

MOSMAN

ASSET MANAGEMENT PLAN 2020-29

ROADS

Adopted by Council 6 October 2020

# **CONTENTS**

| INTRODUCTION  | 04  |
|---|-----|
| LEVELS OF SERVICE   |     |
| FUTURE DEMAND   | 20  |
| CURRENT STATE OF ASSETS   | 22  |
| LIFECYCLE MANAGEMENT PLAN                                       | 70  |
| FINANCIAL SUMMARY   | 96  |
| RISK MANAGEMENT PLAN  |     |
| ASSET MANAGEMENT PRACTICES                                      | 104 |
| PLAN IMPROVEMENT AND MONITORING                                 | 106 |
| REFERENCES  | 108 |
| APPENDICES  |     |
| APPENDIX A - ROADS MAPS   | 110 |
| APPENDIX B - ROADS ASSETS 10 YEAR LIFECYCLE FINANCIAL FORECASTS | 113 |
| APPENDIX C - ROADS DRAFT CAPITAL WORKS PROGRAM 2019/20-2028/29  | 116 |

### INTRODUCTION

#### **Background**

The Mosman local government area is located in Sydney's northern suburbs, around 6 kilometres from central Sydney. The Council area is predominately residential with commercial areas along Military Road. The Council area includes significant areas of Sydney Harbour foreshore. Early settlement in Mosman dates from the 1800s, but the development of the area was slow until the 1880s when road access was improved. Significant growth in Mosman occurred in the interwar period as well as the 1950s and 1960s when many residential flat buildings were constructed. Since this period, growth has slowed as development opportunities have become fewer.

Assets not included in this Plan are those within State and Federal government lands including HMAS Penguin, National Park, Sydney Harbour Federation Trust and Taronga Zoo. 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 Transport for NSW (TfNSW) and are also not considered.

The purpose of this AMP is to have a guide that assists Council to achieve its asset management outcomes by managing the condition of and use of road assets over the next 10 years, as well as direction for use, safety and maintenance.

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 TfNSW maintains the state roads (i.e. Spit Road, and Military Road between Spit Road and Spofforth Street).

#### COVID-19

The assets values, data and modelling that informed the Asset Management Plans was done prior to the full ramifications of the COVID-19 pandemic being known. Due to the variability in market conditions during this time, it is recommended that the Roads AMP be reviewed and updated in 18 months' time to account for any changes. This has also been included in the Policy as a key performance measure.

## Goals and Objectives of Asset Management

Council's goal in managing infrastructure assets is to provide equitable and appropriate services and facilities for the community and ensure they are managed efficiently and effectively and are of a quality consistent with requirements of the Mosman community.

The key elements of infrastructure asset management are:

- Consider a life cycle approach
- Develop cost-effective management strategies for the long term
- Provide 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
- Continuous improvement in asset management practices

This asset management plan sets out objectives over a 10 year period:

To have provided directly or on behalf of other levels of government adequate, equitable and appropriate services and facilities for the community and to ensure that those services and facilities are managed efficiently and effectively, and are always of high quality consistent with the requirements of the Mosman community

- Aim to have Council's unrestricted current ratio at 2:1
- Seek to meet benchmarks, e.g. sustainability financial indicator of greater than 1.0, backlog ratio less than 2.0% and maintenance ratio greater than 100%
- To have business systems which will meet the increasing demands for management information and that add value to the Council and community by providing integrated, accurate, timely, cost-effective and responsive service
- To have Mosman Council regarded as an employer of choice by all its stakeholders
- To have risk management strategies in place to ensure Mosman is a safe place to live, work and play
- To have integrated sustainable practices into the Council's asset management planning and implementation

### **Asset Management Plan Framework**

In accordance with the NSW government's Integrated Planning and Reporting framework, Mosman Council's Community Strategic Plan (2018-2028), named MOSPLAN, presents a broad outline of Mosman Council's aspirations for serving its residents, based on community engagement.

MOSPLAN's Resourcing Strategy, ensures there are adequate financial, human resources and assets to deliver Council's services over 10 years. The Asset Management Framework (see Figure 1) outlines the asset component of the Resourcing Strategy.

The Asset Management Framework is guided by the Asset Management Policy and Asset Management Strategy.

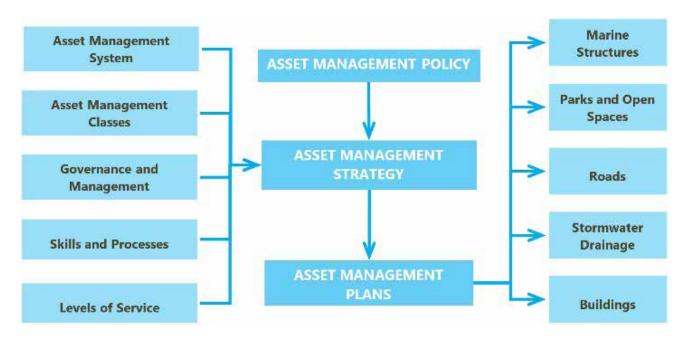


Figure 1 - Asset Management Framework

The key points from the Asset Management Policy are:

- Assets are to be managed (from creation, through operation to disposal) in accordance with the Council's objectives and priorities for service delivery
- Each infrastructure asset class (buildings, roads, stormwater drainage, parks and open space, marine structures) has an asset management plan
- Outlines human resource needs and staff roles and responsibilities
- The asset management strategy is to be implemented in order to apply asset management best practice
- Council will promote continuous improvement in asset management

The Asset Management Strategy is a guide to the content of the asset management plans, relevant legislation, risk management and asset information systems within Council and a broad overview of each plans financial forecasts. This Asset Management Plan is in accordance with the Asset Management Strategy.

The Asset Management Plans guides the yearly capital works and maintenance budgets and provides important input into the Council's Long Term Financial Plan.

### **Summary of Roads Assets**

This roads AMP cover the infrastructure assets in Table 1.

| Asset Class              | Description  | Current Replacement<br>Cost (CRC) '000s (\$) |
|--------------------------|--|--|
| Roads                    | 91.31 km of roads comprising of 1257 assets. Includes surfaces: asphalt wearing surface, brick paving, cobblestone; and pavements: flexible (road base) pavement, rigid (concrete) pavement      | \$89,237,939                                 |
| Footpaths                | 129.43 km of footpaths comprising of 1270 assets. Includes concrete, asphalt, brick paving and timber deck footpaths and others  | \$20,703,922                                 |
| Steps                    | 401 sets of steps (many with multiple sections of steps) covering 2,561 m in length and 3,092 m² in area. Comprises of 903 assets, which also includes handrails, paths between steps and others | \$5,069,670                                  |
| Kerb and Gutter          | 157.38 km of kerb and gutter comprising of 1472 assets. Includes kerb and gutter, kerb only, roll kerb, dish gutter and other variations.  | \$30,182,721                                 |
| Physical Traffic Devices | 7,649 m² of various types including roundabouts, wombat crossings, kerb blister islands, median islands and others. Comprises of 249 assets  | \$4,169,786                                  |

Table 1 - Extent of Assets covered by this Plan

| Asset Class       | Description   | Current Replacement<br>Cost (CRC) '000s (\$) |
|-------------------|---|--|
| Car Parks         | 14 At-grade car parks (comprising of 131 assets) including:<br>27,313 m² road pavement<br>17,342 m² asphalt wearing surface<br>9,971 m² brick paving surface<br>Various other components such as kerb & gutter, line marking and<br>others        | \$3,766,225                                  |
| Street Furniture  | Including (comprising of 789 assets): 10,934 m fencing/handrailing 1,940 m guardrail 1 bus shelter 203 seats 45 traffic visibility mirrors 705 bollards 52 bins 24 parking meters Various other low quantity assets                               | \$3,758,609                                  |
| Lines and Signs   | Including (comprising of 8263 assets): 3,916 traffic signs 1,854 street directional signs 2,801 raised pavement markers 161 m rumble bars 784 painted symbols 1,284 m² painted chevrons, pedestrian crossings and piano keys 48,705 m linemarking | \$2,137,148                                  |
| Retaining Walls   | 41.60 km of retaining structures, rock cuttings, embankments and others comprising of 1135 assets. (Note: excludes 431 structures in arterial roads, structures considered to be private ownership and/or structures less than 1m in height).     | \$38,506,789                                 |
| Vehicle Crossings | 5,135 vehicle crossings of total area 67,343 m² and 261 gutter crossings of total length 1,048 m  | \$5,346,479                                  |
| Pram Ramps        | 694 pram ramps consisting of concrete, asphalt, brick paving and stone  | \$486,805                                    |
| Formation         | 377,000m3 of earthworks (cut + fill)  | \$9,004,787                                  |
|                   | Total (excluding formation)   | \$203,366,093                                |

### **LEVELS OF SERVICE**

### **Description**

Levels of service provide the basis for life cycle management strategies and works programs. They intend to align the measurable attributes of the service to the corporate objectives of the organisation.

They must be readily measurable, and easily understood by members of the community.

Roads assets in this AMP are measured using the key performance measures consisting of quality, safety, function and condition. They also take into account the relevant legislative framework and standards and codes. The objectives of the levels of service in this Roads AMP are intended to:

- Inform the community of the proposed type and level of service to be offered
- Assist with the identification of the costs and benefits of the services being offered
- Enable the community to assess suitability, affordability and equity of the services offered
- Provide a measure of the effectiveness of the asset management plan
- Provide focus for the development of the asset management strategies
- Provide guidance for current and future services to be offered, the manner of the service delivery and definition of the specific levels of service which the organisation wishes to achieve

The levels of service outlined in this section are based on:

- Information gathered and interpreted from customers on the importance of and satisfaction with services and in some cases expected quality and cost of services
- Information obtained from expert advice on asset condition and performance capacity
- Strategic and corporate goals
- Legislative requirements
- Regulations, environmental standards and industry and Australian Standards that specify minimum design parameters for infrastructure delivery
- Availability of resources and the financial environment

### Feedback from the Community

Council regularly conducts community surveys to determine the importance and satisfaction with infrastructure and services. The latest Mosman Community Survey was conducted in June 2018.

Residents were asked a series of questions to inform the review of service delivery standards to be implemented in the Strategic Management Plans including MOSPLAN, Delivery Program, Operational Plan and Asset Management Plans. Community feedback also provides guidance in developing priorities and allocation of resources in the budget.

The community survey provided comprehensive feedback about road assets. Responses covered the maintenance of local roads, footpaths, bike paths, management of traffic, parking and enforcement of parking restrictions. The condition categories mostly meet the performance targets for roads assets. Customer satisfaction and complaints in some categories fell below the target. The community expects a high level of service from road assets and the satisfaction is not always linked to the condition of the assets, such as availability of car park spaces.

The feedback also included the number of complaints received regarding asset defects and insurance claims for injuries or property damage resulting from assets hazards.

See the Levels of Service Matrix (Table 4) for the full comparison between our performance targets and current performance.

### **Legislative Requirements**

Council has to meet many requirements including National and State legislation and regulations. These are listed in Council's Asset Management Strategy document.

# Asset Rating Systems Condition Ratings

The standard condition rating scale used for roads assets (excluding non-valued assets) is the 1-5 rating approach as defined by the IPWEA and is detailed in Table 2.

Assets in condition 1 to 3 are considered to be in a "satisfactory" condition while those in condition 4 and 5 are considered to be in an "unsatisfactory" condition. The condition ratings were determined by the community via the Mosman Asset Management Reference Group in 2011/12. The descriptions determined by the group have been reviewed regularly and remain consistent to how the condition rating would be described today. The service levels determine what the condition the asset should be in before it is renewed.

For roads assets, the following photographs indicate various asset class and conditions. These are purely illustrative and a detailed assessment is required before making a condition assessment.

| Condition           | Rating                   | Description of Asset Condition  |  |  |  |
|---------------------|--------------------------|---|--|--|--|
| "Satisfactory" Cond | "Satisfactory" 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.<br>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. |  |  |  |
| "Unsatisfactory" Co | ndition                  |   |  |  |  |
| 4                   | Poor                     | Poor condition - extensive wear and tear requiring replacement of large sections.<br>Significant risk to public safety and amenity.   |  |  |  |
| 5                   | Very Poor/ 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. |  |  |  |

Table 2 - Condition Rating Scale

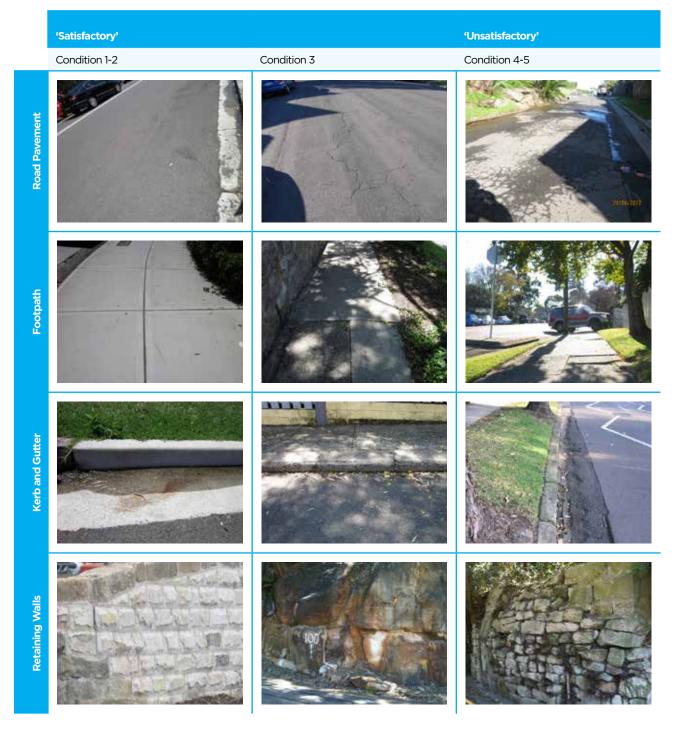


Table 3 - Photographs of assets in various condition ratings



### **Intervention Program**

Council adheres to a Condition 4 'Intervention' program where assets that decline into a Condition 4 rating (unsatisfactory) rating are scheduled to be renewed within the next two financial years.

The renewal intervention level was selected to optimise the desired level of service, mitigate risk and optimise maintenance and renewal expenditure. The aim is to minimise assets in an unsatisfactory condition and therefore a renewals intervention strategy that proposes asset renewal as the asset falls into condition 4 is considered desirable.

Condition 4 assets will be added to the capital works program to be replaced within 2 years unless their failure does not pose a risk. Alternate funding or shifting lower priority work to later years are two ways to ensure condition 4 assets are replaced.

Condition 5 assets are to be replaced as soon as practically possible, especially if the asset poses a high risk.

# Community and Technical Levels of Service

In the roads AMP, service levels have been defined from a Community expectation and an Operational or Technical standard. Community expectation is supported by measures of performance developed to ensure that the minimum technical and operational levels of service are met.

For each Key Performance Measure, the Council determines what is to be measured (Level of Service) and how it will be measured (Performance Measure Process). A target is set to meet the minimum required levels of service (Performance Target). Current Performance indicates whether the target is met (Current Performance). Levels of Service are detailed in Table 4.

To assess the Community Level of Service, three datasets are used to assess performance against a set target:

- Community satisfaction survey Residents are asked how satisfied they are with Council's facilities on a 0 to 10 scale (0 - lowest satisfaction, 10 - highest satisfaction).
   Scores of 5 or higher indicate satisfaction.
- Customer service complaints Complaints and requests are recorded for each asset category and tallied by financial year.
- Insurance claims and incidents Incidents involving injury or damage to property are tallied by financial year for each asset category. A record of insurance claims resulted from these incidents are also kept.

Technical Level of Service is measured using the condition rating values from the asset registers. The percentage of assets in a satisfactory condition (i.e. 3 or better) are recorded for each asset category.

| Asset Category     | Key Performance<br>Measure  | Level of Service   | Performance<br>Measure Process  | Performance<br>Target   | Current<br>Performance  |
|--------------------|---|--|---|---|---|
| Community Levels o | f Service   |  |   |   |   |
| Road Pavement      | Quality   | Provide sealed<br>road with smooth<br>ride appropriate<br>to road type and<br>speed limits                                   | Customer<br>satisfaction survey   | 80% surveyed<br>customers satisfied<br>with road condition  | 2018 Community<br>Survey - 80%<br>surveyed satisfied<br>with the provision<br>and maintenance<br>of local roads                               |
|                    | Safety  | Provide roadways<br>free from hazards  | Customer service requests   | Less than 50 requests/ complaints with regards to hazards/defects per year  | 2018-19: 51<br>2017-18: 33<br>2016-17: 41<br>2015-16: 62  |
|                    |   |  | Insurance claims/<br>incidents  | Less than 10 road<br>pavements related<br>claims/incidents<br>per year  | 2018-19: 2 incidents<br>reported<br>2017-18: 2 incidents<br>reported<br>2016-17: 8 incidents<br>reported<br>2015-16: 11 incidents<br>reported |
| Kerb and Gutter    | Safety / Function   | Barrier is even and<br>consistent and free<br>from hazards while<br>keeping cars on<br>road pavement,<br>providing effective | Customer service<br>requests  | Less than 50<br>requests/<br>complaints<br>with regards to<br>hazards/ defects<br>per year  | 2018-19: 15<br>2017-18: 24<br>2016-17: 19<br>2015-16: 34  |
|                    | roadside drainage<br>and preventing<br>stormwater from<br>entering properties | Insurance claims/<br>requests  | Less than 10 kerb<br>and gutter related<br>claims/incidents<br>per year | 2018-19: 1 incident<br>reported<br>2017-18: 1 incident<br>reported<br>2016-017: 2<br>incidents reported<br>2015-16: 2 incidents<br>reported |   |

| Asset Category     | Key Performance<br>Measure     | Level of Service  | Performance<br>Measure Process   | Performance<br>Target  | Current<br>Performance   |
|--------------------|--------------------------------|---|--|--|--|
| Footpaths          | Quality and Safety             | Quality and Safety Footpath surfaces are smooth and free from hazards             | Customer<br>satisfaction survey  | 80% surveyed<br>customers satisfied<br>with footpath<br>condition  | 2018 Community<br>Survey - 72%<br>surveyed satisfied<br>with the provision<br>and maintenance<br>of footpaths                                    |
|                    |                                |   | Customer service requests  | Less than 100<br>requests/<br>complaints<br>with regards to<br>hazards/ defects<br>per year                                | 2018-19: 141<br>2017-18: 168<br>2016-17: 183<br>2015-16: 171   |
| Fur                |                                |   | Insurance claims/<br>Incidents   | Less than 25<br>footpath related<br>insurance claims/<br>incidents per year  | 2018-19: 19<br>incidents reported<br>2017-18: 21<br>incidents reported<br>2016-17: 23<br>incidents reported<br>2015-16: 37<br>incidents reported |
|                    | Function                       | Facilitate efficient<br>pedestrian access<br>and movement                         | Customer<br>satisfaction survey  | 80% surveyed<br>customers satisfied<br>with footpath<br>condition  | 2018 Community<br>Survey - 72%<br>surveyed satisfied<br>with the provision<br>and maintenance<br>of footpaths                                    |
| Cycleways          | Quality / Safety /<br>Function | Provide safe and<br>accessible cycling<br>facilities                              | Customer<br>satisfaction survey  | 75% surveyed<br>customers satisfied<br>with both on<br>and off-road<br>cycleway access<br>and movement on<br>Council roads | 2018 Community<br>Survey - 49%<br>surveyed satisfied<br>with the provision<br>and maintenance<br>of bike paths                                   |
| Traffic Facilities | Quality / Safety /<br>Function | Facilitate safe and<br>efficient traffic and<br>pedestrian access<br>and movement | Customer<br>satisfaction survey  | 80% surveyed<br>customers satisfied<br>with traffic<br>management on<br>Council roads                                      | 2018 Community<br>Survey - 61%<br>satisfied<br>with traffic<br>management  |
|                    |                                | Customer requests   | Less than<br>50 requests/<br>complaints with<br>regards to facility<br>hazards and<br>defects per year | 2018-19: 8<br>2017-18: 3<br>2016-17: 7<br>2015-16: 4   |  |

Table 4 - Levels of Service Matrix

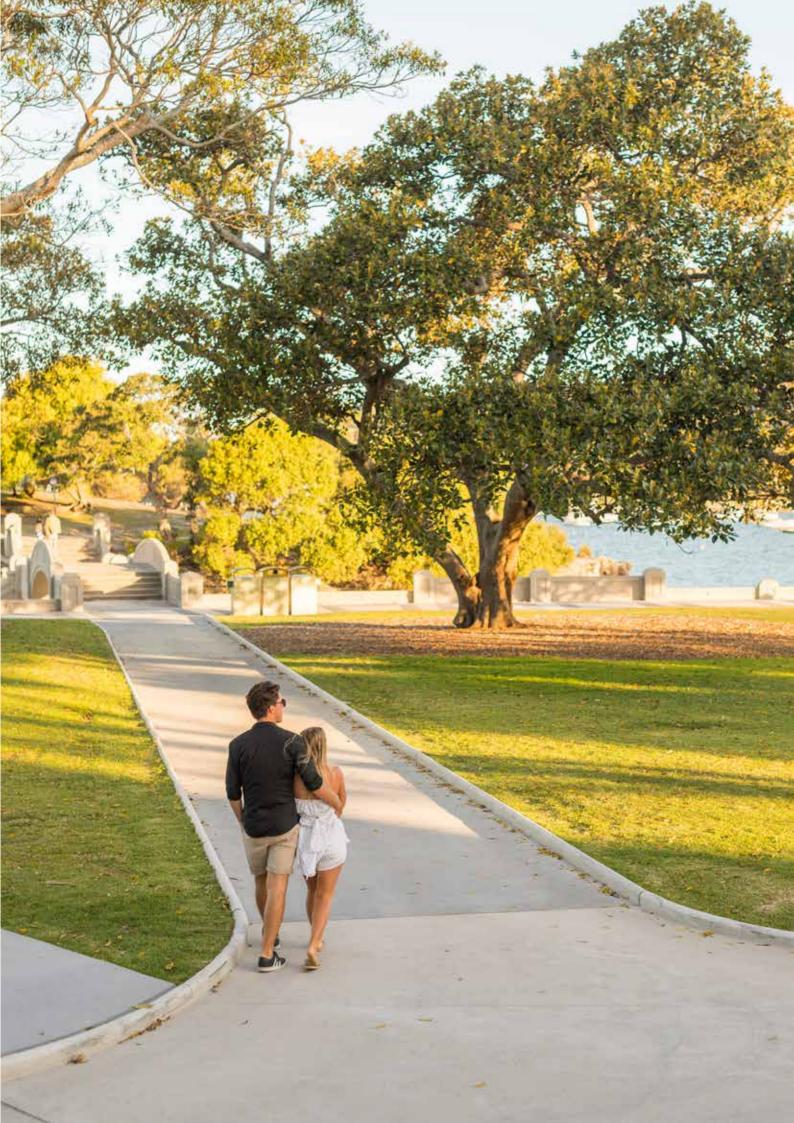
| Asset Category                             | Key Performance<br>Measure | Level of Service  | Performance<br>Measure Process  | Performance<br>Target  | Current<br>Performance   |
|--|----------------------------|---|---------------------------------|--|--|
| Carparks                                   | Quality / Function         | Provide adequate<br>public parking to<br>meet user needs  | Customer<br>satisfaction survey | 70% surveyed<br>customers satisfied<br>with adequacy of<br>public parking            | 2018 Community<br>Survey - 65%<br>satisfied with<br>provision of car<br>parking  |
|  | Safety                     | Provide car parking<br>facilities free from<br>hazards  | Customer service requests       | Less than 25<br>requests/<br>complaints re<br>hazards/ defects<br>per year           | 2018-19: 0<br>2017-18: 2<br>2016-17: 4<br>2015-16: 2   |
|  |                            |   | Insurance claims/<br>incidents  | Less than 4<br>carpark related<br>insurance claims/<br>incidents per year            | 2018-19: 1 incident<br>reported<br>2017-18: 1 incident<br>reported<br>2016-17: 2 incidents<br>reported<br>2015-16: 0 incidents<br>reported   |
| Street Furniture                           | Function/Safety            | Provide fencing<br>and guardrail as<br>effective barriers<br>between areas  | Customer service requests       | Less than 25<br>requests/<br>complaints re<br>hazards/ defects<br>per year           | 2018-19: 18<br>2017-18: 18<br>2016-17: 18<br>2015-16: 15   |
| Retaining<br>Walls (Council<br>Controlled) | Function / Safety          | Provide safe and<br>effective structural<br>division between<br>areas of significant<br>level difference                  | Customer service requests       | Less than 25 requests/ complaints with regards to hazards/defects per year           | 2018-19: 3<br>2017-18: 2<br>2016-17: 5<br>2015-16: 6   |
|  |                            |   | Insurance claims/<br>incidents  | Less than 10<br>retaining wall<br>related insurance<br>claims/incidents<br>per year  | 2018-19: 0 incidents<br>reported<br>2017-18: 0 incidents<br>reported<br>2016-17: 0 incidents<br>reported<br>2015-16: 1 incident<br>reported  |
| Steps                                      | Function / Safety          | Provide safe<br>and effective<br>pedestrian access<br>and movement<br>between areas of<br>significant level<br>difference | Customer service<br>requests    | Less than 25 requests/ complaints with regards to adequacy/ hazards/defects per year | 2018-19: 13<br>2017-18: 26<br>2016-17: 10<br>2015-16: 11   |
|  |                            |   | Insurance claims/<br>incidents  | Less than 6 step<br>related insurance<br>claims/incidents<br>per year                | 2018-19: O incidents<br>reported<br>2017-18: 2 incidents<br>reported<br>2016-17: 2 incidents<br>reported<br>2015-16: O incidents<br>reported |

| Asset Category                             | Key Performance<br>Measure       | Level of Service  | Performance<br>Measure Process | Performance<br>Target  | Current<br>Performance  |
|--|----------------------------------|---|--------------------------------|--|---|
| Pram Ramps                                 | Function / Safety                | Provide safe and<br>effective access for<br>all pedestrians at<br>appropriate road<br>crossing points       | Customer service<br>requests   | Less than 25 requests/ complaints with regards to hazards/defects per year   | 2018-19: 5<br>2017-18: 6<br>2016-17: 4<br>2015-16: 8  |
| Lines and<br>Signs (Council<br>Controlled) | Function                         | Provide clear and unambigious communication of traffic regulations and marking for traffic flow and parking | Customer service<br>requests   | Less than<br>100 requests/<br>complaints<br>with regards to<br>hazards/defects<br>per year   | 2018-19: 93<br>2017-18: 99<br>2016-17: 67<br>2015-16: 57  |
| Technical Levels of S                      | ervice                           |   |                                |  |   |
| Road Pavement                              | Function /<br>Condition / Safety | Provide smooth<br>sealed road surface<br>free from hazards  | Condition rating               | 95% of all road<br>seals in satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5)                 | 99.7% of all road<br>seals in satisfactory<br>condition (as at<br>June 30 2019)                   |
|  |                                  |   |                                | 95% of all concrete<br>road pavements<br>in satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5) | 96.9% of all<br>concrete road<br>pavement in<br>satisfactory<br>condition (as at<br>June 30 2019) |
| Kerb and Gutter                            | Function /<br>Condition / Safety | Provide effective<br>roadside drainage<br>free from hazards   | Condition rating               | 95% of all kerb<br>and gutter in<br>satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5)         | 100% of all kerb<br>and gutter in<br>satisfactory<br>condition (as at<br>June 30 2019)            |
| Footpaths                                  | Function /<br>Condition / Safety | Provide accessible<br>footpath free from<br>hazards   | Condition rating               | 95% of all<br>footpaths in<br>satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5)               | 99.8% of all<br>footpaths in<br>satisfactory<br>condition (as at<br>June 30 2019)                 |
| Traffic Facilities                         | Function /<br>Condition / Safety | Facilitate safe and<br>efficient traffic and<br>pedestrian access<br>and movement                           | Condition rating               | 95% of all<br>traffic facilities<br>in satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5)      | 97.9% of all<br>traffic facilities<br>in satisfactory<br>condition (as at<br>June 30 2019)        |

Table 4 - Levels of Service Matrix

| Asset Category                            | Key Performance<br>Measure       | Level of Service  | Performance<br>Measure Process | Performance<br>Target   | Current<br>Performance   |
|---|----------------------------------|---|--------------------------------|---|--|
| Carparks                                  | Condition / Safety               | Provide car parking<br>facilities free from<br>hazards  | Condition rating               | 95% of all<br>carpark facilities<br>in satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5)                                     | 100% of all<br>carpark facilities<br>in satisfactory<br>condition (as at<br>June 30 2019)                    |
| Street Furniture                          | Condition/ Safety                | Street furniture<br>along with fencing<br>and guardrail<br>provided free<br>from hazards and<br>defects     | Condition rating               | 90% of all<br>street furniture,<br>inclduing fencing<br>and handrail<br>in satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5) | 95.4% of all road<br>related fencing<br>and handrail<br>in satisfactory<br>condition (as at<br>June 30 2019) |
| Retaining Walls                           | Condition / Safety               | Provide retaining<br>walls free from<br>hazards and<br>defects  | Condition rating               | 90% of all retaining<br>walls in satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5)   | 99.3% of all<br>retaining walls<br>in satisfactory<br>condition (as at<br>June 30 2019)                      |
| Steps                                     | Function /<br>Condition / Safety | Provide accessible<br>steps free from<br>hazards  | Condition rating               | 90% of all steps<br>in satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5)   | 93.9% of all steps<br>in satisfactory<br>condition (as at<br>June 30 2019)                                   |
| Pram Ramps                                | Function /<br>Condition / Safety | Provide accessible<br>pram ramps free<br>from hazards   | Condition rating               | 95% of all<br>pram ramps<br>in satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5)   | 99.9% of all<br>pram ramps<br>in satisfactory<br>condition (as at<br>June 30 2019)                           |
| Line and<br>Signs (Council<br>Controlled) | Function /<br>Condition / Safety | Provide clear and unambigious communication of traffic regulations and marking for traffic flow and parking | Condition rating               | 95% of all signs<br>and line marking<br>in satisfactory<br>condition i.e. rated<br>condition 3 or<br>better (on a rating<br>scale of 1-5)                                 | 100% of all signs<br>and line marking<br>in satisfactory<br>condition (as at<br>June 30 2019)                |

Table 4 - Levels of Service Matrix



### **FUTURE DEMAND**

### **Demographics and Growth**

The community of Mosman generates the demand for the services provided by the roads assets considered in this plan.

The estimated population of Mosman as of 30 June 2018 was 30,877 people (http://profile.id.com.au/mosman). There is expected to be minimal population growth over the next few years with a growth rate on average of 82 people per year until 2036. However, the Mosman population will continue to age, with an increase in the proportion of residents aged 60 and over (particularly 70 and over) living in the Mosman area. Therefore, it is increasingly important that infrastructure around Mosman meets accessibility standards, especially surrounding commercial areas and aged care facilities.

Despite there not being a large increase in population in Mosman, there is expected to be a significant increase in the Northern Beaches, which will increase local traffic, and throughout the Sydney region, which will increase the number of tourists.

This is likely to generate increased traffic and demand on public transport corridors and infrastructure such as bus stops. Impacted roads include along Spit, Ourimbah, and Military Road, as well as other local roads.

There are also heritage considerations that can impact the upgrade and installation of new roads assets. Some sandstone kerb & gutters and various retaining walls have heritage significance.

### **Demand Management**

Despite a low population growth in the Mosman area, the higher population growth in the Sydney region will have more of an impact on assets in this asset management plan, more than other asset categories. However, given the high degree of urbanisation within Mosman, it is unlikely that a major extension of the infrastructure network would be required. There will be some need for improving the levels of service provided by upgrading existing infrastructure such as using a thicker road seal or improving traffic devices for areas with increased traffic.

At a smaller scale, new assets will be built to assist pedestrians and the aging population, therefore improving accessibility and safety. These include pathways, pram ramps, seating and traffic devices (e.g. pedestrian refuges, wombat crossings). New roundabouts, chicanes and speed humps improve the safety and traffic flow on local roads.

Council will investigate the locations of particular shortcomings in our infrastructure and determine if new or upgraded assets are needed. Engineer inspections, traffic surveys/pedestrian counts, road safety audits/review and resident feedback are methods for determining these needs

Where necessary, demand management practices will be put in place to address demand issues and pressures. Demand management practices also include non-asset solutions such as risk management, controlling or softening demand, insuring against risks and managing failures.

### **Changes in Technology**

Council will investigate new technologies in terms of both products and maintenance techniques to best manage facilities and balance use across all facilities. They are forecast to affect the delivery of services including plant, equipment and product improvements to allow for more cost and time-efficient construction. A current example is using recycled materials during the asset renewal process.

Improved technology for conducting condition surveys, parking distributing and monitoring will provide for more efficient data collection.

### Impact of Climate Change & Other Environmental Factors

Changing climatic conditions, including increased rainfall, rising sea levels, and more extreme weather patterns are likely to impact on condition of assets and place pressure on asset lifecycle costs. Potential for more frequent asset failures will be monitored throughout the plan, e.g. failure in retaining walls and embankments due to increased water runoff/infiltration and infrastructure damage due to wind events etc.

Council also has placed increased importance on environmental management and sustainability. All new works and assets will consider sustainable environmental outcomes

Council is currently preparing a Climate Strategy and Action Plan, which aims to address to impacts of climate change.

Current initiatives to combat climate change and improve management of the environment include:

- Reduced water consumption
- Retrofitting Council carparks and streetlights with LED lights
- Environmentally friendly materials such as porous paving
- Focus on public transport and electric vehicles and implementing infrastructure to support both
- Expanding Mosman's bicycle network and developing a new Active Transport plan to reduce car usage

There is potential increased cost of service provision due to these initiatives. Environmental impact mitigation and climate change reduction will place time, cost and feasibility pressures on works and projects.

# **CURRENT STATE OF ASSETS**

In 2010, Mosman Council engaged an engineering consultancy to collect road and road related asset data. The data is sorted into inventories split by the class of asset. The assets classes are:

- Roads
- Footpaths
- Steps
- Kerb and Gutter
- Physical Traffic Devices
- Carparks
- Street Furniture
- Lines and Signs
- Retaining Walls
- Vehicle Crossings
- Pram Ramps

The asset inventories have been updated each year with changes from capital works, condition inspections, maintenance and updates to accounting standards.

In 2018, an external valuer conducted a revaluation of road assets unit rates, useful lives and condition ratings.

### **Valuation Summary**

The value of all roads assets (excluding formation) as at 30 June 2019 is summarised in Table 5. Assets were last revalued as at 30 June 2018 and are adjusted each financial year.

All unit rates tabulated in this section are derived from the Council's existing Civil Works contract (schedule of rates) and the revaluation. All useful lives are based on industry sources, historical data, valuers and other sources.

Mosman utilises a Brownfield approach for valuations. A Brownfield valuation takes into account the total cost of replacing that asset. This includes the cost of removal, excavation and disposal of existing assets already in-situ.

| Asset Group                 | Current Replacement Cost (\$) | Depreciable<br>Amount (\$) | Accumulated Depreciation at 30 June 2019 (\$) | Annual Depreciation (\$) | Depreciated<br>Replacement Cost<br>(\$) |
|-----------------------------|-------------------------------|----------------------------|---|--------------------------|---|
| Road Pavement               | \$89,237,939.45               | \$89,237,939.45            | \$39,362,032.78                               | \$1,206,023.28           | \$49,875,906.67                         |
| Footpath                    | \$20,703,922.45               | \$20,703,922.45            | \$6,066,463.53                                | \$248,027.08             | \$14,637,458.92                         |
| Steps                       | \$5,069,669.75                | \$5,069,669.75             | \$3,285,880.31                                | \$89,232.73              | \$1,783,789.44                          |
| Kerb and Gutter             | \$30,182,720.76               | \$30,182,720.76            | \$16,865,541.60                               | \$335,363.85             | \$13,317,179.16                         |
| Physical Traffic<br>Devices | \$4,169,786.36                | \$4,169,786.36             | \$1,932,745.23                                | \$107,174.56             | \$2,237,041.13                          |
| Car Parks                   | \$3,766,225.38                | \$3,766,225.38             | \$1,458,427.45                                | \$66,266.50              | \$2,307,797.93                          |
| Street Furniture            | \$3,758,608.56                | \$3,758,608.56             | \$2,323,916.01                                | \$131,868.09             | \$1,434,692.55                          |
| Lines and Signs             | \$2,137,147.50                | \$2,137,147.50             | \$1,777,222.16                                | \$153,732.23             | \$359,925.34                            |
| Retaining Walls             | \$38,506,788.77               | \$38,506,788.77            | \$19,329,428.08                               | \$259,325.75             | \$19,177,360.69                         |
| Vehicle Crossings           | \$5,346,479.09                | \$-                        | \$-   | \$-                      | \$5,346,479.09                          |
| Pram Ramps                  | \$486,805.00                  | \$486,805.00               | \$124,810.92                                  | \$5,531.38               | \$361,994.08                            |
| Total                       | \$203,366,093                 | \$198,019,614              | \$92,526,468                                  | \$2,602,545              | \$110,839,625                           |

Table 5 - Valuation of roads assets as at 30 June 2019

# Roads 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 Transport for NSW (TfNSW). TfNSW also provides some supporting maintenance funding for regional roads via grants.

A range of flexible road pavement materials has been used including railway ballast and sandstone quarried from the Sydney basin. There are also a number of road pavements with concrete elements, many of which have been overlaid with asphalt.

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

There are 1,490,631 m<sup>2</sup> of road pavement including:

- 17,128 m (101,013 m²) rigid (concrete) pavements
- 82,392 m (693,815 m<sup>2</sup>) flexible (road base) pavements
- 83,011 m (692,859 m²) asphalt wearing surface (seals)
- 517 m (2,738 m²) brick paving surfaces
- 50m (206 m²) cobblestone surfaces

| Road Pavement Type  | Asset Type                                     | Unit | Useful Life<br>(yrs) | Unit Rate<br>(\$) |
|---------------------|--|------|----------------------|-------------------|
| AC Wearing Surface  | 30mm   | m²   | 50                   | \$31.50           |
|                     | 40mm   | m²   | 50                   | \$42.00           |
|                     | 50mm   | m²   | 50                   | \$52.50           |
| Flexible Pavement   | 200 thick                                      | m²   | 90                   | \$43.32           |
|                     | 250 thick                                      | m²   | 90                   | \$48.00           |
|                     | 300 thick                                      | m²   | 90                   | \$55.44           |
|                     | 350 thick                                      | m²   | 90                   | \$63.60           |
| Reinforced Concrete | 200 thick                                      | m²   | 120                  | \$241.50          |
| Brick Paving        | pavers (interlocking) excl underlying pavement | m²   | 50                   | \$121.92          |
| Cobblestone         |  | m²   | 50                   | \$490.00          |

Table 6 - Unit rates and useful lives of road components

### Asset Componentisation, Unit Rates and Useful Lives

Typical road unit rates and useful lives are displayed in Table 6.

Council has categorised road pavements into three categories based on location and environment as per Table 7.

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

| 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<br>Road/part Military Road are TfNSW<br>controlled/maintained) | Council controlled/ maintained | Council controlled/ maintained |

Table 7 - Road categories

#### **Condition Profile**

Roads conditions are assessed 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), loss of binder, deformation and rutting. Physical testing results for roughness and texture have also been considered.

The condition profile of the road pavement network is displayed in Figure 2.

Most road assets are in good condition, with a few in an average condition, these will need to be assessed regularly to check if they become Condition 4. The condition 4 assets have been listed for renewal in the capital works program in Appendix C.

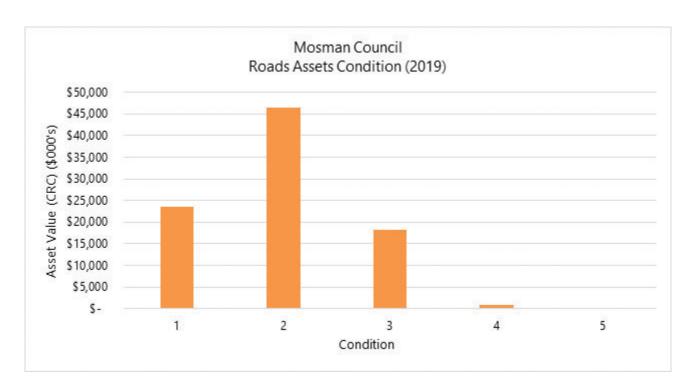


Figure 2 - Condition profile of road pavement network (as at June 30 2019)

### **Age Profile**

The age profile for roads data is displayed in Figure 3.

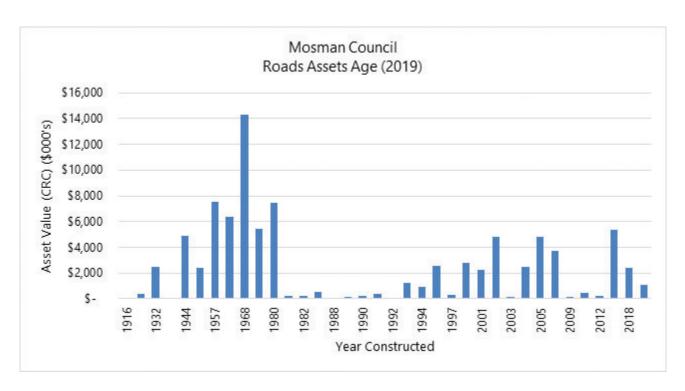


Figure 3 - Age profile of road pavement network (as at June 30 2019)



### **Asset Valuation**

The break up of road pavements into material type are displayed in Table 8.

| Material Type     | Current Replacement Cost (\$) | Depreciable<br>Amount (\$) | Accumulated Depreciation (\$) | Annual Depreciation (\$) | Depreciated<br>Replacement Cost<br>(\$) |
|-------------------|-------------------------------|----------------------------|-------------------------------|--------------------------|---|
| Concrete          | \$23,226,871                  | \$23,226,871               | \$10,855,026                  | \$193,557                | \$12,371,845                            |
| Flexible Pavement | \$34,622,512                  | \$34,622,512               | \$18,581,793                  | \$384,695                | \$16,040,719                            |
| Wearing Surface   | \$30,953,849                  | \$30,953,849               | \$9,844,939                   | \$619,077                | \$21,108,910                            |
| Brick Paving      | \$333,866                     | \$333,866                  | \$78,983                      | \$6,677                  | \$254,883                               |
| Cobblestone       | \$100,842                     | \$100,842                  | \$1,293                       | \$2,017                  | \$99,549                                |
| Total             | \$89,237,939                  | \$89,237,939               | \$39,362,033                  | \$1,206,023              | \$49,875,907                            |

Table 8 - Valuation of road pavement network (as at June 30 2019)

# Footpaths Description of Footpath Network

Footpaths and cycleways in this section are within road reservations. The Spit to Pearl Bay Avenue cycleway is included in the road footpath network given its transport function.

Footpaths in parks are included in the Parks and Open Space Asset Management Plan.

Although concrete is the preferred form of construction due to its optimal capital and maintenance costs, Council installs brick paving in high commercial pedestrian use areas of Mosman. Asphalt is sometimes used to reconstruct sections of the footpath where tree roots impact the footpath.

There are  $129,432 \text{ m} (214,826 \text{ m}^2)$  of footpath (along road and cycleway) including:

- 120,591 m (190,744 m²) concrete footpath
- 2,969 m (5,330 m<sup>2</sup>) asphalt footpath
- 5,712 m (18,525 m²) brick paving footpath
- 160 m (226 m²) other footpaths including cobblestone, gravel and timber

#### Asset Componentisation, Unit Rates and Useful Lives

Footpaths are componentised to the material level/asset subtype. These footpath types are indicated in Table 9. Included are the useful lives and unit rates of these assets.

| Footpath Type | Asset Type   | Unit | Useful Life<br>(yrs) | Unit Rate<br>(\$) |
|---------------|--|------|----------------------|-------------------|
| Concrete      | 75mm thick unreinforced  | m²   | 90                   | \$94.50           |
| Asphalt       | 25mm   | m²   | 40                   | \$68.25           |
| Brick Paving  | average quality, inc sand bed on compacted gravel<br>base course (say 100-150mm) | m²   | 60                   | \$121.92          |
| Brick Paving  | average quality inc sand bed on leanmix concrete<br>base course (say 75mm)       | m²   | 60                   | \$181.20          |
| Cobblestone   |  | m²   | 60                   | \$390.00          |
| Gravel / Dirt |  | m²   | 20                   | \$10.20           |
| Timber        |  | m²   | 30                   | \$107.73          |

Table 9 - Unit rates and useful lives of footpath components (as at June 30 2019)

### **Condition Profile**

The condition profile of the footpath network is displayed in Figure 4.

Most footpaths are in good condition, however there are a small number of assets in condition 4 that will need to be renewed.

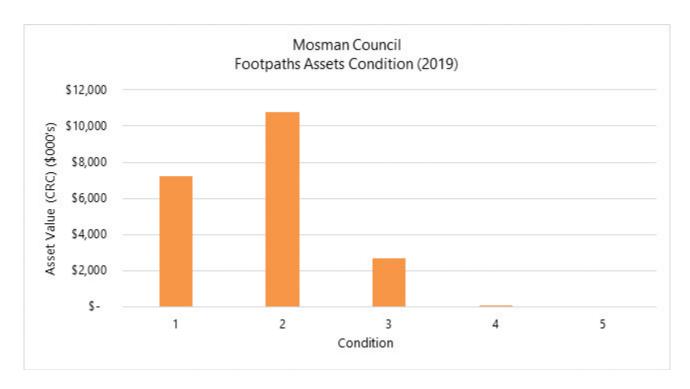


Figure 4 - Condition profile of footpath network (as at June 30 2019)

### **Age Profile**

The age profile for footpath data is displayed in Figure 5.

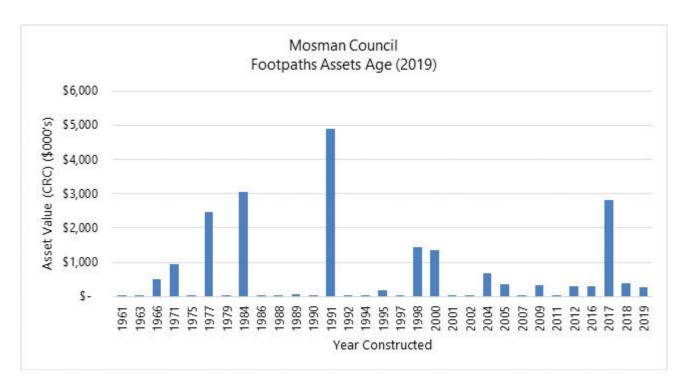


Figure 5 - Age profile of footpath network (as at June 30 2019)

### **Asset Valuation**

The break-up of footpaths along roads (including Spit cycleway) into material type/asset sub type is displayed in Table 11.

| Material Type                                      | Current Replacement Cost (\$) | Depreciable<br>Amount (\$) | Accumulated Depreciation (\$) | Annual Depreciation (\$) | Depreciated Replacement Cost (\$) |
|--|-------------------------------|----------------------------|-------------------------------|--------------------------|-----------------------------------|
| Concrete   | \$18,025,332                  | \$18,025,332               | \$5,261,924                   | \$200,282                | \$12,763,408                      |
| Asphalt  | \$363,800                     | \$363,800                  | \$161,460                     | \$9,095                  | \$202,340                         |
| Brick Paving                                       | \$2,259,209                   | \$2,259,209                | \$641,506                     | \$37,653                 | \$1,617,703                       |
| Other (incl.<br>cobblestone, gravel<br>and timber) | \$55,582                      | \$55,582                   | \$1,574                       | \$996                    | \$54,008                          |
| Total  | \$20,703,922                  | \$20,703,922               | \$6,066,464                   | \$248,027                | \$14,637,459                      |

Table 11 - Valuation of footpath network (as at June 30 2019)

# **Steps**Description of Steps Network

Steps exist in road reservations, laneways and pedestrian lanes.

There are approximately 401 sets of steps (many with multiple sections of steps) within road reserve areas and laneways covering 2,561 m in length and 3,092 m<sup>2</sup> in area.

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

Other assets associated with steps include:

- 4,240 m fencing/handrailing
- 543 m kerb and guttering
- 4,813 m path and ramp
- 19 m wall lengths

### Asset Componentisation, Unit Rates and Useful Lives

Typical steps unit rates and useful lives are as displayed in Table 12.

| Steps         | Asset Type   | Unit | Useful Life<br>(yrs) | Unit Rate<br>(\$) |
|---------------|--|------|----------------------|-------------------|
| Fence         | timber   | m    | 20                   | \$214.20          |
|               | steel  | m    | 25                   | \$214.20          |
| Handrail      | timber   | m    | 20                   | \$214.20          |
|               | steel  | m    | 25                   | \$214.20          |
| Kerb & Gutter | concrete   | m    | 90                   | \$121.28          |
|               | sandstone  | m    | 90                   | \$495.60          |
| Kerb Only     | concrete   | m    | 90                   | \$120.75          |
| Gutter        | concrete   | m    | 90                   | \$102.64          |
| Path          | dirt   | m²   | 100                  | \$-               |
|               | dirt / gravel  | m²   | 20                   | \$19.56           |
|               | dirt / timber dirt log   | m²   | 20                   | \$19.56           |
|               | asphalt  | m²   | 28                   | \$84.00           |
|               | concrete   | m²   | 60                   | \$94.50           |
|               | sandstone  | m²   | 50                   | \$216.00          |
|               | brick paving average quality, inc sand bed on compacted gravel base course (say 100-150mm) | m²   | 60                   | \$148.05          |
| Ramp          | tile   | m²   | 60                   | \$71.81           |
| Steps         | concrete mass (up to 10m²)   | m²   | 100                  | \$1,176.78        |
|               | concrete mass (>10m²)  | m²   | 100                  | \$1,117.94        |
|               | sandstone flagging on conc base (up to 10m²)   | m²   | 100                  | \$1,273.80        |
|               | sandstone flagging on conc base (>10m²)  | m²   | 100                  | \$1,220.31        |
|               | brick paving (conc base) (up to 10m²)  | m²   | 100                  | \$1,176.78        |
|               | brick paving (conc base) (>10m²)   | m²   | 100                  | \$1,117.94        |
|               | timber (suspended deck/staircase)  | m²   | 50                   | \$930.00          |
|               | brick (part conc base structure) (up to 10m²)  | m²   | 80                   | \$539.04          |
|               | brick (part conc base structure) (>10m²)   | m²   | 80                   | \$516.53          |
|               | timber / dirt  | m²   | 20                   | \$260.40          |
|               | timber sleeper / gravel  | m²   | 20                   | \$260.40          |
|               | timber log / dirt  | m²   | 20                   | \$260.40          |
|               | steel  | m²   | 100                  | \$930.00          |
|               | tile   | m²   | 100                  | \$588.24          |
| Wall          | sandstone  | m²   | 100                  | \$912.90          |
|               | concrete   | m²   | 100                  | \$690.00          |

Table 12 - Unit rates and useful lives of steps components

### **Condition Profile**

The condition profile of assets associated with steps is displayed in Figure 6.

Steps assets will need to be closely monitored as many are in an average condition with some in a poor or failed condition status and have some risk for pedestrians.

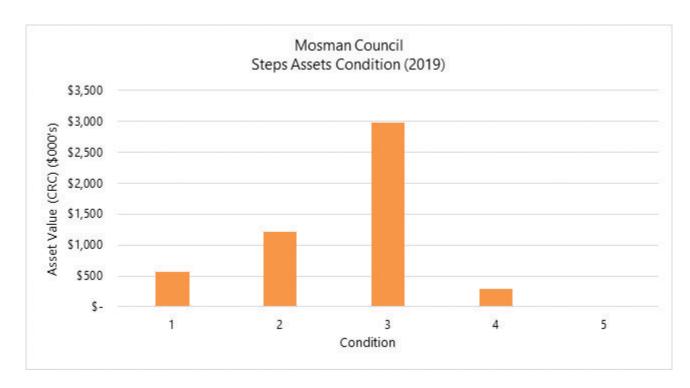


Figure 6 - Condition profile of steps assets (as at June 30 2019)

The age profile of assets associated with steps is displayed in Figure 7.

#### **Asset Valuation**

The valuation of steps assets is available in the Valuation Summary section.

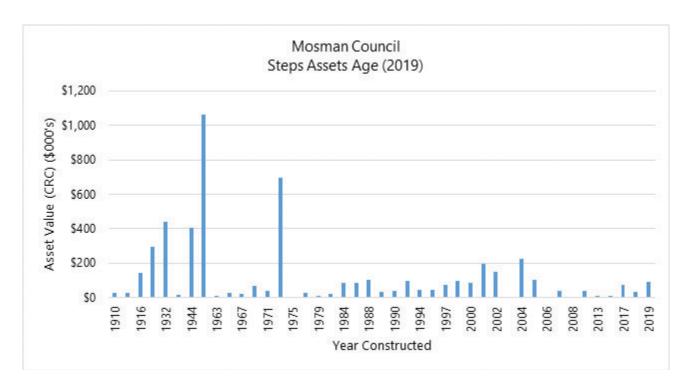


Figure 7 - Age profile of steps assets (as at June 30 2019)

# **Kerb and Gutter Description of Kerb and Gutter Network**

There are 157,376 m of various types of kerb and guttering along roads including:

- 136,391 m kerb and gutter
- 15,132 m kerb only
- 3,166 m dish gutter
- 467 m mountable kerb
- 1,427 m flush kerb
- 793 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.

#### Asset Componentisation, Unit Rates and Useful Lives

Typical kerb and gutter unit rates and useful lives are displayed in Table 13.

| Kerb and Gutter Type | Kerb and Gutter Sub Type            | Unit | Useful Life<br>(yrs) | Unit Rate<br>(\$) |
|----------------------|-------------------------------------|------|----------------------|-------------------|
| Kerb and Gutter      | concrete                            | m    | 90                   | \$121.28          |
|                      | sandstone                           | m    | 90                   | \$495.60          |
|                      | sandstone kerb/concrete gutter      | m    | 90                   | \$358.05          |
|                      | brick kerb / concrete gutter        | m    | 90                   | \$168.00          |
|                      | sandstone kerb/asphalt gutter       | m    | 90                   | \$325.50          |
| Kerb Only            | bullnose brick kerb/concrete gutter | m    | 90                   | \$168             |
|                      | concrete                            | m    | 90                   | \$120.75          |
|                      | sandstone                           | m    | 90                   | \$294.00          |
|                      | sandstone 700 high                  | m    | 90                   | \$529.20          |
| Dish Gutter          | concrete                            | m    | 90                   | \$199.50          |
|                      | asphalt                             | m    | 90                   | \$189.00          |
| Flush Kerb           | concrete                            | m    | 90                   | \$110.25          |
|                      | sandstone                           | m    | 90                   | \$110.25          |
| Kerb Wall            | concrete                            | m    | 90                   | N/A               |
|                      | sandstone                           | m    | 90                   | \$294.00          |
| Mountable Kerb       | concrete                            | m    | 90                   | \$115.50          |
| Roll Kerb            | concrete                            | m    | 90                   | \$152.25          |
| Kerb and Dish        | sandstone                           | m    | 90                   | \$186.90          |
| Gutter               | concrete                            | m    | 90                   | \$102.64          |
| U Drain              | sandstone                           | m    | 90                   | N/A               |

Table 13 - Unit rates and useful lives of kerb & gutter components

The condition profile of the kerb and gutter assets is displayed in Figure 8.

The majority of assets are sitting at Condition 2 and 3. Kerb & gutter assets will need to be inspected regularly to see if assets require renewal in the next few years.

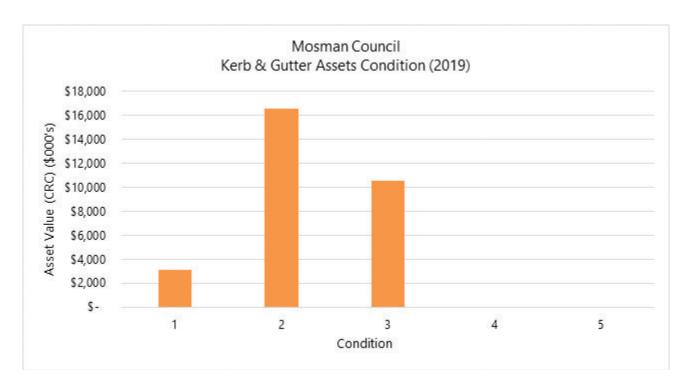


Figure 8 - Condition profile of kerb & gutter network (as at June 30 2019)

The age profile of the kerb and gutter assets is displayed in Figure 9.

#### **Asset Valuation**

The valuation of kerb & gutter assets is available in the Valuation Summary section.

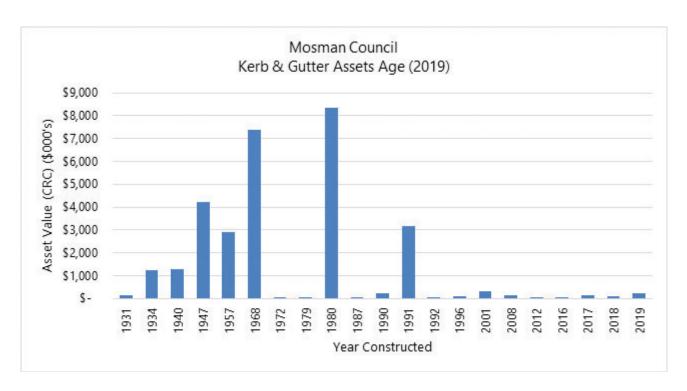


Figure 9 - Age profile of kerb & gutter network (as at June 30 2019)

# Physical Traffic Devices Description of Physical Traffic Device Assets

Physical traffic devices include:

- 17 roundabouts
- 24 wombat crossings
- 21 chicanes
- 47 speed humps
- 8 devices for slow treatment of traffic
- 160 kerb blister islands/kerb buildouts
- 122 median islands/pedestrian refuges

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

#### Asset Componentisation, Unit Rates and Useful Lives

Typical physical traffic devices unit rates and useful lives are displayed in Table 14.

| Physical Traffic Devices | Asset Type   | Unit | Useful Life<br>(yrs) | Unit Rate<br>(\$) |
|--------------------------|--|------|----------------------|-------------------|
| Roundabout               | mass concrete  | m²   | 40                   | \$304.98          |
|                          | concrete / brick paving  | m²   | 40                   | \$319.96          |
|                          | mass concrete apron, concrete kerb centre ring, garden infill          | m²   | 40                   | \$385.39          |
|                          | mass concrete apron, conc kerb centre ring, brick paving, garden infil | m²   | 40                   | \$385.39          |
| Median Island            | concrete   | m²   | 40                   | \$613.32          |
|                          | concrete/asphalt   | m²   | 40                   | \$613.32          |
|                          | concrete - painted   | m²   | 40                   | \$658.32          |
|                          | concrete kerb, grass infill  | m²   | 40                   | \$660.90          |
|                          | concrete kerb, garden infill   | m²   | 40                   | \$675.17          |
|                          | concrete kerb, brick paving infill                                     | m²   | 40                   | \$765.60          |
| Kerb Blister Islands     | conc kerb, grass infill  | m²   | 40                   | \$660.90          |
|                          | conc kerb, garden infill   | m²   | 40                   | \$675.17          |
|                          | conc kerb, garden infill optional                                      | m²   | 40                   | \$613.32          |

| Physical Traffic Devices               | Asset Type   | Unit | Useful Life<br>(yrs) | Unit Rate<br>(\$) |
|--|--|------|----------------------|-------------------|
|  | SS kerb, garden infill   | m²   | 40                   | \$991.32          |
|  | mass concrete  | m²   | 40                   | \$708.48          |
|  | concrete kerb, paver infill  | m²   | 40                   | \$658.32          |
| Kerb Buildout                          | mass concrete  | m²   | 30                   | \$520.92          |
|  | concrete, grass infill   | m²   | 30                   | \$568.50          |
| Wombat Crossing / Raised<br>Thresholds | mass concrete  | m²   | 40                   | \$550.32          |
|  | mass asphalt   | m²   | 40                   | \$550.32          |
|  | concrete/asphalt   | m²   | 40                   | \$550.32          |
|  | concrete/brick paving  | m²   | 40                   | \$570.60          |
|  | concrete edge kerbs, brick paving infill, mass<br>concrete, mass asphalt | m²   | 40                   | \$570.60          |
| Pedestrian Refuges                     | mass concrete  | m²   | 40                   | \$613.32          |
|  | concrete/brick paving infill   | m²   | 40                   | \$633.60          |
| Speed Humps                            | approx 0.5m wide asphalt hump  | m²   | 40                   | \$312.00          |
|  | concrete   | m²   | 30                   | \$312.00          |
|  | concrete optional  | m²   | 40                   | \$312.00          |
|  | concrete/brick paving  | m²   | 40                   | \$570.60          |
|  | asphalt platform, concrete ramp edges                                    | m²   | 40                   | \$312.00          |
|  | concrete/brick paving, asphalt ramps                                     | m²   | 40                   | \$570.60          |
|  | brick paving platform, asphalt ramps                                     | m²   | 40                   | \$570.60          |
| Chicanes                               | concrete kerb  | m²   | 30                   | \$541.20          |
|  | concrete kerb, gravel infill   | m²   | 30                   | \$541.20          |
|  | concrete kerb, grass infill  | m²   | 40                   | \$588.78          |
|  | concrete kerb, grass infill optional                                     | m²   | 30                   | \$541.20          |
| Slow treatment                         | painted, rubber  | m²   | 40                   | \$40.00           |
|  | concrete   | m²   | 40                   | \$312.00          |
|  | concrete, brick paving infill  | m²   | 40                   | \$334.44          |
| Road narrowing                         | concrete kerb, grass infill  | m²   | 30                   | N/A               |

Table 14 - Unit rates and useful lives of physical traffic devices

The condition profile of physical traffic devices is displayed in Figure 10.

Many physical traffic devices are in excellent and good condition. There has been a focus the last few years to install and renew traffic devices, particularly around areas such as Rangers Ave, Beauty Point, Spit East and Mosman Junction and various wombat crossings around high-density pedestrian areas.

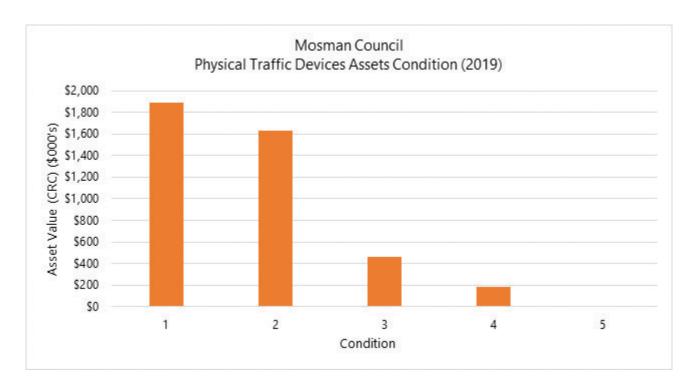


Figure 10 - Condition profile of physical traffic devices (as at June 30 2019)

The age profile of physical traffic devices is displayed in Figure 11.

#### **Asset Valuation**

The valuation of physical traffic device assets is available in the Valuation Summary section.

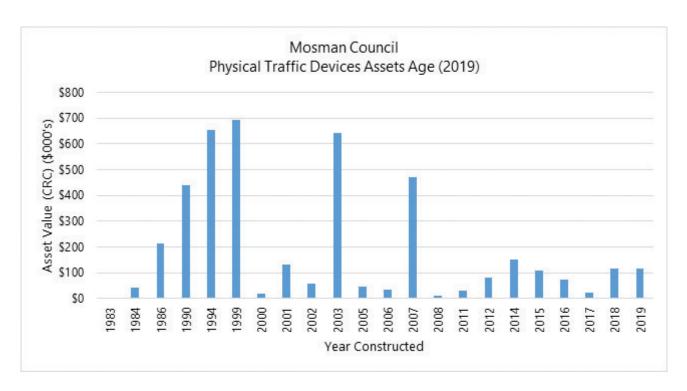


Figure 11 - Age profile of physical traffic devices (as at June 30 2019)

### Carparks 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
- Spit West

Within the 14 at-grade carparks assets include:

- 27,313 m² road pavement
- 17,342 m<sup>2</sup> asphalt wearing surface (seal)
- 9,971 m<sup>2</sup> brick paving surface
- 3,739 m kerbs and/or gutters
- 214.6 m<sup>2</sup> footpath
- 11 parking meters
- 28 m fencing
- 11 traffic devices
- 65 kerb wheelstops
- 25 bollards
- 12 lights
- 42 m<sup>2</sup> of retaining
- 176 regulatory parking signs
- 57 information signs
- Approximately 3,500 m linemarking

#### Asset Componentisation, Unit Rates and Useful Lives

Typical carpark asset unit rates and useful lives are displayed in Table 15.

| Car Park        | Asset Type   | Unit | Useful Life<br>(yrs) | Unit Rate<br>(\$) |
|-----------------|--|------|----------------------|-------------------|
| Road Pavement   | AC wearing surface 30mm                                    | m²   | 60                   | \$31.50           |
|                 | std flex 200   | m²   | 80                   | \$43.32           |
|                 | std flex 250   | m²   | 80                   | \$48.00           |
|                 | brick paving/pavers (interlocking) exc underlying pavement | m²   | 60                   | \$121.92          |
| Footpath        | concrete   | m²   | 90                   | \$94.50           |
|                 | brick paving   | m²   | 50                   | \$169.20          |
|                 | brick paving / concrete                                    | m²   | 30                   | \$181.20          |
| Kerb and Gutter | concrete std   | m    | 80                   | \$121.28          |
|                 | sandstone  | m    | 80                   | \$495.60          |
| Kerb Only       | concrete   | m    | 80                   | \$120.75          |
|                 | sandstone  | m    | 80                   | \$294.00          |
| Mountable Kerb  | precast concrete   | m    | 40                   | \$115.50          |
| Dish Gutter     | concrete   | m    | 80                   | \$186.90          |
| Kerb Wheelstops | timber sleepers  | m    | 15                   | \$176.00          |
| Fence           | timber post and rail log                                   | m    | 20                   | \$34.10           |
|                 | steel railing  | m    | 25                   | \$214.20          |
| Linemarking     | lane and parking space                                     | each | 5                    | \$1.92            |
|                 | hatching   | each | 5                    | \$36.00           |
|                 | disabled parking   | each | 5                    | \$30.93           |
|                 | arrows   | each | 5                    | \$41.23           |
| Signs           | information  | each | 20                   | \$224.28          |
|                 | regulatory   | each | 15                   | \$341.12          |
| Parking Meter   | pay and display  | each | 20                   | \$12,100.00       |
| Tall Lights     | steel  | each | 30                   | \$2,765.75        |
| Bollards        | timber   | each | 15                   | \$110.25          |
|                 | steel  | each | 25                   | \$207.00          |
| Median Island   | concrete   | m²   | 30                   | \$613.32          |
| Speed Hump      | asphalt  | each | 20                   | \$312.00          |
| Retaining Wall  | sandstone  | m²   | 250                  | \$912.90          |

Table 15 - Unit rates and useful lives of carpark components

The condition profile of the carpark assets is displayed in Figure 12.

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

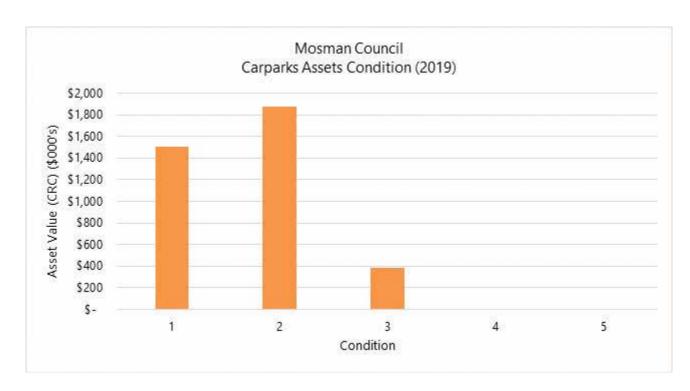


Figure 12 - Condition profile of carpark asset (as at June 30 2019)

The age profile of the carpark assets is displayed in Figure 17

#### **Asset Valuation**

The valuation of carparks assets is available in the Valuation Summary section.

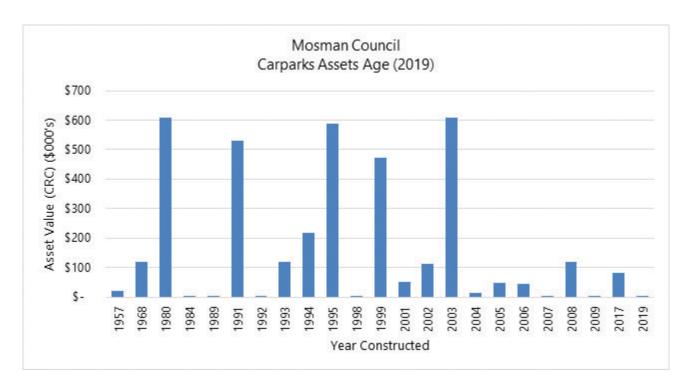


Figure 13 - Age profile of carpark assets (as at June 30 2019)

### **Street Furniture**Description of Street Furniture Assets

Assets associated with street furniture include:

- 10,934 m fencing/handrailing
- 1,940 m guardrail
- 1 bus shelter
- 173 seats
- 30m seating wall
- 45 traffic visibility mirrors
- 712 bollards
- 52 bins
- 24 parking meters
- 9 bike racks
- 2 memorials and monuments
- 26 silent cops
- 1tap
- 3 clearance bars
- 24 tree surrounds

Street furniture along arterial roads are included as these are the responsibility of Council. Advertising (oOH!media) sponsored bus shelters are excluded as these are managed and maintained by oOh!media. The bus shelter (old tram shed) in The Esplanade is included in the street furniture assets.

#### Asset Componentisation, Unit Rates and Useful Lives

Typical asset unit rates and useful lives associated with street furniture are displayed in Table 16.

| Street Furniture        | Asset Type                         | Unit | Useful Life<br>(yrs) | Unit Rate (\$) |
|-------------------------|------------------------------------|------|----------------------|----------------|
| Bike Rack               | std stainless steel hoop           | each | 50                   | \$1,194.60     |
| Bin Enclosure           | steel, timber                      | each | 50                   | \$1,906.30     |
| Bench Seat              | metal frame / timber slats         | each | 30                   | \$1,370.60     |
|                         | concrete legs / timber slats       | each | 30                   | \$775.50       |
|                         | stone                              | each | 50                   | \$1,507.66     |
|                         | sandstone                          | each | 50                   | \$6,250.00     |
|                         | wall mounted timber bench          | each | 20                   | \$4,500.00     |
|                         | seating wall                       | m    | 150                  | \$600.00       |
| Bollards                | timber                             | each | 20                   | \$110.25       |
|                         | metal / steel / concrete / plastic | each | 50                   | \$148.50       |
|                         | sandstone (1)                      | each | 30                   | \$220.00       |
|                         | sandstone (2)                      | each | 30                   | \$900.00       |
| Bus Shelter             | timber / tile roof                 | each | 60                   | \$60,000.00    |
| Clearance Bar           | steel                              | each | 50                   | \$1,000.00     |
|                         | concrete                           | each | 50                   | \$1,000.00     |
| Fence                   | timber post and log rail           | m    | 20                   | \$34.10        |
|                         | timber                             | m    | 20                   | \$214.20       |
|                         | steel (1)                          | m    | 50                   | \$214.20       |
|                         | steel (2)                          | m    | 30                   | \$99.00        |
|                         | steel (3)                          | m    | 50                   | \$68.20        |
| Guardrail               | steel                              | m    | 50                   | \$252.00       |
| Handrail                | timber                             | m    | 20                   | \$214.20       |
|                         | steel                              | m    | 25                   | \$214.20       |
| Mirror                  | stainless steel 600 diameter       | each | 20                   | \$771.39       |
| Memorials and Monuments | statues, etc.                      | each | 100                  | \$34,000.00    |
| Parking meters          | pay and display                    | each | 20                   | \$12,100.00    |
| Silent cop              | steel                              | each | 25                   | \$200.00       |
| Tree Surround           | concrete                           | each | 50                   | \$1,452.00     |
| Water Bubbler           | timber painted                     | each | 20                   | \$3,157.70     |
| Wheelstop               | plastic                            | each | 20                   | \$110.00       |
|                         | concrete                           | each | 20                   | \$242.88       |

Table 16 - Unit rates and useful lives of street furniture assets

The condition profile of street furniture assets is displayed in Figure 14.

Most street furniture assets are in an average condition. Useful lives for street furniture assets are relatively short compared to other asset classes and therefore assets tend to fall to a poor condition quickly. Therefore, it is important to renew these assets regularly.

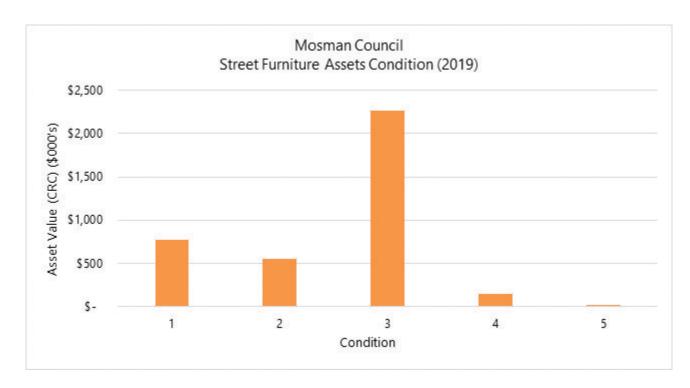


Figure 14 - Condition profile of street furniture asset (as at June 30 2019)

The age profile of street furniture assets is displayed in Figure 15.

#### **Asset Valuation**

The valuation of street furniture assets is available in the Valuation Summary section.

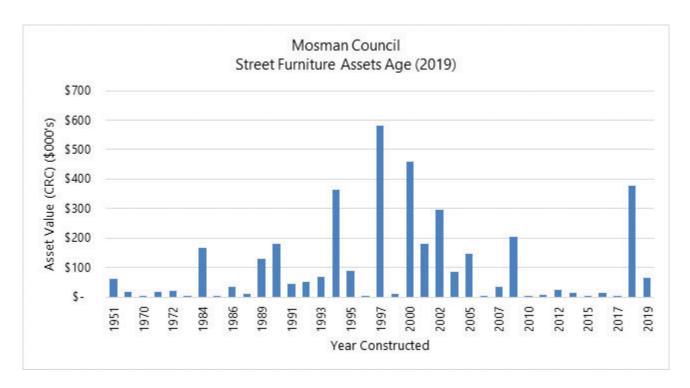


Figure 15 - Age profile of street furniture assets (as at June 30 2019)

## **Lines and Signs**Description of Lines and Signs Assets

Lines and signs assets include:

- 3,938 traffic signs
- 1,857 street directional signs
- 2,801 raised pavement markers
- 161 m rumble bars
- 784 painted symbols
- 1,284 m² painted chevrons, pedestrian crossings and piano keys
- 48,705 m linemarking

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

#### Asset Componentisation, Unit Rates and Useful Lives

Typical asset unit rates and useful lives associated with lines and signs are displayed in Table 17.

| Lines and Signs         | Asset Type   | Unit | Useful Life<br>(yrs) | Unit Rate (\$ |
|-------------------------|--|------|----------------------|---------------|
| Linemarking             | arrow  | each | 10                   | \$41.23       |
|                         | chevron  | m²   | 5                    | \$16.49       |
|                         | continuity line  | m    | 5                    | \$1.92        |
|                         | cycle  | each | 5                    | \$108.24      |
|                         | cycleway symbols   | each | 5                    | \$108.24      |
|                         | disabled parking   | each | 10                   | \$30.93       |
|                         | double barrier   | m    | 5                    | \$2.10        |
|                         | edge / rounadbout edge   | m    | 5                    | \$1.92        |
|                         | give way   | m    | 5                    | \$4.20        |
|                         | lane line  | m    | 10                   | \$1.92        |
|                         | look left/right  | each | 5                    | \$13.40       |
|                         | parking, angle parking   | m    | 10                   | \$1.92        |
|                         | pedestrian crossing  | m²   | 5                    | \$25.00       |
|                         | piano key  | m²   | 5                    | \$4.64        |
|                         | raised plastic pavement marker   | each | 5                    | \$5.26        |
|                         | concrete rumble bar  | each | 10                   | \$53.15       |
|                         | plastic rumble bar   | each | 10                   | \$53.15       |
|                         | 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                   | \$341.58      |
|                         | advisory   | each | 15                   | \$396.00      |
|                         | street name plate  | each | 25                   | \$396.00      |
| Traffic Signs           | hazard markers & chevron, give way / roundabout, speed sign, stop sign | each | 15                   | \$341.52      |
|                         | cycle / STA bus route  | each | 15                   | \$334.80      |
|                         | regulatory parking   | each | 20                   | \$256.32      |
|                         | cycleway   | each | 15                   | \$334.80      |
|                         | keep left / right, one way   | each | 15                   | \$357.60      |
|                         | no entry   | each | 15                   | \$367.74      |
|                         | pedestrian crossing, school / local traffic zone                       | each | 15                   | \$341.58      |
|                         | warning  | each | 15                   | \$396.00      |

Table 17 - Unit rates and useful lives of lines and signs components

The condition profile of assets associated with lines and signs is displayed in Figure 16.

Lines and signs assets have relatively low useful lives when compared to other roads assets and need to be renewed regularly. All lines and signs are within an excellent to average condition. It is ideal to avoid lines and signs assets reaching a poor condition as much as possible.

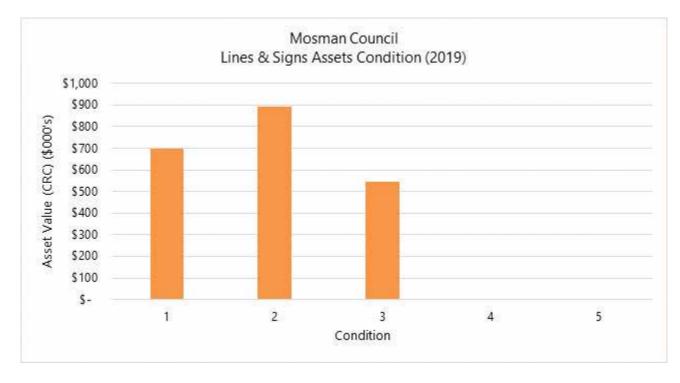


Figure 16 - Condition profile of lines and signs assets (as at June 30 2019)

The age profile of assets associated with lines and signs is displayed in Figure 17.

#### **Asset Valuation**

The valuation of lines and signs assets is available in the Valuation Summary section.

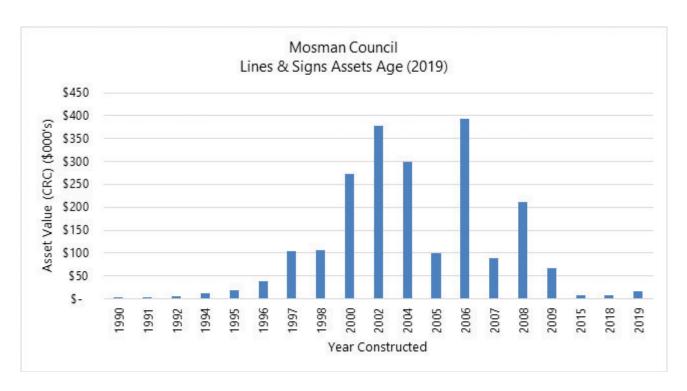


Figure 17 - Age profile of lines and signs assets (as at June 30 2019)

### Retaining Walls Description of Retaining Walls

Retaining wall assets covered by this AMP include approximately 1,135 retaining structures (walls/embankments) covering 76,980 m² in area and 41,603 m in length. Generally, walls covered by this AMP are one metre or greater in height and are road-related retaining structures.

Retaining wall assets covered include:

- 7,739m (11,611 m², 241 no.) dimension stone grouted joints retaining wall
- 2,948 m (4,109 m², 81 no.) dimension stone open joints retaining wall
- 3,164 m (3,585 m², 93 no.) random stone grouted joints retaining wall
- 1,372 m (2,000 m², 54 no.) random stone open joints retaining wall
- 115 m (248 m², 4 no) stone retaining wall
- 6,807 m (12,862 m², 182 no.) concrete/reinforced concrete retaining wall
- 122 m (380 m², 6 no.) crib-bloc retaining wall
- 4,591 m (7,032 m<sup>2</sup>, 98 no.) reinforced hollow block
- 996 m (1,041 m², 55 no.) brick retaining wall
- 161 m (156 m<sup>2</sup>, 8 no.) timber retaining wall
- 38 m (121 m<sup>2</sup>, 2 no.) gabion retaining wall
- 301 m (824 m², 6 no.) earth and clay cuttings
- 8,665 m (18,579 m<sup>2</sup>, 231 no.) rock cutting
- 4,547 m (14,400 m<sup>2</sup>, 73 no.) embankments

431 retaining structures are excluded from this plan including:

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

Currently, these excluded assets are recorded in the asset management system for record purposes only and are not valued.

#### Asset Componentisation, Unit Rates and Useful Lives

Typical asset unit rates and useful lives associated with retaining walls are displayed in Table 18.

| Retaining Wall          | Asset Type                | Unit | Useful Life<br>(yrs) | Unit Rate (\$) |
|-------------------------|---------------------------|------|----------------------|----------------|
| Mass Concrete           |                           | m²   | 150                  | \$608.40       |
| Reinforced Concrete     |                           | m²   | 150                  | \$690.00       |
| Dimension Stone         | grouted joints (1)        | m²   | 150                  | \$1,051.20     |
|                         | grouted joints (2)        | m²   | 150                  | \$1,116.90     |
|                         | grouted joints (heritage) | m²   | 150                  | \$1,314.00     |
|                         | open joints               | m²   | 150                  | \$1,051.20     |
|                         | open joints (heritage)    | m²   | 150                  | \$1,314.00     |
| Random Stone            | grouted joints            | m²   | 150                  | \$859.20       |
|                         | grouted joints (heritage) | m²   | 150                  | \$1,074.00     |
|                         | open joints               | m²   | 150                  | \$912.90       |
|                         | open joints (heritage)    | m²   | 150                  | \$912.90       |
| Stone (1)               |                           | m²   | 150                  | \$912.90       |
| Stone (2)               |                           | m²   | 150                  | \$1,074.00     |
| Crib-block              | concrete                  | m²   | 150                  | \$630.00       |
| Gabion                  |                           | m²   | 150                  | \$608.40       |
| Timber                  | log type                  | m²   | 60                   | \$107.73       |
| Brick                   |                           | m²   | 100                  | \$704.40       |
| Embankment              |                           | m²   | 500                  | \$0            |
| Rock Cutting            |                           | m²   | 500                  | \$0            |
| Earth or Clay Cutting   |                           | m²   | 250                  | \$0            |
| Reinforced Hollow Block | concrete                  | m²   | 150                  | \$690.00       |
| Other                   |                           | m²   | 150                  | \$570.00       |

Table 18 - Unit rates and useful lives of retaining wall assets

The condition profile of retaining walls is displayed in Figure 18.

Most retaining wall assets are in a good or average condition, with a small amount in a poor or failed condition.

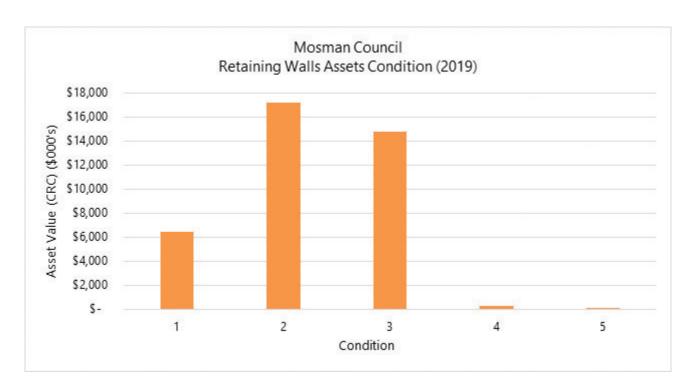


Figure 18 - Condition profile of retaining wall asset (as at June 30 2019)

The age profile of retaining walls is displayed in Figure 19.

#### **Asset Valuation**

The valuation of retaining wall assets is available in the Valuation Summary section.

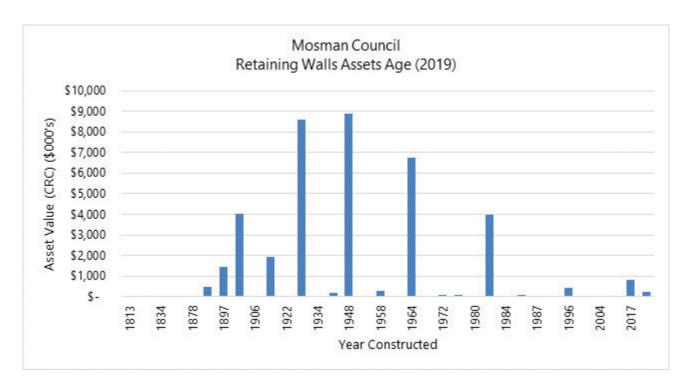


Figure 19 - Age profile of retaining wall assets (as at June 30 2019)



# Vehicle Crossings Description of Vehicle Crossing

Vehicle crossings assets include:

- 5,135 vehicle crossings of total area 67,343 m<sup>2</sup>
- 261 gutter crossings of total length 1,048 m

#### Asset Componentisation, Unit Rates and Useful Lives

Typical asset unit rates and useful lives associated with vehicle crossings are displayed in Table 19.

| Vehicle Crossing | Asset Type  | Unit | Useful Life<br>(yrs) | Unit Rate (\$) |
|------------------|---|------|----------------------|----------------|
| Driveways        | concrete 110 to 150 thick reinforced                          | m²   | 250                  | \$105.24       |
|                  | brick paving inc sand bed on concrete base course (say 100mm) | m²   | 250                  | \$194.10       |
|                  | asphalt (50mm) on 150 compacted FCR                           | m²   | 250                  | \$77.52        |
|                  | stone   | m²   | 250                  | \$204.00       |
|                  | timber  | m²   | 250                  | \$225.60       |
| Gutter Bridges   | asphalt, concrete, steel                                      | m²   | 250                  | \$744.00       |

Table 19 - Unit rates and useful lives of vehicle crossings components

The condition profile of assets associated with vehicle crossings is displayed in Figure 20.

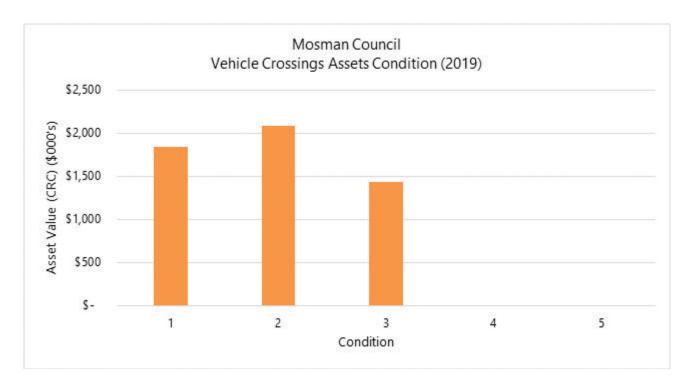


Figure 20 - Condition profile of vehicle crossings assets (as at June 30 2019)

The age profile of assets associated with vehicle crossings is displayed in Figure 21.

#### **Asset Valuation**

The valuation of vehicle crossings assets is available in the Valuation Summary section.

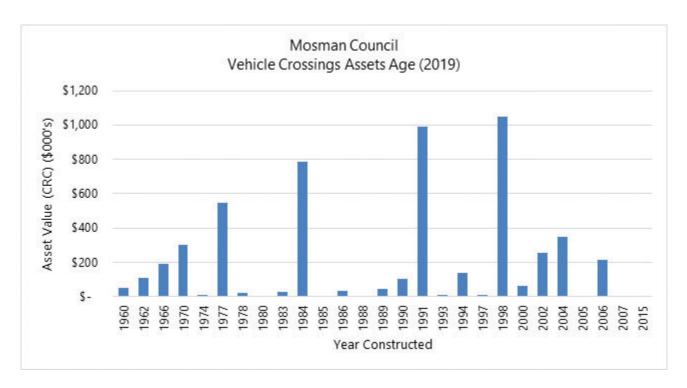


Figure 21 - Age profile of vehicle crossings assets (as at June 30 2019)

# Pram Ramps Description of Pram Ramps

There are 694 identified pram ramps in the Mosman Council area, with a total length of 841m.

#### Asset Componentisation, Unit Rates and Useful Lives

Typical asset unit rates and useful lives associated with pram ramps are displayed in Table 20.

| Pram Ramp Asset Type | Unit | Useful Life (yrs) | Unit Rate (\$) |
|----------------------|------|-------------------|----------------|
| Concrete             | each | 90                | \$700.00       |
| Asphalt              | each | 50                | \$656.00       |
| Pavers               | each | 50                | \$787.50       |
| Stone                | each | 50                | \$875.00       |

Table 20 - Unit rates and useful lives of pram ramp components



The condition profile of pram ramp assets is displayed in Figure 22.

Most pram ramps are in excellent to good condition. Many pram ramps have been renewed/upgraded in recent years to meet compliance standards.

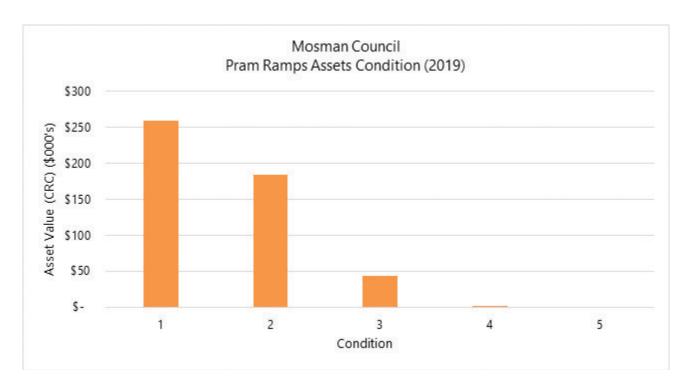


Figure 22 - Condition profile of pram ramp assets (as at June 30 2019)

The age profile of pram ramp assets is displayed in Figure

#### **Asset Valuation**

The valuation of pram ramps assets is available in the Valuation Summary section.

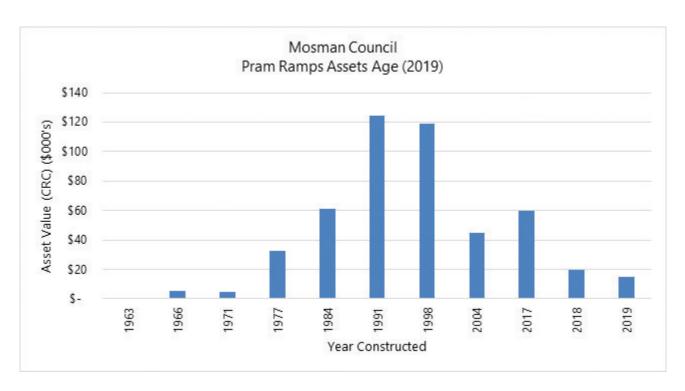


Figure 23 - Age profile of pram ramp assets (as at June 30 2019)

# LIFECYCLE MANAGEMENT PLAN

#### **Lifecycle Strategy**

The lifecycle management plan describes how Council plans to manage the roads assets at the agreed levels of service (information available in Levels of Service section) while optimising life cycle costs.

The lifecycle of an asset encompasses:

- Identification of its need (including confirming that there is no non-asset solution)
- Selection of the asset solution (according to a set process)
- Installation/construction
- Operation, maintenance and inspection
- Renewal/upgrade
- Disposal

#### **Service Deficiencies**

Council's services are generally provided to meet the desired standard. There are instances where the level of service is not being met and will need future investigation and this is detailed in Table 21.

#### Division of Roads Assets for Expenditure Projections

Projections for the required expenditure and planned expenditure has been split into three categories. The lifecycle management plan indicates future expenditure in these categories as well as combining all roads assets for the total expenditure. The three categories are:

- Road Pavement
- Footpaths & Steps
- Other Road Assets including:-
- · Kerb & Gutter
- Physical Traffic Devices
- Car Parks
- Street Furniture
- · Lines & Signs
- Retaining Walls
- Vehicle Crossings
- Pram Ramps

| Location        | Service Deficiency   |
|-----------------|--|
| Roads           | Requirement for more frequent reactive maintenance on pothole and crack repairs.   |
| Retaining Walls | Includes rock cuttings and embankment stabilisation. There are a number of weathered rock faces that potentially need stabilisation by a wall or anchorage system. An example is Plunkett Road new retaining wall which is being built to arrest any further destabilisation of the embankment. Avenue Road rock faces are being investigated for further stabilisation works. |
| Guardrails      | Some guardrails do not meet the current standard for end terminals or height or offset from the kerb face.   |
| Footpaths       | Footpath missing links or footpath only on one side of the street. Some gravel footpaths need upgrading to concrete to prevent washaways.  |
| Pram Ramps      | Many intersections do not have pram ramps and need to be retrofitted. Some are pointing in the wrong direction, which makes crossing road difficult for the visually impaired. Some pram ramps still do not comply with current accessibility standards in terms of width and grade.   |
| Steps           | There are also some steps and refuge islands in the Council area that do not comply with   |
| Refuge Islands  | current accessibility standards. The remaining assets will be assessed.  |

Table 21 - Known Service Performance Deficiencies

## **Operations and Maintenance Plan Operations Overview & Historical Expenditure**

Operations activities are activities that consume resources to ensure the infrastructure asset levels of service are met. For example "running costs" and consumables.

These are day to day operational activities that have no effect on the asset's condition but are necessary to physically keep the asset operating.

Typical operations activities in roads assets include:

- Street sweeping
- Pavement scrubbing
- Graffiti removal
- Pressure washing

Operational costs are distinguished from maintenance expenditure in the financial systems in most cases. From the historical data operations expenditure was determined.

Indicative historical operations expenditure is displayed in Table 22.

Operations cost are fairly consistent and this is expected to continue. The majority of operations costs are known from the 10-year street and gutter cleaning contract. The contract is increased by CPI every year.

| Year           | Historical Annual Operations<br>Expenditure |
|----------------|---|
| 2015/16        | \$1,082,000                                 |
| 2016/17        | \$1,159,000                                 |
| 2017/18        | \$1,166,000                                 |
| 2018/19        | \$1,046,000                                 |
| Average Annual | \$1,113,000                                 |

Table 22 - Historical Operations Expenditure Trends

### Maintenance Overview & Historical Expenditure

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: 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
- Planned Repair work that is identified and managed through a maintenance management system (MMS) or asset management system (AMS) or through other tools to assist in identifying when individual assets are due for repairs
- Cyclic Replacement of higher value components/subcomponents of assets that are undertaken on a regular cycle. Examples include repainting furniture e.g. seating and traffic facilities e.g. speed humps/platform edge strips etc

All non-operations works that fall below the capitalisation threshold of \$5,000 are considered maintenance.

Historical maintenance expenditure trends are shown in Table 23.

Maintenance expenditure in the next 10 years is expected to be lower than the historical figures but will still meet the required maintenance and operational expenditure each year. The historical figures are also inclusive of public utility restoration expenditures of approximately \$360,000 per annum.

| Year           | Historical Annual Maintenance<br>Expenditure |
|----------------|--|
| 2015/16        | \$764,000                                    |
| 2016/17        | \$1,195,000                                  |
| 2017/18        | \$674,000                                    |
| 2018/19        | \$708,000                                    |
| Average Annual | \$835,000                                    |

Table 23 - Historical Maintenance Expenditure Trends

#### **Maintenance Methods & Management**

Maintenance is funded from the Council's operating budget and grants. Funding also comes from restoration charges when there is surplus following the repair or reconstruction of footpaths excavated by service authorities and developers installing underground services.

Generally, all maintenance and restoration work is carried out by contractors via a schedule of rates contracts. Minor 'make safe' works (such as pothole repairs, line marking, furniture and sign replacement) are carried out by Council's day labour team.

Typical maintenance activities are displayed in Table 24.

| Road Pavement  |   |
|--|---|
| Roads  |   |
| Repair road pavement defects 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/<br>cracked  |
| Restoration of road openings   |   |
| Footpaths and Steps  |   |
| Footpaths  |   |
| 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 brick paving paths to eliminate unevenness and trips  |
| Mechanical grinding of concrete path joint lifted lips/trips will be trialled in future to gauge effectiveness                                   | Restoration of footpath openings  |
| Steps  |   |
| 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 | Replacing missing stones or eroded or open joints in sandstone steps or repairing steps where large cracking exists |
| Other Road Assets  |   |
| Kerb & Gutter  |   |
| Reconstructing short sections of failed kerb/gutter e.g. 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                |
| Replacing missing stones in sandstone kerbs/gutters  |   |

| Other Road Assets  |  |
|--|--|
| Physical Traffic Devices   |  |
| 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)                  |
| Landscaping maintenance  |  |
| Car Parks  |  |
| Reconstructing/repairing road pavement and surface failures              | Pothole filling/patching   |
| Restoration of service openings  | Replacement of defective or vandalised signs and furniture e.g. bollards |
| Re-linemarking   |  |
| Street Furniture   |  |
| Reconstructing/repairing damaged/deteriorated fencing                    | Repairing damage caused by vehicles                                      |
| Repairing vandalised assets  | Cleaning assets where required   |
| Retaining Walls  |  |
| Reconstructing/repairing wall capping                                    | Repairing damage caused by vehicles                                      |
| Repairing damage caused by stormwater erosion and tree roots             | Stabilising loose rocks or slip areas                                    |
| Stabilising eroded embankments and cuttings                              |  |
| Lines & Signs  |  |
| Repair of vandalised signs   | Repair of signs damaged by vehicle collision                             |
| Re-linemarking of deteriorated sections of linemarking                   |  |
| Vehicle Crossings  |  |
| 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 | Gutter works to assist in eliminating or reducing vehicle scraping       |
| Pram Ramps   |  |
| Repair of cracked ramps  | Removal of accumulated debris/dirt from inverts                          |
| Gutter correction to remove bullnose lips or gutter irregularities       |  |

**Table 24 - Maintenance Activities** 



### Maintenance and Operations 10 Year Financial Forecast

Projecting the 10 year financial forecast involves comparing the required maintenance to the budgeted maintenance:

- Required maintenance The cost of maintenance and operations required to meet minimum levels of service in Mosman. The value is determined via useful life modelling to be 1.22% of the CRC (current replacement cost) for roads assets, 0.45% of the CRC for footpaths/ steps assets and 0.22% of the CRC for other road assets
- Planned (budgeted) maintenance The expenditure that Council has budgeted for maintenance and operation works

Modelling comparing required maintenance and operations expenditure against planned expenditure for three categories: Road Pavement, Footpaths and Steps and Other Road Assets are displayed in Figures 24 to 26. The combined Roads AMP graph is also shown in Figure 27 to show how overall future planned maintenance and operations compare to what is required. Figures 24 - 27 are shown in 2019/20 dollar values and no CPI has been applied.

Of the budgeted operational costs, only 80% of that is estimated for all roads assets to meet the required levels of service. The additional 20% is spent on emerging issues in safety and customer expectation and unplanned expenses. Other Roads Assets does not have any planned operational expenditure, meaning this only applies to Road Pavement and Footpaths and Steps.

There is enough budgeted expenditure available to meet the minimum required expenditure levels in all three categories of Roads assets. Council has budgeted to spend more than the minimum requirement to deliver a high level of service, improve the quality of the roads assets and reduce the risk consistent with the community expectations. Results can be summarised as:

- Roads Planned expenditure is \$68,000 \$74,000 higher than the required expenditure
- Footpaths and Steps Planned expenditure is \$20,000 \$23,000 higher than the required expenditure
- Other Road Assets Planned expenditure is \$30,000 -\$81,000 higher than the required expenditure

There appears to be a significant number of complaints about footpath hazards and defects. However, when compared to the high number of pedestrians using footpaths the percentage is small. Footpaths are regularly inspected and therefore there is no need for additional maintenance. In 2018, there were approximately 100 potholes in total. There was a spike in November with 21 potholes due to a large storm event. This is on the lower end of the averages from other neighbouring Council areas.

Figure 27 demonstrates there is enough budget to cover required maintenance and operations across all Roads AMP assets, as in Figures 24-26. Planned (budgeted) expenditure is expected to be \$119,000 to \$177,000 more than required. Required maintenance and operations increase each year due to expected addition and upgrade of assets. Planned and required maintenance forecasts are detailed in Appendix B.

Future revisions of this asset management plan will include a more detailed analysis linking required maintenance expenditures with service levels, to set future expenditure.

Expenditure increases in line with the capital works program (in the Capital Works section), meaning that required maintenance expenditure may be reduced in the medium to long term. This will need to be re-assessed as the renewal program gets underway. An increase in capital works funding will have an effect on required maintenance.

Deferred maintenance, i.e. works that are identified for maintenance and unable to be funded are to be included in the infrastructure risk management plan.

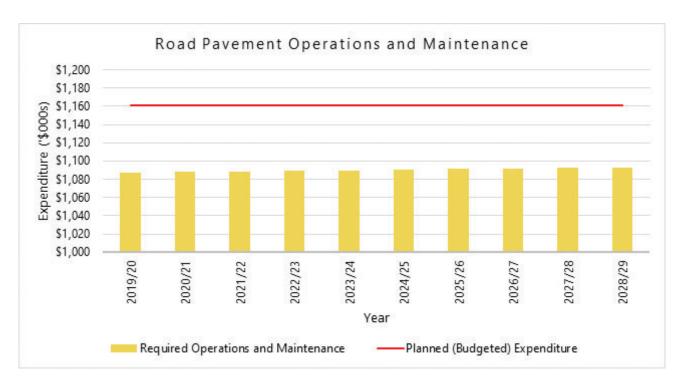


Figure 24 - Planned Operations & Maintenance Expenditure - Road Pavement

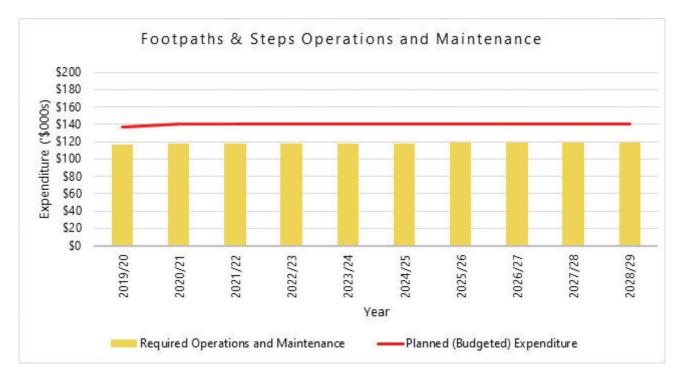


Figure 25 - Planned Operations & Maintenance Expenditure - Footpaths and Steps

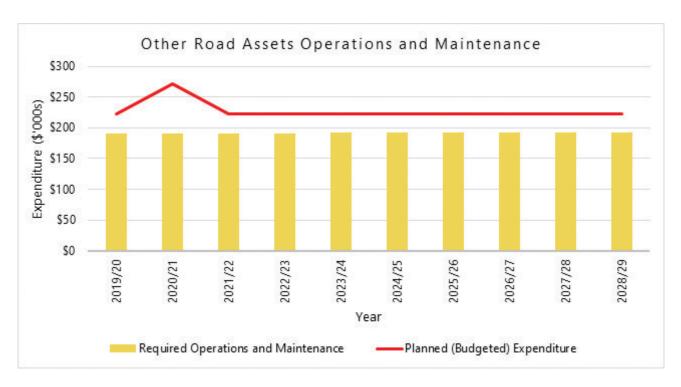


Figure 26 - Planned Operations & Maintenance Expenditure - Other Road Assets

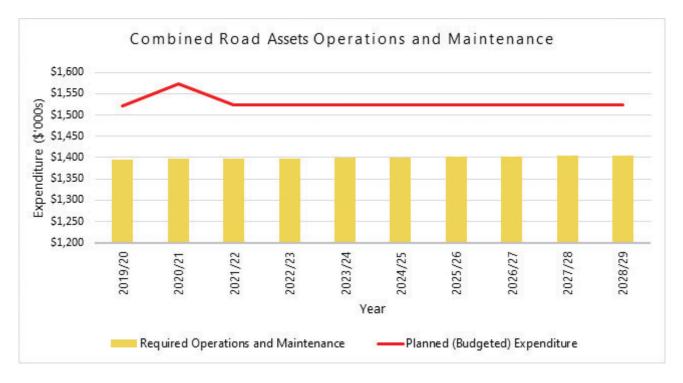


Figure 27 - Planned Operations & Maintenance Expenditure - Combined Road Assets

#### **Maintenance Standards and Specifications**

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

- Relevant Australian Standards
- Relevant Transport for NSW (TfNSW) standards and specifications
- Repair of flexible & rigid pavements specifications
- Building Code of Australia
- Natspec/AUS-Spec specifications and guidelines

The inspection programs for each category of asset are outlined in Table 25. They are recorded as the percentage of assets required for inspection annually.

Vehicle Crossings are no longer inspected as they are the responsibility of the owner of the property and Council will only intervene with temporary works to make safe if it is a hazard/in poor condition. Kerb & gutter and retaining walls are inspected less frequently due to the long useful lives of those assets.

#### **Condition Inspection Schedule**

Formal condition assessments are conducted at different rates depending on the type of asset. For some, it is expected that at least 20% of assets are inspected. It depends on the importance and risk levels of the assets.

Roads AMP assets are condition inspected by Council officers from the engineering team.

There is the possibility of hiring an external inspector to assist and their services will need to be included in the operations budget.

The condition inspections are used to support the accumulation of more comprehensive and refined asset data and to understand the deterioration profile of the various assets. As roads assets are upgraded or as renewal work is completed, asset inventories will be updated accordingly.

The condition ratings of roads assets are updated in the AMS along with any updates from capital works. The AMS has the capability to store condition inspection data that helps to assist in planning where future inspections are required and performing reactive maintenance or capital works.

| Asset Class              | Annual % of Assets Inspected                                    |
|--------------------------|---|
| Roads                    | 20%   |
| Footpaths                | 20%   |
| Steps                    | 20%   |
| Kerb and Gutter          | 10%   |
| Physical Traffic Devices | 20%   |
| Carparks                 | 20%   |
| Street Furniture         | 20% (for fencing/handrails/<br>guardrails)/10% for other assets |
| Lines and Signs          | 10%   |
| Retaining Walls          | 10%   |
| Vehicle Crossings        | 0%  |
| Pram Ramps               | 20%   |

Table 25 - Required Frequency of Annual Condition Inspections

## Capital Works Plan Capital Works Overview & Historical Expenditure

Capital works are defined by Mosman Council's Capitalisation Threshold as any works valued at \$5000 and over. It applies to the renewal or upgrade of the existing assets and the installation of new assets. A description of the three types:

- Renewal: Major work that does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential.
   For example, the replacement of an area of footpath of the same material, length and width
- Upgrade: Work over and above restoring an asset to original service potential often increasing the value of the asset. It also applies to the expansion of an existing asset.
   For example, widening a road or replacing a 30mm asphaltic concrete road with a 50mm asphaltic concrete road
- New: The installation of a new asset that is not related to an existing asset. For example, installing a new public staircase or ramp in a road reserve

Capital works are reported to the Asset Coordinator on a capitalisation form to update the AMS and provide an accurate record of the work throughout the year. The changes in the AMS then contribute to calculating the replacement value, depreciation and Special Schedule 7 of all roads assets at the end of each financial year.

Historical expenditure for capital works is captured in our budgeting system. Expenditure trends for capital works are shown in Table 26.

| Year           | Historical Annual Capital Expenditure |
|----------------|---------------------------------------|
| 2015/16        | \$4,131,000                           |
| 2016/17        | \$5,287,000                           |
| 2017/18        | \$5,296,000                           |
| 2018/19        | \$5,113,000                           |
| Average Annual | \$4,957,000                           |

**Table 26 - Historical Capital Expenditure Trends** 

Expenditure on capital works of Roads AMP has been gradually increasing to over \$5 million in the last three years. Some of the projects in those three years were funded via external grants. For example, Spit East Streetscape project which accounts for over a quarter of the expenditure in both 2017/2018 and 2018/2019 was fully funded from NSW Transport. NSW Transport grants also funded some regional road resurfacing projects, Civic Lane Shared Zone and the installation of pedestrian refuge islands.

In the next couple of years, there is expected to be less expenditure on roads assets and more of a focus on renewing buildings assets. In later years enough has been budgeted to meet the required expenditure to reduce the backlog of Roads, Footpaths and Steps and Other Road Assets

#### Renewal/Replacement Plan

Council has a methodology for assessing and monitoring the condition of road assets and prioritising replacement and maintenance of work. A renewals prioritisation framework (priority ranking criteria) has been developed which indicates the importance and criticality of renewing assets in terms of its function, quality, condition, safety and on a technical level. These are all tied to the levels of service matrix in the Levels of Service section and hierarchy of assets listed in the Current State of Assets section.

A key factor that contributes to deciding which assets are renewed is the condition 4 intervention program where assets that have reached the 'unsatisfactory' condition level are to be renewed within 2 years. Council's aim is to minimise assets in an 'unsatisfactory' condition. Council's objective is to have no roads assets fall into condition 4 or 5 but the reality of restrained resources mean that there will be a small percentage of assets which fall into condition 4 each year.

As of June 30, 2019, less than 1% of roads assets are in an 'unsatisfactory' condition.

Through the life of the plan, budgeted renewal expenditure requirements have been forecast to allow for assets falling into an 'unsatisfactory' condition by projecting condition information, the estimated remaining lives, asset inventory and the requirement for funding renewals in other AMPs.

#### **Renewal Methods and Planning**

Determining which assets are to be renewed uses a combination of factors. These include the condition, remaining life, asset renewal intervention strategy and other factors such as how critical an asset may be. Critical assets have higher priority for renewal even though the condition may be relatively better than others.

Assets proposals for renewal are inspected to verify accuracy of condition, the remaining life estimate and to develop a preliminary estimate. Verified proposals are ranked by priority and available funds and then are scheduled into the works 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 are available in Table 27.

| Roads   |  |
|---|--|
| Flexible road pavement reconstruction using 'mill and fill' deep<br>lift asphalt techniques   | Recycling/re-use of road pavement materials  |
| Narrowing road carriageway where appropriate  | Use pavement strengthening fabric to extend life of pavement   |
| Footpaths and Steps   |  |
| Footpaths   |  |
| Narrowing footpath widths where appropriate (minimum footpath widths of 1.4 metres have been adopted in many locations)   | Pathways accessing single or two residences when reaching its useful life will be removed or only reinstated with costs to be me by residents benefiting from the pathway  |
| Replacing brick paving footpaths with concrete or asphalt   |  |
| Steps   |  |
| Replacing sandstone steps with concrete steps where appropriate (including subject to heritage requirements) or replacing steps to a narrower width                         | Steps accessing single or two residences when reaching its useful life will be removed or only reinstated with costs to be me by residents benefiting from the staircase   |
| Recycling asset components where appropriate e.g. handrail/<br>fence posts or railing   |  |
| Other Road Assets   |  |
| Kerb & Gutter   |  |
| Replacing sandstone kerb and/or gutter with concrete kerb/<br>gutter where appropriate (including subject to heritage<br>requirements)                                      |  |
| Physical Traffic Devices  |  |
| Replacing older concrete, brick paving or landscaped roundabouts or thresholds/raised platforms with mass concrete or asphalt mountable roundabouts                         |  |
| Car Parks   |  |
| Rationalising the layout of the carpark pavement where appropriate  |  |
| Street Furniture  |  |
| Replacing older fencing or furniture such as seating in a different<br>material   | Recycling asset components where appropriate e.g. handrail/fence posts or railing  |
| Retaining Walls   |  |
| Reconstructing retaining walls in alternative, less expensive<br>materials where appropriate e.g. reinforced concrete block or<br>interlocking block in lieu of stone walls | In areas where retaining walls are on the boundary of private<br>and public property, if the private property benefits from<br>the retaining wall then its maintenance/renewal will be the<br>responsibility of the private property |
| Replacing walls with embankments where practical  |  |
|   |  |

Table 27 - Low Life Cycle Cost Renewal Methods

When planning for renewals the following factors are taken into account:

#### Roads -

- Where roads are considered for 'mill and pave fill' it is recommended that a minimum layer of 40mm be milled in readiness for the proposed asphaltic concrete (AC) overlay. Additionally, pavement shape and cross fall are also corrected at the time due to the many number of overlays that have been undertaken over the years. The thickness of the new wearing surface should be in accord with the above reseal thickness framework however local road reseals may be varied between 40 to 50mm thickness. In some cases, more significant structural AC overlays have been considered and costed for heavy loaded pavements such as Bus Stops where a "deep lift 100mm" AC thickness is used for durability. When roads are due for reconstruction then more detailed assessment should be carried out before finalising works.
- Council is considering trialling inexpensive asphalt reinforcement fabric which is made from 100% recycled plastic material, which will increase the life of the pavement between 4 to 6 times.
- Rejuvenation treatments for surfaces with "block cracking" can be rejuvenated by bituminous sealing.
   Surfaces with significant "crocodile cracking" can only be patch repaired to prevent further damage to the pavement and failure of the road base occurring.
- 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.
- In past years, Council has also trialled asphalt overlays over concrete rigid pavements, which are still being monitored for long term performance. Any new overlays will also be utilising the Asphalt Reinforcement Fabric specifically designed for this purpose. This system has demonstrated excellent performance results over time, and over some of the most poorly conditioned concrete pavements around the world.

- Retaining Walls There are some locations that are 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 and construction technique to meet heritage requirements. It is important that open jointing or dry stacked block retaining walls are left with open joints between blocks so they are free to drain. Grouting the joints will increase the hydrostatic pressure behind the wall which it will not be able to withstand as these walls were not built with drainage systems behind the wall
- Lines & Signs Generally most lines and signs related maintenance works are carried out by Council's day labour team. Larger line marking and sign renewal works are carried out by contractors
- Vehicle Crossings Generally the cost of construction of vehicle crossings is funded by the property owner or developer. Building owners and developers need to renew the vehicle crossing to Council specifications

#### **Asset Renewal 10 Year Financial Forecast**

The 10-year asset renewal financial forecast scenario defines asset renewal requirements to sustain assets to meet the required levels of service.

Projecting the 10 year financial forecast involves the comparison of the required renewal and budgeted expenditure:

- Required renewal expenditure The renewal expenditure required to meet minimum levels of service in Mosman. This value is determined from the annual depreciation of all roads assets. All roads assets depreciate at around \$2,602,000 to \$2,621,000 per year; therefore, Council is required to spend at least that amount to address declining assets. When broken down to the three categories, depreciation is:
  - Road Pavement \$1,206,000 to \$1,212,000
  - Footpaths & Steps \$337,000 to \$343,000
  - Other Roads Assets \$1,059,000 to \$1,066,000
- Planned (budgeted) renewal expenditure The amount budgeted by the Council to spend on renewal of roads assets each year. A 10-year capital works program (see Capital Works section and Appendix C) includes the renewal works. The projects are prioritised based on the condition rating, remaining useful life, MOSPLAN or criticality. It also includes the required renewals (i.e. backlog)

The results of this forecasting are displayed in Figures 28-31. Required and planned expenditure has been calculated in 2019/20 dollar values and therefore is not affected by CPI and other factors.

Footpaths renewal costs include public utility restoration and capital works. Figure 29 shows that the planned expenditure exceeds the required expenditure for footpaths and steps, except in 2020/21.

There is a shortfall in some years for Road Pavements and Other Roads Assets. Council has planned to spend less than required in 2019/20, 2020/21 and 2027/28, with less in 2028/29 for other road assets only. Overall, this impacts the backlog. However, enough expenditure has been planned for the other years.

Council has budgeted to spend more than the minimum requirement to deliver a high level of service, improve the quality of roads assets and reduce the risk consistent with the community expectations. For footpaths assets, spending more than the minimum required is beneficial as these are assets that have a high risk for pedestrian trips and falls.

Overall, when combining all roads assets, required expenditure is met excepting 2019/20 & 2020/21. There is a lower budget in the 2019/20 financial year due to large projects in other AMPs such as in Buildings and Marine.

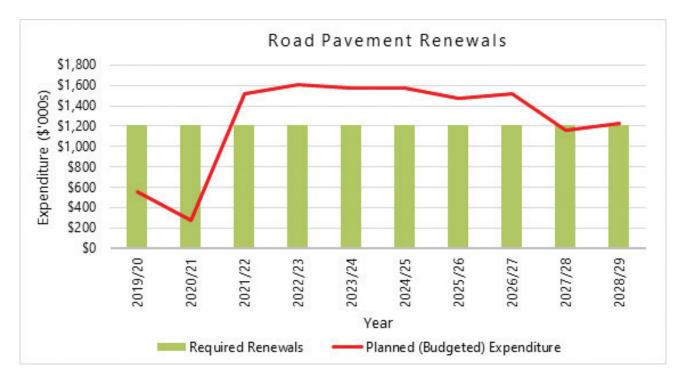


Figure 28 - Forecast 10 Year Renewal Requirements For Asset Sustainability - Road Pavement

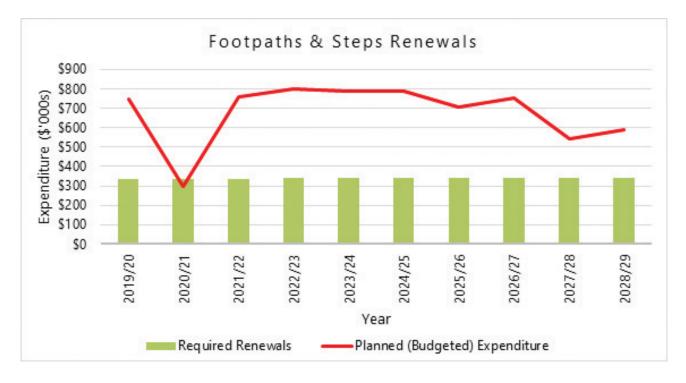


Figure 29 - Forecast 10 Year Renewal Requirements For Asset Sustainability - Footpaths and Steps



Figure 30 - Forecast 10 Year Renewal Requirements For Asset Sustainability - Other Road Assets

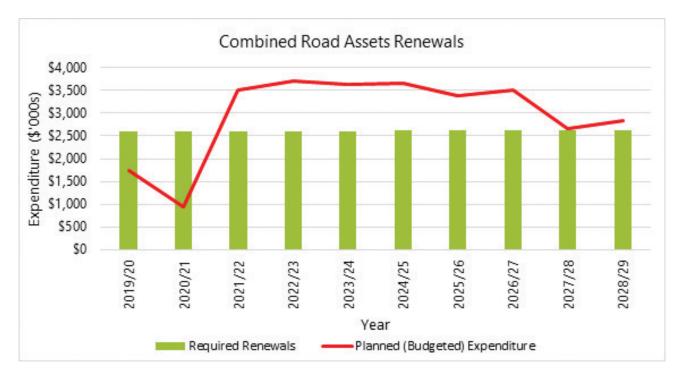


Figure 31 - Forecast 10 Year Renewal Requirements For Asset Sustainability - Combined Road Assets

#### **Expenditure Gap and Backlog Ratio**

Indications of an early shortfall and the injection of more planned expenditure in later years are indicated in Table 28. The breakdown of planned and required renewal spending and the renewal funding gap per year is displayed.

In order to address some of these shortfalls, budget may need to be moved from Footpaths and Steps to the two other categories. If shifting budgets from Footpaths is not possible or there is not enough budget in Roads and Other Roads Assets, there is potential that projects in those categories may need to be deferred to following financial years or budgets for them reduced.

Overall, the biggest funding gap occurs in 2020/21, but due to spending more than the required expenditure in the following years, it helps reduce the backlog. This is another need for why additional spending over the required expenditure is necessary to ensure a smaller number of Council assets are in an unsatisfactory condition.

Backlog is assessed by comparing the backlog ratio to the backlog benchmark. These parameters are defined as follows:

Backlog Ratio - The measurement of the replacement cost of assets in Condition 4 or 5 (i.e. in unsatisfactory condition) divided by the total depreciated replacement value of roads assets. It indicates the percentage of the total roads replacement value that needs to be spent to bring the asset back to a satisfactory standard  Backlog Benchmark - A benchmark of 2.0% or lower was set by the Office of Local Government and indicates that assets are performing well and being renewed in a timely manner

Backlog ratios for all three categories and also the combined are displayed in Figures 32 - 35.

Road Pavements briefly exceed the benchmark but by 2025/2026 moves back under 2% to around 1.7% by the end of the 10 year period. Footpaths and Steps begin just over the 2.0% benchmark but rapidly decreases to a 0% backlog by 2025/2026. This indicates that the planned expenditure in the years following is enough to cover any assets that are declining to an 'unsatisfactory' condition.

Other Roads Assets, however, increases from around 1.2% to around 1.73% by the 2021/22 financial year but then gradually reduces to 1.28% by the end of the 10 year period. The backlog ratios for Roads and Other Roads Assets are higher (though still under the benchmark) and will need to be monitored.

The Combined Roads graph shows that overall, the backlog ratio is decreasing for all roads assets and is expected to be around 1.25% (down from 1.6%) by the end of the 10 year period.

| Year              | Projected/Required Renewals (\$000's) | Current/Planned Renewals (\$000's)   | Renewal Funding Gap<br>(\$000's) |
|-------------------|---------------------------------------|--|----------------------------------|
| Road Pavement     |                                       |  |                                  |
| 2019/20           | 1,206                                 | 550  | 656                              |
| 2020/21           | 1,207                                 | 280  | 927                              |
| 2021/22           | 1,207                                 | 1,517  | 0                                |
| 2022/23           | 1,207                                 | 1,612  | 0                                |
| 2023/24           | 1,208                                 | 1,580  | 0                                |
| 2024/25           | 1,209                                 | 1,579  | 0                                |
| 2025/26           | 1,209                                 | 1,476  | 0                                |
| 2026/27           | 1,210                                 | 1,522  | 0                                |
| 2027/28           | 1,211                                 | 1,155  | 56                               |
| 2028/29           | 1,211                                 | 1,230  | 0                                |
| Footpaths & Steps |                                       |  |                                  |
| 2019/20           | 337                                   | 750  | 0                                |
| 2020/21           | 338                                   | 300  | 38                               |
| 2021/22           | 338                                   | 757  | 0                                |
| 2022/23           | 339                                   | 802  | 0                                |
| 2023/24           | 340                                   | 787  | 0                                |
| 2024/25           | 340                                   | 788  | 0                                |
| 2025/26           | 341                                   | 707  | 0                                |
| 2026/27           | 342                                   | 753  | 0                                |
| 2027/28           | 343                                   | 545  | 0                                |
| 2028/29           | 343                                   | 588  | 0                                |
|                   | · ·                                   | I and the second | ·                                |

| Year                  | Projected/Required Renewals (\$000's) | Current/Planned Renewals (\$000's) | Renewal Funding Gap<br>(\$000's) |
|-----------------------|---------------------------------------|------------------------------------|----------------------------------|
| Other Roads Assets    |                                       |                                    |                                  |
| 2019/20               | 1,059                                 | 430                                | 629                              |
| 2020/21               | 1,060                                 | 365                                | 695                              |
| 2021/22               | 1,060                                 | 1,233                              | 0                                |
| 2022/23               | 1,061                                 | 1,293                              | 0                                |
| 2023/24               | 1,062                                 | 1,273                              | 0                                |
| 2024/25               | 1,063                                 | 1,276                              | 0                                |
| 2025/26               | 1,063                                 | 1,193                              | 0                                |
| 2026/27               | 1,064                                 | 1,228                              | 0                                |
| 2027/28               | 1,065                                 | 948                                | 117                              |
| 2028/29               | 1,066                                 | 1,006                              | 60                               |
| Combined Roads Assets |                                       |                                    |                                  |
| 2019/20               | 2,603                                 | 1,730                              | 873                              |
| 2020/21               | 2,605                                 | 945                                | 1,660                            |
| 2021/22               | 2,605                                 | 3,507                              | 0                                |
| 2022/23               | 2,607                                 | 3,707                              | 0                                |
| 2023/24               | 2,610                                 | 3,640                              | 0                                |
| 2024/25               | 2,612                                 | 3,644                              | 0                                |
| 2025/26               | 2,614                                 | 3,377                              | 0                                |
| 2026/27               | 2,616                                 | 3,503                              | 0                                |
| 2027/28               | 2,619                                 | 2,648                              | 0                                |
| 2028/29               | 2,621                                 | 2,823                              | 0                                |

Table 28 - Projected and Current/Planned Renewals and Expenditure Gap

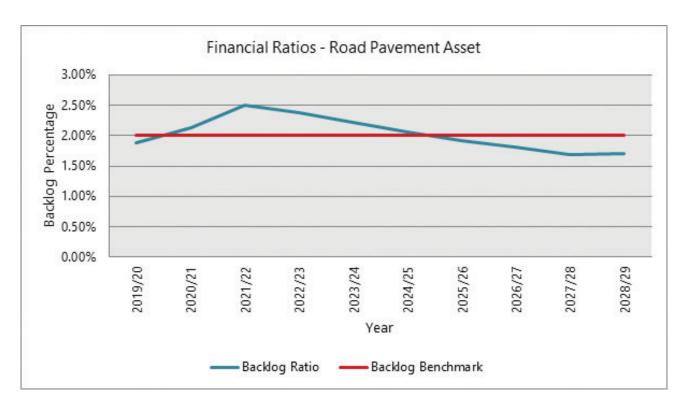


Figure 32 - Forecast 10 Year Backlog Ratio - Road Pavement

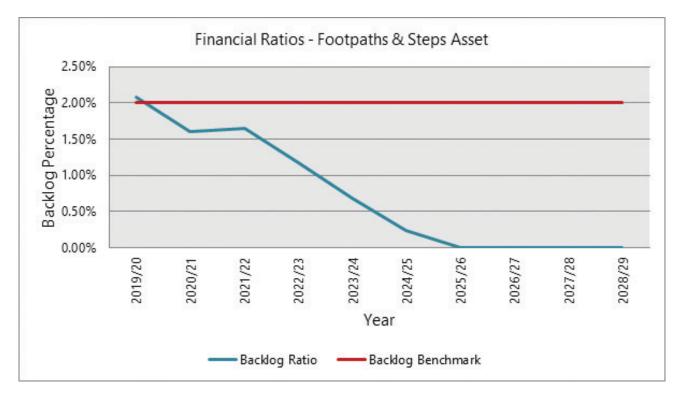


Figure 33 - Forecast 10 Year Backlog Ratio - Footpaths & Steps

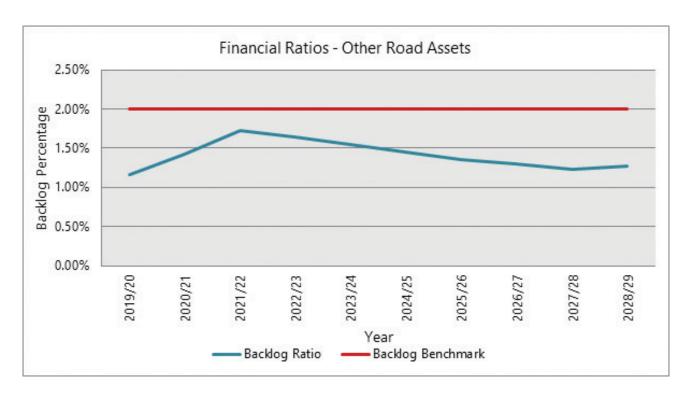


Figure 34 - Forecast 10 Year Backlog Ratio - Other Roads Assets

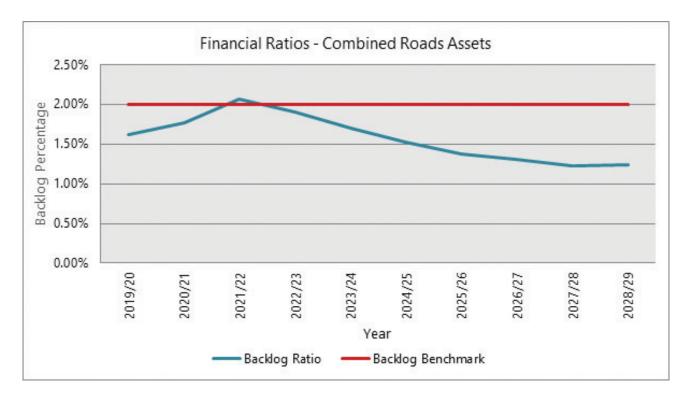


Figure 35 - Forecast 10 Year Backlog Ratio - Combined Roads Assets

#### **Upgrade/New Works Plan**

Upgrade works are works that improve an asset beyond its existing capacity and new works create a new asset that did not previously exist.

New assets may be required due to growth, social or environmental needs. Assets may also be acquired at no cost to the Council from private development.

New/upgraded assets are considered in Future Demand, and even though there will be a limit of new assets due to the well-established nature of Mosman, there is still potential for new assets. Examples include linking the footpath network and installing pram ramps to improve accessibility, upgrading road seals to higher quality and other improvements that increase the levels of service.

Estimates of new/upgraded assets have been determined in the financial modelling for the roads categories based on historical data.

Estimates of annual planned upgrade/new expenditure are shown in Table 29.

Upgrade of existing assets and new assets are identified from various sources such as strategic plans, Mosman contributions plans, service deficiencies, councillor or community requests, or partnerships with other organisations.

New assets and services are funded from Council's capital works program, contributions plans and grants where available. This is further discussed in the Funding Strategy within the Financial Summary section.

Opportunities for implementation of environmental sustainability initiatives will be included in the New Works program or as renewal works when opportunities arise.

| Asset                  | Planned Upgrade/New Expenditure (p.a.) |
|------------------------|--|
| Road Pavement          | \$50,000 (\$5,000 in 2020/2021 only)   |
| Footpaths and<br>Steps | \$60,000 (\$10,000 in 2020/2021 only)  |
| Other Roads<br>Assets  | \$90,000 (\$10,000 in 2020/2021 only)  |
| Total                  | \$200,000 (\$25,000 in 2020/2021 only) |

Table 29 - Planned Upgrade/New Expenditure (per annum)

#### **Capital Works Program**

The 10-year capital works program has been created for all asset classes and are available in Appendix C. The program has been determined by factors such as remaining useful life, condition and priority. Backlog items have been prioritised for renewal in the 19/20 and 20/21 financial years. The need for installing a new asset or increasing the level of service as demand increases have also been considered.

It is often the case in roads assets that partial renewals take place due to only some parts of the asset being in an 'unsatisfactory' condition. This means the percentage of asset to be renewed can vary and budget is often determined from an inspection before the works. Therefore, budgets are not listed in the program.

Planned expenditure has been estimated by looking at the total Current Replacement Cost of all assets listed in the capital works program and estimating approximately what percentage of these assets are to be renewed/upgraded based on historical data.

These capital works programs have been created using the best available knowledge and data at the time and should be viewed as a guide only.

Improvement in creating 10 years capital works programs have been detailed in the Improvement Plan in the Plan Improvement and Monitoring section. Examples include creating a system that combines the condition ratings, remaining useful life and other factors to indicate where capital works are needed. This will be done automatically and reviewed by an experienced officer. The asset management system has the capability to assist in generating these programs.

#### **Capital Works Standards and Specifications**

Capital works are carried out in accordance with the following standards and specifications:

- Relevant Australian Standards;
- Relevant Transport for NSW (TfNSW) standards and specifications
- Building Code of Australia
- Natspec/AUS-Spec specifications and guidelines

#### Disposal Plan Overview

Disposal includes any activity associated with the disposal of a decommissioned asset including the sale, demolition or relocation. Disposals often make up part of the capital works process when assets are renewed or upgraded. The disposal can encompass the whole or a part of an asset.

#### **Documentation & Loss on Disposal**

Currently, any disposals that occur during a financial year are recorded on a disposal form (related to a capitalisation form where required), which is then reported on at the end of each financial year. The costs of the disposal are included in capital works costs during the replacement of the asset. The loss on the disposal of the asset is the value that is lost from an asset that has not yet reached the end of its useful life or is in Condition 5.

#### **Identified Disposals**

Disposals identified in the near future include those assets being replaced in the capital works program in Appendix C.

It has been estimated that a small proportion of assets will be disposed of and not renewed. From historical data, the following annual disposal amounts of disposed assets are displayed in Table 30. These have been incorporated into the financial modelling and affects replacement cost and depreciation of roads assets.

Other assets that are identified for 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 and included in future revisions of this AMP.

| Asset               | Planned Disposals Amounts of Non-<br>Renewed Assets (p.a.) |
|---------------------|--|
| Road Pavement       | <b>\$</b> O  |
| Footpaths and Steps | \$2,000  |
| Other Roads Assets  | \$18,000   |
| Total               | \$20,000   |

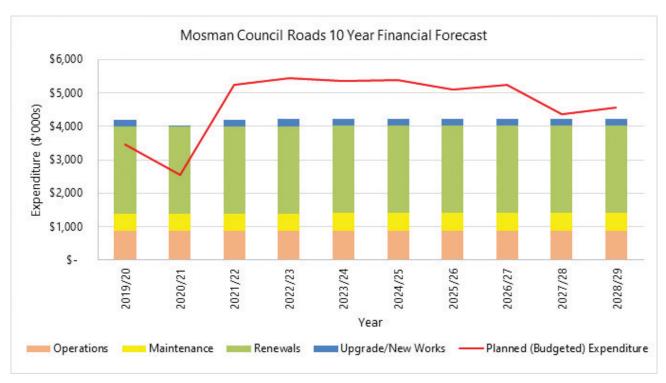
Table 30 - Planned Disposals Amounts of Non-Renewed Assets (per annum)

## **FINANCIAL SUMMARY**

Maintenance and renewal are funded from general revenue, as well as from other sources such as grants, contributions plan and VPA.

#### **Financial Statements and Projections**

The 10-year financial projections are shown in Figure 36 for planned operating (operations and maintenance) and capital expenditure (renewal and new works i.e. upgrade/new assets). Operating and capital projections are detailed in the 10 Year Lifecycle Financial Forecasts table in Appendix B.



<sup>\*</sup> Note that all costs are shown in 2019/20 dollar values.

Figure 36 - Planned Operating and Capital Expenditure

#### **Sustainability Modelling**

There are two key high-level indicators for financial sustainability that have been considered in the analysis of the services provided by roads assets, these being long term life cycle costs and medium-term costs over the 10 year financial planning period.

A 10-year financial indicator is also used to provide an indicator of financial sustainability. An indicator value of 1.0 indicates that the current funding provided is equal to the required lifecycle funding estimates. An indicator of less than 1.0 indicates a funding gap.

#### 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 required maintenance, operations and asset consumption (annual depreciation). The annual average life cycle cost for the services covered by roads assets is \$4,126,000 pa (assuming overall average roads asset life of 84 years).

Life cycle costs can be compared to the life cycle expenditure to give an indicator of sustainability in service provision. Life cycle expenditure includes planned operations, maintenance plus capital renewal expenditure. The annual average life cycle expenditure is \$4,611,000 pa.

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 Roads 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.

### Medium Term - 10 Year Financial Planning Period

This AMP identifies the estimated maintenance, operations and capital expenditure required to provide an agreed level of service to the community into a 10-year financial plan to provide the service in a sustainable manner.

This may be compared to existing or planned expenditure to identify any gap. A gap is generally due to increasing asset renewal requirements.

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

#### **Summary**

A summary of the long and medium term sustainability of all Roads assets is shown in Table 31.

| Long Term                           |                | Medium Term                                 |                |
|-------------------------------------|----------------|---|----------------|
| Life Cycle Cost <sup>1</sup>        | \$4,126,000 pa | Required Expenditure <sup>3</sup>           | \$4,011,000 pa |
| Life Cycle Expenditure <sup>2</sup> | \$4,611,000 pa | Current (Budgeted) Expenditure <sup>4</sup> | \$4,481,000 pa |
|                                     |                | Funding Gap                                 | (\$471,000) pa |
|                                     |                | 10 Year Financial Indicator⁵                | 1.12           |

#### Table 31 - Long and Medium Term Financial Sustainability (as of 30 June 2019)

<sup>&</sup>lt;sup>1</sup>Required maintenance, operations and depreciation ('sustainable' assets case) over the average useful life of all road assets (averaged per annum).

<sup>&</sup>lt;sup>2</sup>Budgeted operations, maintenance and renewal expenditure over the average useful life of all road assets (averaged per annum).

<sup>&</sup>lt;sup>3</sup> Required maintenance, operations and renewal ('sustainable' assets case) expenditure over the 10 year financial period (averaged per annum).

<sup>&</sup>lt;sup>4</sup> Budgeted operations, maintenance and renewal expenditure over the 10 year financial period (averaged per annum).

<sup>&</sup>lt;sup>5</sup>Medium term budgeted expenditure per annum divided by medium term required expenditure per annum. A financial indicator of 1.0 indicates that the current funding provided is equal to the required funding estimates. A financial indicator of less than 1.0 indicates a funding shortfall.



#### **Funding Strategy**

Projected expenditure detailed in the Lifecycle Financial Forecasts in Appendix B is to be funded from the Council's operating and capital budgets. The funding strategy is detailed in the Council's 10-year long term financial plan.

Capital works, operations and maintenance are funded from general funds, loans and a variety of income sources, including:

- Restoration charges
- Owners of vehicle crossings for vehicle crossing works
- Contributions plans
- Voluntary Planning Agreement (VPA) contributions
- Developer contributions
- Grants/Subsidies (e.g. TfNSW Block, Roads to Recovery, B-Line)

If funding needs are not met, achieving the financial strategy will require additional funding from a combination of

- Investigation and implementation of alternative funding sources
- Review and rationalisation of specific service areas identified as potentially being over-serviced
- Re-allocation of income where appropriate
- Stormwater levy
- Additional grant funding from higher levels of Government, such as TfNSW
- Review of contributions plans

#### **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 developers and others and donated to Council. Identified in this asset management plan, there is forecast to be a small number of new/upgraded assets added to the stock.

The depreciated replacement cost (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. Forecast of the assets' depreciated replacement cost is based on current projected asset renewal funding levels.

## Key Assumptions Made in Financial Forecasts

This section details the key assumptions made in the Asset Management Plan and in forecasts of required operating, capital expenditure, asset values, depreciation expense and carrying amount estimates.

Key assumptions made in this Asset Management Plan are:

- Financial forecasts are based on providing defined Levels of Service
- Council will endeavour to fully fund required asset renewal requirements into the future
- Capital renewal programs are designed to maintain the service potential of existing assets
- Works are estimated using the Council's existing 2016
   Civil Works contract. Though, Council staff has since revalued its assets to reflect current 2019 market rates
- Operations and maintenance costs are based largely on historical expenditure and assume there will be no significant increase in the cost of providing these services except when new assets are installed
- Financial forecasts are based on 2019/20 dollars with the inherent assumption then that costs will increase in the future in line with consumer price index (CPI). For Operations and Maintenance, it has been assumed that costs will increase at a rate slightly above CPI i.e. additional 1% pa. (This may not be the case as material costs and/or salaries and wages, for example, may increase (or decrease) at alternative rates). 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 Asset Management Plan by the following actions:

- More detailed review of asset unit rates and useful lives at an asset group or asset type level
- Better alignment with Council's Community Strategic
   Plan and Long Term Financial Plan
- Improved understanding and availability of information regarding and development of Levels of Service
- Improved understanding of Demand Forecasting and future required new works/ upgraded assets
- Refining/developing long term operational programs for works and services (at least 10 years) in addition to the capital works programs
- More advanced strategic analysis of the data and information particularly considering Levels of Service, asset capacity and performance and demand
- Optimisation of asset renewal works and forecasts
- Understanding and analysing the many financial and economic influences which may potentially impact upon the cost of provision of services (sensitivity analysis)

## RISK MANAGEMENT PLAN

Council's broad risk management approach is covered in the Strategic Risk Review and the Asset Management Strategy. The standard procedure includes the following:

- Risk identification
- Risk analysis
- Risks evaluation
- Risk treatment
- Monitoring and review
- Communication

The implementation of an effective asset management plan is integral in assisting Council to manage the risks and liabilities of infrastructure assets. The roads asset management plan covers a number of risk management procedures including:

- Routine inspection and maintenance regimes
- Prioritisation of maintenance and capital works to support the delivery of Council services
- Long term asset renewal program and required funding estimates
- Key responsible staff for roads assets
- High quality data on the useful life and condition of assets

The large number of assets in this category prevents 100% being inspected each year but there is a targeted routine inspection regime. Footpaths have the highest number of reported incidents each year and a footpath inspection procedure has been developed to guide the management of defects.

A risk assessment covering the common risks in roads assets is summarised in Table 32.

| Description of<br>Risk                 | Previous Risk<br>Rating | Risk Planning   | Risk Treatment   | New Risk<br>Rating |
|--|-------------------------|---|--|--------------------|
| General defects                        | Medium                  | Regular inspections and prioritised work                      | 10-20% of all assets are inspected each year. Prioritise works program based on accurate data  | Low                |
| Footpath<br>defects                    | High                    | Inspections and maintenance                                   | Mark defects, patch holes, repair footpath<br>to level any vertical displacement, seal<br>cracks, ramp displacement around tree<br>roots   | Medium             |
| Road defects                           | High                    | Inspections and maintenance                                   | Mark defects, patch pot holes within one week, seal cracks, inspect more frequently roads with high traffic counts   | Medium             |
| Retaining wall<br>defects              | Medium                  | Assessment and prioritised works                              | Yearly inspections carried out, failed walls prioritised and referred to structural engineer if necessary  | Low                |
| Guardrail and<br>fences defects        | Medium                  | Inspections and<br>maintenance                                | Fences in higher traffic areas prioritised<br>for works and inspections. Assessment<br>by structural engineer if necessary. Minor<br>defects repaired by rapid response                              | Low                |
| Hazards &<br>emergency                 | High                    | Regular monitoring  | Road closure, rerouting traffic and removing debris or obstacles from road. Clear communication through signage for road users. Assistance with Traffic Control from Rapid Response, Rangers and SES | Medium             |
| Construction<br>risks                  | Medium                  | CTMP, barriers, insurance<br>and WHS site plan                | Review traffic plan and construction management plans. Prior to construction, contractor insurances are to be submitted. Check on site to ensure construction works are carried out in a safe manner | Low                |
| WHS and<br>environmental<br>protection | Medium                  | Appointment of suitable contractor, clear contract conditions | Selection of contractors will entail their compliance with WHS and Environmental requirements. Regular audits will be undertaken to ensure work is compliant with WHS and Environmental standards.   | Low                |
| Reputation/<br>Political risks         | Medium                  | Communication plan  | Communicate the benefits of the AMP to the community and ensure works programs are well planned  | Low                |

Table 32 - Risks and Treatments Plan

# ASSET MANAGEMENT PRACTICES

#### **Financial Systems**

Council's financial system is Civica Authority and its budgeting system is Powerbudget.

Financial reporting must comply with the requirements of the Local Government Act 2003, relevant Australian Accounting Standards, Local Government Code of Accounting Practice and Financial Reporting and Local Government Accounting Manual.

The value of the Mosman roads assets is reported in the financial records and valuations are carried out when necessary due to the changes in the market.

The financial system is managed by the Council's Finance and Information Technology staff. The following are responsible for the financial system:

- Chief Financial Officer
- Accountant Finance and Strategy

## Asset Management and Geographic Information Systems

Council is using the asset management system known as AssetFinda and the geographic information system (GIS) known as MapInfo.

This asset management system contains information about all roads assets including quantities and financial information. It is the primary source of data for these assets, which is updated regularly. The system contributes to the end of financial year reporting and the roads asset inventory is constantly maturing due to increasing data confidence. This includes more accurate data in relation to construction dates, condition, cost and past performance. These improvements have been brought on by regular inspections of the roads assets and the revaluation in 2017/2018.

GIS is linked to the asset management system. The majority of roads assets have associated GIS features and contains all attributes sourced from AssetFinda.

Accountability for the operation and management of the asset management system and GIS is corporate and requires input from the technical, operational and financial areas of Council.

## Information Flow Requirements and Processes

The key information flows into this asset management plan are:

- The asset register data on size, age, value, remaining life of the network
- The unit rates for categories of assets, materials and works
- The adopted service levels
- Projections of various factors affecting future demand for services
- Correlations between maintenance and renewal, including an understanding of asset deterioration
- Data on new or upgraded assets acquired by Council

The key information flows from this AMP are:

- The Works Program and trends
- The resulting budget, valuation and depreciation projections
- The asset useful life analysis

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

It is essential to incorporate records of inspections, maintenance and capital works activities into the asset management system to maintain their currency and to permit analysis of performance for the development of predictions of future performance.

#### **Standards and Guidelines**

Relevant standards and guidelines include:

- NSW Local Government Act 1993
- Australian Accounting Standards (AASB 13 & AASB 116)
- Relevant Transport for NSW (TfNSW) standards and specifications
- Austroads guidelines
- Building Code of Australia 2019
- MOSPLAN
- Mosman Council's Standard Drawings
- IPWEA, 2015, 'International Infrastructure Management Manual'
- IPWEA, 2015, 'Australian Infrastructure Financial Management Manual'
- DLG Code of Accounting and Reporting Practice
- DLG Integrated Planning and Reporting Manual and Guidelines
- AUS-SPEC/Natspec documentation sets which assist Councils with works and maintenance management and contracts
- AS/NZS/ISO 31000:2018 Risk Management Principles and Guidelines

# PLAN IMPROVEMENT AND MONITORING

#### **Performance Measures**

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

- The degree to which the required cashflows identified in this plan are incorporated into Council's Resourcing Strategy, Council's long term financial plan and Strategic Management Plan
- The degree to which adopted organisation 1 to 10-year detailed works programs, budgets, business plans and organisational structures take into account the 'global' works program trends provided by the asset management plan
- Community acceptance including Levels of Service and risk management plan

Refer to Council's Asset Management Strategy for more information regarding asset management status and maturity.

#### Improvement Plan

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 has a number of short to medium (1-4 years) and longer-term goals (4 to 10 years). In the short to medium-term, rather than using straight-line approaches to depreciation, improvement can involve using a condition or consumption-based depreciation approach to generate a deterioration profile that is tailored to the asset. More improvements are highlighted in Table 33.

Longer-term goals include achieving more advanced asset management practice in a range of asset management areas including key areas of asset knowledge, strategic asset planning and operations, maintenance and works processes.

| Action  | Priority | Timeline |
|---|----------|----------|
| Integration of revaluation threshold to identify assets required to be revalued and what should be counted as at cost   | Medium   | 2021/22  |
| Mapping of all remaining assets missing from the GIS systems, including line marking, minor street furniture.   | Low      | 2022/23  |
| Improved capital planning, prioritising and scheduling maintenance through the use of the AMS including calculating asset life cycle costs  | Medium   | 2024/25  |
| Networking of assets such as parking signs, line marking. Ensures a large number of the same type of low value assets are combined to one networked asset for ease of revaluation | Medium   | 2024/25  |

Table 33 - Asset management improvement plan

Council's current status of Roads assets are:

- Comprehensive revaluation of roads completed in June 2018 including verification of asset location, attribute and condition data for roads assets
- Condition, renewals, new works, operations, maintenance, cost, utilisation and performance data for all assets collected and recorded on an ongoing basis
- Further improvements in the asset management system to display more information about capital works and providing details such as renewal dates, upgrade reasoning, partial renewals and disposals
- Roads asset data is all available in the asset management system and all end of year financial reporting is done through the AMS
- Spatial data is available for almost all roads assets within GIS (MapInfo), recent updates include using polygons to represent the roads asset class and mapping of pram ramps
- Basic demand forecasting and demand management considerations have been incorporated into the AMP
- Comprehensive 10-year asset works programs completed
- Basic integration of asset long term financial forecasts into organisation long term financial planning and resourcing strategies
- Asset management development linked strongly with MOSPLAN
- Condition inspection processes in place

#### **Monitoring and Review Procedures**

This Asset Management Plan is to be reviewed and updated at least every 4 years (standard Council term) and as a minimum should be aligned with the review of Council's Community Strategic Plan and Delivery Program.

The assets values, data and modelling that informed this plan were done prior to the ramifications of the COVID-19 pandemic being known. Due to these circumstances, in 18 months time a review and update will take place to account for changes.

Under normal circumstances, every 2 years there will be a minor review and the plans will be amended to recognise any changes in service levels or budget and resources during this time. The capital works program may need modification due to these changes.

## **REFERENCES**

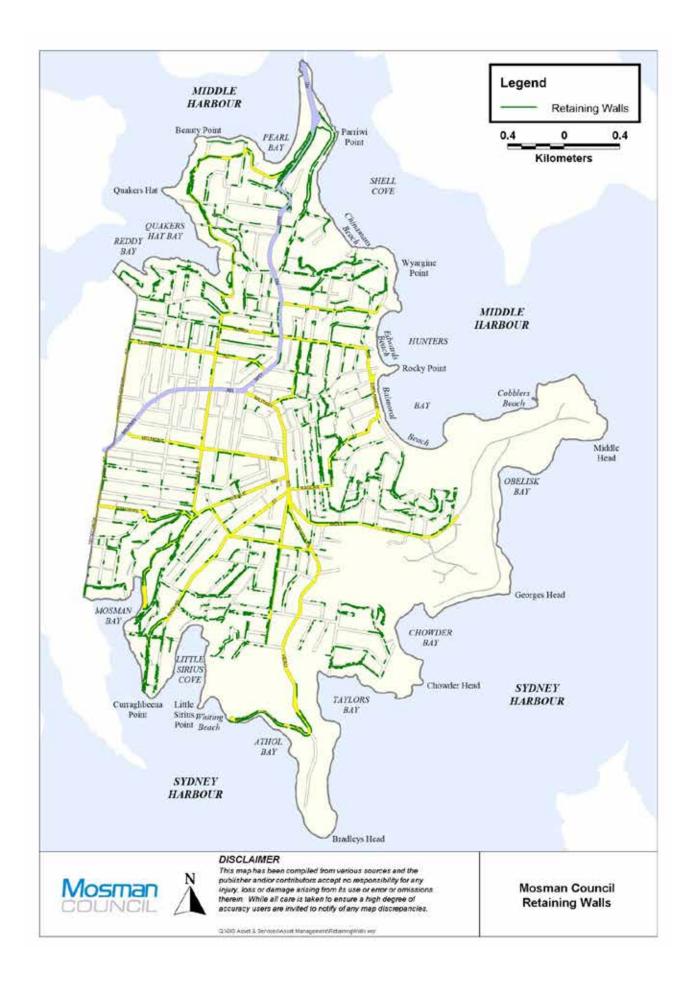
- Mosman Community Strategic Plan (MOSPLAN)
- Mosman Council Asset Management Policy
- Mosman Council Asset Management Strategy
- Integrated Planning and Reporting Guidelines for local government in NSW Planning a sustainable future 2013
- IPWEA, 2015, 'International Infrastructure Management Manual', Institute of Public Works Engineering Australia, Sydney, www.ipwea.org.au
- IPWEA, 2015, 'Australian Infrastructure Financial Management Manual', Institute of Public Works Engineering Australia, Sydney, www.ipwea.org.au
- AS/NZS/ISO 31000:2018 Risk Management Principles and Guidelines
- .idcommunity, 2018, Mosman Municipal Council community profile, idcommunity, <a href="http://profile.id.com.au/mosman">http://profile.id.com.au/mosman</a>
- Photography by Ben Williams Photography, 2020

# **APPENDICES**

# **APPENDIX A**

**ROADS MAPS** 





# **APPENDIX B**

### **ROADS ASSETS 10 YEAR LIFECYCLE FINANCIAL FORECASTS**

#### Figures are in 2019/20 dollar values (\$000's)

|                        | 2019/<br>2020 | 2020/<br>2021 | 2021/<br>2022 | 2022/<br>2023 | 2023/<br>2024 | 2024/<br>2025 | 2025/<br>2026 | 2026/<br>2027 | 2027/<br>2028 | 2028/<br>2029 |
|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                        | 1             | 2             | 3             | 4             | 5             | 6             | 7             | 8             | 9             | 10            |
| Annual Depred          | ciation       |               |               |               |               |               |               |               |               |               |
| Road<br>Pavement       | 1,206         | 1,207         | 1,207         | 1,207         | 1,208         | 1,209         | 1,209         | 1,210         | 1,211         | 1,211         |
| Footpaths<br>and Steps | 337           | 338           | 338           | 339           | 340           | 340           | 341           | 342           | 343           | 343           |
| Other Road<br>Assets   | 1,059         | 1,060         | 1,060         | 1,061         | 1,062         | 1,063         | 1,063         | 1,064         | 1,065         | 1,066         |
| Total                  | 2,603         | 2,605         | 2,605         | 2,607         | 2,610         | 2,612         | 2,614         | 2,616         | 2,619         | 2,621         |
| Planned Exper          | nditure       |               |               |               |               |               |               |               |               |               |
| Operations             |               |               |               |               |               |               |               |               |               |               |
| Road<br>Pavement       | 1,044         | 1,044         | 1,044         | 1,044         | 1,044         | 1,044         | 1,044         | 1,044         | 1,044         | 1,044         |
| Footpaths<br>and Steps | 56            | 56            | 56            | 56            | 56            | 56            | 56            | 56            | 56            | 56            |
| Other Road<br>Assets   | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             |
| Sub Total              | 1,100         | 1,100         | 1,100         | 1,100         | 1,100         | 1,100         | 1,100         | 1,100         | 1,100         | 1,100         |
| Maintenance            |               |               | •             |               | ^             | ^             |               |               |               | ^             |
| Road<br>Pavement       | 117           | 117           | 117           | 117           | 117           | 117           | 117           | 117           | 117           | 117           |
| Footpaths<br>and Steps | 81            | 84            | 84            | 84            | 84            | 84            | 84            | 84            | 84            | 84            |
| Other Road<br>Assets   | 223           | 272           | 223           | 223           | 223           | 223           | 223           | 223           | 223           | 223           |
| Sub Total              | 421           | 473           | 424           | 424           | 424           | 424           | 424           | 424           | 424           | 424           |

|                        | 2019/<br>2020 | 2020/<br>2021 | 2021/<br>2022 | 2022/<br>2023 | 2023/<br>2024 | 2024/<br>2025 | 2025/<br>2026 | 2026/<br>2027 | 2027/<br>2028 | 2028/<br>2029 |
|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                        | 1             | 2             | 3             | 4             | 5             | 6             | 7             | 8             | 9             | 10            |
| New Work               |               |               |               |               |               |               |               |               |               |               |
| Road<br>Pavement       | 50            | 5             | 50            | 50            | 50            | 50            | 50            | 50            | 50            | 50            |
| Footpaths<br>and Steps | 60            | 10            | 60            | 60            | 60            | 60            | 60            | 60            | 60            | 60            |
| Other Road<br>Assets   | 90            | 10            | 90            | 90            | 90            | 90            | 90            | 90            | 90            | 90            |
| Sub Total              | 200           | 25            | 200           | 200           | 200           | 200           | 200           | 200           | 200           | 200           |
| Renewals               |               |               |               |               |               |               |               |               |               |               |
| Road<br>Pavement       | 550           | 280           | 1,517         | 1,612         | 1,580         | 1,579         | 1,476         | 1,522         | 1,155         | 1,230         |
| Footpaths<br>and Steps | 750           | 300           | 757           | 802           | 787           | 788           | 707           | 753           | 545           | 588           |
| Other Road<br>Assets   | 430           | 365           | 1,233         | 1,293         | 1,273         | 1,276         | 1,193         | 1,228         | 948           | 1,006         |
| Sub Total              | 1,730         | 945           | 3,507         | 3,707         | 3,640         | 3,644         | 3,377         | 3,503         | 2,648         | 2,823         |
|                        |               |               |               |               |               |               |               |               |               |               |
| Total                  | 3,451         | 2,543         | 5,231         | 5,431         | 5,364         | 5,368         | 5,101         | 5,227         | 4,372         | 4,547         |
| Required Expe          | nditure ("Su  | stainable" A  | ssets Case)   |               |               |               |               |               |               |               |
| Operations             |               |               |               |               |               |               |               |               |               |               |
| Road<br>Pavement       | 835           | 835           | 835           | 835           | 835           | 835           | 835           | 835           | 835           | 835           |
| Footpaths<br>and Steps | 45            | 45            | 45            | 45            | 45            | 45            | 45            | 45            | 45            | 45            |
| Other Road<br>Assets   | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 0             |
| Sub Total              | 880           | 880           | 880           | 880           | 880           | 880           | 880           | 880           | 880           | 880           |

|                        | 2019/<br>2020 | 2020/<br>2021 | 2021/<br>2022 | 2022/<br>2023 | 2023/<br>2024 | 2024/<br>2025 | 2025/<br>2026 | 2026/<br>2027 | 2027/<br>2028 | 2028/<br>2029 |
|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                        | 1             | 2             | 3             | 4             | 5             | 6             | 7             | 8             | 9             | 10            |
| Maintenance            |               |               |               |               |               |               |               |               |               |               |
| Road<br>Pavement       | 252           | 253           | 253           | 254           | 254           | 255           | 255           | 256           | 257           | 257           |
| Footpaths<br>and Steps | 72            | 72            | 72            | 73            | 73            | 73            | 73            | 74            | 74            | 74            |
| Other Road<br>Assets   | 191           | 191           | 191           | 191           | 192           | 192           | 192           | 192           | 192           | 192           |
| Sub Total              | 515           | 516           | 516           | 518           | 519           | 520           | 520           | 522           | 523           | 523           |
| New Work               |               |               |               |               |               |               |               |               |               |               |
| Road<br>Pavement       | 50            | 5             | 50            | 50            | 50            | 50            | 50            | 50            | 50            | 50            |
| Footpaths<br>and Steps | 60            | 10            | 60            | 60            | 60            | 60            | 60            | 60            | 60            | 60            |
| Other Road<br>Assets   | 90            | 10            | 90            | 90            | 90            | 90            | 90            | 90            | 90            | 90            |
| Sub Total              | 200           | 25            | 200           | 200           | 200           | 200           | 200           | 200           | 200           | 200           |
| Renewals               | ^             |               | ^             |               | ^             |               | ^             | •             |               | •             |
| Road<br>Pavement       | 1,206         | 1,207         | 1,207         | 1,207         | 1.208         | 1.209         | 1,209         | 1,210         | 1,211         | 1,211         |
| Footpaths<br>and Steps | 337           | 338           | 338           | 339           | 340           | 340           | 341           | 342           | 343           | 343           |
| Other Road<br>Assets   | 1,059         | 1,060         | 1,060         | 1,061         | 1,062         | 1,063         | 1,063         | 1,064         | 1,065         | 1,066         |
| Sub Total              | 2,603         | 2,605         | 2,605         | 2,607         | 2,610         | 2,612         | 2,614         | 2,616         | 2,619         | 2,621         |
|                        |               |               |               |               |               |               |               |               |               |               |
| Total                  | 4,198         | 4,026         | 4,202         | 4,205         | 4,208         | 4,212         | 4,215         | 4,218         | 4,222         | 4,225         |

# **APPENDIX C**

# ROADS DRAFT CAPITAL WORKS PROGRAM 2019/20-2028/29

#### E.1 - Roads

| Year      | Road Name        | Material     | Road Segment                                | Length<br>(m) | Width<br>(m) |
|-----------|------------------|--------------|---|---------------|--------------|
| 2019/2020 | Bay Street       | Concrete     | Bay St - Upper-Divided Rd To 64 Bay         | 324           | 5.5          |
| 2019/2020 | Bickell Road     | Asphalt Seal | Bickell Rd - End Of A.C To Ryrie St         | 117           | 3            |
| 2019/2020 | Warringah Road   | Asphalt Seal | Warringah Rd - No.1 To Bend                 | 64            | 6.2          |
| 2019/2020 | Wolseley Road    | Asphalt Seal | Wolseley Rd (Upper) - Mulbring To<br>Redan  | 110           | 1.5          |
| 2019/2020 | Lindsay Lane     | Asphalt Seal | Lindsay Lane - Cowles To Bardwell           | 235           | 3.8          |
| 2019/2020 | Moruben Road     | Asphalt Seal | Moruben Rd - No.8 To Punch St - Upper       | 73            | 5.3          |
| 2019/2020 | Moruben Road     | Asphalt Seal | Moruben Rd - Punch St To Awaba St           | 237           | 10           |
| 2020/2021 | Cowles Road      | Concrete     | Cowles Rd - Avenue To Spencer               | 168           | 7            |
| 2020/2021 | Raglan St        | Concrete     | Raglan St - Gibson to Esplanade             | 464           | 10.4         |
| 2020/2021 | Raglan Street    | Concrete     | Raglan St - Cullen To Gibson                | 150           | 9            |
| 2020/2021 | Art Gallery Way  | Asphalt Seal | Art Gallery Way - Myahgah Rd To Vista<br>St | 46            | 1.3          |
| 2020/2021 | Art Gallery Way  | Concrete     | Art Gallery Way - Myahgah Rd To Vista<br>St | 45            | 3.8          |
| 2020/2021 | Art Gallery Way  | Asphalt Seal | Art Gallery Way - Vista St To Harbour St    | 86            | 3.2          |
| 2020/2021 | Gordon Street    | Concrete     | Gordon St - Middle Head To Bayview          | 160           | 5.4          |
| 2021/2022 | Hopetoun Avenue  | Concrete     | Hopetoun Av - Kirkoswald To Rosherville     | 199           | 6.5          |
| 2021/2022 | Pindari Avenue   | Asphalt Seal | Pindari Av - Medusa To Government Rd        | 95            | 6            |
| 2021/2022 | Pindari Avenue   | Asphalt Seal | Pindari Av - Central Av To Medusa St        | 106           | 5.5          |
| 2021/2022 | Rosebery Street  | Asphalt Seal | Rosebery St - Earl St To Ourimbah Rd        | 183           | 11.4         |
| 2021/2022 | Mackie Lane      | Asphalt Seal | Mackie Lane - Lang St To Dead End           | 196           | 4.8          |
| 2021/2022 | Sverge Street    | Asphalt Seal | Sverge St - Moran To Clanalpine             | 59            | 6            |
| 2021/2022 | Wyong Road       | Asphalt Seal | Wyong Rd - Cowles Rd To Inkerman St         | 220           | 3.8          |
| 2021/2022 | Middle Head Road | Asphalt Seal | Middle Head Rd - Gordon To King Max         | 327           | 11.6         |
| 2021/2022 | Cobbittee Lane   | Asphalt Seal | Cobbittee Lane - Cobbitee St To D.End       | 65            | 4            |

| Year      | Road Name         | Material     | Road Segment                              | Length (m) | Width<br>(m) |
|-----------|-------------------|--------------|---|------------|--------------|
| 2021/2022 | Dugald Road       | Concrete     | Dugald Rd - Gordon To Mulbring            | 31         | 4.2          |
| 2021/2022 | Silex Road        | Asphalt Seal | Silex Rd - Thompson To Bradleys           | 256        | 11.8         |
| 2022/2023 | Albion Lane       | Asphalt Seal | Albion Lane - The Crescent To Barrier     | 58         | 3.5          |
| 2022/2023 | Arbutus Street    | Asphalt Seal | Arbutus St - Almora St To Mandolong R     | 225        | 6            |
| 2022/2023 | Sirius Cove Road  | Asphalt Seal | Sirius Cove Rd - D.E Carpark To Lennox    | 112        | 7            |
| 2022/2023 | Sirius Cove Road  | Asphalt Seal | Sirius Cove Rd - Car Park To Cs           | 32         | 4.6          |
| 2022/2023 | Wallington Road   | Asphalt Seal | Wallington Rd - Fairfax Rd To End         | 80         | 5.5          |
| 2022/2023 | Burran Avenue     | Concrete     | Burran Av - No.6 To Kirkoswald Av         | 29         | 7.6          |
| 2022/2023 | Kurrawong Lane    | Asphalt Seal | Kurrawong Lane - Warringah Ln To End      | 37         | 4.6          |
| 2022/2023 | The Esplanade     | Asphalt Seal | The Esplanade - Mandolong To Awaba        | 142        | 12           |
| 2022/2023 | Ruby Street       | Asphalt Seal | Ruby St - Thompson To Union               | 312        | 10.5         |
| 2022/2023 | Sabina Street     | Asphalt Seal | Sabina St - Dead End To Tivoli St         | 54         | 6            |
| 2022/2023 | Edwards Bay Road  | Asphalt Seal | Edwards Bay Rd - Wyargine To The<br>Grove | 185        | 3            |
| 2022/2023 | Kirkoswald Avenue | Asphalt Seal | Kirkoswald Av - Bend To Fairfax Rd        | 139        | 11.4         |
| 2022/2023 | Tennis Court Lane | Asphalt Seal | Tennis Court Lane - Countess To Bend      | 46         | 2.7          |
| 2022/2023 | The Grove         | Asphalt Seal | The Grove - Awaba St To Edward Bay Rd     | 135        | 3.4          |
| 2022/2023 | Wyargine Street   | Asphalt Seal | Wyargine St - Edwards B Rd To Stanton     | 90         | 2.2          |
| 2023/2024 | Ballantyne Street | Concrete     | Ballantyne St - Avenue To Dead End        | 75         | 5.8          |
| 2023/2024 | Burran Avenue     | Concrete     | Burran Av Upper - Divided Rd              | 159        | 6.1          |
| 2023/2024 | Glover Street     | Asphalt Seal | Glover St - Cowles To Bardwell St         | 236        | 11.6         |
| 2023/2024 | Bardwell Road     | Asphalt Seal | Bardwell Rd - Lane To Glover              | 123        | 11.7         |
| 2023/2024 | Bardwell Road     | Asphalt Seal | Bardwell Rd - Glover To Belmont           | 106        | 11.8         |
| 2023/2024 | Bardwell Road     | Asphalt Seal | Bardwell Rd - Belmont To Melrose          | 211        | 11.8         |
| 2023/2024 | Archer Street     | Asphalt Seal | Archer St - Avenue To Keston              | 89         | 10           |
| 2023/2024 | Cowles Road       | Asphalt Seal | Cowles Rd - Glover To Belmont             | 154        | 3            |
| 2024/2025 | Kirkoswald Avenue | Asphalt Seal | Kirkoswald Av - Tivoli St To Bend         | 153        | 6.5          |
| 2024/2025 | Kirkoswald Avenue | Asphalt Seal | Kirkoswald Av - Upper - Fairfax To Burra  | 218        | 6.4          |
| 2024/2025 | Thompson Street   | Asphalt Seal | Thompson St - Bradleys To Prince Albert   | 184        | 12           |
| 2024/2025 | Muston Street     | Asphalt Seal | Muston St - Middle Head To Raglan         | 227        | 8.6          |
| 2024/2025 | Kahibah Road      | Asphalt Seal | Kahibah Rd - Middle Head To Wolseley      | 125        | 6            |

| Year      | Road Name            | Material     | Road Segment                                 | Length<br>(m) | Width<br>(m) |
|-----------|----------------------|--------------|--|---------------|--------------|
| 2024/2025 | Moss Lane            | Asphalt Seal | Moss Lane - Dead End To End Of<br>Concrete   | 22            | 5.5          |
| 2024/2025 | Redan Street         | Asphalt Seal | Redan St – Balmoral To Almora                | 158           | 4.1          |
| 2024/2025 | Shellbank Avenue     | Asphalt Seal | Shellbank Ave - Wyong Sth To Wyong<br>Nth    | 328           | 4.8          |
| 2025/2026 | Avenue Road          | Asphalt Seal | Avenue Rd - Rangers To Noble                 | 338           | 9            |
| 2025/2026 | Avenue Road          | Concrete     | Avenue Rd - Upper Avenue To Rangers          | 40            | 3            |
| 2025/2026 | Beaconsfield Road    | Asphalt Seal | Beaconsfield Rd - Middle Head To<br>Wolseley | 146           | 11.5         |
| 2025/2026 | Beaconsfield Road    | Asphalt Seal | Beaconsfield Rd - Wolseley To Plunkett       | 212           | 11.7         |
| 2025/2026 | Cowles Road          | Asphalt Seal | Cowles Rd - Military Rd To Ourimbah R        | 235           | 11.3         |
| 2025/2026 | Cowles Road          | Asphalt Seal | Cowles Rd - Ourimbah Rd To Awaba St          | 193           | 11.8         |
| 2025/2026 | Cowles Road          | Asphalt Seal | Cowles Rd - Awaba St To Wyong Rd             | 92            | 11.6         |
| 2025/2026 | Cowles Road          | Asphalt Seal | Cowles Rd - Avenue To Spencer                | 115           | 5.2          |
| 2025/2026 | Cowles Road          | Asphalt Seal | Cowles Rd - Art Gallery Way To Military      | 180           | 5.6          |
| 2025/2026 | Cowles Road          | Concrete     | Cowles Rd - Glover To Belmont                | 74            | 6            |
| 2025/2026 | Cowles Road          | Concrete     | Cowles Rd - Belmont To Art Gallery Way       | 221           | 6.2          |
| 2025/2026 | Cowles Road          | Concrete     | Cowles Rd - Art Gallery Way To Military      | 161           | 6            |
| 2026/2027 | Belmont Road         | Asphalt Seal | Belmont Rd - Military To Bardwell            | 302           | 12           |
| 2026/2027 | Bickell Road         | Concrete     | Bickell Rd - End Of A.C To Ryrie St          | 82            | 6            |
| 2026/2027 | Pindari Avenue       | Concrete     | Pindari Av - Central Av To Medusa St         | 103           | 6            |
| 2026/2027 | Pindari Avenue       | Concrete     | Pindari Av - Medusa To Government Rd         | 95            | 5.5          |
| 2026/2027 | Prince Albert Street | Asphalt Seal | Prince Albert St - Union To Queen            | 177           | 11.7         |
| 2026/2027 | Spofforth Street     | Asphalt Seal | Spofforth St - Boyle To Concrete<br>Pavement | 201           | 10.5         |
| 2027/2028 | Warringah Road       | Asphalt Seal | Warringah Rd - Hopetoun Ave To No.1          | 98            | 2.3          |
| 2027/2028 | Warringah Road       | Asphalt Seal | Warringah Rd - Divided Rd To Spit Rd         | 141           | 10           |
| 2027/2028 | Warringah Road       | Concrete     | Warringah Rd - Hopetoun Ave To No.1          | 88            | 6.3          |
| 2027/2028 | Wolseley Road        | Concrete     | Wolseley Rd - Methuen To Beaconsfield        | 364           | 5.5          |
| 2027/2028 | Wolseley Road        | Concrete     | Wolseley Rd (Upper) - Mulbring To<br>Redan   | 98            | 5.6          |
| 2027/2028 | Quakers Road         | Concrete     | Quakers Rd - Bullecourt Ave To End           | 5             | 2.5          |
| 2028/2029 | Albion Lane          | Asphalt Seal | Albion Lane - Junction To Dead End           | 28            | 2.4          |

| Year      | Road Name       | Material     | Road Segment                           | Length<br>(m) | Width<br>(m) |
|-----------|-----------------|--------------|--|---------------|--------------|
| 2028/2029 | Clifton Street  | Concrete     | Clifton St - Dead End To Burrawong Ave | 153           | 4            |
| 2028/2029 | Gordon Street   | Asphalt Seal | Gordon St - Middle Head To Bayview     | 340           | 6            |
| 2028/2029 | Kahibah Road    | Concrete     | Kahibah Rd - Middle Head To Wolseley   | 122           | 5.4          |
| 2028/2029 | Mclean Crescent | Asphalt Seal | Mclean Cres - Dead End To Grecia La    | 164           | 12           |
| 2028/2029 | Milner Lane     | Asphalt Seal | Milner Lane - Queen To Milner St       | 97            | 3.9          |
| 2028/2029 | Milton Avenue   | Asphalt Seal | Milton Ave - Union To Queen            | 150           | 8.2          |
| 2028/2029 | Mitchell Lane   | Asphalt Seal | Mitchell Lane - Killarney St To Bend   | 56            | 3.3          |
| 2028/2029 | Mitchell Lane   | Asphalt Seal | Mitchell Lane - Mitchell Rd To End     | 21            | 5.5          |
| 2028/2029 | Mitchell Lane   | Concrete     | Mitchell Lane - Killarney St To Bend   | 32            | 3.4          |
| 2028/2029 | Mitchell Lane   | Concrete     | Mitchell Lane - Bend To Mitchell Rd    | 38            | 4.4          |

## **E.2 - Footpaths**

| 2019/2020         Cardinal Street         Cardinal St- Bend to Concrete Pewern         Concrete         Left         107         1.8           2019/2020         Cardinal Street         Cardinal St- Bend to Concrete Pewern         Asphalt         Left         107         1.2           2019/2020         Milton Avenue         Milton Avenue St to Queen St to Queen         Concrete         Left         73         1.8           2019/2020         Milton Avenue         Milton Avenue St to Queen         Concrete         Left         73         1.8           2019/2020         Milton Avenue         Milton Avenue         Shiton Avenue St to Queen         Concrete         Left         44         55           2019/2020         Myahgah Rd         Myahgah Rd - Belmont Rd to Military         Brick Paving         Left         44         55           2019/2020         Bradleys Head Rd         Mysta St - Belmont Rd to Military         Brick Paving         Right         30         25           2019/2020         Bradleys Head Rd         Mysta St - Belmont Rd to Military         Concrete         Right         30         15           2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Concrete         Left         301         14           2019/2020         Bradleys Head Rd <th>Year</th> <th>Road Name</th> <th>Road Segment</th> <th>Material</th> <th>Side</th> <th>Length<br/>(m)</th> <th>Width<br/>(m)</th>  | Year      | Road Name        | Road Segment   | Material     | Side  | Length<br>(m) | Width<br>(m) |
|--|-----------|------------------|--|--------------|-------|---------------|--------------|
| Pavem   Pave   | 2019/2020 | Cardinal Street  |  | Concrete     | Left  | 107           | 1.8          |
| Milton Avenue         St         Concrete         Left         73         1.8           2019/2020         Myahgah Rd         Myahgah Rd - Belmont Rd to The Crescent         Brick Paving         Left         44         5.5           2019/2020         Vista St         Vista St - Belmont Rd to Military Rd         Brick Paving         Right         30         25           2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Military         Concrete         Right         288         1.5           2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Military         Concrete         Left         20         2.5           2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Military         Concrete         Left         301         1.4           2019/2020         Bradleys Head Rd         Bradleys Head Rd - Union to Military         Concrete         Left         301         1.4           2019/2020         Bradleys Head Rd         Bradleys Head Rd - Union to Concrete         Left         36         3.5           2020/2021         Countess St         Countess St         Concrete         Right         180         1.5           2020/2021         Shadforth St         Shadforth St - Crux St to Countess St         Concrete <td>2019/2020</td> <td>Cardinal Street</td> <td colspan="2">The state of the s</td> <td>Left</td> <td>107</td> <td>1.2</td> | 2019/2020 | Cardinal Street  | The state of the s |              | Left  | 107           | 1.2          |
| 2019/2020         Myahgah Rd         Myahgah Rd - Belmont Rd to The Crescent         Brick Paving         Left         44         5.5           2019/2020         Vista St         Vista St - Belmont Rd to Military         Brick Paving         Right         30         2.5           2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Military         Concrete         Right         288         1.5           2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Military         Concrete         Left         20         2.5           2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Military         Concrete         Left         301         1.4           2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Military         Concrete         Left         36         3.5           2020/2021         Bradleys Head Rd         Bradleys Head Rd - Union to King Max         Concrete         Left         36         3.5           2020/2021         Countess St         Countess St         Countess St         Concrete         Right         180         1.5           2020/2021         Earl St         Earl St - Bond St to Countess St         Concrete         Right         178         1.5           2021/2022  | 2019/2020 | Milton Avenue    |  | Concrete     | Left  | 73            | 1.8          |
| The Crescent   | 2019/2020 | Milton Avenue    |  | Concrete     | Left  | 73            | 1.8          |
| Right   Bradleys Head Rd   Bradleys Head Rd - King Max to   Concrete   Right   288   1.5   | 2019/2020 | Myahgah Rd       |  | Brick Paving | Left  | 44            | 5.5          |
| 2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Military         Concrete         Left         20         2.5           2019/2020         Bradleys Head Rd         Bradleys Head Rd - King Max to Military         Concrete         Left         301         1.4           2019/2020         Bradleys Head Rd         Bradleys Head Rd - Union to King Max         Concrete         Left         36         3.5           2020/2021         Countess St         Countess St - Earl St to Ourimbah         Concrete         Right         180         1.5           2020/2021         Earl St         Earl St - Bond St to Countess St         Concrete         Right         178         1.5           2020/2021         Shadforth St         Shadforth St - Crux St to Countess St         Concrete         Left         371         1.4           2021/2022         Awaba Street         Awaba Street - Spit Road to Countess St         Concrete         Left         420         1.8           2021/2022         Badham Avenue         Badham Ave - Mcleod to No.4         Concrete         Left         420         1.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Timber         Right         60         1.8           2021/2022         B   | 2019/2020 | Vista St         | •  | Brick Paving | Right | 30            | 2.5          |
| Military  | 2019/2020 | Bradleys Head Rd | •  | Concrete     | Right | 288           | 1.5          |
| Military         Concrete         Left         36         3.5           2019/2020         Bradleys Head Rd         Bradleys Head Rd - Union to King Max         Concrete         Left         36         3.5           2020/2021         Countess St         Countess St - Earl St to Ourimbah         Concrete         Right         180         1.5           2020/2021         Earl St         Earl St - Bond St to Countess St         Concrete         Right         178         1.5           2020/2021         Shadforth St         Shadforth St - Crux St to Canrobert St         Concrete         Left         371         1.4           2021/2022         Awaba Street         Awaba Street - Spit Road to Countess Concrete         Left         420         1.8           2021/2022         Badham Avenue         Badham Ave - Mcleod to No.4         Concrete         Left         58         0.7           2021/2022         Badham Avenue         Badham Ave - No.4 to No.9         Concrete         Left         150         0.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Timber         Right         60         1.8           2021/2022         Bradleys Head Rd - Dead End to Cowles         Concrete         Right         397         1.65<  | 2019/2020 | Bradleys Head Rd | •  | Concrete     | Left  | 20            | 2.5          |
| King Max         Countess St         Countess St - Earl St to Ourimbah         Concrete         Right         180         1.5           2020/2021         Earl St         Earl St - Bond St to Countess St         Concrete         Right         178         1.5           2020/2021         Shadforth St         Shadforth St - Crux St to Canrobert St         Concrete         Left         371         1.4           2021/2022         Awaba Street         Awaba Street - Spit Road to Cowles Road         Concrete         Left         420         1.8           2021/2022         Badham Avenue         Badham Ave - Mcleod to No.4         Concrete         Left         58         0.7           2021/2022         Badham Avenue         Badham Ave - No.4 to No.9         Concrete         Left         150         0.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Timber         Right         60         1.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Concrete         Right         140         1.8           2021/2022         Dalton Road         Dalton Rd - Dead End to Cowles         Concrete         Right         397         1.65           2021/2022         Raglan Street <td>2019/2020</td> <td>Bradleys Head Rd</td> <td>•</td> <td>Concrete</td> <td>Left</td> <td>301</td> <td>1.4</td>  | 2019/2020 | Bradleys Head Rd | •  | Concrete     | Left  | 301           | 1.4          |
| Ourimbah         Concrete         Right         178         1.5           2020/2021         Earl St         Earl St - Bond St to Countess St         Concrete         Right         178         1.5           2020/2021         Shadforth St         Shadforth St - Crux St to Canrobert St         Concrete         Left         371         1.4           2021/2022         Awaba Street         Awaba Street - Spit Road to Cowles Road         Concrete         Left         420         1.8           2021/2022         Badham Avenue         Badham Ave - Mcleod to No.4         Concrete         Left         58         0.7           2021/2022         Badham Avenue         Badham Ave - No.4 to No.9         Concrete         Left         150         0.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Timber         Right         60         1.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Concrete         Right         140         1.8           2021/2022         Dalton Road         Dalton Rd - Dead End to Cowles         Concrete         Right         397         1.65           2021/2022         Everview Ave         Everview Ave - Awaba St to T         Concrete   | 2019/2020 | Bradleys Head Rd | •  | Concrete     | Left  | 36            | 3.5          |
| 2020/2021         Shadforth St         Shadforth St - Crux St to Canrobert St         Concrete         Left         371         1.4           2021/2022         Awaba Street         Awaba Street - Spit Road to Cowles Road         Concrete         Left         420         1.8           2021/2022         Badham Avenue         Badham Ave - Mcleod to No.4         Concrete         Left         58         0.7           2021/2022         Badham Avenue         Badham Ave - Mcleod to No.4         Concrete         Left         150         0.8           2021/2022         Badham Avenue         Badham Ave - No.4 to No.9         Concrete         Left         150         0.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Timber         Right         60         1.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Concrete         Right         140         1.8           2021/2022         Dalton Road         Dalton Rd - Dead End to Cowles         Concrete         Right         397         1.65           2021/2022         Everview Ave         Everview Ave - Awaba St to T         Concrete         Left         39         1.8           2021/2022         Raglan Street   | 2020/2021 | Countess St      |  | Concrete     | Right | 180           | 1.5          |
| Canrobert St         Cancrete         Left         420         1.8           2021/2022         Awaba Street         Awaba Street - Spit Road to Cowles Road         Concrete         Left         420         1.8           2021/2022         Badham Avenue         Badham Ave - Mcleod to No.4         Concrete         Left         58         0.7           2021/2022         Badham Avenue         Badham Ave - No.4 to No.9         Concrete         Left         150         0.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Timber         Right         60         1.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Concrete         Right         140         1.8           2021/2022         Dalton Road         Dalton Rd - Dead End to Cowles         Concrete         Right         397         1.65           2021/2022         Everview Ave         Everview Ave - Awaba St to T         Concrete         Left         39         1.8           2021/2022         Raglan Street         Raglan St - Want St to Military Rd         Concrete         Left         111         1.9           2021/2022         Raglan Street         Raglan St - Want St to Military Rd         Brick Paving </td <td>2020/2021</td> <td>Earl St</td> <td>Earl St - Bond St to Countess St</td> <td>Concrete</td> <td>Right</td> <td>178</td> <td>1.5</td>   | 2020/2021 | Earl St          | Earl St - Bond St to Countess St   | Concrete     | Right | 178           | 1.5          |
| Cowles Road         Left         58         0.7           2021/2022         Badham Avenue         Badham Ave - Mcleod to No.4         Concrete         Left         58         0.7           2021/2022         Badham Avenue         Badham Ave - No.4 to No.9         Concrete         Left         150         0.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Timber         Right         60         1.8           2021/2022         Bradleys Head Rd         Bradleys Head Rd - Athol Wharf to End of Parking         Concrete         Right         140         1.8           2021/2022         Dalton Road         Dalton Rd - Dead End to Cowles         Concrete         Right         397         1.65           2021/2022         Everview Ave         Everview Ave - Awaba St to T         Concrete         Left         39         1.8           2021/2022         Raglan Street         Raglan St - Want St to Military Rd         Concrete         Left         111         1.9           2021/2022         Raglan Street         Raglan St - Want St to Military Rd         Brick Paving         Left         35         3.5   | 2020/2021 | Shadforth St     |  | Concrete     | Left  | 371           | 1.4          |
| 2021/2022 Badham Avenue Badham Ave - No.4 to No.9 Concrete Left 150 0.8 2021/2022 Bradleys Head Rd Bradleys Head Rd - Athol Wharf to End of Parking Concrete Right 140 1.8 2021/2022 Dalton Road Dalton Rd - Dead End to Cowles Concrete Right 397 1.65 2021/2022 Everview Ave Everview Ave - Awaba St to T Concrete Left 39 1.8 2021/2022 Raglan Street Raglan St - Want St to Military Rd Concrete Left 111 1.9 2021/2022 Raglan Street Raglan St - Want St to Military Rd Brick Paving Left 35 3.5  | 2021/2022 | Awaba Street     | · ·  | Concrete     | Left  | 420           | 1.8          |
| 2021/2022 Bradleys Head Rd Bradleys Head Rd - Athol Wharf to End of Parking  2021/2022 Bradleys Head Rd Bradleys Head Rd - Athol Wharf to End of Parking  2021/2022 Dalton Road Dalton Rd - Dead End to Cowles Concrete Right 397 1.65  2021/2022 Everview Ave Everview Ave - Awaba St to T Concrete Left 39 1.8  2021/2022 Raglan Street Raglan St - Want St to Military Rd Concrete Left 111 1.9  2021/2022 Raglan Street Raglan St - Want St to Military Rd Brick Paving Left 35 3.5  | 2021/2022 | Badham Avenue    | Badham Ave - Mcleod to No.4  | Concrete     | Left  | 58            | 0.7          |
| to End of Parking  2021/2022 Bradleys Head Rd Bradleys Head Rd - Athol Wharf to End of Parking  2021/2022 Dalton Road Dalton Rd - Dead End to Cowles Concrete Right 397 1.65  2021/2022 Everview Ave Everview Ave - Awaba St to T Concrete Left 39 1.8  2021/2022 Raglan Street Raglan St - Want St to Military Rd Concrete Left 111 1.9  2021/2022 Raglan Street Raglan St - Want St to Military Rd Brick Paving Left 35 3.5  | 2021/2022 | Badham Avenue    | Badham Ave - No.4 to No.9  | Concrete     | Left  | 150           | 0.8          |
| to End of Parking  2021/2022 Dalton Road Dalton Rd - Dead End to Cowles Concrete Right 397 1.65  2021/2022 Everview Ave Everview Ave - Awaba St to T Concrete Left 39 1.8  2021/2022 Raglan Street Raglan St - Want St to Military Rd Concrete Left 111 1.9  2021/2022 Raglan Street Raglan St - Want St to Military Rd Brick Paving Left 35 3.5   | 2021/2022 | Bradleys Head Rd | •  | Timber       | Right | 60            | 1.8          |
| 2021/2022 Everview Ave Everview Ave - Awaba St to T Concrete Left 39 1.8  2021/2022 Raglan Street Raglan St - Want St to Military Rd Concrete Left 111 1.9  2021/2022 Raglan Street Raglan St - Want St to Military Rd Brick Paving Left 35 3.5  | 2021/2022 | Bradleys Head Rd | •  | Concrete     | Right | 140           | 1.8          |
| Junction Junction Left 111 1.9  2021/2022 Raglan Street Raglan St - Want St to Military Rd Concrete Left 111 1.9  2021/2022 Raglan Street Raglan St - Want St to Military Rd Brick Paving Left 35 3.5  | 2021/2022 | Dalton Road      | Dalton Rd - Dead End to Cowles   | Concrete     | Right | 397           | 1.65         |
| 2021/2022 Raglan Street Raglan St - Want St to Military Rd Brick Paving Left 35 3.5  | 2021/2022 | Everview Ave     |  | Concrete     | Left  | 39            | 1.8          |
|  | 2021/2022 | Raglan Street    | Raglan St - Want St to Military Rd   | Concrete     | Left  | 111           | 1.9          |
| 2021/2022 Raglan Street Raglan St - Milner St to Want St Concrete Left 216 1.9   | 2021/2022 | Raglan Street    | Raglan St - Want St to Military Rd   | Brick Paving | Left  | 35            | 3.5          |
|  | 2021/2022 | Raglan Street    | Raglan St - Milner St to Want St   | Concrete     | Left  | 216           | 1.9          |

| Year      | Road Name            | Road Segment                                | Material     | Side  | Length<br>(m) | Width<br>(m) |
|-----------|----------------------|---|--------------|-------|---------------|--------------|
| 2021/2022 | Raglan Street        | Raglan St - Canrobert St to<br>Milner St    | Concrete     | Left  | 137           | 1.8          |
| 2021/2022 | Raglan Street        | Raglan St - Calypso Av to<br>Canrobert S    | Concrete     | Left  | 202           | 1.8          |
| 2021/2022 | Raglan Street        | Raglan St - Mosman St to<br>Calypso Av      | Concrete     | Left  | 326           | 1.8          |
| 2021/2022 | Raglan Street        | Raglan St - Canrobert St to<br>Milner St    | Asphalt      | Left  | 40            | 1.5          |
| 2021/2022 | Raglan Street        | Raglan St - Want St to Military Rd          | Brick Paving | Right | 36            | 3.5          |
| 2021/2022 | Raglan Street        | Raglan St - Want St to Military Rd          | Concrete     | Right | 89            | 1.5          |
| 2021/2022 | Raglan Street        | Raglan St - Milner St to Want St            | Concrete     | Right | 188           | 1.4          |
| 2021/2022 | Raglan Street        | Raglan St - Canrobert St to<br>Milner St    | Concrete     | Right | 127           | 1.4          |
| 2021/2022 | Raglan Street        | Raglan St - Calypso Av to<br>Canrobert S    | Concrete     | Right | 183           | 1.4          |
| 2021/2022 | Wudgong Street       | Wudgong St - Wudgong Walk<br>to Military    | Concrete     | Left  | 112           | 1.4          |
| 2021/2022 | Wudgong Street       | Wudgong St - Prince to<br>Wudgong Walk      | Concrete     | Left  | 128           | 1.4          |
| 2021/2022 | Wudgong Street       | Wudgong St - Wudgong Walk<br>to Military    | Concrete     | Right | 113           | 1.6          |
| 2021/2022 | Wudgong Street       | Wudgong St - Prince to<br>Wudgong Walk      | Concrete     | Right | 80            | 1.4          |
| 2021/2022 | Wudgong Street       | Wudgong St - Prince to<br>Wudgong Walk      | Concrete     | Right | 80            | 1.4          |
| 2021/2022 | Wudgong Walk         | Wudgong Walk - Cowles Rd to<br>End          | Concrete     | Left  | 51            | 1            |
| 2021/2022 | Wudgong Walk         | Wudgong Walk - End to<br>Wudgong St         | Concrete     | Left  | 18            | 2            |
| 2022/2023 | Cabramatta Road      | Cabramatta Rd - Bardwell St to<br>Spofforth | Concrete     | Left  | 412           | 1.5          |
| 2022/2023 | Cabramatta Road      | Cabramatta Rd - Cowles to<br>Bardwell St    | Concrete     | Left  | 234           | 1.5          |
| 2022/2023 | Martens Lane         | Martens Lane - Middle Head To<br>Raglan     | Concrete     | Left  | 50            | 2            |
| 2022/2023 | Prince Albert Street | Prince Albert St - Union To<br>Queen        | Concrete     | Right | 148           | 1.8          |
| 2022/2023 | Union Street         | Union St - Bradleys to Milton               | Concrete     | Right | 115           | 1.5          |
| 2022/2023 | Union Street         | Union St - Bradleys to Milton               | Concrete     | Right | 10            | 1.5          |
| 2022/2023 | Union Street         | Union St - Milton to Prince Albert          | Concrete     | Right | 123           | 1.8          |

| Year      | Road Name          | Road Segment                                | Material | Side  | Length<br>(m) | Width<br>(m) |
|-----------|--------------------|---|----------|-------|---------------|--------------|
| 2022/2023 | Thompson Street    | Thompson St - Bradleys to Prince<br>Albert  | Concrete | Left  | 35            | 1.8          |
| 2022/2023 | Thompson Street    | Thompson St - Burrawong to<br>Bradleys      | Concrete | Left  | 46            | 1.2          |
| 2023/2024 | Holt Avenue        | Holt Ave - Bardwell Ln to<br>Spofforth      | Concrete | Left  | 414           | 1.4          |
| 2023/2024 | Holt Avenue        | Holt Ave - Cowles to Bardwell Ln            | Concrete | Left  | 230           | 1.4          |
| 2023/2024 | Kahibah Road       | Kahibah Rd - Middle Head to<br>Wolseley     | Concrete | Left  | 117           | 1.5          |
| 2023/2024 | Kardinia Lane      | Kardinia Rd - Morella to Lane               | Concrete | Left  | 15            | 1.8          |
| 2023/2024 | Bradleys Head Road | Bradleys Head Rd - King Max to<br>Military  | Concrete | Right | 288           | 1.5          |
| 2023/2024 | Clanalpine Street  | Clanalpine St - Kallaroo to Magic<br>Grove  | Concrete | Left  | 295           | 1.3          |
| 2023/2024 | Clanalpine Street  | Clanalpine St - Magic to Queen              | Concrete | Left  | 38            | 1.8          |
| 2023/2024 | Clanalpine Street  | Clanalpine St - Magic to Queen              | Concrete | Left  | 70            | 1.8          |
| 2023/2024 | Kardinia Road      | Kardinia Rd Morella to Lane                 | Concrete | Left  | 15            | 1.8          |
| 2023/2024 | King Max Street    | King Max St - Bradleys to Middle<br>Hd Rd   | Concrete | Right | 15            | 2.3          |
| 2023/2024 | King Max Street    | King Max St - Bradleys to Middle<br>Hd Rd   | Asphalt  | Right | 15            | 3            |
| 2023/2024 | Lennox Street      | Lennox St - Prince Albert to<br>Dead End    | Concrete | Left  | 115           | 1.8          |
| 2023/2024 | Lennox Street      | Lennox St: Prince Albert to Dead<br>End     | Concrete | Left  | 134           | 1.5          |
| 2024/2025 | Magic Grove        | Magic Grove - Cabban to<br>Clanalpine       | Concrete | Left  | 62            | 1.4          |
| 2024/2025 | Magic Grove        | Magic Grove - Mistral to Calypso            | Concrete | Left  | 27            | 0.8          |
| 2024/2025 | Magic Grove        | Magic Grove - Mistral to Calypso            | Concrete | Left  | 17            | 0.8          |
| 2024/2025 | Methuen Avenue     | Methuen Ave - Middle Head Rd<br>to Wolseley | Concrete | Right | 57            | 1.5          |
| 2024/2025 | Raglan Street      | Raglan St - Calypso Av to<br>Canrobert S    | Concrete | Right | 183           | 1.4          |
| 2024/2025 | Cabramatta Road    | Cabramatta Rd - Bardwell St to<br>Spofforth | Concrete | Left  | 412           | 1.5          |
| 2024/2025 | Cabramatta Road    | Cabramatta Rd - Cowles to<br>Bardwell St    | Concrete | Left  | 234           | 1.5          |
| 2024/2025 | Wolseley Road      | Wolseley Rd (Lower) - Mulbring<br>to Cullen | Concrete | Right | 38            | 1.1          |

| Year      | Road Name         | Road Segment                                 | Material | Side  | Length<br>(m) | Width<br>(m) |
|-----------|-------------------|--|----------|-------|---------------|--------------|
| 2025/2026 | Burrawong Avenue  | Burrawong Ave - Dead End to<br>Kardinia      | Concrete | Left  | 85            | 1.8          |
| 2025/2026 | Burrawong Avenue  | Burrawong Ave - Kardinia to<br>Clifton       | Concrete | Left  | 15            | 1.8          |
| 2025/2026 | Wunda Road        | Wunda Rd - Wolger to Belmont                 | Concrete | Left  | 243           | 1.6          |
| 2025/2026 | Fairfax Road      | Fairfax Rd - Kirkoswald to Tivoli<br>St      | Concrete | Left  | 130           | 1.5          |
| 2025/2026 | Kirkoswald Avenue | Kirkoswald Av (Lower) - Fairfax<br>to Burran | Concrete | Left  | 222           | 1.4          |
| 2025/2026 | Congewoi Road     | Congewoi Rd - Ourimbah Rd to<br>Wyong Rd     | Concrete | Right | 281           | 1.8          |
| 2026/2027 | Magic Grove       | Magic Grove - Cabban to<br>Clanalpine        | Concrete | Left  | 62            | 1.4          |
| 2026/2027 | Magic Grove       | Magic Grove - Mistral to Calypso             | Concrete | Left  | 27            | 0.8          |
| 2026/2027 | Magic Grove       | Magic Grove - Mistral to Calypso             | Concrete | Left  | 17            | 0.8          |
| 2026/2027 | Mandolong Road    | Mandolong Rd - Little to<br>Moruben          | Concrete | Left  | 105           | 1.2          |
| 2026/2027 | Mistral Avenue    | Mistral Av - Clanalpine to Magic<br>Grov     | Concrete | Right | 117           | 2.4          |
| 2026/2027 | Orlando Avenue    | Orlando Ave - Dead End to<br>Caliope         | Concrete | Right | 220           | 1.5          |
| 2026/2027 | Rickard Avenue    | Rickard Ave - Junction to End                | Concrete | Right | 120           | 1.5          |
| 2027/2028 | Silex Road        | Silex Rd - Thompson to Bradleys              | Concrete | Right | 44            | 1.4          |
| 2027/2028 | Silex Road        | Silex Rd - Thompson to Bradleys              | Concrete | Right | 55            | 1.8          |
| 2027/2028 | Silex Road        | Silex Rd - Thompson to Bradleys              | Concrete | Right | 11            | 1.8          |
| 2027/2028 | Silex Road        | Silex Rd - Thompson to Bradleys              | Concrete | Right | 81            | 1.4          |
| 2027/2028 | Silex Road        | Silex Rd - Thompson to Bradleys              | Concrete | Right | 81            | 1.4          |
| 2027/2028 | Tivoli Street     | Tivoli St - Warringah L to Fairfax<br>Rd     | Concrete | Right | 58            | 1.8          |
| 2027/2028 | Wyargine Street   | Wyargine St - Edwards B Rd to<br>Stanto      | Concrete | Right | 110           | 1.5          |
| 2027/2028 | Beaconsfield Road | Beaconsfield Rd - Middle Head<br>to Wolseley | Concrete | Left  | 145           | 1.3          |
| 2027/2028 | Beaconsfield Road | Beaconsfield Rd - Wolseley to<br>Plunkett    | Concrete | Left  | 180           | 1.3          |
| 2028/2029 | Horsnell Lane     | Horsnell Lane - Field Ln to Civic<br>Ln      | Concrete | Right | 119           | 0.55         |
| 2028/2029 | Moruben Road      | Moruben Rd - No.8 to Punch St                | Concrete | Left  | 63            | 1.5          |

| Year      | Road Name         | Road Segment                               | Material | Side  | Length<br>(m) | Width<br>(m) |
|-----------|-------------------|--|----------|-------|---------------|--------------|
| 2028/2029 | Moruben Road      | Moruben Rd - Awaba St to<br>Stanton Rd     | Concrete | Left  | 217           | 1.5          |
| 2028/2029 | Moruben Road      | Moruben Rd - Mandolong Rd to<br>No.8       | Concrete | Left  | 70            | 1.5          |
| 2028/2029 | Moruben Road      | Moruben Rd - Punch St to<br>Awaba St       | Concrete | Left  | 230           | 1.8          |
| 2028/2029 | Moruben Road      | Moruben Rd - No.8 to Punch St              | Concrete | Right | 70            | 1.8          |
| 2028/2029 | Moruben Road      | Moruben Rd - Awaba St to<br>Stanton Rd     | Concrete | Right | 218           | 1.5          |
| 2028/2029 | Moruben Road      | Moruben Rd - Mandolong Rd to<br>No.8       | Concrete | Right | 84            | 1.8          |
| 2028/2029 | Moruben Road      | Moruben Rd - Punch St to<br>Awaba St       | Concrete | Right | 227           | 1.5          |
| 2028/2029 | Ruby Street       | Ruby Street - Thompson to<br>Union         | Concrete | Right | 133           | 1.8          |
| 2028/2029 | Ruby Street       | Ruby Street - Thompson to<br>Union         | Concrete | Right | 136           | 1.7          |
| 2028/2029 | Ruby Street       | Ruby Street - Thompson to<br>Union         | Concrete | Right | 17            | 1.7          |
| 2028/2029 | Ruby Street       | Ruby Street - Thompson to<br>Union         | Concrete | Right | 17            | 1.7          |
| 2028/2029 | Harston Avenue    | Harston Av- Dead End to<br>Carrington      | Concrete | Right | 10            | 1.4          |
| 2028/2029 | Hopetoun Avenue   | Hopetoun Av - Kirkoswald to<br>Rosherville | Concrete | Left  | 92            | 1.7          |
| 2028/2029 | Botanic Road      | Botanic Rd - Dead End to<br>Esplanade      | Concrete | Left  | 174           | 1.5          |
| 2028/2029 | Botanic Road      | Botanic Rd - Dead End to<br>Esplanade      | Concrete | Left  | 262           | 1.5          |
| 2028/2029 | Ballantyne Street | Ballantyne St - Avenue to Dead<br>End      | Concrete | Left  | 80            | 1.4          |

### E.3 - Steps

| Year      | Road Name                  | Material               | Associated Road Segment                               | Side  | Approx.<br>No. of<br>Steps | Length<br>(m) | Width<br>(m) |
|-----------|----------------------------|------------------------|---|-------|----------------------------|---------------|--------------|
| 2019/2020 | Inkerman Street            | Concrete               | Inkerman St - Dead End to<br>Carrington               | Right | 57                         | 18            | 1.8          |
| 2020/2021 | Avenue Road                | Sandstone              | Avenue Rd - Reid Park to<br>Upper Avenue              | Right | 20                         | 10            | 0.7          |
| 2020/2021 | Musgrave Street            | Sandstone/<br>Asphalt  | Musgrave - Cs End Concrete to Mcleod                  | Right | 25                         | 12            | 1            |
| 2020/2021 | Sirius Avenue              | Sandstone              | Sirius Ave/Sirius Cove Rd to<br>Dead End              | Right | 10                         | 3             | 1            |
| 2021/2022 | Avenue Road                | Concrete               | Avenue Rd - Reid Park to<br>Upper Avenue              | Right | 18                         | 6             | 0.7          |
| 2021/2022 | Balmoral<br>Lookout        | Sandstone              | Balmoral Lookout - Stanton<br>to Kirkos               | Right | 5                          | 2             | 0.7          |
| 2021/2022 | Burrawong<br>Avenue        | Concrete               | Burrawong Ave - Dead End<br>to Iluka                  | Left  | 40                         | 12            | 1.5          |
| 2021/2022 | James Street               | Sandstone/<br>Concrete | James St - Dead End to<br>Parriwi Rd                  | Right | 16                         | 5             | 1            |
| 2021/2022 | Julian Street              | Sandstone              | Julian St - Wyong Rd to<br>Divided In Rd              | Left  | 25                         | 10            | 0.7          |
| 2022/2023 | Kahibah Road               | Brick                  | Kahibah Rd - Coronation to<br>Dead End                | Left  | 14                         | 5             | 0.5          |
| 2022/2023 | Major Street               | Sandstone              | Major St - Whiting Beach Rd<br>to Dead End            | Left  | 4                          | 1.2           | 0.6          |
| 2022/2023 | Mcleod Street              | Concrete               | Mcleod St - Trumfield to<br>Dead End                  | Left  | 14                         | 5             | 0.9          |
| 2022/2023 | Mosman Street              | Sandstone              | Mosman St - Trumfield to<br>Badham                    | Right | 20                         | 10            | 0.9          |
| 2022/2023 | Mulbring Street            | Concrete               | Mulbring St - Wolseley to<br>Dugald                   | Right | 42                         | 13            | 1            |
| 2023/2024 | Musgrave Street            | Sandstone              | Musgrave St - Dead End to<br>Cs Concrete              | Left  | 15                         | 5             | 0.7          |
| 2023/2024 | Sirius Park<br>Access Road | Sandstone/<br>Concrete | Sirius Park Access Rd -<br>Curlew Camp to Sirius Cove | Right | 5                          | 2             | 1            |
| 2023/2024 | Spencer Road               | Sandstone              | Spencer Rd - Cowles to<br>Bardwell Ln                 | Right | 5                          | 1.5           | 0.9          |
| 2023/2024 | Parriwi Road               | Sandstone              | Parriwi Rd - No.17 to End Of<br>Concrete Kerb         | Left  | 12                         | 5             | 0.7          |
| 2023/2024 | Pulpit Lane                | Sandstone              | Pulpit Lane - Bay St to<br>Reserve                    | Right | 40                         | 12            | 0.7          |
| 2024/2025 | Redan Street               | Sandstone/<br>Concrete | Redan St - Raglan to<br>Balmoral                      | Left  | 8                          | 3             | 0.6          |
| 2024/2025 | Redan Street               | Sandstone              | Redan St - Balmoral to<br>Almora                      | Left  | 20                         | 5             | 0.5          |

| Year      | Road Name              | Material                  | Associated Road Segment                     | Side                                 | Approx.<br>No. of<br>Steps | Length<br>(m) | Width<br>(m) |
|-----------|------------------------|---------------------------|---|--------------------------------------|----------------------------|---------------|--------------|
| 2024/2025 | Rickard Avenue         | Sandstone/<br>Concrete    | Rickard Ave - Junction to<br>End            | Right                                | 66                         | 20            | 1.2          |
| 2024/2025 | Stanley Avenue         | Sandstone                 | Stanley Av - L.Punch St to<br>Awaba St      | Left                                 | 7                          | 2.5           | 0.7          |
| 2024/2025 | Upper Spit<br>Road     | Sandstone                 | Upper Spit Rd - Spit Rd to<br>End           | Right                                | 9                          | 4             | 0.9          |
| 2025/2026 | Wyong Road             | Sandstone                 | Wyong Rd - Dead End to<br>Shellbank West    | Right                                | 70                         | 30            | 0.8          |
| 2025/2026 | Lower Almora<br>Street | Timber Sleeper/<br>Gravel | Lower Almora St - Ryan Av<br>to Superba     | Right                                | 12                         | 6             | 1.2          |
| 2025/2026 | Arbutus Street         | Sandstone/<br>Concrete    | Arbutus St - Almora St to<br>Mandolong R    | Right                                | 8                          | 3             | 0.8          |
| 2025/2026 | Avenue Road            | Sandstone/<br>Concrete    | Avenue Rd - Reid Park to<br>Upper Avenue    | Right                                | 13                         | 4.5           | 0.7          |
| 2025/2026 | Awaba Street           | Concrete                  | Awaba St - Bond St to<br>Countess St        | Right                                | 11                         | 3.5           | 0.9          |
| 2026/2027 | Boyle Street           | Sandstone/<br>Concrete    | Boyle St - Dead End,<br>Mosman Bay to D-End | Right                                | 26                         | 9             | 1            |
| 2026/2027 | Burrawong<br>Avenue    | Concrete                  | Burrawong Ave - Iluka to<br>Dead End        | Left                                 | 82                         | 24            | 1.2          |
| 2026/2027 | Fairfax Road           | Timber Log/Dirt           | Fairfax Rd - Stanton Rd to<br>Burran Av     | Left                                 | 10                         | 3             | 1.2          |
| 2026/2027 | Harnett Avenue         | Timber Log/Dirt           | Harnett Ave - Reid Park to<br>Dead End      | Left                                 | 7                          | 3             | 1            |
| 2026/2027 | Illawarra Street       | Sandstone                 | Illawarra St - Dead End to<br>Raglan        | Left                                 | 16                         | 8             | 1            |
| 2027/2028 | Mcleod Street          | Sandstone                 | Mcleod St - Dead End to<br>Musgrave         | Left                                 | 4                          | 1.5           | 1            |
| 2027/2028 | Moran Street           | Sandstone/<br>Concrete    | Moran St - Sverge to Dead<br>End            | Left                                 | 50                         | 15            | 1.2          |
| 2027/2028 | Mosman Street          | Sandstone                 | Mosman St - Trumfield to<br>Badham          | Right                                | 13                         | 4             | 1            |
| 2027/2028 | Avenue Road            | Brick Paving              | Avenue Rd - Reid Park to<br>Upper Avenue    | Right                                | 16                         | 6             | 1            |
| 2027/2028 | Boyle Street           | Sandstone/<br>Concrete    | Boyle St - Dead End,Mosman<br>Bay to D-End  | Right                                | 135                        | 41            | 1.1          |
| 2028/2029 | Bullecourt<br>Avenue   | Sandstone                 | Bullecourt Av - Dead End to<br>Bickell      | Right                                | 1                          | 0.5           | 0.8          |
| 2028/2029 | Clifton Gardens        | Sandstone                 | Clifton Gardens                             | Clifton<br>Gardens<br>Access<br>Road | 35                         | 40            | 1.2          |

| Year      | Road Name        | Material  | Associated Road Segment               | Side  | Approx.<br>No. of<br>Steps | Length<br>(m) | Width<br>(m) |
|-----------|------------------|-----------|---------------------------------------|-------|----------------------------|---------------|--------------|
| 2028/2029 | Cobbittee Street | Sandstone | Cobbittee St - Dayrell to<br>Dead End | Right | 15                         | 6             | 0.7          |
| 2028/2029 | Delecta Avenue   | Sandstone | Delecta Av - Dead End to<br>Bay St    | Right | 13                         | 4             | 0.8          |
| 2028/2029 | Harston Avenue   | Concrete  | Harston Av - Wyong Rd to<br>Dead End  | Right | 82                         | 28            | 1.8          |

#### E.4 - Kerb & Gutter

| Year      | Road Name           | Туре            | Material                           | Associated Road Segment                         | Side  | Length<br>(m) |
|-----------|---------------------|-----------------|------------------------------------|---|-------|---------------|
| 2019/2020 | Morella Road        | Kerb and Gutter | Concrete                           | Morella Rd - David To Conc<br>Section           | Right | 107           |
| 2019/2020 | Morella Road        | Kerb Only       | Concrete                           | Morella Rd - Concrete to<br>Burrawong           | Left  | 208           |
| 2019/2020 | Pindari Avenue      | Kerb and Gutter | Concrete                           | Pindari Ave - No 28 to<br>Beauty Point Rd       | Right | 172           |
| 2019/2020 | Pindari Avenue      | Kerb and Gutter | Concrete                           | Pindari Ave - No 28 to<br>Beauty Point Rd       | Left  | 157           |
| 2019/2020 | Superba Parade      | Kerb and Gutter | Concrete                           | Superba Parade (Upper) -<br>Almora to Mandolong | Left  | 143           |
| 2019/2020 | Warringah Road      | Dish Gutter     | Concrete                           | Warringah Rd - No 1 to Bend                     | Left  | 72            |
| 2020/2021 | Clifford Street     | Kerb and Gutter | Sandstone                          | Clifford St - Moruben Rd To<br>Spit Rd          | Right | 178           |
| 2020/2021 | Punch Lane          | Kerb and Gutter | Sandstone Kerb/<br>Concrete Gutter | Punch Lane - Bend To<br>Awaba St                | Right | 179           |
| 2020/2021 | Rickard Avenue      | Kerb and Gutter | Sandstone Kerb/<br>Concrete Gutter | Rickard Ave/MajorJunction                       | Right | 12            |
| 2020/2021 | Alexander<br>Avenue | Kerb Only       | Sandstone                          | Alexander Ave - Concrete To<br>Effingha         | Left  | 93            |
| 2020/2021 | Awaba Street        | Kerb and Gutter | Concrete                           | Awaba St - Bond St To<br>Countess St            | Right | 183           |
| 2020/2021 | Awaba Street        | Kerb and Gutter | Concrete                           | Awaba St - Bond St To<br>Countess St            | Right | 183           |
| 2021/2022 | Awaba Street        | Kerb and Gutter | Concrete                           | Awaba St - Spit Rd To<br>Cowles Rd              | Left  | 170           |
| 2021/2022 | Awaba Street        | Kerb and Gutter | Sandstone                          | Awaba St - Spit Rd To<br>Cowles Rd              | Left  | 255           |
| 2021/2022 | Awaba Street        | Kerb and Gutter | Concrete                           | Awaba St - Bond St To<br>Countess St            | Left  | 174           |
| 2021/2022 | Awaba Street        | Kerb and Gutter | Concrete                           | Awaba St - Bond St To<br>Countess St            | Left  | 174           |
| 2021/2022 | Awaba Street        | Kerb and Gutter | Sandstone                          | Awaba St - Moruben To Spit                      | Left  | 75            |
| 2021/2022 | Awaba Street        | Kerb and Gutter | Sandstone                          | Awaba St - Moruben To Spit                      | Right | 75            |
| 2022/2023 | Burrawong<br>Avenue | Kerb and Gutter | Concrete                           | Burrawong Ave - Dead End<br>To Kardinia         | Right | 98            |
| 2022/2023 | Burrawong<br>Avenue | Kerb and Gutter | Sandstone                          | Burrawong Ave - Dead End<br>To Kardinia         | Left  | 40            |
| 2022/2023 | Cabramatta<br>Road  | Kerb and Gutter | Sandstone                          | Cabramatta Rd - Cowles To<br>Bardwell St        | Left  | 23            |
| 2022/2023 | Calypso Avenue      | Kerb Only       | Sandstone                          | Calypso Ave - Dead End To<br>Clanalpine         | Right | 43            |

| Year      | Road Name             | Туре            | Material                           | Associated Road Segment                     | Side  | Length<br>(m) |
|-----------|-----------------------|-----------------|------------------------------------|---|-------|---------------|
| 2022/2023 | Clifton Street        | Kerb and Gutter | Concrete                           | Clifton St - Dead End To<br>Burrawong Ave   | Right | 83            |
| 2022/2023 | Clifton Street        | Kerb and Gutter | Concrete                           | Clifton St - Dead End To<br>Burrawong Ave   | Left  | 95            |
| 2023/2024 | Countess Street       | Kerb and Gutter | Concrete                           | Countess St - Earl St To<br>Ourimbah        | Right | 184           |
| 2023/2024 | Gladstone<br>Avenue   | Kerb and Gutter | Sandstone Kerb/<br>Concrete Gutter | Gladstone Ave - Avenue To<br>Belmont        | Right | 84            |
| 2023/2024 | Gladstone<br>Avenue   | Kerb and Gutter | Sandstone                          | Gladstone Ave - Avenue To<br>Belmont        | Right | 84            |
| 2023/2024 | Gooseberry<br>Lane    | Kerb Only       | Sandstone                          | Gooseberry Lane - Pretoria<br>To Dead End   | Right | 10            |
| 2023/2024 | Gooseberry<br>Lane    | Kerb Only       | Sandstone                          | Gooseberry Lane - Pretoria<br>To Dead End   | Left  | 10            |
| 2023/2024 | Hampden Street        | Kerb and Gutter | Sandstone Kerb/<br>Concrete Gutter | Hampden St - Stanton Rd To<br>Dead End      | Left  | 75            |
| 2024/2025 | Horsnell Lane         | Kerb and Gutter | Sandstone                          | Horsnell Lane - Field Ln To<br>Civic Ln     | Left  | 12            |
| 2024/2025 | Iluka Road            | Kerb Only       | Concrete                           | lluka Rd (Upper) - Morella<br>To Lane       | Right | 99            |
| 2024/2025 | Iluka Road            | Kerb Only       | Concrete                           | lluka Rd (Upper) - Lane To<br>End           | Right | 127           |
| 2024/2025 | Kirkoswald<br>Avenue  | Kerb and Gutter | Concrete                           | Kirkoswald Av - Upper -<br>Fairfax To Burra | Right | 225           |
| 2024/2025 | Macpherson<br>Street  | Kerb and Gutter | Sandstone Kerb/<br>Concrete Gutter | Macpherson St - Gerard To<br>Ourimbah Rd    | Right | 118           |
| 2024/2025 | Muston Street         | Kerb and Gutter | Concrete                           | Muston St - Almora To<br>Melaleuca          | Left  | 40            |
| 2025/2026 | Muston Street         | Kerb and Gutter | Sandstone                          | Muston St - Almora To<br>Melaleuca          | Left  | 85            |
| 2025/2026 | Punch Street          | Kerb and Gutter | Sandstone                          | Punch St - Moruben Rd To<br>Spit Rd         | Right | 159           |
| 2025/2026 | Raglan Street         | Kerb and Gutter | Sandstone                          | Raglan St - Mosman St To<br>Calypso Av      | Right | 252           |
| 2025/2026 | Bond Street           | Kerb and Gutter | Sandstone                          | Bond St - Military To<br>Ourimbah           | Right | 100           |
| 2025/2026 | Buena Vista<br>Avenue | Kerb and Gutter | Sandstone Kerb/<br>Concrete Gutter | Buena Vista Ave - Dead End<br>To Thompson   | Left  | 23            |
| 2025/2026 | Buena Vista<br>Avenue | Kerb and Gutter | Sandstone                          | Buena Vista Ave - Dead End<br>To Thompson   | Left  | 92            |
| 2026/2027 | Buena Vista<br>Avenue | Kerb and Gutter | Sandstone                          | Buena Vista Ave - Dead End<br>To Thompson   | Left  | 23            |

| Year      | Road Name            | Туре            | Material                           | Associated Road Segment                   | Side  | Length<br>(m) |
|-----------|----------------------|-----------------|------------------------------------|---|-------|---------------|
| 2026/2027 | Burrawong<br>Avenue  | Kerb and Gutter | Sandstone                          | Burrawong Ave - Kardinia To<br>Clifton    | Right | 14            |
| 2026/2027 | Burrawong<br>Avenue  | Kerb and Gutter | Concrete                           | Burrawong Ave - Kardinia To<br>Clifton    | Right | 61            |
| 2026/2027 | Burrawong<br>Avenue  | Kerb and Gutter | Sandstone                          | Burrawong Ave - Kardinia To<br>Clifton    | Right | 15            |
| 2026/2027 | Burrawong<br>Avenue  | Kerb and Gutter | Concrete                           | Burrawong Ave - Kardinia To<br>Clifton    | Left  | 51            |
| 2026/2027 | Burrawong<br>Avenue  | Kerb and Gutter | Sandstone Kerb/<br>Concrete Gutter | Burrawong Ave - Clifton To<br>Morella     | Left  | 20            |
| 2027/2028 | Cabban Street        | Kerb and Gutter | Concrete                           | Cabban St - Sirius Cove Rd<br>To Magic Gr | Left  | 45            |
| 2027/2028 | Curraghbeena<br>Road | Dish Gutter     | Concrete                           | Curraghbeena Rd - Raglan<br>To Dead End   | Left  | 95            |
| 2027/2028 | Earl Street          | Kerb and Gutter | Concrete                           | Earl St - Bond St To Countess<br>St       | Left  | 68            |
| 2027/2028 | Earl Street          | Kerb and Gutter | Concrete                           | Earl St - Bond St To Countess<br>St       | Left  | 68            |
| 2027/2028 | Earl Street          | Kerb and Gutter | Concrete                           | Earl St - Bond St To Countess<br>St       | Left  | 68            |
| 2027/2028 | Earl Street          | Kerb and Gutter | Concrete                           | Earl St - Bond St To Countess<br>St       | Left  | 68            |
| 2028/2029 | Iluka Road           | Kerb Only       | Concrete                           | lluka Rd (Upper) - Morella<br>To Lane     | Right | 48            |
| 2028/2029 | Iluka Road           | Kerb Only       | Concrete                           | Iluka Rd (Upper) - Lane To<br>End         | Right | 66            |
| 2028/2029 | Iluka Road           | Kerb Only       | Concrete                           | Iluka Rd (Lower) - Morella<br>To Lane     | Left  | 166           |
| 2028/2029 | Iluka Road           | Kerb Only       | Concrete                           | Iluka Rd (Lower) - Lane To<br>End         | Left  | 221           |
| 2028/2029 | James King<br>Lane   | Kerb and Gutter | Concrete                           | James King Lane - Union To<br>Queen       | Right | 40            |
| 2028/2029 | James King<br>Lane   | Kerb and Gutter | Concrete                           | James King Lane - Union To<br>Queen       | Left  | 100           |

### E.5 - Physical Traffic Devices

| Year      | Road Name         | Туре                 | Location or Intersecting Road      | Number | Area<br>(m²) |
|-----------|-------------------|----------------------|------------------------------------|--------|--------------|
| 2019/2020 | Middle Head Road  | Pedestrian Refuge    |                                    | 1      | 30           |
| 2019/2020 | Middle Head Road  | Kerb Buildout        |                                    | 2      | 32           |
| 2019/2020 | Spencer Road      | Chicane              | Chicane Bet Bardwell and Spofforth |        | 80           |
| 2019/2020 | Holt Avenue       | Chicane              | Bet Bardwell and Spofforth         | 6      | 144          |
| 2019/2020 | Cabramatta Road   | Speed Humps          | Spofforth                          | 1      | 80           |
| 2019/2020 | Cowles Road       | Speed Humps          | Bet Art Gallery and Belmont        | 1      | 56           |
| 2019/2020 | Glover St         | Roundabout           | Bardwell                           | 1      | 50           |
| 2020/2021 | Wolger Road       | Roundabouts          | Noble                              | 1      | 28           |
| 2020/2021 | Holt Avenue       | Speed Humps          | Bet Bardwell and Cowles            | 1      | 80           |
| 2020/2021 | Holt Avenue       | Median Islands       |                                    | 1      | 10           |
| 2020/2021 | Holt Avenue       | Kerb Blister Islands |                                    | 2      | 6            |
| 2020/2021 | Holt Avenue       | Kerb Blister Islands |                                    | 2      | 6            |
| 2020/2021 | Medusa Street     | Wombat Crossing      | Mid length                         | 1      | 65           |
| 2021/2022 | Raglan Street     | Kerb Blister Islands | East side McLeod to Currambeena    | 1      | 3            |
| 2021/2022 | Raglan Street     | Median Islands       |                                    | 2      | 13           |
| 2021/2022 | Raglan Street     | Median Islands       |                                    | 2      | 13           |
| 2021/2022 | Rangers Avenue    | Kerb Blister Islands |                                    | 2      | 10           |
| 2021/2022 | Rangers Avenue    | Kerb Blister Islands |                                    | 2      | 10           |
| 2021/2022 | Reginald Street   | Slow Treatment       | Oswald                             | 1      | 140          |
| 2021/2022 | Wolger Road       | Speed Humps          | Just east of Noble                 | 1      | 18           |
| 2022/2023 | Upper Avenue Road | Kerb Blister Islands |                                    | 1      | 2            |
| 2022/2023 | Upper Avenue Road | Kerb Blister Islands |                                    | 1      | 2            |
| 2022/2023 | Upper Avenue Road | Kerb Blister Islands |                                    | 2      | 4            |
| 2022/2023 | Upper Avenue Road | Kerb Blister Islands |                                    | 2      | 4            |
| 2022/2023 | Upper Avenue Road | Speed Humps          |                                    | 1      | 9            |
| 2022/2023 | Cobbittee Street  | Median Islands       | Middle Hd Rd                       | 1      | 28           |
| 2022/2023 | Avenue Road       | Roundabouts          | Canrobert                          | 1      | 38           |
| 2023/2024 | Awaba Street      | Speed Humps          | Bet Cowles and Spit                | 1      | 26           |
| 2023/2024 | Awaba Street      | Speed Humps          | Bet Cowles and Spit                | 1      | 26           |
| 2023/2024 | Awaba Street      | Speed Humps          | Bet Cowles and Spit                | 1      | 26           |

| Year      | Road Name         | Туре                 | Location or Intersecting Road | Number | Area<br>(m²) |
|-----------|-------------------|----------------------|-------------------------------|--------|--------------|
| 2023/2024 | Awaba Street      | Pedestrian Refuges   | Cowles                        | 1      | 6            |
| 2023/2024 | Awaba Street      | Pedestrian Refuges   | The Esplanade                 | 1      | 10           |
| 2023/2024 | Bay Street        | Kerb Blister Islands | Kerb Blister Islands          |        | 9            |
| 2023/2024 | Bay Street        | Kerb Blister Islands | Kerb Blister Islands          |        | 9            |
| 2023/2024 | Bay Street        | Speed Humps          | Bet Bickell and Quakers       | 1      | 33           |
| 2024/2025 | Beauty Point Road | Median Islands       | Pindari                       | 2      | 8            |
| 2024/2025 | Beauty Point Road | Median Islands       | Pindari                       | 2      | 8            |
| 2024/2025 | Belmont Road      | Roundabouts          | Bardwell                      | 1      | 50           |
| 2024/2025 | Belmont Road      | Median Islands       |                               | 1      | 7            |
| 2024/2025 | Belmont Road      | Median Islands       |                               | 1      | 7            |
| 2024/2025 | Belmont Road      | Median Islands       |                               | 1      | 7            |
| 2024/2025 | Belmont Road      | Median Islands       |                               | 1      | 7            |
| 2024/2025 | Belmont Road      | Speed Humps          | Just west of Noble            | 1      | 70           |
| 2024/2025 | Belmont Road      | Kerb Blister Islands |                               | 4      | 5            |
| 2024/2025 | Belmont Road      | Kerb Blister Islands |                               | 4      | 5            |
| 2024/2025 | Belmont Road      | Median Islands       |                               | 1      | 7            |
| 2024/2025 | Belmont Road      | Speed Humps          | Just east of Bardwell         | 1      | 70           |
| 2024/2025 | Belmont Road      | Kerb Blister Islands |                               | 4      | 5            |
| 2024/2025 | Belmont Road      | Kerb Blister Islands |                               | 4      | 5            |
| 2024/2025 | Belmont Road      | Median Islands       |                               | 1      | 7            |
| 2024/2025 | Belmont Road      | Median Islands       | Military                      | 1      | 6            |
| 2024/2025 | Belmont Road      | Wombat Crossing      | Bet Military and Gladstone    | 1      | 66           |
| 2025/2026 | Brady Street      | Median Islands       | Military                      | 1      | 10           |
| 2025/2026 | Brady Street      | Wombat Crossing      | Hordern                       | 1      | 31           |
| 2025/2026 | Brady Street      | Kerb Blister Islands |                               | 4      | 4            |
| 2025/2026 | Brady Street      | Kerb Blister Islands |                               | 4      | 4            |
| 2025/2026 | Brady Street      | Kerb Blister Islands |                               | 4      | 4            |
| 2025/2026 | Brady Street      | Kerb Blister Islands |                               | 4      | 4            |
| 2025/2026 | Cabban Street     | Median Islands       | Magic                         | 1      | 24           |
| 2026/2027 | Cabramatta Road   | Median Islands       |                               | 1      | 15           |

| Year      | Road Name       | Туре                 | Location or Intersecting Road | Number | Area<br>(m²) |
|-----------|-----------------|----------------------|-------------------------------|--------|--------------|
| 2026/2027 | Cabramatta Road | Kerb Blister Islands |                               | 2      | 15           |
| 2026/2027 | Cabramatta Road | Kerb Blister Islands |                               | 2      | 15           |
| 2026/2027 | Cabramatta Road | Median Islands       |                               | 1      | 6            |
| 2026/2027 | Cabramatta Road | Median Islands       |                               | 1      | 6            |
| 2026/2027 | Cabramatta Road | Median Islands       |                               | 1      | 6            |
| 2026/2027 | Cabramatta Road | Kerb Buildout        |                               | 2      | 48           |
| 2026/2027 | Cabramatta Road | Kerb Buildout        |                               | 2      | 48           |
| 2027/2028 | Cowles Road     | Kerb Blister Islands | Ourimbah to Awaba             | 8      | 4            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands | Ourimbah to Awaba             | 8      | 4            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands | Ourimbah to Awaba             | 8      | 4            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands | Ourimbah to Awaba             | 8      | 4            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands | Ourimbah to Awaba             | 8      | 4            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands | Ourimbah to Awaba             | 8      | 4            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands | Ourimbah to Awaba             | 8      | 4            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands | Ourimbah to Awaba             | 8      | 4            |
| 2027/2028 | Cowles Road     | Speed Humps          | Spencer to Glover             | 1      | 56           |
| 2027/2028 | Cowles Road     | Median Islands       |                               | 1      | 2            |
| 2027/2028 | Cowles Road     | Median Islands       |                               | 1      | 2            |
| 2027/2028 | Cowles Road     | Roundabouts          | Belmont                       | 1      | 57           |
| 2027/2028 | Cowles Road     | Median Islands       |                               | 4      | 6            |
| 2027/2028 | Cowles Road     | Median Islands       |                               | 4      | 6            |
| 2027/2028 | Cowles Road     | Median Islands       |                               | 4      | 6            |
| 2027/2028 | Cowles Road     | Median Islands       |                               | 4      | 6            |
| 2027/2028 | Cowles Road     | Speed Humps          | Bet Short and Belmont         | 1      | 56           |
| 2027/2028 | Cowles Road     | Median Islands       |                               | 1      | 2            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands |                               | 2      | 10           |
| 2027/2028 | Cowles Road     | Kerb Blister Islands |                               | 2      | 10           |
| 2027/2028 | Cowles Road     | Wombat Crossing      | Spencer to Avenue             | 1      | 48           |
| 2027/2028 | Cowles Road     | Kerb Blister Islands |                               | 4      | 2            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands |                               | 4      | 2            |

| Year      | Road Name       | Туре                 | Location or Intersecting Road | Number | Area<br>(m²) |
|-----------|-----------------|----------------------|-------------------------------|--------|--------------|
| 2027/2028 | Cowles Road     | Kerb Blister Islands |                               | 4      | 2            |
| 2027/2028 | Cowles Road     | Kerb Blister Islands |                               | 4      | 2            |
| 2028/2029 | Erith Street    | Median Islands       | Hale                          | 1      | 11           |
| 2028/2029 | Euryalus Street | Median Islands       | Pindari                       | 1      | 10           |
| 2028/2029 | Glover Street   | Roundabouts          | Bardwell                      | 1      | 50           |
| 2028/2029 | Glover Street   | Median Islands       |                               | 4      | 7            |
| 2028/2029 | Glover Street   | Median Islands       |                               | 4      | 7            |
| 2028/2029 | Glover Street   | Median Islands       |                               | 4      | 7            |
| 2028/2029 | Glover Street   | Median Islands       |                               | 4      | 7            |
| 2028/2029 | Glover Street   | Kerb Blister Islands |                               | 4      | 15           |

#### E.6 - Car Parks

| Year      | Location                                   | Group                      | Туре               | Sub-Type                  | Quantity | Unit |
|-----------|--|----------------------------|--------------------|---------------------------|----------|------|
| 2019/2020 | Ellery Park                                | Physical Traffic<br>Device | Bollards           | Steel Painted             | 9        | Each |
| 2019/2020 | Spit East                                  | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 200      | m    |
| 2020/2021 | Raglan Street West                         | Road Pavement              | Surface Course     | Asphalt                   | 1660     | m2   |
| 2020/2021 | Raglan Street West                         | Road Pavement              | Flexible Pavement  | 200 Road Base             | 1660     | m2   |
| 2020/2021 | Raglan Street West                         | Kerb & Gutter              | Kerb Only          | Concrete                  | 210      | m    |
| 2020/2021 | Raglan Street West                         | Physical Traffic<br>Device | Speed Hump         | Asphalt                   | 2        | Each |
| 2020/2021 | Raglan Street West                         | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 400      | m    |
| 2020/2021 | Raglan Street West                         | Lines & Signs              | Linemarking        | Disabled Parking          | 2        | Each |
| 2021/2022 | Cross Street /<br>Rawson Oval              | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 200      | m    |
| 2021/2022 | Cross Street /<br>Rawson Oval              | Lines & Signs              | Linemarking        | Disabled Parking          | 1        | Each |
| 2021/2022 | Cross Street /<br>Rawson Oval              | Road Pavement              | Wearing Surface    | Asphalt                   | 1350     | m2   |
| 2021/2022 | Cross Street /<br>Rawson Oval              | Kerb & Gutter              | Kerb Only          | Concrete                  | 220      | m    |
| 2021/2022 | Cross Street /<br>Rawson Oval              | Lines & Signs              | Regulatory Parking | Parking                   | 3        | Each |
| 2021/2022 | Cross Street /<br>Rawson Oval-West<br>Side | Retaining Wall             | Sandstone          |                           | 42       | m2   |
| 2021/2022 | Cnr Spit / Stanton                         | Road Pavement              | Wearing Surface    | Asphalt                   | 396      | m2   |
| 2021/2022 | Cnr Spit / Stanton                         | Kerb & Gutter              | Kerb Only          | Concrete                  | 72       | m    |
| 2021/2022 | Cnr Spit / Stanton                         | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 120      | m    |
| 2021/2022 | Cnr Spit / Stanton                         | Lines & Signs              | Custom Signs       | Information               | 1        | Each |
| 2022/2023 | Civic Centre                               | Road Pavement              | Wearing Surface    | Asphalt                   | 1530     | m2   |
| 2022/2023 | Civic Centre                               | Lines & Signs              | Regulatory Parking | Parking                   | 20       | Each |
| 2022/2023 | Civic Centre                               | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 55       | Each |
| 2022/2023 | Civic Centre                               | Kerb & Gutter              | Kerb Only          | Concrete                  | 200      | m    |
| 2022/2023 | Civic Centre                               | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 300      | m    |
| 2022/2023 | Civic Centre                               | Lines & Signs              | Linemarking        | Arrows                    | 6        | Each |

| Year      | Location                       | Group                      | Туре               | Sub-Type                  | Quantity | Unit |
|-----------|--------------------------------|----------------------------|--------------------|---------------------------|----------|------|
| 2022/2023 | Civic Centre                   | Physical Traffic<br>Device | Tall Lights        | Steel                     | 10       | Each |
| 2022/2023 | Mosman Library                 | Road Pavement              | Wearing Surface    | Asphalt                   | 200      | m2   |
| 2022/2023 | Mosman Library                 | Fence                      | Railing            | Steel                     | 8        | m    |
| 2022/2023 | Mosman Library                 | Kerb & Gutter              | Kerb Only          | Concrete                  | 40       | m    |
| 2022/2023 | Mosman Library                 | Lines & Signs              | Regulatory Parking | Parking                   | 7        | Each |
| 2023/2024 | Spit West                      | Lines & Signs              | Linemarking        | Disabled Parking          | 1        | Each |
| 2023/2024 | Spit West                      | Road Pavement              | Wearing Surface    | Asphalt                   | 5389     | m2   |
| 2023/2024 | Spit West                      | Footpath                   | Brick Paving       |                           | 2        | m2   |
| 2023/2024 | Spit West                      | Kerb & Gutter              | Kerb Only          | Concrete                  | 688      | m    |
| 2023/2024 | Spit West                      | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 200      | m    |
| 2023/2024 | Spit West                      | Lines & Signs              | Regulatory Parking | Parking                   | 9        | Each |
| 2023/2024 | Spit West                      | Parking Meter              | Pay and Display    | Steel                     | 3        | Each |
| 2023/2024 | Spit West                      | Lines & Signs              | Custom Signs       | Information               | 9        | Each |
| 2024/2025 | Balmoral Oval                  | Fence                      | Post and Rail Log  | Timber                    | 20       | m    |
| 2024/2025 | Balmoral Oval                  | Kerb & Gutter              | Kerb Only          | Concrete                  | 220      | m    |
| 2024/2025 | Balmoral Oval                  | Kerb & Gutter              | Kerb & Gutter      | Concrete                  | 410      | m    |
| 2024/2025 | Balmoral Oval                  | Fence                      | Post and Rail Log  | Timber                    | 20       | m    |
| 2024/2025 | Balmoral Oval                  | Kerb & Gutter              | Kerb Only          | Concrete                  | 220      | m    |
| 2024/2025 | Balmoral Oval                  | Kerb & Gutter              | Kerb & Gutter      | Concrete                  | 410      | m    |
| 2024/2025 | Balmoral Oval-<br>Around Trees | Kerb & Gutter              | Flush Kerb         | Concrete                  | 50       | m    |
| 2024/2025 | Balmoral Oval-Entry<br>Area    | Kerb & Gutter              | Kerb Only          | Sandstone                 | 80       | m    |
| 2024/2025 | Balmoral Oval                  | Lines & Signs              | Custom Signs       | Information               | 11       | Each |
| 2024/2025 | Balmoral Oval                  | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 50       | m    |
| 2024/2025 | Balmoral Oval                  | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 300      | m    |
| 2024/2025 | Balmoral Oval                  | Lines & Signs              | Linemarking        | Arrows                    | 11       | Each |
| 2024/2025 | Balmoral Oval                  | Lines & Signs              | Linemarking        | Disabled Parking          | 3        | Each |
| 2024/2025 | Balmoral Oval                  | Lines & Signs              | Linemarking        | Hatching                  | 50       | m2   |

| Year      | Location                               | Group                      | Туре               | Sub-Type                  | Quantity | Unit |
|-----------|--|----------------------------|--------------------|---------------------------|----------|------|
| 2024/2025 | Balmoral Oval                          | Physical Traffic<br>Device | Speed Hump         | Asphalt                   | 1        | Each |
| 2024/2025 | Balmoral Oval-Entry                    | Road Pavement              | Wearing Surface    | Asphalt                   | 50       | m2   |
| 2024/2025 | Balmoral Oval                          | Lines & Signs              | Regulatory Parking | Parking                   | 42       | Each |
| 2024/2025 | Balmoral Oval                          | Parking Meter              | Pay and Display    | Steel                     | 3        | Each |
| 2024/2025 | Balmoral Oval                          | Road Pavement              | Brick Paving       |                           | 4725     | m2   |
| 2024/2025 | Balmoral Oval                          | Road Pavement              | Flexible Pavment   | 200 Road Base             | 4725     | m2   |
| 2025/2026 | Rosherville Reserve                    | Road Pavement              | Flexible Pavment   | 200 Road Base             | 1674     | m2   |
| 2025/2026 | Rosherville Reserve                    | Road Pavement              | Brick Paving       |                           | 1674     | m2   |
| 2025/2026 | Rosherville Reserve                    | Kerb & Gutter              | Kerb Only          | Concrete                  | 240      | m    |
| 2025/2026 | Rosherville Reserve                    | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 150      | m    |
| 2025/2026 | Rosherville Reserve-<br>Entry          | Physical Traffic<br>Device | Median Islands     | Concrete                  | 5        | m2   |
| 2025/2026 | Rosherville Reserve                    | Road Pavement              | Brick Paving       |                           | 1674     | m2   |
| 2025/2026 | Rosherville Reserve                    | Lines & Signs              | Regulatory Parking | Parking                   | 7        | Each |
| 2025/2026 | Rosherville Reserve                    | Parking Meter              | Pay and Display    | Steel                     | 1        | Each |
| 2025/2026 | Rosherville Reserve                    | Lines & Signs              | Custom Signs       | Information               | 4        | Each |
| 2026/2027 | Spit East                              | Kerb & Gutter              | Kerb Only          | Concrete                  | 8        | m    |
| 2026/2027 | Spit East                              | Kerb & Gutter              | Kerb Only          | Sandstone                 | 35       | m    |
| 2026/2027 | Spit East                              | Kerb & Gutter              | Mountable Kerb     | Precast Concrete          | 4        | m    |
| 2026/2027 | Spit East                              | Kerb & Gutter              | Kerb Only          | Sandstone                 | 5        | m    |
| 2026/2027 | Spit East                              | Kerb & Gutter              | Kerb Wheelstops    | Timber Sleeper            | 65       | m    |
| 2026/2027 | Spit East                              | Lines & Signs              | Custom Signs       | Information               | 4        | Each |
| 2026/2027 | Spit East                              | Lines & Signs              | Linemarking        | Lane and Parking<br>Space | 200      | m    |
| 2026/2027 | Spit East                              | Physical Traffic<br>Device | Bollards           | Timber                    | 8        | Each |
| 2026/2027 | Spit East                              | Physical Traffic<br>Device | Bollards           | Steel Painted             | 17       | Each |
| 2026/2027 | Spit East                              | Road Pavement              | Wearing Surface    | Asphalt                   | 1300     | m2   |
| 2026/2027 | Spit East-Access<br>Road Off South End | Road Pavement              | Flexible Pavment   | 250 Road Base             | 175      | m2   |
| 2026/2027 | Spit East-Access<br>Road Off South End | Road Pavement              | Wearing Surface    | Asphalt                   | 175      | m2   |

| Year      | Location        | Group         | Туре               | Sub-Type                  | Quantity | Unit |
|-----------|-----------------|---------------|--------------------|---------------------------|----------|------|
| 2026/2027 | Spit East       | Footpath      | Concrete           |                           | 5.6      | m2   |
| 2026/2027 | Spit East       | Lines & Signs | Regulatory Parking | Parking                   | 12       | Each |
| 2026/2027 | Spit East       | Parking Meter | Pay and Display    | Steel                     | 1        | Each |
| 2027/2028 | Mosman Bay      | Footpath      | Concrete           | None                      | 100      | m2   |
| 2027/2028 | Mosman Bay      | Road Pavement | Wearing Surface    | Asphalt                   | 1664     | m2   |
| 2027/2028 | Mosman Bay      | Kerb & Gutter | Kerb Only          | Concrete                  | 250      | m    |
| 2027/2028 | Mosman Bay      | Lines & Signs | Regulatory Parking | Parking                   | 10       | Each |
| 2027/2028 | Mosman Bay      | Lines & Signs | Custom Signs       | Information               | 2        | Each |
| 2027/2028 | Mosman Bay      | Lines & Signs | Linemarking        | Lane and Parking<br>Space | 240      | m    |
| 2027/2028 | Mosman Bay      | Lines & Signs | Linemarking        | Disabled Parking          | 2        | Each |
| 2028/2029 | Clifton Gardens | Kerb & Gutter | Flush Kerb         | Concrete                  | 6        | m    |
| 2028/2029 | Clifton Gardens | Lines & Signs | Regulatory Parking | Parking                   | 11       | Each |
| 2028/2029 | Clifton Gardens | Road Pavement | Brick Paving       |                           | 3572     | m2   |
| 2028/2029 | Clifton Gardens | Kerb & Gutter | Kerb Only          | Concrete                  | 440      | m    |
| 2028/2029 | Clifton Gardens | Lines & Signs | Regulatory Parking | Parking                   | 4        | Each |
| 2028/2029 | Clifton Gardens | Parking Meter | Pay and Display    | Steel                     | 2        | Each |
| 2028/2029 | Clifton Gardens | Lines & Signs | Custom Signs       | Information               | 12       | Each |
| 2028/2029 | Clifton Gardens | Lines & Signs | Linemarking        | Disabled Parking          | 1        | Each |

#### E.7 - Street Furniture

| Year      | Road Name            | Road Segment                                   | Туре      | Material            | Quantity | Unit |
|-----------|----------------------|--|-----------|---------------------|----------|------|
| 2019/2020 | Beauty Point<br>Road | Beauty Point Rd - Marasla To Pindari<br>Upper  | Fence     | Timber Painted      | 81       | m    |
| 2019/2020 | Elfrida St           | Elfrida St - Cabban To Dead End                | Fence     | Timber Painted      | 13       | m    |
| 2019/2020 | Delecta Ave          | Delecta Av - Dead End To Bay St                | Fence     | Timber Painted      | 260      | m    |
| 2019/2020 | Avenue Rd            | Avenue Rd - Reid Park To Upper Avenue          | Fence     | Timber Painted      | 68       | m    |
| 2019/2020 | Avenue Rd            | Avenue Rd - Upper Avenue To Rangers            | Fence     | Timber Painted      | 6        | m    |
| 2019/2020 | Mosman St            | Mosman St - Trumfield To Badham                | Handrail  | Steel Painted       | 45       | m    |
| 2020/2021 | Clanalpine<br>Street | Clanalpine St -Mistral To Kallaroo             | Fence     | Timber Painted      | 58.5     | m    |
| 2020/2021 | Marsala Street       | Marsala St - S End To Beauty Point Rd          | Fence     | Timber Painted      | 55       | m    |
| 2020/2021 | Bay Street           | Bay St - Bickell To Divided Road               | Fence     | Timber Painted      | 48       | m    |
| 2020/2021 | Fairfax Road         | Fairfax Rd - Kirkoswald To Tivoli St           | Fence     | Timber<br>Unpainted | 81       | m    |
| 2020/2021 | Royalist Road        | Royalist Rd - Boyle To Dead End                | Fence     | Timber Painted      | 95       | m    |
| 2020/2021 | Lennox Street        | Lennox St - Prince Albert To Dead End          | Fence     | Steel Painted       | 19       | m    |
| 2020/2021 | Parriwi Rd           | Parriwi Rd - End Conc Kerb To C Kerb           | Guardrail | Steel Unpainted     | 154      | m    |
| 2020/2021 | Musgrave Street      | Musgrave St - Cs Concrete To Cs<br>Concrete    | Guardrail | Steel Unpainted     | 4.6      | m    |
| 2020/2021 | Iluka Road           | lluka Rd (Upper) - Morella To Lane             | Handrail  | Timber Painted      | 158      | m    |
| 2020/2021 | Iluka Road           | lluka Rd (Upper) - Lane To End                 | Handrail  | Timber Painted      | 215      | m    |
| 2020/2021 | Boyle Street         | Boyle St - Dead End, Mosman Bay To<br>Dead-End | Handrail  | Steel Painted       | 78       | m    |
| 2020/2021 | Macpherson<br>Street | Macpherson St - Gerard To Ourimbah<br>Rd       | Handrail  | Steel Painted       | 59       | m    |
| 2021/2022 | Beauty Point<br>Road | Beauty Point Rd Upper - Divided To Bay         | Fence     | Timber Painted      | 81       | m    |
| 2021/2022 | Burran Avenue        | Burran Av - Upper To- Divided Road             | Fence     | Timber Painted      | 160      | m    |
| 2021/2022 | Bay Street           | Bay St Lower - Divided Road To 64 Bay          | Fence     | Timber Painted      | 165      | m    |
| 2021/2022 | Bay Street           | Bay St Lower - 64 Bay To Beauty Pt Rd          | Fence     | Timber Painted      | 253      | m    |
| 2021/2022 | Rangers Avenue       | Rangers Ave - Avenue To Oswald                 | Fence     | Timber Painted      | 105      | m    |
| 2021/2022 | Illawarra Street     | Illawarra St - Dead End To Raglan              | Fence     | Timber Painted      | 16       | m    |
| 2021/2022 | Hopetoun<br>Avenue   | Hopetoun Av-Lower-25 To Warringah              | Fence     | Timber Painted      | 221      | m    |
| 2021/2022 | Coronation<br>Avenue | Coronation Ave - Wolseley To No.9              | Fence     | Timber Painted      | 21       | m    |

| Year      | Road Name            | Road Segment                                     | Туре      | Material                  | Quantity | Unit |
|-----------|----------------------|--|-----------|---------------------------|----------|------|
| 2021/2022 | Cobbittee Street     | Cobbittee St - Dayrell To Dead End               | Fence     | Timber Painted            | 26       | m    |
| 2021/2022 | Marsala Street       | Marsala St - S End To Beauty Point Rd            | Fence     | Steel Painted             | 23       | m    |
| 2021/2022 | Curraghbeena<br>Road | Curraghbeena Rd - Raglan To Dead End             | Fence     | Steel Painted             | 95       | m    |
| 2021/2022 | Oswald Street        | Oswald St - Rangers To Reginald                  | Guardrail | Steel Unpainted           | 22       | m    |
| 2022/2023 | Curlew Camp<br>Road  | Curlew Camp Rd - Dead End To<br>Illawarra        | Fence     | Timber Painted            | 75       | m    |
| 2022/2023 | Cyprian Street       | Cyprian St - Conc. Pavement To Parriw            | Fence     | Timber<br>Unpainted       | 27       | m    |
| 2022/2023 | Holt Avenue          | Holt Ave - Cowles To Bardwell Ln                 | Fence     | Timber<br>Unpainted       | 26       | m    |
| 2022/2023 | Dayrell Avenue       | Dayrell Ave - Cobbittee To Pretoria              | Fence     | Timber Painted            | 22       | m    |
| 2022/2023 | Redan Street         | Redan St - Raglan To Balmoral                    | Fence     | Timber Painted            | 129      | m    |
| 2022/2023 | Bullecourt<br>Avenue | Bullecourt Av High Level -No.3 To 14             | Fence     | Timber Painted            | 15       | m    |
| 2022/2023 | Congewoi Road        | Congewoi Rd - Wyong Rd To Burton St              | Fence     | Timber Painted            | 40       | m    |
| 2022/2023 | Illawarra Street     | Illawarra St - Dead End To Raglan                | Fence     | Timber Painted            | 22       | m    |
| 2022/2023 | Pretoria Avenue      | Pretoria Ave - Wolseley To Dayrell               | Fence     | Timber<br>Unpainted       | 7        | m    |
| 2022/2023 | Athol Wharf<br>Road  | Athol Wharf Rd - Lower Zoo Entrance<br>To Cs End | Fence     | Steel Painted             | 11       | m    |
| 2022/2023 | Athol Wharf<br>Road  | Athol Wharf Rd - Lower Zoo Entrance<br>To Cs End | Fence     | Steel Painted             | 200      | m    |
| 2022/2023 | Reginald Street      | Reginald St - Oswald To No.13 Reginald           | Guardrail | Steel Unpainted           | 62       | m    |
| 2022/2023 | Delecta Avenue       | Delecta Av - Dead End To Bay St                  | Guardrail | Steel Painted             | 11       | m    |
| 2023/2024 | Royalist Road        | Royalist Rd - Dead End To Reginald               | Fence     | Timber Painted            | 25       | m    |
| 2023/2024 | Raglan Street        | Raglan St - Dead End To Curraghbeena             | Fence     | Timber Log Post<br>& Rail | 68       | m    |
| 2023/2024 | Pearl Bay<br>Avenue  | Pearl Bay Av - Spit Rd To No.3                   | Fence     | Timber Painted            | 64       | m    |
| 2023/2024 | Amiens Avenue        | Amiens Av - Bapaume To Bullecourt                | Fence     | Timber Painted            | 30       | m    |
| 2023/2024 | Burton Street        | Burton St - Julian To Congewoi                   | Fence     | Timber Painted            | 8        | m    |
| 2023/2024 | Killarney Street     | Killarney St - Dead End To Dead End              | Fence     | Timber Painted            | 14       | m    |
| 2023/2024 | Major Street         | Major St - Whiting Beach Rd To Dead<br>End       | Fence     | Timber Painted            | 65       | m    |
| 2023/2024 | Bickell Road         | Bickell Rd - Spit Rd To End Of A.C               | Fence     | Steel Painted             | 4        | m    |

| Year      | Road Name               | Road Segment   | Туре      | Material            | Quantity | Unit |
|-----------|-------------------------|--|-----------|---------------------|----------|------|
| 2023/2024 | Kahibah Road            | Kahibah Rd - Coronation To Dead End                      | Guardrail | Steel Painted       | 7        | m    |
| 2023/2024 | Kirkoswald<br>Avenue    | Kirkoswald Av - Bend To Fairfax Rd                       | Handrail  | Timber Painted      | 8        | m    |
| 2023/2024 | Barney Kearns<br>Steps  | Barney Kearns Steps - Kiora To Parriwi                   | Handrail  | Steel Painted       | 5        | m    |
| 2023/2024 | Barney Kearns<br>Steps  | Barney Kearns Steps - Kiora To Parriwi                   | Handrail  | Steel Painted       | 6        | m    |
| 2024/2025 | Park Avenue             | Park Av - Rangers Av To Dead End                         | Fence     | Timber Painted      | 88       | m    |
| 2024/2025 | Pretoria Avenue         | Pretoria Ave - Dayrell To Gooseberry                     | Fence     | Timber Painted      | 23       | m    |
| 2024/2025 | Quakers Road            | Quakers Rd E - Kb Koowong To Bay St                      | Fence     | Timber Painted      | 36       | m    |
| 2024/2025 | Rickard Avenue          | Rickard Ave - Major To Junction                          | Fence     | Timber Painted      | 46       | m    |
| 2024/2025 | Wunda Road              | Wunda Rd - Wolger To Belmont                             | Fence     | Timber Painted      | 45       | m    |
| 2024/2025 | Wolseley Road           | Wolseley Rd - Methuen To Beaconsfield                    | Fence     | Timber Painted      | 7        | m    |
| 2024/2025 | Pearl Bay<br>Avenue     | Pearl Bay Av - Fig Tree To Marsala Ea                    | Fence     | Timber Painted      | 23       | m    |
| 2024/2025 | Cobbittee Street        | Cobbittee St - Dayrell To Dead End                       | Fence     | Steel Painted       | 7        | m    |
| 2024/2025 | Glengarry Lane          | Glengarry Lane - Dead End To<br>Effingham                | Fence     | Steel Painted       | 44       | m    |
| 2024/2025 | Kiora Avenue            | Kiora Av-Upper - No.14 To Dead End                       | Fence     | Steel Painted       | 190      | m    |
| 2024/2025 | Athol Wharf<br>Road     | Athol Wharf Rd - Bradleys Hd Rd To<br>Lower Zoo Entrance | Guardrail | Steel Unpainted     | 355      | m    |
| 2024/2025 | Government<br>Road      | Government Rd - Bend To Dead End                         | Guardrail | Steel Unpainted     | 60       | m    |
| 2025/2026 | The Esplanade           | The Esplanade - Plunkett To Raglan                       | Fence     | Steel Painted       | 105      | m    |
| 2025/2026 | Parriwi Road            | Parriwi Rd - Conc.Kerb To Spit Rd                        | Fence     | Timber<br>Unpainted | 55       | m    |
| 2025/2026 | Beauty Point<br>Road    | Beauty Point Rd - Marsala To Pindari<br>Upper            | Fence     | Timber Painted      | 81       | m    |
| 2025/2026 | Warringah Road          | Warringah Rd - Upper-Warr.L.To Divid.                    | Fence     | Timber Painted      | 86       | m    |
| 2025/2026 | Prince Albert<br>Street | Prince Albert St - Whiting To Cs @<br>Lennox             | Fence     | Timber Painted      | 170      | m    |
| 2025/2026 | Parriwi Road            | Parriwi Rd - No.4 To End Of Conc.Kerb                    | Fence     | None                | 22       | m    |
| 2025/2026 | Balmoral<br>Avenue      | Balmoral Ave - Raglan To Redan                           | Fence     | Timber Painted      | 47       | m    |
| 2025/2026 | Morella Road            | Morella Rd - Kardinia To David Cs                        | Fence     | Steel Painted       | 22       | m    |
| 2025/2026 | Park Avenue             | Park Av - Rangers Av To Dead End                         | Fence     | Steel Unpainted     | 30       | m    |

| Year      | Road Name           | Road Segment                               | Туре      | Material        | Quantity | Unit |
|-----------|---------------------|--|-----------|-----------------|----------|------|
| 2025/2026 | Redan Street        | Redan St - Balmoral To Almora              | Fence     | Steel Painted   | 14       | m    |
| 2025/2026 | Hopetoun<br>Avenue  | Hopetoun Av - Lower-25 To Warringah        | Guardrail | Steel Painted   | 36       | m    |
| 2026/2027 | Gordon Street       | Gordon St - Middle Head To Bayview         | Fence     | Timber Painted  | 27       | m    |
| 2026/2027 | Raglan Street       | Raglan St - Gibson To Esplanade            | Fence     | Timber Painted  | 46       | m    |
| 2026/2027 | Dugald Road         | Dugald Rd - Gordon To Mulbring             | Fence     | Timber Painted  | 60       | m    |
| 2026/2027 | Balmoral<br>Avenue  | Balmoral Ave - Raglan To Redan             | Fence     | Timber Painted  | 136      | m    |
| 2026/2027 | Julian Street       | Julian St - Wyong Rd To Divide In Rd       | Fence     | Timber Painted  | 46       | m    |
| 2026/2027 | Archer Street       | Archer St - Avenue To Keston               | Fence     | Timber Painted  | 48       | m    |
| 2026/2027 | Arbutus Street      | Arbutus St - Almora St To Mandolong R      | Fence     | Steel Painted   | 19       | m    |
| 2026/2027 | Arbutus Street      | Arbutus St - Almora St To Mandolong R      | Fence     | Steel Painted   | 8        | m    |
| 2026/2027 | Balmoral<br>Avenue  | Balmoral Ave - Raglan To Redan             | Fence     | Steel Painted   | 10       | m    |
| 2026/2027 | Mcleod Street       | Mcleod St - Dead End To Raglan             | Fence     | Steel Painted   | 22       | m    |
| 2026/2027 | Kahibah Road        | Kahibah Rd - Coronation To Dead End        | Guardrail | Steel Unpainted | 8        | m    |
| 2026/2027 | Boyle Street        | Boyle St - Dead End, Mosman Bay To<br>D-En | Handrail  | Timber Painted  | 17       | m    |
| 2027/2028 | Calypso Avenue      | Calypso Ave - Clanalpine To Magic<br>Grove | Fence     | Timber Painted  | 17       | m    |
| 2027/2028 | Edwards Bay<br>Road | Edwards Bay Rd - Wyargine To<br>Thegrove   | Fence     | Timber Painted  | 65       | m    |
| 2027/2028 | Gordon Street       | Gordon St - Middle Head To Bayview         | Fence     | Timber Painted  | 34       | m    |
| 2027/2028 | Mcleod Street       | Mcleod St - Raglan To Dead End             | Fence     | Timber Painted  | 7.5      | m    |
| 2027/2028 | Moruben Road        | Moruben Rd - Punch St To Awaba St          | Fence     | Steel Unpainted | 209      | m    |
| 2027/2028 | Raglan Street       | Raglan St - Cullen To Gibson               | Fence     | Steel Painted   | 16       | m    |
| 2027/2028 | The Esplanade       | The Esplanade - Plunkett To Raglan         | Fence     | Steel Unpainted | 9        | m    |
| 2027/2028 | The Esplanade       | The Esplanade - Plunkett To Raglan         | Fence     | Steel Unpainted | 19       | m    |
| 2027/2028 | Quakers Road        | Quakers Rd - Bullecourt Av To End          | Guardrail | Steel Painted   | 10       | m    |
| 2027/2028 | Boyle Street        | Boyle St - Dead End, Mosman Bay To<br>D-En | Handrail  | Timber Painted  | 78       | m    |
| 2027/2028 | Keston Avenue       | Keston Ave - Archer To Gladstone           | Handrail  | Timber Painted  | 40       | m    |
| 2027/2028 | Mistral Avenue      | Mistral Av - Clanalpine To Magic Grov      | Handrail  | Timber Painted  | 10       | m    |
| 2028/2029 | Musgrave Street     | Musgrave - Cs End Concrete To Mcleod       | Fence     | Timber Painted  | 68       | m    |

| Year      | Road Name            | Road Segment                           | Туре      | Material        | Quantity | Unit |
|-----------|----------------------|--|-----------|-----------------|----------|------|
| 2028/2029 | Stanton Road         | Stanton Rd - Fairfax Rd To Wyargine S  | Fence     | Timber Painted  | 16       | m    |
| 2028/2029 | Moran Street         | Moran St - Sverge To Dead End          | Fence     | Timber Painted  | 7.8      | m    |
| 2028/2029 | Redan Street         | Redan St - Raglan To Balmoral          | Fence     | Timber Painted  | 14       | m    |
| 2028/2029 | Reginald Street      | Reginald St - Oswald To No.13 Reginald | Fence     | Timber Painted  | 35       | m    |
| 2028/2029 | Bickell Road         | Bickell Rd - Spit Rd To End Of A.C     | Fence     | Steel Painted   | 16       | m    |
| 2028/2029 | Clanalpine<br>Street | Clanalpine St - Mistral To Kallaroo    | Fence     | Steel Unpainted | 20       | m    |
| 2028/2029 | Clifton Street       | Clifton St - Dead End To Burrawong Ave | Fence     | Steel Painted   | 65       | m    |
| 2028/2029 | Raglan Street        | Raglan St - Dead End To Curraghbeena   | Guardrail | Steel Unpainted | 6        | m    |
| 2028/2029 | The Grove            | The Grove - Edwards Bay Rd To Stanton  | Handrail  | Timber Painted  | 2        | m    |
| 2028/2029 | Bickell Road         | Bickell Rd - Ryrie To Bay-End Concre   | Handrail  | Steel Painted   | 42       | m    |

### E.8 - Lines & Signs

| Year      | Road Name              | Road Segment                           | Program of Works   |
|-----------|------------------------|--|--|
| 2019/2020 | Belmont Rd             | Military Road to Noble St              | Repaint speed humps and roundabouts                          |
| 2019/2020 | Belmont Rd             | Noble St to Military Rd                | Repaint pedestrian crossing                                  |
| 2019/2020 | Ourimbah Rd            | Spit Rd to Macpherson St               | Replace all Clearway signs                                   |
| 2019/2020 | Lennon Lane            | End to Gouldsbury St                   | Repaint RSL car park   |
| 2019/2020 | Athol Wharf Rd         | Lower Zoo Entrance to End              | Repaint pedestrian crossing                                  |
| 2019/2020 | Awaba St               | The Esplanade to Moruben               | Repaint centre line and roundabout                           |
| 2019/2020 | Avenue Rd              | Rangers Ave to Military Rd             | Repaint pedestrian crossing                                  |
| 2020/2021 | Bradleys Head<br>Rd    | Athol Wharf Rd to Military Rd          | Repaint pedestrian crossings, centre line and roundabouts    |
| 2020/2021 | The Crescent           | Gouldsbury Street to Myahgah Rd        | Repaint parking bays and centre lines                        |
| 2020/2021 | The Esplanade          | Plunkett St to End                     | Repaint angle parking bays and centreline                    |
| 2020/2021 | Rangers Avenue         | Avenue Rd to Spofforth St              | Repaint roundabout, speed hump and refuge islands            |
| 2020/2021 | Spofforth Street       | Concrete Pavement to Military Rd       | Repaint centreline, roundabout and pedestrian crossing       |
| 2020/2021 | Hale Rd                | Military Rd to Ourimbah Rd             | Repaint centre lines and pedestrian crossings                |
| 2020/2021 | The Esplanade          | Various                                | Replace RPS inserts with new winter and summer parking signs |
| 2020/2021 | Arbutus Street         | Upper Almora Street to Mandolong<br>Rd | Repaint edge line and one way markings                       |
| 2021/2022 | The Esplanade          | Plunkett Rd to Awaba St                | Repaint pedestrian crossings and centre lines                |
| 2021/2022 | Bardwell Road          | Lane to Earl St                        | Repaint roundabout and centre line                           |
| 2021/2022 | Harbour Street         | Belmont Rd to Military Rd              | Repaint centre line and speed humps                          |
| 2021/2022 | The Esplanade          | Plunkett St to End                     | Replace ticket parking signs                                 |
| 2021/2022 | Botanic Road           | Dead End to The Esplanade              | Repaint angle parking bays                                   |
| 2021/2022 | Lower Almora<br>Street | The Esplanade to Ryan Ave              | Repaint angle parking bays and edge lines                    |
| 2021/2022 | Upper Almora<br>Street | Redan Street to Military Rd            | Replace parking signs and repaint bicycle markings           |
| 2021/2022 | Military Rd            | Middle Head Rd to Spit Rd              | Replace traffic and parking signs                            |
| 2022/2023 | Medusa Street          | Spit Rd to Pindari Ave                 | Repaint pedestrian crossing and centre line                  |
| 2022/2023 | Cowles Rd              | Avenue Rd to Wyong Rd                  | Repaint centreline and speed humps                           |
| 2022/2023 | Vista Street           | Belmont Rd to Military Rd              | Repaint pedestrian crossing, zig zag and centre lines        |
| 2022/2023 | Avenue Rd              | Rangers Ave to Military Rd             | Paint roundabout and centre line                             |
| 2022/2023 | Middle Head Rd         | Cobbittee St to Military Rd            | Repaint centreline, parking and bicycle lanes                |

| Year      | Road Name              | Road Segment                     | Program of Works  |
|-----------|------------------------|----------------------------------|---|
| 2022/2023 | Mandolong Rd           | The Esplanade to Lavoni St       | Repaint pedestrian crossing and centre line               |
| 2022/2023 | Mandolong Rd           | Little St to Military Rd         | Repaint pedestrian crossing and centre line               |
| 2022/2023 | Hunter Road            | The Esplanade to Dead End        | Repaint angle parking bays                                |
| 2022/2023 | Military Rd            | Middle Head Rd to Spit Rd        | Replace parking signs                                     |
| 2022/2023 | Moruben Road           | Mandolong Rd to Stanton Rd       | Repaint centre line and median island                     |
| 2022/2023 | Glover Street          | Cowles Rd to Military Rd         | Replace parking signs                                     |
| 2023/2024 | Macpherson St          | Military Rd to Ourimbah Rd       | Repaint pedestrian crossing and centre line               |
| 2023/2024 | Canrobert<br>Street    | Raglan St to Avenue Rd           | Repaint pedestrian crossing and centre line               |
| 2023/2024 | Upper Almora<br>Street | Redan St to Military Rd          | Repaint pedestrian crossing and centre line               |
| 2023/2024 | Raglan Street          | Military Rd to The Esplanade     | Repaint pedestrian crossing and centre line               |
| 2023/2024 | Muston Street          | Raglan Street to Upper Almora St | Repaint centreline  |
| 2023/2024 | Raglan Street          | Military Rd to The Esplanade     | Replace signs   |
| 2023/2024 | Prince Albert St       | Milner St to Bradleys Head Rd    | Repaint pedestrian crossing                               |
| 2024/2025 | Queen Street           | Milton Ave to Milner Ln          | Repaint pedestrian crossings                              |
| 2024/2025 | Pearl Bay<br>Avenue    | Spit Ave to Marsala              | Repaint speed humps, centre line                          |
| 2024/2025 | Bay Street             | Glen St to Beauty Point Rd       | Replace traffic signs                                     |
| 2025/2026 | Belmont Rd             | Military Road to Bardwell St     | Repaint roundabout  |
| 2025/2026 | Belmont Rd             | Bardwell St to Noble St          | Repaint speed humps and roundabouts                       |
| 2025/2026 | Belmont Rd             | Noble St to Military Rd          | Repaint pedestrian crossing                               |
| 2025/2026 | Ourimbah Rd            | Spit Rd to Macpherson St         | Replace all Clearway signs                                |
| 2025/2026 | Lennon Lane            | End to Gouldsbury St             | Repaint RSL car park                                      |
| 2025/2026 | Athol Wharf Rd         | Lower Zoo Entrance to End        | Repaint pedestrian crossing                               |
| 2025/2026 | Awaba St               | The Esplanade to Moruben         | Repaint centre line and roundabout                        |
| 2025/2026 | Avenue Rd              | Rangers Ave to Military Rd       | Repaint pedestrian crossing                               |
| 2026/2027 | Bradleys Head<br>Rd    | Athol Wharf Rd to Military Rd    | Repaint pedestrian crossings, centre line and roundabouts |
| 2026/2027 | The Crescent           | Gouldsbury Street to Myahgah Rd  | Repaint parking bays and centre lines                     |
| 2026/2027 | The Esplanade          | Plunkett St to End               | Repaint angle parking bays and centreline                 |
| 2026/2027 | Rangers Avenue         | Avenue Rd to Spofforth St        | Repaint roundabout, speed hump and refuge islands         |

| Year      | Road Name              | Road Segment                           | Program of Works   |
|-----------|------------------------|--|--|
| 2026/2027 | Spofforth Street       | Concrete Pavement to Military Rd       | Repaint centreline, roundabout and pedestrian crossing       |
| 2027/2028 | Hale Rd                | Military Rd to Ourimbah Rd             | Repaint centre lines and pedestrian crossings                |
| 2027/2028 | The Esplanade          | Various                                | Replace RPS inserts with new winter and summer parking signs |
| 2027/2028 | Arbutus Street         | Upper Almora Street to Mandolong<br>Rd | Repaint edge line and one way markings                       |
| 2028/2029 | The Esplanade          | Plunkett Rd to Raglan St               | Repaint pedestrian crossings and centre lines                |
| 2028/2029 | The Esplanade          | Almora St to Awaba St                  | Repaint pedestrian crossings and centre lines                |
| 2028/2029 | Bardwell Road          | Lane to Earl St                        | Repaint roundabout and centre line                           |
| 2028/2029 | Harbour Street         | Belmont Rd to Military Rd              | Repaint centre line and speed humps                          |
| 2028/2029 | The Esplanade          | Plunkett St to End                     | Replace ticket parking signs                                 |
| 2028/2029 | Botanic Road           | Dead End to The Esplanade              | Repaint angle parking bays                                   |
| 2028/2029 | Lower Almora<br>Street | The Esplanade to Ryan Ave              | Repaint angle parking bays and edge lines                    |
| 2028/2029 | Upper Almora<br>Street | Redan Street to Military Rd            | Replace parking signs and repaint bicycle markings           |

### E.9 - Retaining Walls

| Year      | Road Name                  | Location   | Material                               | Length<br>(m) | Height<br>(m) |
|-----------|----------------------------|--|--|---------------|---------------|
| 2019/2020 | Plunkett Road              | Supports road between The Esplanade and Coronation Ave   | Embankment                             | 85            | 4             |
| 2019/2020 | Redan Street               | In front of Nos. 26 - 30 Redan St  | Rock Cutting                           | 58            | 1.5           |
| 2019/2020 | Spofforth St               | Beside and in front of No. 123 Spencer Rd  | Dimension Stone<br>RW - Open Joints    | 45            | 1.6           |
| 2019/2020 | Beauty Point Road          | South side between Marsala St and No. 9<br>Beauty Point Rd                                     | Dimension Stone<br>RW - Open Joints    | 75            | 0.75          |
| 2019/2020 | Mosman Street              | Separates high and low level roads from<br>Badham Ave north                                    | Rock Cutting                           | 56            | 4.5           |
| 2020/2021 | lda Street                 | South side in front of Nos. 22 - 26 Ida Ave  | Rock Cutting                           | 22            | 3             |
| 2021/2022 | Rickard Avenue             | At rear of No. 2 - 6 Major St  | Rock Cutting                           | 37            | 2.3           |
| 2021/2022 | Morella Road               | In front of Nos. 18d and 20a Morella   | Rock Cutting                           | 16            | 2.3           |
| 2021/2022 | Morella Road               | In front of No. 18b Morella Rd   | Random Stone RW<br>- Grouted Joints    | 13            | 0.9           |
| 2021/2022 | Parriwi Road               | In front of Nos. 34 and 36 Parriwi Rd  | Rock Cutting                           | 24            | 2.8           |
| 2021/2022 | Whiting Beach<br>Road      | Supporting traffic island at junction with Major St  | Dimension Stone<br>RW                  | 26            | 0.7           |
| 2022/2023 | Bickell Road               | Supports footpath in front of No. 20 Bickell<br>Rd   | Random Stone RW<br>- Grouted Joints    | 9             | 0.5           |
| 2022/2023 | Stanton Road               | Opposite Nos. 6, 8 and 8A Stanton Rd   | Rock Cutting                           | 50            | 1.2           |
| 2022/2023 | Redan Street               | In front of Nos. 18 - 20b Redan St and part<br>beside No. 198 Raglan St                        | Rock Cutting                           | 84            | 1.6           |
| 2022/2023 | Lennox Street              | North side of vehicular entrance to No. 3a<br>Sirius Cove Rd also known as No. 28 Lennox<br>St | Random Stone RW<br>- Open Joints       | 22            | 1.8           |
| 2022/2023 | Parriwi Road               | Western side of Parriwi Rd between No. 50 and No. 60   | Rock Cutting                           | 96            | 2.3           |
| 2023/2024 | Burran Ave                 | In front of Nos. 27 - 33 Burran Ave  | Rock Cutting                           | 64            | 3.3           |
| 2023/2024 | Waitovu Street             | In front of Nos. 7 - 11 Waitovu St   | Brick RW                               | 30            | 0.8           |
| 2023/2024 | Clanalpine Street          | Separates high and low level roads at intersect'n with Mistral Ave                             | Concrete Retaining<br>Wall             | 45            | 1.3           |
| 2023/2024 | Athol Wharf Road           | North side west from Bradleys Head Rd<br>Intersection  | Rock Cutting                           | 200           | 2             |
| 2023/2024 | Clifton Gardens<br>Reserve | Supports east side of access road adjoining path and steps                                     | Dimension Stone<br>RW - Grouted Joints | 35            | 2.1           |
| 2024/2025 | Boyle Street               | North side of pathway connecting lower<br>Boyle St with Royalist Rd                            | Rock Cutting                           | 25            | 2             |
| 2024/2025 | Silex Road                 | In front of Nos. 13 and 15 Silex Rd  | Dimension Stone<br>RW - Grouted Joints | 21            | 2.3           |

| Year      | Road Name              | Location   | Material                               | Length<br>(m) | Height<br>(m) |
|-----------|------------------------|--|--|---------------|---------------|
| 2024/2025 | Superba Parade         | Separates high and low level roads Concrete                                      | Concrete Retaining<br>Wall             | 147           | 2.3           |
| 2024/2025 | Wyong Road             | Landscape walls at western end (east of<br>Shellbank Ave)                        | Dimension Stone<br>RW - Grouted Joints | 39            | 1.5           |
| 2024/2025 | Sirius Avenue          | In front of No. 4 Sirius Ave   | Rock Cutting                           | 4             | 1             |
| 2025/2026 | Parriwi Road           | North eastern side northerly from northern bend (rear Middle Harbour Yacht Club) | Embankment                             | 150           | 6             |
| 2025/2026 | Orlando Avenue         | Across small park at southern end of Orlando<br>Ave adjoining Boyle St           | Random Stone                           | 16            | 0.6           |
| 2025/2026 | Clanalpine Street      | North and northwest side from No. 16 to<br>Magic Gr                              | Rock Cutting                           | 195           | 1             |
| 2025/2026 | Clanalpine Street      | Supports high level path in front of Nos. 8 - 10<br>Clanalpine St                | Reinforced Hollow<br>Block             | 50            | 0.75          |
| 2025/2026 | Clanalpine Street      | Supports high level footpath north and northwest side from No. 16 to Magic Gr    | Random Stone                           | 295           | 1             |
| 2026/2027 | Holt Avenue            | Supporting steps in front of No. 1 Holt Ave at rear of electricity kiosk         | Dimension Stone                        | 5             | 1             |
| 2026/2027 | Moruben Road           | Beside No. 34 Stanton Rd   | Rock Cutting                           | 36            | 1.75          |
| 2026/2027 | Redan Lane             | Beside No. 50 Upper Almora St  | Concrete                               | 10            | 1             |
| 2026/2027 | Stanley Avenue         | West side at rear of Nos. 20 - 24 Moruben Rd                                     | Rock Cutting                           | 30            | 5.5           |
| 2026/2027 | Upper Almora<br>Street | South side at toe of embankment supporting road between Redan St and Superba Pde | Random Stone                           | 15            | 1             |
| 2027/2028 | Bloxsome Lane          | South side at rear of No. 9a Rangers Ave   | Reinforced Hollow<br>Block             | 28            | 0.85          |
| 2027/2028 | Clanalpine Street      | South side in front of No. 23 Clanalpine St                                      | Dimension Stone                        | 8             | 1             |
| 2027/2028 | Congewoi Lane          | Top of rock cutting each side of steps at<br>Macpherson Street end               | Random Stone                           | 6             | 1             |
| 2027/2028 | Lavoni Street          | In front of Nos. 1 and 3 Lavoni St and beside part No. 32 Mandalong Rd           | Dimension Stone                        | 57            | 1.7           |
| 2027/2028 | Major Street           | In front of Nos. 6 and 8 Major St  | Concrete                               | 28            | 1.2           |
| 2028/2029 | Mosman Street          | Separates high and low level roads opposite<br>Nos. 6 and 6a                     | Random Stone                           | 24            | 1             |
| 2028/2029 | Shellbank Avenue       | At rear of Nos. 55 - 65 Wyong Rd   | Rock Cutting                           | 32            | 1             |
| 2028/2029 | Stanton Road           | Opposite Nos. 6, 8 and 8A Stanton Rd   | Rock Cutting                           | 50            | 1.2           |

### E.10 - Pram Ramps

| Year      | Road Name         | Road Segment                           | Material | Width<br>(m) |
|-----------|-------------------|--|----------|--------------|
| 2019/2020 | Vista St          | Vista St - Belmont To Military         | Concrete | 1.2          |
| 2019/2020 | Harbour St        | Harbour St - Belmont To Military       | Concrete | 1.2          |
| 2019/2020 | Moruben Rd        | Moruben Rd - Mandolong To No. 8        | Concrete | 1.2          |
| 2019/2020 | Middle Head Rd    | Middle Head Rd - Kahibah To Gordon     | Concrete | 1.2          |
| 2019/2020 | Centenary Dr      | Centenary Dr - Avenue To Harnett       | Concrete | 1.2          |
| 2019/2020 | Union St          | Union St - Bradleys To Milton          | Concrete | 1.2          |
| 2019/2020 | The Esplanade     | The Esplanade - Plunkett To Raglan     | Concrete | 1.2          |
| 2020/2021 | Earl Street       | Earl Street - Bond To Countess         | Concrete | 1.2          |
| 2020/2021 | Shadforth St      | Shadforth St - Crux To Canrobert       | Concrete | 1.2          |
| 2020/2021 | Awaba Street      | Awaba St - Congewoi Rd To Macpherson   | Concrete | 1.2          |
| 2020/2021 | King Max Street   | King Max St - Bradleys To Middle Hd Rd | Concrete | 1.2          |
| 2020/2021 | Military Road     | Military Rd - Twin Towers To Spofforth | Concrete | 1.2          |
| 2021/2022 | Raglan Street     | Raglan St - Military To Cullen Ave     | Pavers   | 1.2          |
| 2021/2022 | Raglan Street     | Raglan St - Military To Cullen Ave     | Pavers   | 1.2          |
| 2021/2022 | Effingham Street  | Effingham St - King Max To Middle Head | Concrete | 1.2          |
| 2021/2022 | Bullecourt Avenue | Bullecourt Av - No.33 To Central Ave   | Concrete | 1.2          |
| 2021/2022 | Cross Street      | Cross St - Dead End To Bradleys Head R | Concrete | 1.2          |
| 2021/2022 | Ellamatta Avenue  | Ellamatta Ave - Dead End To Bradleys   | Concrete | 1.2          |
| 2021/2022 | Military Road     | Military Rd - Raglan To Upper Almora   | Concrete | 1.2          |
| 2022/2023 | Waitovu Street    | Waitovu St - Mandolong To Awaba        | Pavers   | 1.2          |
| 2022/2023 | Avenue Road       | Avenue Rd - Noble To Military          | Pavers   | 1.2          |
| 2022/2023 | Avenue Road       | Avenue Rd - Noble To Military          | Concrete | 1.2          |
| 2022/2023 | Avenue Road       | Avenue Rd - Rangers To Noble           | Concrete | 1.2          |
| 2022/2023 | Calypso Avenue    | Calypso Ave - Dead End To Clanalpine   | Concrete | 1.2          |
| 2022/2023 | Central Avenue    | Central Av - Spit Rd For 19 Metres     | Concrete | 1.2          |
| 2022/2023 | Central Avenue    | Central Av - Spit Rd For 19 Metres     | Concrete | 1.2          |
| 2023/2024 | Countess Street   | Countess St - Earl St To Ourimbah      | Concrete | 1.2          |
| 2023/2024 | Cowles Road       | Cowles Rd - Awaba St To Wyong Rd       | Concrete | 1.2          |
| 2023/2024 | Cowles Road       | Cowles Rd - Glover To Belmont          | Concrete | 1.2          |
| 2023/2024 | Drury Lane        | Drury Lane - Gordon To Dugald          | Concrete | 1.2          |

| Year      | Road Name            | Road Segment                          | Material | Width<br>(m) |
|-----------|----------------------|---------------------------------------|----------|--------------|
| 2023/2024 | Ellamatta Avenue     | Ellamatta Ave - Dead End To Bradleys  | Concrete | 1.2          |
| 2024/2025 | Gurrigal Street      | Gurrigal St - Nathan To Military      | Concrete | 1.2          |
| 2024/2025 | Hamlet Lane          | Hamlet Lane - Raglan To Shadforth     | Concrete | 1.2          |
| 2024/2025 | Holt Avenue          | Holt Ave - Cowles To Bardwell Ln      | Concrete | 1.2          |
| 2024/2025 | James King Lane      | James King Lane - Union To Queen      | Concrete | 1.2          |
| 2024/2025 | Magic Grove          | Magic Grove - Cabban To Clanalpine    | Concrete | 1.2          |
| 2025/2026 | Martens Lane         | Martens Lane - Middle Head To Raglan  | Concrete | 1.2          |
| 2025/2026 | Medusa Street        | Medusa St - Spit Rd To Pindari Av     | Concrete | 1.2          |
| 2025/2026 | Medusa Street        | Medusa St - Spit Rd To Pindari Av     | Concrete | 1.2          |
| 2025/2026 | Nock Lane            | Nock Lane - Shadforth To Avenue Rd    | Concrete | 1.2          |
| 2025/2026 | Pearl Bay Avenue     | Pearl Bay Av - Spit Rd To No.3        | Concrete | 1.2          |
| 2025/2026 | Pearl Bay Avenue     | Pearl Bay Av - Spit Rd To No.3        | Concrete | 1.2          |
| 2026/2027 | Prince Albert Street | Prince Albert St - Union To Queen     | Concrete | 1.2          |
| 2026/2027 | Prince Albert Street | Prince Albert St - Union To Queen     | Concrete | 1.2          |
| 2026/2027 | Quakers Road         | Quakers Rd - Spit Rd To Ryrie St      | Concrete | 1.2          |
| 2026/2027 | Rawson Street        | Rawson St - Awaba St To Rawson Lane   | Concrete | 1.2          |
| 2026/2027 | Rawson Street        | Rawson S t- Awaba St To Rawson Lane   | Concrete | 1.2          |
| 2027/2028 | Redan Lane           | Redan Lane/Charles To Raglan          | Concrete | 1.2          |
| 2027/2028 | Redan Lane           | Redan Lane/Charles To Raglan          | Concrete | 1.2          |
| 2027/2028 | Redan Street         | Redan St - Raglan To Balmoral         | Concrete | 1.2          |
| 2027/2028 | Shellbank Avenue     | Shellbank Av - Wyong Sth To Wyong Nth | Concrete | 1.2          |
| 2027/2028 | Shellbank Avenue     | Shellbank Av - Wyong Sth To Wyong Nth | Concrete | 1.2          |
| 2028/2029 | Silex Road           | Silex Rd/Thompson To Bradleys         | Concrete | 1.2          |
| 2028/2029 | Simpson Street       | Simpson St - Prince Albert To Major   | Concrete | 1.2          |
| 2028/2029 | Simpson Street       | Simpson St - Prince Albert To Major   | Concrete | 1.2          |
| 2028/2029 | Spit Road            | Spit Rd - Ourimbah To Medusa          | Concrete | 1.2          |
| 2028/2029 | Spit Road            | Spit Rd - Ourimbah To Medusa          | Concrete | 1.2          |

