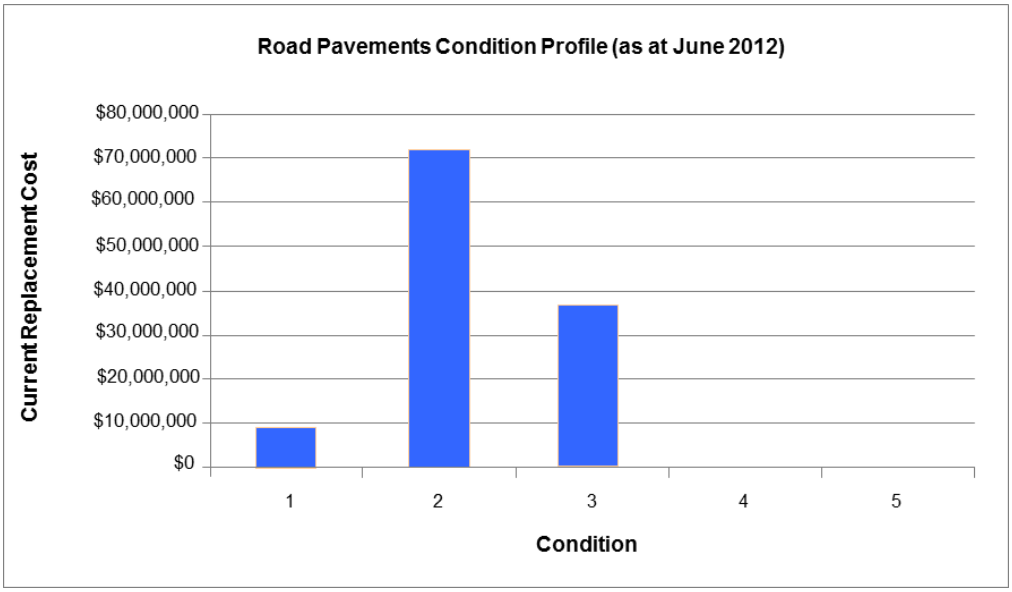
Category 1	Category 2	Category 3
Arterial, Regional	Collector	Local
High traffic volumes	Medium/High traffic volumes	Low/Medium traffic volumes
Council controlled/ maintained (Spit Road/part Military Road are RMS controlled/maintained)	Council controlled/ maintained	Council controlled/ maintained

The categorisation guides maintenance service levels including maintenance intervention levels and response times.

E2.2 Road Pavement Condition

The assessment is based on a range of factors including a visual assessment that, for example, considers the nature and extent of defects such as cracking (environmental and fatigue) and rutting. Physical testing results for roughness and texture have also been considered.

The condition profile (June 2012) of the road pavement network is as follows:



E2.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	98%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	2%

E2.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, road pavements valued at $73,242 (approximately 0.06% of road pavement network) are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A road pavement maintenance priority list has been prepared to repair defects in road pavements. Identified defect are repaired subject to available resources. Additionally, road pavements in or approaching condition 4 and 5 are prioritised for renewal in the Road Pavement Renewal Program.

E2.5 Current Maintenance and Renewal Strategies

Typical road pavement maintenance activities include:

- Reconstructing small road pavement and surface failures;
- Pothole filling/patching;
- Crack sealing of concrete pavements and asphalt seals using a bituminous sealant;
- Repair of edges of asphalt seals where edges have frayed/cracked; and
- Restoration of road openings.

Examples of 'low lifecycle cost' methods include flexible road pavement reconstruction using 'mill and fill' deep lift asphalt techniques or rationalising road widths where appropriate.

In developing the road pavements resealing program 'mill and fill' or overlay treatments have been adopted on the following basis:

- Arterial/Regional/Collector Roads – 50mm reseal;
- Local Roads – 40mm reseal; and
- Lanes – 30mm reseal.

Where roads are considered for 'mill and fill' it is recommended that a thin (approx 15mm) layer be milled in readiness for the proposed asphaltic concrete (AC) overlay. The thickness of the overlay should be in accord with the above reseal thickness framework however local road reseals may be varied between 30 and 40mm thickness.

In some cases more significant structural AC overlays have been considered and costed i.e. Military Road and Athol Wharf Road. When roads are due for resurfacing then more detailed assessment should be carried out prior to finalising works.

Council is considering trialing inexpensive 'seal rejuvenation' treatments such as using thin bitumen based 'liquid road' seals to prolong the life of the surface course in appropriate locations. Generally rejuvenation treatment is best applied to local roads or lightly trafficked collector roads where existing seals have aged but have not significantly oxidized to a point of surface being brittle. Surfaces with minor environmental surface cracking can be rejuvenated following sealing of any more significant cracks. Surfaces with significant cracking should not be rejuvenated.

Rejuvenation is economical and may assist in prolonging the life of existing seals by in the order of 5 years. An extensive rejuvenation program can obviously have a significant effect in extending required program resurfacing costs over longer timeframes and the net effect is reduced average annual expenditure required for surface seal renewal. Council may undertake a basic economic analysis prior to pursuing any significant rejuvenation program and subject to trials proving successful.

Over the last few years Council has also trialled asphaltic concrete ('stone-mastic') overlays over concrete pavements however currently this is being reviewed given the mixed results.

E2.6 Recent Expenditure Profile

Road pavement expenditure ($000s, excluding restoration expenditure) over the last few years is outlined in the following table:

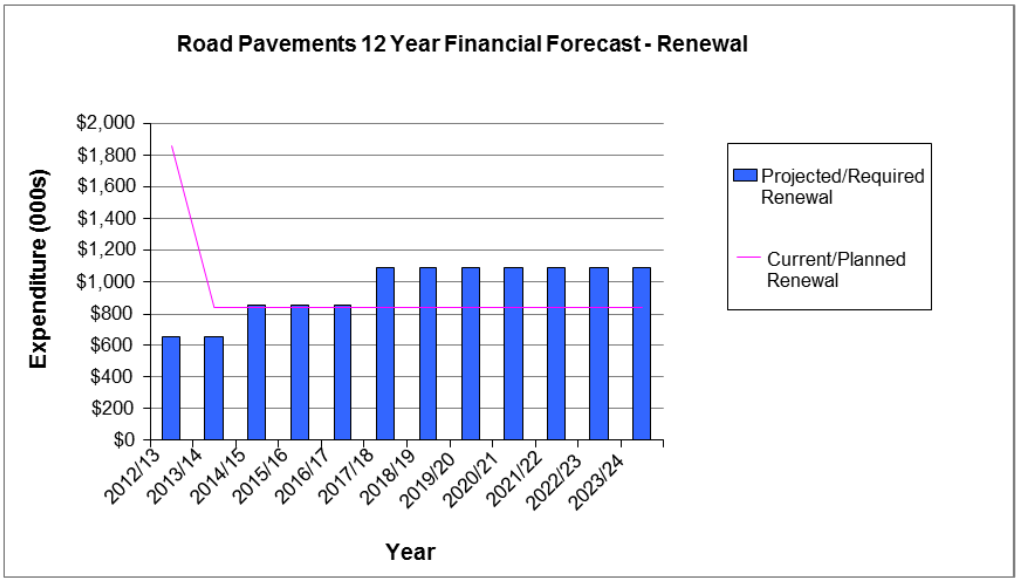
	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	190	150	76	136	129	136
Renewals	1,047	739	746	782	893	841
New Work	0	0	120	0	0	24
TOTAL	**1,237**	**889**	**942**	**918**	**1,022**	**978**

E2.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to increase over time as the asset stock ages. All costs are shown in 2012 dollar values.

Road Pavement 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/ Required Expenditure	648	648	855	855	855	1,090	1,090	1,090	1,090	1,090	1,090	1,090
Planned/ Current Expenditure	1,856*	841	841	841	841	841	841	841	841	841	841	841
Funding Gap	-1,208	-193	14	14	14	249	249	249	249	249	249	249
Cumulative Funding Gap	-1,208	-1,401	-1,387	-1,373	-1,359	-1,110	-861	-612	-363	-114	135	384

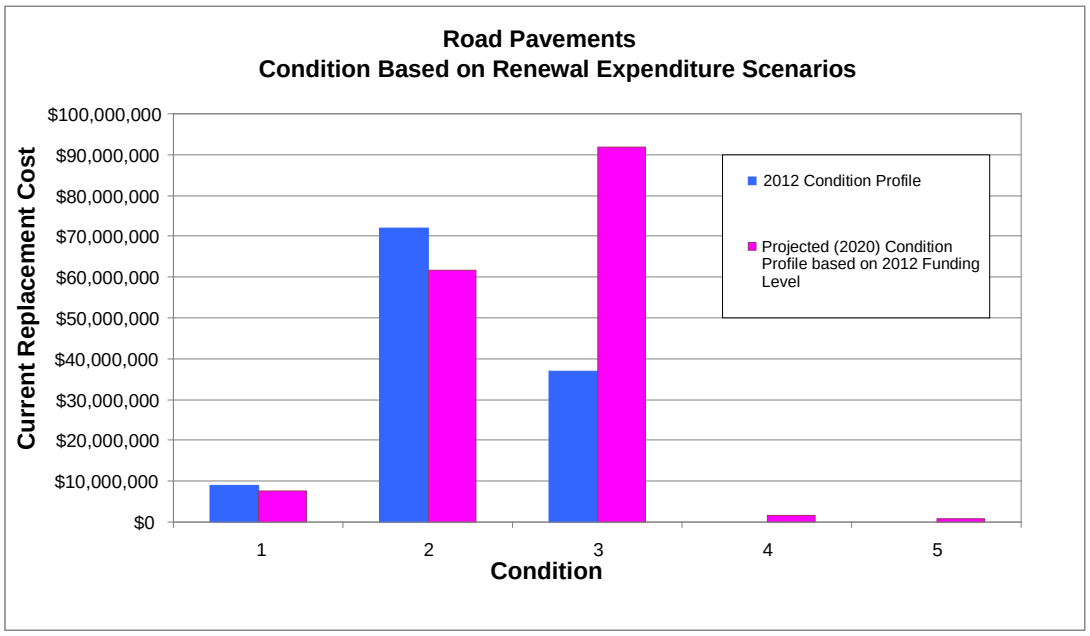
*2012/2013 planned/current spend is inclusive of a one-off $1,015,000 expenditure on road pavements under the NSW Government Local Infrastructure Renewal Scheme (LIRS).



It is also proposed that the above annual renewal funding be complemented by an increase in the road pavement maintenance allocation to $265,000 per year.

E2.8 Projected Condition

Utilising 2012 funding levels, the future projected condition of Council's road pavements in 2020 are as follows. This has been compared to the condition of assets in 2012.



If Council continues to fund road pavement renewals at 2012 level there will be some deterioration over the next 8 years including a significant percentage of falling into the condition 3 range.

E2.9 10 Year Work Program

A 10 year road pavement assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed.

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Bardwell Lane	Road Pavement Asphalt Seal	Bardwell Ln: Holt Ave to Spencer Rd	85	4	2012/2013
Bardwell Rd	Road Pavement Asphalt Seal	Bardwell Rd: Military Rd to Earl St	90	12	2012/2013
Brady Street	Road Pavement Asphalt Seal	Brady St: Military Rd for 94 metres	94	10	2012/2013
Bray Street	Flexible Pavement	Bray St: Congewoi Rd to Macpherson St	208	4.2	2012/2013
Bray Street	Road Pavement Asphalt Seal	Bray St: Congewoi Rd to Macpherson St	208	4.2	2012/2013
Cartref Lane	Road Pavement Asphalt Seal	Cartref Ln: Brierley St to Rangers Ave	81	4.3	2012/2013
Croquet Lane	Flexible Pavement	Croquet Ln: Alexander Ave to Middle Head Rd	172	4.5	2012/2013
Croquet Lane	Road Pavement Asphalt Seal	Croquet Ln: Alexander Ave to Middle Head Rd	172	4.5	2012/2013
Hordern Lane	Road Pavement Asphalt Seal	Hordern Ln: Ourimbah Rd to End	97	4.8	2012/2013
Hunter Road	Road Pavement Asphalt Seal	Hunter Rd: The Esplanade to Dead End	238	11.4	2012/2013
Kallaroo Street	Road Pavement Asphalt Seal	Kallaroo St: Dead End to Clanalpine St	55	7	2012/2013
Lennon Lane	Road Pavement Asphalt Seal	Lennon Ln: End to Gouldsbury St	41	15	2012/2013
Lennon Lane	Road Pavement Asphalt Seal	Lennon Ln: End to Gouldsbury St	48	4.6	2012/2013
Macpherson Street	Flexible Pavement	Macpherson St: Prince St to Erith St			2012/2013
Macpherson Street	Road Pavement Asphalt Seal	Macpherson St: Prince St to Erith St			2012/2013
Royalist Road	Road Pavement Asphalt Seal	Royalist Rd/Boyle St to Dead End	40	3.5	2012/2013
Sirius Park Access Road	Flexible Pavement	Sirius Park Access/Curlew Camp Rd to Sirius Cove Rd	193	8	2012/2013
Sirius Park Access Road	Road Pavement Asphalt Seal	Sirius Park Access/Curlew Camp Rd to Sirius Cove Rd	193	8	2012/2013

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Stanton Road	Road Pavement Asphalt Seal	Intersection of Spit and Stanton			2012/2013
Superba Lane	Flexible Pavement	Superba Ln: Almora St to Superba Pde	161	4.4	2012/2013
Superba Lane	Road Pavement Asphalt Seal	Superba Ln: Almora St to Superba Pde	161	4.4	2012/2013
The Esplanade	Flexible Pavement	The Esplanade: Awaba Street to End	140	12	2012/2013
The Esplanade	Road Pavement Asphalt Seal	The Esplanade: Awaba Street to End	140	12	2012/2013
Athol Wharf Road	Flexible Pavement	Athol Wharf Rd: Lower Zoo Entrance to CS End	244	9.8	2013/2014
Athol Wharf Road	Flexible Pavement	Athol Wharf Rd: Lower Zoo Entrance to CS End	244	9.8	2013/2014
Athol Wharf Road	Road Pavement Asphalt Seal	Athol Wharf Rd: Lower Zoo Entrance to CS End	244	9.8	2013/2014
Awaba Street	Road Pavement Asphalt Seal	Awaba St: Cowles Rd to Bond St	61	11.9	2013/2014
Awaba Street	Road Pavement Asphalt Seal	Awaba St: Bond St to Countess St	193	11.9	2013/2014
Awaba Street	Road Pavement Asphalt Seal	Awaba St: Spit Rd to Cowles Rd	427	11.8	2013/2014
Beauty Point Road	Road Pavement Asphalt Seal	Beauty Point Rd: Marsala St to Pindari Lower	117	8.1	2013/2014
Bickell Road	Road Pavement Asphalt Seal	Bapaume Rd to Ryrie St			2013/2014
Bloxsome Lane	Road Pavement Asphalt Seal	Blozsome Ln: Dead End to Rangers Ave	43	2.4	2013/2014
Bond Street	Road Pavement Asphalt Seal	Bond St: Military Rd to Ourimbah Rd	254	12	2013/2014
Burrogy Lane	Road Pavement Asphalt Seal	Burrogy Ln: Bond St to Cardinal St	64	2.7	2013/2014
Cabramatta Road	Road Pavement Asphalt Seal	Cabramatta Rd: Cowles Rd to Bardwell Rd	245	11.6	2013/2014
Carney Lane	Road Pavement Asphalt Seal	Carney Ln: Parking Area to Avenue Rd	45	4.6	2013/2014

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Cedric Lane	Road Pavement Asphalt Seal	Cedric Ln: Wenban Ln to Mulbring St	89	3.5	2013/2014
Dream House Lane	Road Pavement Asphalt Seal	Dream House Ln: Spit Rd to End	29	4.7	2013/2014
Kiora Aveneu	Flexible Pavement	Kiora Ave: Lower No.3 Kiora Ave to End	175	5.5	2013/2014
Kiora Aveneu	Flexible Pavement	Kiora Ave: Upper No.14 to Dead End	76	5.6	2013/2014
Kiora Aveneu	Road Pavement Asphalt Seal	Kiora Ave: Lower No.3 Kiora Ave to End	175	5.5	2013/2014
Kiora Aveneu	Road Pavement Asphalt Seal	Kiora Ave: Upper No.14 to Dead End	76	5.6	2013/2014
Military Road	Road Pavement Asphalt Seal	Spit Junction to Raglan			2013/2014
Parriwi Road	Flexible Pavement	Parriwi Rd: Concrete Kerb to Spit Rd	120	9	2013/2014
Parriwi Road	Flexible Pavement	Parriwi Rd: End Concrete Kerb to Conc Kerb	310	9	2013/2014
Parriwi Road	Road Pavement Asphalt Seal	Parriwi Rd: Concrete Kerb to Spit Rd	120	9	2013/2014
Parriwi Road	Road Pavement Asphalt Seal	Parriwi Rd: End Concrete Kerb to Conc Kerb	310	9	2013/2014
Prince Street	Flexible Pavement	Prince Street: Cowles Rd to Macpherson St	570	9.6	2013/2014
Punch Lane	Road Pavement Asphalt Seal	Punch Ln: Bend to Awaba St	180	5.7	2013/2014
Punch Lane	Road Pavement Asphalt Seal	Punch Ln: Punch St to Bend	66	4	2013/2014
Raglan Street	Road Pavement Asphalt Seal	Illawarra St to Dead End			2013/2014
Raglan Street		Raglan St: The Esplanade to Esther Rd			2013/2014
Rangers Avenue		Rangers Ave: avenue Rd to Oswald St	374	8	2013/2014
Spofforth Street	Conc Pavement	Spofforth St: Florence Ln to Rangers Rd			2013/2014
Spofforth Street	Conc Pavement	Spofforth St: Rangers Rd to Military Rd	392	12.6	2013/2014
Warringah Road	Road Pavement Asphalt Seal	Warringah Rd: Lower Bend to Divided Rd	92	8.2	2013/2014

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Warringah Road	Road Pavement Asphalt Seal	Warringah Rd: Upper Warringah Rd to Divided Rd	97	6.5	2013/2014
Wyong Road	Road Pavement Asphalt Seal	Wyong Rd: Inkerman St to Congewoi Rd (Sth)	76	6	2013/2014
Alexander Avenue	Road Pavement Asphalt Seal	Alexander Ave: Concrete to Effingham St	74	3.7	2014/2015
Almora Lane	Road Pavement Asphalt Seal	Almora Ln: Almora St to Evans Ln	104	4	2014/2015
Athol Wharf Road	Flexible Pavement	Athol Wharf Rd: Bradleys Head Rd to Lower Zoo Entrance	395	9	2014/2015
Athol Wharf Road	Road Pavement Asphalt Seal	Athol Wharf Rd: Bradleys Head Rd to Lower Zoo Entrance	395	9	2014/2015
Awaba Street	Flexible Pavement	Awaba St: Bond St to Countess St	193	11.9	2014/2015
Bardwell Road	Road Pavement Asphalt Seal	Bardwell Rd: Lane to Glover St	123	11.7	2014/2015
Bardwell Road	Road Pavement Asphalt Seal	Bardwell Rd: Melrose St to Military Rd	148	11.8	2014/2015
Clifton Street	Conc Pavement	Clifton St: Dead End to Burrawong Ave	153	4	2014/2015
Clifton Street	Flexible Pavement	Clifton St: Dead End to Burrawong Ave	160	3.6	2014/2015
Clifton Street	Road Pavement Asphalt Seal	Clifton St: Dead End to Burrawong Ave	160	3.6	2014/2015
Curraghbeena Road	Road Pavement Asphalt Seal	Curraghbeena Rd: Raglan St to Dead End	257	6.5	2014/2015
Cyprian Street	Road Pavement Asphalt Seal	Cyprian St: Concrete Pavement to Parriwi Rd	90	1	2014/2015
Edwards Bay Road	Road Pavement Asphalt Seal	Edwards Bay Rd: Wyargine St to The Grove	185	3	2014/2015
Eric Lane	Road Pavement Asphalt Seal	Eric Ln: Dead End to Earl St	50	4.9	2014/2015
Euryalus Street	Road Pavement Asphalt Seal	Euryalus St: Central Ave to Pindari Ave	309	8	2014/2015
Glover Lane	Road Pavement Asphalt Seal	Glover Ln: Cabramatta Rd to Glover St	103	3.9	2014/2015

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Glover Street	Road Pavement Asphalt Seal	Glover St: Cowles Rd to Bardwell St	236	11.6	2014/2015
Horsnell Lane	Road Pavement Asphalt Seal	Horsnell Ln: Field Ln to Civic Ln	120	5.2	2014/2015
Illawarra Street	Road Pavement Asphalt Seal	Illawarra St: Dead End to Raglan St	54	4.6	2014/2015
Killarney Street	Road Pavement Asphalt Seal	Killarney St: Bullecourt Ave to Glen St	86	2	2014/2015
Kirkoswald Avenue	Road Pavement Asphalt Seal	Kirkoswald Ave: Upper Fairfax Rd to Burran Ave	218	6.4	2014/2015
Lennon Lane	Flexible Pavement	Carpark: End to Gouldsbury St	41	15	2014/2015
Lennon Lane	Flexible Pavement	Carpark: End to Gouldsbury St	48	4.6	2014/2015
Magic Grove	Road Pavement Asphalt Seal	Magic Grove: Dead End to Mistral Ave	40	4.5	2014/2015
Mandolong Lane	Road Pavement Asphalt Seal	Mandolong Ln: End to Mandolong Rd	45	5	2014/2015
Musgrave Street	Road Pavement Asphalt Seal	Musgrave St: Dead End to CS Concrete	20	2.2	2014/2015
Quakers Road	Conc Pavement	Quakers RdL Bullecourt Ave to End	46	1.4	2014/2015
Quakers Road	Flexible Pavement	Quakers Rd: Dead End to ET KB Koowong Ave	50	5	2014/2015
Queen Street	Road Pavement Asphalt Seal	Queen St: Milner Ln to Raglan St	226	10	2014/2015
Royalist Road	Flexible Pavement	Royalist Rd/Boyle St to Dead End	40	3.5	2014/2015
Wunda Road	Road Pavement Asphalt Seal	Wunda Rd/Wolger Rd to Belmont Rd	252	11.2	2014/2015
Wyong Road	Road Pavement Asphalt Seal	Wyong Rd: Cowles Rd to Inkerman St	220	3.8	2014/2015
Albion Lane	Road Pavement Asphalt Seal	Albion Ln: Junction to Dead End	28	2.4	2015/2016
Albion Lane	Road Pavement Asphalt Seal	Albion Ln: The Crescent to Barrier	58	3.5	2015/2016

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Ballantyne Street	Road Pavement Asphalt Seal	Ballantyne St: Avenue Rd to Dead End	80	2.8	2015/2016
Ballantyne Street	Road Pavement Asphalt Seal	Ballantyne St: Avenue Rd to Dead End	52	3	2015/2016
Bardwell Road	Road Pavement Asphalt Seal	Bardwell Rd: Belmont Rd to Melrose St	211	11.8	2015/2016
Bardwell Road	Road Pavement Asphalt Seal	Bardwell Rd: Glover St to Belmont Rd	106	11.8	2015/2016
Bay Street	Road Pavement Asphalt Seal	Bay St: Beauty Point Rd to Delecta Ave	88	1.2	2015/2016
Bay Street	Road Pavement Asphalt Seal	Bay St: Beauty Point Rd to Delecta Ave	73	0.6	2015/2016
Bickell Road	Conc Pavement	Bickell Rd: Ryrie St to End Concrete	228	6	2015/2016
Boyle Street	Road Pavement Asphalt Seal	Boyle St: Dead End to Spofforth St Lower	246	5.5	2015/2016
Burran Avenue	Conc Pavement	Burran Ave: Service Road at Fairfax Rd	75	1.4	2015/2016
Carrington Avenue	Road Pavement Asphalt Seal	Carrington Ave: Glen St to Harston Ave	150	7.8	2015/2016
Cedric Lane	Flexible Pavement	Cedric Ln: Wenban Ln to Mulbring St	89	3.5	2015/2016
Dugald Road	Conc Pavement	Dugald Rd: Gordon St to Mulbring St	31	4.2	2015/2016
Gordon Street	Conc Pavement	Gordon St: Middle Head Rd to Bayview Ave	160	5.4	2015/2016
Gurrigal Street	Flexible Pavement	Gurrigal St: Nathan Ln to Military Rd	112	8.5	2015/2016
Gurrigal Street	Road Pavement Asphalt Seal	Gurrigal St: Nathan Ln to Military Rd	112	8.5	2015/2016
Illawarra Street	Road Pavement Asphalt Seal	Illawarra St: Curlew Camp Rd to Dead End	48	9.5	2015/2016
Illawarra Street	Road Pavement Asphalt Seal	Illawarra St: Dead End to Raglan St	24	11.4	2015/2016
James King Lane	Road Pavement Asphalt Seal	James King Ln: Union St to Queen St	169	5	2015/2016
Kirkoswald Avenue	Road Pavement Asphalt Seal	Kirkoswald Ave: Bend to Fairfax Rd	139	11.4	2015/2016
Kirkoswald Avenue	Road Pavement Asphalt Seal	Kirkoswald Ave: Tivoli St to Bend	153	6.5	2015/2016

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Lennox Street	Road Pavement Asphalt Seal	Lennox St: Prince Albert St to Dead End	255	9	2015/2016
Lower Almora Street	Road Pavement Asphalt Seal	Lower Almora St: The Esplanade to Ryan Ave	267	5.2	2015/2016
Macpherson street	Road Pavement Asphalt Seal	Macoherson St: Ourimbah Rd to Wyong Rd	318	11.8	2015/2016
Magic Grove	Flexible Pavement	Magic Grove: Cabban St to Clanalpine St	60	5.6	2015/2016
Magic Grove	Road Pavement Asphalt Seal	Magic Grove: Cabban St to Clanalpine St	60	5.6	2015/2016
Moruben Road	Road Pavement Asphalt Seal	Moruben Rd: Punch St to Awaba St	237	10	2015/2016
Musgrave Street	Flexible Pavement	Musgrave St: McLeod St to Raglan St	179	8	2015/2016
Musgrave Street	Road Pavement Asphalt Seal	Musgrave St: CS End Concrete to McLeod St	300	5.5	2015/2016
Musgrave Street	Road Pavement Asphalt Seal	Musgrave St: McLeod St to Raglan St	179	8	2015/2016
Muston Street	Road Pavement Asphalt Seal	Muston St: Almora St to Melaleuca Ln	130	12	2015/2016
Pindari Avenue	Road Pavement Asphalt Seal	Pindari Ave: Central Ave to Medusa St	106	5.5	2015/2016
Pindari Avenue	Road Pavement Asphalt Seal	Pindari Ave: Medusa St to Government Rd	95	6	2015/2016
Prince Street	Road Pavement Asphalt Seal	Prince St: Military Rd to Macpherson St	117	12	2015/2016
Pursell Avenue	Road Pavement Asphalt Seal	Pursell Ave: Medusa St to Dead End	87	6.2	2015/2016
Quakers Road	Road Pavement Asphalt Seal	Quakers Rd: Spit Rd to Ryrie St	118	5.4	2015/2016
Roseberry Street	Road Pavement Asphalt Seal	Roseberry St: Earl St to Ourimbah Rd	183	11.4	2015/2016
Sabina Street	Road Pavement Asphalt Seal	Sabina St: Dead End to Tivoli St	54	6	2015/2016
Shellbank Avenue	Road Pavement Asphalt Seal	Shellbank Ave: Wyong Rd Sth to Wyong Rd Nth	328	4.8	2015/2016
Short Street	Road Pavement Asphalt Seal	Short St: Myahgah Rd to Vista St	46	1.3	2015/2016

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Short Street	Road Pavement Asphalt Seal	Short St: Vista St to Harbour St	86	3.2	2015/2016
Sirius Cove Road	Road Pavement Asphalt Seal	Sirius Cove Rd/Dead End at Carpark to Lennox St	112	7	2015/2016
Sirius Cove Road	Road Pavement Asphalt Seal	Sirius Cove Rd: Lennox St to Water Ln	62	7.7	2015/2016
Spencer Road	Road Pavement Asphalt Seal	Spencer Rd: Cowles Rd to Bardwell Ln	238	11.8	2015/2016
Superba Parade	Road Pavement Asphalt Seal	Superba Pde: Lower End to Mandolong Rd	139	6.8	2015/2016
Sverge Street	Road Pavement Asphalt Seal	Sverge St/Moran St to Clanalpine St	59	6	2015/2016
Tennis Court Lane	Road Pavement Asphalt Seal	Tennis Court Ln: Countess St to Bend	46	2.7	2015/2016
Thompson Street	Road Pavement Asphalt Seal	Thompson St/Bradleys Head Rd to Prince Albert St	184	12	2015/2016
Wenban Lane	Flexible Pavement	Wenban Ln: Cedric Ln to Dugald Rd	47	4.4	2015/2016
Wenban Lane	Road Pavement Asphalt Seal	Wenban Ln: Cedric Ln to Dugald Rd	47	4.4	2015/2016
Whiting Beach Road	Road Pavement Asphalt Seal	Whiting Beach Rd/Major St to Dead End	100	2	2015/2016
Brady Street	Flexible Pavement	Brady St: 94 metres from Military Rd to Telecom	61	8.8	2016/2017
Brady Street	Road Pavement Asphalt Seal	Brady St: 94 metres from Military Rd to Telecom	61	8.8	2016/2017
Iluka Road	Conc Pavement	Iluka Rd (Lower): Lane to End	208	4.8	2016/2017
Iluka Road	Conc Pavement	Iluka Rd (Lower): Morella Rd to Lane	164	3.5	2016/2017
Iluka Road	Conc Pavement	Iluka Rd (Upper): Lane to End	213	5.5	2016/2017
Iluka Road	Conc Pavement	Iluka Rd (Upper): Morella Rd to Lane	164	6	2016/2017

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Mandolong Road	Road Pavement Asphalt Seal	Mandolong Rd: The Esplanade to Lavoni St	204	9.2	2016/2017
Markham Close	Road Pavement Asphalt Seal	Markham Cl: Dead End to Middle Head Rd	173	7	2016/2017
McLeod Street	Road Pavement Asphalt Seal	McLeod St: Dead End to Musgrave St	40	15.5	2016/2017
Military Road	Road Pavement Asphalt Seal	Military Rd: Raglan St to Upper Almora St	413	13	2016/2017
Milner Lane	Road Pavement Asphalt Seal	Milner Ln: Queen St to Milner St	97	3.9	2016/2017
Milner Street	Road Pavement Asphalt Seal	Milner St: Milner Ln to Raglan St	124	8	2016/2017
Milner Street	Road Pavement Asphalt Seal	Milner St: Prince Albert St to Milner Ln	122	9	2016/2017
Mitchell Lane	Road Pavement Asphalt Seal	Mitchell Ln: Mitchell Rd to End	21	5.5	2016/2017
Morella Road	Road Pavement Asphalt Seal	Morella Rd: Concrete to Burrawong Ave	202	1.4	2016/2017
Mosman Street	Road Pavement Asphalt Seal	Mosman St: Trumfield Ln to Badham Ave	15	3	2016/2017
Mosman Street	Road Pavement Asphalt Seal	Mosman St: Upper Avenue to Raglan St	182	5.5	2016/2017
Moss Lane	Road Pavement Asphalt Seal	Moss Ln: Dead End to End of Concrete	22	5.5	2016/2017
Plunkett Road	Flexible Pavement	Plunkett Rd: Beaconsfield Rd to Coronation Ave	335	7.4	2016/2017
Plunkett Road	Road Pavement Asphalt Seal	Plunkett Rd: Beaconsfield Rd to Coronation Ave	335	7.4	2016/2017
Queen Street	Road Pavement Asphalt Seal	Queen St: Milton Ave to Prince Albert St	137	11.8	2016/2017
Silex Road	Flexible Pavement	Silex Rd/Thompson St to Bradleys Head Rd	256	11.8	2016/2017
Silex Road	Road Pavement Asphalt Seal	Silex Rd/Thompson St to Bradleys Head Rd	256	11.8	2016/2017
Spencer Road	Road Pavement Asphalt Seal	Spencer Rd: Bardwell Ln to Spofforth St	420	11.8	2016/2017

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
The Grove	Road Pavement Asphalt Seal	The Grove: Awaba St to Edwards Bay Rd	135	3.4	2016/2017
Upper Spit Road	Road Pavement Asphalt Seal	Upper Spit Rd: Spit Rd to End	216	6.2	2016/2017
Wallington Road	Road Pavement Asphalt Seal	Wallington Rd: Fairfax Rd to End	80	5.5	2016/2017
Warringah Road	Road Pavement Asphalt Seal	Warringah Rd: Hopetoun Ave to No.1	98	2.3	2016/2017
Water Lane	Road Pavement Asphalt Seal	Water Ln/Prince Albert St to Sirius Cove Rd	20	3	2016/2017
Whiting Beach Road	Road Pavement Asphalt Seal	Whiting Beach Rd/Major St to Dead End	43	8	2016/2017
Wolger Road	Road Pavement Asphalt Seal	Wolger Rd/Archer St to Noble St	27	6	2016/2017
Wudgong Walk	Road Pavement Asphalt Seal	Wudgong Walk: Cowles Rd to End	53	4.2	2016/2017
Wyargine Street	Road Pavement Asphalt Seal	Wyargine St: Edwards Bay Rd to Stanton Rd	90	2.2	2016/2017
Arbutus Street	Road Pavement Asphalt Seal	Arbutus St: Almora St to Mandolong Rd	225	6	2017/2018
Archer Street	Road Pavement Asphalt Seal	Archer St: Avenue Rd to Keston Ave	89	10	2017/2018
Avenue Road	Road Pavement Asphalt Seal	Avenue Rd: Reid Park to Upper Avenue Rd	100	2.6	2017/2018
Badham Avenue	Road Pavement Asphalt Seal	Badham Ave: McLeod St to No.4B	60	2.8	2017/2018
Bay Street	Conc Pavement	Bay St: Lower Divided Road to 64 BaySt	347	5.2	2017/2018
Bay Street	Conc Pavement	Bay St: Lower Divided Road to 64 BaySt	324	5.5	2017/2018
Beaconsfield Road	Road Pavement Asphalt Seal	Beaconsfield Rd: Middle Head Rd to Wolseley Rd	146	11.5	2017/2018
Belmont Road	Road Pavement Asphalt Seal	Belmont Rd: Gladstone Ave to Military Rd	129	11.6	2017/2018
Belmont Road	Road Pavement Asphalt Seal	Belmont Rd: Noble St to Gladstone Ave	243	11.7	2017/2018
Bradleys Head Road	Road Pavement Asphalt Seal	Bradleys Head Rd: Union St to King Max St	253	6	2017/2018

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Delecta Avenue	Flexible Pavement	Delecta Ave: Dead End to Bay St	276	5.5	2017/2018
Delecta Avenue	Road Pavement Asphalt Seal	Delecta Ave: Dead End to Bay St	276	5.5	2017/2018
Field Lane	Road Pavement Asphalt Seal	Field Ln: Military Rd to Clifford St	102	4.5	2017/2018
Gooseberry Lane	Road Pavement Asphalt Seal	Gooseberry Ln: Pretoria Ave to Dead End	44	4	2017/2018
Harbour Street	Road Pavement Asphalt Seal	Harbour St: Belmont Rd to Military Rd	134	9.2	2017/2018
Killarney Street	Road Pavement Asphalt Seal	Killarney St: Dead End to Bullecourt Ave	46	8	2017/2018
Kurrawong Lane	Flexible Pavement	Kurrawong Ln: Warringah Ln to End	37	4.6	2017/2018
Kurrawong Lane	Road Pavement Asphalt Seal	Kurrawong Ln: Warringah Ln to End	37	4.6	2017/2018
McLean Crescent	Flexible Pavement	McLean Cres: Dead End to Grecia Ln	164	12	2017/2018
McLean Crescent	Road Pavement Asphalt Seal	McLean Cres: Dead End to Grecia Ln	164	12	2017/2018
Military Road	Road Pavement Asphalt Seal	Military Rd: Albion Ln to Spit Rd	253	12	2017/2018
Military Road	Road Pavement Asphalt Seal	Military Rd: Upper Almora St to Albion Ln	176	12.6	2017/2018
Pearl Bay Avenue	Road Pavement Asphalt Seal	Pearl Bay Ave: Spit Rd to No.3	6	18	2017/2018
Punch Street	Road Pavement Asphalt Seal	Punch St: Moruben Rd to Spit Rd	173	9.7	2017/2018
Quakers Road	Conc Pavement	Quakers Rd: Bullecourt Ave to End	5	2.5	2017/2018
Raglan Street	Road Pavement Asphalt Seal	Raglan St: Cullen Ave to Gibson Rd	130	11.4	2017/2018
Raglan Street	Road Pavement Asphalt Seal	Raglan St: Curraghbeena Rd to McLeod St	213	11	2017/2018
Warringah Lane	Flexible Pavement	Warringah Ln: Tivoli St to Hampden St	109	4.8	2017/2018
Warringah Lane	Road Pavement Asphalt Seal	Warringah Ln: Tivoli St to Hampden St	109	4.8	2017/2018
Warringah Road	Flexible Pavement	Warringah Rd: Divided Rd to Spit Rd	141	10	2017/2018

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Warringah Road	Road Pavement Asphalt Seal	Warringah Rd: Divided Rd to Spit Rd	141	10	2017/2018
Balmoral Avenue	Road Pavement Asphalt Seal	Balmoral Ave: Raglan St to Redan St	243	10	2018/2019
Beaconsfield Road	Road Pavement Asphalt Seal	Beaconsfield Rd: Wolseley Rd to Plunkett Rd	212	11.7	2018/2019
Beauty Point Road	Road Pavement Asphalt Seal	Beauty Point Rd: Marsala St to Pindari Ave Upper	92	3.8	2018/2019
Boronia Lane	Road Pavement Asphalt Seal	Boronia Ave: Brady St to End	88	4.5	2018/2019
Boyle Street	Road Pavement Asphalt Seal	Boyle St: Dead End to Spofforth St Upper	200	6.6	2018/2019
Brady Street	Road Pavement Asphalt Seal	Brady St: Telecom Entrance to Ourimbah Rd	62	11.6	2018/2019
Calypso Avenue	Flexible Pavement	Calypso Ave: Clanalpine St to Magic Grove	164	11.4	2018/2019
Calypso Avenue	Road Pavement Asphalt Seal	Calypso Ave: Clanalpine St to Magic Grove	164	11.4	2018/2019
Calypso Avenue	Road Pavement Asphalt Seal	Calypso Ave: Dead End to Clanalpine St	63	9	2018/2019
Clanalpine Street	Conc Pavement	Clanalpine Access Road Adjacent Mistral Ave Opposite Sverge St	47	2.4	2018/2019
Congewoi Road	Flexible Pavement	Congewoi Rd: Ourimbah Rd to Wyong Rd	297	6.3	2018/2019
Congewoi Road	Road Pavement Asphalt Seal	Congewoi Rd: Ourimbah Rd to Wyong Rd	297	6.3	2018/2019
Coronation Avenue	Road Pavement Asphalt Seal	Coronation Ave: Wolseley Rd to No.9	280	1.5	2018/2019
Cross Street	Road Pavement Asphalt Seal	Cross St: Dead End to Bradleys Head Rd	116	5.9	2018/2019
Effingham Street	Road Pavement Asphalt Seal	Effingham St: King Max St to Middle Head Rd	218	12	2018/2019
Esther Road	Road Pavement Asphalt Seal	Esther Rd: Raglan St to The Esplanade	310	10.5	2018/2019
Everview Avenue	Road Pavement Asphalt Seal	Everview Ave: Awaba St to The Junction	44	7.2	2018/2019

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Everview Avenue	Road Pavement Asphalt Seal	Everview Ave: The Junction to Dead End	118	6.9	2018/2019
Fairfax Road	Road Pavement Asphalt Seal	Fairfax Rd: Dead End to Dead End	20	3.5	2018/2019
Fairfax Road	Road Pavement Asphalt Seal	Fairfax Rd: Dead End to Parriwi Rd	48	5.5	2018/2019
Gibson Road	Road Pavement Asphalt Seal	Gibson Rd: Dead End to Raglan St	72	4	2018/2019
Glen Street	Road Pavement Asphalt Seal	Glen St: End Concrete to Carrington Ave	22	7	2018/2019
Gordon Street	Road Pavement Asphalt Seal	Gordon St: Middle Head Rd to Bayview Ave	340	6	2018/2019
Harnett Avenue	Road Pavement Asphalt Seal	Harnett Ave: Reid Park (Centenary) to Dead End	183	5	2018/2019
Harston Avenue	Road Pavement Asphalt Seal	Harston Ave: Dead End to Carrington Ave	30	3	2018/2019
Hopetoun Avenue	Conc Pavement	Hopetoun Ave: Kirkoswald Ave to Rosherville Rd	199	6.5	2018/2019
Hopetoun Avenue	Road Pavement Asphalt Seal	Hopetoun Ave Lower: No.52 to Warringah Rd	35	6.5	2018/2019
James Street	Road Pavement Asphalt Seal	James St: Dead End to Parriwi Rd	70	4	2018/2019
Julian Street	Road Pavement Asphalt Seal	Julian St: Side Access Rd	50	3.5	2018/2019
Julian Street	Road Pavement Asphalt Seal	Julian St: Wyong Rd to Divide in Road	188	7.5	2018/2019
Julian Street	Road Pavement Asphalt Seal	Julian St (Lower) to Dead End	98	6.5	2018/2019
Julian Street	Road Pavement Asphalt Seal	Julian St (Upper) to Burton St	52	5	2018/2019
Kahibah Road	Road Pavement Asphalt Seal	Kahibah Rd: Coronation Ave to Dead End	55	8	2018/2019
Kahibah Road	Road Pavement Asphalt Seal	Kahibah Rd: Middle Head Ed to Wolseley Rd	125	6	2018/2019
Kemble Lane	Flexible Pavement	Kemble Ln: Gladstone Ave to Archer St	211	4	2018/2019

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Kemble Lane	Road Pavement Asphalt Seal	Kemble Ln: Gladstone Ave to Archer St	211	4	2018/2019
Waitovu Street	Conc Pavement	Waitovu St: Mandolong Rd to Awaba St	161	5.5	2018/2019
Windward Avenue	Flexible Pavement	Windward Ave/Kahibah Rd to Amaroo Cr	260	5	2018/2019
Windward Avenue	Road Pavement Asphalt Seal	Windward Ave/Kahibah Rd to Amaroo Cr	260	5	2018/2019
Burrawong Avenue	Flexible Pavement	Burrawong Ave: Dead End to Kardinia Rd	100	11	2019/2020
Burrawong Avenue	Road Pavement Asphalt Seal	Burrawong Ave: Dead End to Kardinia Rd	100	11	2019/2020
Cobbittee Lane	Road Pavement Asphalt Seal	Cobbittee Ln: Cobbittee St to Dead End	65	4	2019/2020
Countess Street	Flexible Pavement	Countess St: Earl St to Ourimbah Rd	192	11.8	2019/2020
Countess Street	Road Pavement Asphalt Seal	Countess St: Earl St to Ourimbah Rd	192	11.8	2019/2020
David Street	Road Pavement Asphalt Seal	David St: Morella Rd to Burrawong Ave	331	11	2019/2020
Glover Street	Road Pavement Asphalt Seal	Glover St: Bardwell Rd to Spofforth St	378	11.8	2019/2020
Herron Walk	Road Pavement Asphalt Seal	Herron Walk: Raglan St to Dead End	44	5.5	2019/2020
Keston Avenue	Road Pavement Asphalt Seal	Keston Ave: Archer St to Gladstone Ave	231	11.7	2019/2020
Keston Lane	Road Pavement Asphalt Seal	Keston Ln: Keston Ave to Dead End	82	4.2	2019/2020
Killarney Street	Road Pavement Asphalt Seal	Killarney St: Spit Rd for 34 metres	34	11.5	2019/2020
Koowong Avenue	Flexible Pavement	Koowong Ave: Bullecourt Ave to Quakers Rd	158	6.6	2019/2020
Koowong Avenue	Road Pavement Asphalt Seal	Koowong Ave: Bullecourt Ave to Quakers Rd	158	6.6	2019/2020
Little Street	Road Pavement Asphalt Seal	Little St: Mandolong Rd to Lower Punch St	122	5.3	2019/2020
Mackie Lane	Flexible Pavement	Mackie Ln: Lang St to Dead End	196	4.8	2019/2020
Mackie Lane	Road Pavement Asphalt Seal	Mackie Ln: Lang St to Dead End	196	4.8	2019/2020

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Magic Grove	Road Pavement Asphalt Seal	Magic Grove: Mistral Ave to Calypso Ave	49	3.9	2019/2020
Martens Lane	Road Pavement Asphalt Seal	Martens Ln: Middle Head Rd to Raglan St	166	5.5	2019/2020
Mistral Avenue	Road Pavement Asphalt Seal	Mistral Ave: Clanalpine St to Magic Grove	346	9	2019/2020
Moran Street	Road Pavement Asphalt Seal	Moran St: Sverge St to Dead End	38	4	2019/2020
Mosman Street	Road Pavement Asphalt Seal	Mosman St: Badham Ave to Upper Ave	67	8	2019/2020
Muston Street	Road Pavement Asphalt Seal	Muston St: Middle Head Rd to Raglan St	227	8.6	2019/2020
Quakers Road	Road Pavement Asphalt Seal	Quakers Rd: E.KB Koowong Ave to Bay St	78	6.6	2019/2020
Quakers Road	Road Pavement Asphalt Seal	Quakers Rd: Ryrie St to Kerb at End	79	6.6	2019/2020
Redan Street	Road Pavement Asphalt Seal	Redan St: Balmoral Ave to Almora St	158	4.1	2019/2020
Short Street	Road Pavement Asphalt Seal	Short St: Harbour St to Cowles Rd	87	3.2	2019/2020
Sirius Cove Road	Road Pavement Asphalt Seal	Sirius Cove Rd: Car Park CS	32	4.6	2019/2020
Stanley Avenue	Road Pavement Asphalt Seal	Stanley Ave: Awaba St to Dead End	129	7.2	2019/2020
Superba Parade	Road Pavement Asphalt Seal	Superba Pde: Upper Almora St to Mandolong Rd	150	5.6	2019/2020
Union Street	Road Pavement Asphalt Seal	Union St/Bradleys Head Rd to Milton Ave	135	12	2019/2020
Badham Avenue	Road Pavement Asphalt Seal	Badham Ave: No.4 to No.9	156	7.2	2020/2021
Bardwell Lane	Road Pavement Asphalt Seal	Bardwell Ln: Bloxsome Ln to Holt Ave	42	4.4	2020/2021
Bardwell Lane	Road Pavement Asphalt Seal	Bardwell Ln: Spencer Rd to Cabramatta Rd	93	4.6	2020/2021
Bay Street	Road Pavement Asphalt Seal	Bay St: Ramp Road at No.64 Bay St	11	1.3	2020/2021
Bayview Avenue	Road Pavement Asphalt Seal	Bayview Ave: Beaconsfield Rd to Gordon St	96	5.5	2020/2021

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Beach Lane	Road Pavement Asphalt Seal	Beach Ln: Ritchie Ln to Military Rd	44	3.8	2020/2021
Bickell Road	Road Pavement Asphalt Seal	Bickell Rd: Ryrie St to Bay-End Concrete	75	1	2020/2021
Botanic Road	Road Pavement Asphalt Seal	Botanic Rd: Dead End to The Esplanade	439	10.5	2020/2021
Bradleys Head Road	Road Pavement Asphalt Seal	Bradleys Head Rd: Thompson St to Union St	298	5.4	2020/2021
Bradleys Head Road	Road Pavement Asphalt Seal	Bradleys Head Rd: King Max St to Military Rd	342	5.9	2020/2021
Milton Avenue	Flexible Pavement	Milton Ave: Union St to Queen St	150	8.2	2020/2021
Milton Avenue	Road Pavement Asphalt Seal	Milton Ave: Union St to Queen St	150	8.2	2020/2021
Pearl Bay Avenue	Road Pavement Asphalt Seal	Pearl Bay Ave: Spit Rd to No.3	140	2.8	2020/2021
Pearl Bay Avenue	Road Pavement Asphalt Seal	Pearl Bay Ave: No.3 to Speed Hump Near Moss Ln	160	4.2	2020/2021
Pearl Bay Avenue	Road Pavement Asphalt Seal	Pearl Bay Ave: Speed Hump Near Moss Ln to Marsala EA	77	10	2020/2021
Queen Street	Road Pavement Asphalt Seal	Queen St: Prince Albert St to Milner Ln	121	10	2020/2021
Ruby Street	Flexible Pavement	Ruby St/Thompson St to Union St	312	10.5	2020/2021
Ruby Street	Road Pavement Asphalt Seal	Ruby St/Thompson St to Union St	312	10.5	2020/2021
Wolseley Road	Road Pavement Asphalt Seal	Wolseley Rd (Upper)/Mulbring St to Redan St	29	10	2020/2021
Wolseley Road	Road Pavement Asphalt Seal	Wolseley Rd (Upper)/Mulbring St to Redan St	110	1.5	2020/2021
Alexander Avenue	Road Pavement Asphalt Seal	Alexander Ave: Croquet Ln to Concrete	78	6.2	2021/2022
Awaba Lane	Flexible Pavement	Awaba Ln: Bend to Dead End	159	4.4	2021/2022
Awaba Lane	Flexible Pavement	Awaba Ln: Awaba St to Bend	42	4.3	2021/2022

Street Location	Type	Segment	Length (m)	Width (m)	Forecast Renewal Year
Awaba Lane	Road Pavement Asphalt Seal	Awaba Ln: Bend to Dead End	159	4.4	2021/2022
Awaba Lane	Road Pavement Asphalt Seal	Awaba Ln: Awaba St to Bend	42	4.3	2021/2022
Beauty Point Road	Flexible Pavement	Beauty Point Rd: Lower Divide to Bay St	97	6.3	2021/2022
Beauty Point Road	Road Pavement Asphalt Seal	Beauty Point Rd: Lower Divide to Bay St	97	6.3	2021/2022
Beauty Point Road	Road Pavement Asphalt Seal	Beauty Point Rd: Pindari Ave to Divide Rd	51	13.5	2021/2022
Mitchell Lane	Road Pavement Asphalt Seal	Mitchell Ln: Killarney St to Bend	56	3.3	2021/2022
Newton Lane	Flexible Pavement	Newton Ln: Medusa St to Dead End	50	2.7	2021/2022
Newton Lane	Road Pavement Asphalt Seal	Newton Ln: Medusa St to Dead End	50	2.7	2021/2022
Raglan Street	Road Pavement Asphalt Seal	Raglan St: Dead End to Curraghbeena Rd	165	8	2021/2022
Raglan Street	Road Pavement Asphalt Seal	Raglan St: McLeod St to Musgrave St	134	11.5	2021/2022
Tennis Court Lane	Road Pavement Asphalt Seal	Tennis Court Ln: Bend to Awaba St	146	2.6	2021/2022
Union Street	Road Pavement Asphalt Seal	Union St/Milton Ave to Prince Albert St	136	12	2021/2022
Upper Avenue Road	Road Pavement Asphalt Seal	Upper Avenue Rd/Mosman St to No.23	160	9.5	2021/2022
Upper Avenue Road	Road Pavement Asphalt Seal	Upper Avenue Rd/Mosman St to No.23	75	3.2	2021/2022
Waitovu Street	Road Pavement Asphalt Seal	Waitovu St: Mandolong Rd to Awaba St	165	4.4	2021/2022
Want Street	Road Pavement Asphalt Seal	Want St/Dead End to Raglan St	98	9.4	2021/2022
Warringah Road	Road Pavement Asphalt Seal	Warringah Rd: No.1 to Bend	64	6.2	2021/2022

E.3 Kerb and Gutters

E3.1 Description of Kerb and Gutter Network

There are 156,847 m of various types of kerb and guttering along roads including:

- 136,135 m kerb and gutter;
- 14,877 m kerb only;
- 3,152 m dish gutter;
- 467 m mountable kerb;
- 1,427 m flush kerb; and
- 789 m other.

Some sandstone kerb and/or gutters are in heritage areas and replacement either in sandstone or concrete must be to strict heritage guidelines and requirements.

Typical kerb and gutter unit rates and useful lives are as follows:

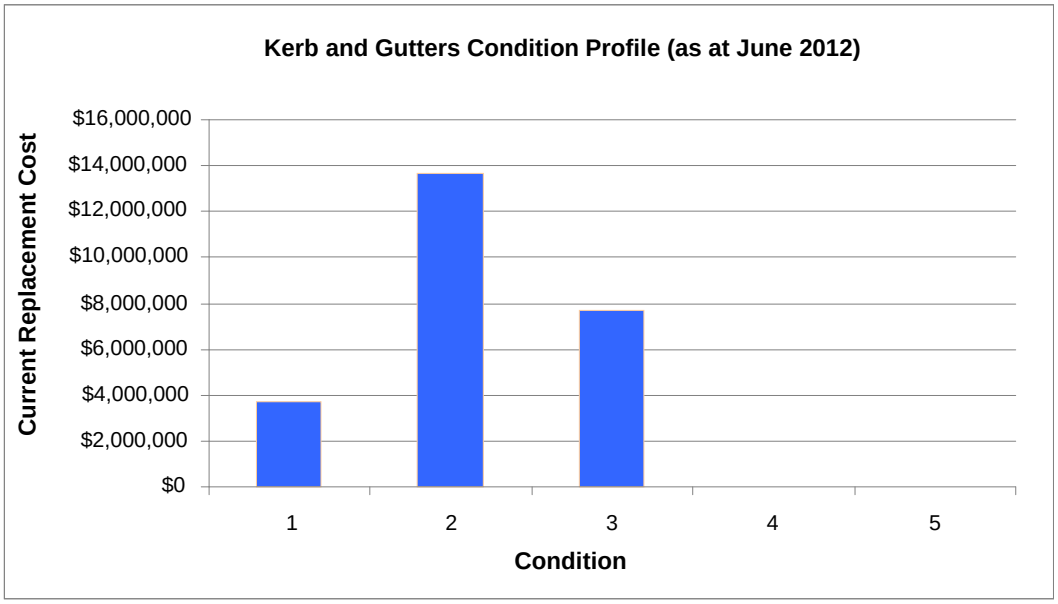
Kerb and Gutter Type		Unit	Useful Life (yrs)	Unit Rate
Kerb and Gutter	concrete	m	90	$118.88
	sandstone	m	90	$360.00
	sandstone kerb/concrete gutter	m	90	$227.00
	brick kerb / concrete gutter	m	90	$325.00
Kerb Only	bullnose brick kerb/concrete gutter	m	90	$330.00
	concrete	m	90	$98.68
	sandstone	m	90	$252.00
	sandstone 700 high	m	90	$500.00
Dish Gutter	concrete	m	90	$114.78
	asphalt	m	90	$230.00
Flush Kerb	concrete	m	90	$150.00
	sandstone	m	90	$150.00
Kerb Wall	concrete	m	90	$150.00
	sandstone	m	90	$450.00

Kerb and Gutter Type		Unit	Useful Life (yrs)	Unit Rate
	sandstone	m	90	$500.00
Mountable Kerb	concrete	m	90	$91.00
Roll Kerb	concrete	m	90	$85.00
Kerb and Dish	sandstone	m	90	$230.00

The value of the kerb and gutter network is summarised in Section 4.1.4.

E3.2 Kerb and Gutter Condition

The condition profile (June 2012) of the kerb and gutter network is as follows:



E3.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	95%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	5%

E3.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, kerb and gutters valued at $9,868 are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A maintenance priority list has been prepared to repair defects in kerb and gutters. Identified defect are repaired subject to available resources. Additionally, kerb and gutters in or approaching condition 4 and 5 are prioritised for renewal in the Kerb and Gutter Renewal Program.

E3.5 Current Maintenance and Renewal Strategies

Typical kerb and gutter maintenance activities include:

- Reconstructing short sections of failed kerb/gutter eg where tree roots have damaged assets or where risk to the public exist;
- Reconstructing failed gutters or filling failed gutters with asphalt to rectify ponding water issues; and
- Replacing missing stones in sandstone kerbs/gutters.

Examples of 'low lifecycle cost' methods include replacing sandstone kerb and/or gutter with concrete kerb/gutter where appropriate (including subject to heritage requirements).

E3.6 Recent Expenditure Profile

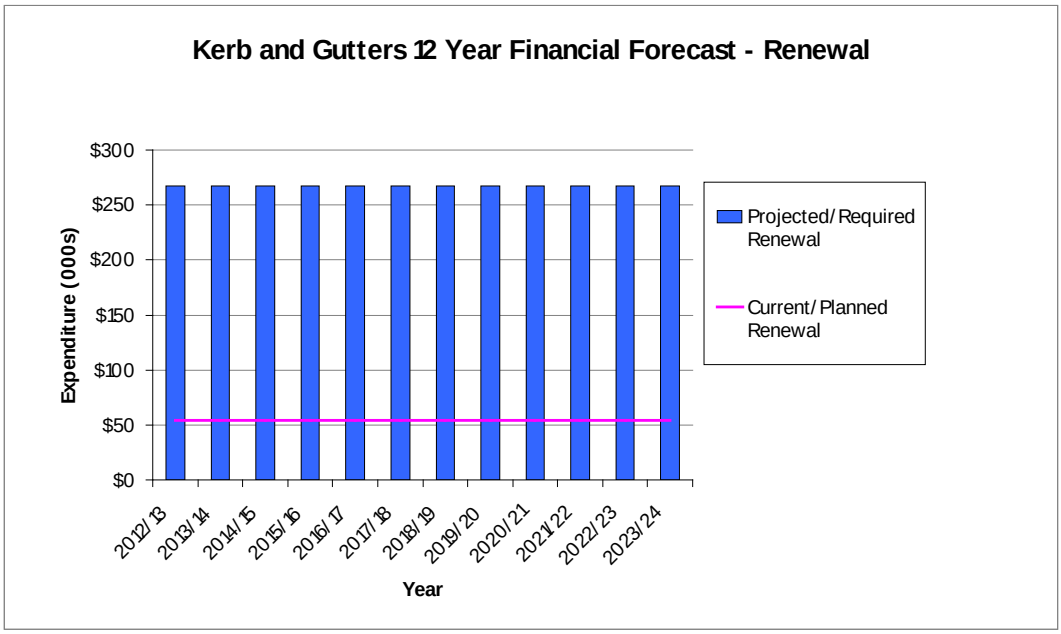
Kerb and gutter expenditure ($000s) over the last few years is outlined in the following table:

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	29	12	13	17	13	17
Renewals	17	22	140	64	28	54
New Work	0	0	50	0	0	10
TOTAL	**46**	**34**	**203**	**81**	**41**	**81**

E3.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to remain at the same level over time as the asset stock ages. All costs are shown in 2012 dollar values.

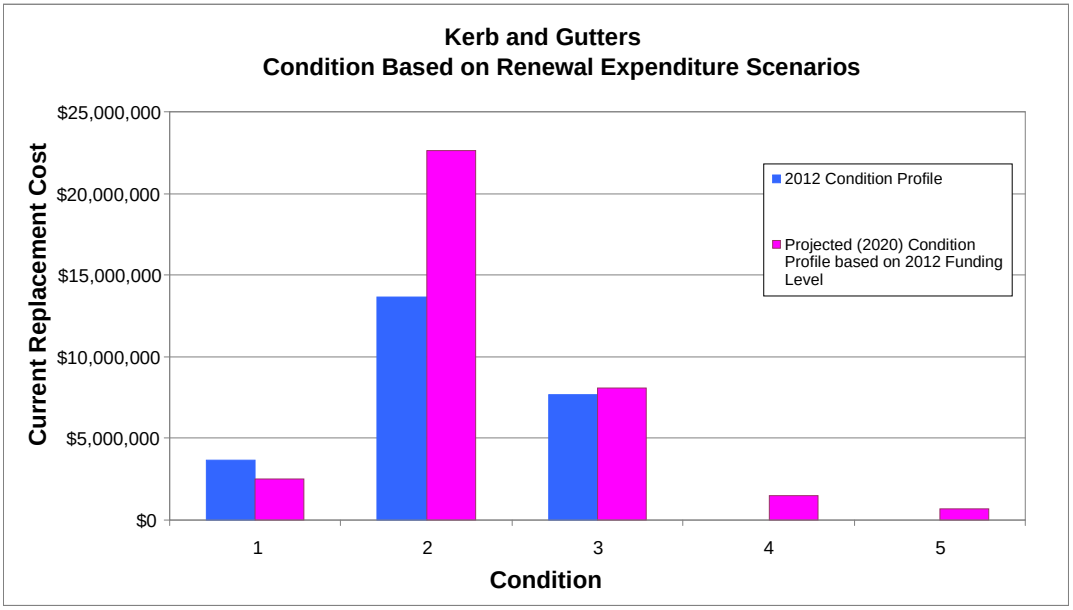
Kerb and Gutter 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	268	268	268	268	268	268	268	268	268	268	268	268
Planned/Current Expenditure	54	54	54	54	54	54	54	54	54	54	54	54
Funding Gap	214	214	214	214	214	214	214	214	214	214	214	214
Cumulative Funding Gap	214	428	642	856	1,070	1,284	1,498	1,712	1,926	2,140	2,354	2,568



It is also proposed that the above annual renewal funding be complemented by an increase in the kerb and gutter maintenance allocation to $39,000 per year.

E3.8 Projected Condition

Utilising 2012 funding levels, the future projected condition of Council's kerb and gutters in 2020 are as follows. This has been compared to the condition of assets in 2012.



If Council continues to fund kerb and gutter renewals at 2012 levels then the condition of Council's kerb and gutters will deteriorate over the next 8 years including a significant percentage falling into condition 4 and 5 range.

E3.9 10 Year Work Program

A 10 year kerb and gutter assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed.

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Awaba Street	Kerb and Gutter	L-Awaba St: Spit Rd to Cowles Rd	Sandstone	255	2012/2013
Cabramatta Road	Kerb and Gutter	L-Cabramatta Rd: Cowles Rd to Bardwell Rd	Sandstone	23	2012/2013
Raglan Street	Kerb and Gutter	R-Raglan St: Mosman St to Calypso Ave	Sandstone	252	2012/2013
Spencer Road	Kerb and Gutter	L-Spencer Rd: Cowles Rd to Bardwell Ln	Concrete	141	2012/2013
Spencer Road	Kerb and Gutter	L-Spencer Rd: Cowles Rd to Bardwell Ln	Sandstone	94	2012/2013
Spencer Road	Kerb and Gutter	R-Spencer Rd: Cowles Rd to Bardwell Ln	Sandstone	40	2012/2013
Rickard Avenue	Dish Gutter	R-Rickard Ave/Major St to Junction	SSkerb/Cdish	12	2012/2013
Brady Street	Kerb and Gutter	L-Brady St: Military Rd for 94 metres	SSkerb/ Cgutter	47	2012/2013
Calypso Avenue	Kerb Only	R-Calypso Ave: Dead End to Clanalpine St	Sandstone	43	2012/2013
Countess Street	Kerb and Gutter	R-Countess St: Earl St to Ourimbah Rd	Concrete	184	2012/2013
Gooseberry Lane	Kerb Only	R-Gooseberry Ln: Pretoria Ave to Dead End	Sandstone	10	2012/2013
Gooseberry Lane	Kerb Only	L-Gooseberry Ln: Pretoria Ave to Dead End	Sandstone	10	2012/2013
Hampden Street	Kerb and Gutter	L-Hampden St: Stanton Rd to Dead End	SSkerb/Cgutter	75	2012/2013
Horsnell Lane	Kerb and Gutter	L-Horsnell Ln: Field Ln to Civic Ln	Sandstone	12	2012/2013
Iluka Road	Kerb Only	R-Iluka Rd (Upper) to Morella Ln	Concrete	99	2012/2013
Iluka Road	Kerb Only	R-Iluka Rd (Upper) to Lane to End	Concrete	127	2012/2013

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Kirkoswald Avenue	Kerb and Gutter	R-Kirkoswald Ave: Upper Fairfax Rd to Burran Ave	Concrete	225	2012/2013
Muston Street	Kerb and Gutter	L-Muston St: Almora St to Melaleuca Ln	Concrete	40	2012/2013
Muston Street	Kerb and Gutter	L-Muston St: Almora St to Melaleuca Ln	Sandstone	85	2012/2013
Punch Lane	Kerb and Gutter	R-Punch Ln: Bend to Awaba St	SSkerb/ Cgutter	179	2013/2014
Belmont Road	Kerb and Gutter	L-Belmont Rd: Noble St to Gladstone Ave	SSkerb/Agutter	250	2013/2014
Bloxsome Lane	Kerb and Gutter	L-Bloxsome Ln: Dead End to Bardwell Ln	Concrete	135	2013/2014
Gladstone Avenue	Kerb and Gutter	Gladstone Ave: Belmont Rd to The Grove			2013/2014
Prince Albert Street	Kerb and Gutter	R-Prince Albert St: Whiting Beach Rd to CS at Lennox St	Sandstone	229	2013/2014
Bapaume Road	Kerb and Gutter	L-Bapaume Rd: Amiens Ave to Bickell Rd	Concrete	170	2013/2014
Warringah Lane	Kerb and Gutter				2013/2014
Clifford Street	Kerb and Gutter				2013/2014
James King Road	Kerb and Gutter				2013/2014
Middle Head Road	Kerb and Gutter	L-Middle Head Rd: Kahibah Rd to Gordon St	SSkerb/Cgutter	215	2013/2014
Thompson Street	Kerb and Gutter	L-Thompson St/Burrawong Ave to Bradleys Head Rd	Sskerb/Agutter	50	2013/2014
Parriwi Road	Kerb and Gutter				2013/2014
Ritchie Lane	Kerb and Gutter				2013/2014
Bickell Road	Kerb and Gutter	L-Bickell Rd: Spit Rd to Ryrie St			2013/2014

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Belmont Road	Kerb and Gutter	L-Belmont Rd: Gladstone Ave to Military Rd	SSkerb/Cgutter	73	2013/2014
Mandolong Road	Kerb and Gutter	L-Mandolong Rd: Moruben Rd to Military Rd	Sandstone	78	2013/2014
Middle Head Road	Kerb and Gutter	L-Middle Head Rd: King Max St to Military Rd	SSkerb/ Cgutter	74	2013/2014
The Esplanade	Kerb and Gutter	L-The Esplanade: Almora St to Mandolong Rd	Sandstone	64	2013/2014
Parriwi Road	Dish Gutter	L-Parriwi Rd: End Concrete Kerb to Concrete Kerb	Concrete	190	2013/2014
Queen Street	Kerb and Gutter	L-Queen St: Milner St to Raglan St	SSkerb/Cgutter	84	2013/2014
Queen Street	Kerb and Gutter	L-Queen St: Milner Ln to Raglan St	Concrete	68	2013/2014
The Esplanade	Kerb and Gutter	L-The Esplanade: awaba St to End	Concrete	136	2013/2014
The Esplanade	Kerb and Gutter	R-The Esplanade: Awaba St to End	Concrete	146	2013/2014
Awaba Street	Kerb and Gutter	R-Awaba St: Bond St to Countess St	Concrete	183	2013/2014
Awaba Street	Kerb and Gutter	L-Awaba St: Bond St to Countess St	Concrete	174	2013/2014
Earl Street	Kerb and Gutter	L-Earl St: Bond St to Countess St	Concrete	68	2013/2014
Prince Albert Street	Kerb and Gutter	R-Prince Albert St: Elfrida St to Union St	SSkerb/Cgutter	148	2013/2014
Raglan Street	Kerb and Gutter	L-Raglan St: Canrobert St to Milner St	Sandstone	116	2013/2014
Punch Street	Kerb and Gutter	R-Punch St: Moruben Rd to Spit Rd	Sandstone	159	2013/2014
Ruby Street	Kerb and Gutter	R-Ruby St/Thompson St to Union St	Sandstone	18	2013/2014

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Superba Lane	Kerb and Gutter	L-Superba Ln: Almora St to Superba Pde	Concrete	43	2013/2014
Walkway – Dalton Road to Awaba Street	Kerb Only	R-Walkway: Dalton Rd to Awaba St	Concrete	80	2013/2014
Walkway – Dalton Road to Awaba Street	Kerb Only	L-Walkway: Dalton Rd to Awaba St	Concrete	80	2013/2014
Whiting Beach Road	Kerb Wall 600 high	R-Whiting Beach Rd/Major St to Dead End	Sandstone	16	2013/2014
Shadforth Street	Kerb and Gutter	R-Shadforth St/Canrobert St: CS past Hamlet Ln	SSkerb/Cgutter	295	2014/2015
Clifton Street	Kerb and Gutter	R-Clifton St: Dead End to Burrawong Ave	Concrete	83	2014/2015
Clifton Street	Kerb and Gutter	L-Clifton St: Dead End to Burrawong Ave	Concrete	95	2014/2015
Bond Street	Kerb and Gutter	R-Bond St: Military Rd to Ourimbah Rd	Sandstone	100	2014/2015
Buena Vista Avenue	Kerb and Gutter	L-Buena Vista Ave: Dead End to Thompson St	SSkerb/Cgutter	69	2014/2015
Buena Vista Avenue	Kerb and Gutter	L-Buena Vista Ave: Dead End to Thompson St	SSkerb/Cgutter	23	2014/2015
Buena Vista Avenue	Kerb and Gutter	L-Buena Vista Ave: Dead End to Thompson St	Sandstone	92	2014/2015
Buena Vista Avenue	Kerb and Gutter	L-Buena Vista Ave: Dead End to Thompson St	Sandstone	23	2014/2015
Burrawong Avenue	Kerb and Gutter	R-Burrawong Ave: Kardinia Rd to Clifton St	Sandstone	14	2014/2015

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Burrawong Avenue	Kerb and Gutter	R-Burrawong Ave: Kardinia Rd to Clifton St	Concrete	61	2014/2015
Burrawong Avenue	Kerb and Gutter	L-Burrawong Ave: Kardinia Rd to Clifton St	Sandstone	15	2014/2015
Burrawong Avenue	Kerb and Gutter	L-Burrawong Ave: Kardinia Rd to Clifton St	Concrete	51	2014/2015
Burrawong Avenue	Kerb and Gutter	L-Burrawong Ave: Clifton St to Morella Rd	SSkerb/Cgutter	20	2014/2015
Cabban Street	Kerb and Gutter	L-Cabban St: Sirius Cove Rd to Magic Grove	Concrete	45	2014/2015
Curraghbeena Road	Dish Gutter	L-Curraghbeena Rd: Raglan St to Dead End	Concrete	95	2014/2015
Elfrida Street	Kerb and Gutter	R-Elfrida St: Prince Albert St to Cabban St	Sskerb/Agutter	100	2014/2015
Iluka Road	Kerb Only	R-Iluka Rd (Upper): Morella Rd to Lane	Concrete	48	2014/2015
Iluka Road	Kerb Only	R-Iluka Rd (Upper): Lane End	Concrete	66	2014/2015
Iluka Road	Kerb Only	L-Iluka Rd (Lower): Morella Rd to Lane	Concrete	166	2014/2015
Iluka Road	Kerb Only	L-Iluka Rd (Lower): Lane End	Concrete	221	2014/2015
James King Lane	Kerb and Gutter	R-James King Ln: Union St to Queen St	Concrete	40	2014/2015
James King Lane	Kerb and Gutter	L-James King Ln: Union St to Queen St	Concrete	100	2014/2015
James King Lane	Kerb and Gutter	L-James King Ln: Union St to Queen St	Sandstone	64	2014/2015
Kallaroo Street	Kerb and Gutter	R-Kallaroo St: Dead End to Clanalpine St	Concrete	56	2014/2015
Killarney Street	Kerb and Gutter	R-Killarney St: Dead End to Bullecourt Ave	Concrete	45	2014/2015
Kirkoswald Avenue	Kerb and Gutter	R-Kirkoswald Ave: Bend to Fairfax Rd	Concrete	120	2014/2015
Magic Grove	Kerb and Gutter	R-Magic Grove: Dead End to Mistral Ave	Concrete	46	2014/2015

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Magic Grove	Kerb Only	L-Magic Grove: Dead End to Mistral Ave	Sandstone	30	2014/2015
Major Street	K&G (U gutter)	R-Major St: Whiting Beach Rd to Dead End	Concrete	13	2014/2015
Gurrigal Street	Kerb and Gutter	R-Gurrigal St: Nathan Ln to Military Rd	Concrete	106	2014/2015
Macpherson Street	Kerb and Gutter	R-Macpherson St: Ourimbah Rd to Wyong Rd	Concrete	44	2015/2016
Macpherson Street	Kerb and Gutter	R-Macpherson St: Ourimbah Rd to Wyong Rd	Concrete	44	2015/2016
Morella Road	Kerb and Gutter	R-Morella Rd: David St to Concrete Section	Concrete	107	2015/2016
Morella Road	Kerb and Gutter	L-Morella Rd: Kardinia Rd to David St Concrete Section	SSkerb/Cgutter	12	2015/2016
Morella Road	Kerb and Gutter	L-Morella Rd: Kardinia Rd to David St Concrete Section	Sandstone	4	2015/2016
Morella Road	Kerb and Gutter	L-Morella Rd: Kardinia Rd to David St Concrete Section	SSkerb/Cgutter	110	2015/2016
Morella Road	Kerb and Gutter	L-Morella Rd: David St to Concrete Section	Concrete	10	2015/2016
Morella Road	Kerb and Gutter	L-Morella Rd: David St to Concrete Section	Concrete	96	2015/2016
Moruben Road	Kerb and Gutter	R-Moruben Rd: Punch St to Awaba St	Concrete	233	2015/2016
Pindari Avenue	Kerb and Gutter	R-Pindari Ave: Central Ave to Medusa St	Concrete	97	2015/2016
Rawson Lane	Kerb Only	R-Rawson St: Moruben Rd to Rawson St	Sandstone	72	2015/2016

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Rickard Avenue	Kerb and Gutter	R-Rickard Ave/Major St to Junction	Concrete	54	2015/2016
Rickard Avenue	Kerb and Gutter	L-Rickard Ave/Major St to Junction	Concrete	20	2015/2016
St. Elmo Street	Kerb and Gutter	R-St. Elmo St/Dead End to Thompson St	Concrete	93	2015/2016
Stanton Road	Kerb and Gutter	R-Stanton Rd: Fairfax Rd to Wyargine St	Concrete	88	2015/2016
Superba Parade	Kerb and Gutter	R-Superba Pde: Lower End to Mandolong Rd	Concrete	71	2015/2016
Thompson Street	Kerb and Gutter	R-Thompson St/Burrawong Ave to Bradleys Head Rd	SSkerb/Cgutter	148	2015/2016
Thompson Street	Kerb and Gutter	R-Thompson St: Bradleys Head Rd to Prince Albert St	SSkerb/Cgutter	95	2015/2016
Thompson Street	Kerb and Gutter	L-Thompson St: Bradleys Head Rd to Prince Albert St	Sskerb/Agutter	180	2015/2016
Tivoli Street	Kerb and Gutter	R-Tivoli St: Stanton Rd to Warringah Ln	Sandstone	98	2015/2016
Tivoli Street	Kerb and Gutter	R-Tivoli St: Warringah Ln to Fairfax Rd	Concrete	98	2015/2016
Tivoli Street	Kerb and Gutter	L-Tivoli St: Warringah Ln to Fairfax Rd	Concrete	115	2015/2016
Ryan Avenue	Kerb and Gutter	R-Ryan Ave: Balmoral Ave to Dead End	Concrete	160	2015/2016
Ourimbah Road	Kerb and Gutter	R-Ourimbah Rd: Congewoi Rd to Macpherson St	Sandstone	216	2016/2017
Gouldsbury Street	Kerb and Gutter	R-Gouldsbury St: Military Rd to Dead End	SSkerb/Cgutter	14	2016/2017
Belmont Road	Kerb and Gutter	R-Belmont Rd: Bardwell Rd to Cowles Rd	Sandstone	236	2016/2017
Cowles Road	Kerb and Gutter	R-Cowles Rd: Military Rd to Ourimbah Rd	Sandstone	70	2016/2017

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Myahgah Road	Kerb and Gutter	L-Myahgah Rd: Belmont Rd to The Crescent	Sandstone	228	2016/2017
Queen Street	Kerb and Gutter	R-Queen St: Bradleys Head Rd to Milton Ave	SSkerb/Cgutter	34	2016/2017
Queen Street	Kerb and Gutter	R-Queen St: Milton Ave to Prince Albert St	Sandstone	27	2016/2017
Queen Street	Kerb and Gutter	L-Queen St: Bradleys Head Rd to Milton Ave	Sandstone	61	2016/2017
Queen Street	Kerb and Gutter	L-Queen St: Milton Ave to Prince Albert St	SSkerb/Cgutter	127	2016/2017
Vista Street	Kerb and Gutter	L-Vista St: Belmont Rd to Military Rd	SSkerb/Cgutter	229	2016/2017
Avenue Road	Kerb Only	R-Avenue Rd: Rangers Ave to Noble St	Sandstone	138	2016/2017
Warringah Lane	Kerb Only	R-Warringah Ln: Tivoli St to Hampden Ave	Concrete	100	2017/2018
Cabramatta Road	Kerb and Gutter	L-Cabramatta Rd: Bardwell St to Spofforth St	Sandstone	408	2017/2018
Cowles Road	Kerb and Gutter	R-Cowles Rd: Awaba St to Wyong Rd	Concrete	76	2017/2018
Parriwi Road	Kerb and Gutter	R-Parriwi Rd: Spit Rd to No.4	Sandstone	62	2017/2018
Parriwi Road	Kerb and Gutter	R-Parriwi Rd: No.4 to No.17 Parriwi Rd	Concrete	61	2017/2018
Parriwi Road	Kerb and Gutter	R-Parriwi Rd: No.17 to End of Concrete Kerb	Concrete	154	2017/2018
Prince Albert Street	Kerb and Gutter	R-Prince Albert St: Lennox St to Elfrida St	Concrete	172	2017/2018
Prince Albert Street	Kerb and Gutter	R-Prince Albert St: Union St to Queen St	SSkerb/Cgutter	148	2017/2018
Prince Albert Street	Kerb and Gutter	L-Prince Albert St: Lennox St to Elfrida St	Concrete	171	2017/2018

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Prince Albert Street	Kerb and Gutter	L-Prince Albert St: Union St to Queen St	SSkerb/Cgutter	140	2017/2018
Prince Albert Street	Kerb and Gutter	L-Prince Albert St: Union St to Queen St	Sandstone	88	2017/2018
Prince Albert Street	Kerb and Gutter	L-Prince Albert St: Union St to Queen St	Concrete	62	2017/2018
Prince Albert Street	Kerb and Gutter	L-Prince Albert St: Union St to Queen St	SSkerb/Cgutter	18	2017/2018
Raglan Street	Kerb and Gutter	L-Raglan St: Curraghbeena Rd to McLeod St	Concrete	210	2017/2018
Rangers Avenue	Kerb and Gutter	L-Rangers Ave: Avenue Rd to Oswald St	SSkerb/Cgutter	17	2017/2018
Shadforth Street	Kerb and Gutter	R-Shadforth St: CS Past Hamlet Ln to Avenue Rd	Sskerb/Agutter	25	2017/2018
Warringah Road	Kerb and Gutter	R-Warringah Rd: Divided Rd to Spit Rd	Concrete	142	2017/2018
Kemble Lane	Kerb and Gutter	R-Kemble Ln: Gladstone Ave to Archer St	Sskerb/Agutter	83	2018/2019
Shadforth Street	Kerb and Gutter	L-Shadforth St/Canrobert St to CS Past Hamlet Ln	Sskerb/Agutter	332	2018/2019
Stanton Road	Kerb and Gutter	R-Stanton Rd: Tivoli St to Spit Rd	Concrete	194	2018/2019
Stanton Road	Kerb and Gutter	L-Stanton Rd: Tivoli St to Spit Rd	Concrete	288	2018/2019
Balmoral Avenue	Kerb and Gutter	L-Balmoral Ave: Raglan St to Redan St	Concrete	102	2018/2019
Balmoral Avenue	Kerb Only	L-Balmoral Ave: Raglan St to Redan St	Concrete	102	2018/2019
Buena Vista Avenue	Kerb and Gutter	R-Buena Vista Ave: Dead End to Thompson St	Concrete	23	2018/2019
Cabban Street	Kerb and Gutter	R-Cabban St: Elfrida St to Sirius Cove Rd	Ckerb/Agutter	100	2018/2019
Cabban Street	Kerb and Gutter	L-Cabban St: Elfrida St to Sirius Cove Rd	SSkerb/Cgutter	15	2018/2019

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Cabban Street	Kerb and Gutter	L-Cabban St: Elfrida St to Sirius Cove Rd	Concrete	80	2018/2019
Calypso Avenue	Kerb and Gutter	R-Calypso Ave: Dead End to Clanalpine St	Concrete	65	2018/2019
Charles Lane	Kerb Only	L-Charles Ln: Dead End to Muston St	Concrete	56	2018/2019
Charles Lane	Kerb and Gutter	L-Charles Ln: Dead End to Muston St	Concrete	56	2018/2019
Clanalpine Street	Kerb and Gutter	R-Clanalpine St: Raglan St to Mistral Ave	Sskerb/Agutter	78	2018/2019
Clanalpine Street	Kerb and Gutter	R-Clanalpine St: Raglan St to Mistral Ave	Concrete	51	2018/2019
Congewoi Road	Kerb and Gutter	L-Congewoi Rd: Ourimbah Rd to Wyong Rd	Concrete	270	2018/2019
Burrawong Avenue	Kerb and Gutter	R-Burrawong Ave: Dead End to Kardinia Rd	Concrete	98	2019/2020
Burrawong Avenue	Kerb and Gutter	L-Burrawong Ave: Dead End to Kardinia Rd	Sandstone	40	2019/2020
Countess Street	Kerb and Gutter	R-Countess St: Earl St to Ourimbah Rd	Concrete	184	2019/2020
Dalton Road	Kerb and Gutter	R-Dalton Rd/Dead End to Cowles Rd	Sandstone	363	2019/2020
Dalton Road	Kerb and Gutter	R-Dalton Rd/Dead End to Cowles Rd	Concrete	40	2019/2020
Dalton Road	Kerb and Gutter	L-Dalton Rd/Dead End to Cowles Rd	Sandstone	322	2019/2020
David Street	Kerb and Gutter	R-David St: Morella Rd to Burrawong Ave	SSkerb/Cgutter	252	2019/2020
David Street	Kerb and Gutter	R-David St: Morella Rd to Burrawong Ave	SSkerb/Cgutter	32	2019/2020
David Street	Kerb and Gutter	L-David St: Morella Rd to Burrawong Ave	SSkerb/Cgutter	277	2019/2020
Dayrell Avenue	K&G (U gutter)	L-Dayrell Ave: Cobbittee St to Pretoria Ave	Concrete	57	2019/2020

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Evans Lane	Kerb and Gutter	L-Evans Ln: Muston St to Arbutus St	Concrete	111	2019/2020
Glover Street	Kerb and Gutter	R-Glover St: Bardwell St to Spofforth St	SSkerb/Cgutter	300	2019/2020
Government Road	Kerb and Gutter	L-Government Rd: Bend to Dead End	Concrete	52	2019/2020
Ruby Street	Kerb and Gutter	R-Ruby St: Thompson St to Union St	Sandstone	18	2020/2021
Milton Avenue	Kerb and Gutter	R-Milton Ave: Union St to Queen St	Sandstone	75	2020/2021
Milton Avenue	Kerb and Gutter	R-Milton Ave: Union St to Queen St	Sandstone	60	2020/2021
Milton Avenue	Kerb and Gutter	R-Milton Ave: Union St to Queen St	Concrete	15	2020/2021
Milton Avenue	U Drain 500	L-Milton Ave: Union St to Queen St	Sandstone	140	2020/2021
Holt Avenue	Kerb and Gutter	L-Holt Ave: Bardwell Ln to Spofforth St	SSkerb/Agutter	416	2020/2021
Holt Avenue	Kerb and Gutter	R-Holt Ave: Bardwell Ln to Spofforth St	Concrete	208	2020/2021
Holt Avenue	Kerb and Gutter	R-Holt Ave: Bardwell Ln to Spofforth St	SSkerb/Agutter	208	2020/2021
Beauty Point Road	Kerb and Gutter	R-Beauty Point Rd: Lower David St to Bay St	Concrete	95	2020/2021
Milton Avenue	Kerb and Gutter	L-Milton Ave: Union St to Queen St	Concrete	135	2020/2021
Ida Avenue	Kerb and Gutter	L-Ida Ave: 24 Ida Ave to Dead End	Concrete	47	2020/2021
Ida Avenue	Kerb and Gutter	R-Ida Ave: 24 Ida Ave to Dead End	Concrete	45	2020/2021
Ruby Street	Kerb and Gutter	L-Ruby St/Thompson St to Union St	Sandstone	126	2020/2021
Ruby Street	Kerb and Gutter	L-Ruby St/Thompson St to Union St	Concrete	14	2020/2021
Ruby Street	Kerb Only	L-Ruby St/Thompson St to Union St	Concrete	200	2020/2021
Ruby Street	Kerb and Gutter	R-Ruby St/Thompson St to Union St	SSkerb/Cgutter	40	2020/2021

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Ruby Street	Kerb and Gutter	R-Ruby St/Thompson St to Union St	Concrete	95	2020/2021
Ruby Street	Kerb Only	R-Ruby St/Thompson St to Union St	Concrete	200	2020/2021
James Street	Kerb Only	R-James St: Dead End to Parriwi Rd	Sandstone	35	2021/2022 and beyond
Inkerman Street	Kerb and Gutter	R-Inkerman St: Wyong Rd to Dead End	Concrete	157	2021/2022 and beyond
Inkerman Street	Kerb and Gutter	L-Inkerman St: Wyong Rd to Dead End	Concrete	164	2021/2022 and beyond
Kardinia Road	Kerb and Gutter	R-Kardinia Rd Morella Rd to Lane	Sandstone	15	2021/2022 and beyond
Kardinia Road	Kerb and Gutter	R-Kardinia Rd Morella Rd to Lane	Concrete	15	2021/2022 and beyond
Kardinia Road	Kerb and Gutter	R-Kardinia Rd Morella Rd to Lane	SSkerb/Cgutter	120	2021/2022 and beyond
Kardinia Road	Kerb and Gutter	R-Kardinia Rd: Lane to Burrawong Ave	Sandstone	25	2021/2022 and beyond
Kardinia Road	Kerb and Gutter	R-Kardinia Rd: Lane to Burrawong Ave	Concrete	25	2021/2022 and beyond
Kardinia Road	Kerb and Gutter	R-Kardinia Rd: Lane to Burrawong Ave	SSkerb/Cgutter	195	2021/2022 and beyond
Kardinia Road	Kerb and Gutter	L-Kardinia Rd: Lane to Burrawong Ave	SSkerb/Cgutter	77	2021/2022 and beyond
Kardinia Road	Kerb and Gutter	L-Kardinia Rd Morella Rd to Lane	Concrete	77	2021/2022 and beyond

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Killarney Street	Kerb and Gutter	L-Killarney St: 34 metres to Dead End	Sandstone	138	2021/2022 and beyond
Kirkoswald Avenue	Kerb and Gutter	R-Kirkoswald Ave: Tivoli St to Bend	Concrete	164	2021/2022 and beyond
Kirkoswald Avenue	Kerb and Gutter	L-Kirkoswald Ave: Tivoli St to Bend	Concrete	114	2021/2022 and beyond
Kirkoswald Avenue	Kerb and Gutter	L-Kirkoswald Ave: Lower Fairfax Rd to Burran Ave	Concrete	224	2021/2022 and beyond
Lower Almora Street	K&G (U Gutter)	L-Lower Almora St: The Esplanade to Ryan Ave	Concrete	259	2021/2022 and beyond
McLeod Street	Kerb Only	L-McLeod St: Dead End to Musgrave St	Concrete	20	2021/2022 and beyond
Melaleuca Lane	Kerb and Gutter	R-Melaleuca Ln: Muston St to Mandolong Rd	Concrete	116	2021/2022 and beyond
Milner Street	Kerb and Gutter	R-Milner St: Prince Albert St to Milner Ln	Sskerb/Agutter	97	2021/2022 and beyond
Milner Street	Kerb and Gutter	R-Milner St: Prince Albert St to Milner Ln	SSkerb/Cgutter	25	2021/2022 and beyond
Milner Street	Kerb and Gutter	R-Milner St: Milner Ln to Raglan St	Sskerb/Agutter	115	2021/2022 and beyond
Morella Road	Kerb and Gutter	R-Morella Rd: Kardinia Rd to David St CS	Concrete	221	2021/2022 and beyond
Moruben Road	Kerb and Gutter	R-Moruben Rd: No.8 to Punch St	Sandstone	71	2021/2022 and beyond

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Moruben Road	Kerb and Gutter	L-Moruben Rd: Mandolong Rd to No. 8	Concrete	76	2021/2022 and beyond
Moruben Road	Kerb and Gutter	L-Moruben Rd: Awaba St to Stanton Rd	Sandstone	177	2021/2022 and beyond
Noble Street	Kerb and Gutter	L-Noble St: Avenue Rd to No.6	Sskerb/Agutter	85	2021/2022 and beyond
Noble Street	Kerb and Gutter	L-Noble St: Avenue Rd to No.6	SSkerb/Cgutter	38	2021/2022 and beyond
Noble Street	Kerb and Gutter	L-Noble St: No.6 to Belmont Rd	Sandstone	105	2021/2022 and beyond
Noble Street	Kerb and Gutter	L-Noble St: No.6 to Belmont Rd	SSkerb/Cgutter	70	2021/2022 and beyond
Park Avenue	Kerb and Gutter	L-Park Ave: Rangers Ave to Dead End	Concrete	390	2021/2022 and beyond
Park Lane	Kerb and Gutter	R-Park Ln: Almora St to Hunter Rd	Concrete	84	2021/2022 and beyond
Pindari Avenue	Kerb and Gutter	R-Pindari Ave: Medusa St to Government Rd	Concrete	106	2021/2022 and beyond
Pindari Avenue	Kerb and Gutter	L-Pindari Ave: Medusa St to Government Rd	Concrete	99	2021/2022 and beyond
Prince Albert Street	Kerb and Gutter	L-Prince Albert St: Whiting Beach Rd to CS at Lennox St	Concrete	175	2021/2022 and beyond
Prince Lane	Kerb and Gutter	L-Prince Ln: Union St to Prince Albert St	Concrete	78	2021/2022 and beyond

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Prince Street	Kerb and Gutter	R-Prince St: Military Rd to Macpherson St	Sandstone	123	2021/2022 and beyond
Pursell Avenue	Kerb and Gutter	L-Pursell Ave: Medusa St to Dead End	Concrete	86	2021/2022 and beyond
Roseberry Street	Kerb and Gutter	L-Roseberry St: Earl St to Ourimbah Rd	Concrete	182	2021/2022 and beyond
Hopetoun Avenue	Kerb and Gutter	L-Hopetoun Ave: Kirkoswald St to Rosherville Rd	Concrete	186	2021/2022 and beyond
Hordern Lane	Kerb and Gutter	L-Hordern Ln: Ourimbah Rd to End	Concrete	98	2021/2022 and beyond
Sabina Street	Kerb and Gutter	L-Sabina St: Dead End to Tivoli St	Sandstone	58	2021/2022 and beyond
Simpson Street	Kerb and Gutter	L-Simpson St: Prince Albert St to Major St	SSkerb/Cgutter	128	2021/2022 and beyond
Sirius Cove Road	Kerb and Gutter	L-Sirius Cove R: Kallaroo St to Elfrida St	Concrete	90	2021/2022 and beyond
St. Elmo Street	Kerb and Gutter	R-St. Elmo St/Dead End to Thompson St	Sandstone	117	2021/2022 and beyond
St. Elmo Street	Kerb and Gutter	R-St. Elmo St/Dead End to Thompson St	SSkerb/Cgutter	24	2021/2022 and beyond
St. Elmo Street	Kerb and Gutter	L-St. Elmo St/Dead End to Thompson St	Concrete	230	2021/2022 and beyond
Stanton Road	Kerb and Gutter	L-Stanton Rd: Fairfax Rd to Wyargine St	Concrete	88	2021/2022 and beyond

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Superba Lane	Kerb and Gutter	R-Superba Ln: Almora St to Superba Pde	Concrete	162	2021/2022 and beyond
Superba Parade	Kerb and Gutter	L-Superba Pde: Upper Almora St to Mandolong Rd	Concrete	143	2021/2022 and beyond
The Grove	Kerb and Gutter	R-The Grove: No.14A to Awaba St	Concrete	222	2021/2022 and beyond
The Grove	Kerb and Gutter	L-The Grove: No.14A to Awaba St	Concrete	222	2021/2022 and beyond
Union Street	Kerb and Gutter	R-Union St/Bradleys Head Rd to Milton Ave	Sandstone	65	2021/2022 and beyond
Union Street	Kerb and Gutter	R-Union St/Bradleys Head Rd to Milton Ave	Sandstone	13	2021/2022 and beyond
Union Street	Kerb and Gutter	R-Union St/Bradleys Head Rd to Milton Ave	SSkerb/Cgutter	52	2021/2022 and beyond
Union Street	Kerb and Gutter	R-Union St/Milton Ave to Prince Albert St	SSkerb/Cgutter	125	2021/2022 and beyond
Upper Spit Road	Kerb and Gutter	R-Upper Spit Rd: Spit Rd to End	Concrete	220	2021/2022 and beyond
Upper Spit Road	Kerb and Gutter	L-Upper Spit Rd: Spit Rd to End	Concrete	215	2021/2022 and beyond
Whiting Beach Road	Kerb and Gutter	R-Whiting Beach Rd/Major St to Dead End	Concrete	15	2021/2022 and beyond
Wunda Road	Kerb and Gutter	R-Wunda Rd/Wolger Rd to Belmont Rd	Concrete	251	2021/2022 and beyond

Street Location	Type	Segment	Material	Length (m)	Forecast Renewal Year
Wunda Road	Kerb and Gutter	L-Wunda Rd/Wolger Rd to Belmont Rd	Concrete	251	2021/2022 and beyond

E.4 Carparks

E4.1 Description of Carpark Network

Council is responsible for the care, control and management of 14 at-grade carparks located at:

- Balmoral Oval;
- Civic Centre;
- Clifton Gardens;
- Corner Spit Rd/Stanton Rd;
- Cross St/Rawson Oval;
- Ellery Park;
- Mosman Bay;
- Mosman Library;
- North End Balmoral;
- Raglan St East;
- Raglan St West;
- Rosherville Reserve;
- Spit East; and
- Spit West.

Within the 14 at-grade carparks assets include:

- 27,313 m^2 carpark road pavement;
- 17,342 m^2 asphalt surface course (seal);
- 9,971 m^2 paving brick surface;
- 3,714 m kerbs and/or gutters;
- 179 m^2 paving;
- 176 regulatory parking signs;
- 11 parking meters;
- 57 information signs; and
- Approximately 3,500 m linemarking.

Typical carpark asset unit rates and useful lives are as follows:

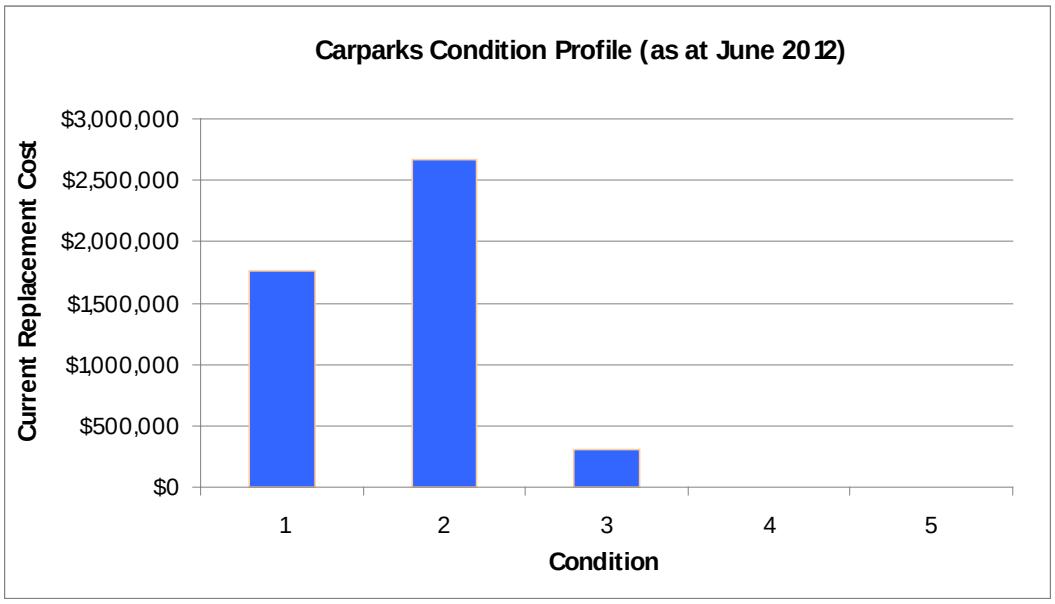
Car Park Asset Type		Unit	Useful Life	Unit Rate
Road Pavement	AC surface course 30mm	m^2	50	$23.00
	std flex 200	m^2	90	$92.00
	std flex 250	m^2	90	$112.00
	paving brick/pavers (interlocking) exc underlying pavement	m^2	50	$116.05
Footpath	concrete	m^2	90	$96.81
	paving brick	m^2	60	$116.05
	paving brick / concrete	m^2	60	$750.00
Kerb and Gutter	concrete std	m	90	$118.88
	sandstone	m	90	$360.00
Kerb Only	concrete/sandstone	m	90	$98.68
Mountable Kerb	precast concrete	m	90	$91.00
Dish Gutter	concrete	m	90	$114.78
Kerb Wheelstops	timber sleepers	m	15	$160.00
Fence	timber post and rail log	m	20	$30.00
	steel railing	m	25	$220.00
Linemarking	lane and parking space	each	10	$1.03
	hatching	each	10	$36.00
	disabled parking	each	10	$30.93
	arrows	each	10	$41.23
Signs	information	each	25	$250.00
	regulatory	each	20	$113.40
Parking Meter	pay and display	each	25	$8,600.00
Tall Lights	steel	each	40	$2,500.00
Bollards	timber	each	20	$100.00
	steel	each	30	$150.00

Car Park Asset Type		Unit	Useful Life	Unit Rate
Median Island	concrete	m^2	40	$510.00
Speed Hump	asphalt	each	30	$2,400.00
Retaining Wall	sandstone	m^2	130	$577.00

The value of the carpark assets is summarised in Section 4.1.4.

E4.2 Carpark Condition

The condition profile (June 2012) of the carpark assets is as follows:



Generally carpark assets are in average to good condition. However, pavement surfaces in several carparks are approaching the need for resurfacing/renewal.

E4.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	100%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	0%

E4.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, carpark assets valued at $0 are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A maintenance priority list has been prepared to repair defects in carparks. Identified defect are repaired subject to available resources. Additionally, carpark assets in or approaching condition 4 and 5 are prioritised for renewal in the Carpark Renewal Program.

E4.5 Current Maintenance and Renewal Strategies

Typical carpark maintenance activities include:

- Reconstructing/repairing road pavement and surface failures;
- Pothole filling/patching;
- Restoration of service openings;
- Replacement of defective or vandalised signs and furniture eg bollards; and
- Re-linemarking.

Examples of 'low lifecycle cost' methods include flexible road pavement reconstruction using 'mill and fill' deep lift asphalt techniques or rationalising the layout of the carpark pavement where appropriate.

E4.6 Recent Expenditure Profile

Carpark expenditure ($000s) over the last few years is outlined in the following table:

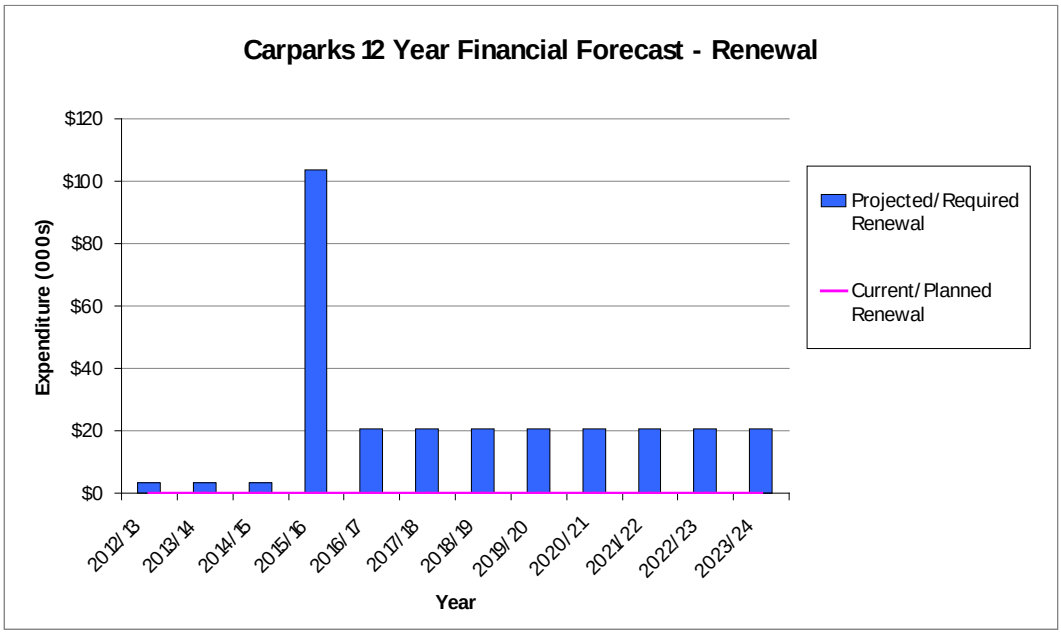
	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	8	5	5	3	10	6.2
Renewals	0	0	0	0	0	0
New Work	0	0	0	0	0	0
TOTAL	**8**	**5**	**5**	**3**	**10**	**6.2**

There has been limited work on Council carparks over recent years, although there is emerging recognition of the need to undertake more maintenance and renewal work on carparks given the importance placed on carparks by the community.

E4.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to increase over time as the asset stock ages. All costs are shown in 2012 dollar values.

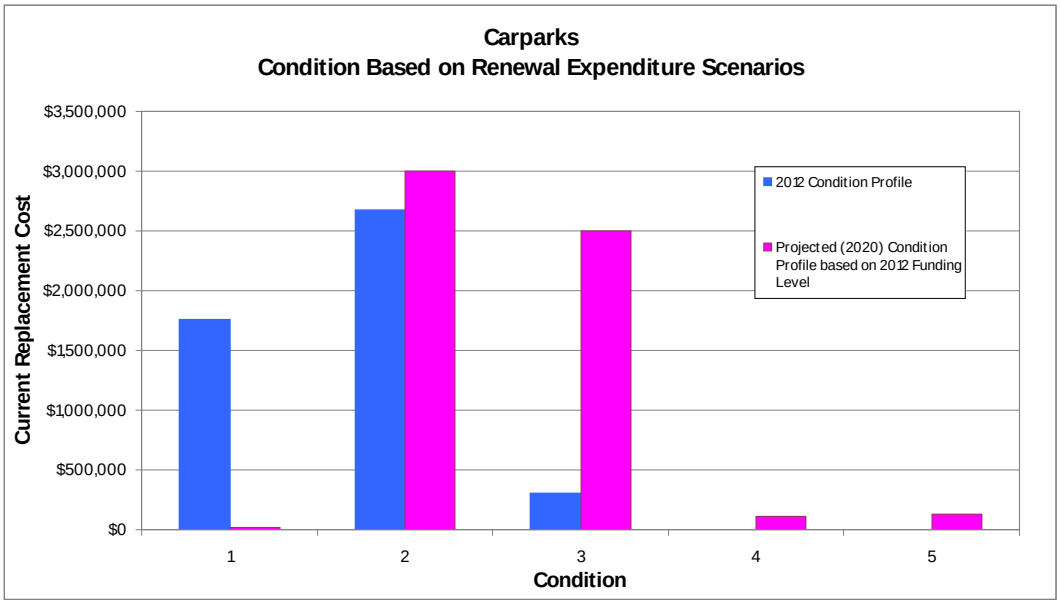
Carpark 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	3	3	3	104	21	21	21	21	21	21	21	21
Planned/Current Expenditure	0	0	0	0	0	0	0	0	0	0	0	0
Funding Gap	3	3	3	104	21	21	21	21	21	21	21	21
Cumulative Funding Gap	3	6	9	113	134	155	176	197	218	239	260	281



It is also proposed that the above annual renewal funding be complemented by an increase in the carpark maintenance allocation to $23,000 per year, mainly to address vandalism, graffiti issues and minor defect works.

E4.8 Projected Condition

Utilising 2012 funding levels, the future projected condition of Council's carpark assets in 2020 are as follows. This has been compared to the condition of assets in 2012.



If Council continues to fund carpark renewals at 2012 levels then the condition of Council's carpark assets will deteriorate over the next 8 years including a significant percentage falling into condition 4 and 5 range.

A large percentage of Council's carpark assets will reach the end of their useful life in the next 10 to 25 years when required renewal funding will hit an initial peak, likely as a result of pavement surfacing renewal requirements. There will be a more significant peak in 40 or so years when pavements will likely require renewal.

Renewal of shorter life assets such as linemarking will be required on an ongoing basis year by year.

E4.9 10 Year Work Program

A 10 year carpark assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed.

Location	Type	Material	Quantity	Unit	Forecast Renewal Year
Cross Street / Rawson Oval	Linemarking	Paint	200	m (est)	2012/2013
Cross Street / Rawson Oval	Linemarking	Paint	1	each	2012/2013
Spit West	Linemarking	Paint	1	each	2012/2013
Balmoral Oval	Linemarking	Paint	300	m (est)	2012/2013
Civic Centre	Linemarking	Paint	55	each	2012/2013
Cnr Spit / Stanton	Linemarking	Paint	120	m (est)	2012/2013
Ellery Park	Linemarking	Paint	100	m (est)	2012/2013
Spit West	Linemarking	Paint	200	m (est)	2012/2013
Civic Centre	Surface Course	Asphalt	1,530	m^2	2012/2013
Cnr Spit / Stanton	Surface Course	Asphalt	396	m^2	2013/2014
Cross Street / Rawson Oval	Surface Course	Asphalt	1,350	m^2	2013/2014
Mosman Library	Surface Course	Asphalt	200	m^2	2013/2014
Raglan Street West	Surface Course	Asphalt	1,660	m^2	2014/2015
Spit East	Surface Course	Asphalt	175	m^2	2014/2015
Spit West	Surface Course	Asphalt	5,389	m^2	2015/2016
Balmoral Oval	Linemarking	Paint	50	m	2016/2017
Balmoral Oval	Linemarking	Paint	11	each	2016/2017
Balmoral Oval	Linemarking	Paint	3	each	2016/2017
Balmoral Oval	Linemarking	Paint	50	m^2 (est)	2016/2017
Rosherville Reserve	Linemarking	Paint	150	m (est)	2016/2017
Spit East	Linemarking	Paint	200	m (est)	2016/2017
Civic Centre	Linemarking	Paint	300	m	2016/2017
Civic Centre	Linemarking	Paint	6	each	2016/2017
Mosman Bay	Linemarking	Paint	240	m (est)	2016/2017
Mosman Bay	Linemarking	Paint	2	each	2016/2017

Roads

Location	Type	Material	Quantity	Unit	Forecast Renewal Year
North End Balmoral	Linemarking	Paint	300	each	2016/2017
Raglan Street East	Linemarking	Paint	400	m (est)	2016/2017
Raglan Street West	Linemarking	Paint	400	m (est)	2016/2017
Raglan Street West	Linemarking	Paint	2	each	2016/2017
Clifton Gardens	Linemarking	Paint	1	each	2016/2017
North End Balmoral	Surface Course	Asphalt	480	m^2	2016/2017
Spit East	Kerb and Gutter	Timber Sleeper	65	m	2016/2017
Civic Centre	Regulatory Signage	Steel	20	each	2016/2017
Clifton Gardens	Regulatory Signage	Steel	11	each	2016/2017
Cross Street / Rawson Oval	Regulatory Signage	Steel	3	each	2016/2017
Spit East	Bollards	Timber	8	each	2016/2017
Balmoral Oval	Regulatory Signage	Steel	42	each	2016/2017
Ellery Park	Regulatory Signage	Steel	6	each	2016/2017
Cross Street / Rawson Oval	Linemarking	Paint	200	m (est)	2017/2018
Cross Street / Rawson Oval	Linemarking	Paint	1	each	2017/2018
Spit West	Linemarking	Paint	1	each	2017/2018
BALMORAL OVAL	Linemarking	Paint	300	m (est)	2017/2018
Civic Centre	Linemarking	Paint	55	each	2017/2018
Cnr Spit / Stanton	Linemarking	Paint	120	m (est)	2017/2018
Ellery Park	Linemarking	Paint	100	m (est)	2017/2018
Spit West	Linemarking	Paint	200	m (est)	2017/2018
Mosman Bay	Regulatory Signage	Steel	10	each	2017/2018

Location	Type	Material	Quantity	Unit	Forecast Renewal Year
Mosman Library	Regulatory Signage	Steel	7	each	2017/2018
Raglan Street East	Regulatory Signage	Steel	28	each	2017/2018
Raglan Street West	Regulatory Signage	Steel	17	each	2017/2018
Rosherville Reserve	Regulatory Signage	Steel	7	each	2017/2018
Spit East	Regulatory Signage	Steel	12	each	2017/2018
Balmoral Oval	Fence	Timber	20	m	2017/2018
Balmoral Oval	Signage	Steel	11	each	2017/2018
Balmoral Oval	Speed Hump	Asphalt	1	each	2017/2018
Spit East	Signage	Steel	4	each	2017/2018
Raglan Street West	Paving	Paving Brick/Concrete	50	m^2	2017/2018
Rosherville Reserve	Median	Concrete	5	m^2	2018/2019
Rosherville Reserve	Surface Course	Paving Brick	1,674	m^2	2018/2019
Balmoral Oval	Surface Course	Asphalt	50	m^2	2020/2021
Mosman Bay	Surface Course	Asphalt	1,664	m^2	2020/2021
Spit East	Surface Course	Asphalt	1,300	m^2	2021/2022
Clifton Gardens	Regulatory Signage	Steel	4	each	2021/2022
Spit West	Regulatory Signage	Steel	9	each	2021/2022
Balmoral Oval	Linemarking	Paint	50	m	2021/2022
Balmoral Oval	Linemarking	Paint	11	each	2021/2022
Balmoral Oval	Linemarking	Paint	3	each	2021/2022
Balmoral Oval	Linemarking	Paint	50	m^2 (est)	2021/2022
Rosherville Reserve	Linemarking	Paint	150	m (est)	2021/2022
Spit East	Linemarking	Paint	200	m (est)	2021/2022

Roads

Location	Type	Material	Quantity	Unit	Forecast Renewal Year
Civic Centre	Linemarking	Paint	300	m	2021/2022
Civic Centre	Linemarking	Paint	6	each	2021/2022
Mosman Bay	Linemarking	Paint	240	m (est)	2021/2022
Mosman Bay	Linemarking	Paint	2	each	2021/2022
North End Balmoral	Linemarking	Paint	300	each	2021/2022
Raglan Street East	Linemarking	Paint	400	m (est)	2021/2022
Raglan Street West	Linemarking	Paint	400	m (est)	2021/2022
Raglan Street West	Linemarking	Paint	2	each	2021/2022
Clifton Gardens	Linemarking	Paint	1	each	2021/2022

E.5 Physical Traffic Devices

E5.1 Description of Physical Traffic Device Assets

Physical traffic devices include:

- 16 roundabouts;
- 10 raised pedestrian crossings;
- 10 chicanes;
- 17 raised platforms;
- 7 entry thresholds; and
- 55 median islands/ pedestrian refuges.

Linemarking and signage associated with physical traffic devices are included in the 'Lines and Signs' asset class.

Typical physical traffic devices unit rates and useful lives are as follows:

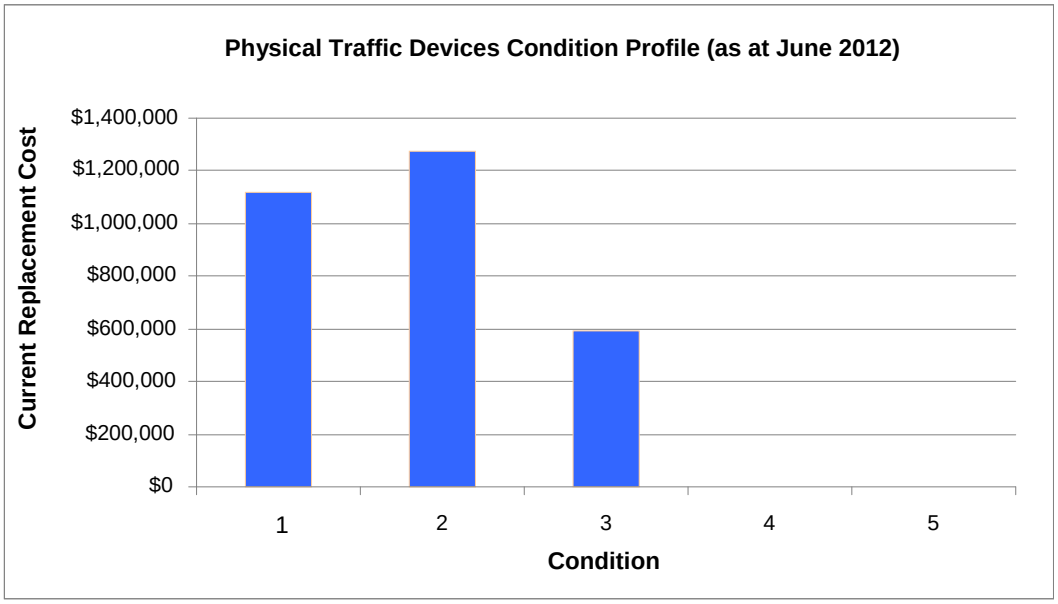
Physical Traffic Devices Asset Type		Unit	Useful Life	Unit Rate
Roundabout	mass concrete / paving bricks	m^2	40	$360.00
	mass concrete apron, concrete kerb centre ring, garden infill	m^2	40	$391.00
Median Island	concrete - painted	m^2	40	$100.00
	concrete kerb, grass infill	m^2	40	$554.00
Median Islands / Kerb Blister Islands	concrete/SS kerb, grass infill	m^2	40	$615.00
	mass concrete	m^2	40	$514.00
	concrete kerb, paver infill	m^2	40	$750.00
Wombat Crossing / Raised Thresholds	concrete edge kerbs, paving brick infill, mass concrete, mass asphalt	m^2	40	$372.00
Pedestrian Refuges	mass concrete	m^2	40	$510.00
Speed Humps	approx 0.5m wide asphalt	m^2	40	$385.00

Physical Traffic Devices Asset Type		Unit	Useful Life	Unit Rate
	concrete	m^2	30	$455.00
Chicanes	concrete kerb, grass/gravel infill	m^2	30	$465.00
Slow treatment	painted, rubber	m^2	40	$40.00
Road narrowing	concrete kerb, grass infill	m^2	30	$465.00

The value of physical traffic device assets is summarised in Section 4.1.4.

E5.2 Physical Traffic Devices Condition

The condition profile (June 2012) of physical traffic devices is as follows:



Generally traffic device assets are in good condition, however there are a number of devices approaching the end of their useful life.

E5.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	100%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	0%

E5.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, physical traffic devices valued at $0 are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A maintenance priority list has been prepared to repair defects in physical traffic devices. Identified defect are repaired subject to available resources. Additionally, physical traffic devices in or approaching condition 4 and 5 are prioritised for renewal in the Physical Traffic Devices Renewal Program.

E5.5 Current Maintenance and Renewal Strategies

Typical Physical Traffic Device maintenance activities include:

- Reconstructing/repairing component and surface failures;
- Repairing damage caused by vehicles;
- Repairing pavements including loose brick paving;
- Re-linemarking (refer to 'Lines and Signs' asset class); and
- Landscaping maintenance.

Examples of 'low lifecycle cost' methods include replacing older concrete paving brick or landscaped roundabouts or thresholds/raised platforms with mass concrete or asphalt mountable roundabouts.

E5.6 Recent Expenditure Profile

Physical traffic devices expenditure ($000s) over the last few years is outlined in the following table:

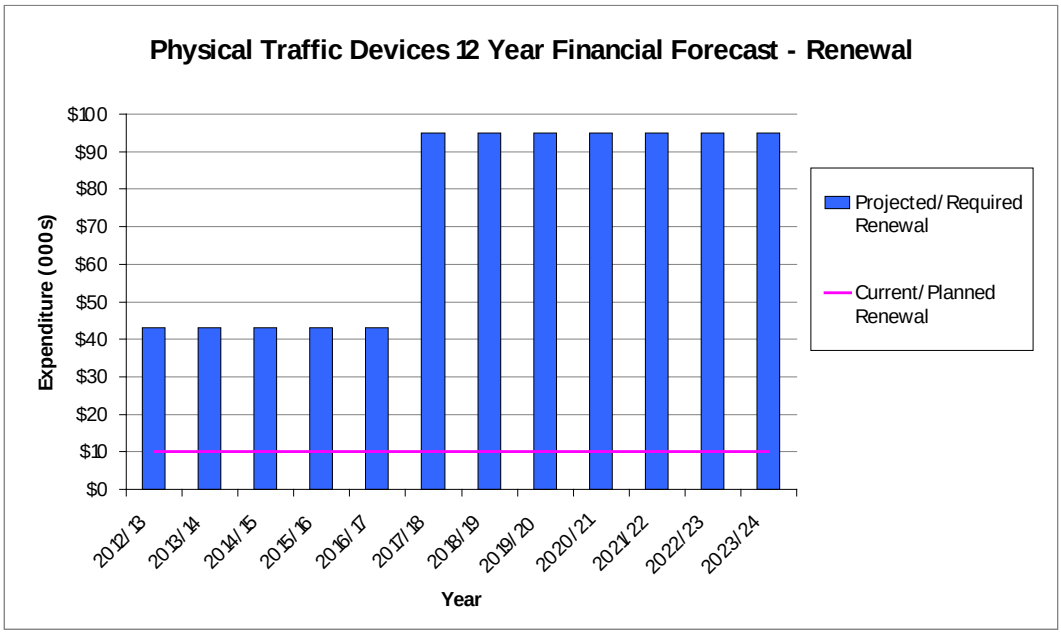
	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	65	67	70	65	67	66.8
Renewals	0	0	26	0	25	10.2
New Work	49	38	67	50	0	40.8
TOTAL	**114**	**105**	**163**	**115**	**92**	**117.8**

There has been limited work on Council Physical Traffic Devices over recent years, although there is emerging recognition of the need to undertake more maintenance and renewal work on traffic devices given the importance placed on traffic devices by the community and their importance from a traffic management perspective.

E5.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to increase over time as the asset stock ages. All costs are shown in 2012 dollar values.

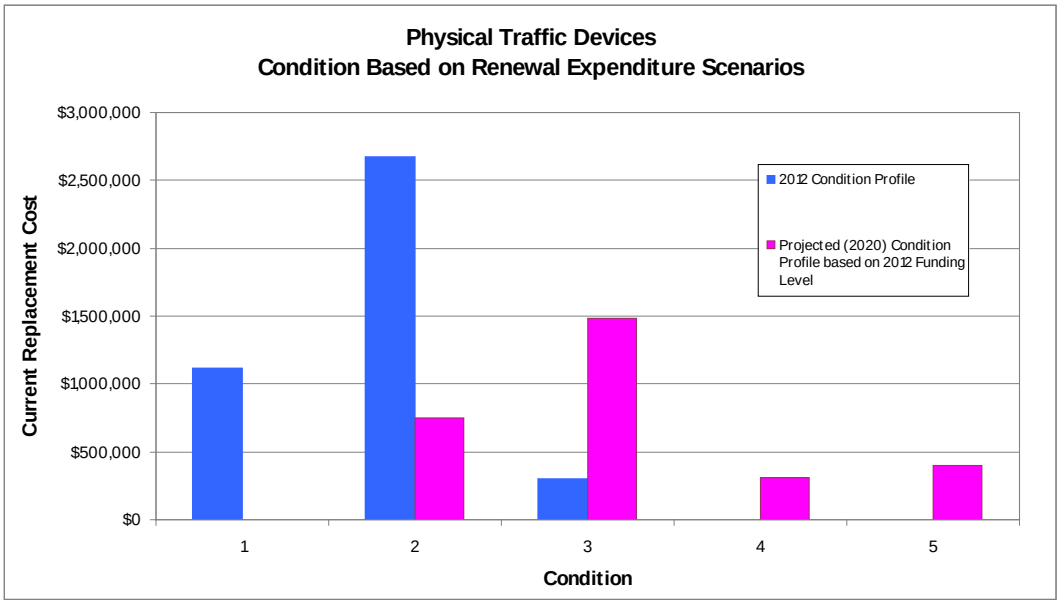
Physical Traffic Device 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	43	43	43	43	43	95	95	95	95	95	95	95
Planned/Current Expenditure	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2
Funding Gap	33	33	33	33	33	85	85	85	85	85	85	85
Cumulative Funding Gap	33	66	98	131	164	249	334	418	503	588	673	758



It is also proposed that the above annual renewal funding be complemented by an increase in physical traffic device maintenance allocation to $101,000 per year mainly to address vandalism, graffiti issues and minor defect works.

E5.8 Projected Condition

Utilising 2012 funding levels, the future projected condition of Council's physical traffic devices in 2020 are as follows. This has been compared to the condition of assets in 2012.



If Council continues to physical traffic device renewals at 2012 levels then the condition of Council's physical traffic devices will deteriorate over the next 8 years including a significant percentage falling into condition 4 and 5 range.

E5.9 10 Year Work Program

A 10 year physical traffic devices assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed.

Street Location	Type	Segment	Number	Quantity (m^2)	Forecast Renewal Year
Cowles Road	Kerb Blister Island	Ourimbah to Awaba	8	29	2012/2013
Pearl Bay Avenue	Kerb Blister Island		2	24	2012/2013
Awaba Street	Kerb Blister Island		6	86	2013/2014
Bay Street	Kerb Blister Island		4	36	2014/2015
Hale Road	Raised Platform Pedestrian Crossing	Between Erith and Ourimbah	1	96	2014/2015
Parriwi Road	Median Island	North end at Spit	1	67	2015/2016
The Esplanade	Roundabout	North end	1	20	2015/2016
Wolger Road	Roundabout	Noble	1	28	2016/2017
Spencer Road	Chicane	Between Bardwell and Spofforth	4	80	2016/2017
Holt Avenue	Raised Platform	Between Bardwell and Cowles	1	80	2017/2018
Holt Avenue	Median Island		1	10	2017/2018
Holt Avenue	Kerb Blister Island		2	12	2017/2018
Holt Avenue	Raised Platform Entry Threshold	Spofforth	1	80	2017/2018
Holt Avenue	Median Island		1	24	2017/2018
Medusa Street	Raised Platform Pedestrian Crossing	Mid length	1	65	2017/2018
Medusa Street	Kerb Blister Island		5	40	2017/2018
Oswald Street	Median Island	Rangers	1	75	2017/2018
Pearl Bay Avenue	Raised Platform	Between No 3 and Moss Lane	1	63	2018/2019

Street Location	Type	Segment	Number	Quantity (m^2)	Forecast Renewal Year
Raglan Street	Kerb Blister Island	East side McLeod to Curraghbeena	1	3	2018/2019
Raglan Street	Median Island		2	26	2018/2019
Rangers Avenue	Raised Platform	Between Oswald and Spofforth	1	47	2018/2019
Rangers Avenue	Median Island		1	2	2018/2019
Rangers Avenue	Kerb Blister Island		2	20	2018/2019
Rangers Avenue	Raised Entry Platform	Between Oswald and Spofforth	1	47	2018/2019
Rangers Avenue	Median Island		1	2	2018/2019
Rangers Avenue	Kerb Blister Island		2	20	2018/2019
Reginald Street	Slow Treatment	Oswald	1	140	2018/2019
Spencer Road	Raised Platform	Between Bardwell and Cowles	1	64	2018/2019
Spencer Road	Median Island		1	4	2018/2019
Spencer Road	Kerb Blister Island		2	25	2018/2019
Spofforth Street	Median Island		2	13	2018/2019
Spofforth Street	Median Island		1	6	2018/2019
Wolger Road	Raised Entry Platform	East of Noble	1	18	2018/2019
Reginald Street	Speed Hump	Mid block	1	42	2018/2019
Upper Avenue Road	Speed hump		1	9	2018/2019
Upper Avenue Road	Speed hump		1	7	2018/2019
Awaba Street	Speed hump	Between Cowles and Spit	3	79	2019/2020
Bay Street	Speed Hump	Between Bickell and Quakers	1	33	2019/2020

Street Location	Type	Segment	Number	Quantity (m^2)	Forecast Renewal Year
Redan Lane	Speed Hump		7	53	2019/2020
Upper Avenue Road	Speed hump		1	21	2019/2020
Belmont Road	Roundabout	Bardwell	1	50	2019/2020
Belmont Road	Median Island		4	28	2019/2020
Brady Street	Median Island	Military	1	10	2019/2020
Cabban Street	Median Island	Magic	1	24	2019/2020
Cabramatta Road	Chicane	Between Bardwell and Cowles	2	60	2019/2020
Cabramatta Road	Kerb Blister Island	Between Spofforth and Bardwell	2	8	2019/2020
Cabramatta Road	Kerb Blister Island	Between Spofforth and Bardwell	2	8	2019/2020
Cabramatta Road	Kerb Blister Island	Between Spofforth and Bardwell	2	8	2019/2020
Cabramatta Road	Kerb Blister Island	Between Spofforth and Bardwell	2	8	2019/2020
Congewoi Road	Pavement Entry Treatment	Wyong	1	12	2019/2020
Cowles Road	Raised Platform	Spencer to Glover	1	56	2020/2021
Cowles Road	Median Island		1	2	2020/2021
Cowles Road	Kerb Blister Island		2	20	2020/2021
Cowles Road	Raised Platform	Spencer to Glover	1	56	2020/2021
Cowles Road	Median Island		1	2	2020/2021
Cowles Road	Kerb Blister Island		2	20	2020/2021
Cowles Road	Roundabout	Belmont	1	57	2020/2021
Cowles Road	Median Island		4	24	2020/2021

Street Location	Type	Segment	Number	Quantity (m^2)	Forecast Renewal Year
Hale Road	Kerb Blister Island		4	38	2020/2021
Ourimbah Road	Median Island	Between Macpherson and Hale	1	17	2020/2021
Pearl Bay Avenue	Raised Platform	Between Marsala and Moss Lane	1	63	2020/2021
Pearl Bay Avenue	Median Island		1	4	2020/2021
Pearl Bay Avenue	Kerb Blister Island		2	27	2020/2021
Pearl Bay Avenue	Median Island		1	4	2020/2021
Queen Street	Entry Treatment with Pedestrian Crossing	Prince Albert	1	95	2021/2022
Raglan Street	Raised Pedestrian Crossing	Just north of Canrobert	1	85	2021/2022
Raglan Street	Kerb Blister Island		2	25	2021/2022
Raglan Street	Kerb Blister Island		2	25	2021/2022
Rangers Avenue	Kerb Blister Island	Near No. 2	1	3	2021/2022
Rangers Avenue	Median Island		2	12	2021/2022
Rangers Avenue	Median Island	Oswald	1	90	2021/2022
Spofforth Street	Median Island	Military	1	18	2021/2022
The Esplanade	Kerb Blister Island		1	6	2021/2022
Upper Avenue Road	Kerb Blister Island		1	2	2021/2022
Upper Avenue Road	Kerb Blister Island		1	2	2021/2022
Wolger Road	Median Island	Noble	4	32	2021/2022

E.6 Street Furniture

E6.1 Description of Street Furniture Assets

Assets associated with street furniture include:

- 10,877 m fencing/handrailing;
- 1,839 m guardrail;
- 1 bus shelter;
- 156 seats;
- 46 traffic visibility mirrors;
- 705 bollards;
- 47 bins;
- 24 parking meters;
- 4 bike racks;
- 3 clearance bars; and
- 24 tree surrounds;

Street furniture along arterial roads are included as these are the responsibility of Council. Advertising (*Adshell*) sponsored bus shelters are excluded as these are managed and maintained by *Adshell*.

The bus shelter (old tram shed) in The Esplanade is included in the street furniture assets. The bus shelter has undergone a renovation in June 2010 and the current valuation was informed by previous Condition Audit and Valuation by Consultants GW Engineers in 2000.

Typical asset unit rates and useful lives associated with street furniture include:

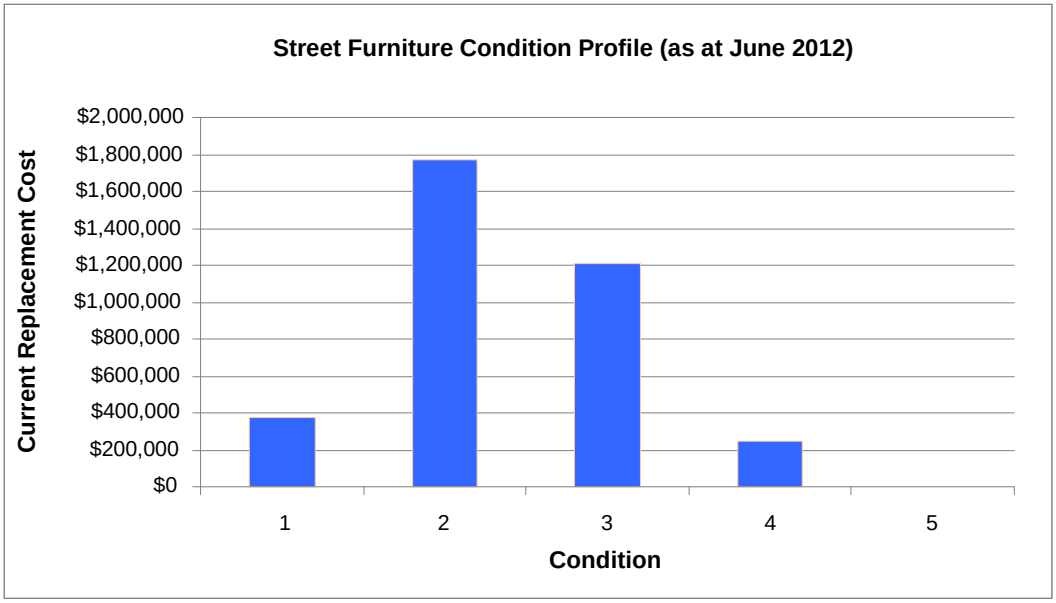
Street Furniture Asset Type		Unit	Useful Life	Unit Rate
Bike Rack	std stainless steel hoop	each	30	$2,200.00
Bin Enclosure	steel, timber	each	30	$1,000.00
	square	each	30	$2,000.00
	dog tidy	each	30	$500.00
Bench Seat	metal frame / timber slats	each	30	$1,030.00
	concrete legs / timber slats	each	30	$800.00
	stone	each	30	$1,200.00
Bollards	timber	each	20	$100.00
	metal / steel / concrete	each	30	$150.00

Street Furniture Asset Type		Unit	Useful Life	Unit Rate
	sandstone	each	30	$300.00
	stainless steel / feature	each	30	$1,260.00
Bus Shelter	timber / tile roof	each	60	$60,000.00
Clearance Bar	steel / concrete	each	20	$1,000.00
Fence	timber post and log rail	m	20	$30.00
	timber	m	20	$220.00
	steel (1)	m	25	$220.00
	steel (2)	m	25	$130.00
Guardrail	steel	m	40	$320.00
Handrail	timber	m	20	$220.00
	steel	m	25	$220.00
Mirror	800 diameter	each	20	$650.00
	1000 diameter	each	20	$750.00
	stainless steel 600 diameter	each	20	$1,150.00
Monuments	sundial, Billy the Dog, etc	each	100	$30,000.00
Parking meters	pay and display	each	20	$8,600.00
Silent cop	steel	each	25	$200.00
Tree Surround	concrete	each	50	$1,000.00
Water Bubbler	timber painted	each	20	$2,000.00
Wheelstop	plastic	each	20	$170.00
	concrete	each	20	$510.00

The value of assets associated with street furniture is summarised in Section 4.1.4.

E6.2 Street Furniture Condition

The condition profile (June 2012) of street furniture assets is as follows:



Generally street furniture assets are in fair to good condition, however there are a significant number of assets in poor condition and/or approaching the end of their useful life, particularly fencing/handrail assets.

Given the relatively short life of street furniture assets and their susceptibility to vandalism and vehicle collision for example, many of the assets are now requiring increased levels of maintenance and/or replacement.

E6.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	100%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	0%

E6.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, street furniture valued at $247,482 (approximately 7% of assets associated with street furniture) are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A maintenance priority list has been prepared to repair defects in assets associated with street furniture. Identified defect are repaired subject to available resources. Additionally, street furniture in or approaching condition 4 and 5 are prioritised for renewal in the Street Furniture Renewal Program.

E6.5 Current Maintenance and Renewal Strategies

Typical Street Furniture maintenance activities include:

- Reconstructing/repairing damaged/deteriorated fencing;
- Repairing damage caused by vehicles;
- Repairing vandalised assets; and
- Cleaning assets where required.

Examples of 'low lifecycle cost' methods include replacing older fencing or furniture such as seating in a different material.

E6.6 Recent Expenditure Profile

Street furniture expenditure ($000s) over the last few years is outlined in the following table:

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	5	5	5	6	0	4.2
Renewals	0	0	0	40*	181	44.2
New Work	2	37	0	0	0	7.8
TOTAL	**10**	**42**	**5**	**46**	**181**	**56.2**

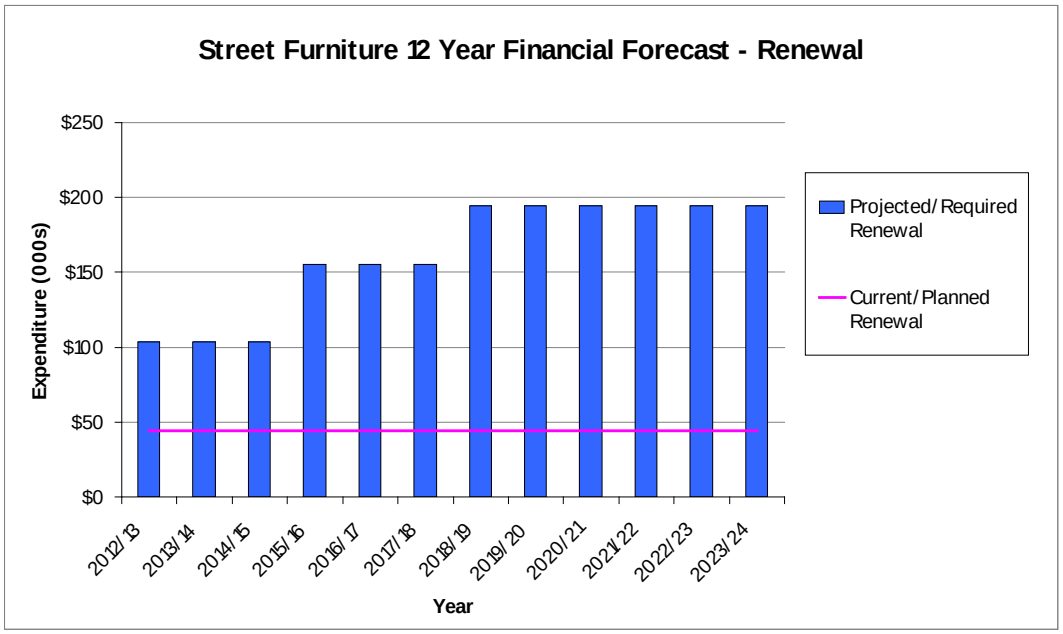
*The Esplanade bus shelter refurbishment

There has been limited work on Council street furniture assets over recent years, although there is emerging recognition of the need to undertake more maintenance and renewal work on street furniture given the importance placed on these assets by the community.

E6.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to increase over time as the asset stock ages. All costs are shown in 2012 dollar values.

Street Furniture 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	104	104	104	155	155	155	194	194	194	194	194	194
Planned/Current Expenditure	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2
Funding Gap	60	60	60	111	111	111	150	150	150	150	150	150
Cumulative Funding Gap	60	120	179	290	401	512	662	811	961	1,111	1,261	1,411



Renewal costs have been 'optimised' assuming there can be optimisation of renewal methods and materials eg guardrail posts or some sections of guardrail can be retained/re-used, seating frames can be retained/re-used, some fencing posts or rails can be re-used in most cases etc. The cost of renewal at 'optimised' level has been assumed at 75% of current replacement cost.

It is also proposed that the above annual renewal funding be complemented by an increase in the street furniture maintenance allocation to $16,000 per year, mainly to address minor defect works, vehicle damage to guardrails and fencing, and for vandalism and graffiti issues.

E6.8 Projected Condition

Utilising 2012 funding levels, the future projected condition of Council's street furniture assets in 2020 are as follows. This has been compared to the condition of assets in 2012.

If Council continues to fund street furniture renewals at 2012 levels then the condition of Council's street furniture will deteriorate over the next 8 years including a significant percentage falling into condition 4 and 5 range.

E6.9 10 Year Work Program

A 10 year street furniture assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed. Please note, due to its size the whole program has not been included in this AMP.

Street Location	Type	Segment	Number	Quantity	Unit	Forecast Renewal Year
Delecta Avenue	Guardrail	Delecta Av: Dead End to Bay St	Steel Painted	11	m	2012/2013
Musgrave Street	Guardrail	Musgrave St: CS Concrete to CS Concrete	Steel Unpainted	4.6	m	2012/2013
Croquet Lane	Mirror	Croquet Lane: Alexander Ave to Middle Head Road	Steel Unpainted	1	each	2012/2013
Oswald Street	Guardrail	Oswald St: Rangers Ave to Reginald St	Steel Unpainted	22	m	2012/2013
Redan Lane	Mirror	Renda Ln/Raglan St to Upper Almora St	Steel Unpainted	1	each	2012/2013
Reginald Street	Guardrail	Reginald St: Oswald St to No.13 Reginald St	Steel Unpainted	62	m	2012/2013
The Grove	Handrail	L-The Grove: No.14A to Awaba St	Timber Painted	1	m	2012/2013
Botanic Road	Pay & Display Machine	Botanic Rd: Dead End, Mosman Vat to The Esplanade	Steel Unpainted	1	each	2012/2013
Boyle Street	Handrail	Boyle St: Dead End, Mosman Bay to Dead End	Timber Painted	30	m	2012/2013
Burrawong Avenue	Handrail	Burrawong Ave: Dead End to Iluka Rd	Timber Painted	10	m	2012/2013
Burrawong Avenue	Handrail	Burrawong Ave: Iluka Rd to Dead End	Timber Painted	2	m	2012/2013
Morella Road	Handrail	Morella Rd: David St to Conc Section	Steel Painted	42	m	2012/2013

Street Location	Type	Segment	Number	Quantity	Unit	Forecast Renewal Year
Mulbring Street	Handrail	Mulbring StL Dugald Rd to Dead End	Timber Painted	4	m	2012/2013
Pretoria Avenue	Fence	Pretoria Ave: Wolseley Rd to Dayrell Ave	Timber Unpainted	7	m	2012/2013
Sarah's Walk	Handrail	Sarah's Walk/Morella Rd to Dead End	Timber Painted	3	m	2012/2013
Upper Spit Road	Handrail	Upper Spit Rd: Spit Rd to End	Timber Painted	7	m	2012/2013
Burran Avenue	Fence	L-Burran Ave: Stanton Rd to Fairfax Rd	Timber Painted	26	m	2012/2013
Burran Avenue	Fence	L-Burran Ave: Stanton Rd to Fairfax Rd	Timber Painted	30	m	2012/2013
Burrawong Avenue	Fence	L-Burrawong Ave: Iluka Rd to Dead End	Timber Painted	30	m	2012/2013
Military Road	Seat/ Bench	Military Rd: Raglan St to Upper Almora St	Steel Painted	1	each	2012/2013
Military Road	Seat/ Bench	Military Rd: Raglan St to Upper Almora St	Steel Painted	1	each	2012/2013
Spit Road	Seat/ Bench	Spit Rd: Military Rd to Ourimbah Rd		1	each	2012/2013
Spit Road	Bollard	Spit Rd: Ourimbah Rd to Medusa St	Timber Painted	1	each	2012/2013
Spit Road	Seat/ Bench	Spit Rd: Ourimbah Rd to Medusa St	Timber Painted	1	each	2012/2013
Macpherson Street	Handrail	Macpherson St: Gerard St to Ourimbah Rd	Steel Painted	59	m	2012/2013

Street Location	Type	Segment	Number	Quantity	Unit	Forecast Renewal Year
Spofforth Street	Handrail	Spofforth St: Creek to Boyle St	Steel Unpainted	28	m	2012/2013
Bradleys Head Road	Bollard	Bradleys Head Rd: Union St to King Max St	Timber Painted	2	each	2012/2013
Awaba Street	Bollard	Awaba St: Spit Rd to Cowles Rd	Timber Unpainted	1	each	2012/2013
Raglan Street	Seat/ Bench	Raglan St: Want St to Military Rd	Timber Painted	1	each	2012/2013
Raglan Street	Seat/ Bench	Raglan St: Military Rd to Cullen Ave	Steel Painted	1	each	2012/2013
Barney Kearns Steps	Handrail	Barney Kearns Steps: Kiora Ave to Parriwi Rd	Steel Painted	7	m	2012/2013
Boyle Street	Handrail	Boyle St: Dead End, Mosman Bay to Dead End	Steel Painted	78	m	2012/2013

E.7 Retaining Walls

E7.1 Description of Retaining Walls

Retaining wall assets covered by this AMP include approximately 1,133 retaining structures (walls/ embankments) covering 77,047 m^2 in area and 41,625 m in length. Generally walls covered by this AMP are one (1) metre or greater in height and are road related retaining structures.

Retaining wall assets covered include:

- 7,731 m (11,570 m^2, 239 no.) dimension stone grouted joints retaining wall;
- 2,906 m (4,063 m^2, 80 no.) dimension stone open joints retaining wall;
- 3,148 m (3,562 m^2, 92 no.) random stone grouted joints retaining wall;
- 1,372 m (2,000 m^2, 54 no.) random stone open joints retaining wall;
- 250 m (430 m^2, 9 no) stone retaining wall;
- 6,807 m (12,862 m^2, 182 no.) concrete/reinforced concrete retaining wall;
- 122 m (380 m^2, 6 no.) crib-bloc retaining wall;
- 4,591 m (7,032 m^2, 98 no.) reinforced hollow block;
- 996 m (1,041 m^2, 55 no.) brick retaining wall;
- 151 m (150 m^2, 7 no.) timber retaining wall;
- 38 m (121 m^2, 2 no.) gabion retaining wall;
- 301 m (824 m^2, 6 no.) earth and clay cuttings;
- 8,665 m (18,612 m^2, 230 no.) rock cutting; and
- 4,547 m (14,400 m^2, 73 no.) embankments.

430 retaining structures are excluded from this plan including:

- Along arterial roads (responsibility of the RMS);
- Structures on or adjacent to road boundaries but considered to be in private ownership;
- Structures less than 1m in height; and
- Retaining structures in park areas and along the waterfront.

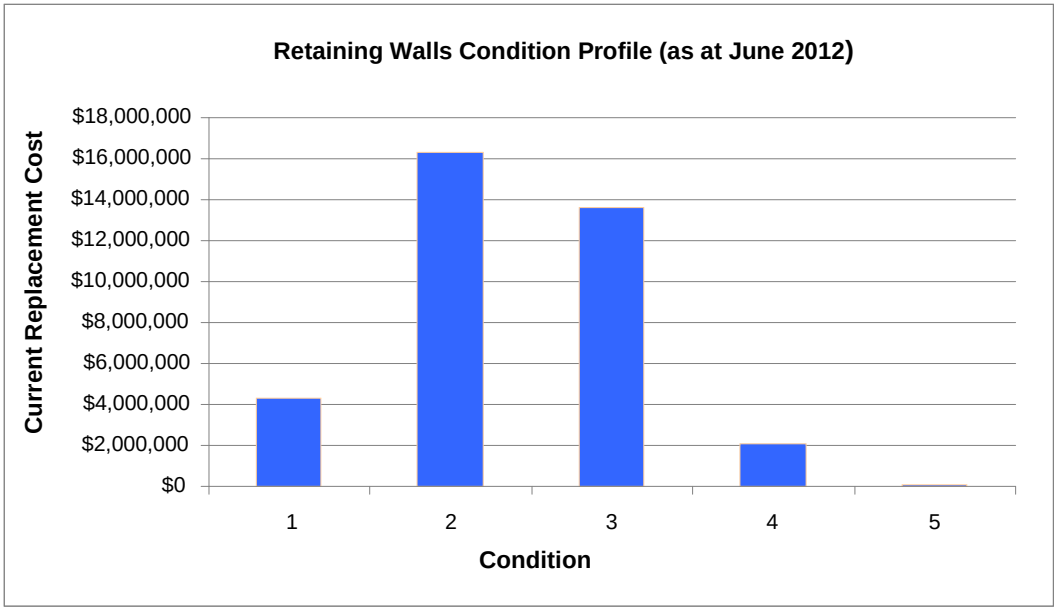
Further work will be done to assess these excluded assets and they will be included in relevant future AMPs. Typical asset unit rates and useful lives associated with retaining walls include:

Retaining Wall Asset Type		Unit	Useful Life	Unit Rate
Mass Concrete		m^2	130	$700.00
Reinforced Concrete		m^2	130	$700.00
Dimension Stone	grouted joints (1)	m^2	130	$1,100.00
	grouted joints (2)	m^2	130	$700.00
	grouted joints (3)	m^2	130	$800.00
	open joints (1)	m^2	130	$1,100.00
	open joints (2)	m^2	130	$700.00
Random Stone	grouted joints (1)	m^2	130	$885.00
	grouted joints (2)	m^2	130	$700.00
	open joints (1)	m^2	130	$885.00
	open joints (2)	m^2	130	$700.00
Stone (1)		m^2	130	$700.00
Stone (2)		m^2	130	$885.00
Crib-block	concrete	m^2	130	$630.00
	timber	m^2	100	$630.00
Gabion		m^2	100	$630.00
Timber	log type	m^2	60	$425.00
Brick		m^2	100	$700.00
Embankment		m^2	250	$50.00
Rock Cutting		m^2	250	$50.00
Earth or Clay Cutting		m^2	250	$50.00
Reinforced Hollow Block	concrete	m^2	130	$700.00
Interlocking Block		m^2	130	$530.00
[Not specified]		m^2	100	$425.00

The value of retaining walls is summarised in Section 4.1.4.

E7.2 Retaining Walls Condition

The condition profile (June 2012) of retaining walls is as follows:



Generally retaining all assets are in fair to good condition, however there are a significant number of assets in poor condition and/or at or approaching the end of their useful life.

E7.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	100%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	0%

E7.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, retaining walls valued at $2,178,586 (approximately 6% of retaining walls) are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A maintenance priority list has been prepared to repair defects in retaining walls. Identified defect are repaired subject to available resources. Additionally, retaining walls in or approaching condition 4 and 5 requiring full or partial renewal are prioritised for renewal in the Retaining Wall Renewal Program.

E7.5 Current Maintenance and Renewal Strategies

Typical retaining wall maintenance activities include:

- Reconstructing/repairing wall capping;
- Repairing damage caused by vehicles;
- Repairing damage caused by stormwater erosion and tree roots;
- Stabilising loose rocks or slip areas; and
- Stabilising eroded embankments and cuttings.

Examples of 'low lifecycle cost' methods include replacing walls with embankments where practical or reconstructing walls with less expensive alternative eg concrete block, interlocking block or crib-loc in lieu of stone walls.

There are some locations that in heritage areas which require careful planning and management of the renewal process. In some cases in heritage areas walls must be replaced in the same material (generally stone) to meet heritage requirements.

E7.6 Recent Expenditure Profile

Retaining wall expenditure ($000s) over the last few years is outlined in the following table:

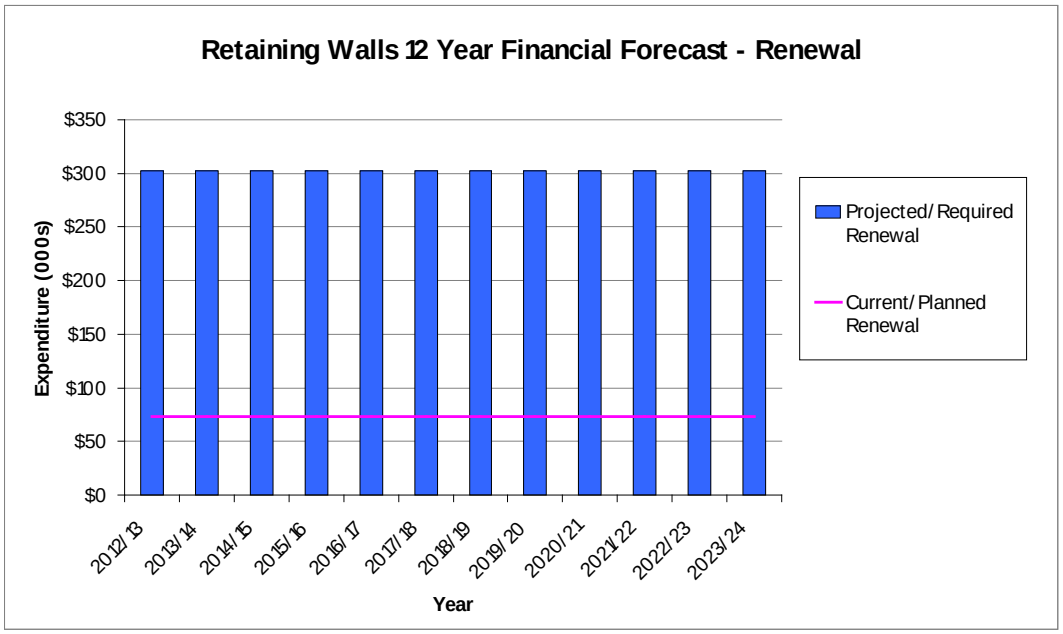
	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	19	31	21	40	42	30.6
Renewals	42	248	25	30	21	73.2
New Work	0	0	0	0	0	0
TOTAL	**61**	**279**	**46**	**70**	**63**	**103.8**

There has been some but limited work on Council retaining wall assets over recent years. There is emerging recognition of the need to undertake more maintenance and renewal work on retaining wall structures given the importance placed on these assets by the community and the significant risks surrounding many of these assets.

E7.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to remain at the same level over time as the asset stock ages. All costs are shown in 2012 dollar values.

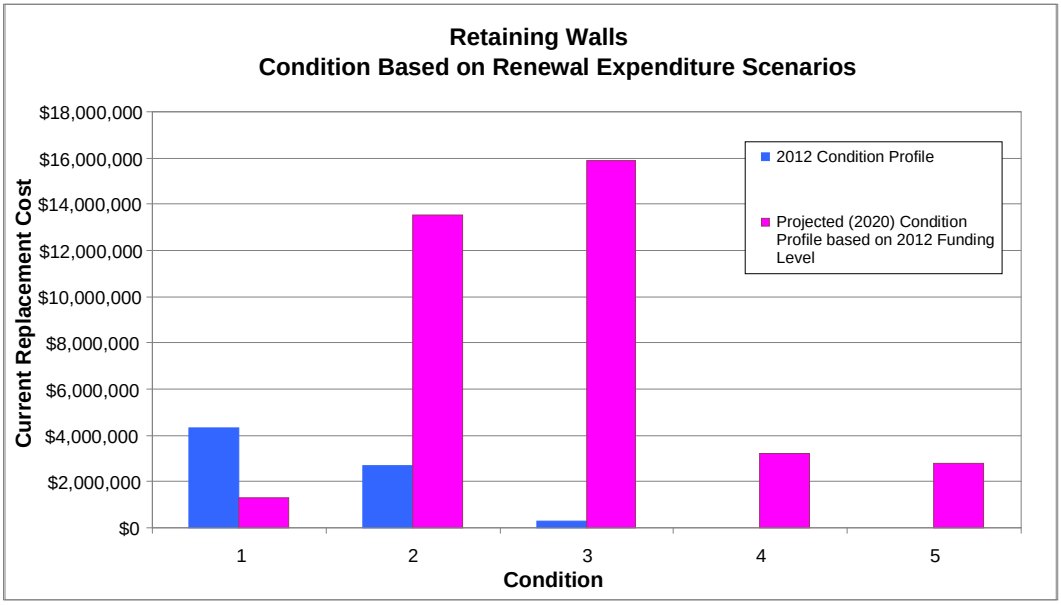
Retaining Wall 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/ Required Expenditure	302	302	302	302	302	302	302	302	302	302	302	302
Planned/ Current Expenditure	73.2	73.2	73.2	73.2	73.2	73.2	73.2	73.2	73.2	73.2	73.2	73.2
Funding Gap	229	229	229	229	229	229	229	229	229	229	229	229
Cumulative Funding Gap	229	458	686	915	1,144	1,373	1,602	1,830	2,059	2,288	2,517	2,746



It is also proposed that the above annual renewal funding be complemented by an increase in the retaining wall maintenance allocation to $47,000 per year, mainly to address minor defect and emergency works.

E7.8 Projected Condition

Utilising 2012 funding levels, the future projected condition of Council's retaining walls in 2020 are as follows. This has been compared to the condition of assets in 2012.



If Council continues to fund retaining wall renewals at 2012 levels then the condition of Council's retaining walls will deteriorate over the next 8 years including a significant percentage falling into condition 4 and 5 range.

E7.9 10 Year Work Program

A 10 year retaining walls assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed.

Street Location	Segment	Material	Length (m)	Height (m)	Forecast Renewal Year
Ida Avenue	South side in front of Nos. 22 - 26 Ida Ave	Rock Cutting	22	3	2012/2013
Avenue Road	East side around turning circle at south end of Avenue Rd	Rock Cutting	53	7	2012/2013
Kiora Ave	Separates high and low level roads opposite Nos. 15 - 17 Kiora Ave	Dimension Stone RW - grouted joints	68	2.8	2012/2013
Avenue Road	On west and north west side from Centenary Dr to opposite No. 11a Avenue Rd	Reinforced Hollow Block	110	3	2012/2013
Clanalpine Street	Supports high level footpath north and northwest side from No. 16 to Magic Gr	Random Stone RW - grouted joints	295	1	2013/2014
Clifton Gardens Reserve	West side of access road north of bottom bend adjoins concrete wall - assessed separately		20	1	2013/2014
Clifton Gardens Reserve	East side of access road at bottom bend in road		16	1.4	2013/2014
Parriwi Road	Western side between pathway to Upper Spit Rd and Spit Rd	Rock Cutting	400	8	2013/2014
Coronation Avenue	On north west side from The Esplanade towards Coronation Ave	Rock Cutting	31	1.5	2013/2014
Sirius Avenue	North side in front of Nos. 8 and 10 Sirius Ave	Random Stone RW - grouted joints	7	0.8	2013/2014
Sirius Cove Reserve	North side of road linking Sirius Cove Rd and Illawarra St between Sverge St and Sirius Cove Rd	Rock Cutting	85	1.7	2013/2014

Street Location	Segment	Material	Length (m)	Height (m)	Forecast Renewal Year
Sirius Cove Reserve	North side of road linking Sirius Cove Rd with Illawarra St west of adjoining gabion wall	Random Stone RW - open joints	12	3	2013/2014
Coronation Avenue	In front of Nos. 26a and 28 Coronation Ave	Reinforced Hollow Block	94	1.5	2013/2014
Glen Street	Eastern side south of Bay St	Random Stone RW - open joints	70	2.3	2013/2014
The Esplanade	In front of Nos. 71 and 73 The Esplanade	Rock Cutting	23	2.4	2014/2015 to 2016/2017
Sirius Cove Reserve	North side of road linking Sirius Cove Rd and Illawarra St between Sverge St and Sirius Cove Rd	Rock Cutting	85	1.7	2013/2014
Sirius Cove Reserve	North side of road linking Sirius Cove Rd with Illawarra St west of adjoining gabion wall	Random Stone RW - open joints	12	3	2013/2014
Coronation Avenue	In front of Nos. 26a and 28 Coronation Ave	Reinforced Hollow Block	94	1.5	2013/2014
Glen Street	Eastern side south of Bay St	Random Stone RW - open joints	70	2.3	2013/2014
The Esplanade	In front of Nos. 71 and 73 The Esplanade	Rock Cutting	23	2.4	2014/2015 to 2016/2017
Bullecourt Avenue	Separates high and low level section of Bullecourt Ave opposite No. 14	Reinforced Hollow Block	11	2.2	2014/2015 to 2016/2017

Street Location	Segment	Material	Length (m)	Height (m)	Forecast Renewal Year
Parriwi Road	North eastern side northerly from northern bend (rear Middle Harbour Yacht Club)	Embankment	150	6	2014/2015 to 2016/2017
Parriwi Road	In front of No. 30a Morella Rd	Rock Cutting	10	1.7	2014/2015 to 2016/2017
Wenban Lane	At rear of No. 39 Wolseley Rd	Earth or Clay Cutting	5	2	2014/2015 to 2016/2017
Wenban Lane	At rear of No. 39 Wolseley Rd north of C301	Rock Cutting	8	1.3	2014/2015 to 2016/2017
Hopetoun Avenue	Across Rosherville Rd and in front of Nos. 5 - 3a Hopetoun Ave	Rock Cutting	64	1	2014/2015 to 2016/2017
Rickard Avenue	At rear of No. 2 - 6 Major St	Rock Cutting	37	2.3	2017/2018 to 2021/2022
Morella Road	In front of Nos. 18d and 20a Morella Rd	Rock Cutting	16	2.3	2017/2018 to 2021/2022
Morella Road	In front of No. 18b Morella Rd	Random Stone RW - grouted joints	13	0.9	2017/2018 to 2021/2022
Parriwi Road	In front of Nos. 34 and 36 Parriwi Rd	Rock Cutting	24	2.8	2017/2018 to 2021/2022

Street Location	Segment	Material	Length (m)	Height (m)	Forecast Renewal Year
Whiting Beach Road	Supporting traffic island at junction with Major St	Dimension Stone RW - grouted joints	26	0.7	2017/2018 to 2021/2022
Bickell Road	Supports footpath in front of No. 20 Bickell Road	Random Stone RW - grouted joints	9	0.5	2017/2018 to 2021/2022
Stanton Road	Opposite Nos. 6, 8 and 8A Stanton Rd	Rock Cutting	50	1.2	2017/2018 to 2021/2022
Redan Street	In front of Nos. 18 - 20b Redan St and part beside No. 198 Raglan St	Rock Cutting	84	1.6	2017/2018 to 2021/2022
Lennox Street	North side of vehicular entrance to No. 3a Sirius Cove Rd also known as No. 28 Lennox St	Random Stone RW - open joints	22	1.8	2017/2018 to 2021/2022
Parriwi Road	Western side of Parriwi Rd between No. 50 and No. 60	Rock Cutting	96	2.3	2017/2018 to 2021/2022
Burran Ave	In front of Nos. 27 - 33 Burran Ave	Rock Cutting	64	3.3	2017/2018 to 2021/2022
Waitovu Street	In front of Nos. 7 - 11 Waitovu St	Brick RW	30	0.8	2017/2018 to 2021/2022
Clanalpine Street	Separates high and low level roads at intersect'n with Mistral Ave	Concrete Retaining Wall	45	1.3	2017/2018 to 2021/2022

Street Location	Segment	Material	Length (m)	Height (m)	Forecast Renewal Year
Athol Wharf Road	North side west from Bradleys Head Road intersect'n	Rock Cutting	200	2	2017/2018 to 2021/2022
Clifton Gardens Reserve	Supports east side of access road adjoining path and steps	Dimension Stone RW - grouted joints	35	2.1	2017/2018 to 2021/2022
Boyle Street	North side of pathway connecting lower Boyle St with Royalist Rd	Rock Cutting	25	2	2017/2018 to 2021/2022
Silex Road	In front of Nos. 13 and 15 Silex Rd	Dimension Stone RW - grouted joints	21	2.3	2017/2018 to 2021/2022
Superba Parade	Separates high and low level roads	Concrete Retain Wall	147	2.3	2017/2018 to 2021/2022
Wyong Road	Landscape walls at western end (east of Shellbank Ave)	Dimension Stone RW - grouted joints	39	1.5	2017/2018 to 2021/2022
Sirius Avenue	In front of No. 4 Sirius Ave	Rock Cutting	4	1	2017/2018 to 2021/2022

E.8 Steps

E8.1 Description of Steps Network

Steps exist along and adjacent to roadways, in laneways and pedestrian lanes, (in some cases providing access to a private property or group of properties). Steps covered by this AMP are all steps in the dedicated road reservation. Steps in parks are covered in the Parks AMP.

There are approximately 395 sets of steps (many with multiple sections of steps) within road reserve areas covering 2,537 m in length and 3,120 m^2 in area.

Generally steps are concrete however some are sandstone, paving bricks, timber or a combination of various materials.

Other assets associated with steps include:

- 4,223 m fencing/handrailing;
- 383 m kerb and guttering;
- 4,811 m path and ramp; and
- 8 m wall lengths.

Typical steps unit rates and useful lives are as follows:

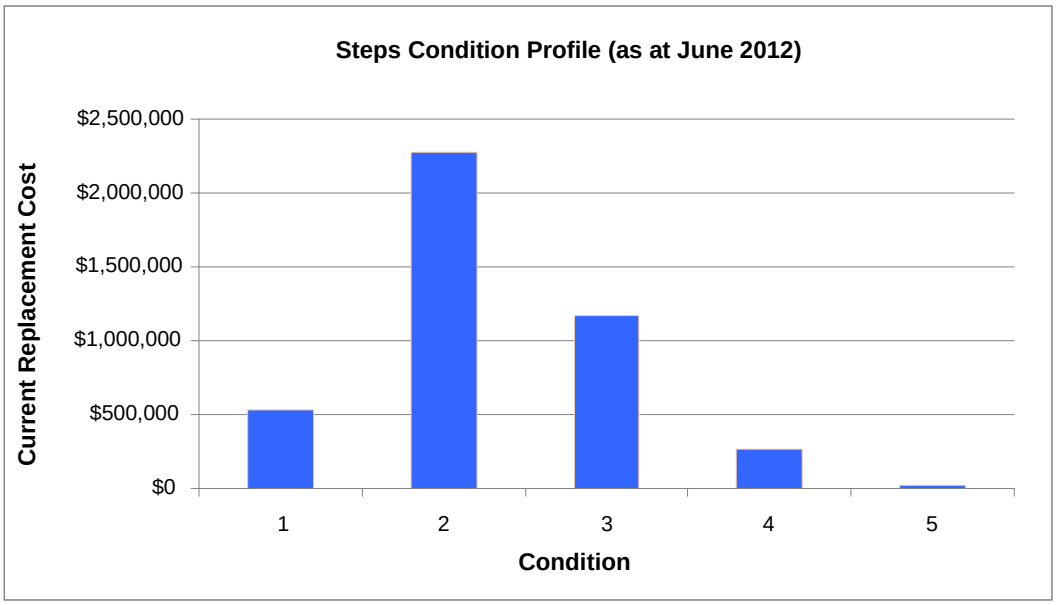
Steps Asset Type		Unit	Useful Life	Unit Rate
Fence	timber	m	20	$220.00
	steel	m	25	$220.00
Handrail	timber	m	20	$220.00
	steel	m	25	$220.00
Kerb & Gutter	concrete / sandstone	m	90	$118.88
Kerb Only	concrete	m	90	$98.68
Gutter	concrete	m	90	$114.78
Path	dirt	m^2	100	$0.00
	dirt / gravel	m^2	20	$20.00
	dirt / timber dirt log	m^2	20	$30.00
	asphalt / concrete	m^2	28	$45.72
	concrete	m^2	60	$71.81

Steps Asset Type		Unit	Useful Life	Unit Rate
	sandstone	m^2	50	$125.00
	paving bricks average quality, inc sand bed on compacted gravel base course (say 100-150mm)	m^2	60	$116.05
	paving bricks average quality inc sand bed on leanmix concrete base course (say 75mm)	m^2	60	$118.05
Steps	concrete mass (up to 10m^2)	m^2	100	$1,000.00
	concrete mass (>10m^2)	m^2	100	$900.00
	concrete suspended deck/staircase (up to 10m^2)	m^2	100	$1,000.00
	concrete suspended deck/staircase (>10m^2)	m^2	100	$900.00
	sandstone flagging on conc base (up to 10m^2)	m^2	100	$1,000.00
	sandstone flagging on conc base (>10m^2)	m^2	100	$900.00
	stone (eg sandstone) step structure (up to 10m^2)	m^2	100	$1,000.00
	stone (eg sandstone) step structure (>10m^2)	m^2	100	$900.00
	paving brick (conc base) (up to 10m^2)	m^2	100	$1,000.00
	paving brick (conc base) (>10m^2)	m^2	100	$900.00
	timber (suspended deck/staircase)	m^2	50	$750.00
	brick (part conc base structure) (up to 10m^2)	m^2	80	$1,000.00
	brick (part conc base structure) (>10m^2)	m^2	80	$900.00
	timber / dirt	m^2	20	$500.00
	timber sleeper / gravel	m^2	20	$550.00
	timber log / dirt	m^2	20	$600.00
	steel	m^2	100	$750.00
	tile	m^2	100	$1,000.00
Wall	sandstone / concrete	m^2	100	$600.00

The value of assets associated with steps is summarised in Section 4.1.4.

E8.2 Steps Condition

The condition profile (June 2012) of assets associated with steps is as follows:



E8.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	95%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	5%

E8.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, steps valued at $288,633 (approximately 7% of steps) are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A maintenance priority list has been prepared to repair defects in steps. Identified defect are repaired subject to available resources. Additionally, steps in or approaching condition 4 and 5 are prioritised for renewal in the Steps Renewal Program.

E8.5 Current Maintenance and Renewal Strategies

Typical steps maintenance activities include:

- Reconstructing short sections of failed steps e.g. where age or ground movement/tree roots have damaged assets or where risk to the public exist; and
- Replacing missing stones or eroded or open joints in sandstone steps or repairing steps where large cracking exists.

Examples of 'low lifecycle cost' methods include replacing sandstone steps with concrete steps where appropriate (including subject to heritage requirements) or replacing steps to a narrower width.

E8.6 Recent Expenditure Profile

Steps expenditure ($000s) over the last few years is outlined in the following table:

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	4	0	1	10	0	3
Renewals	9	0	0	5	0	2.8
New Work	0	0	50	0	0	10
TOTAL	**13**	**0**	**51**	**15**	**0**	**15.8**

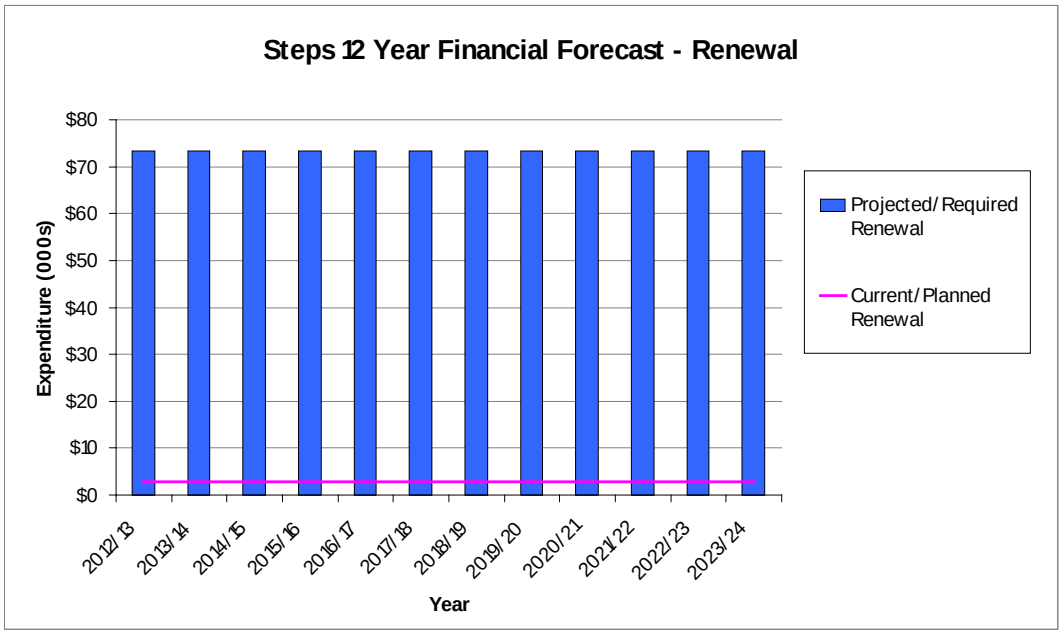
Maintenance and renewal are funded from general revenue, including the recent Infrastructure Levy rate increase that provides funding for infrastructure asset renewal (although no specific Infrastructure levy funding has been earmarked for steps renewal). Generally there are no grant funds available for renewal of steps assets.

It is forecast that new steps construction will be nil to limited in the future and as such new works projections have been assumed to be zero for steps.

E8.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to remain at the same level over time as the asset stock ages. All costs are shown in 2012 dollar values.

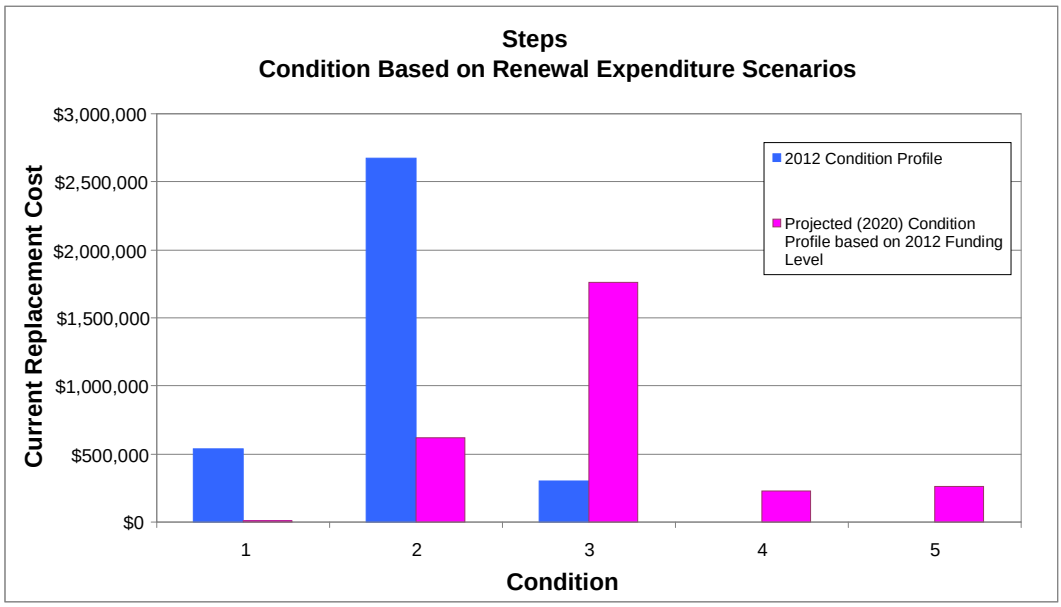
Steps 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	73	73	73	73	73	73	73	73	73	73	73	73
Planned/Current Expenditure	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Funding Gap	70	70	70	70	70	70	70	70	70	70	70	70
Cumulative Funding Gap	70	140	211	281	351	421	491	562	632	702	772	842



It is also proposed that the above annual renewal funding be complemented by an increase in the steps maintenance allocation to $23,000 per year.

E8.8 Projected Condition

Utilising 2012 funding levels, the future projected condition of Council's steps in 2020 are as follows. This has been compared to the condition of assets in 2012.



If Council continues to fund steps renewals at 2012 levels then the condition of Council's steps will deteriorate over the next 8 years including a significant percentage falling into condition 4 and 5 range.

E8.9 10 Year Work Program

A 10 year steps assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed.

Associated Road Segment	Material	Approx no. steps	Length (m)	Width (m)	Forecast Renewal Year
R-Avenue Road: Reid Park to Upper Avenue Rd	Sandstone	20	10	0.7	2012/2013
R-Musgrave St: CS End Concrete to McLeod St	Sandstone/Asphalt	25	12	1	2012/2013
R-Sirius Ave/Sirius Cove Rd to Dead End	Sandstone	10	3	1	2012/2013
R-Avenue Rd: Reid Park to Upper Avenue Rd	Concrete	18	6	0.7	2012/2013
R-Balmoral Lookout: Stanton Rd to Kirkoswald Ave	Sandstone	5	2	0.7	2012/2013
L-Julian St: Wyond Rd to Divide in Road	Sandstone	25	10	0.7	2012/2013
L-Kahibah Rd: Coronation Ave to Dead End	Brick	14	5	0.5	2012/2013
L-Major St: Whiting Beach Rd to Dead End	Sandstone	4	1.2	0.6	2012/2013
L-McLeod St: Trumfield Ln to Dead End	Concrete	14	5	0.9	2012/2013
R-Sirius Park Access Rd/Curlew Camp Rd to Sirius Cove Rd	Concrete/Sandstone	5	2	1	2012/2013
R-Spencer Rd: Cowles Rd to Bardwell Ln	Sandstone	5	1.5	0.9	2012/2013
L-Burrawong Ave: Dead End to Iluka Rd	Concrete	40	12	1.5	2012/2013
R-James St: Dead End to Parriwi Rd	Concrete/Sandstone	16	5	1	2012/2013
R-Kahibah Rd: Wolsley Rd to Coronation St	Concrete	58	18	1.1	2012/2013
R-Mosman St: Trumfield Ln to Badham Ave	Sandstone	20	10	0.9	2013/2014
R-Mulbring St: Wolsley Rd to Dugald Rd	Concrete	42	13	1	2013/2014
L-Musgrave St: Dead End to CS Concrete	Sandstone	15	5	0.7	2013/2014
L-Parriwi Rd: No.17 to End of Concrete Kerb	Sandstone	12	5	0.7	2013/2014
R-Pulpit Ln: Bay St to Reserve	Sandstone	40	12	0.7	2013/2014

Associated Road Segment	Material	Approx no. steps	Length (m)	Width (m)	Forecast Renewal Year
L-Redan S: Raglan St to Balmoral Ave	Concrete/Sandstone	8	3	0.6	2014/2015
L-Redan St: Balmoral Ave to Almora St	Sandstone	20	5	0.5	2014/2015
R-Rickard Ave/Junction to End	Concrete/Sandstone	66	20	1.2	2014/2015
L-Stanley Ave: Punch St to Awaba St	Sandstone	7	2.5	0.7	2014/2015
R-Upper Spit Rd: Spit Rd to End	Sandstone	9	4	0.9	2014/2015
R-Wyong Rd: Dead End to Shellbank West	Sandstone	70	30	0.8	2014/2015
R-Kahibah Rd: Coronation Ave to Dead End	Timber/Dirt	81	25	0.9	2014/2015
R-Arbutus St: Almora St to Mandolong Rd	Concrete/Sandstone	8	3	0.8	2015/2016
R-Avenue Rd: Reid Park to Upper Avenue Rd	Concrete/Sandstone	13	4.5	0.7	2015/2016
R-Awaba St: Bond St to Countess St	Concrete	11	3.5	0.9	2015/2016
R-Boyle St: Dead End, Mosman Bay to Dead End	Concrete/Sandstone	26	9	1	2015/2016
L-Burrawong Ave: Iluka Rd to Dead End	Concrete	82	24	1.2	2015/2016
L-Illawarra St: Dead End to Raglan St	Sandstone	16	8	1	2015/2016
L-McLeod St: Dead End to Musgrave St	Sandstone	4	1.5	1	2015/2016
L-Moran St: Sverge St to Dead End	Concrete/Sandstone	50	15	1.2	2015/2016
R-Mosman St: Trumfield Ln to Badham Ave	Sandstone	13	4	1	2015/2016
R-Musgrave St: Dead End Cs Concrete	Concrete/Sandstone	29	10	1.2	2015/2016
R-Musgrave St: CS Concrete CS Concrete	Concrete/Sandstone	55	18	1	2016/2017
R-Parriwi Rd No.17 to End of Concrete Kerb	Brick	16	5	0.8	2016/2017
L-Parriwi Rd No.17 to End of Concrete Kerb	Sandstone	7	2	0.8	2016/2017

Associated Road Segment	Material	Approx no. steps	Length (m)	Width (m)	Forecast Renewal Year
R-Rangers Ave: Avenue Rd to Oswald St	Concrete/Sandstone	18	6	0.8	2016/2017
R-Rosebery St: Ourimbah Rd to Awaba St	Sandstone	6	2	0.8	2016/2017
R-Rosebery St: Ourimbah Rd to Awaba St	Sandstone	6	2	0.8	2016/2017
L-Royalist Rd/Boyle St to Dead End	Sandstone	6	2	0.6	2016/2017
R-Sarah's Walk/Morella Rd to Dead End	Concrete	150	45	2	2016/2017
R-Spofforth St: Creek to Boyle St	Concrete/Sandstone	20	6	2.5	2017/2018
R-Stanton Rd: Wyargine St to The Grove	Sandstone	3	2	1.2	2017/2018
L-The Grove: Edwards Bay Rd to Stanton Rd	Sandstone	11	3.5	1	2017/2018
L-Upper Almora St: Redan St to Military Rd	Concrete	18	7	1.8	2017/2018
R-Upper Avenue Rd/Mosman Street to No.23	Concrete	2	0.6	0.7	2017/2018
R-Upper Avenue Rd/Mosman Street to No.23	Sandstone	3	1	0.7	2017/2018
L-Warringah Rd: No.1 to Bend	Sandstone	16	5	1	2017/2018
R-Goseberry Ln: Pretoria Av to Dead End	Timber Sleeper/Gravel	30	9	0.8	2017/2018
R-Lower Almora St: Ryan Ave to Superba Pde	Timber/Dirt	12	6	1.2	2017/2018
R-Avenue Rd: Reid Park to Upper Avenue Rd	Paving Brick	16	6	1	2017/2018
R-Boyle St: Dead End, Mosman Bay to Dead End	Concrete/Sandstone	135	41	1.1	2018/2019
R-Bullecourt Ave: Dead End to Bickell Rd	Sandstone	1	0.5	0.8	2018/2019
R-Cobbittee St: Dayrell Ave to Dead End	Sandstone	15	6	0.7	2019/2020
R-Delecta Ave: Dead End to Bay St	Sandstone	13	4	0.8	2019/2020
R-Harston Ave: Wyong Rd to Dead End	Concrete	82	28	1.8	2019/2020

Associated Road Segment	Material	Approx no. steps	Length (m)	Width (m)	Forecast Renewal Year
R-Holt Ave: Cowles Rd to Bardwell Ln	Sandstone	18	6	1	2019/2020
R-Illawarra St: Curlew Camp Rd to Dead End	Concrete	114	35	1.8	2019/2020
R-Inkerman St: Dead End to Carrington Ave	Concrete	57	18	1.8	2020/2021
R-Mandolong Rd: No.25 to Arbutus St	Concrete	39	12	0.8	2020/2021
L-Marsala St: Beauty Point Rd to Delecta Ave	Concrete	67	20.1	1.3	2020/2021
L-Marsala St: Beauty Point Rd to Delecta Ave	Sandstone	15	5	1	2021/2022
R-McLeod St: Dead End to Curraghbeena Rd	Concrete	41	12	1.1	2021/2022
L-Milton Ave: Union St to Queen St	Concrete	4	1.2	0.7	2021/2022
L-Milton Ave: Union St to Queen St	Concrete	4	1.2	0.7	2021/2022
L-Milton Ave: Union St to Queen St	Concrete	4	1.2	0.7	2021/2022
R-Muston St: Raglan St to Almora St	Concrete	2	0.6	0.7	2021/2022
R-Muston St: Raglan St to Almora St	Concrete	1	0.4	0.8	2021/2022
R-O'Neil Walk: Botanic Rd to Raglan St	Brick/Concrete	32	10	1.8	2021/2022
L-Plunkett Rd: Beaconsfield Rd to Coronation Av	Concrete	4	1.2	1.1	2021/2022
R-Queen St: Milner Ln to Raglan St	Concrete	5	1.5	1.5	2021/2022
R-Rangers Ave: Avenue Rd to Oswald St	Concrete	5	1.3	0.9	2021/2022
R-Rangers Ave: Avenue Rd to Oswald St	Concrete/Sandstone	10	3.5	0.8	2021/2022
R-Rangers Ave: Avenue Rd to Oswald St	Concrete/Sandstone	8	2.5	0.8	2021/2022
R-Redan St: Raglan St to Balmoral Ave	Concrete/Sandstone	16	6	1.3	2021/2022
L-Stanley Ave: Awaba St to Dead End	Paving Brick	12	4	0.6	2021/2022

Associated Road Segment	Material	Approx no. steps	Length (m)	Width (m)	Forecast Renewal Year
L-Upper Almora St: Superba Pde to Redan St	Concrete	9	3	1.8	2021/2022
R-Water Ln/Prince Albert St to Sirius Cove	Concrete/Sandstone	80	24	1	2021/2022
L-Wolseley Rd (Upper)/Mulbring St to Redan St	Brick	3	1	0.6	2021/2022
L-Fairfax Rd: Stanton Rd to Burran Ave	Timber/Dirt	10	3	1.2	2021/2022
L-Harnett Ave: Reid Park to Dead End	Timber/Dirt	7	3	1	2021/2022

E.9 Lines and Signs

E9.1 Description of Lines and Signs Assets

Lines and signs assets include:

- 3,898 traffic signs;
- 1,854 street directional signs;
- 3,591 painted symbols;
- 1,112 m^2 painted chevrons, pedestrian crossings and piano keys; and
- 48,456 m linemarking.

Lines and regulatory traffic and parking signs along arterial roads are not included as these are the responsibility of the RMS.

Typical asset unit rates and useful lives associated with lines and signs include:

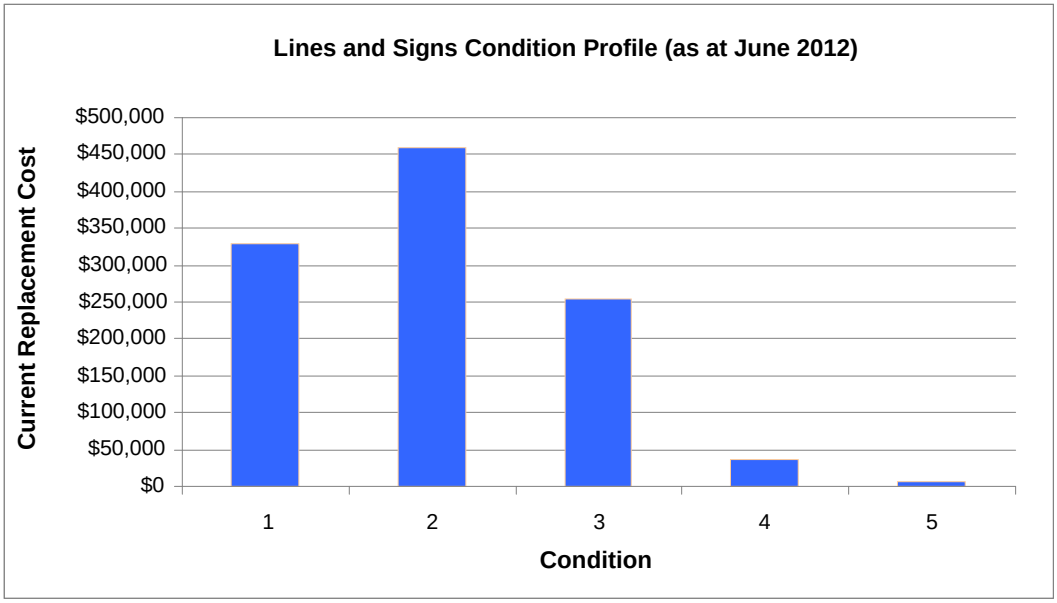
Lines and Signs Asset Type		Unit	Useful Life	Unit Rate
Linemarking	arrow	each	10	$41.23
	chevron	m^2	5	$16.49
	continuity line	m	5	$0.54
	cycle	each	5	$108.24
	cycleway symbols	each	5	$108.24
	disabled parking	each	10	$30.93
	double barrier	m	5	$0.72
	edge / rounadbout edge	m	5	$0.77
	give way	m	5	$2.67
	lane line	m	10	$0.72
	look left/right	each	5	$13.40
	parking, angle parking	m	10	$1.03
	pedestrian crossing	m^2	5	$25.00
	piano key	m^2	5	$4.64
	raised plastic pavement marker	each	5	$5.26
	concrete rumble bar	each	10	$45.00

Lines and Signs Asset Type		Unit	Useful Life	Unit Rate
	speed number	each	5	$133.81
	stop, holding	m	5	$7.40
	yellow (no stopping edge) line	m	5	$7.22
	zig zag	m	5	$2.30
Street Directional Sign	public path	each	15	$135.00
	advisory	each	15	$150.00
	street name plate	each	25	$250.00
Traffic Signs	hazard markers & chevron, give way / roundabout, speed sign, stop sign	each	15	$159.76
	cycle / STA bus route	each	15	$103.09
	regulatory parking	each	20	$113.40
	cycleway	each	15	$103.09
	keep left / right, one way	each	15	$146.99
	no entry	each	15	$123.71
	pedestrian crossing, school / local traffic zone	each	15	$135.63
	warning	each	15	$141.75

The value of assets associated with lines and signs is summarised in Section 4.1.4. Given the relatively short life of lines and signs assets and their susceptibility to vandalism and vehicle wear for example, many of the assets are now requiring increased levels of maintenance and/or replacement.

E9.2 Lines and Signs Condition

The condition profile (June 2012) of assets associated with lines and signs is as follows:



Generally lines and signs assets are in fair to good condition, however there are a significant number of assets in poor condition and/or approaching the end of their useful life.

E9.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	100%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	0%

E9.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, lines and signs valued at $43,538 (approximately 4% of lines and signs) are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A maintenance priority list has been prepared to repair defects in lines and signs. Identified defect are repaired subject to available resources. Additionally, lines and signs in or approaching condition 4 and 5 are prioritised for renewal in the Line and Signs Renewal Program.

E9.5 Current Maintenance and Renewal Strategies

Typical signs and lines maintenance activities include:

- Repair of vandalised signs;
- Repair of signs damaged by vehicle collision; and
- Re-linemarking of deteriorated sections of linemarking.

Generally most lines and signs related maintenance works and signage renewal/reconstruction works are carried out by Council's day labour 'Core Group' works team. Larger linemarking renewal works are carried out by contractors under Council's existing schedule of rates contracts.

E9.6 Recent Expenditure Profile

Lines and signs expenditure ($000s) over the last few years is outlined in the following table:

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	16	10	39	20	11	19.2
Renewals	0	6	13	0	2	4.2
New Work	0	0	1	0	0	0.2
TOTAL	**16**	**16**	**53**	**20**	**13**	**23.6**

There has been ongoing maintenance and renewal work on Council lines and signs assets over recent years, although there is emerging recognition of the need to undertake more

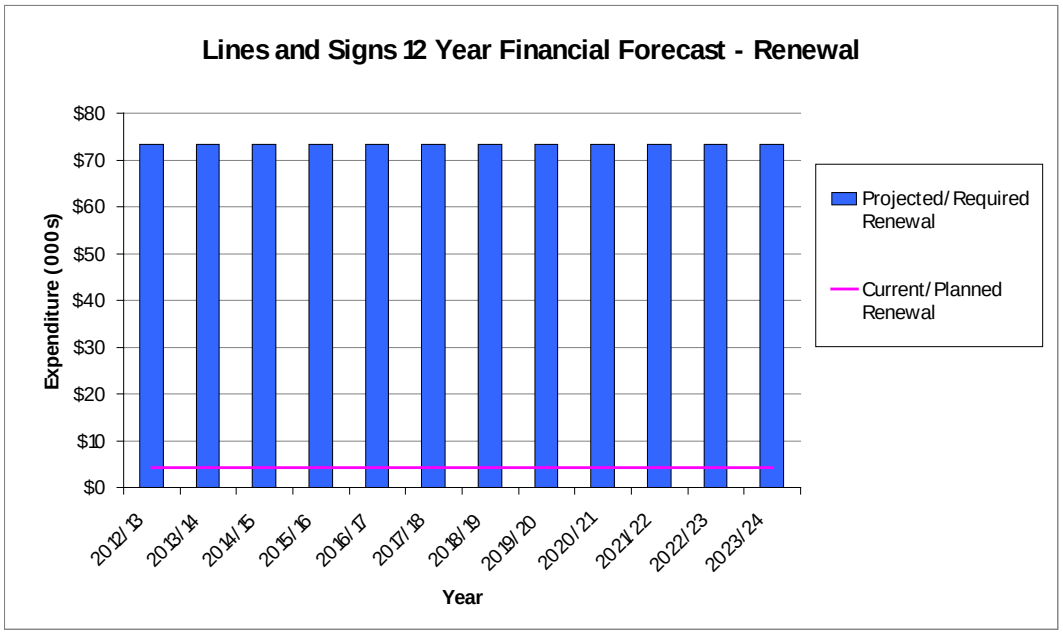
maintenance and renewal work given renewal is considered not to be keeping pace with deterioration of the assets and the importance placed on these assets by the community.

Maintenance and renewal are funded from general revenue and RMS traffic facility grants.

E9.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to remain at the same level over time as the asset stock ages. All costs are shown in 2012 dollar values.

Lines and Signs 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	73	73	73	73	73	73	73	73	73	73	73	73
Planned/Current Expenditure	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Funding Gap	69	69	69	69	69	69	69	69	69	69	69	69
Cumulative Funding Gap	69	138	206	275	344	413	482	550	619	688	757	826



It is also proposed that the above annual renewal funding be complemented by an increase in the lines and signs maintenance allocation to $31,000 per year, mainly to address minor defect works, vandalism and graffiti issues.

E9.8 Projected Condition

High level analysis indicates that a continuation of 2012 renewals funding levels will see the condition of lines and signs assets deteriorate over the next 8 years including a significant percentage of assets falling into the condition 4 and 5 range.

E9.9 10 Year Work Program

A 10 year lines and signs assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed. Please note, due to its size the whole program has not been included in this AMP.

Street Location	Type		Material	Quantity	Unit	Forecast Renewal Year
Military Rd – Raglan St to Upper Almora St	Traffic Signs	Regulatory Parking	Steel Unpainted	1	each	2012/2013
Military Rd – Raglan St to Upper Almora St	Traffic Signs	Regulatory Parking	Steel Unpainted	1	each	2012/2013
Military Rd – Raglan St to Upper Almora St	Linemarking		Paint	69	m	2012/2013
Military Rd – Raglan St to Upper Almora St	Linemarking		Paint	26	m	2012/2013
Military Rd – Raglan St to Upper Almora St	Linemarking		Paint	35	m	2012/2013
Military Rd – Raglan St to Upper Almora St	Linemarking		Paint	35	m	2012/2013
Military Rd – Raglan St to Upper Almora St	Linemarking		Paint	127	m	2012/2013
Spit Rd – Ourimbah Rd to Medusa St	Street Directional Signs	Street Names	Steel Painted	1	each	2012/2013
Spit Rd – Ourimbah Rd to Medusa St	Street Directional Signs	Street Names	Steel Painted	1	each	2012/2013
Macpherson St – Military Rd to Gerard St	Traffic Signs	Regulatory Parking	Steel Unpainted	1	each	2012/2013
Macpherson St – Gerard St to Ourimbah Rd	Traffic Signs	Regulatory Parking	Steel Unpainted	1	each	2012/2013
Macpherson St - Gerard St to Ourimbah Rd	Traffic Signs	Regulatory Parking	Steel Unpainted	1	each	2012/2013
Ourimbah Rd – Cowles Rd to Roseberry St	Traffic Signs	Regulatory Parking	Steel Unpainted	1	each	2012/2013
Ourimbah Rd – Cowles Rd to Roseberry St	Traffic Signs	Regulatory Parking	Steel Unpainted	1	each	2012/2013

Street Location	Type		Material	Quantity	Unit	Forecast Renewal Year
Spofforth St conc pave to Rangers Rd	Linemarking		Paint	10	m	2012/2013
Spofforth St - Rangers Rd to Military Rd	Street Directional Signs	Other	Steel Unpainted	1	each	2012/2013
Spofforth St - Rangers Rd to Military Rd	Street Directional Signs	Other	Steel Unpainted	1	each	2012/2013
Spofforth St - Rangers Rd to Military Rd	Linemarking		Paint	6	m	2012/2013
Spofforth St - Rangers Rd to Military Rd	Linemarking		Paint	1.8	m	2012/2013
Spofforth St - Rangers Rd to Military Rd	Linemarking		Paint	1.8	m	2012/2013
Awaba St - Spit Rd to Cowles Rd	Linemarking		Paint	1.8	m	2012/2013
Bay St - 8 Bay St to Bickell Rd	Traffic Signs	Regulatory Traffic	Steel Unpainted	1	each	2012/2013
Bay St - 8 Bay St to Bickell Rd	Traffic Signs	Regulatory Traffic	Steel Unpainted	1	each	2012/2013
Bay St Lower – 64 Bay St to Beauty Point Rd	Street Directional Signs	Other	Steel Unpainted	1	each	2012/2013
Bay St Lower – 64 Bay St to Beauty Point Rd	Linemarking		Paint	1	each	2012/2013
Middle Head Rd – Kahibah Rd to Gordon St	Street Directional Signs	Other	Steel Unpainted	1	each	2012/2013
Pearl Bay Av – Spit Rd to No.3	Linemarking		Paint	1	each	2012/2013
Pearl Bay Av – No.3 to Fig Tree Walk	Linemarking		Paint	1	each	2012/2013
Queen St – Bradleys Head Rd to Milton Av	Linemarking		Paint	57	m	2012/2013
Queen St – Bradleys Head Rd to Milton Av	Linemarking		Paint	1	each	2012/2013

Street Location	Type		Material	Quantity	Unit	Forecast Renewal Year
Queen St – Milton Av to Prince Albert St	Street Directional Signs	Other	Steel Unpainted	1	each	2012/2013
Queen St – Milton Av to Prince Albert St	Street Directional Signs	Other	Steel Unpainted	1	each	2012/2013

E.10 Vehicle Crossings

E10.1 Description of Vehicle Crossings

Vehicle crossings assets include:

- 5,134 vehicle crossings of total area 67,334 m^2; and
- 261 gutter crossings of total length 1,048 m.

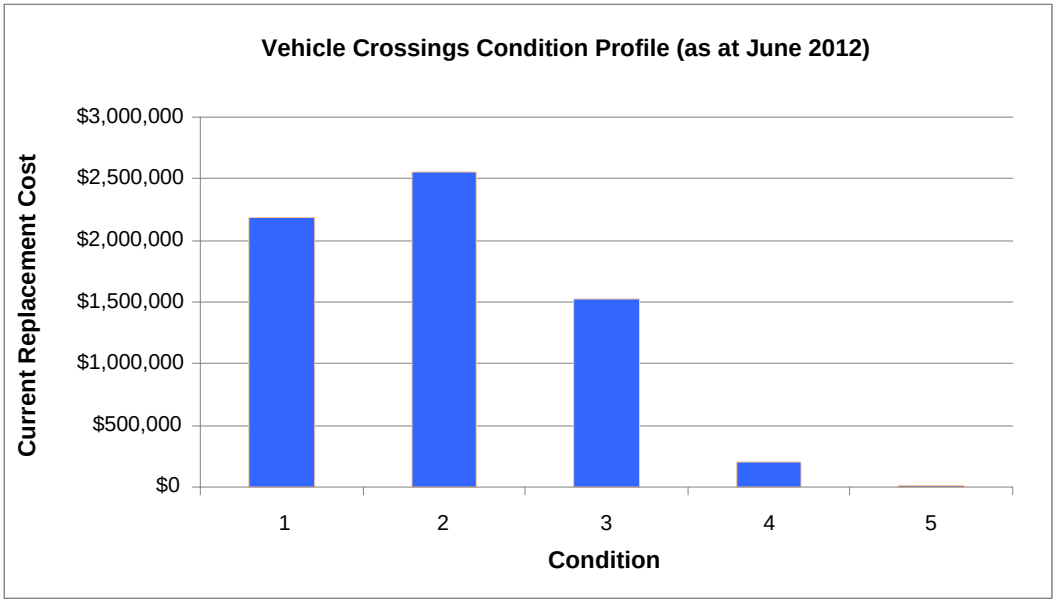
Typical asset unit rates and useful lives associated with vehicle crossings include:

Vehicle Crossing Type		Unit	Useful Life	Unit Rate
Driveways	concrete 110 to 150 thick reinforced	m^2	50	$107.81
	paving bricks inc sand bed on concrete base course (say 100mm)	m^2	40	$182.81
	asphalt (50mm) on 150 compacted FCR	m^2	25	$83.00
	stone, timber	m^2	50	$220.00
Gutter Bridges	asphalt, concrete, steel	m^2	30	$722.33

The value of assets associated with vehicle crossings is summarised in Section 4.1.4.

E10.2 Vehicle Crossings Condition

The condition profile (June 2012) of assets associated with vehicle crossings is as follows:



Generally vehicle crossings assets are in fair to good condition, however it is noted that there are a significant percentage of assets in poor condition and/or approaching the end of their useful life.

E10.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	100%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	0%

E10.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, vehicle crossings assets valued at $220,091 (approximately 3% of vehicle crossings) are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A maintenance priority list has been prepared to repair defects in assets associated with vehicle crossings. Identified defect are repaired subject to available resources. Additionally, vehicle crossings in or approaching condition 4 and 5 are prioritised for renewal in the Vehicle Crossing Renewal Program.

E10.5 Current Maintenance and Renewal Strategies

Typical vehicle crossings maintenance activities include:

- Repair of cracked crossings and gutter bridges;
- Cleaning of debris and blockages from under gutter bridges;
- Repair or replacement of damaged grates or lids/covers on gutter bridges; and
- Gutter works to assist in eliminating or reducing vehicle scraping.

Generally vehicle crossings are renewed when necessary in conjunction with road, kerb and gutter and/or footpath works. However where crossings are in very poor condition one-off reconstruction is carried out.

Renewals are to be funded from Council's capital works program where appropriate, however generally the cost of construction of new or upgraded vehicle crossings and or vehicle crossing renewal are at the cost of the property owner. Council seeks payment of the full cost of these works from the property owner before works are carried out. But in the case of vehicle crossing renewals where there are issues with attributing costing responsibility, Council may seek only part cost recovery from the property owner. This may, for example, be where Council is undertaking road works and the levels are proposed to be altered and the existing crossing has some remaining life.

Vehicle crossing works by Council are normally carried out by contractors under the existing schedule of rates contracts. Additionally building developers may construct or replace vehicle crossings to Council specification and approval as part of property development at the developer's cost.

E10.6 Recent Expenditure Profile

Vehicle crossings expenditure ($000s) over the last few years is outlined in the following table:

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	0	0	0	0	0	0
Renewals	0	0	0	0	0	0
New Work	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**

Often where vehicle crossing works have been carried out they have been costed to footpaths maintenance and/or costs recovered from property owners. In the future it is proposed that a specific vehicle crossings cost centre and maintenance and renewal allocation/budget be established.

There has been limited maintenance and renewal work on Council vehicle crossings assets over recent years, although there is emerging recognition of the need to undertake more maintenance and renewal work on vehicle crossings given renewal is considered not to be keeping pace with deterioration of the assets and the importance placed on these assets by the community.

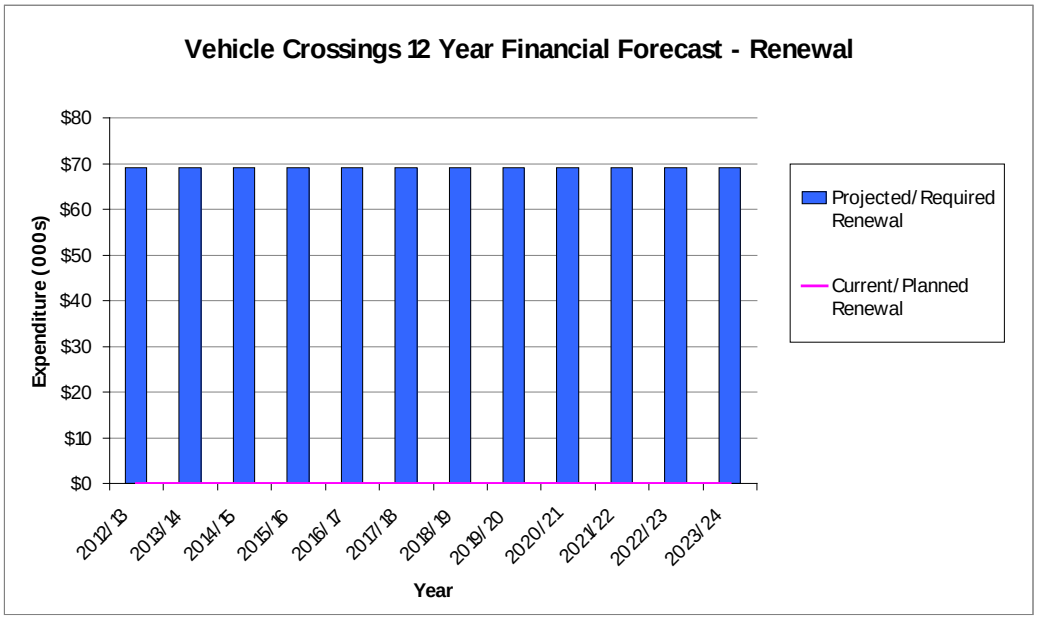
There are a very small percentage of vehicle crossings where scarping of standard vehicles has been noted. These crossings will be investigated and works will be carried out to rectify the scraping issues where appropriate.

E10.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to increase over time as the asset stock ages. All costs are shown in 2012 dollar values.

Roads

Vehicle Crossing 12 Year Renewals Forecast Summary (2012 $000's)												
Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	69	69	69	69	69	69	69	69	69	69	69	69
Planned/Current Expenditure	0	0	0	0	0	0	0	0	0	0	0	0
Funding Gap	69	69	69	69	69	69	69	69	69	69	69	69
Cumulative Funding Gap	69	138	207	276	345	414	483	552	621	690	759	828



The above renewal funding levels take into account part private ownership (assumed 50% contribution from property owners) and the fact that costs can be optimised to some extent given a majority of works will carried out in association with other road works.

It is also proposed that the above annual renewal funding be complemented by an increase in the vehicle crossing maintenance allocation to $8,000 per year, mainly to address minor defects and cleaning issues.

E10.8 Projected Condition

High level analysis indicates that a continuation of 2012 renewals funding levels will see the condition of vehicle crossing assets deteriorate over the next 8 years including a significant percentage of assets falling into the condition 4 and 5 range.

E10.9 10 Year Work Program

A 10 year vehicle crossings assets renewals program has been developed and is held within Council's Assets and Services Section. It is acknowledged that vehicle crossing renewal will largely align with Council's other road works renewal programs and as such vehicle crossings identified for renewal may change from year to year as road works programs are confirmed and delivered.

Unavailable data associated with a street location denotes works that are yet to be confirmed. Please note, due to its size the whole program has not been included in this AMP.

Street Location	Type	Segment	Material	Quantity	Unit	Forecast Renewal Year
Spit Road	Driveways	Spit Rd – Ourimbah Rd to Medusa St	Asphalt	9.3	m^2	2012/2013
Macpherson Street	Driveways	Macpherson St – Ourimbah Rd to Wyong Rd	Concrete	1.9	m^2	2012/2013
Ourimbah Road	Driveways	Ourimbah Rd – Cowles Rd to Roseberry St	Concrete	4.3	m^2	2012/2013
Awaba Street	Driveways	Awaba St – Congewoi Rd to Macpherson St	Concrete	3.0	m^2	2012/2013
Awaba Street	Driveways	Awaba St – Bond St to Countess St	Concrete	5.3	m^2	2012/2013
Awaba Street	Driveways	Awaba St – Bond St to Countess St	Concrete	5.7	m^2	2012/2013
Cowles Road	Driveways	Cowles Rd – Belmont Rd to Short St (Art Gallery Way)	Concrete	5.4	m^2	2012/2013
Cowles Road	Driveways	Cowles Rd – Belmont Rd to Short St (Art Gallery Way)	Concrete	8.6	m^2	2012/2013
Cowles Road	Driveways	Cowles Rd – Glover St to Belmont Rd	Concrete	5.3	m^2	2012/2013
Cowles Road	Driveways	Cowles Rd – Awaba St to Wyong Rd	Concrete	4.5	m^2	2012/2013
Pearl Bay Avenue	Driveways	Pearl Bay Ave – Fig Tree Walk to Marsala St	Concrete	5.9	m^2	2012/2013
Pearl Bay Avenue	Driveways	Pearl Bay Ave – Fig Tree Walk to Marsala St	Concrete	8.2	m^2	2012/2013

Street Location	Type	Segment	Material	Quantity	Unit	Forecast Renewal Year
Pearl Bay Avenue	Driveways	Pearl Bay Av – No.3 to Fig Tree Walk	Concrete	11.0	m^2	2012/2013
Raglan Street	Driveways	Raglan St/Gibson Rd to The Esplanade	Concrete	7.4	m^2	2012/2013
Raglan Street	Driveways	Raglan St/Gibson Rd to The Esplanade	Concrete	17.6	m^2	2012/2013
Raglan Street	Driveways	Raglan St – Calypso Ave to Canrobert St	Concrete	6.8	m^2	2012/2013
Raglan Street	Driveways	Raglan St – Calypso Ave to Canrobert St	Concrete	5.8	m^2	2012/2013
Raglan Street	Driveways	Raglan St – Mosman St to Calypso Av	Concrete	7.9	m^2	2012/2013
Raglan Street	Driveways	Raglan St – Mosman St to Calypso Ave	Concrete	5.9	m^2	2012/2013
Raglan Street	Driveways	Raglan St – Mosman St to Calypso Ave	Concrete	4.6	m^2	2012/2013
Raglan Street	Driveways	Raglan St – Mosman St to Calypso Ave	Concrete	9.0	m^2	2012/2013
Raglan Street	Driveways	Raglan St – McLeod St to Musgrave St	Concrete	17.6	m^2	2012/2013
Raglan Street	Driveways	Raglan St – Curraghbeena Rd to McLeod St	Concrete	17.2	m^2	2012/2013
Raglan Street	Driveways	Raglan St – Curraghbeena Rd to McLeod St	Concrete	9.0	m^2	2012/2013

Street Location	Type	Segment	Material	Quantity	Unit	Forecast Renewal Year
The Esplanade	Driveways	The Esplanade – Awaba St End	Concrete	5.4	m^2	2012/2013
The Esplanade	Driveways	The Esplanade – Plunkett St to Raglan St	Concrete	0.0	m^2	2012/2013
Albion Lane	Driveways	Albion Lane – Barrier to Military Rd	Concrete	0.0	m^2	2012/2013
Badham Avenue	Driveways	Badham Ave – No.9 to No.23 Mosman St	Concrete	20.5	m^2	2012/2013

E.11 Pram Ramps

E11.1 Description of Pram Ramps

Data collected in 2010 have identified 646 Council pram ramps, 777 m in length.

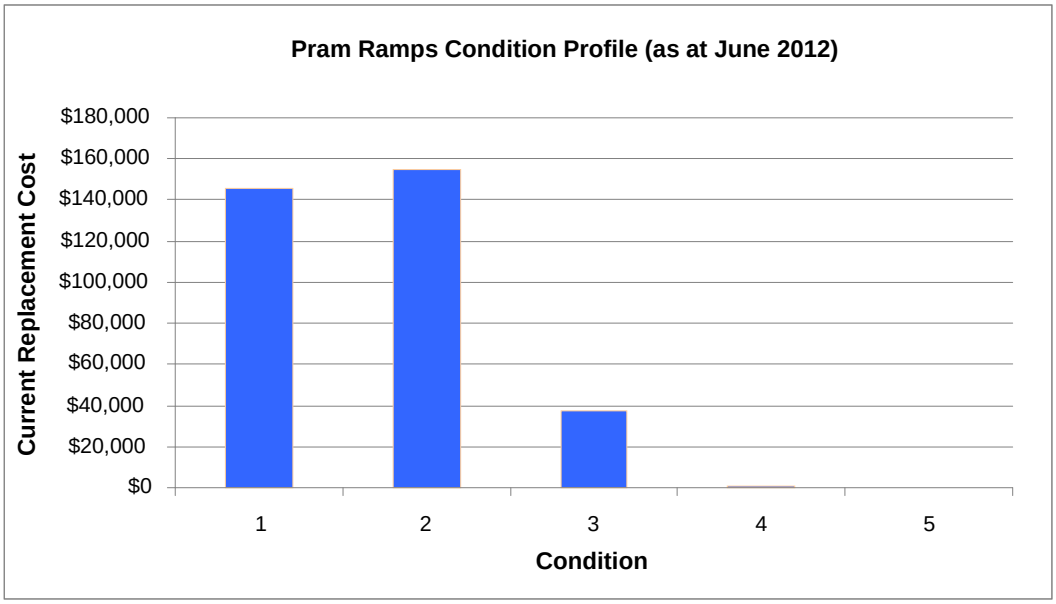
Typical asset unit rates and useful lives associated with pram ramps are as follows:

Pram Ramp Asset Type	Unit	Useful Life	Unit Rate
Concrete	each	90	$511.00
Asphalt	each	50	$950.00
Pavers	each	50	$950.00
Stone	each	50	$950.00

The value of assets associated with pram ramps is summarised in Section 4.1.4.

E11.2 Pram Ramps Condition

The condition profile (June 2012) of pram ramp assets is as follows:



Generally pram ramps assets are in good condition, and there are only a small percentage of assets in poor condition and/or approaching the end of their useful life.

It is acknowledged however that a large percentage of pram ramps do not fully comply with Australian Standards/BCA/DDA accessibility requirements. These pram ramps will be renewed to appropriate accessibility standards when renewal works are required.

Pram ramps which are identified as departing significantly from appropriate accessibility standards will be replaced on a priority basis.

E11.3 Renewal Intervention

From a service level perspective Council's aim is to have the following condition profile:

Condition	Rating	Acceptance Rating	Percentage
1 to 3	Excellent to Average	Satisfactory	100%
4 to 5	Poor, Very Poor to Failed	Unsatisfactory	0%

E11.4 Current Status of 'Unsatisfactory' Condition Assets

As at June 2012, pram ramps valued at $511 (approximately 0.15% of pram ramps) are in an 'unsatisfactory' condition (i.e. rated condition 4 or worse).

A maintenance priority list has been prepared to repair defects in pram ramps. Identified defect are repaired subject to available resources. Additionally, pram ramps in or approaching condition 4 and 5 are prioritised for renewal in the Pram Ramp Renewal Program.

E11.5 Current Maintenance and Renewal Strategies

Typical pram ramp maintenance activities include:

- Repair of cracked ramps;
- Removal of accumulated debris/dirt from inverts; and
- Gutter correction to remove bullnose lips or gutter irregularities.

E11.6 Recent Expenditure Profile

Pram ramp expenditure ($000s) over the last few years is outlined in the following table:

	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	Average
Maintenance	0	0	0	0	0	0
Renewals	0	0	0	0	3	0.6
New Work	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**3**	**0.6**

There has been minimal maintenance and renewal work on Council pram ramps assets over recent years, although there is emerging recognition of the need to undertake more maintenance and renewal work on given the importance placed on these assets by the community. The accessibility compliance issues add additional attention on this asset group.

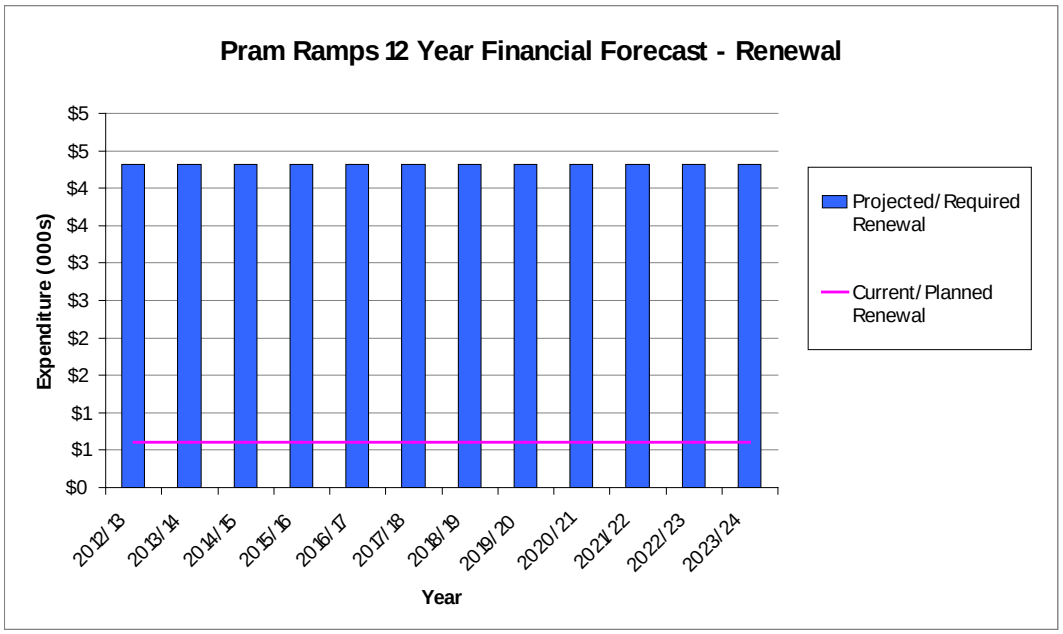
Traditionally some pram ramps renewal works have been carried out under footpath maintenance allocations. It is intended to clearly define renewal versus maintenance works in future and cost works accordingly.

E11.7 Projected Expenditure Scenario

It is intended that the renewal intervention be at condition 4 to effectively provide the desired community level of service and optimise maintenance and renewal expenditure. A level 4 intervention scenario and current expenditure scenario is summarised in the table and figure below. The expenditure requirements are forecast to increase over time as the asset stock ages. All costs are shown in 2012 dollar values.

Pram Ramp 12 Year Renewals Forecast Summary (2012 $000's)

Year	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Projected/Required Expenditure	4	4	4	4	4	4	4	4	4	4	4	4
Planned/Current Expenditure	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Funding Gap	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Cumulative Funding Gap	3.4	6.8	10.2	13.6	17	20.4	23.8	27.2	30.6	34	37.4	40.8



It is also proposed that the above annual renewal funding be complemented by an increase in the pram ramp maintenance allocation to $8,000 per year, mainly to address minor defect works.

E11.8 Projected Condition

High level analysis indicates that a continuation of 2012 renewals funding levels will see the condition of pram ramp assets deteriorate over the next 8 years including a significant percentage of assets falling into the condition 4 and 5 range.

E11.9 10 Year Work Program

A 10 year pram ramp assets renewals program has been developed and is held within Council's Assets and Services Section. The first four years of the renewal program are reviewed annually to confirm extent of work and may be changed subject to funding.

Unavailable data associated with a street location denotes works that are yet to be confirmed.

Street Location	Segment	Material	Quantity (m)	Forecast Renewal Year
Awaba Street	Awaba St – Congewoi Rd to Macpherson St	Concrete	1.2	2012/2013
Military Road	Military Rd – Raglan St to Upper Almora St	Asphalt	1.2	2013/2014
Military Road	Military Rd – Twin Towers to Spofforth St	Concrete	1.2	2013/2014
Raglan Street	Raglan St – Military Rd to Cullen Ave	Pavers	1.2	2013/2014
Raglan Street	Raglan t – Canrobert St to Milner St	Concrete	1.2	2013/2014
Raglan Street	Raglan St – Military Rd to Cullen Ave	Pavers	1.2	2013/2014
Bradleys Head Road	Bradleys Head Rd - King Max St to Military Rd	Concrete	1.2	2013/2014
Bradleys Head Road	Bradleys Head Rd - King Max St to Military Rd	Concrete	1.2	2013/2014
Frascatti Lane	Frascatti Lane – Dead End to Beaconsfield Rd	Concrete	1.2	2013/2014
Kallaroo Street	Kallaroo St – Sirius Cove Rd to Dead End	Concrete	1.2	2013/2014
King Max Street	Kind Max St – Bradleys Head Rd to Middle Head Rd	Concrete	1.2	2013/2014
Milton Avenue	Milton Ave – Union St to Queen St	Concrete	1.2	2013/2014
Military Road	Military Rd – Raglan St to Upper Almora St	Concrete	1.2	2016/2017
Military Road	Military Rd – Spit Rd to Bond St	Concrete	1.2	2016/2017
Bullecourt Avenue	Bullecourt Ave – No.33 to Central Ave	Concrete	1.2	2016/2017
Cross Street	Cross St – Dead End to Bradleys Head Rd	Concrete	1.2	2016/2017
Effingham Street	Effingham St – Kind Max St to Middle Head Rd	Concrete	1.2	2016/2017
Ellamatta Avenue	Ellamatta Ave – Dead End to Bradleys Head Rd	Concrete	1.2	2016/2017
Waitovu Street	Waitovu St – Mandolong Rd to Awaba St	Concrete	1.2	2016/2017

Street Location	Segment	Material	Quantity (m)	Forecast Renewal Year
Military Road	Military Rd – Spit Rd to Bond St	Concrete	1.2	2021/2022
Spit Road	Spit Rd – Ourimbah Rd to Medusa St	Concrete	1.2	2021/2022
Spit Road	Spit Rd – Ourimbah Rd to Medusa St	Concrete	1.2	2021/2022
Cowles Road	Cowles Rd – Awaba St to Wyong Rd	Concrete	1.2	2021/2022
Cowles Road	Cowles Rd – Glover St to Belmont Rd	Concrete	1.2	2021/2022
Pearl Bay Avenue	Pearl Bay Ave – Spit Rd to No.3	Concrete	1.2	2021/2022
Pearl Bay Avenue	Pearl Bay Ave – Spit Rd to No.3	Concrete	1.2	2021/2022
Raglan Street	Raglan St – Calypso Ave to Canrobert St	Concrete	1.2	2021/2022
The Esplanade	The Esplanade – Plunkett Rd to Raglan St	Concrete	1.2	2021/2022
Avenue Road	Avenue Rd – Noble St to Military Rd	Pavers	1.2	2021/2022
Avenue Road	Avenue Rd – Noble St to Military Rd	Pavers	1.2	2021/2022
Avenue Road	Avenue Rd – Rangers Rd to Noble St	Concrete	1.2	2021/2022
Calypso Avenue	Calypso Ave – Dead End to Clanalpine St	Concrete	1.2	2021/2022
Central Avenue	Central Ave – Spit Rd for 19 metres	Concrete	1.2	2021/2022
Central Avenue	Central Ave – Spit Rd for 19 metres	Concrete	1.2	2021/2022
Countess Street	Countess St – Earl St to Ourimbah Rd	Concrete	1.2	2021/2022
Drury Lane	Drury Lane – Gordon St to Dugald Rd	Concrete	1.2	2021/2022
Ellamatta Avenue	Ellamatta Ave – Dead End to Bradleys Head Rd	Concrete	1.2	2021/2022
Frascatti Lane	Frascatti Lane – Dead End to Beaconsfield Rd	Concrete	1.2	2021/2022

Street Location	Segment	Material	Quantity (m)	Forecast Renewal Year
Gurrigal Street	Gurrigal St – Nathan Ln to Military Rd	Concrete	1.2	2021/2022
Hamlet Lane	Hamlet Ln – Raglan St to Shadforth St	Concrete	1.2	2021/2022
Holt Avenue	Holt Ave – Cowles Rd to Bardwell Ln	Concrete	1.2	2021/2022
James King Lane	James King Ln – Union St to Queen St	Concrete	1.2	2021/2022
Magic Grove	Magic Grove – Cabban St to Clanalpine St	Concrete	1.2	2021/2022
Martens Lane	Martens Ln – Middle Head Rd to Raglan St	Asphalt	1.2	2021/2022
Martens Lane	Martens Ln – Middle Head Rd to Raglan St	Concrete	1.2	2021/2022
Medusa Street	Medusa St – Spit Rd to Pindari Ave	Concrete	1.2	2021/2022
Medusa Street	Medusa St – Spit Rd to Pindari Ave	Concrete	1.2	2021/2022
Melrose Street	Melrose St – Bardwell Rd to Military Rd	Asphalt	1.2	2021/2022
Mosman Street	Mosman St – Upper Avenue Rd to Raglan St	Pavers	1.2	2021/2022
Nock Lane	Nock Ln – Shadforth St to Avenue Rd	Concrete	1.2	2021/2022
Prince Albert Street	Prince Albert St – Union St to Queen St	Concrete	1.2	2021/2022
Prince Albert Street	Prince Albert St – Union St to Queen St	Concrete	1.2	2021/2022
Quakers Road	Quakers Rd – Spit Rd to Ryrie St	Concrete	1.2	2021/2022
Rawson Street	Rawson St – Awaba St to Rawson Ln	Concrete	1.2	2021/2022
Rawson Street	Rawson St – Awaba St to Rawson Ln	Concrete	1.2	2021/2022
Redan Lane	Redan Ln/Charles Ln to Raglan St	Concrete	1.2	2021/2022
Redan Lane	Redan Ln/Charles Ln to Raglan St	Concrete	1.2	2021/2022

Street Location	Segment	Material	Quantity (m)	Forecast Renewal Year
Redan Street	Redan St – Raglan St to Balmoral Ave	Concrete	1.2	2021/2022
Shellbank Avenue	Shellbank Ave – Wyong South to Wyong North	Concrete	1.2	2021/2022
Shellbank Avenue	Shellbank Ave – Wyong South to Wyong North	Concrete	1.2	2021/2022
Silex Road	Silex Rd/Thompson St to Bradleys Head Rd	Concrete	1.2	2021/2022
Simpson Street	Simpson St – Prince Albert St to Major St	Concrete	1.2	2021/2022
Simpson Street	Simpson St – Prince Albert St to Major St	Concrete	1.2	2021/2022
Stanley Avenue	Stanley Ave – Awaba St to Dead End	Concrete	1.2	2021/2022
Stanton Road	Stanton Rd – Tivoli St to Spit Rd	Concrete	1.2	2021/2022
Sverge Street	Sverge St/Moran St to Clanalpine St	Concrete	1.2	2021/2022
The Tar	The Tar – Middle Head Rd to Wolseley Rd	Concrete	1.2	2021/2022

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