NORTH SYDNEY COUNCIL

ASSET MANAGEMENT PLAN

ROADS ASSET CLASS

2025/35

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1.0 Executive Summary

This Asset Management Plan (AMP) covers the Roads Asset Class and details the following asset categories: Bus Shelters, Kerb and Gutter, Road Pavements, Street Furniture, and Traffic Facilities. This Asset Management Plan outlines the required actions to maintain the current level of service in the most cost effective manner while outlining associated risks within each of the asset classes. The scope and value of this Asset Class is shown in the Table below:

Table: Scope and Replacement Cost of Roads Asset Class by Asset Category ($)2024

Roads Asset Class		
Asset Category	**Scope**	**Replacement Cost (2024)**
Bus Shelters	66 items	$5,843,913
Kerb and Gutter	260km	$93,362,784
Road Pavements	152.5km	$324,887,171
Street Furniture	1,084 items	$4,728,578
Traffic Facilities	1,173 items	$21,064,141
	TOTAL	**$449,886,586**

All assets within the Roads Asset Class in North Sydney provide a vital service to the local community providing access to all parts of the council area in all weather conditions. These assets support transportation and economic activities in the Local Government Area (LGA).

The North Sydney LGA covers 10.5 square kilometres or 1049 hectares. Road Pavements and Kerb and Gutter make up a significant proportion of Council's asset portfolio. Within Council's area there are approximately 152.5km of local and regional roads. Many of the roads in North Sydney were originally built from 1880 onwards. Further development and subdivisions increased significantly with the opening of the Sydney Harbour Bridge in 1932 and continued after World War 2. It was during this development period that much of the infrastructure in North Sydney was originally built. Therefore, North Sydney faces the continual challenge of maintaining a large portfolio of aging road infrastructure.

The Table below shows that the current cost to bring all Council's Road infrastructure assets to a satisfactory standard is $26.1M. This amount includes the cost to replace existing infrastructure currently in either poor or very poor condition (condition 4 or 5). This represents 5.8% of the Road infrastructure network in terms of Replacement Cost. This means that 94.2% of this portfolio is in very good to fair condition (1 to 3).

The Table also shows that the total current Depreciation Expense is $6.8M or 1.5% of the Total Replacement Cost of Council's assets. This assumes that all Council's assets are completely replaced every 65.7 years on average.

The Table shows that the 10 year Long Term Cost to bring all Council's infrastructure assets to a satisfactory standard as well as maintain the current standard is $94.6M over 10 years or an average annual cost of $9.5M. This includes the total Depreciation Expense over 10 years (maintaining the existing standard) and assumes that all condition 4 and 5 assets will be replaced over the next 10 years (bringing all assets to a satisfactory condition).

Table: Long Term Infrastructure Funding Required ($) 2024

Asset Class / Category	Cost to bring to assets to satisfactory Cond. (4 + 5)	Total replacement cost	Depreciation Expense (2024)	Funding required over 10 years (Depreciation x 10 + Cond 4 + 5)	Average Annual Funding Required (2024)
Roads / Bus Shelters	$2,049,656	$5,843,913	$110,481	$3,154,470	$315,447
Roads / Kerb and Gutter	$3,454,350	$93,362,784	$1,331,873	$16,773,082	$1,677,308
Roads / Road Pavements	$20,179,960	$324,887,171	$4,884,434	$69,024,301	$6,902,430
Roads / Street Furniture	$76,957	$4,728,578	$217,010	$2,247,054	$224,705
Roads / Traffic Facilities	$346,161	$21,064,141	$303,549	$3,381,647	$338,165
TOTAL	**$26,107,084**	**$449,886,586**	**$6,847,347**	**$94,580,553**	**$9,458,055**

The allocation in the current forecast capital budget (as at 30 June 2024) is insufficient to continue providing existing services at current levels for the planning period.

The main service consequences of the current forecast capital budget are:

- Assets progressively deteriorating over time
- Increasing asset failures and potential closures
- Service levels not fully meeting the needs of users

2.0 Asset Description

2.1 Asset Description – Bus Shelters

As shown in the Table below the Bus Shelter network mainly comprises of:

- NSC (North Sydney Council) Style Timber = 65.2% (combined)

Bus Shelter Type	Quantity	Replacement Cost (2024)	% of the Network
JCDecaux	11	$941,036	16.1%
NSC Style Timber	55	$4,902,877	83.9%
Grand Total	**66**	**$5,843,913**	**100%**

2.2 Asset Description – Kerb and Gutter

As shown in the Table below the Kerb and Gutter network mainly comprises of:

- Concrete Barrier Kerb = 65.2% (combined)
- Sandstone Kerb = 23.7%

It should be noted that both Granite Kerb and Sandstone Kerb are relatively very expensive to replace.

Type	Kerb Material	Length (m)	Replacement Cost (2024)	% of the Network
Barrier	Asphalt (Formed)	210	$28,485	0.0%
	Brick	21	$4,338	0.0%
	Concrete	217,446	$60,898,343	65.2%
	Granite	5,697	$6,813,833	7.3%
	Sandstone	26,623	$22,132,510	23.7%
	Timber	21	$4,470	0.0%
	Barrier Total	**250,018**	**$89,881,978**	**96.3%**
Dish crossing	Concrete	8	$2,742	0.0%
	No Kerb	6,010	$1,997,675	2.1%
	Dish crossing Total	**6,018**	**$2,000,418**	**2.1%**
Mountable kerb	Asphalt (Formed)	205	$52,310	0.1%
	Concrete	2,942	$752,443	0.8%
	Granite	71	$125,630	0.1%
	Mountable kerb Total	**3,217**	**$930,383**	**1.0%**
Semi-mountable kerb	Concrete	476	$121,640	0.1%
	Sandstone	263	$428,364	0.5%
	Semi-mountable kerb Total	**738**	**$550,005**	**0.6%**
	Grand Total	**259,991**	**$93,362,784**	**100.0%**

2.3 Asset Description – Road Pavements

As shown in the Table below the Road Pavements network mainly comprises of:

- Road Pavements - Structure = 73.0%

Asset Component	Area (sqm)	Replacement Cost (2024)	% of the Network
Road Pavement Surface	1,201,065	$64,641,232	20.1%
Road Pavement Structure	1,213,241	$234,463,491	73.0%
Road Pavement Formation		$22,051,673	6.9%
Car Parks and Access Roads		$3,730,775	1.1%
Total		**$324,887,171**	**100.0%**

2.4 Asset Description – Street Furniture

As shown in the Table below the Street Furniture network mainly comprises of:

- Seats = 43.2%
- Bike Racks = 10.6%
- Bins = 10.0%

Street Furniture Types	Quantity	Replacement Cost (2024)	% of the Network
Backflow Device	2	$8,424	0.2%
Bike Rack	210	$500,286	10.6%
Bin	87	$472,140	10.0%

Street Furniture Types	Quantity	Replacement Cost (2024)	% of the Network
Bubbler	6	$75,376	1.6%
Fire Hydrant	5	$10,937	0.2%
Flagpole	18	$61,852	1.3%
Information Board	6	$15,917	0.3%
Planter Box	201	$294,896	6.2%
Plaque	17	$25,125	0.5%
Power Outlet	1	$528	0.0%
Seat	399	$2,042,940	43.2%
Shade Structure	2	$146,329	3.1%
Shelter	1	$37,451	0.8%
Sign	19	$18,990	0.4%
Table	8	$30,741	0.7%
Tap	10	$5,542	0.1%
Tree Guard	47	$195,193	4.1%
Wall - Brick	6	$23,854	0.5%
Wall - Concrete	22	$109,600	2.3%
Wall - Concrete, Brick	1	$2,484	0.1%
Wall - Metal	3	$452,606	9.6%
Wall - Stone	12	$190,713	4.0%
Wall - Timber	1	$6,651	0.1%
Grand Total	**1,084**	**$4,728,578**	**100.0%**

2.5 Asset Description – Traffic Facilities

As shown in the Table below the Traffic Facilities network mainly comprises of:

- Raised Thresholds = 38.9%
- Separated Cycleways = 18.0%
- Median Strips (total) = 11.2%

Traffic Facility Types	Quantity	Replacement Cost (2024)	% of the Network
Footpath Continuation	63	$1,304,364	6.2%
Kerb Island (Landscaped Infill)	183	$358,563	1.7%
Kerb Island (Paved Infill)	124	$292,223	1.4%
Kerb Island (Tree)	121	$50,126	0.2%
Median (Landscaped Infill)	5	$54,817	0.3%
Median (Paved Infill)	111	$2,295,227	10.9%
Pedestrian Refuge Island	147	$1,092,855	5.2%
Rain Garden	5	$378,538	1.8%
Roundabout (Landscaped Infill)	17	$207,936	1.0%
Roundabout (Paved Infill)	10	$197,470	0.9%
Separated Cycleway	22	$3,799,318	18.0%
Speed Cushion	16	$174,816	0.8%

Traffic Facility Types	Quantity	Replacement Cost (2024)	% of the Network
Speed Hump	53	$579,078	2.7%
Splitter Island (Landscaped Infill)	24	$251,477	1.2%
Splitter Island (Paved Infill)	94	$654,765	3.1%
Threshold (Flush)	44	$1,168,863	5.5%
Threshold (Raised)	131	$8,203,703	38.9%
Traffic Dome	3	$0	0.0%
Grand Total	**1,173**	**$21,064,141**	**100%**

3.0 Levels of Service

Technical service measures are linked to the activities and annual budgets covering:

- Operations – the regular activities to provide services (e.g. cleansing, inspections, etc).
- Maintenance – the activities necessary to retain an asset as near as practicable to an appropriate service condition. Maintenance activities enable an asset to provide service for its planned life (e.g. footpath repair – patching, minor works),
- Renewal – the activities that return the service capability of an asset up to that which it had originally (e.g. footpath replacement and or footpath reconstruction),
- Upgrade – the activities to provide a higher level of service (e.g. widening a footpath or replacing an existing footpath with a different type as per Public Domain Style Manual).
- New - the activities to provide an additional level of service (e.g. constructing a footpath where none previously existed).

The Table below shows the technical levels of service expected to be provided for the Road Asset Class infrastructure assets. The 'Desired' position in the Table documents the position being recommended in this Asset Management Plan

Table: Road Asset Class – Technical Levels of Service

Service Attribute	Service Activity Objective	Activity Measure Process	Current Performance	Desired for Optimum Lifecycle Cost
Operations	Undertake network inspections to monitor condition	Network inspections to monitor condition	• Bus Shelters (2023) • Kerb & Gutter (2018) • Road Pavements (2024) • Street Furniture (2019) • Traffic Facilities (2018)	Network inspected every 5 years
Maintenance	Reactive service Requests completed in a timely manner or made safe.	Respond to complaints.	Minor repairs undertaken in accordance with Maintenance Management System	Minor repairs undertaken in accordance with Maintenance Management Delivery System.
Renewal	Maintain existing assets to a satisfactory condition	Percentage of assets in 'poor' or 'very poor' (4, 5) Condition.	• Bus Shelters (35.1%) • Kerb & Gutter (3.7%) • Road Pavements (6.2%)	Improve

Service Attribute	Service Activity Objective	Activity Measure Process	Current Performance	Desired for Optimum Lifecycle Cost
			• Street Furniture (1.6%) • Traffic Facilities (1.6%)	
Upgrade	Assets meet the standard of the Public Domain Style Manual.	Number of assets meet the standard of the Public Domain Style Manual.	When assets are renewed, they are replaced with assets that meet the standard of the Public Domain Style Manual.	When assets are renewed, they are replaced with assets that meet the standard of the Public Domain Style Manual.
New	Satisfactory provision of assets.	New assets provided subject to needs, physical constraints, demand, and cost.	Provision of new assets assessed as required subject to needs, physical constraints, demand, and cost.	Provision of new assets assessed as required subject to needs, physical constraints, demand, and cost.

3.1 Future Demand

Drivers affecting demand for Bus Shelters, Kerb and Gutter, Road Pavements, Street Furniture, and Traffic Facilities include things such as population change, regulation changes, new development, community expectations, public safety, technological changes, economic factors, climate change, and environmental factors. As North Sydney is a "brown field" site most capital projects are either renewal or upgrade to meet Public Domain Style Manual. Generally no new assets are built. The provision of new assets is assessed as required subject to needs, physical constraints, demand, and cost.

With respect to Road Pavements, very few new roads have been constructed within the past few decades. No new assets are anticipated to be acquired. However, increasing development and population is likely to lead to increased traffic volumes resulting in increased deterioration of the road network. Traffic growth factors have been accounted for in Council's Pavement Management System and will be monitored in the future.

With respect to Traffic Facilities, as part of the North Sydney Integrated Traffic and Parking Strategy (2015), Council has adopted Local Area Traffic Management (LATM) Action Plans. The LATM implementation procedure adopts a methodology that takes into consideration an area wide traffic management scheme and allows the community's high priority traffic projects to be ranked according to a number of criteria, including safety, traffic volume, speeds, pedestrian and cycling volumes, surrounding land uses, and alignment with the Community Strategic Plan.

The Action Plans form the basis of a works program to be implemented by Council going forward. The Action Plans are also updated and reviewed on an ongoing basis to ensure they are relevant and up to date. Projects are planned on an annual basis subject to the priorities within the Action Plans, availability of funding and community consultation.

In addition, the North Sydney Integrated Cycling Strategy ('Cycling Strategy') was adopted by Council in 2014. The Cycling Strategy proposes a range of significant infrastructure works which aim to facilitate significant growth in cycling as a transport mode for people of all ages and abilities.

There is an anticipated population increase due to increasing medium to high density developments, rezoning of land by the State Government and demand for active transport. This will have significant implications on demand for these assets.

4.0 Asset Condition

4.1 Asset Condition – Bus Shelters

The condition of Council's Bus Shelters was surveyed in 2023 by Consultants, Urbanspec Engineering Pty Ltd.

The following condition criteria was used.

Table: Bus Shelters Condition Survey Criteria

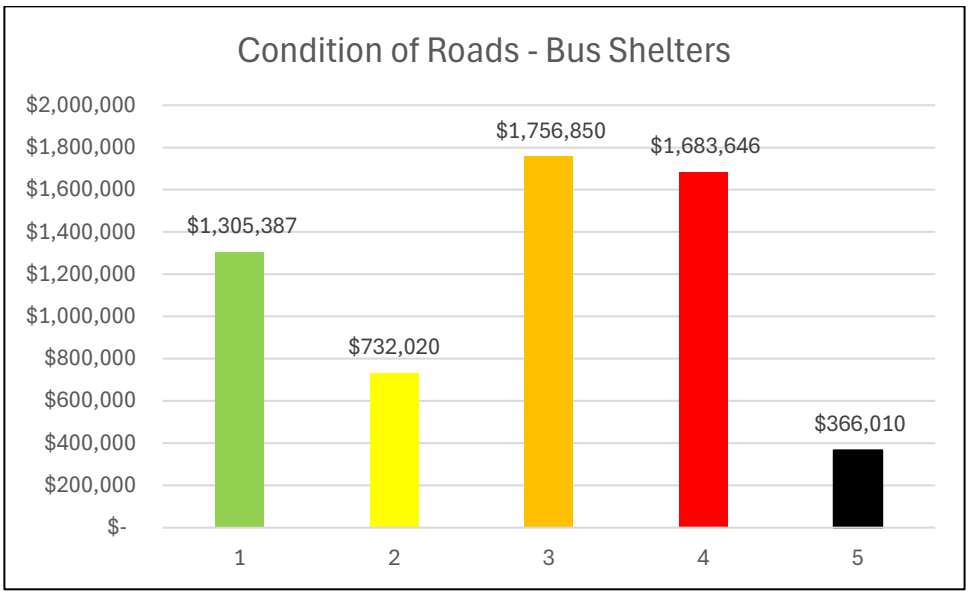
Grade	Condition	Description
1	Very Good	Sound shelter constructed to current standards, well maintained with no defects. **No work required**
2	Good	As grade 1 but not constructed to current standards or showing minor wear, tear and deterioration. E.g. weathering of timber, staining of fastenings but no decay of timber or corrosion of steel. Deterioration has no significant impact on, safety & appearance of the shelter. **Only minor work required**
3	Fair	Shelter functionally sound, but appearance affected by minor defects e.g. vandalism, slight decay of timber, and mild corrosion of fastenings. Deterioration beginning to affect the stability, functionality or appearance of the shelter. **Some work required**
4	Poor	Shelter functioning but with problems due to significant defects e.g. rotting/ splitting of timber, corrosion, loosening of fastenings, causing a marked deterioration in stability, functionality or appearance. **Some replacement or rehabilitation needed within 1 year**
5	Very Poor	Shelter has serious problems and has failed or are about to fail in the near future, causing unacceptable deterioration in stability, safety and appearance. **Urgent replacement/ rehabilitation required**

The Table below shows the Replacement Cost for each of the condition scores.

Table: Bus Shelters Condition Survey Results

Condition	Replacement Cost (2024)	% Condition (based on cost)
1 (Very Good)	$1,305,387	22.3%
2 (Good)	$732,020	12.5%
3 (Fair)	$1,756,850	30.1%
4 (poor)	$1,683,646	28.8%
5 (Very Poor)	$366,010	6.3%
Total	**$5,843,913**	**100.0%**

The Graph below shows the condition of Bus Shelters assets in terms of replacement cost.



4.2 Asset Condition – Kerb and Gutter

The condition of Council's kerb and gutter network was surveyed in 2018 by Consultants, Rapid Map Services Pty Ltd in conjunction with Asset & Facilities Management Consulting Pty Ltd. The following condition criteria were used.

Table: Kerb and Gutter Condition Survey Criteria

Grade	Condition	Description	
1	Very Good	As new, no need for intervention. Low risk to public safety. **No work required**	
		Cracking	No cracks or only occasional fine surface cracks.
		Misalignment due to uplift/ settlement/ rotation	Nil
		Chipping/ Spalling	Nil
		Ponding	Nil
2	Good	Some signs of wear and tear. No immediate intervention required. Note for review at next inspection. Low to Medium risk to public safety. **Only minor work required**	
		Cracking	Isolated fine cracking at intervals.
		Misalignment due to uplift/ settlement/ rotation	Isolated misalignment up to 5mm.
		Chipping/ Spalling	Minor cosmetic chipping only. No impact on performance.
		Ponding	Minor ponding in channel only.
3	Fair	Some isolated defects. Generally able to be addressed through routine/ scheduled maintenance. Medium to High risk to public safety and amenity. **Some work required**	
		Cracking	Block cracking typically 3 to 5mm width. Up to 20% of length.
		Misalignment due to uplift/ settlement/ rotation	Misalignments of 5 to 15mm with up to 30% of length affected.
		Chipping/ Spalling	Isolated chipping, max 30mm diameter. Average 5m apart.
		Ponding	More significant ponding up to 10mm deep but confined to channel. Now more than 30% affected.
4	Poor	Extensive wear and tear. Requiring replacement of sections. High to Very High risk to public safety and amenity.	

Grade	Condition	Description	
		Some replacement or rehabilitation needed within 1 year	
		Cracking	Block cracking over 5mm width but still intact. Generally, over 20% to 50% of section affected.
		Misalignment due to uplift/ settlement/ rotation	Misalignments 15 to 50mm width over 50% of length affected. Water infiltration to pavement.
		Chipping/ Spalling	Chipping and spalling with some water infiltration evident. No more than 50% of section affected.
		Ponding	Ponding up to 30mm deeps encroaching onto pavement and isolated pavement damage. No more than 30% of section affected.
5	Very Poor	Significant defects in terms of severity and extent. Requires full length replacement. High to Very High risk to public safety and, pavement and amenity. **Urgent replacement/ rehabilitation required**	
		Cracking	Block cracking, displacement and sections missing. Water infiltrating pavement. Generally, over more than 50% of the section affected.
		Misalignment due to uplift/ settlement/ rotation	Misalignments over 50mm and over 50% of the section affected. Water infiltration to pavement.
		Chipping/ Spalling	Major spalling of sections. Water infiltration common. Over 50% of the length affected.
		Ponding	Ponding over 30mm deep significantly encroaching onto pavement. Infiltration evident over 30% of length. Significant impact on adjoining pavement.

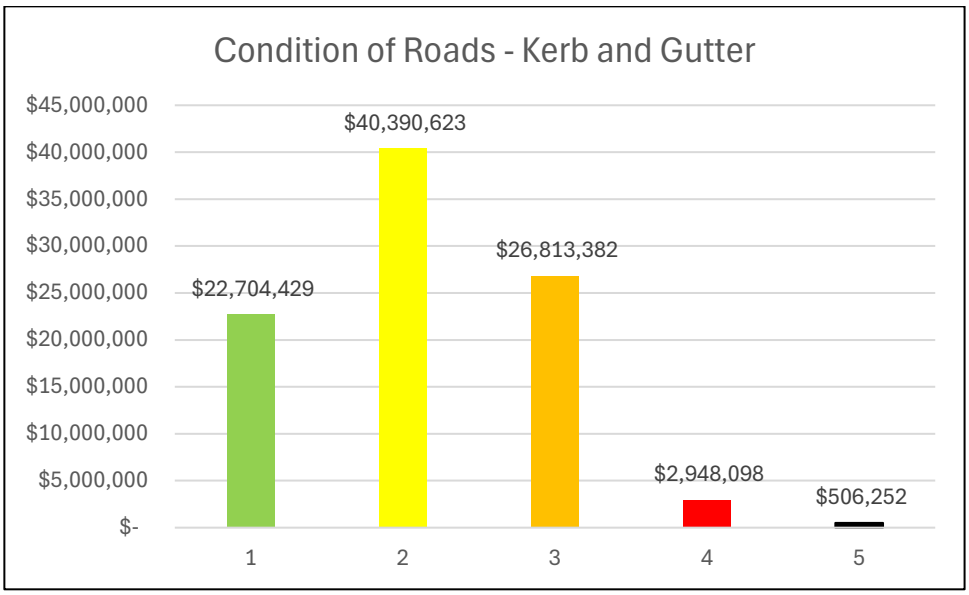
As per IPWEA Condition Assessment & Asset Performance Guidelines Practice Note 2 v2 2014 Kerb and Channel

The Table below shows the Replacement Cost for each of the condition scores.

Table: Kerb and Gutter Condition Survey Results

Condition	Replacement Cost (2024)	% Condition (based on cost)
1 (Very Good)	$22,704,429	24.3%
2 (Good)	$40,390,623	43.3%
3 (Fair)	$26,813,382	28.7%
4 (poor)	$2,948,098	3.2%
5 (Very Poor)	$506,252	0.5%
Total	**$93,362,784**	**100.0%**

The Graph below shows the condition of Kerb and Gutter assets in terms of replacement cost.



4.3 Asset Condition – Road Pavements

The condition of Council's Road Pavement network was surveyed in 2024 by Talis Consultants Pty Ltd. The following condition criteria was used.

Table: Local and Regional Roads Condition Survey Criteria

Grade	Condition	Description	Response
0	Not Rated		
1	Very Good	Structural: Sound physical condition. Insignificant deterioration. Asset likely to perform adequately without gravel resheeting work for typically 12 years or more. (Austroads Guide to Pavement Technology Part 6: Unsealed Pavements 2009 8.3 Resheeting (Wear Course Replacement). Serviceability: No or insignificant surface defects apparent. Very good driveability. Routine maintenance only required.	No immediate action required. Routine patrol grading to be maintained. Maintain standard programmed condition assessment.
2	Good	Structural: Acceptable physical condition; minor deterioration/ minor defects evident. Serviceability: Minor increase in pavement roughness counts. Some minor surface defects apparent. Driveability still good. Negligible short-term failure risk but potential for deterioration in medium-term (Typically 10 years plus). Only routine patrol grading required.	No immediate action required other than routine maintenance and patrol grading. Maintain standard programmed condition assessment.
3	Fair	Structural: Moderate to significant localised deterioration evident: Minor components or isolated sections of the asset need replacement or repair now but not affecting short term overall structural integrity. Serviceability: Moderate increase of pavement roughness but asset still functions safely at adequate level of service.	Take action as appropriate to address defects and if necessary, major maintenance grading and shape correction. Monitor with programmed condition assessment for

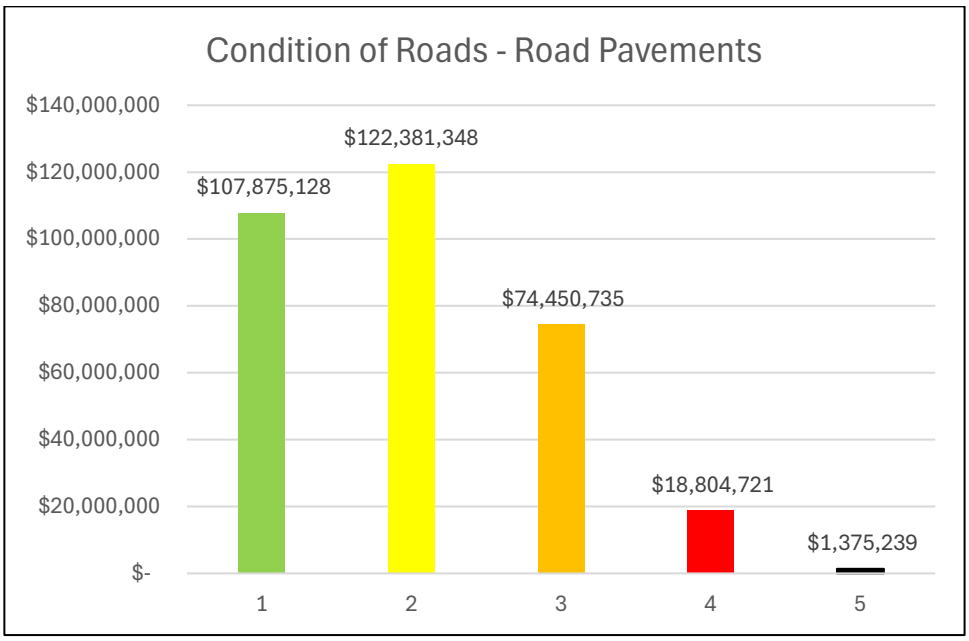
Grade	Condition	Description	Response
		Failure unlikely within the short term but further deterioration likely and major replacement likely within next 5 to 10 years. Significant maintenance grading and reshaping required but asset is still serviceable.	rehabilitation and/or renewal in medium term.
4	Poor	Structural: Serious deterioration and significant defects evident affecting structural integrity. Serviceability: Significant increase in pavement roughness. Substantial work required in short-term to keep asset serviceable. Failure likely in short to medium term. Poor driveability. Likely need to carry out gravel resheeting within the next 1 to 2 years. No immediate risk to health or safety but works required within 1 to 2 years to ensure asset remains safe.	Take immediate action as appropriate to address the defects. Immediately undertake risk assessment and further investigate options. Schedule appropriate action – rehabilitation or renewal in short term.
5	Very Poor	Structural: Failed or failure imminent. Immediate need to replace most or all of asset. Serviceability: Large increase in pavement roughness and surface defects. Increase in road user costs and a deterioration in the safe performance of the asset. Very poor drivability. Major work including reshaping and gravel resheeting required urgently.	Take immediate action as appropriate to address the defects. Immediately undertake risk assessment and further investigate options. Schedule appropriate action – immediate rehabilitation or renewal.

The Table below shows the Replacement Cost for each of the condition scores.

Table: Road Pavement Condition Survey Results

Condition	Replacement Cost (2024)	% Condition (based on cost)
1 (Very Good)	$107,875,128	33.2%
2 (Good)	$122,381,348	37.7%
3 (Fair)	$74,450,735	22.9%
4 (poor)	$18,804,721	5.8%
5 (Very Poor)	$1,375,239	0.4%
Total	**$324,887,171**	**100.0%**

The Graph below shows the condition of Road Pavement assets in terms of replacement cost.



4.4 Asset Condition – Street Furniture

The condition of Council's Street Furniture network was surveyed in 2019 by Consultants, Rapid Map Services Pty Ltd in conjunction with Asset & Facilities Management Consulting Pty Ltd. The following condition criteria were used.

Table: Street Furniture Condition Survey Criteria

Grade	Condition	Description
1	Very Good	Sound - constructed to current standards, well maintained with no defects. with no defects. Meets Council's current Public Domain Style Manual standards. **No work required**
2	Good	As grade 1 but not constructed to current standards or showing minor wear, tear and deterioration. E.g. weathering of timber, staining of fastenings but no decay of timber or corrosion of steel. Deterioration has no significant impact on safety & appearance of the street furniture. **Only minor work required**
3	Fair	Street furniture functionally sound, but appearance affected by minor defects e.g. vandalism, slight decay of timber, and mild corrosion of fastenings. Deterioration beginning to affect the stability, functionality or appearance of the street furniture or does not meet Council's current Public Domain Style Manual. **Some work required**
4	Poor	Street furniture functioning but with problems due to significant defects e.g. rotting/ splitting of timber, corrosion, loosening of fastenings, causing a marked deterioration in stability, functionality or appearance or does not meet Council's current Public Domain Style Manual. **Some replacement or rehabilitation needed within 1 year**
5	Very Poor	Street furniture has serious problems and has failed or are about to fail in the near future, causing unacceptable deterioration in stability, safety and appearance. **Urgent replacement/ rehabilitation required**

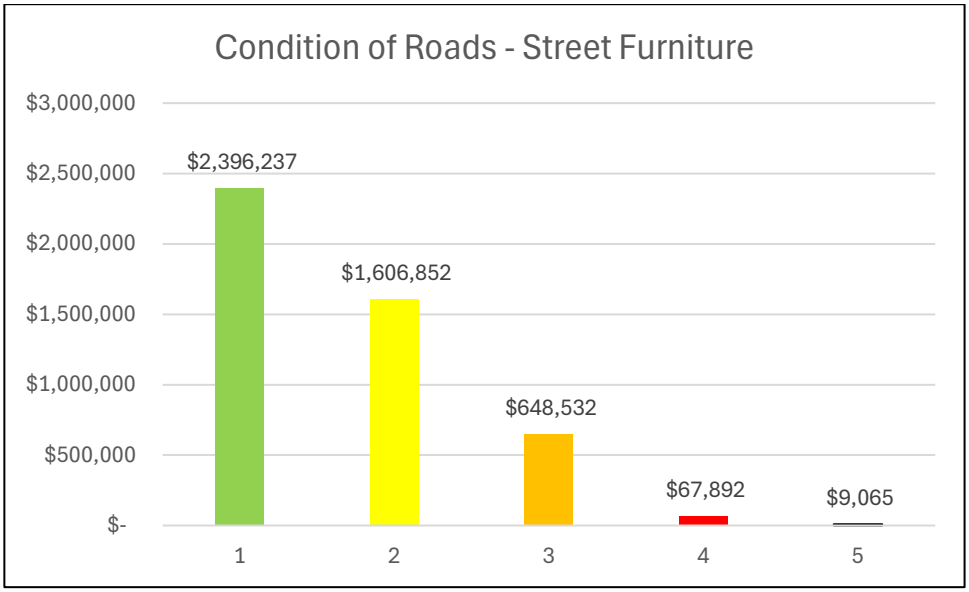
As per IPWEA Condition Assessment & Asset Performance Guidelines Practice Note 10.1 2014 Parks Asset Management

The Table below shows the Replacement Cost for each of the condition scores.

Table: Street Furniture Condition Survey Results

Condition	Replacement Cost (2024)	% Condition (based on cost)
1 (Very Good)	$2,396,237	50.7%
2 (Good)	$1,606,852	34.0%
3 (Fair)	$648,532	13.7%
4 (poor)	$67,892	1.4%
5 (Very Poor)	$9,065	0.2%
Total	**$4,728,578**	**100.0%**

The Graph below shows the condition of Street Furniture assets in terms of replacement cost.



4.5 Asset Condition – Traffic Facilities

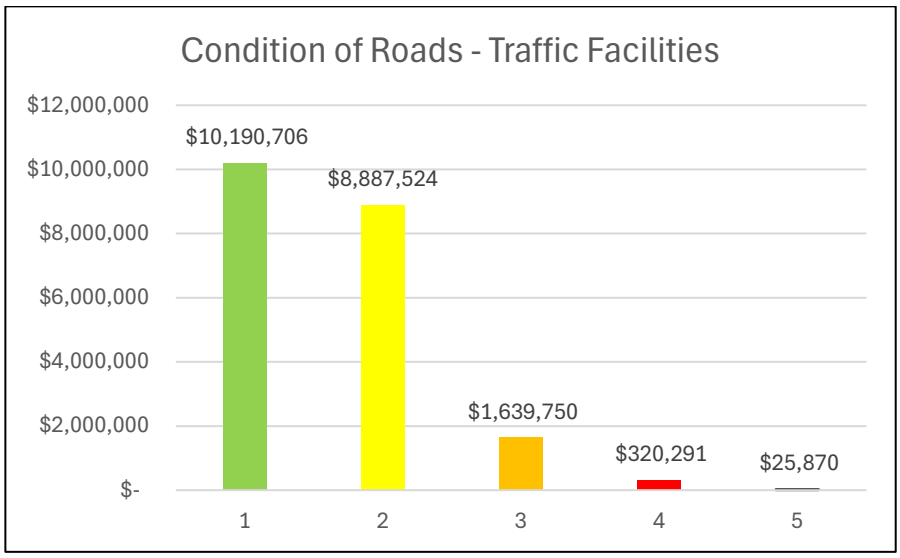
The condition of Council's Traffic Facilities network was surveyed in 2018 by Consultants, Rapid Map Services Pty Ltd in conjunction with Asset & Facilities Management Consulting Pty Ltd. The same condition criteria that were used for Kerb and Gutter, refer above, was used for Traffic Facilities.

The Table below shows the Replacement Cost for each of the condition scores.

Table: Traffic Facilities Condition Survey Results

Condition	Replacement Cost (2024)	% Condition (based on cost)
1 (Very Good)	$10,190,706	48.4%
2 (Good)	$8,887,524	42.2%
3 (Fair)	$1,639,750	7.8%
4 (poor)	$320,291	1.5%
5 (Very Poor)	$25,870	0.1%
Total	**$21,064,141**	**100.0%**

The Graph below shows the condition of Traffic Facilities assets in terms of replacement cost.



5.0 Financial Summary

5.1 Asset Valuation

The total Replacement Value of the Road Asset Class network is shown in the Table below as at 30 June 2024.

Table: Road Asset Class Valuation ($) 2024

Asset Category	Replacement Value (2024)	Accumulated Depreciation (2024)	Fair Value (2024)	Depreciation Expense (2024)
Bus Shelters	$5,843,913	$2,514,858	$3,329,055	$110,481
Kerb and Gutter	$93,362,784	$35,941,900	$57,420,884	$1,331,873
Road Pavements	$324,887,171	$98,549,850	$226,337,321	$4,884,434
Street Furniture	$4,728,578	$1,832,233	$2,896,345	$217,010
Traffic Facilities	$21,064,141	$4,736,405	$16,327,736	$303,549
TOTAL	**$449,886,586**	**$143,575,246**	**$306,311,340**	**$6,847,347**

5.2 Funding Requirements

The Table below shows that the current cost to bring all Council's Road infrastructure assets to a satisfactory standard is $26.1M. This amount includes the cost to replace existing infrastructure currently in either poor or very poor condition (condition 4 or 5). This represents 5.8% of the Road infrastructure network in terms of Replacement Cost. This means that 94.2% of this portfolio is in very good to fair condition (1 to 3).

The Table also shows that the total current Depreciation Expense is $6.8M or 1.5% of the Total Replacement Cost of Council's assets. This assumes that all Council's assets are completely replaced every 65.7 years on average. This is a weighted average for the network as useful lives of the individual components varies.

The Table shows that the 10 year Long Term Cost to bring all Council's infrastructure assets to a satisfactory standard as well as maintain the current standard is $94.6M over 10 years or an average annual cost of $9.5M. This includes the total Depreciation Expense over 10 years (maintaining the existing standard) and assumes

that all condition 4 and 5 assets will be replaced over the next 10 years (bringing all assets to a satisfactory condition).

Historically, Council has reported a 'cost to bring to satisfactory condition' that assumed those assets in 'poor' condition (category 4) were acceptable by the community. Council's recommendation is that assets in poor condition should be brought to a satisfactory condition, and therefore we have included these in our backlog estimates.

The Local Government Code of Accounting Practice outlines the requirements for both Council's financial statements and the special schedules. Under this Code, where Councils haven't developed an 'agreed' level of service, a standard of 'good' (category 2) should be used for the 'Estimated cost to bring to satisfactory condition'. This would mean including within our backlog figures category 3, 4 and 5 assets.

North Sydney Council has not undertaken the exercise with the community to determine the 'agreed level of service'. However, Council did not think it was reasonable to inflate the backlog to this extent. Instead, Council has opted to use the standard of 'satisfactory/fair' (category 3) as the condition to aspire to, rather than 'good' (category 2).

At a recent demographically selected workshop in 2024 (involving a group of residents, representative of the demographics of the North Sydney local government area), feedback suggested that infrastructure in a 'poor' or 'very poor' condition would not be acceptable to the community. Based on Council's review, it is recommended that all infrastructure currently classified as 'poor' or 'very poor' are required to be addressed.

Table: Long Term Infrastructure Funding Required ($)2024

Asset Class / Category	Cost to bring to assets to satisfactory Cond. (4 + 5)	Total replacement cost	Depreciation Expense (2024)	Funding required over 10 years (Depreciation x 10 + Cond 4 + 5)	Average Annual Funding Required (2024)
Roads / Bus Shelters	$2,049,656	$5,843,913	$110,481	$3,154,470	$315,447
Roads / Kerb and Gutter	$3,454,350	$93,362,784	$1,331,873	$16,773,082	$1,677,308
Roads / Road Pavements	$20,179,960	$324,887,171	$4,884,434	$69,024,301	$6,902,430
Roads / Street Furniture	$76,957	$4,728,578	$217,010	$2,247,054	$224,705
Roads / Traffic Facilities	$346,161	$21,064,141	$303,549	$3,381,647	$338,165
TOTAL	**$26,107,084**	**$449,886,586**	**$6,847,347**	**$94,580,553**	**$9,458,055**

5.3 Useful Lives – Bus Shelters

There is no specific guidance in the IPWEA 2017 Practice Note – "Useful Life of Infrastructure" on Bus Shelters. The IPWEA Practice Note does, however, provide guidelines on minor building structures as follows:

Notes from IPWEA 2017 Practice Note – "Useful Life of Infrastructure" BUILDINGS - MINOR						
Component	Low rates' description	High rates' description	Unit ID	Useful Lives		
				Std	Low	High
Carport	Concrete slab, timber frame, galvanised steel roof (kitset)	Higher quality including Colour steel	m2	50	40	60
Covered Ways	0.4mm Endura corrugated	0.9mm aluminium trough 300 profile	m2	55	45	70
Garage	6x3.5m Concrete, timber frame, galvanised steel clad	Brick veneer, Concrete tile roof	m2	50	40	60

The useful lives of all types of Bus Shelters assets were reviewed by Australis Pty Ltd and are shown in the following Table.

Bus Shelter Type	Reviewed Useful Life (years)
NSC Style Timber	50
JCDecaux	50

5.4 Useful Lives – Kerb and Gutter

The useful lives of all types of Kerb and Gutter assets were reviewed by Australis Pty Ltd and are shown in the following Table. The Weighted Average Useful Life is 65.7 years.

Material	Useful Life
Brick	40
Asphalt	60
Concrete	60
Timber	80
Granite	80
Sandstone	80

The useful lives are consistent with industry standards. The Table below shows the ranges of useful lives from the IPWEA 2017 Practice Note – "Useful Life of Infrastructure" from detailed studies in South Australia, Tasmania, as well as an IPWEA Workshop.

Kerb and Gutter – Review of Useful Lives							
Description	South Aust. Tonkin Rpt.			IPWEA Workshop		Tasmania Audit Office	
	Min	Max	Avg	Min	Max	Min	Max
Upright Concrete Kerbs	55	100	74	55	100	50	80
Median Concrete Kerbs	40	100	70				
Valley Drain Concrete Kerbs	55	100	72				

5.5 Useful Lives – Road Pavements

The Table below compares the useful lives of North Sydney's road assets with detailed studies in South Australia, Queensland, as well as recommendations in the IPWEA 2017 Practice Note – "Useful Life of Infrastructure" which workshopped and reviewed all the reports. Given the local conditions, maintaining condition, population density, and traffic volumes the useful lives of road assets in North Sydney have been reviewed and adjusted. The weighted average useful life is 65.7 years.

USEFUL LIVES - ROADS							
Road Class	**Component A = Asphalt C=Concrete**	**NSC Previous (years)**	**South Aust. 2014 Tonkin Report (years)**	**QLD 2013 RAV Project Recommended (years)**	**NSW OLG 2015 data Group 2&3 Councils (years)**	**IPWEA 2017 Practice Note Recommended (years)**	**NSC Adopted (years)**
Regional	Surface (A)	20	15 to 40 (24 Avg)	20 to 50	21 to 30 (25 Avg)	12 to 25	18
Collector		30					22
Local		40	15 to 35 (26 Avg)			15 to 30	24
Lanes		40					30
Regional	Structure (A)	70	45 to 100 (67 Avg)	20 to 100	92 to 104 (98 Avg)	50 to 100	60
Collector		90					72
Local		150	55 to 150 (83 Avg)				88
Lanes		150					100
All	Structure (C)	120		50 to 100			100
All	Formation	200		100 to 1000			200

5.6 Useful Lives – Street Furniture

The useful lives of all types of Kerb and Gutter assets were reviewed by Australis Pty Ltd and are shown in the following Table. The weighted average useful life is 21.8 years.

Street Furniture Type	Useful Life (Years)
Backflow Device	15
Bike Rack	15
Bin	15
Bubbler	15
Fire Hydrant	50
Flagpole	35
Information Board	15
Planter Box	50
Plaque	15
Power Outlet	15
Seat	15
Shade Structure	15
Shelter	50
Sign	15
Table	15
Tap	15

Street Furniture Type	Useful Life (Years)
Tree Guard	15
Wall - Brick	90
Wall - Concrete	90
Wall - Concrete, Brick	90
Wall - Metal	90
Wall - Stone	90
Wall - Timber	90

5.7 Useful Lives – Traffic Facilities

The Table below shows the ranges of useful lives from the IPWEA 2017 Practice Note – "Useful Life of Infrastructure" from detailed studies in South Australia, Tasmania, as well as an IPWEA Workshop.

	South Aust. Tonkin Rpt.			IPWEA Workshop		Tasmania Audit Office	
Description	Min	Max	Avg	Min	Max	Min	Max
Upright Concrete Kerbs	55	100	74	55	100	50	80
Median Concrete Kerbs	40	100	70				
Valley Drain Concrete Kerbs	55	100	72				

The useful lives of all types of Traffic Facility assets were reviewed by Australis Pty Ltd and are shown in the following Table.

Traffic Facility Type	Units	Reviewed Useful Life (years)
Footpath Continuation	m^2	70
Kerb Island (Landscaped Infill)	m^2	70
Kerb Island (Paved Infill)	m^2	70
Kerb Island (Tree)	m^2	70
Median (Landscaped Infill)	m	70
Median (Paved Infill)	m	70
Pedestrian Refuge Island	Each	70
Rain Garden	Each	70
Roundabout (Landscaped Infill)	m^2	70
Roundabout (Paved Infill)	m^2	70
Separated Cycleway	m	70
Speed Cushion	Each	70
Speed Hump	Each	70
Splitter Island (Landscaped Infill)	m^2	70
Splitter Island (Paved Infill)	m^2	70
Threshold (Flush)	m^2	70
Threshold (Raised)	m^2	70
Traffic Dome	Each	70
Barrier Kerb	m	70

6.0 Managing the Risks

Councils present budget levels (as at 30 June 2024) are insufficient to continue to manage risks in the medium term (4 years).

The main risk consequences are:

- Increase in trip hazards which may result in personal injury
- Bus Shelter assets - sudden failure, for example, damage due to vehicular accident.
- Kerb and Gutter – cracking of K&G causing water to enter the road pavement potentially causing premature road pavement failure
- Street Furniture assets - sudden failure, for example, damage due to vehicular accident.
- Traffic Facilities in poor condition – causing possible trip hazard.
- Road Pavements –increase of major storm events damaging the road surface.
- Decreasing frequency of renewal resulting in faster deterioration of overall network

Council will endeavour to manage these risks within available funding by:

- Prioritising higher risk works within the planned budget where possible
- Re-allocating budgets from other sources if required and where possible
- Seeking emergency funding if required and where possible
- Partial or full closure where necessary

The PARMMS Road Manager software was used to produce the required future works program. The methodology used is detailed in the Appendix. The Risk Matrix used to prioritise capital works for Bus Shelters, Kerb and Gutter, Street Furniture, and Traffic Facilities is shown in the Table below.

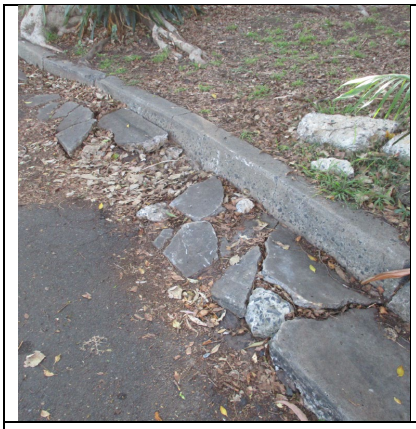
Table: Risk Matrix – Bus Shelters, Kerb and Gutter, Street Furniture, and Traffic Facilities

Risk Matrix - Bus Shelters, Kerb and Gutter, Street Furniture, and Traffic Facilities					
Condition	Footpath Hierarchy		All Other Areas	Medium Traffic	High Traffic
	Road Hierarchy	Lane	Local	Collector	Regional / State
	Park Hierarchy	Local	District	Regional	
	Score	1	2	3	4
Condition 1 – Very Good	1	L	L	L	L
Condition 2 - Good	2	L	L	L	M
Condition 3 – Fair	3	M	M	M	H
Condition 4 – Poor	4	H	H	H	VH
Condition 5 – Very Poor	5	H	VH	VH	VH

6.1 Examples of Bus shelter risks in the North Sydney LGA.

Examples of failed and failing Bus Shelters in the North Sydney LGA

6.2 Examples of Kerb and Gutter risks in the North Sydney LGA.



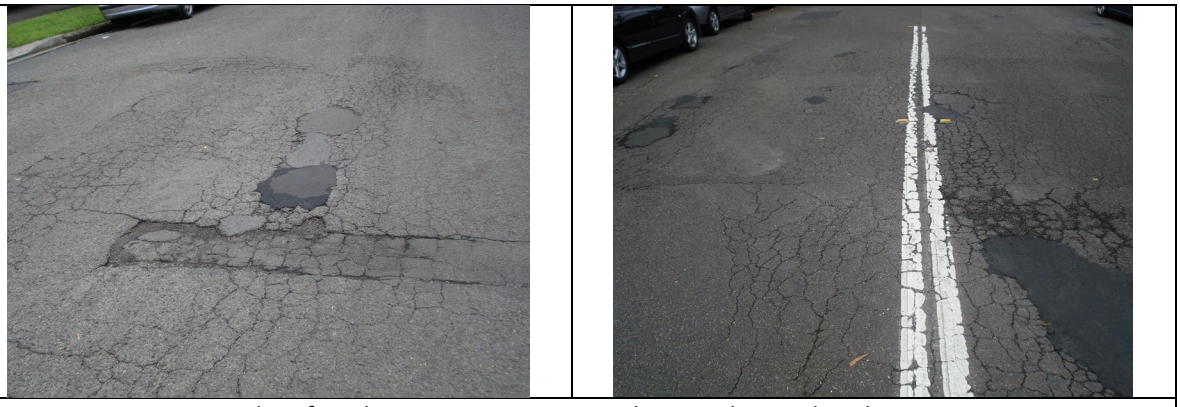
Examples of failed and failing Kerb and Gutter in the North Sydney LGA

Examples of failed and failing Kerb and Gutter in the North Sydney LGA

Examples of failed and failing Kerb and Gutter in the North Sydney LGA

6.3 Examples of Road Pavement risks in the North Sydney LGA.

Examples of road pavements in poor condition in the North Sydney LGA



Examples of road pavements in poor condition in the North Sydney LGA

Examples of road pavements in poor condition in the North Sydney LGA

6.4 Examples of Street Furniture risks in the North Sydney LGA.

6.5 Examples of Traffic Facilities risks in the North Sydney LGA.



Examples of failed and failing Traffic Facilities in the North Sydney LGA


Examples of failed and failing Traffic Facilities in the North Sydney LGA

7.0 Funding Programs

7.1 Maintenance Program

Routine 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, e.g. trip hazard repair. Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including regular ongoing day-to-day work necessary to keep assets operating.

The current maintenance expenditure levels are considered to be adequate to meet projected service levels.

Over the longer term, future operations and maintenance expenditure is forecast to increase as the asset stock increases and asset type changes to meet the requirements of the Public Domain Style Manual.

7.2 Capital Works – Prioritised list based on risk

The list of prioritised capital works for this asset category are based on the Risk Matrix. The extent of the program depends on the final adopted Council budget. The Program is prioritised in the following order:

1. Risk sorting score (descending order)
2. Risk rating score (descending order)

3. % Condition 5 (descending order)
4. % Condition 4 (descending order)

The following Table shows the prioritised list of capital works. Only projects with a Very High Risk Sorting Score or High Risk Sorting Score (with a Risk Rating Score 12 or higher) are shown. The Capital Works Program is based on data collected by consultants engaged to undertake condition assessments of the asset network. Prior to any Capital Works Program being finalised a detailed inspection, project scoping, and project estimates are undertaken. Program priorities may change as a result. In practice, and where funds permit, assets in condition 3 are generally replaced at the same time as assets in condition 4 or 5 if they are adjacent if there are potential risks and if it is cost effective.

It should be noted that these assets may also be replaced based on other criteria including:

- Damage.
- Restorations.
- Works in association with other projects such as drainage works.
- Streetscape projects.
- Professional judgement in cases where the risk matrix score does not accurately reflect the actual risk on site.

7.3 Capital Works Program – Prioritised list based on risk – Bus Shelters

Table: Prioritised Capital Works - Bus Shelters

Location	Risk sorting score	Risk rating score	Cost Estimate
BS006 - Miller St, North Sydney	Very High	16	$94,894
BS002 - Miller St, Cammeray	Very High	16	$94,894
BS054 - Falcon St, Neutral Bay	Very High	16	$427,026
BS001 - Miller St, Cammeray	Very High	16	$94,894
BS053 - Falcon St, Neutral Bay	Very High	16	$427,026
BS046 - Fitzroy St, Milsons Point	Very High	16	$94,894
BS012 - Murdoch St, Cremorne Point	Very High	15	$94,894
BS051 - Murdoch St, Cremorne Point	Very High	15	$94,894
BS041 - Rawson St, Neutral Bay	Very High	15	$94,894
BS061 - Henry Lawson Ave, McMahons Point	High	12	$94,894
BS064 - Milson Rd, Cremorne Point	High	12	$94,894
BS011 - Milson Rd, Cremorne Point	High	12	$94,894
BS028 - Ben Boyd Rd, Neutral Bay	High	12	$94,894
BS055 - High St, North Sydney	High	12	$94,894
BS005 - Miller St, North Sydney	High	12	$94,894
BS004 - Miller St, North Sydney	High	12	$94,894
BS050 - Falcon St, North Sydney	High	12	$94,894
BS010 - Falcon St, North Sydney	High	12	$94,894
BS049 - Falcon St, North Sydney	High	12	$94,894
BS059 - Rocklands Rd, Wollstonecraft	High	12	$94,894
BS044 - High St, North Sydney	High	12	$94,894
BS034 - Pacific Hwy, Wollstonecraft	High	12	$94,894
BS024 - Bay Rd, Waverton	High	12	$94,894
BS067 - Gerard St, Cremorne	High	12	$94,894

Location	Risk sorting score	Risk rating score	Cost Estimate
BS066 - Gerard St, Cremorne	High	12	$94,894
BS043 - Clark Rd, Neutral Bay	High	8	$94,894
BS025 - Woolcott St, Waverton	High	8	$94,894
BS052 - Carter St, Cammeray	High	8	$94,894
BS018 - Carter St, Cammeray	High	8	$94,894
BS029 - Wycombe Rd, Neutral Bay	High	8	$94,894

7.4 Capital Works Program – Prioritised list based on risk – Kerb and Gutter

Table: Prioritised Capital Works - Kerb and Gutter

Location	Risk sorting score	Risk rating score	Cost Estimate
Brook St (PSID 116)	Very High	20	$87,961
Rangers Rd (PSID 457)	Very High	16	$52,058
Military Rd (PSID 366)	Very High	16	$10,203
Miller St (PSID 380)	Very High	16	$30,354
Ennis Rd (PSID 678)	Very High	16	$321,772
Murdoch St (PSID 410)	Very High	16	$59,841
Falcon St (PSID 231)	Very High	16	$121,599
Chandos St (Westbound) (PSID 156)	Very High	16	$27,482
Ernest St (PSID 218)	Very High	16	$54,990
Miller St (PSID 383)	Very High	16	$22,322
Shirley Rd (PSID 496)	Very High	16	$45,283
Blues Point Reserve	Very High	15	$471,874
Shirley La (PSID 494)	Very High	15	$5,407
Brightmore Reserve	Very High	10	$52,458
Middlemiss St (PSID 362)	Very High	10	$6,826
Robertson La (PSID 984)	Very High	10	$2,543
Hayberry La (PSID 269)	Very High	10	$2,313
Smoothey Park	Very High	10	$33,133
Samora Ave (PSID 488)	Very High	10	$5,221
Lloyd Ave (PSID 341)	Very High	10	$2,423
Berry Island Reserve	High	12	$71,631
Blues Point Rd (PSID 106)	High	12	$84,329
Blues Point Rd (PSID 861)	High	12	$22,625
Bent St (PSID 92)	High	12	$13,291
Milson Rd (PSID 395)	High	12	$9,735
Cremorne Reserve	High	12	$96,502
Bent St (PSID 93)	High	12	$14,742
Milson Rd (PSID 394)	High	12	$36,065
Gillies St (PSID 246)	High	12	$6,654

Location	Risk sorting score	Risk rating score	Cost Estimate
Balls Head Reserve	High	12	$1,903,737
St Leonards Park	High	12	$49,076
West St (PSID 566)	High	12	$11,551
West St (PSID 567)	High	12	$23,034
Carr St (PSID 145)	High	12	$15,940
Nicholson St (PSID 419)	High	12	$10,290
Bay Rd (PSID 60)	High	12	$7,883
Ernest St (PSID 217)	High	12	$52,603
Shirley La (PSID 495)	High	12	$9,487
Henry Lawson Ave (PSID 275)	High	12	$105,046
Alfred St North (Southbound) (PSID 891)	High	12	$90,681
Young St (PSID 801)	High	12	$5,485
Rocklands Rd (PSID 477)	High	12	$36,075
Blues Point Rd (PSID 104)	High	12	$5,234
Bay Rd (PSID 58)	High	12	$8,924
Miller St (PSID 378)	High	12	$76,516
Rangers Rd (PSID 458)	High	12	$34,154
Macpherson St (Northbound) (PSID 347)	High	12	$34,854
Amherst St (PSID 23)	High	12	$84,168
Bay Rd (PSID 61)	High	12	$69,469
Belgrave St (PSID 67)	High	12	$63,473
Burton St (PSID 998)	High	12	$21,174
Pacific Hwy (PSID 816)	High	12	$72,743
Chandos St (PSID 154)	High	12	$20,782
Chandos St (Westbound) (PSID 157)	High	12	$29,586
Clark Rd (PSID 164)	High	12	$32,333
Miller St (PSID 376)	High	12	$218,229
Clark Rd (PSID 165)	High	12	$24,663
Belgrave St (PSID 66)	High	12	$45,642
Crows Nest Rd (PSID 186)	High	12	$70,622
River Rd (PSID 474)	High	12	$145,583
Yeo St (PSID 609)	High	12	$25,631
Atchison St (PSID 35)	High	12	$24,232
Ernest St (PSID 220)	High	12	$22,696
Ernest St (PSID 221)	High	12	$40,219
Military Rd (PSID 365)	High	12	$23,938
Falcon St (PSID 229)	High	12	$82,838
Military Rd (PSID 368)	High	12	$85,738
Falcon St (PSID 230)	High	12	$21,208
Miller St (PSID 377)	High	12	$61,547
Miller St (PSID 379)	High	12	$79,332
Falcon St (PSID 232)	High	12	$47,228

Location	Risk sorting score	Risk rating score	Cost Estimate
Miller St (PSID 382)	High	12	$25,252
Falcon St (PSID 874)	High	12	$13,684
Gerard St (PSID 244)	High	12	$9,231
Belgrave St (PSID 68)	High	12	$19,921
Gerard St (PSID 245)	High	12	$2,038
Pacific Hwy (PSID 817)	High	12	$21,396
Grosvenor St (PSID 259)	High	12	$12,472
Harriette St (PSID 265)	High	12	$66,304
Ben Boyd Rd (PSID 80)	High	12	$9,657
River Rd (Westbound) (PSID 846)	High	12	$32,354
Ben Boyd Rd (PSID 958)	High	12	$16,977
Shirley Rd (PSID 500)	High	12	$24,433
High St (PSID 278)	High	12	$112,252
High St (PSID 882)	High	12	$21,413
Telopea St (PSID 520)	High	12	$38,857
Waters Rd (PSID 557)	High	12	$24,613
Kurraba Rd (PSID 320)	High	12	$31,346
Kurraba Rd (PSID 321)	High	12	$25,883
Albany St (PSID 7)	High	12	$14,580

7.5 Capital Works Program – Prioritised list based on risk – Road Pavements

Table: Prioritised Capital Works - Road Pavements

Location	Priority	Cost Estimate
PSID 1011 - Spofforth St (Northbound), Cremorne - Ch 810 Change In Surface To Military Rd	Priority 1	$55,498
PSID 160 - Christie St, St. Leonards - Pacific Hwy To Chandos St	Priority 1	$79,702
PSID 166 - Clark Rd, North Sydney - Margaret St To Kurraba Rd	Priority 1	$124,587
PSID 18 - Alexander St, Crows Nest - Albany St To Chandos St	Priority 1	$166,434
PSID 249 - Grafton St, Cremorne - Cammeray Rd To Earle St	Priority 1	$140,712
PSID 253 - Grasmere Rd, Cremorne - Illiliwa St To Young St	Priority 1	$210,706
PSID 258 - Grosvenor St, Neutral Bay - Ben Boyd Rd To Young St	Priority 1	$362,282
PSID 259 - Grosvenor St, Neutral Bay - Young St To Waters Rd	Priority 1	$404,822
PSID 265 - Harriette St, Neutral Bay - Wycombe Rd To Bannerman St	Priority 1	$93,043
PSID 278 - High St, North Sydney - Clark Rd To Alfred St North	Priority 1	$186,027
PSID 320 - Kurraba Rd, Neutral Bay - Clark Rd To Ben Boyd Rd	Priority 1	$319,630
PSID 334 - Lavender St, Lavender Bay - Waiwera St To Blues Point Rd	Priority 1	$78,457
PSID 358 - McLaren St, North Sydney - Pacific Hwy To Miller St	Priority 1	$138,628
PSID 359 - McLaren St, North Sydney - Miller St To Walker St	Priority 1	$159,289
PSID 373 - Miller St, North Sydney - Pacific Hwy To Berry St	Priority 1	$196,240
PSID 404 - Morton St, Wollstonecraft - Gillies St To Rocklands Rd	Priority 1	$192,065
PSID 460 - Rawson St, Neutral Bay - Darley St To Eaton St	Priority 1	$115,881

Location	Priority	Cost Estimate
PSID 496 - Shirley Rd, Wollstonecraft - Pacific Hwy To River Rd	Priority 1	$204,224
PSID 500 - Shirley Rd, Wollstonecraft - Belmont Ave To Telopea St	Priority 1	$61,151
PSID 515 - Spruson St, Neutral Bay - Holdsworth Rd To Colindia Ave	Priority 1	$47,696
PSID 585 - Willoughby Rd, Crows Nest - Albany St To Ernest St	Priority 1	$77,924
PSID 586 - Willoughby Rd, Crows Nest - Chandos St To Albany St	Priority 1	$115,578
PSID 603 - Wycombe Rd, Neutral Bay - Raymond Rd To Harriette St	Priority 1	$406,602
PSID 617 - Alfred St North (Southbound), North Sydney - Kurraba Rd To Mount St	Priority 1	$41,155
PSID 62 - Bay Rd, Waverton - Crows Nest Rd To Whatmore St	Priority 1	$98,615
PSID 70 - Bellevue St, Cammeray - Amherst St To Palmer St	Priority 1	$180,188
PSID 83 - Ben Boyd Rd, Neutral Bay - Lindsay St To Premier St	Priority 1	$260,126
PSID 832 - Spofforth St (Northbound), Cremorne - Rangers Rd To Holt Ave	Priority 1	$78,721
PSID 833 - Spofforth St (Northbound), Cremorne - Holt Ave To Ch 810 Change In Surface	Priority 1	$38,863
PSID 958 - Ben Boyd Rd, Cremorne - Belgrave St To Ernest St	Priority 1	$79,255
PSID 116 - Brook St, Crows Nest - Chandos St To Donnelly Rd	Priority 2	$192,625
PSID 126 - Burlington St, Crows Nest - Alexander St To Willoughby Rd	Priority 2	$69,033
PSID 147 - Carr St, Waverton - Railway Pde To Euroka St	Priority 2	$48,878
PSID 156 - Chandos St (Westbound), Crows Nest - Wheatleigh St To Willoughby Rd	Priority 2	$36,362
PSID 186 - Crows Nest Rd, Waverton - Harriott St To Bay Rd	Priority 2	$194,777
PSID 195 - Earle St, Cremorne - Grafton St To Young St	Priority 2	$131,137
PSID 220 - Ernest St, Neutral Bay - Chainage 1157m Eastern Bridge Joint To Park Ave	Priority 2	$403,561
PSID 223 - Euroka St, Waverton - Union St To Carr St	Priority 2	$41,354
PSID 239 - Florence St, Cremorne - Murdoch St To Spofforth St	Priority 2	$486,538
PSID 321 - Kurraba Rd, Neutral Bay - Ben Boyd Rd To Wycombe Rd	Priority 2	$255,972
PSID 332 - Lavender St, Lavender Bay - Alfred St South To Harbourview Cres	Priority 2	$123,281
PSID 347 - Macpherson St (Northbound), Cremorne - Gerard St To Montague Rd	Priority 2	$107,757
PSID 348 - Macpherson St (Northbound), Cremorne - Montague Rd To Fernhurst Ave	Priority 2	$105,046
PSID 401 - Montpelier St, Neutral Bay - Spruson St To Eaton St	Priority 2	$33,256
PSID 405 - Morton St, Wollstonecraft - Rocklands Rd To Hazelbank Rd	Priority 2	$38,585
PSID 433 - Palmer St, Cammeray - Miller St To Bellevue St	Priority 2	$27,556
PSID 434 - Park Ave, Cammeray - Ernest St To Grasmere Rd	Priority 2	$179,804
PSID 435 - Park Ave, Cammeray - Grasmere Rd To Cammeray Ave	Priority 2	$213,465
PSID 474 - River Rd, Wollstonecraft - Shirley Rd To Chainage 300m Lithgow St Rd Closure	Priority 2	$220,760
PSID 497 - Shirley Rd, Wollstonecraft - River Rd To Newlands St	Priority 2	$27,586
PSID 535 - Union St, McMahons Point - Chuter St To Euroka St	Priority 2	$163,423
PSID 54 - Bannerman St, Cremorne - Shellcove Rd To Murdoch St	Priority 2	$238,403
PSID 544 - Walker St, North Sydney - Berry St To McLaren St	Priority 2	$120,516
PSID 609 - Yeo St, Neutral Bay - Wycombe Rd To Rangers Rd	Priority 2	$114,769

Location	Priority	Cost Estimate
PSID 618 - Alfred St North (Northbound), Neutral Bay - Kurraba Rd To Winter Ave	Priority 2	$206,920
PSID 63 - Bay Rd, Waverton - Whatmore St To Woolcott St	Priority 2	$88,338
PSID 66 - Belgrave St, Cremorne - Ben Boyd Rd To Young St	Priority 2	$132,613
PSID 67 - Belgrave St, Cremorne - Young St To Waters Rd	Priority 2	$188,137
PSID 7 - Albany St, Crows Nest - Pacific Hwy To Willoughby Rd	Priority 2	$52,066
PSID 752 - Olympic Dr, Milsons Point - Kirribilli Ave To Alfred St South	Priority 2	$313,246
PSID 800 - Young St, Neutral Bay - Military Rd To Grosvenor St	Priority 2	$68,708
PSID 846 - River Rd (Westbound), Wollstonecraft - Boronia St To Russell St	Priority 2	$80,738
PSID 867 - Gerard St, Cremorne - Langley Ave To Macpherson St	Priority 2	$19,824
PSID 89 - Benelong Rd, Cremorne - Brightmore St South To Grasmere Rd	Priority 2	$97,135
PSID 104 - Blues Point Rd, McMahons Point - Lavender St To King George St	Priority 3	$150,269
PSID 105 - Blues Point Rd, McMahons Point - King George St To East Crescent St	Priority 3	$105,925
PSID 106 - Blues Point Rd, McMahons Point - East Crescent St To Parker St	Priority 3	$167,133
PSID 107 - Blues Point Rd, McMahons Point - Parker St To Henry Lawson Ave	Priority 3	$150,340
PSID 119 - Broughton St, Kirribilli - Ennis Rd To Fitzroy St	Priority 3	$95,043
PSID 134 - Cammeray Rd, Cammeray - Park Ave To Carter St	Priority 3	$157,781
PSID 154 - Chandos St, Crows Nest - Wheatleigh St To Brook St	Priority 3	$154,272
PSID 165 - Clark Rd, North Sydney - Adderstone Ave To Margaret St	Priority 3	$150,976
PSID 185 - Crows Nest Rd, Waverton - McHatton St To Harriott St	Priority 3	$4,256
PSID 20 - Alfred St South, Milsons Point - Glen St To Dind St	Priority 3	$140,329
PSID 21 - Alfred St South, Milsons Point - Dind St To Olympic Pl	Priority 3	$142,782
PSID 218 - Ernest St, Cammeray - Lytton St To Chainage 1000m Western Bridge Joint	Priority 3	$802,968
PSID 221 - Ernest St, Cremorne - Park Ave To Ben Boyd Rd	Priority 3	$137,206
PSID 23 - Amherst St, Cammeray - West St To Miller St	Priority 3	$161,722
PSID 235 - Fitzroy St, Milsons Point - Alfred St South To Broughton St	Priority 3	$34,880
PSID 24 - Amherst St, Cammeray - Miller St To Warringa Rd	Priority 3	$361,636
PSID 245 - Gerard St, Cremorne - Ada St To Langley Ave	Priority 3	$716,911
PSID 333 - Lavender St, Lavender Bay - Harbourview Cres To Waiwera St	Priority 3	$173,537
PSID 375 - Miller St, North Sydney - McLaren St To Ridge St	Priority 3	$8,810
PSID 376 - Miller St, North Sydney - Ridge St To Carlow St	Priority 3	$5,008
PSID 401 - Montpelier St, Neutral Bay - Spruson St To Eaton St	Priority 3	$120,320
PSID 406 - Morton St, Wollstonecraft - Hazelbank Rd To Crows Nest Rd	Priority 3	$14,310
PSID 409 - Murdoch St, Cremorne - Military Rd To Rangers Rd	Priority 3	$26,661
PSID 433 - Palmer St, Cammeray - Miller St To Bellevue St	Priority 3	$70,366
PSID 459 - Rawson St, Neutral Bay - Kurraba Rd To Darley St	Priority 3	$98,782
PSID 469 - Ridge St, North Sydney - West St To Miller St	Priority 3	$170,345
PSID 497 - Shirley Rd, Wollstonecraft - River Rd To Newlands St	Priority 3	$147,701
PSID 499 - Shirley Rd, Wollstonecraft - Belmont La To Belmont Ave	Priority 3	$5,350
PSID 545 - Walker St, North Sydney - McLaren St To Ridge St	Priority 3	$64,913
PSID 584 - Willoughby Rd, Crows Nest - Ernest St To Pacific Hwy	Priority 3	$85,029

Location	Priority	Cost Estimate
PSID 589 - Winnie St, Cremorne - Military Rd To Gerard St	Priority 3	$107,689
PSID 60 - Bay Rd, Waverton - Priory Rd To Waverton Ave	Priority 3	$45,534
PSID 600 - Wycombe Rd, Neutral Bay - Military Rd To Harrison St	Priority 3	$3,659
PSID 602 - Wycombe Rd, Neutral Bay - Shellcove Rd To Raymond Rd	Priority 3	$139,395
PSID 604 - Wycombe Rd, Neutral Bay - Harriette St To Kurraba Rd	Priority 3	$159,843
PSID 607 - Yeo St, Neutral Bay - Bent St To Ben Boyd Rd	Priority 3	$53,091
PSID 608 - Yeo St, Neutral Bay - Ben Boyd Rd To Wycombe Rd	Priority 3	$158,996
PSID 61 - Bay Rd, Waverton - Waverton Ave To Crows Nest Rd	Priority 3	$30,719
PSID 619 - Alfred St North (Northbound), Neutral Bay - Winter Ave To Wyagdon St	Priority 3	$67,218
PSID 620 - Alfred St North, Neutral Bay - Wyagdon St To Merlin St	Priority 3	$67,308
PSID 7 - Albany St, Crows Nest - Pacific Hwy To Willoughby Rd	Priority 3	$4,911
PSID 734 - Merlin St, Neutral Bay - Military Rd To Alfred St North	Priority 3	$87,540
PSID 80 - Ben Boyd Rd, Neutral Bay - Ernest St To Military Rd	Priority 3	$2,287
PSID 802 - Young St, Cremorne - Belgrave St To Sutherland St	Priority 3	$68,077
PSID 803 - Young St, Cremorne - Sutherland St To Grasmere Rd	Priority 3	$73,131
PSID 81 - Ben Boyd Rd, Neutral Bay - Military Rd To Yeo St	Priority 3	$109,897
PSID 869 - Broughton St, Kirribilli - Fitzroy St To Pitt St	Priority 3	$31,565
PSID 88 - Benelong Rd, Cremorne - Brightmore St To Brightmore St South	Priority 3	$6,561
PSID 891 - Alfred St North (Southbound), North Sydney - Mount St To Whaling Rd	Priority 3	$78,954
PSID 92 - Bent St, Neutral Bay - Military Rd To Winter Ave	Priority 3	$160,450
PSID 94 - Bent St, Neutral Bay - Chainage 612m No. 22-24 Bent St To Eaton St	Priority 3	$107,625
PSID 1007 - Ernest St, Cammeray - Miller St To Lytton St	Priority 4	$119,604
PSID 103 - Blues Point Rd, North Sydney - Blue St To Lavender St	Priority 4	$16,251
PSID 115 - Brightmore St, Cremorne - Benelong Rd To Benelong Rd South	Priority 4	$197,232
PSID 133 - Cammeray Rd, Cammeray - Warringa Rd To Park Ave	Priority 4	$4,353
PSID 140 - Carlow St, North Sydney - Miller St To West St	Priority 4	$231,011
PSID 145 - Carr St, Waverton - Crows Nest Rd To Bay Rd	Priority 4	$24,628
PSID 155 - Chandos St, Crows Nest - Brook St To Cul-De-Sac	Priority 4	$275,667
PSID 16 - Alexander St, Crows Nest - Falcon St To Ernest St	Priority 4	$15,203
PSID 17 - Alexander St, Crows Nest - Ernest St To Albany St	Priority 4	$35,416
PSID 19 - Alfred St South, Milsons Point - Lavender St To Glen St	Priority 4	$176,718
PSID 207 - Elamang Ave, Kirribilli - Chainage 262m No. 17 Elamang Ave To Peel St	Priority 4	$296,898
PSID 215 - Ernest St, Crows Nest - Alexander St To Sophia St	Priority 4	$107,591
PSID 216 - Ernest St, Crows Nest - Sophia St To West St	Priority 4	$603,671
PSID 217 - Ernest St, Crows Nest - West St To Miller St	Priority 4	$154,402
PSID 234 - Fifth Ave, Cremorne - Ellalong Rd To Montague Rd	Priority 4	$276,512
PSID 235 - Fitzroy St, Milsons Point - Alfred St South To Broughton St	Priority 4	$3,608
PSID 244 - Gerard St, Cremorne - Winnie St To Ada St	Priority 4	$2,862
PSID 281 - Hodgson Ave, Cremorne Point - Murdoch St To Kareela Rd	Priority 4	$280,762
PSID 290 - Holtermann St, Crows Nest - Alexander St To Willoughby Rd	Priority 4	$11,150
PSID 302 - Iredale Ave, Cremorne - Murdoch St To Iredale La	Priority 4	$80,674

Location	Priority	Cost Estimate
PSID 327 - Kyngdon St, Cammeray - Jenkins St To Palmer St	Priority 4	$133,157
PSID 375 - Miller St, North Sydney - McLaren St To Ridge St	Priority 4	$6,468
PSID 393 - Milson Rd, Cremorne Point - Murdoch St To Sirius St	Priority 4	$5,277
PSID 394 - Milson Rd, Cremorne Point - Sirius St To Rialto Ave	Priority 4	$202,420
PSID 395 - Milson Rd, Cremorne Point - Rialto Ave To Cremorne Rd	Priority 4	$480,206
PSID 405 - Morton St, Wollstonecraft - Rocklands Rd To Hazelbank Rd	Priority 4	$2,053
PSID 411 - Murdoch St, Cremorne - Bannerman St To Milson Rd	Priority 4	$150,292
PSID 43 - Balfour La, Wollstonecraft - Balfour St To Cul-De-Sac	Priority 4	$13,501
PSID 443 - Phillips St, Neutral Bay - Spruson St To Ben Boyd Rd	Priority 4	$171,039
PSID 457 - Rangers Rd, Cremorne - Military Rd To Murdoch St	Priority 4	$6,828
PSID 513 - Spofforth St (Northbound), Cremorne - Boyle St To Florence St	Priority 4	$62,136
PSID 545 - Walker St, North Sydney - McLaren St To Ridge St	Priority 4	$4,935
PSID 564 - West St, Crows Nest - Myrtle St To Falcon St	Priority 4	$4,507
PSID 58 - Bay Rd, North Sydney - Pacific Hwy To Edward St	Priority 4	$11,153
PSID 596 - Woolcott St, Waverton - Balls Head Rd To Larkin St	Priority 4	$188,703
PSID 601 - Wycombe Rd, Neutral Bay - Harrison St To Shellcove Rd	Priority 4	$187,932
PSID 604 - Wycombe Rd, Neutral Bay - Harriette St To Kurraba Rd	Priority 4	$5,629
PSID 61 - Bay Rd, Waverton - Waverton Ave To Crows Nest Rd	Priority 4	$4,932
PSID 7 - Albany St, Crows Nest - Pacific Hwy To Willoughby Rd	Priority 4	$189,356
PSID 8 - Albany St, Crows Nest - Willoughby Rd To Alexander St	Priority 4	$16,093
PSID 80 - Ben Boyd Rd, Neutral Bay - Ernest St To Military Rd	Priority 4	$11,754
PSID 801 - Young St, Cremorne - Grosvenor St To Belgrave St	Priority 4	$70,901
PSID 804 - Young St, Cremorne - Grasmere Rd To Earle St	Priority 4	$169,112
PSID 82 - Ben Boyd Rd, Neutral Bay - Yeo St To Lindsay St	Priority 4	$181,578
PSID 821 - Walker St, North Sydney - Pacific Hwy To Mount St	Priority 4	$120,291
PSID 822 - Walker St, North Sydney - Mount St To Berry St	Priority 4	$129,599
PSID 84 - Ben Boyd Rd, Neutral Bay - Premier St To Phillips St	Priority 4	$4,282
PSID 85 - Ben Boyd Rd, Neutral Bay - Phillips St To Kurraba Rd	Priority 4	$722,980
PSID 865 - Tiley St, Cammeray - Weringa Ave To Cul-De-Sac	Priority 4	$44,840

7.6 Capital Works Program – Prioritised list based on risk – Street Furniture

Table: Prioritised Capital Works - Street Furniture

Location	Risk sorting score	Risk rating score	Cost Estimate
SF0260 - Wall - Brick - Spring St, North Sydney	Very High	20	$8,975
SF0910 - Tap - Bay Rd, Waverton	Very High	20	$621
SF0248 - Tree Guard - Little Spring St, North Sydney	Very High	16	$4,654
SF0475 - Planter Box - Falcon St, Crows Nest	Very High	16	$1,789
SF0138 - Bin - Blue St, North Sydney	Very High	16	$6,082

Location	Risk sorting score	Risk rating score	Cost Estimate
SF0358 - Wall - Concrete, Brick - Donnelly Rd (Westbound), Crows Nest	Very High	10	$2,784
SF0660 - Seat - Cammeray Rd, Cammeray	High	12	$5,738
SF0109 - Tree Guard - Blues Point Rd, North Sydney	High	12	$4,654
SF0786 - Seat - Lavender St, McMahons Point	High	12	$5,738
SF0892 - Bin - Military Rd, Cremorne	High	12	$6,082
SF0891 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0888 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0887 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0311 - Seat - McLaren St, North Sydney	High	12	$5,738
SF0310 - Seat - Ridge St, North Sydney	High	12	$5,738
SF0309 - Seat - Ridge St, North Sydney	High	12	$5,738
SF0294 - Seat - Miller St, North Sydney	High	12	$5,738
SF0262 - Seat - Spring St, North Sydney	High	12	$5,738
SF0261 - Table - Spring St, North Sydney	High	12	$4,306
SF0247 - Tree Guard - Little Spring St, North Sydney	High	12	$4,654
SF0246 - Tree Guard - Denison St, North Sydney	High	12	$4,654
SF0182 - Shade Structure - Arthur St, North Sydney	High	12	$136,812
SF0189 - Seat - Pacific Hwy, North Sydney	High	12	$5,738
SF0535 - Planter Box - Willoughby Rd, Crows Nest	High	12	$2,609
SF0564 - Plaque - Pacific Hwy, Crows Nest	High	12	$1,656
SF0536 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,342
SF0566 - Planter Box - Willoughby Rd, Crows Nest	High	12	$447
SF0567 - Planter Box - Pacific Hwy, Crows Nest	High	12	$447
SF0565 - Planter Box - Pacific Hwy, Crows Nest	High	12	$2,236
SF0540 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,565
SF0539 - Planter Box - Willoughby Rd, Crows Nest	High	12	$2,087
SF0534 - Planter Box - Willoughby Rd, Crows Nest	High	12	$4,919
SF0584 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,565
SF0533 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,342
SF0521 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,267
SF0524 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,267
SF0523 - Planter Box - Willoughby Rd, Crows Nest	High	12	$4,621
SF0522 - Planter Box - Willoughby Rd, Crows Nest	High	12	$10,584
SF0520 - Bin - Willoughby Rd, Crows Nest	High	12	$6,082
SF0512 - Seat - Falcon St, Crows Nest	High	12	$5,738
SF0505 - Planter Box - Willoughby Rd, Crows Nest	High	12	$894
SF0485 - Seat - Miller St, North Sydney	High	12	$5,738
SF0487 - Sign - Ernest St, Cammeray	High	12	$1,120
SF0493 - Seat - Falcon St, Crows Nest	High	12	$5,738
SF0478 - Seat - Falcon St, Crows Nest	High	12	$5,738
SF0473 - Planter Box - Falcon St, Crows Nest	High	12	$373
SF0474 - Planter Box - Falcon St, Crows Nest	High	12	$1,863

Location	Risk sorting score	Risk rating score	Cost Estimate
SF0476 - Planter Box - Falcon St, Crows Nest	High	12	$373
SF0480 - Seat - Falcon St, North Sydney	High	12	$5,738
SF0654 - Seat - Grosvenor La, Neutral Bay	High	12	$5,738
SF0625 - Seat - Young St, Neutral Bay	High	12	$5,738
SF0651 - Wall - Concrete - Waters Rd, Neutral Bay	High	12	$5,371
SF0642 - Table - Waters Rd, Neutral Bay	High	12	$4,306
SF0440 - Planter Box - Willoughby Rd, Crows Nest	High	12	$4,248
SF0436 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,342
SF0438 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,342
SF0384 - Planter Box - Willoughby Rd, Crows Nest	High	12	$6,186
SF0379 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,342
SF0385 - Planter Box - Willoughby Rd, Crows Nest	High	12	$2,460
SF0386 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,193
SF0391 - Planter Box - Willoughby Rd, Crows Nest	High	12	$2,087
SF0381 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,342
SF0408 - Planter Box - Clarke St, Crows Nest	High	12	$1,342
SF0392 - Planter Box - Willoughby Rd, Crows Nest	High	12	$1,342
SF0399 - Planter Box - Willoughby Rd, Crows Nest	High	12	$4,248
SF0400 - Planter Box - Willoughby Rd, Crows Nest	High	12	$2,460
SF0164 - Bike Rack - Miller St, North Sydney	High	12	$2,670
SF0168 - Bike Rack - Miller St, North Sydney	High	12	$2,670
SF0171 - Bike Rack - Pacific Hwy, North Sydney	High	12	$2,670
SF0157 - Bike Rack - Miller St, North Sydney	High	12	$2,670
SF0945 - Seat - Pacific Hwy, Crows Nest	High	12	$5,738
SF0140 - Plaque - Pacific Hwy, North Sydney	High	12	$1,656
SF0353 - Seat - Amherst St, Cammeray	High	12	$5,738
SF0936 - Seat - Shirley Rd, Wollstonecraft	High	12	$5,738
SF0937 - Seat - Telopea St, Wollstonecraft	High	12	$5,738
SF0093 - Seat - Bay Rd, Waverton	High	12	$5,738
SF0090 - Seat - Bay Rd, Waverton	High	12	$5,738
SF0335 - Tree Guard - Miller St, Cammeray	High	12	$4,654
SF0784 - Plaque - Blues Point Rd, McMahons Point	High	12	$1,656
SF0787 - Seat - Blues Point Rd, McMahons Point	High	12	$5,738
SF0785 - Sign - Blues Point Rd, McMahons Point	High	12	$1,120
SF0744 - Information Board - Burton St, Milsons Point	High	12	$2,973
SF0761 - Seat - Ennis Rd, Milsons Point	High	12	$5,738
SF0743 - Sign - Alfred St South, Milsons Point	High	12	$1,120
SF0592 - Bin - Falcon St, Neutral Bay	High	12	$6,082
SF0039 - Seat - Miller St, Cammeray	High	12	$5,738
SF0846 - Seat - Wycombe Rd, Neutral Bay	High	12	$5,738
SF0849 - Seat - Murdoch St, Cremorne	High	12	$5,738
SF0816 - Seat - Murdoch St, Cremorne	High	12	$5,738

Location	Risk sorting score	Risk rating score	Cost Estimate
SF0803 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0805 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0798 - Seat - Spofforth St (Northbound), Cremorne	High	12	$5,738
SF0855 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0871 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0860 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0875 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0874 - Planter Box - Military Rd, Cremorne	High	12	$894
SF0863 - Planter Box - Military Rd, Cremorne	High	12	$894

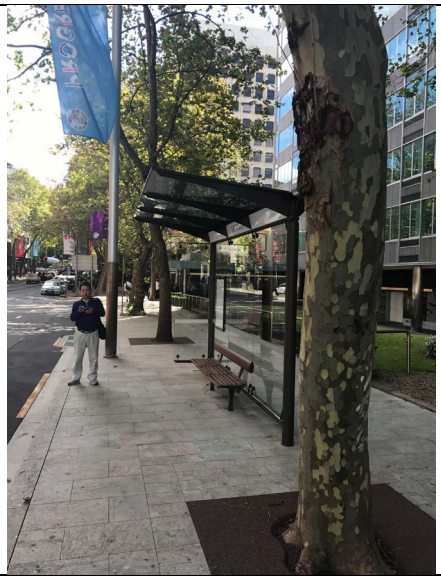
7.7 Capital Works Program – Prioritised list based on risk – Traffic Facilities

Table: Prioritised Capital Works - Traffic Facilities

Location	Risk sorting score	Risk rating score	Cost Estimate
High St, North Sydney - Median (Paved Infill)	Very High	16	$133,424
Ennis Rd, Milsons Point - Speed Hump	Very High	16	$9,566
Bay Rd, North Sydney - Kerb Island (Paved Infill)	Very High	16	$4,225
Bay Rd, Waverton - Kerb Island (Landscaped Infill)	Very High	16	$202
Parraween St, Cremorne - Kerb Island (Landscaped Infill)	Very High	16	$1,437
Grosvenor St, Neutral Bay - Kerb Island (Landscaped Infill)	Very High	16	$613
Grosvenor St, Neutral Bay - Kerb Island (Landscaped Infill)	Very High	16	$1,886
Wycombe Rd, Neutral Bay - Kerb Island (Tree)	Very High	16	$47
Grasmere Rd, Cremorne - Pedestrian Refuge Island	Very High	15	$6,509
Olympic Dr, Kirribilli - Splitter Island (Landscaped Infill)	Very High	15	$9,532
Carr St, Waverton - Kerb Island (Tree)	Very High	15	$359
Earle St, Cremorne - Kerb Island (Landscaped Infill)	Very High	15	$1,247
Bellevue St, Cammeray - Kerb Island (Tree)	Very High	15	$172
Shirley Rd, Wollstonecraft - Kerb Island (Tree)	Very High	15	$233
Oak St, North Sydney - Kerb Island (Tree)	Very High	10	$288
Hazelbank Rd, Wollstonecraft - Kerb Island (Tree)	Very High	10	$408
Hazelbank Rd, Wollstonecraft - Kerb Island (Tree)	Very High	10	$79
Bellevue St, Cammeray - Kerb Island (Tree)	High	12	$172
Balls Head Dr, Waverton - Speed Hump	High	12	$9,566
Balls Head Dr, Waverton - Kerb Island (Landscaped Infill)	High	12	$1,292
Carr St, Waverton - Kerb Island (Tree)	High	12	$574
Grasmere Rd, Cremorne - Pedestrian Refuge Island	High	12	$6,509
Park Ave, Cremorne - Splitter Island (Paved Infill)	High	12	$14,032
Park Ave, Cammeray - Kerb Island (Landscaped Infill)	High	12	$1,414
Cammeray Rd, Cammeray - Kerb Island (Landscaped Infill)	High	12	$1,693
Park Ave, Cammeray - Kerb Island (Landscaped Infill)	High	12	$1,744
Cammeray Rd, Cammeray - Kerb Island (Landscaped Infill)	High	12	$1,529

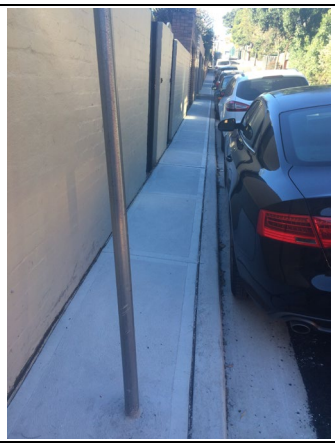
Location	Risk sorting score	Risk rating score	Cost Estimate
Earle St, Cremorne - Pedestrian Refuge Island	High	12	$6,509
Bellevue St, Cammeray - Kerb Island (Tree)	High	12	$672
Bellevue St, Cammeray - Kerb Island (Tree)	High	12	$182
Bellevue St, Cammeray - Kerb Island (Tree)	High	12	$244
Lavender St, Milsons Point - Kerb Island (Paved Infill)	High	12	$1,891

7.8 Examples of completed Capital Works Projects



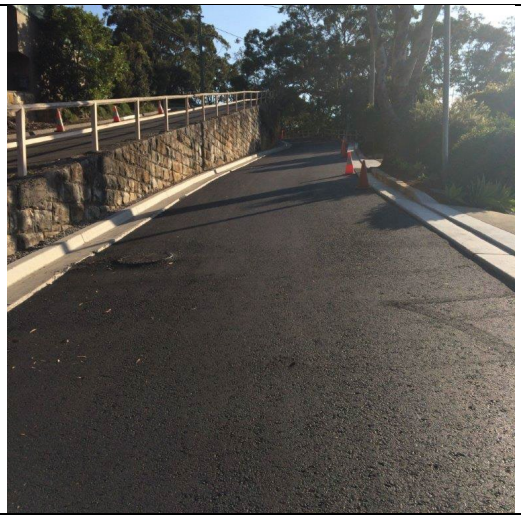
Bus Shelters in the North Sydney CBD

Kerb and Gutter, Ernest Lane, Crows Nest – Before and After



Kerb and Gutter, Crescent Place, Kirribilli – Before and After

Road Pavement - Miller Street, North Sydney, before and after



Road Pavement - Folly Point, Cammeray, before and after

Street Furniture - Pacific Highway, Crows Nest

Street Furniture – Burlington St, Crows Nest

Street Furniture - Planter Boxes, Ernest Place, Crows Nest

Street Furniture – Seats – North Sydney CBD

Traffic Facilities - Pedestrian Crossing – Anzac Avenue, Cammeray

Traffic Facilities - Bi-directional separated cycle path on Ernest Street/Park Avenue

8.0 Monitoring and Improvement Program

A whole of organisation approach is essential for continuous asset management practices to continue to improve. Council's Asset Management Plans AMPs need to be based on accurate data and require detailed Valuations to be done on a periodic basis. Accurate Valuations in turn require detailed condition assessments of infrastructure assets. The following Improvement Plan summarises the areas for improvement within AMPs.

Table: Improvement Plan

Asset	Last Comprehensive Valuation (Year)	Comprehensive Valuation to be performed
Roads Asset Class: Bus Shelters, Kerb and Gutter, Road Pavements, Street Furniture, and Traffic Facilities.	2020	Planned for 2025
Community Consultation to determine and adopt Level of Service		No later than 2029

9.0 References

- 2023 Bus Shelter Condition Audit by Consultants, Urbanspec Engineering Pty Ltd
- 2018 Kerb and Gutter Data Collection & Condition Survey Audit by Consultants, Rapid Map Services Pty Ltd in conjunction with Asset & Facilities Management Consulting Pty Ltd.
- 2024 Road Pavement Condition Survey Audit by Talis Consultants Pty Ltd.
- 2019 Street Furniture Data Collection & Condition Survey Audit by Consultants, Rapid Map Services Pty Ltd in conjunction with Asset & Facilities Management Consulting Pty Ltd.
- 2018 Traffic Facilities Data Collection & Condition Survey Audit by Consultants, Rapid Map Services Pty Ltd in conjunction with Asset & Facilities Management Consulting Pty Ltd.
- 2014, North Sydney Council Public Domain Style Manual
- IPWEA, 2006, 'International Infrastructure Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM
- IPWEA, 2008, 'NAMS.PLUS Asset Management', Institute of Public Works Engineering Australasia, Sydney,
- IPWEA, 2015, 2nd edition, 'Australian Infrastructure Financial Management Manual', Institute of Public Works Engineering Australasia, Sydney
- IPWEA, 2015, 3rd edition, 'International Infrastructure Management Manual', Institute of Public Works Engineering Australasia, Sydney
- IPWEA, 2012 LTFP Practice Note 6 PN Long Term Financial Plan, Institute of Public Works Engineering Australasia, Sydney

10.0 Appendix A: Maintenance Management System - Bus Shelters

Inspection areas have been defined in accordance with their usage – high **(red)**, medium **(blue)** or low **(white)**

Inspection frequencies are based on these areas as defined by the reference maps and the resources currently available to undertake the inspections. The results of inspections are downloaded into the MMDS database.

Red – 2 times per year **Blue** – Once each year **White** – Once every 2 years

There are 5 categories in which a defect may be placed.

Cat 5		Will be completed or **made safe** no later than 2 working days after allocation of defect to work crew. If made safe defect will then be re-categorised as Cat 4 or Cat 3.
Cat 4		Will be repaired no later than 10 working days after allocation of defect to work crew.
Cat 3		Will be repaired no later than 40 working days after allocation of defect to work crew.
Cat 2		Will be repaired no later than 160 working days after allocation of defect to work crew.
Cat 1		As new. Surface displaying no defects. May have aesthetic issues such as gum, stains, services mark-up, etc.

Intervention Matrix – Bus Shelters

DEFECT	SEVERITY	RISK ADJUSTED FOR PEDESTRIAN VOLUME AND AGE		
		WHITE	BLUE	RED
Minor defects only with faded paint OR graffiti		LOW	LOW	LOW
Requires maintenance to return to acceptable level of service; typically minor evidence of wood rot, cracked roof tiles, ETC.	Slight	MEDIUM	HIGH	HIGH
Sections require replacement or significant renewal; evidence of wood rot; posts moving with ease	Moderate	HIGH	HIGH	VERY HIGH
Broken beyond repair; over 50% requires replacement; has missing sections; very unstable posts OR beams	Extreme	HIGH	VERY HIGH	VERY HIGH

NOTES:

1. Appearance defects (gum, stains, surface marks etc) are not safety issues. Response time TBA. Record in "Category" as "A".
2. **Red** areas have high pedestrian traffic and high usage by older pedestrians.
3. **Blue** areas have medium pedestrian traffic.
4. **White** areas have low pedestrian traffic.

Scheduled Maintenance

Bus shelter cleaning undertaken as per Bus Shelter Cleaning Program.

11.0 Appendix B: Maintenance Management System - Kerb and Gutter

Inspection areas have been defined in accordance with the identified key factors of:

- Volume of pedestrian traffic, e.g. transport hubs; retail/commercial areas; schools and hospitals.
- Use by people over 50 years old.

Inspection frequencies are based on these areas as defined by the reference maps and the resources currently available to undertake the inspections.

Red – 2 times per year; **Blue** – Annual; **Other** – Once every 2 years;

The results of inspections will be downloaded into the MMDS database. There are 5 categories in which a defect may be placed. Not all categories may be applicable to every inspection area and/or type of asset:

Cat 5		Will be **made safe** no later than 2 working days after allocation of defect to work crew. Defect may then be re-categorised as Cat 4 or Cat 3.
Cat 4		Will be repaired no later than 10 working days after allocation of defect to work crew.
Cat 3		Will be placed on Zone Maintenance Program. This program operates on an 8 week cycle, however, depending on workload and reactive maintenance requests, Cat 3 defects may miss a cycle or more before repairs are able to be undertaken.
Cat 2		Deferred maintenance. Could also have aesthetic issues such as gum, stains, services mark-up, etc. May be addressed if close-by to Cat 4 or Cat 3 defect that is being repaired. Otherwise will be re-inspected on next area inspection.
Cat 1		As new. Surface displaying no defects.

Intervention Matrix

KERB + GUTTER	RED	BLUE	OTHER
MISSING/DAMAGED/LOOSE	28	24	21
> 50mm/GRATE NOT BICYCLE SAFE	23	19	16
25mm – 50mm/GRATE BLOCKED	20	16	13
10mm – 25mm	18	14	11
AESTHETIC	12	8	5
AS NEW	10	6	3

Scoring example: 28 = High Use Area score 10 and Defect of Missing or Loose score 18

The focus of inspections will be the kerb section and unobstructed gutter sections. It is noted that the gutter section may be obstructed and not visible due to parked vehicles during inspection. Inspectors are not expected to get down on their hands and knees to look for defects. The kerb and guttering includes all drainage kerb inlets, convertor outlets, gutter grates or access pit lids in gutter. Driveway crossings shall be listed as private when selecting the owner of the asset.

NORTH SYDNEY COUNCIL - GUIDE FOR KERB + GUTTER DEFECT RATING

AN EXPLANATION OF THE DEFECT INSPECTION SYSTEM

AREA OF INSPECTION		SCORE
RED	HIGH PEDESTRIAN TRAFFIC AREAS WITH SIGNIFICANT USAGE BY PEDESTRIANS OVER 50 YEARS OLD INSPECTIONS - 2 PER YEAR	10
BLUE	HIGH PEDESTRIAN TRAFFIC AREAS WITH MODERATE USAGE BY PEDESTRIANS OVER 50 YEARS OLD or MEDIUM PEDESTRIAN TRAFFIC AREAS WITH SIGNIFICANT USAGE BY PEDESTRIANS OVER 50 YEARS OLD INSPECTIONS - ANNUAL	6
WHITE	ALL OTHER AREAS IN LGA EXCLUDING PARKS; RESERVES and PLAZAS INSPECTION - EVERY 2 YEARS **NOTE:** IN THESE AREAS ONLY DEFECTS GREATER THAN ABOUT 10mm WILL HAVE DETAILS RECORDED.	3

KERB + GUTTER TYPE	
CONCRETE	SANDSTONE
GRANITE	OTHER
DRIVEWAY CROSSING - STANDARD or GUTTER BRIDGE	LETTERBOX or OTHER PIT TYPE
KERB INLET or CONVERTOR OUTLET	GUTTER GRATE or PIT LID IN GUTTER

DEFECT – MAY BE **HEIGHT or WIDTH**	
SECTION MISSING, BADLY DAMAGED or LOOSE UNDER FOOT	18
GREATER THAN ABOUT 50mm – MAY BE HEIGHT or WIDTH	13
GUTTER GRATE NOT BICYCLE SAFE/DAMAGED	13
BETWEEN ABOUT 25mm AND ABOUT 50mm – MAY BE HEIGHT or WIDTH	10
GUTTER GRATE BLOCKED - LEAF LITTER, DEBRIS or OTHER ITEM eg. POLLUTION CONTROLS	10
BETWEEN ABOUT 10mm AND ABOUT 25mm – MAY BE HEIGHT or WIDTH	8
AESTHETIC ISSUES - GUM; STAINS, SERVICES MARK-UP; etc	2
NO DEFECT - IF THIS IS SELECTED A PHOTO MUST BE TAKEN OF THE INSPECTED ITEM or PSID	0

HAZARD TYPE	
TRIP - LIFTING/DROPPING OF SECTION TO ADJACENT SECTION	UNEVEN SURFACE - CHIPPED or ERODED SURFACE
CRACKING - DEFECT NOT AT CONSTRUCTION JOINT	MISSING - SECTION OF KERB MISSING EG. OVER DRAIN PIPE
BROKEN/OUT OF ALIGNMENT- LOOSE UNDER FOOT	SERVICE ACCESS COVER - LOOSE/LIFTED/DROPPED

OTHER ASPECTS	
AREA HAS OBSTRUCTIONS DUE TO TREE ROOTS or OTHER VEGETATION	PRESENCE OF PARTICULAR ASPECT/S NOTED PRIOR TO DEPARTURE FROM PSID. REFERRED TO RELEVANT NSC SECTION VIA EMAIL
AREA HAS EDGE SCOUR (DROP OFF ALONG EDGE OF VERGE/TREE SITE) > 50MM	
AREA HAS PLANTING, GRASS and/or WEED GROWTH OVERGROWING KERB	

12.0 Appendix C: Maintenance Management System – Road Pavements

Inspection areas have been defined in accordance with the identified key factors of:

- Road pavement where failure is most disruptive and expensive to the community/users.
- Traffic (both vehicular and pedestrian) flows, e.g. pedestrian use areas; retail/commercial areas; schools; hospitals; major collector roads; primary or sole access to significant population areas;

Inspection frequencies are based on these areas as defined by the reference maps and the resources currently available to undertake the inspections.

Red – 2 times per year; **Blue** – Annual; **Other** – Once every 2 years;

The results of inspections will be downloaded into the MMDS database.
There are 5 categories in which a defect may be placed. Not all categories may be applicable to every inspection area and/or type of asset:

Cat 5		Will be **made safe** no later than 2 working days after allocation of defect to work crew. Defect may then be re-categorised as Cat 4 or Cat 3.
Cat 4		Will be repaired no later than 10 working days after allocation of defect to work crew.
Cat 3		Will be placed on Zone Maintenance Program. This program operates on an 8 week cycle, however, depending on workload and reactive maintenance requests, Cat 3 defects may miss a cycle or more before repairs are able to be undertaken.
Cat 2		Deferred maintenance. Defect may be repaired if close-by to Cat 4 or Cat 3 defect that is being repaired. Otherwise will be re-inspected on next area inspection.
Cat 1		As new. Surface displaying no defects. May have aesthetic aspects such as gum, stains, services mark-up, etc.

Intervention Matrix

ROADS	RED	BLUE	OTHER
USED BY PEDESTRIANS	**28**	**24**	**21**
> 100mm or > 10sqm and > 30mm	**23**	**19**	**16**
30 – 100mm or 5-10sqm and > 30mm	**20**	**16**	**13**
< 30mm	**18**	**14**	**11**
AESTHETIC	**10**	**6**	**3**

Scoring example: 28 = High Use Area score 10 and Defect of Slippery or Loose Underfoot score 18
The focus of road inspections will be the areas of road pavement used by pedestrians and the traffic lanes. Parking lanes will be inspected if visible at the time of inspection.

If defects appear at intervals at of approximately every 2.0m of road pavement, then the area of the defect recorded shall be the width by the distance from the first to the last identified defect.

NORTH SYDNEY COUNCIL - GUIDE FOR ROAD DEFECT RATING

AN EXPLANATION OF THE DEFECT INSPECTION SYSTEM

AREA OF INSPECTION		SCORE
RED	**ROAD PAVEMENT WHERE FAILURE IS MOST DISRUPTIVE AND EXPENSIVE TO THE COMMUNITY/USERS. HIGH TRAFFIC FLOWS. EG. HIGH PEDESTRIAN USE AREAS; RETAIL/COMMERCIAL AREAS; SCHOOLS; HOSPITALS; MAJOR COLLECTOR ROADS; PRIMARY OR SOLE ACCESS TO SIGNIFICANT POPULATION AREAS;** **INSPECTIONS - 2 PER YEAR**	**10**
BLUE	**ROAD PAVEMENT WHERE FAILURE IS LIKELY TO BE LESS DISRUPTIVE BUT STILL SIGNIFICANT TO THE COMMUNITY/USERS. MEDIUM TRAFFIC FLOWS. EG. MEDIUM PEDESTRIAN USE AREAS; SIDE STREETS NEAR RETAIL/COMMERCIAL AREAS, SCHOOLS and HOSPITALS; ALTERNATE ROUTES TO MAJOR COLLECTOR ROADS and ACCESS TO SIGNIFICANT POPULATION AREAS** **INSPECTIONS - ANNUAL**	**6**
WHITE	**ALL OTHER AREAS IN LGA EXCLUDING PARKS; RESERVES and PLAZAS** **INSPECTION - EVERY 2 YEARS** **NOTE:** IN THESE AREAS ONLY DEFECTS GREATER THAN ABOUT 30mm WILL HAVE DETAILS RECORDED.	**3**

PAVEMENT TYPE	
CONCRETE	PAVING - UNIPAVERS & OTHER TYPES OF PAVERS
ASPHALT	STENCILLED/COLOURED ASPHALT

DEFECT – MAY BE **HEIGHT or WIDTH**	
AREA OF ROAD PAVEMENT USED BY PEDESTRIANS	**18**
DEFECT GREATER THAN ABOUT 100mm HEIGHT or WIDTH	**13**
DEFECT AREA GREATER THAN 10 sqm and HEIGHT or WIDTH GREATER THAN 30mm	**13**
DEFECT BETWEEN ABOUT 30mm AND ABOUT 100mm HEIGHT or WIDTH	**10**
DEFECT AREA 5 to 10 sqm and HEIGHT or WIDTH GREATER THAN 30mm	**10**
LESS THAN ABOUT 30MM	**8**
AESTHETIC ISSUES - STAINS, SERVICES MARK-UP; etc	**0**

HAZARD TYPE (REFER TO ROAD DEFECT REFERENCE SHEETS)	
TRIP - LIFTING/DROPPING OF SECTION TO ADJACENT SECTION	RUTTING - DEFORMATION IN ONE OR BOTH WHEEL PATHS
DELAMINATION - PEELING OR LIFTING OF PAVEMENT SURFACE	POT HOLE - TYPICALLY BOWL SHAPED AND BREAKING EDGES
CRACKING - ROAD PAVEMENT FRACTURES (SEE REF DIAGRAM)	UNEVEN SURFACE - LOWER OR ABOVE SURROUNDING AREA
SERVICE ACCESS COVER - BELOW OR ABOVE SURROUNDING PAVEMENT or PAVEMENT BREAKING UP AROUND IT	
PAVEMENT SURFACE - SLIPPERY or LOOSE UNDER FOOT eg. SAND, LEAVES, SEEDS or OIL ON SURFACE	

OTHER ASPECTS	
AREA HAS KERB & GUTTER (K&G) FAILURE THAT HAS CONTRIBUTED TO ROAD PAVEMENT FAILURE AND NEEDS ATTENTION PRIOR TO ROAD PAVEMENT REPAIR	PRESENCE OF PARTICULAR ASPECT/S NOTED PRIOR TO DEPARTURE FROM PSID. REFERRED TO RELEVANT NSC SECTION VIA EMAIL
AREA HAS DROP OFF ALONG EDGE OF ROAD PAVEMENT > 50MM - NO K&G	
AREA HAS OBSTRUCTIONS DUE TO OVERHANGING TREE or VEGETATION	

13.0 Appendix D: Road Pavements - Capital Renewal Works Program Modelling

The PARMMS® Road Manager software is used to produce the required future works programs. This system is detailed below.

Pavement Treatments

The appropriate and applicable preventive, corrective and rehabilitation maintenance options considered are shown in the following Table.

Table: Selected Treatments

TREATMENT	DESCRIPTION OF TREATMENT
Routine	Routine maintenance involves work such as pothole repairs and clearing of drainage that is carried out during a patrol of the road network.
Do Nothing	No treatment is necessary at this time.
Crack Sealing	Sealing of cracks to waterproof the pavement surface and reduce the ingress of moisture into the pavement to extend the useful pavement life. This routine maintenance activity is not currently undertaken by NSC.
Pothole Patching	Repair of potholes to provide a safe pavement surface and reduce the moisture ingress into the pavement.
Heavy Patching	Repair of pavement affected by structural cracking to restore localised failures and reduce ingress of moisture leading to more significant failures.
Mill & Resheet	The existing pavement is profiled to allow the pavement to remain at the existing level after the treatment and therefore the existing drainage capacity of the pavement is retained. This treatment utilises a minimum 50mm of AC and is used where there is minimal structural distress, and the pavement is sound.
Full Depth Asphalt	The existing pavement is profiled to allow the pavement to remain at the existing level after the treatment and therefore the existing drainage capacity of the pavement is retained. This treatment utilises a minimum 150mm of AC and is used where there is extensive distress, and the pavement requires strengthening.

These pavement treatments are to be triggered based on the intervention levels described below.

Intervention Levels

To allow investigation as to what treatment would be applicable once the pavement has reached a determined serviceability level, intervention levels are specified indicating the minimum condition under which work would be undertaken. These levels are set out for each of the classes based on North Sydney's Road network as shown in the Table below. The intervention levels for the appropriate pavement condition are compared to the average current condition to assist in the interpretation of these levels.

Pavement Condition	Class 6 Regional	Class 7 Collector	Class 8 Local	Class 9 Lanes
Roughness (counts/km)	100	150	N/A	N/A
Rut Depth (mm)	6	12	18	18
Environmental Cracking (%)	5	10	20	20
Fatigue Cracking (%)	2	5	10	15
Potholes (%)	5	5	5	5
Ravelling (%)	10	25	35	50

Treatment Selection

The treatment selection processes used in this analysis, via the Road Manager software is a two-phase analysis. The first phase is a broad classification of the pavement treatment needs based solely on the condition data and is referred to as "Classification"; the second is a more detailed "Resolution" of the required treatment based on both pavement condition and the attributes of the pavement.

Classification

In this process the current condition of the pavement is used to determine an appropriate level of treatment. For example, less than 5% of cracking on a class 6 regional road may be acceptable and this condition would be ignored for the current year. If there is between 5% and 10% cracking it is recommended for "heavy patching". For over 10% the reason for the distress would be determined and the pavement would be redesigned according to the NAASRA road design manual. This is the "redesign" action of the resolution phase.
On occasions sections will satisfy more than one condition in the classification decision matrix. When this occurs, the process selects the highest classification treatment group to be used in the resolution phase. The priorities from highest to lowest are listed in the following Table, with highest priority being reconstruction.

Table: Classification Priorities

Classification Treatment	Priority
Reconstruction	1
Redesign	2
Resurface	3
Pothole Patching	4
Heavy Patching	5
Crack Sealing	6
No Treatment	7

The following notes outline each of the classification priorities shown in above Table and how they are used to determine where road sections will be sent in the resolution matrix.

- **Roughness** – there is a minimum level for class 6 and 7 roads above which sections will be sent to the '*redesign*' area of the resolution phase. Class 8 and 9 roads do not consider roughness due to the low speed environment. A second intervention level has been set where a high roughness results in sections being sent to the '*reconstruction*' area of the resolution phase.

- **Rut depth** – there is a lower intervention level based on class above which sections will be sent to the '*redesign*' area of the resolution phase.

- **Environmental cracking** – there is a lower intervention level based on class above which sections will be sent to the '*crack sealing'* area of the resolution phase. When the cracking is greater than the upper intervention level the section will be sent to the '*redesign'* area of the resolution phase.

- **Fatigue cracking** – there is a lower intervention level based on class above which sections will be sent to the '*heavy patching*' area of the resolution phase. When the cracking is greater than the upper intervention level the section will be sent to the '*redesign'* area of the resolution phase to investigate the cause of the structural cracking.

- **Potholes** - there is a minimum level based on class above which sections will be sent to the '*pothole patching'* area of the resolution matrix. When the potholes are greater than the upper intervention level the section will be sent to the '*redesign'* area of the resolution matrix.

- **Ravelling** - there is a lower intervention level based on class above which sections will be sent to either the '*rejuvenation'*, or '*resurface*' area of the resolution phase.

If a section has no characteristics exceeding the minimum intervention levels, the section will be sent to the '*no treatment*' area of the resolution matrix.

Resolution

This phase uses a series of decision trees in order to obtain a treatment suitable for routine maintenance, resurfacing or rehabilitation of each pavement section. The treatment can be based on a combination of both the condition and attributes of the pavement, such as: roughness, rut depth, NAASRA class, surface type, kerb height, overlay requirement, curvature function, geographical conditions, skid resistance parameters and surface life. The careful process of combining the desired factors allows the system to define the treatment selection process, with the process being flexible and tailored to the client's practices and pavement conditions, creating an expert system.

The following notes outline the operation of various areas of the resolution matrix in determining what, if any, treatment will be applied to a given section. The resolution matrix is read from left to right with a particular treatment being applied only if all criteria in the particular row are satisfied.

- **No Treatment -** When sections are assigned the Treatment Classification of '*no treatment*' no treatment is applied.
- **Crack Sealing -** When sections are sent to crack sealing this treatment is applied to the areas affected by environmental cracking.
- **Pothole Patching -** When sections are sent to pothole patching this treatment is applied to the areas affected by potholes.
- **Heavy Patching -** When sections are sent to heavy patching this treatment is applied to the areas affected by structural cracking.
- **Resurface -** When sections are sent resurface and asphalt overlay treatment is applied based on the total area of the section.
- **Redesign -** Sections sent to the treatment classification '*redesign*' are divided into a range of characteristics as outlined in the Resolution Matrix, Appendix A.
- **Reconstruction -** When sections are sent to reconstruction this treatment is applied based on a depth of 200mm of asphalt material.

Works Effects

Post resolution adjustment, or the resetting of condition data after a treatment, is required so that decisions for future years can be made on the basis of defensible data. The adjustment modifies the condition of the pavement so that it reflects the predicted condition after performing a certain treatment. The following Table shows the works effects models used for all years in the analysis, for each treatment.

Table: Works Effects Models, Reset Values

Treatment	Roughness Reset, Min Value	Potholes	Environmental Cracking	Fatigue Cracking	Rutting	Surface Age*	Structural Capacity
Crack Sealing	N/A	N/A	0	N/A	N/A	No	No
Pothole Patching	+1, N/A	0	N/A	N/A	N/A	No	No
Heavy Patching	+2, N/A	0	N/A	0	N/A	No	No
Mill & Resheet	-60, 70	0	0	0	0	Yes	No
Full Depth Asphalt	-150, 70	0	0	0	0	Yes	Yes

* Ravelling condition is also reset to zero, where indicated by "Yes"

Risk Scenarios

Each pavement condition is examined through five scenarios. These include DO NOTHING, ROUTINE and three USER DEFINED risk scenarios.

The three USER DEFINED risk scenarios are based on the statistical risk of failure. For example, if we want to be 100% sure our decision is correct then we will have to use a safety factor to ensure all failure contingencies are met. If it is possible to accept a 25% failure (i.e. expect to be correct 75% of the time) then it is possible to

accept a lower safety factor, and if we are considered to be correct 50% of the time we need not use a safety factor at all.
The risk scenarios used in the analysis for North Sydney Council are 5, 15 and 25%.
The ROUTINE scenario is when the system adopts a strategy of only crack sealing, pothole and heavy patching until such time as the pavement reaches terminal roughness and public objection would dominate. At this point reconstruction is necessary.
The DO NOTHING scenario adopts a strategy of no treatments on the pavement section until reconstruction is required. This is a viable option when the pavement is in a poor condition thus making it more cost effective to allow deterioration to the terminal point, and then reconstructing.

Data Synchronisation

The PARMMS® Road Manager system is capable of accepting input data on a cyclical basis, where treatments are applied on an annual basis reflecting the work undertaken in that year. As a result, there will be age discrepancies between the data sets for different pavement sections with some being based on measured data and others on predicted data.
Because the pavement section's data maybe collected once every five years, the information necessary to compute the pavement sections maintenance strategy is out of synchronisation with the starting year of the analysis. Thus, there is a preliminary activity to bring this condition into synchronisation before the optimum redesign treatment can be identified.
The PARMMS® Road Manager system will deteriorate the condition for each pavement section in accordance with the deterioration models and the time interval between the pavement sections condition date and the analysis start date.
After the pavement condition has been deteriorated using the appropriate deterioration models, all conditions are in synchronisation with the analysis start date. At this point further analysis and decisions identify the optimum redesign treatment for the applicable scenario and study period.

Model Calibration

The deterioration models have previously been calibrated based on Long Term Pavement Performance (LTPP) site data previously collected across the North Sydney and Sydney road networks. The following environmental factor and rainfall figures are also used;

- Environmental Factor: 1.0% (deterioration in roughness per annum associated with the temperature and rainfall environment of the NSC network)

- Mean Monthly Precipitation: 100mm

Traffic

Traffic count data has been provided for 43% of the road network over a period of 19 years with close to half this data less than 5 years old. Where traffic count data is not available, traffic data was interpolated using traffic data from adjacent road segments or surrounding roads by representatives of NSC in order to provide 100% coverage of the network.

Classification Matrix

ROUGHNESS (NRM)	NAASRA CLASS 6	NAASRA CLASS 7	NAASRA CLASS 8	NAASRA CLASS 9
0 - 100	No Treatment	No Treatment	No Treatment	No Treatment
100 - 150	Redesign	No Treatment	No Treatment	No Treatment
150 - 200	Redesign	Redesign	No Treatment	No Treatment
200 - 350	Redesign	Redesign	Redesign	No Treatment
350 - 400	Redesign	Redesign	Redesign	Redesign
> 400	Reconstruction	Reconstruction	Reconstruction	Reconstruction

RUT DEPTH (mm)	NAASRA CLASS 6	NAASRA CLASS 7	NAASRA CLASS 8	NAASRA CLASS 9
0 - 6	No Treatment	No Treatment	No Treatment	No Treatment
6 - 12	Redesign	No Treatment	No Treatment	No Treatment
12 - 18	Redesign	Redesign	No Treatment	No Treatment
18 - 24	Redesign	Redesign	Redesign	No Treatment
> 24	Redesign	Redesign	Redesign 1	Redesign

ENVIRONMENTAL CRACKING (%)	NAASRA CLASS 6	NAASRA CLASS 7	NAASRA CLASS 8	NAASRA CLASS 9
0 - 5	No Treatment	No Treatment	No Treatment	No Treatment
5 - 10	Heavy Patching	No Treatment	No Treatment	No Treatment
10 - 20	Heavy Patching	Heavy Patching	No Treatment	No Treatment
20 - 30	Redesign	Redesign	Heavy Patching	Heavy Patching
> 30	Redesign	Redesign	Redesign	Redesign

STRUCTURAL CRACKING (%)	NAASRA CLASS 6	NAASRA CLASS 7	NAASRA CLASS 8	NAASRA CLASS 9
0 - 2	No Treatment	No Treatment	No Treatment	No Treatment
2 - 5	Heavy Patching	No Treatment	No Treatment	No Treatment
5 - 10	Heavy Patching	Heavy Patching	No Treatment	No Treatment
10 - 15	Heavy Patching	Heavy Patching	Heavy Patching	No Treatment
15 - 20	Heavy Patching	Heavy Patching	Heavy Patching	Heavy Patching
20 - 30	Redesign	Redesign	Heavy Patching	Heavy Patching
30 - 50	Redesign	Redesign	Heavy Patching	Heavy Patching
> 50	Redesign	Redesign	Redesign	Redesign

POTHOLES & POTHOLE PATCHING (%)	NAASRA CLASS 6	NAASRA CLASS 7	NAASRA CLASS 8	NAASRA CLASS 9
0 - 5	No Treatment	No Treatment	No Treatment	No Treatment
5 - 8	Pothole Patching	Pothole Patching	Pothole Patching	Pothole Patching
8 - 13	Heavy Patching	Heavy Patching	Heavy Patching	Pothole Patching
13 - 15	Redesign	Redesign	Heavy Patching	Pothole Patching
15 - 20	Redesign	Redesign	Redesign	Heavy Patching
> 20	Redesign	Redesign	Redesign	Redesign

RAVELLING (%)	NAASRA CLASS 6	NAASRA CLASS 7	NAASRA CLASS 8	NAASRA CLASS 9
0 - 10	No Treatment	No Treatment	No Treatment	No Treatment
10 - 25	Resurface	No Treatment	No Treatment	No Treatment
25 - 35	Resurface	Resurface	No Treatment	No Treatment
35 - 50	Resurface	Resurface	Resurface	No Treatment
50 - 75	Redesign	Resurface	Resurface	Resurface
80 - 100	Redesign	Redesign	Resurface	Resurface

Resolution Matrix

NAASRA Class	Treatment Classification	Surface Type	Minimum Age	Structural Cracking	Treatment Number	Treatment
6	No Treatment				2	No Treatment
	Crack Sealing				5	Crack Sealing
	Heavy Patching				7	Heavy Patching
	Pothole Patching				6	Pothole Repair
	Resurfacing	Asphalt	≤ Min		2	No Treatment
			> Min		9	Mill & Resheet
		Concrete			2	No Treatment
		Pavers			2	No Treatment
	Redesign	Asphalt	≤ Min		2	No Treatment
			> Min	≤ 20	9	Mill & Resheet
				> 20	11	Full Depth Asphalt
		Concrete		< 50	2	No Treatment
				> 50	18	Reconstruction Concrete
		Pavers			2	No Treatment
	Reconstruction	Asphalt			17	Reconstruction Asphalt
		Concrete			18	Reconstruction Concrete
		Pavers			2	No Treatment

NAASRA Class	Treatment Classification	Surface Type	Minimum Age	Structural Cracking	Treatment Number	Treatment
7	No Treatment				2	No Treatment
	Crack Sealing				5	Crack Sealing
	Heavy Patching				7	Heavy Patching
	Pothole Patching				6	Pothole Repair
	Resurfacing	Asphalt	≤ Min		2	No Treatment
			> Min		9	Mill & Resheet
		Concrete			2	No Treatment
		Pavers			2	No Treatment
	Redesign	Asphalt	≤ Min		2	No Treatment
			> Min	≤ 25	9	Mill & Resheet
				> 25	11	Full Depth Asphalt
		Concrete		< 50	2	No Treatment
				> 50	18	Reconstruction Concrete
		Pavers			2	No Treatment

	Reconstruction	Asphalt			17	Reconstruction Asphalt
		Concrete			18	Reconstruction Concrete
		Pavers			2	No Treatment

NAASRA Class	Treatment Classification	Surface Type	Minimum Age	Structural Cracking	Treatment Number	Treatment
8	No Treatment				2	No Treatment
	Crack Sealing				5	Crack Sealing
	Heavy Patching				7	Heavy Patching
	Pothole Patching				6	Pothole Repair
	Resurfacing	Asphalt	≤ Min		2	No Treatment
			> Min		9	Mill & Resheet
		Concrete			2	No Treatment
		Pavers			2	No Treatment
	Redesign	Asphalt	≤ Min		2	No Treatment
			> Min	≤ 40	9	Mill & Resheet
				> 40	11	Full Depth Asphalt
		Concrete		< 50	2	No Treatment
				> 50	18	Reconstruction Concrete
		Pavers			2	No Treatment
	Reconstruction	Asphalt			17	Reconstruction Asphalt
		Concrete			18	Reconstruction Concrete
		Pavers			2	No Treatment

NAASRA Class	Treatment Classification	Surface Type	Minimum Age	Structural Cracking	Treatment Number	Treatment
9	No Treatment				2	No Treatment
	Crack Sealing				5	Crack Sealing
	Heavy Patching				7	Heavy Patching
	Pothole Patching				6	Pothole Repair
	Resurfacing	Asphalt	≤ Min		2	No Treatment
			> Min		9	Mill & Resheet
		Concrete			2	No Treatment
		Pavers			2	No Treatment
	Redesign	Asphalt	≤ Min		2	No Treatment
			> Min	≤ 50	9	Mill & Resheet
				> 50	11	Full Depth Asphalt
		Concrete		< 50	2	No Treatment
				> 50	18	Reconstruction Concrete
		Pavers			2	No Treatment
	Reconstruction	Asphalt			17	Reconstruction Asphalt
		Concrete			18	Reconstruction Concrete
		Pavers			2	No Treatment

14.0 Appendix E: Maintenance Management System - Street Furniture

Defect Management Inspection – Street Furniture

Inspection areas have been defined in accordance with their usage – high **(red)**, medium **(blue)** or low **(white)**

Inspection frequencies are based on these areas as defined by the reference maps and the resources currently available to undertake the inspections. The results of inspections are downloaded into the MMDS database.

Red – 2 times per year **Blue** – Once each year **White** – Once every 2 years

There are 5 categories in which a defect may be placed.

Cat 5		Will be completed or made safe no later than 2 working days after allocation of defect to work crew. If made safe defect will then be re-categorised as Cat 4 or Cat 3.
Cat 4		Will be repaired no later than 10 working days after allocation of defect to work crew.
Cat 3		Will be repaired no later than 40 working days after allocation of defect to work crew.
Cat 2		Will be repaired no later than 160 working days after allocation of defect to work crew.
Cat 1		As new. Surface displaying no defects. May have aesthetic issues such as gum, stains, services mark-up, etc.

Intervention Matrix – Street Furniture

DEFECT	SEVERITY	RISK ADJUSTED FOR PEDESTRIAN VOLUME AND AGE		
		WHITE	BLUE	RED
Minor defects only with faded paint OR graffiti		LOW	LOW	LOW
Requires maintenance to return to acceptable level of service; typically minor evidence of wood rot, unstable movement of item; presence of rust, dirty	Slight	MEDIUM	HIGH	HIGH
Sections require replacement or significant renewal; evidence of wood rot; item moving with ease	Moderate	HIGH	HIGH	VERY HIGH
Broken beyond repair; has missing sections; very unstable	Extreme	HIGH	VERY HIGH	VERY HIGH

NOTES:

1. Appearance defects (gum, stains, surface marks etc) are not safety issues. Response time TBA. Record in "Category" as "A".
2. **Red** areas are where failure is most disruptive and expensive to the community/users and/or high traffic (both pedestrian and vehicular) flows, e.g. retail/commercial areas; schools; hospitals; plazas.
3. **Blue** areas have medium traffic flows, e.g. streets leading to retail/commercial areas; schools; hospitals; plazas.
4. **White** areas have low traffic flows, e.g. typical residential street.
5. Street furniture – seat with backrest; seat bench only; table + seats or benches; rubbish bin; bike holding rail; drinking fountain or bottle refiller; notice board.

15.0 Appendix F: Traffic Facilities – Strategic Documents

Both the North Sydney Integrated Cycling Strategy and the Local Area Traffic Management (LATM) Action Plans and Reports can be found on Council's website