NORTH SYDNEY COUNCIL

ASSET MANAGEMENT PLAN

SEAWALLS 2022-2032

Document Control	Asset Management Plan

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1	12/12/2021	First Draft	IM	JVH/DM	DM

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Seawalls

Executive summary

Located across the North Sydney LGA is approximately 4.7km of seawalls which are comprised of various materials and typologies. The condition of Sea Walls was assessed in 2017 by Manly Hydraulics Laboratory for every 10m section of wall. Each wall was divided into 10m sections to assess the condition and risk. Forty two seawalls were visited in the field. The total length of seawalls is 4,666m and the total area is 16,615 Sq.m.

The Seawalls are generally vertical or sloped gravity walls constructed from sandstone blocks and mortar.

Each wall was divided into segments of 10m or less and a condition score was assigned to each segment.

Overall some 87.6% of the portfolio is in very good to fair condition (1-3) with some 12.4% in poor to very poor condition (4-5).

A Risk rating was assigned to each segment. Overall 87% of the portfolio has a low to medium risk rating and 13% has a high to very high risk rating.

The total Replacement Value of the portfolio is $91,267,050 as at 30 June 2021. The values are shown in the Table below.

Table 1: Seawalls – Summary Table

Asset Category	Length (m)	Replacement Value (2021)	Accumulated Depreciation (2021)	Fair Value (2021)	Depreciation Expense
Seawalls	**4,666**	**$91,267,050**	**$45,914,051**	**$45,352,999**	**$838,992**

The following table provides a summary of the quantities and replacement values for each wall type. The portfolio is dominated by sandstone block walls.

Table 2: Seawalls – Typology

Seawall Type	Total Length (m)	Sum of Replace Costs
Concrete	396	$5,301,615
Concrete, Granite, Sandstone	10	$369,934
Concrete, Sandstone	848	$24,132,430
Concrete, Sandstone, Steel	20	$383,140
Concrete, Steel	30	$547,931
Concrete, Timber	70	$980,431
Concrete, Timber, Sandstone	10	$137,326
Sandstone	3,028	$56,475,540
Sandstone, Concrete	234	$2,680,529
Sandstone, Timber	20	$258,173
Grand Total	**4,666**	$91,267,050

Seawalls – Future Demand

Drivers affecting demand for seawalls include things such as population growth, regulation changes – new development, community expectations (Public Safety), technological changes, climate change, economic factors and environmental factors.

Seawalls – Levels of Customer Service

Service levels are defined service levels in two terms, customer levels of service and technical levels of service. These are supplemented by organisational measures.

Customer Levels of Service measure how the customer receives the service and whether value to the customer is provided.

Customer levels of service measures used in the asset management plan are:

Quality How good is the service … *what is the condition or quality of the service?*

Function Is it suitable for its intended purpose …. *Is it the right service?*

Capacity/Use Is the service over or under used … *do we need more or less of these assets?*

The current and expected customer service levels are detailed in table below.

Table 3: Seawalls – Levels of Customer Service

Service Attribute	Expectation	Performance Measure Used	Current Performance	Desired Position in 10 Years
Quality	Seawalls are well maintained.	Percentage of seawalls in 'very good' or 'good' (1, 2) and percentage poor/very poor (4, 5) Condition.	87.6% of seawalls in 'very good', 'good' or 'Fair' (1, 2, 3) condition. 12.4% of seawalls in poor/very poor (4, 5) Condition.	Maintain – Condition 1-2-3 Improve and replace Condition 4-5
Function	Standard seawalls are constructed from sandstone.	Percentage of seawalls constructed from sandstone where practical.	92.5% (by length) of seawalls are constructed or partly constructed from sandstone	Improve
Capacity and Use	Number of seawalls required is appropriate.	Number of additional seawalls required	No additional seawalls identified as being required	Improve

Seawalls – Levels of Technical Service

Technical Levels of Service - Supporting the customer service levels are operational or technical measures of performance. These technical measures relate to the allocation of resources to service activities to best achieve the desired customer outcomes and demonstrate effective performance.

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

- Operations – the regular activities to provide services (e.g. cleaning, 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. seawall repair – patching, minor works),
- Renewal – the activities that return the service capability of an asset up to that which it had originally (e.g. seawall replacement and or seawall component replacement),
- Upgrade/New – the activities to provide a higher level of service (e.g. increasing the size or length of a seawall or upgrading its structural / retaining capacity through complete replacement to address new site conditions. (e.g. replacing a sandstone block seawall with a reinforced concrete seawall with sandstone flagging.

Table 4 shows the technical levels of service expected to be provided for seawalls. The 'Desired' position in the table documents the position being recommended in this AM Plan.

Table 4: Seawalls – 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	Network inspected in 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 seawalls in poor/very poor (4, 5) Condition.	12.4% of seawalls in poor/very poor (4, 5) Condition.	Improve or replace
Upgrade	Standard seawalls are constructed from sandstone where practical.	Percentage of seawalls constructed from sandstone where practical.	92.5% (by length) of seawalls are constructed or partly constructed from sandstone	Maintain
New	Satisfactory provision of seawalls.	New seawalls provided as required.	No additional seawalls identified as being required	No additional seawalls identified as being required

Seawalls - Condition

The condition of council's 4,666m of seawalls was surveyed at 10m intervals in 2017 by Consultants, Manly Hydraulics Laboratory.

Table 5: Seawalls Condition Survey Criteria

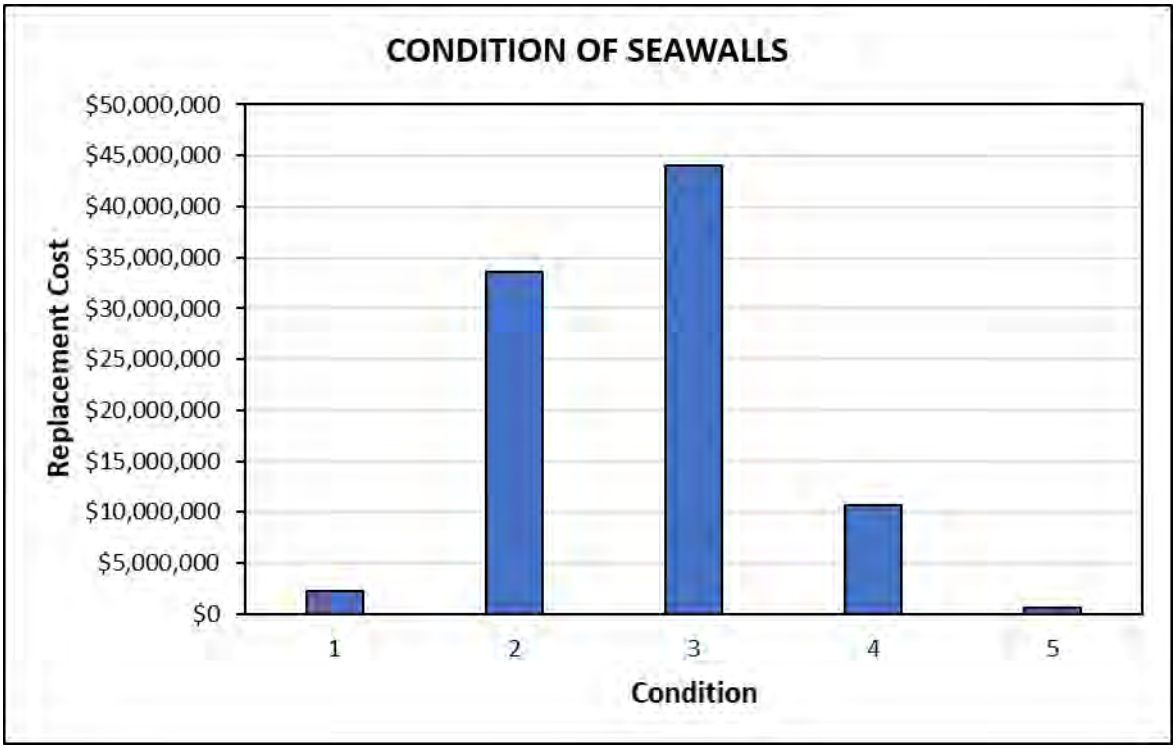
Grade	Condition	Description
1	Very Good	Sound wall designed to current standards and well maintained with no defects. **No work required**
2	Good	As grade 1 but not designed to current standards or showing minor wear, tear and deterioration of surfaces e.g. minor mortar loss and weathering, but no undermining of foundation. Needs to be reinspected in 2- 3 years. Deterioration has no significant impact on stability and appearance of the wall. **Only minor work required**
3	Fair	Wall functionally sound, but appearance affected by minor defects e.g. cracks <2mm, surface weathering, chipping of stone and minor loss of mortar, isolated undermining of foundation, but no loss of stability. Some deterioration beginning to be reflected in stability and appearance of the wall. **Some work required**
4	Poor	Wall functioning but with problems due to significant defects e.g. cracks 2-10mm, mortar loss, loss of stone, undermining of foundations, deformation and loss of support, likely to cause marked deterioration of stability and appearance likely within 1 year. **Some replacement or rehabilitation needed within 1 year**
5	Very Poor	Wall has serious problems and has failed or are about to fail in the near future, causing unacceptable stability, appearance and is a Public Safety Hazard. **Urgent replacement/ rehabilitation required**

The table below shows the condition of Seawall assets in terms of replacement cost where condition 1 is very good and 5 is very poor condition. In practice and where funds permit seawall sections in condition 3 are generally replaced at the same time as seawall sections in condition 4 or 5 if they are adjacent, there are potential risks, and it is cost effective.

Table 6: Seawalls Condition Survey Results - Overall

CONDITION OF SEAWALLS			
Condition	**Length (m)**	**Replacement Cost**	**% Condition (based on cost)**
1 (Very Good)	85	$2,287,657	2.5%
2 (Good)	1,699	$33,583,297	36.8%
3 (Fair)	2,258	$44,057,119	48.3%
4 (poor)	584	$10,709,725	11.7%
5 (Very Poor)	40	$629,251	0.7%
Total	**4,666**	**$91,267,050**	**100.0%**

The Graph below shows the condition of Seawall assets over the entire network in terms of replacement cost.



Seawalls – Review of Useful Lives

Determining the useful lives of seawalls in North Sydney is a challenging process. There appears to be limited information on sandstone "gravity" seawalls. Research into the historical construction date is currently being undertaken. Most of the seawalls (if not all) in North Sydney were constructed by the State Government on Crown Land and then handed over to North Sydney Council for "Care, Control, and Management". As council did not construct most of these seawalls (if any) information on the construction date is unknown and is currently being sought from various State Government Departments. Once the construction date is determined the current Age of each seawall is found. Adding the estimated Remaining Life to the Age will provide an estimate of the total Useful Life.

Detailed aerial photography taken in 1943 is available through the State Government. This shows that 84% of seawalls existed in their current location in 1943. This information, whilst vague, at least provides evidence of the existence of seawalls at a point in time. It is interesting to note that about 40% of the sandstone seawalls that were in existence in 1943 have significant concrete sections within them. This suggests that major rehabilitation work was undertaken to stabilise these walls at some time unknown (prior to the 1980s). What is known is that, as a result of significant deterioration of these seawalls, North Sydney has undertaken major rehabilitation on many sections of nearly every single seawall under its care since the early 1990s onwards. This includes major rehabilitation on seawalls that must have been constructed after 1943. It is also very clear that if this action was not undertaken these seawalls would have fully collapsed into the harbour. It some instances due to the nature of sudden failures some sections of seawalls have previously collapsed into the harbour before rehabilitation could be carried out. The seawall at McMahons Point fully collapsed which required full reconstruction in 2006.

The aggressive nature of the harbour environment affects the Useful Life of seawalls with waves constantly pounding against the sandstone wall founded on the harbour foreshore often on soil with weak bearing capacity. Both the volume, type, and size of harbour traffic also influence the Useful Life of seawalls including Ferries, Cruise Liners, commercial, and recreational craft. The river cat with the unique wave frequency and

amplitude affects the life of seawalls. Also under certain tides and conditions waves currently overtops at some seawall locations. This combined with future sea level rise will further increase the frequency waves currently overtop seawalls and reduce the remaining life of seawalls and therefore reduce the useful life.

Most of the original seawall sandstone blocks are still in place and most of these seawalls have been rehabilitated. Until further detailed research is completed a "long life short life" approach has been adopted in accordance with accounting standards. Until further detailed research is completed a short life of 80 years has been adopted which is the estimated period when major seawall rehabilitation is required. This major seawall rehabilitation may extend the life of seawalls by a further 40 years. Therefore, until further detailed research is completed a long life of 120 years has been adopted for seawalls. Based on this Depreciation is as follows:

Capital funding to maintain a renewal ratio of 1	
	Annual Depreciation
Seawalls	**$838,992**

A budget of $838,992 is required on average over the long term to maintain the condition of Council's Seawall network, noting that fluctuations in renewal requirements in the medium term.

Seawalls – Funding Strategy

The Asset Renewal Funding Ratio is the most important indicator. It compares funding with depreciation. An Asset Renewal Funding Ratio of 1 or greater sustained over the long term indicates the optimal renewal and replacement of assets.

The forecast for Depreciation (or Long Term Average Annual Asset Consumption) is $838,992. Therefore, an annual average capital renewal funding of $838,992 (2021 dollars) will achieve an Asset Renewal Funding Ratio of 1.

The cost to fully replace assets identified by Consultants, Manly Hydraulics Laboratory, in condition 4 and 5 as well as the cost to replace the condition 3 assets which will become condition 4 over the next 10 is $27,539,158. This is an average annual cost of $2,753,916 which is greater than the $838,992 Depreciation Expense and is greater than the average annual forecast budget of $1,983,785. With further investigation and detailed design it is hoped that alternate and lesser cost solutions may be possible to maintain seawall assets at an optimal level.

Seawalls – Capital works

Replacement of seawall segments is assumed to be a capital works project.

The ranking criteria used to determine priority of identified renewal and replacement proposals is detailed in table 7. A priority for action of 1 to 5 has been assigned to each seawall requiring capital works as described in the following table.

Seawalls – Managing the Risks

There are risks associated with providing and maintaining seawalls. They are primarily as follows:

- Sudden failure of seawalls providing structural support to roads, footpaths and parks – causing property damage – public safety hazards, injury.

The following risk response table was used to identify those seawall segments requiring action within the next 10 years.

Table 7: Seawalls – Risk Response Table

Level of Risk		Condition	Action Required	Time frame for repairs, upgrade or replacement
VH	Very High Risk	5	Immediate corrective action	1-12 months
H	High Risk	4	Prioritised action required	2-10 Years
M	Medium Risk	3	Planned action required	4-10 Years
L	Low Risk	2	Manage by routine procedures	Inspections 1-2 years
New	No Risk	1	None	None

Consideration has been given to each seawall segment, whether to replace the seawall segment or perform maintenance on it.

Seawall segments that have a **Very High or High** risk rating were considered to need replacement within the 1-10 year forecast period.

Seawall segments with a **Medium** risk rating were also considered needing replacement within the 4-10 year forecast period.


Examples of failed and failing seawalls in the North Sydney LGA – Bradfield Park

Examples of failed and failing seawalls in the North Sydney LGA – Cremorne Point

Examples of failed and failing seawalls in the North Sydney LGA – Sawmillers Reserve

Examples of failed and failing seawalls in the North Sydney LGA – Blues Point

Examples of failed and failing seawalls in the North Sydney LGA – McMahons Point

Examples of crowded foreshore on New Years Eve in the North Sydney LGA – Blues Point

Council will endeavour to manage these risks within available funding by prioritising seawall renewal works based on the North Sydney Council Seawalls and Backfill Condition Audit prepared by Consultants, Manly Hydraulics Laboratory.

Table 8: Seawalls – Capital renewal Priorities based on Condition and Risk Rating

Risk Matrix - Seawalls (Condition and Risk Rating)					
Likelihood of seawall failing (L) Refer to Table 5 Condition Criteria	Seawalls (No. of walls)				
	Seawall Height	0 to 1m	>1m to 2m	>2m to 3m	>3m
	Relative Usage	Low	Medium	High	Very High
	Park Hierarchy	Local	District	Regional	
	Priority	d	c	b	a
Condition 1 – Very Good (2.5%)	5	N/A	1	N/A	1
Condition 2 - Good (36.8%)	4	N/A	N/A	11	2
Condition 3 – Fair (48.3%)	3	N/A	3	8	6
Condition 4 – Poor (11.7%)	2	N/A	1	2	5
Condition 5 – Very Poor (0.7%)	1	N/A	1	1	N/A

(Note: Also Refer to Table 6)

Note: This table has been based on data from the 2017 North Sydney Council Seawalls and Backfill Condition Audit, performed by Manly Hydraulics Laboratory.

Note: Factors which are used to determine the priority include 'Seawall Height', 'Road Hierarchy' and 'Park Hierarchy'. The most critical factor is used to determine the priority.

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

- Damage
- Seawalls replaced in association with other projects such as marine structure works
- Landscape projects

Seawalls – Maintenance

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. Resetting of loose blocks, re-pointing mortar.

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.

Seawalls – Prioritised Expenditure Forecast

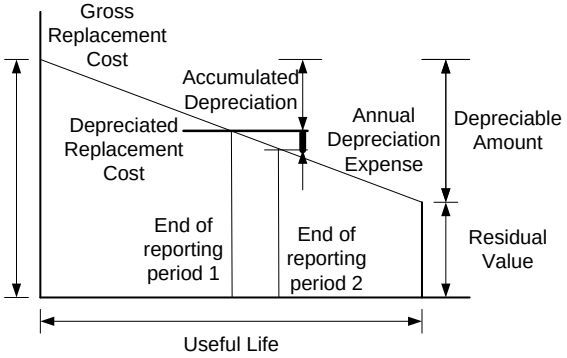
Table 9: Seawalls – Prioritised Expenditure Forecast – 10 years FY2023-FY2032

Year		Priority	Capital Costs	Maintenance Costs	Total Costs
1	2022/23	1a	$1,000,000	$0	$1,000,000
2	2023/24	2a	$1,237,856	$0	$1,237,856
3	2024/25	2a	$2,200,000	$0	$2,200,000
4-10	2025/32	2a to 2c	$15,400,000	$0	$15,400,000
Works Identified	2025/32	3a to 3c	$7,501,302	$0	$7,501,302
		Grand Total	**$27,339,158**	**$0**	**$27,339,158**

In summary the current value of seawall assets is detailed in the table below.

Table 10: Seawalls – Valuation

Asset Category	Length (m)	Replacement Value (2021)	Accumulated Depreciation (2021)	Fair Value (2021)	Depreciation Expense
Seawalls	**4,666**	**$91,267,050**	**$45,914,051**	**$45,352,999**	**$838,992**



Seawalls – Valuation Forecast

Asset values (Seawalls) are forecast to increase slowly. It is forecast that no additional assets are expected to be added to the asset stock from new construction and acquisition by Council or from assets constructed by land developers or other assets donated to Council.

Seawalls – Key Assumptions – Financial Forecasts

Key assumptions made in this asset management plan for Seawalls are:

Table 11: Key Assumptions made in AM Plan and Risks of Change

Key Assumptions	Risks of Change to Assumptions
Useful Lives of Seawalls	Low risk
Rate of deterioration	Low risk

Seawalls – Creation / Acquisition / Upgrade Program

New works are those that create a new asset that did not previously exist, or works which will upgrade or improve an existing asset beyond its existing capacity. They may result from growth, social or environmental needs. Assets may also be acquired at no cost. No new assets are currently identified.

Seawalls – Disposal Plan

No seawall assets have been identified for disposal.

Seawalls – Forecast reliability and confidence

The estimated confidence level and reliability of data used in this AMP is considered to be reliable as the data is based on a detailed condition report on Seawalls.

Seawalls – Improvement Plan

The improvement plan is shown in the table below.

Task No	Task	Responsibility	Resources Required	Timeline
1	Research the Useful Life of Seawalls	EPS	Staff Time	2024

Seawalls – Monitoring and Review Procedures

This Asset Management Plan will be reviewed during annual budget planning processes and amended to show any material changes in service levels and/or resources available to provide those services as a result of budget decisions.

The Asset Management Plan has a life of 4 years and is due for complete revision and updating within 1 year of each Council election.

Seawalls – Renewal and Replacement Program

Renewal and replacement expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is considered to be an upgrade/expansion or new work expenditure resulting in additional future operations and maintenance costs.

Seawall assets requiring renewal/replacement have been identified by the North Sydney Council Seawalls and Backfill Condition Audit completed by Consultants, Manly Hydraulics Laboratory, in 2017.

Seawalls – Funding Scenarios

The Long Term Financial Plan includes three scenarios, all of which maintain current services levels but propose differing levels of capital expenditure on the renewal of Council's ageing infrastructure assets.

In summary:

- Pessimistic Scenario - This Scenario results in a decline in operating results and deficits in the later years.
- Optimistic Scenario - This Scenario results in improvements in operating results for the life of the plan.
- Planned Scenario - This Scenario results modest surplus operating results for the life of the plan.

Table 12: Funding Scenarios – Seawalls – North Sydney Councils 10 Year Plan

Scenario	Capital Funding Level Required Per Annum	10 Year Plan $ Total
Scenario 1.	$1,983,785/year	**$19,837,856**
Scenario 2.	$1,983,785/year	**$19,837,856**
Scenario 3.	$1,983,785/year	**$19,837,856**

Note: *These Scenarios are based on the 10-year Long Term Financial Plan.*

Seawalls – Service and Risk Tradeoffs

The decisions made in adopting this AM Plan are based on the objective to achieve the optimum benefits from the available resources.

Service trade-off

If this funding Scenario is adopted, then the Level of Service will be maintained.

Risk trade-off

If this funding Scenario is adopted, then it there is less risk of a sudden collapse of a seawall.

Seawalls – Renewal and Replacement Program – FY2023-FY2032 (10 Year Plan)

Council's projected 10 year Capital Renewal Program is shown in the Tables below. It is based on the funding required to replace Seawall assets identified by North Sydney Council Seawalls and Backfill Condition Audit completed by Consultants, Manly Hydraulics Laboratory, in 2017.

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

- Damage
- Seawalls replaced in association with other projects such as marine structure works
- Landscape projects

Project priorities may also be subject to change due to accelerated deterioration, sudden failure or finalization of detailed designs and project costings.

Due to the amount of funding required to complete seawall and marine structure projects, funds may be pooled to carry out either marine structure projects, seawall projects or projects from both asset categories.

Table13: Seawalls – Renewal and Replacement Program – FY2023-FY2032 (10 Year Plan)

Priority Projects 2022/23 (Year 1)

Replace Year	Priority	Seawall ID	Location	Risk Rating / Category	Condition	Capital Cost
2022/23	1a	SW009	Kesterton Park and High St	Very High (5)	Very Poor	$250,000
2022/23	1a	SW036	Neutral Bay - West of Hayes Street Wharf	Very High (5)	Very Poor	$450,000
2022/23	1a	SW032a	Tunks Park - Brothers Avenue	Very High (5)	Very Poor	$300,000
					Total	**$1,000,000**

Note: *These Cost estimates do not include inflation / building escalations costs which can vary between 3-8% each year.*

Table 14: Seawalls – Renewal and Replacement Program

Priority Projects 2023/24 (Year 2)

Replace Year	Priority	Seawall ID	Location	Risk Rating / Category	Condition	Capital Cost
2023/24	2a	SW002	WILLOUGHBY BAY - PRIMROSE PARK	High (4)	Poor	$1,237,856
					Total	**$1,237,856**

Note: *These Cost estimates do not include inflation / building escalations costs which can vary between 3-8% each year.*

Table 15: **Seawalls – Renewal and Replacement Program**

Priority Projects 2024/25 (Year 3)

Replace Year	Priority	Seawall ID	Location	Risk Rating / Category	Condition	Capital Cost
2024/25	2a	SW024	MILSONS POINT - LUNA PARK WHARF TO JEFFREYS STREET WHARF	High (4)	Poor	$2,200,000
					Total	**$2,200,000**

Note: *These Cost estimates do not include inflation / building escalations costs which can vary between 3-8% each year.*

Table 16: Seawalls – Renewal and Replacement Program

Priority Projects 2025/32 (Year 4-10)

Replace Year	Priority	Seawall ID	Location	Risk Rating / Category	Condition	Capital Cost
2025/32	2a	SW023	LAVENDER BAY FORESHORE - CLARK PARK AND HARBOURVIEW CR	High (4)	Poor	$10,460,000
2025/32	2a	SW035a	WONDAKIAH - OYSTER COVER RESERVE	High (4)	Poor	$350,000
2025/32	2b	SW006	BERRYS BAY - SAWMILLERS RESERVE	High (4)	Poor	$2,390,000
2025/32	2b	SW026	JEFFREY STREET WHARF - BETWEEN CAPTAIN HENRY WATERHOUSE AND DR MARY BOOTH LOOKOUT	High (4)	Poor	$420,000
2025/32	2b	SW028	NEUTRAL BAY FORESHORES - WALLARINGA MANSIONS	High (4)	Poor	$560,000
2025/32	2c	SW008	BALLS HEAD BAY - BERRY ISLAND RESERVE	High (4)	Poor	$1,220,000
					Total	**$15,400,000**

Note: *These Cost estimates do not include inflation / building escalations costs which can vary between 3-8% each year.*

Table 17: **Seawalls –** ***Renewal and Replacement Program***

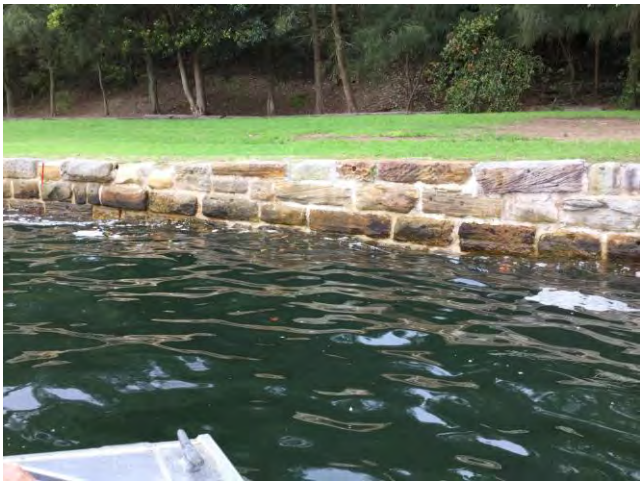
Works Identified – Years 2025 - 32 (Years 4 - 10)

Replace Year	Priority	Seawall ID	Location	Risk Rating / Category	Condition	Capital Cost
2025/32	3a	SW019	BERRYS BAY - MUNRO ST	Medium (3)	Fair	$520,000
2025/32	3a	SW025	JEFFREY STREET WHARF - CAPTAIN HENRY WATERHOUSE RESERVE	Medium (3)	Fair	$710,000
2025/32	3a	SW035b	WONDAKIAH - OYSTER COVER RESERVE	Medium (3)	Fair	$900,000
2025/32	3b	SW001	BERRYS BAY - WAVERTON PARK	Medium (3)	Fair	$550,000
2025/32	3b	SW007b	GORE COVE - BERRY ISLAND RESERVE	Medium (3)	Fair	$230,000
2025/32	3b	SW010	BEULAH ST WHARF - BEULAH STREET	Medium (3)	Fair	$100,000
2025/32	3b	SW012	KURRABA POINT - KURRABA POINT RESERVE	Medium (3)	Fair	$1,660,000
2025/32	3b	SW022	LAVENDER BAY WHARF -	Medium (3)	Fair	$860,000

Replace Year	Priority	Seawall ID	Location	Risk Rating / Category	Condition	Capital Cost
2025/32	3b	SW030	KURRABA WHARF - NEUTRAL BAY	Medium (3)	Fair	$100,000
2025/32	3b	SW031	CREMORNE WHARF - MILSON ROAD	Medium (3)	Fair	$110,000
2025/32	3b	SW032b	TUNKS PARK - BROTHERS AVE	Medium (3)	Fair	$711,302
2025/32	3b	SW035c	WONDAKIAH - OYSTER COVER RESERVE	Medium (3)	Fair	$200,000
2025/32	3c	SW027	DR MARY BOOTH LOOKOUT - WARUDA STREET	Medium (3)	Fair	$70,000
2025/32	3c	SW032c	TUNKS PARK - BROTHERS AVE	Medium (3)	Fair	$570,000
2025/32	3c	SW033	COLINDA RESERVE -	Medium (3)	Fair	$90,000
2025/32	3c	SW035d	WONDAKIAH - OYSTER COVER RESERVE	Medium (3)	Fair	$120,000
					Total	**$7,501,302**

Note: *These Cost estimates do not include inflation / building escalations costs which can vary between 3-8% each year.*

Seawalls Renewal Program



Before After

Sawmillers Reserve – Grout Injection - Completed 2017

Henry Lawson Avenue - Before

Henry Lawson Avenue - After

Before After

Anderson Park – Grout Injection – Completed 2018

Before After

Quibaree Park – Grout Injection – Completed 2018

Seawalls – Performance Measures

The effectiveness of the asset management plan can be measured in the following ways:

- The degree to which the required projected expenditures identified in this asset management plan are incorporated into the long term financial plan,
- The degree to which 1-5 year detailed works programs, budgets, business plans and corporate structures take into account the 'global' works program trends provided by the asset management plan,
- The degree to which the existing and projected service levels and service consequences (what we cannot do), risks and residual risks are incorporated into the Strategic Plan and associated plans,
- The Asset Renewal Funding Ratio achieving the target of 1.0.

Seawalls – References

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