

# Patterson Lakes Waterways

Management Plan 2022



Cover Photo: Tidal Waterways, (Courtesy of Melbourne Water)

# Document Versions and Amendments

## Document Versions

Revision	Date Issued	Issued By	Issued To
Draft A	8 April 2022	Emily Boucher – City of Kingston	Melbourne Water and Parks Victoria

# Foreword

This Plan has been developed by negotiation with Melbourne Water and City of Kingston representatives. It seeks to clarify roles and responsibilities of the agencies to provide adequate levels of service to the residents and users of Patterson Lakes Waterways.

To assist maintaining the assets of Patterson Lakes Waterways residents and users must also play their part. To ensure safe and efficient servicing of the sandy beaches residents must ensure equipment, structures and private property vegetation do not impede access.

Residents and users of Patterson Lakes Waterways should understand the primary function of the system is for flood protection. But they should also understand the impact that waste and litter can have on water quality. Simple actions like picking up after your pet and displaying responsible pet ownership through keeping dog on leads will increase all user's enjoyment of the space.

Residents must also ensure compliance with the conditions of use outlined in the mooring lease and Patterson Lakes Jetty Guidelines (2014).

<b>Executive Summary</b>	<b>7</b>
<b>2.0 Context</b>	<b>8</b>
2.1 Location	8
2.2 Waterways Operations	8
2.3 Land Status	10
<b>3.0 Management Precincts</b>	<b>11</b>
3.1 Management Precincts Locations	11
<b>4.0 Assets and Management Services</b>	<b>13</b>
4.1 Tidal Waterways	13
4.2 Quiet Lakes	16
<b>5.0 Management Plan Review</b>	<b>19</b>
<b>Figures</b>	
<b>Figure 2:</b> Patterson Lakes Waterways Location Plan	9
<b>Figure 3:</b> Current Land Ownership Map of the Patterson Lakes Waterways	10
<b>Figure 4:</b> Patterson Lakes Waterways Management Precinct Areas Map	12
<b>Appendices</b>	
Appendix A – Melbourne Water Maintenance Schedule for Patterson Lakes Waterways	20
Appendix B – Kingston City Council Maintenance Schedule for Patterson Lakes Waterways	24

# Executive Summary

## Vision

Patterson Lakes Waterways are public reserves that play an important role in the regional drainage system and provide flood protection. By managing these areas well, government agencies enable the area to realise its recreational and economic benefit whilst maintaining the prime purpose of the waterways which is to provide flood protection to the surrounding residential area.

## Executive Summary

This plan provides the framework to guide the management and maintenance of the different water bodies of Patterson Lakes Waterways in a manner responsive to a range of environmental and community values.

Responsibility predominately falls to Melbourne Water or Council with Parks Victoria, the waterway manager under the Marine Safety Act 2010, for the tidal waterways only, Parks Victoria are responsible for boating safety through the application of the 'Vessel Operating and Zone Rules' which apply to the tidal waterways.

This management plan outlines the management services provided by the various agencies and provides measurable targets which these services should achieve.

The plan is to be reviewed every five years.

# Context

## 2.1 Location

Patterson Lakes is located approximately 34 kilometres south-east of Melbourne within the municipality of Kingston. It is a suburb formed around a series of waterbodies known as the Tidal Waterways and Quiet Lakes which are collectively referred to as the Patterson Lakes Waterways. They consist of a series of canals and harbours (known as Tidal Waterways) and three landlocked lakes; Lake Legana, Lake Illawong, and Lake Carramar (known as Quiet Lakes) that provide around 23 kilometres of shoreline water frontage to more than 1200 residential properties. Refer to **Figure 2: Patterson Lakes Waterways Location Plan**

The Waterways is highly valued by the local community and is fondly referred to as the 'Blue Reserve of Kingston'.

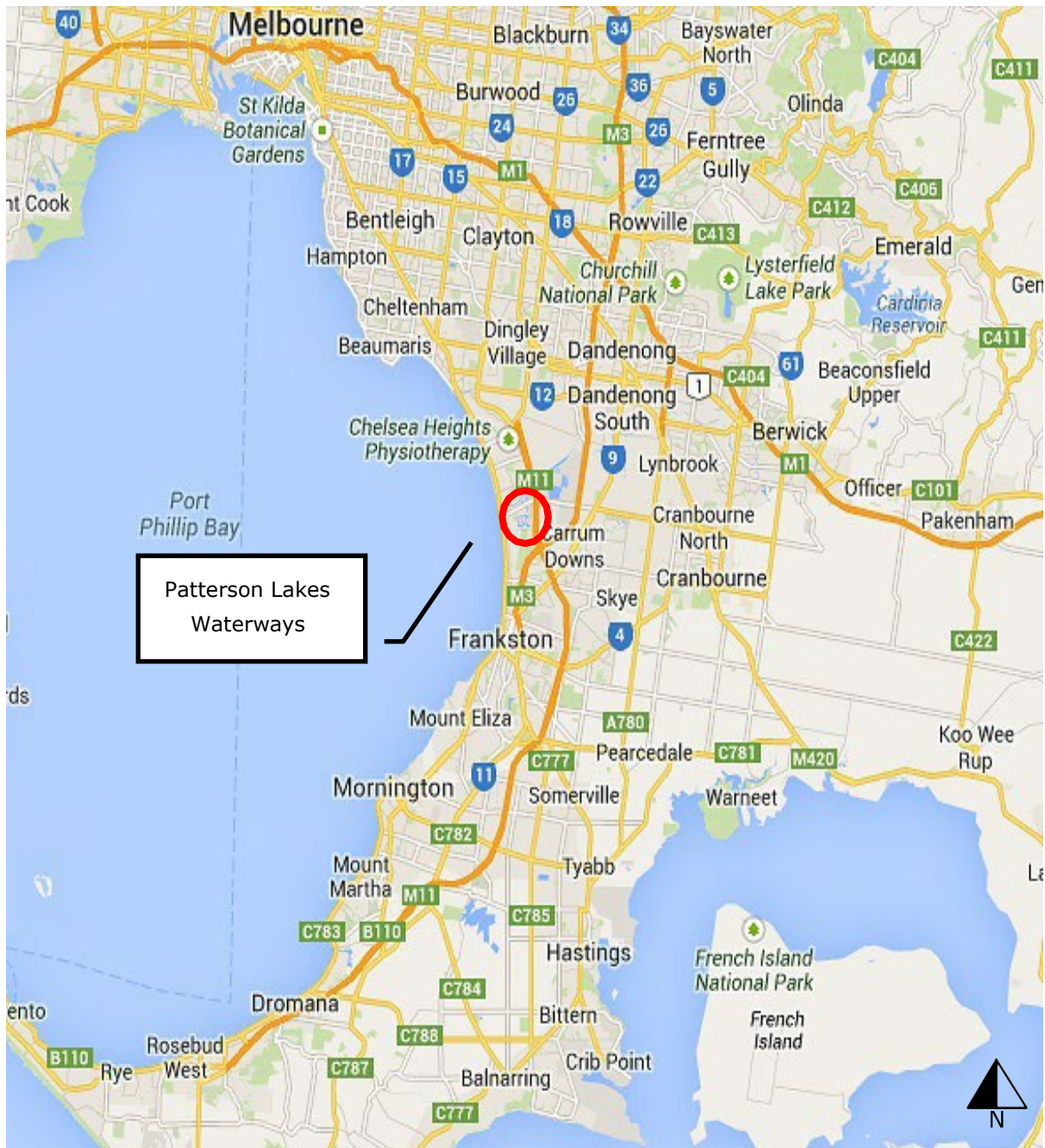
## 2.2 Waterways Operations

The Patterson Lakes Waterways were designed within a swamp floodplain to establish a network of waterways and lakes that would be capable of receiving and transmitting water between them and both the Patterson River and Kananook Creek. This operation was based on a network of drains, pumps, and floodgates. The creation of the Patterson Lakes Waterways was based on two functions which are labelled on the waterways titles as 'Reserves for Drainage and Recreational Purposes'.

The Tidal Waterways consist of a series of canals and harbours that are connected to the Patterson River and in turn to Port Phillip Bay. They are separated from the Patterson River via floodgates that form part of the flood protection infrastructure along Patterson River. The Tidal Waterways are used for a public purpose, both in terms of their drainage function and being a place of recreation for the public boating community.





The Quiet Lakes system is brackish and comprise of three interconnected shallow lakes; Lake Legana (3.7 ha), Lake Illawong (2 ha) and Lake Carramar (0.8 ha). They are connected to the Patterson River and Kananook Creek via pumps and drains. The lake system was constructed to act as a retarding basin for stormwater runoff from the adjacent catchment and to provide recreational benefit to the surrounding and some nearby residents.

**Figure 2:** Patterson Lakes Waterways Location Plan



**Figure 3: Current Land Ownership Map of the Patterson Lakes Waterways**



<p>Figure 3: Current Land Ownership Map of Patterson Lakes Waterways</p>	<p>LEGEND</p> <ul style="list-style-type: none"> <li> Natural Waterway</li> <li> Non MWC owned land</li> <li> MWC owned land</li> </ul>	<p>Map at A3 Scale 1: 6,000 3/04/2014</p>	 <p>N</p>
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# Management Precincts

## 3.1 Management Precinct Locations

The Patterson Lakes Waterways has been divided into three management precincts to enable the management plan to be adaptive to future changes to either management structures or existing conditions. The three management precincts are:

- A. Tidal Waterways
- B. Quiet Lakes
- C. Whalers Cove East, Runaway Bay & Town Centre

Refer to **Figure 3**: Patterson Lakes Waterways Management Plan Precinct Areas.

### Tidal Waterways

Tidal Waterways comprise of two areas to the north of McLeod Road, Whalers Cove Waterway and Town Centre, and a large area to the south.

Whalers Cove Waterway lays to the north of McLeod Road and to the west of Whalers Cove East. It is connected to Patterson River by twin double floodgates. The area contains jetties and waterfront housing

The Town Centre lays to the east of Inner Harbour Marina and comprises the Town Centre commercial precinct and associated medium and low-density housing around Mariners Island and is connected to Patterson River by a single floodgate.

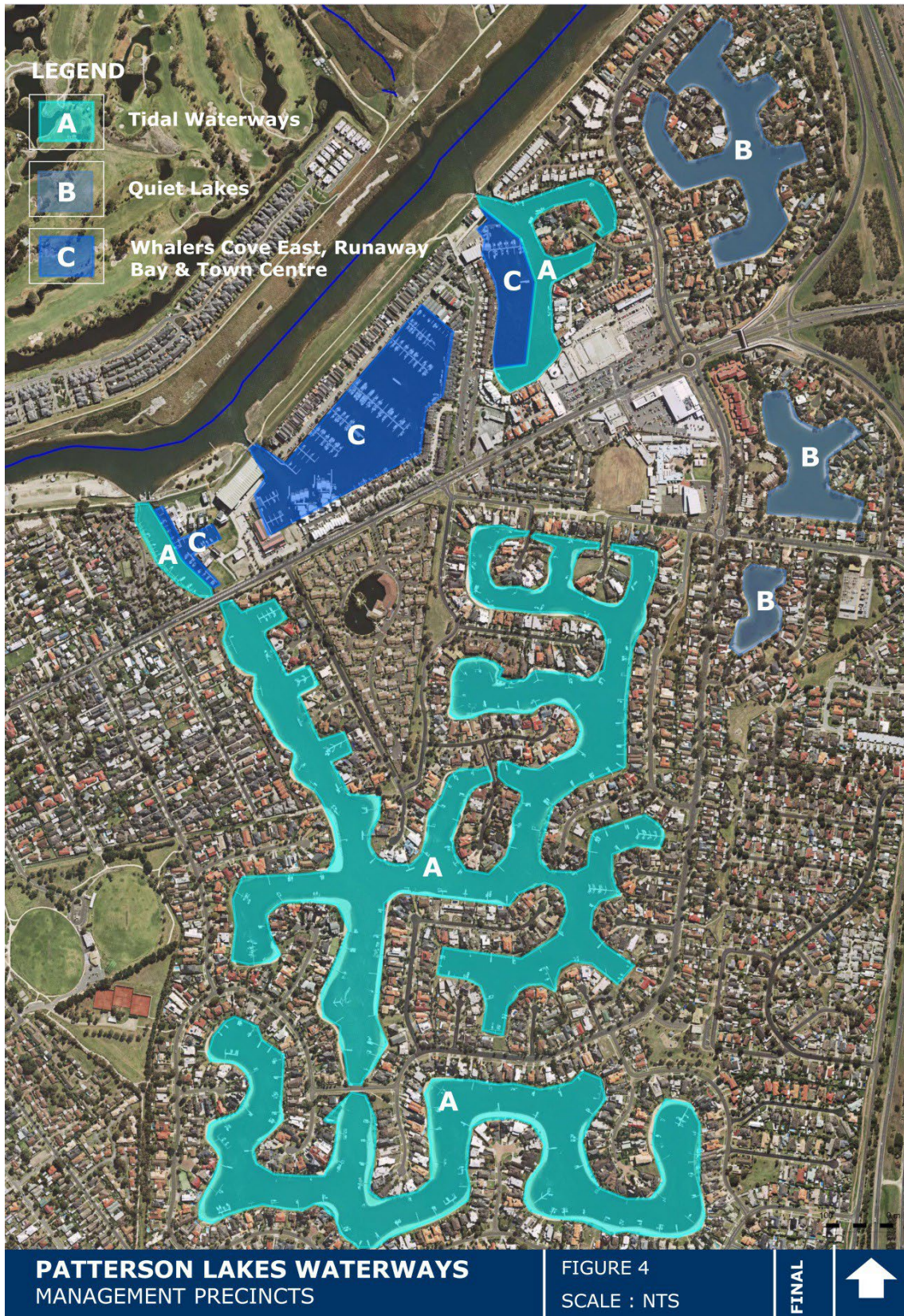
The largest tidal canal extends south from McLeod Road Bridge to Eel Race Drain and contains jetties, beaches, retaining walls and waterfront housing.

### Quiet Lakes

The Quiet Lakes comprise of three freshwater lakes

- Lake Legana is the northern most and largest of the three lakes with a surface area of approximately 3.7ha.
- Lake Illawong is the central lake with a surface area of approximately 2.0ha.
- Lake Carramar is the smallest and southern most of the three lakes with a surface area of approximately 0.8ha.

**Figure 4:** Patterson Lakes Waterways Management Precinct Areas Map



# 4.0 Assets and Management Services

## 4.1 Tidal Waterways

### Management Assets

Asset	Landowner	Function	Responsible Agency	Funding	Management Service(s)	Target	Measure	
Waterways	MWC	Flood protection	MWC	Waterways & Drainage Charge	Manage, fund and control Patterson River floodgate operations.	There will be no failure that result in significant flooding, damage, disruption, or personal injury due to agreed service levels being compromised.	Performance assessment will be based on reviewing details contained in MWC records relating to incident notification and response.	
					Ensure structural integrity of protection infrastructure such as retaining walls.			
					Replace/renew assets when it no longer performs its function.			
			Stormwater management	KCC	Rate revenue & project grants	Maintain local drainage network to achieve highest practical water quality stormwater flows.	Facilitate the adoption of WSUD road upgrade practices to improve waterway health.	The program of upgrades is developed by 30 June each year.
						Pre-treatment of stormwater flows to achieve appropriate water quality standards.		
			Water quality	MWC	Waterways & Drainage Charge	Work collaboratively with MWC customers and stakeholders to improve waterway health.	All algal bloom incidents that require a response will be managed promptly and in accordance with MWC procedures.	Algal blooms are responded to in an appropriate timeframe including signage and notifications.
						Manage algal bloom outbreaks in the tidal waterways.		
			Recreational benefits	KCC	Rate revenue	Update the Open Space Strategy to recognise the water-based recreational opportunity that the Tidal Waterways provides.	Include Tidal Waterways as a water-based recreational opportunity in the Open Space Strategy.	Update Open Space Strategy by Nov 2023.

**Tidal Waterways - Cont.**

	Landowner	Function	Responsible Agency	Funding	Management Service(s)	Target	Measure
Concrete edging	Various	Delineates land management boundaries	KCC	Rate revenue	Ensure functions as per design and replace/renew asset when it no longer performs its function.	Replace /renew asset when requests exceed a Council determined threshold.	Response time to customer requests.
Pipes	MWC & KCC	Stormwater management	KCC	Rate revenue & project grants	Manage and fund local drainage network to achieve highest practical water quality stormwater flows. Pre-treatment of stormwater flows to achieve appropriate water quality standards.	Respond to requests in a timely manner, as outlined in Councils Customer Service Charter.	Response time to customer requests.
		Flood Protection	MWC	Waterways & Drainage Charge	Maintain interconnecting pipes.	Maintain structural integrity and replace/renew asset when it no longer performs its function.	Melbourne Water to undertake inspections on a as need basis.
Pits	MWC & KCC	Stormwater management	KCC	Rate revenue & project grants	Manage and fund local pits to provide 'first' flush' retention of pollutants, keeping pits free of organic debris to achieve highest practical water quality stormwater flows. Pre-treatment of stormwater flows to achieve appropriate water quality standards.	Respond to requests in a timely manner, as outlined in Councils Customer Service Charter.	Response time to customer requests.
		Flood Protection	MWC	Waterways & Drainage Charge	Maintain interconnecting pits.	Maintain structural integrity and replace/renew asset when it no longer performs its function.	Structural checks done on an as needed basis.
Bridge Culverts (excluding McLeod Rd bridge managed by VicRoads)	KCC	Structural Integrity	KCC	Rate revenue	Ensure structural integrity of bridge infrastructure. Replace/renew assets when it no longer performs its function.	Visually inspected to Level 1 Bridge Inspection Standards annually. Level 2 inspections are undertaken as per Council's Road Management Plan.	Repair and renewal works are programmed based on the results of the formal bridge inspection results.
		Hydraulic conveyance	MWC	Waterways & Drainage Charge	Maintain flow through the culverts.	Ensure existing hydraulic capacity is managed appropriately through a program of maintenance and ensure any works do not reduce hydraulic capacity in the lakes.	Performance assessed every 5 years. With Preventative Maintenance in place for this.
Bridge Culverts' Fencing (including McLeod Rd bridge)	KCC	Safety	KCC	Rate revenue	Ensure structural integrity of bridge fencing. Replace/renew fencing when it no longer performs its function.	Maintain structural integrity and renew asset when it no longer performs its function.	Performance assessed annually by reference to KCC record of incident response.
Sand Beaches	MWC	Recreational benefit	KCC	Rate Revenue	Manage and fund maintenance activities to the sand beaches (this does not include sand renourishment).	Ensure sand beaches have no more than 10% weed cover or loose debris.	Performance assessed annually by reference to KCC record of incident response.

**Tidal Waterways - Cont.**

<b>Asset</b>	<b>Landowner</b>	<b>Function</b>	<b>Responsible Agency</b>	<b>Funding</b>	<b>Management Service(s)</b>	<b>Target</b>	<b>Measure</b>
Rock beaching on sand beaches	MWC	Recreational benefit and asset protection	MWC	Waterways & Drainage Charge	Manage and fund integrity of rock beaching.	Repair and maintain as necessary.	Performance assessment based on visual inspection by MWC PL Maintenance Coordinator as required.
Concrete Steps along Beaches	MWC	Recreational benefit	MWC	Waterways & Drainage Charge	Manage and fund integrity of concrete steps.	Repair and maintain as necessary.	Performance assessment based on visual inspection by MWC PL Maintenance Coordinator as required.
Retaining Walls	MWC	Flood protection	MWC	Waterways & Drainage Charge	Manage and fund structural integrity. Replace/renew asset when it no longer performs it function.	Repair and maintain as necessary.	Performance assessment based on visual inspection by MWC Asset Management Engineer annually.
Tidal Gates	MWC	Flood protection	MWC	Waterways & Drainage Charge	Manage, fund and control Patterson River floodgate operations. Ensure structural integrity of protection infrastructure such as retaining walls. Replace/renew assets when it no longer performs it function.	There will be no instances of built asset deterioration, malfunction or failure that result in significant flooding, damage, disruption, or personal injury due to agreed service levels being compromised.	Performance assessment will be based on reviewing details contained in MWC records relating to incident notification and response.
Jetties	MWC	Recreational benefit	MWC	Jetty Service Charge	Maintain as per the design. Renew at the end of the asset design life. Manage jetty leases.	Maintain structural integrity and renew asset when it no longer performs it function.	Performance assessment based on visual inspection by MWC PL Maintenance Coordinator annually.
Maintenance Access Points (MAP)	MWC	Waterway management	MWC	Waterways & Drainage Charge	Manage, fund and control access points.	Repair and maintain as necessary.	Performance assessment based on visual inspection by MWC PL Maintenance Coordinator as required.
MAP Security Fencing & Gates	MWC	Waterway management	MWC	Waterways & Drainage Charge	Manage, fund and control access fencing.	Repair and maintain as necessary.	Performance assessment based on visual inspection by MWC PL Maintenance Coordinator as required.

## 4.2 Quiet Lakes

### Management Assets

Asset	Landowner	Function	Responsible Agency	Funding	Management Service(s)	Target	Measure
Waterway	MWC	Flood protection	MWC	Waterways & Drainage Charge	Ensure structural integrity of protection infrastructure.	There will be no failure that result in significant flooding, damage, disruption, or personal injury due to agreed service levels being compromised.	Performance assessment will be based on reviewing details contained in MWC records relating to incident notification and response.
					Replace/renew assets when it no longer performs its function.		
					Manage accumulated sediments on the base of the lake system.	Remove accumulated sediments from the base of the lake system if its drainage function is compromised and/or retarding basin storage capacity is reduced.	Performance assessed every 10 years (with the next assessment due by the end of 2022) Regular visual assessment carried out by our Crews, with action as necessary.
		Stormwater management	KCC	Rate revenue & project grants	Maintain local drainage network to achieve highest practical water quality stormwater flows. Pre-treatment of stormwater flows to achieve appropriate water quality standards.	Facilitate the adoption of WSUD road upgrade practices to improve waterway health.	Road renewal projects will incorporate best practice to minimise stormwater flooding and maximise water quality.
Water quality	MWC	Waterways & Drainage Charge	MWC	Waterways & Drainage Charge	Undertake water quality testing and surveillance to ensure compliance with secondary contact recreation guidelines.	Compliance with relevant guidelines.	Testing done routinely during the summer months, and then as needed the other months.
					Manage exotic fish population.	Reduce the carp population from the lake system.	Performance assessed every 2 years.
Concrete edging	Various	Delineates land management boundaries	KCC	Rate revenue	Ensure functions as per design and replace/renew asset when it no longer performs its function.	Replace /renew asset when requests exceed a Council determined threshold.	Response time to customer requests.
Lake side Pits	Various	Conveyance of local drainage discharge	KCC	Rate revenue	Ensure functions as per design and replace/renew asset when it no longer performs its function.	Renew asset when it no longer performs its function.	Performance assessed annually by reference to KCC record of incident response.

**Quiet Lakes - Cont.**

Asset	Landowner	Function	Responsible Agency	Funding	Management Service(s)	Target	Measure
Gladesville Boulevard Bore Pump	MWC	Water Quality benefit	MWC	Waterways & Drainage Charge, and user pays system	Manage and fund the drainage pump station.	Maintain structural integrity and replace/renew asset when it no longer performs its function.	Performance assessment based on visual inspection by MWC PL Maintenance Coordinator annually.
					Maintain the lakes normal water level.		
					Renew bore extracting licence.		
					Operate the bore under the user pays system.		
McLeod Road Drainage Pump Station	MWC	Flood Protection	MWC	Waterways & Drainage Charge	Manage and fund the drainage pump station that pumps local drainage away from the lakes.	Maintain structural integrity and replace/renew asset when it no longer performs its function.	Performance assessment based on visual inspection by MWC PL Maintenance Coordinator annually.
Pipes	MWC & KCC	Stormwater management	KCC	Rate revenue & project grants	Maintain local drainage network to achieve highest practical water quality stormwater flows. Pre-treatment of stormwater flows to achieve appropriate water quality standards.	Facilitate the adoption of WSUD road upgrade practices to improve waterway health.	Road renewal projects will incorporate best practice to minimise stormwater flooding and maximise water quality.
		Flood Protection	MWC	Waterways & Drainage Charge	Manage and fund interconnecting pipes between water bodies.	Maintain structural integrity and replace/renew asset when it no longer performs its function.	Performance assessment based on undertaking CCTV every 10 years. Balance pipes assessed via the correct balance of water in the lake system – visual inspection by Crews.
Pits	MWC & KCC	Stormwater management	KCC	Rate revenue & project grants	Manage and fund local pits to provide 'first' flush' retention of pollutants, keeping pits free of organic debris to achieve highest practical water quality stormwater flows. Pre-treatment of stormwater flows to achieve appropriate water quality standards.	Respond to requests in a timely manner, as outlined in Councils Customer Service Charter.	Response time to customer requests.
		Flood Protection	MWC	Waterways & Drainage Charge	Maintain interconnecting pits.	Maintain structural integrity and replace/renew asset when it no longer performs its function.	Structural checks done when annual cleaning occurs. Asset life is approx. 100 years, inspected on an as needed basis.
Bridge Culverts	KCC	Structural Integrity	KCC	Rate revenue	Ensure structural integrity of bridge infrastructure Replace/renew assets when it no longer performs its function.	Visually inspected to Level 1 Bridge Inspection Standards annually. Level 2 inspections are undertaken as per Council's Road Management Plan.	Repair and renewal works are programmed based on the results of the formal bridge inspection results.
		Hydraulic conveyance	MWC	Waterways & Drainage Charge	Maintain flow through the culverts.	Ensure existing hydraulic capacity is managed appropriately through a program of maintenance and ensure any works do not reduce hydraulic capacity in the lakes.	Performance assessed every 5 years. With Preventative Maintenance in place for this
Bridge Culverts (Fencing)	KCC	Safety	KCC	Rate revenue	Ensure structural integrity of bridge fencing.	Maintain structural integrity and renew asset when it no longer performs its function.	Performance assessed annually by reference to KCC record of incident response
					Replace/renew fencing when it no longer performs its function.		
Concrete Rock Groynes	MWC	Stormwater management	KCC	Rate revenue	Manage and fund groynes that discharge water from local pipe network and spoon drain into the lakes.	Maintain structural integrity and renew asset when it no longer performs its function.	Performance assessed annual by reference to KCC record of incident responses.

**Quiet Lakes - Cont.**

<b>Asset</b>	<b>Landowner</b>	<b>Function</b>	<b>Responsible Agency</b>	<b>Funding</b>	<b>Management Service(s)</b>	<b>Target</b>	<b>Measure</b>
Sand Beaches	MWC	Recreational benefit	KCC	Rate revenue	Manage and fund maintenance activities to the sand beaches (this does not include sand renourishment).	Ensure sand beaches have no more than 10% weed cover or loose debris.	Performance assessed annually by reference to KCC record of incident response.
Fencing & Gates	MWC	Waterway management	MWC	Waterways & Drainage Charge	Manage, fund and control access fencing around pumping stations.	Maintain structural integrity and replace/renew asset when it no longer performs its function.	Performance assessment based on visual inspection.
Lighting Bollards	MWC	Safety	MWC		Manage, fund and control lighting.	Maintain structural integrity and replace/renew asset when it no longer performs its function.	Performance and repairs based on complaints.



## 5.0 Management Plan Review

The agreed shared governance of the Patterson Lakes Waterway assets and management services is to be reviewed every 5 years. An earlier review can be undertaken as agreed by the responsible management agency if the performance targets outlined within Section 4.0 *Assets and Management Services* are not being satisfactorily met.

Melbourne Water will be the lead agency responsible for managing the review process and undertaking minor updates to the Waterways Management Plan in consultation with Kingston City Council and Parks Victoria. Kingston City Council and Parks Victoria will commit resourcing to update the plan every 5 years, in particular the review of the appended maintenance schedules that outlines levels of service for the agreed assets.

General enquiries or complaints would still be dealt with via each agencies standard Customer Service process.

A review of the Plan is anticipated for June 2027.

# Appendix A

## Melbourne Water Maintenance Schedule for Patterson Lakes Waterways

Contact MW on 131 722 for queries regarding this maintenance schedule.

### Tidal Waterways Maintenance Schedule

#### Waterways and Drainage Charge Funded

Asset	Function	Maintenance Works	Frequency of Maintenance Works
Waterway	Water quality	Water Quality Surveillance for BGA.	Testing carried out if cues for BGA are present and notify users when BGA levels exceed 10mm <sup>3</sup> /l.
Interconnecting Drainage Pipes	Flood Protection	Structural assessment, repair, and replacement.	CCTV of pipes as required. Repair and replace as required.
Interconnecting Drainage Pits	Flood Protection	Removal of litter, debris, and sediment.	Performance audit biannually. As required.
Bridge Culverts	Hydraulic Conveyance	Removal of debris, sediment, and marine growth such as barnacles.	Performance audit every 5 years. With Preventative Maintenance in place for this
Rock beaching on sand beaches	Recreational benefit	Structural assessment, repair and replace rock work associated with sand beaches.	Based on performance and repaired/replaced as required.
Concrete Steps along Beaches	Recreational benefit	Structural assessment, repair and replacement.	Performance audit annually. Repair and replace as required.
Retaining Walls	Flood Protection	Structural assessment, repair, and replacement.	Performance audit annually. Repair and replace as required.
Tidal Gates (Whalers Cove, Runaway Bay & Town Centre)	Flood Protection	Operate, maintain, and replace Gates.	Undertake activities outlined within MW's programmed maintenance for the tidal gates.
		Remove sediments including silt and organic materials at base of Tidal Gates.	

**Tidal Waterways Schedule - Cont.**

<b>Asset</b>	<b>Function</b>	<b>Maintenance Works</b>	<b>Frequency of Maintenance Works</b>
Maintenance Access Points (MAP)	Waterway Management	Repair and maintain access points.	Based on performance – repaired/ replaced as required.
		Monitor surface conditions, assess, and remedy any safety risks. Maintain grass to MW’s standard levels of service for grass maintenance.	
Fencing & Gates	Waterway Management	Structural assessment, repair, and replacement.	Based on performance – repaired/ replaced as required.
MW Signage	Safety and educational benefits	Structural assessment, repair, and replacement.	Based on performance – repaired/ replaced as required.

**Maintenance Works – User Pays System**

<b>Asset</b>	<b>Function</b>	<b>Maintenance Works</b>	<b>Frequency of Maintenance Works</b>
Jetties	Recreational Benefit	Jetties structural assessment and repair.	Performance audit annually. Repair as required.
		Replacement of asset at end of design life if required.	Replace and maintain on an as needs basis (not locked into the 15 & 25 year timeframe).

## Quiet Lakes Waterways Maintenance Schedule

### Waterways and Drainage Charge Funded

Asset	Function	Maintenance Works	Frequency of Maintenance Works
Waterway	Flood Protection	Removal of accumulated sediments including silt and organic materials.	Sediment accumulation reduces the retarding basins storage capacity creating the potential for interconnecting pipes to be blocked.
	Water Quality	Water Quality Testing for secondary contact recreation ( <i>E. coli</i> ).	Weekly testing from Dec to Mar (16 weeks). Erect signage when <i>E. coli</i> geomean value is greater than 1000 organisms / 100ml.
		Water Quality Surveillance for BGA.	Testing carried out if cues for BGA are present and notify users when BGA levels exceed 10mm <sup>3</sup> /l.
		Removal of exotic fish such as carp.	Once every 2 years.
Gladesville Boulevard Bore Pumping Station*	Recreational Benefit	Monitor and maintain bore pump system.	Maintain and monitor systems and pumps to ensure working well.
		Top up lake to compensate for evaporation losses.	Licence renewed in 2021 – next due for renewal in 2031.
McLeod Road Drainage Pumping Station	Flood Protection	Monitor and maintain drainage pump system.	Undertake activities outlined within MW's programmed maintenance for the pumping station.
Drainage pipes (interconnecting pipes between water bodies)	Flood Protection	Structural assessment, repair and replacement.	Inspection on an as needed basis.
Drainage pits (interconnecting pits between water bodies)	Flood Protection	Removal of litter, debris, and sediment.	Performance audit biannually. Repair and replace as required.
Bridge Culverts	Hydraulic Conveyance	Removal of debris and marine growth such as barnacles.	Performance audit every 5 years. With Preventative Maintenance in place for this
Maintenance & Pedestrian Access Points (MPAP)	Waterway Management	Repair and maintain access points.	Performance audit annually, Repair and replace as required.
		Monitor surface conditions, assess, and remedy any safety risks. Maintain grass to MW's standard levels of service for grass maintenance.	
Fencing & Gates	Waterway Management	Structural assessment, repair and replacement.	Performance audit annually, Repair and replace as required.
MW Signage	Safety and educational benefits	Repair and replacement update as required.	Performance audit annually, Repair and replace as required.

## Quiet Lakes Schedule - Cont.

### Maintenance Works – User Pays System

<b>Asset</b>	<b>Function</b>	<b>Maintenance Works</b>	<b>Frequency of Maintenance Works</b>
Waterways	Water quality	Operation of the bore for flushing purposes.	In accordance with Melbourne Water pricing submission.

# Appendix B

## Kingston City Council Maintenance Schedule for Patterson Lakes Waterways

Contact KCC on 1300 653 356 for queries regarding this maintenance schedule.

### Tidal Waterways Maintenance Schedule

#### Revenue Funded

Asset	Function	Maintenance Works	Frequency of Maintenance Works
Waterway	Stormwater management & water quality	Maintain local drainage network.	When Council reconstructs roads in accordance with the Road Management Plan, they will incorporate best practice to minimise stormwater flooding and maximise water quality.
Concrete edging	Delimitation of land management responsibilities	Structural assessment, repair and replacement.	Reactive maintenance.
Drainage pipes	Stormwater management	Structural assessment, repair and replacement.	Repair and replace as required.
Drainage pits	Stormwater management	Removal of litter, debris and sediment.	Repair and replace as required.
Bridge Culverts	Structural Integrity	Structural assessment repair, and replacement.	Repair and replace as required.
Bridge Culverts' Fencing	Safety	Structural assessment, repair and replacement.	Performance audit annually. Repair and replace as required.
Sand beaches	Recreational benefit	Beach Planing/Raking.	Mechanically level and smooth sand areas 6 times per year.
		Debris Collection & removal.	Collect and dispose of organic and inorganic material from the sand and rock beaching 6 times per year.
		Beach spraying.	Spraying of weeds to the sand beaches & rock beaching 6 times per year.

## Quiet Lakes Maintenance Schedule

### Revenue Funded

Asset	Function	Maintenance Works	Frequency of Maintenance Works
Waterway	Stormwater management & water quality	Maintain local drainage network.	When Council reconstructs roads in accordance with the Road Management Plan, they will incorporate best practice to minimise stormwater flooding and maximise water quality.
Concrete edging	Delimitation of land management responsibilities	Structural assessment, repair and replacement.	Reactive maintenance.
Drainage pipes	Stormwater management	Structural assessment, repair and replacement.	Repair and replace as required.
Drainage pits	Stormwater management	Removal of litter, debris and sediment.	Repair and replace as required.
Bridge Culverts	Structural Integrity	Structural assessment, repair and replacement.	Repair and replace as required.
Bridge Culverts' Fencing	Safety	Structural assessment, repair and replacement.	Performance audit annually. Repair and replace as required.
Sand beaches	Recreational benefit	Beach Planing/Raking.	Mechanically level and smooth sand areas 6 times per year.
		Debris Collection & removal.	Collect and dispose of organic and inorganic material from the sand and concrete rock groynes 6 times per year.
		Beach spraying.	Spraying of weeds to the sand beaches 4 times per year.
		Sand retrieval.	Replenish sand from waterways and replace on beaches annually. Target worst affected areas.
Lighting bollards	Safety	Structural assessment, repair, and replacement. Includes payment of associated electricity costs.	Annual inspections. Repair and replace as required.

