

# Parrearra Lake Management Plan

2019 - 2029

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**[www.sunshinecoast.qld.gov.au](http://www.sunshinecoast.qld.gov.au)**

[mail@sunshinecoast.qld.gov.au](mailto:mail@sunshinecoast.qld.gov.au)

**T** 07 5475 7272 **F** 07 5475 7277

Locked Bag 72 Sunshine Coast Mail Centre Qld 4560

#### **Acknowledgements**

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# 1 Introduction

This Lake Management Plan has been prepared by Sunshine Coast Council to promote effective long-term management of the Parrearra Lake system. It is a 10 year plan that supersedes the original Lake Management Plan developed by Lensworth in 2001.

## 1.1 Purpose

The purpose of the Lake Management Plan is to:

- outline the rights and responsibilities of the lake owners, residents and users;
- develop an appropriate inspection and maintenance schedule to meet objectives and performance standards;
- provide guidelines and management actions for ensuring the lake continues to function as an effective flood bypass channel (based on previously accepted and approved criteria);
- provide guidelines and management actions for ensuring compliance with secondary contact water quality guidelines;
- provide guidelines for acceptable use of the lake such as sport and recreation; and
- define permitted uses subject to approval such as commercial operations and private structures.

## 1.2 Objectives

The objectives of the Lake Management Plan are specified in Table 1 below.

Table 1: Management plan objectives

Objective	Performance standard	Refer
Public use complies with guidelines outlined in this management plan	<ul style="list-style-type: none"> <li>• Public, residents and sporting bodies are informed of acceptable uses, their rights and responsibilities</li> </ul>	Section 5
Water quality is maintained to a standard suitable for secondary contact recreation use <sup>1</sup>	<ul style="list-style-type: none"> <li>• Compliance with water quality guidelines</li> <li>• Effective operation and maintenance of tidal exchange system and weir</li> <li>• Growth of undesirable marine organisms is absent or regulated</li> </ul>	Section 6
The lake functions as an effective flood bypass channel	<ul style="list-style-type: none"> <li>• No flooding above Q100 level</li> <li>• Compliance with design criteria for lake operation as a flood channel</li> <li>• Effective operation and maintenance of tidal exchange system and weir</li> <li>• Maintain lake to acceptable tolerances from design profile</li> </ul>	Section 7
Amenity and visual quality of the lake is of an acceptable standard	<ul style="list-style-type: none"> <li>• The lake is free of litter and debris and/or removed in a timely manner</li> <li>• Growth of undesirable marine organisms is absent or regulated</li> <li>• Structures are designed and located suitably</li> </ul>	Section 6 and 9
Lake assets are maintained in a structurally sound and safe condition	<ul style="list-style-type: none"> <li>• Routine inspections and maintenance are undertaken in accordance with relevant schedules</li> <li>• Sinking fund adequate to maintain assets</li> </ul>	Section 9

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<sup>1</sup> Secondary contact recreation is any activity where only the limbs are regularly wet, and swallowing water is unusual. Examples of secondary contact recreation are boating, fishing, rowing, kayaking, dragon boating, wading etc.

## **2 Background**

### **2.1 Site overview**

Parrearra Lake Reserve is a brackish artificial tidally restricted lake, 48.6 ha in area, built in accordance with the relevant planning approvals granted by the Department of Natural Resources and Mines and the former Caloundra City Council.

The land abutting the Reserve was developed for urban purposes in accordance with DCP1 - Kawana Waters, except in the south and south east where industrial uses have been established.

The lake is defined as the area contained within the concrete revetment walls upstream of the lock and weir structure adjacent to Chelsea Crescent in the north (Structure Z) to the weir adjacent to the Kawana Industrial Estate in the south (Structure Y). Figure 1 represents the Parrearra Lake system and locality.

The lake has a restricted tidal range of about 300mm and rock protection exists along areas of the bank where design velocities determined such protection was needed when the lake functions as a flood control structure.

Stormwater drainage enters the lake from the adjoining land development through controlled outlet structures and pipes into the lake.

Residents can navigate their registered motor vessels to Mooloolah River via the lock structure to the north (Structure Z). Public access is available at designated places along the eastern bank and along the substantial majority of the western bank. All public access areas are created as public park abutting the lake. Use of the lake system for recreational purposes is an added benefit and subject to guidelines outlined in this management plan.

### **2.2 Exclusion**

The entry channel between the Mooloolah River and the upstream Structure Y is not included in this Management Plan. This area is designated Drainage Reserve.

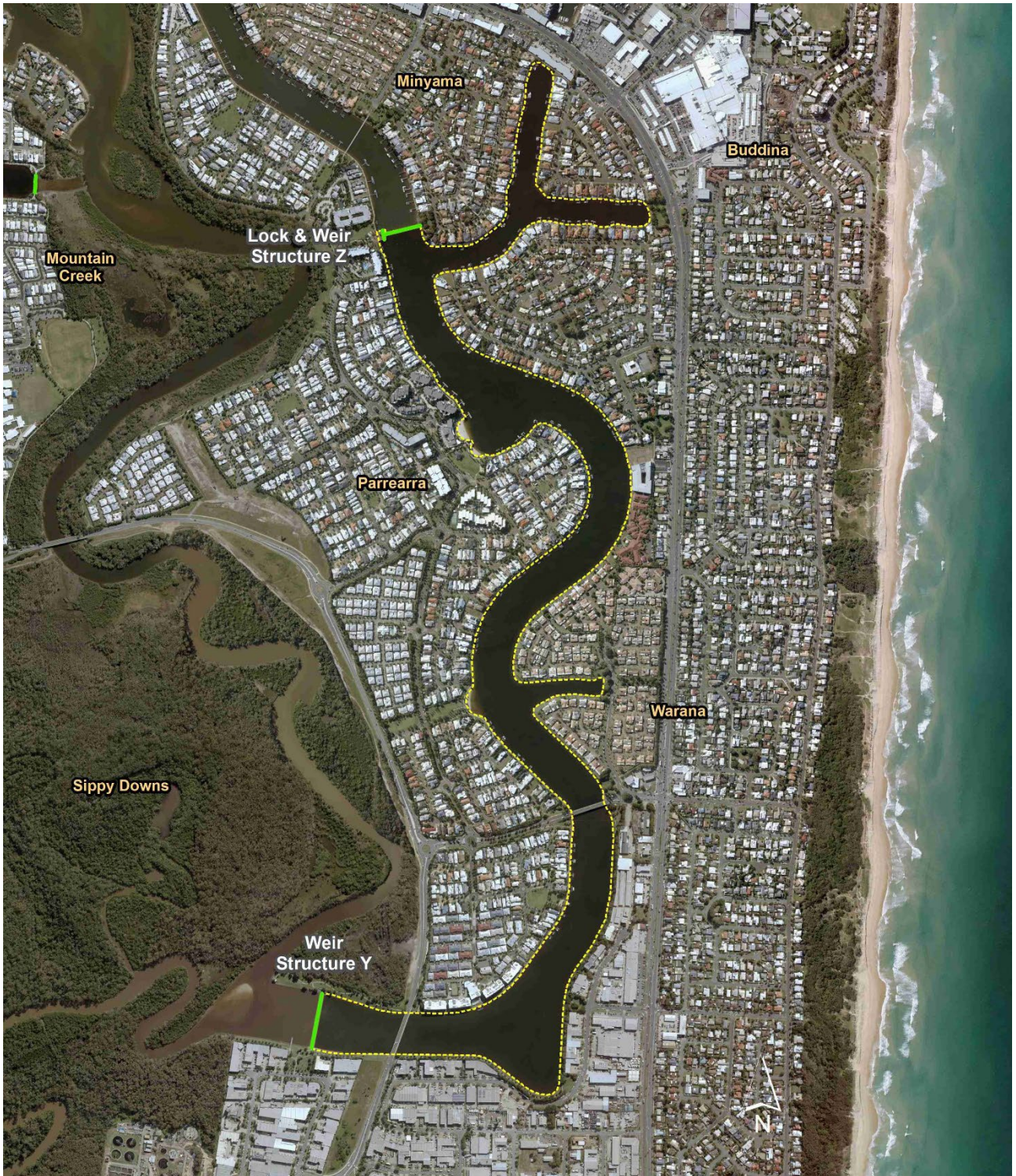



Figure 1: Locality plan






## 2.3 Assets



The assets included in this management plan are specified in Table 2 below.


Table 2: Lake assets

Assets	Description	Quantity
<p>Southern weir (structure Y)</p>	<p>A broad crested weir that controls the entry of flood flows to the Parrearra Channel. Refer design drawings in Appendix A.</p> 	<p>1</p>


Assets	Description	Quantity
<p>Northern weir (structure Z)</p>	<p>A broad crested weir that was constructed to restrict the increase in the tidal prism of the Mooloolah River caused by the construction of the Parrearra Channel. Refer design drawings in Appendix B.</p> 	<p>1</p>
<p>Lock (structure Z)</p>	<p>Allows registered motor vessels of a size up to 15m in length, 4.5m in width and 2m draft to pass through safely. There is no height limitation for vessels using the lock, however the bridges within the lake and those further downstream in the Mooloolah River will cause a height restriction. Refer design drawings in Appendix B.</p> 	<p>1</p>


Assets	Description	Quantity
<p>Revetment walls</p>	<p>Lake edge abutting public land only - required to maintain the stability of the lake edge, whilst contributing to the aesthetics and usefulness of the lake.</p> <p>In accordance with the Building Regulations for slab on ground the Finish Floor Level is 0.225m above natural ground level. The top of the revetment wall to residential properties is RL 0.9m AHD.</p> 	<p>Approx. 5,500m</p>

Assets	Description	Quantity
<p>Rock scour</p>	<p>Rock scour provides protection to revetment walls and associated land assets.</p> 	<p>Approx. 8,500 m</p>
<p>Salinity exchange system (northern*)</p>	<p>Salinity exchange system includes pipe, pit and fittings, including an actuated penstock to control flows.</p> 	<p>1</p>


Assets	Description	Quantity
Pontoon	<p data-bbox="371 215 1150 277">Floating platforms built over the water to facilitate lake access and enjoyment.</p> 	2


Assets	Description	Quantity
Viewing platform	<p data-bbox="371 215 1181 277">Platforms built partially over or adjacent to the water to facilitate lake viewing and enjoyment.</p> 	2

Assets	Description	Quantity
<p>Constructed beaches</p>	<p>Beach artificially created to facilitate enjoyment of the lake foreshore areas.</p> 	<p>5</p>

Assets	Description	Quantity
Portages	<p data-bbox="371 215 1206 275">Steps built into the southern weir to facilitate waterway access for non-motorised watercraft.</p> 	2



Assets	Description	Quantity
<p>Waterway access</p>	<p>Infrastructure facilitating access from public land to the water, e.g. stairs and ramps. There are only 2 stair accesses in Parrearra for non-motorised watercraft.</p> 	<p>2</p>

Assets	Description	Quantity
<p>Gross pollutant trap (GPT)</p>	<p>Gross pollutant traps (GPT's) are provided at most outlets from stormwater drainage systems to the lake. The GPT's provide primary treatment to all road runoff and secondary treatment to surface runoff.</p> <p>Includes those on the western side of the lake only, as those on the east are maintained by the state government (draining a state-owned road).</p> 	<p>23</p>
<p>Stormwater pipe outlet</p>	<p>Stormwater pipes draining directly into the lake. 11 on western side and 20 on eastern side.</p>	<p>31</p>

Assets	Description	Quantity
<p>Aids to navigation</p>	<p>Aids to navigation are usually in the form of a channel marker, buoy or pile and may house a sign, light or beacon.</p> <p>28 piles are located approximately 30m either side of both weirs, with 16 of those housing a beacon.</p> <p>2 blue channel markers are located either side of Kawana Island Blvd bridge.</p> 	<p>28 piles 16 beacons 2 channel markers</p>
<p>Signs</p>	<p>Public signage associated with lake use and safety.</p> 	<p>10</p>

Note: Any assets managed by state government agencies are not included in this management plan e.g. channel markers on Kawana Way Bridge and GPT's draining Nicklin Way.

\* the southern salinity exchange at structure Y forms part of the Lake Kawana Management Plan

## 3 Land tenure and statutory requirements

### 3.1 History

As a result of a Design Approval granted by the Department of Natural Resources and Mines on the 26 June 1998 for the creation of a waterway (lake) as shown on plan P-2780-54A, plus an earlier similar approval on 20 October 1997 for additional waterway (lake) as shown on plan P-2780-498, the constructed lake was surrendered out of Development Lease No. 2 in stages for the purpose of a Sport and Recreation Reserve under the provisions of the Land Act 1994.

From 1959 to 2001, the land was held as part of Development Lease No. 2 granted to Lensworth Kawana Waters Pty Ltd and was dedicated as a Sport and Recreation Reserve under council's control on 26<sup>th</sup> April 2002.

### 3.2 Lake ownership details

Name: State of Queensland (DNRME)

### 3.3 Lake owner's responsibilities

As trustee of the Reserve, council is responsible for ensuring that the lake system and its infrastructure:

- is maintained to a safe and reasonable standard to the best of council's ability;
- provides adequate amenity for residents and general public;
- maintain its function as an effective flood bypass channel; and
- residents can access downstream Mooloolah River via their powered craft.

Facilitating water-based recreational use is not a responsibility of council, however guidelines are provided in this plan to allow for this additional community benefit of the lake (refer section 5).

### 3.4 Private landowners responsibilities

Private landowners abutting the lake are responsible for:

- their private property and infrastructure, including any constructed ramp, jetty, deck and/or pontoon;
- stormwater management within their property boundary;
- any pollution or run-off from their property that adversely affects lake water quality; and
- revetment walls fronting their property.

If any maintenance of privately owned revetment walls are required, owners are advised to first speak with council staff and also refer to the following:

- *Sunshine Coast Council Residents' Handbook: Artificial Waterways*;
- standards in section 9.3; and
- recommended typical revetment wall section, as designed in Appendix A.

### 3.5 Legislation

The Lake Management Plan complies with the following statutory legislation and its associated regulations and policies:

- Local Government Act 2009
  - Sunshine Coast Council Local Laws
- Coastal Protection and Management Act 1995
- Planning Act 2016
- Environmental Protection Act 1994
- Waste Reduction and Recycling Act 2011
- Fisheries Act 1994
- Nature Conservation Act 1992
- Transport Operations (Marine Safety) Act 1994
- Transport Operations (Marine Pollution) Act 1995
- Aboriginal Cultural Heritage Act 2003

## 4 Lake purpose and function

### 4.1 Intent for use

The primary purpose of Parrearra Lake is to provide an effective flood control solution for the surrounding urban development (flood bypass channel). Secondary to that is to provide resident's navigational access to Mooloolah River via the lock and maintain amenity and visual quality of public spaces. Additional water-based recreation presents an opportunity for added benefit, however it's not the purpose of the lake.

The lake is intended to be used by the community in a responsible way for their recreational enjoyment, with minimal adverse impact upon the amenity of those dwellings in proximity to the lake. Contact with the water is proposed as secondary contact only (e.g. kayaks, canoes and stand-up paddle board).

### 4.2 Function of lake as a flood bypass channel

Parrearra Lake forms an essential component of the flood solution for the Kawana Waters development. The lake, together with the Parrearra Canal and the channel between Structure Y and the Mooloolah River form the Parrearra Flood Bypass channel. The development on the flood plain and the associated flood solution incorporating the bypass channel were the subject of extensive hydraulic model testing.

Model testing was undertaken by the University of New South Wales, Water Research Laboratory, under the guidance of the Mooloolah River Hydraulic Model Technical Committee. This committee consisted of representatives of the following organisations:

- Land Administration Commission (Joint Principal)
- Kawana Estates Pty Ltd (Joint Principal)
- Co-ordinator General's Department
- Department of Harbours & Marine
- Department of Local Government
- Landsborough Shire Council
- Maroochy Shire Council
- Cardno & Davies Australia Pty Ltd

At its final meeting on 10 March 1983, the Committee accepted the Water Resource Laboratory report on the testing and commended to the joint principals the ultimate development proposal and flood solution.

The flood solution compensates for the loss of flood storage due to the reclamation on the flood plain by providing additional flood conveyance. This is achieved by the construction of a flood bypass channel through the development.

The lake conveys floodwaters from the river just downstream of the sewage treatment works to re-join the river on the northern side of the Nicklin Way. Downstream of this point, the additional conveyance is provided by dredging the river.

The entry of flood flows to the Parrearra Channel is regulated by a flood control structure located within the channel near its upstream end. The structure is a broad crested weir and has been designated Structure Y. To restrict the increase in the tidal prism of the Mooloolah River caused by the construction of the Parrearra Channel to the limit imposed by the approving authorities, a second broad-crested control structure, Structure Z, was constructed near the downstream end of the channel, approximately 1.5km from its junction with the Mooloolah River. The waterway between the control structures is a tidally restricted lake. Boating access to the lake is provided by a navigation lock incorporated in Structure Z. The Parrearra Canal forms the fully tidal reach of the Parrearra Channel between Structure Z and the river.

## 5 Lake use

Permitted and prohibited uses are detailed in the following section and must be adhered to at all times.

### 5.1 Permitted uses

Lake use is open to the general public or 'sports-based' user groups providing the use is a 'permitted use' as described below.

With the exception of enforcement/safety/disaster response craft in emergency situations, the maximum speed must not exceed 6 knots.

Waterway access to the lake is provided via the navigation lock. Lock use is permitted for registered motorised vessels only.

Council, as the trustee, may from time to time utilise the lake and/or surrounding open space for public events (e.g. markets, public displays etc.).

The following uses and/or actions are permitted in or on the lake:

- non-motorised watercraft (e.g. canoe, kayak, rowboat and stand-up paddle board);
- small wind powered sail craft;
- model boat;
- motor powered pleasure craft;
- recreational fishing, except as precluded in section 0;
- mobile structures (e.g. dry docks, seapens and float bricks) that are secured to an approved privately owned pontoon or jetty;
- approved maintenance, safety, disaster response and enforcement craft;
- approved construction craft (e.g. barges, dredges and support craft);
- flood storage purposes and to control flood discharge at the weir;
- use of lake water for fire control purposes (e.g. helicopter fire services); and
- any other activity prescribed by council from time to time.

Please note:

All lake users are encouraged to exercise a personal duty of care when accessing the lake system and/or participating in water-based recreation. Recreation in constructed tidal lakes has inherent risks, including but not limited to potentially hazardous marine creatures such as sharks and stingrays.

The water quality in the lake is maintained to a secondary contact standard. At times post major rainfall events the water quality within the lake may be diminished below secondary contact standards (refer section 6 for an overview of council's water quality management of the lake).

Due to the above reasons, direct exposure through swimming is not advised.

## 5.2 Permitted uses subject to approval

### 5.2.1 Events, recreational clubs and commercial operations

Council may agree to allow certain low-use/low-impact events, group/club recreational activities and commercial operations to occur on the lake that do not negatively impact on surrounding residents and the overall amenity. The activity must be a permitted use as specified in section 5.1, including (but not limited to) water taxi, vessel hire and other water-based activities/events e.g. SUP lessons, dragon boat user groups, model boats etc. For such operations to be considered for approval, council requires a written submission detailing the type of activity and any potential impact the activity will have on surrounding residents, other users of the lake, water quality, council-owned assets and overall amenity.

Refer to council's [Community Land and Complementary Commercial Activity Policy](#) for more information.

### 5.2.2 Structures and permanent moorings within the lake

The location of private structures, namely a boat ramp, pontoon, deck or jetty for lot owners abutting the lake, must be approved by council. All works must comply with the standards outlined in the Planning Scheme Policy for Development Works within the current Sunshine Coast Planning Scheme.

A Quay Line Plan defines the allowable location of any structures available to an adjacent landowner. All works must be constructed in accordance with the Quay Line Plan in Appendix C.

#### 5.2.2.1 Tenure

Prior to any adjoining lot owner lodging an application for approval to construct a boat ramp, pontoon, deck or jetty on part of the lake, they must enter into a lease over the area containing the proposed structure or works and its appurtenances, from council, in accordance with the provisions of Section 57 of the Land Act 1994. Council will charge an application fee and an annual lease fee for the leased area as determined by council from time to time. The lease term would be to a maximum of 30 years.

The registration on title of the lease into the name of the adjoining lot owner, must be completed before any applications to council for the proposed structure may be made.

#### 5.2.2.2 Approval of works

Private boat ramps, pontoons, decks and jetties contained within the quay line designated area may be approved by council on application by that lot owner, subject to lodgement of engineering plans for the proposed structure and any/all conditions applied by Council.

For lots that directly abut the lake, if part of a pontoon, deck or jetty is proposed to be located within 1.5 metres of the rear boundary of the lot an application for relaxation under the Standard Building Law 1993, will also be required.

Pontoons may be approved by council for allotments abutting the park fronting the lake in the case of Kawana Island.

Construction of any permanent works must be approved by council and a private building certifier before any onsite work commences. Use of the works or structure must not commence until a final inspection and approval to use has been granted by the relevant authority. Failure to obtain the relevant approval or the carrying out of works to a lesser standard than required, may result in an order to remove the offending works.

The use of standard appropriate design structures is encouraged and provided in Appendix D.

#### 5.2.2.3 Exclusivity and restrictions

By the action of granting a lease over the mooring structure or works, exclusivity of use is secured to the adjacent lot owner to whom the lease was granted, to the exclusion of any other user of the lake reserve.



As described in section 1.1, a lock access card is required should a vessel owner wish to use the lock facility to access Mooloolah River.

### 5.3 Prohibited uses and practices

The following uses or actions are prohibited in the lake:

- events/recreational clubs/commercial operations (SCC approved permits excepted, refer section 5.2.1);
- construction of ramps/pontoons/decks/jetties (SCC approved structures excepted, refer section 5.2.2);
- temporary moorings<sup>2</sup> (SCC approved event/recreational club/commercial permits excepted, refer section 5.2.1);
- diving or jumping off any structure over or in the lake;
- fishing from the following public infrastructure:
  - bridge;
  - deck/boardwalk;
  - jetty;
  - pontoon;
  - weir; or
  - lock structure.
- motor powered vessels navigating at speeds exceeding 6 knots (with the exception of enforcement/safety/disaster craft in emergency situations);
- waterskiing, freestyling or wave jumping whilst operating any watercraft;
- living on watercraft whether temporarily, intermittently or permanently;
- the construction, reconstruction, refitting or undertaking of structural repairs on or to watercraft;
- unmarked fishing equipment (e.g. crab pots and fish traps);
- refuelling of watercraft;
- dumping or depositing of any wastes (including garden wastes), contaminants or other pollutants into the lake, adjoining waterways or in a place (e.g. road-side gutter or stormwater drain) where it could reasonably be expected to blow or wash into the lake or adjoining waterways; and
- any other activity prescribed by council from time to time.

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<sup>2</sup> Temporary moorings include the use of dry docks, seapens, float bricks etc. that are not secured to an approved pontoon or jetty.

## 5.4 Lock and weirs

The navigation lock allows registered motorised vessels only of a size up to 15 metres in length, 4.5 metres in width and 2.0 metres draft to pass through safely at low tide. Whilst there is no height limitation for vessels using the lock, the downstream bridges and bridges within the lake will cause a height restriction. The maximum speed limit for vessels navigating the lake is six (6) knots (with the exception of enforcement/safety/disaster response craft in emergency situations).

Use by non-motorised watercraft is not permitted e.g. kayak, stand up paddleboard, canoe, pontoon, sail craft.

### 5.4.1 Lock access

The lock may only be accessed by using a lock access card or a Frequency Operated Button (FOB). Cards and FOBs can be purchased from the Caloundra and Maroochydore Office of the Sunshine Coast Council. An application form must be completed and the applicable fees need to be paid prior to the issue of the access card. For security and safety of both the lock and residents, a photo identification with permanent address must be attached to the application form.

All access cards include a 1-year replacement warranty.

The fees payable to obtain a lock access card can be found on council's website at <https://www.sunshinecoast.qld.gov.au/Pay-and-Apply/Fees-and-Charges>

#### 5.4.1.1 Faulty access card and FOBs

If an access card is faulty, the following applies:

1. access card and/or FOB to be returned to council;
2. application for replacement to be completed;
3. if item is more than 1 year old, pay replacement fee (refer link above);
4. if item is less than 1 year old and a test confirms the fault, no charge will apply; and
5. new item will be issued

Further enquiries may be made to council's Customer Services Centre staff on 1300 007 272 (local calls) or (07) 5475 7272 (outside local area and mobile phones).

#### 5.4.1.2 Commerciality

Income from the annual fee for lock access cards and annual lease fee for the leased area pursuant to Section 57 of the Land Act 1994, will be retained by council to assist in the maintenance of the lake and abutting public land.

The quantum of the fee or charge will be determined annually by council in association with normal budgetary considerations.

## 5.1 Abutting public land

Abutting public land is under the control of council. All normal activities that are permitted in parks and on roads are permitted on abutting public land fronting the lake except as may be restricted elsewhere in this Lake Management Plan, or by approved signs erected on such land.

## 5.2 Temporary restricted use

Council reserves the right to restrict lake use for a specific purpose at any time, if such action is required to either protect public health and safety or prevent pollution of the lake.

## 5.3 Future development

No further development within the Lake Reserve or on adjacent Reserves is intended by council, unless determined necessary to support the primary purpose and function of the lake.



## 6 Water quality management

The lake system is best described as a lower catchment flow through system i.e. an artificial waterway which acts as an estuary in some part, where the flow through rate is determined by a salinity exchange system and weir. As such, the water level and flushing can be controlled to ensure ideal conditions.

Influences on water quality in the lake system are therefore principally impacted by:

- appropriate exchange of water;
- up-stream catchment practices;
- surrounding urban runoff (i.e hydrocarbons, particulates, pesticides, herbicides etc.);
- activities associated with vessel maintenance; and
- colonisation by marine organisms. Certain species may proliferate at times of elevated nutrient levels and cause other environment and human health risks e.g. algal blooms

Table 3 provides a framework to effectively manage these influences to ensure acceptable water quality is maintained.

Table 3: Water quality management overview

<b>Objective</b>	Water quality is maintained to a standard suitable for secondary contact recreation
<b>Performance standards</b>	<ul style="list-style-type: none"> <li>• Water quality is maintained in accordance with scheduled water quality objectives for secondary contact recreation in the <a href="#">Environmental Protection (Water and Wetland Biodiversity) Policy 2019</a> and <a href="#">Guidelines for Managing Risks in Recreational Water (NHMRC 2008)</a></li> <li>• Reactive water quality sampling is in accordance with the methods prescribed in the <a href="#">Queensland Monitoring and Sampling Manual (2018)</a></li> <li>• Growth of undesirable marine organisms is absent or regulated</li> </ul>
<b>Management controls</b>	<ol style="list-style-type: none"> <li>1. Maintain impervious and/or vegetated overland flow paths in accordance with routine inspection and maintenance schedules</li> <li>2. Maintain stormwater drainage systems and GPTs in accordance with routine inspection and maintenance schedules</li> <li>3. Maintain salinity exchange systems and weir in accordance with routine inspection and maintenance schedules</li> <li>4. Educate residents and public to reduce pollutant run-off and/or input (e.g. signage, residents' handbook and website)</li> </ol>
<b>Corrective action</b>	<ul style="list-style-type: none"> <li>• If the relevant water quality guidelines are exceeded, or a trend of declining water quality develops over an extended period, it will be considered to indicate the need for reassessment of the appropriateness and effectiveness of existing water quality management controls</li> <li>• Erection of temporary signage if determined necessary</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• Visual monitoring to be undertaken concurrent with routine inspections and/or maintenance schedules</li> <li>• Water quality sampling will be undertaken on a reactive basis if requested and determined necessary</li> <li>• Maintain customer service request records and incident/non-compliance register</li> </ul>
<b>Reporting</b>	The results of monitoring will be made available to the public at council's discretion and by request only
<b>Responsibility</b>	SCC

## 7 Flood bypass management

During the design 100 year average recurrence interval flood event, the bypass channel conveys a peak discharge of 370m<sup>3</sup>/s. Maximum water levels in the lake are RL 2.7m AHD just upstream of Structure Z and RL 2.8m AHD just downstream of Structure Y. At the peak discharge the average flow velocity in the lake is 0.55m/s.

The minimum level of blocks are RL 3.3m AHD just upstream of Structure Z and RL 3.5m AHD just downstream of Structure Y.

In accordance with the Building Regulations for slab on ground the Finish Floor Level is 0.225m above natural ground level. The top of the revetment wall to residential properties is RL 0.9m AHD.

Table 4 provides an overview of management to ensure the lake continues to provide an effective flood bypass solution.

Table 4: Flood bypass management overview

<b>Objective</b>	The lake continues to function as an effective flood bypass channel
<b>Performance standards</b>	<ul style="list-style-type: none"> <li>• No flooding above Q100 level</li> <li>• Compliance with design criteria for lake operation as a flood channel</li> <li>• Effective operation and maintenance of tidal exchange system and weir</li> <li>• Maintain lake to acceptable tolerances from design profile</li> </ul>
<b>Management controls</b>	<ol style="list-style-type: none"> <li>1. Adherence to maintenance procedures in Appendix E</li> <li>2. Adherence to asset management plans</li> <li>3. Asset inspections and maintenance schedules met</li> </ol>
<b>Corrective action</b>	<ul style="list-style-type: none"> <li>• Undertake reactive inspection and maintenance of flood mitigation devices (salinity exchange system &amp; weir)</li> <li>• Review incident and where required review procedures to ensure effective measures are in place to meet performance standards</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• Visual monitoring undertaken during asset inspections and maintenance</li> <li>• View CCTV at structure Z</li> <li>• Maintain customer service request records</li> </ul>
<b>Reporting</b>	<ul style="list-style-type: none"> <li>• Contractor maintenance reports</li> <li>• Asset inspections logs</li> </ul>
<b>Responsibility</b>	SCC and maintenance contractor

## 8 Incident, non-compliance and complaint management

Table 5: Incident, non-compliance and complaint management overview

<b>Objective</b>	To ensure prompt and efficient response to pollution, environmental incidents, complaints and non-compliance
<b>Performance standards</b>	<ul style="list-style-type: none"> <li>• Prompt removal of pollution spillages from waterways with minimum risk to the public and the environment</li> <li>• All complaints and non-compliance are dealt with promptly and efficiently, in accordance with council's Compliance and Enforcement Policy 2018</li> <li>• Appropriate investigations are undertaken to determine the source of pollution and the cause of environmental incidents (e.g. oil spills, fish kills and algal blooms)</li> </ul>
<b>Management controls</b>	<ol style="list-style-type: none"> <li>1. Adherence to asset management plans</li> <li>2. Asset inspections and routine maintenance schedules met</li> <li>3. Adherence to water quality management procedures (refer section 6)</li> <li>4. Sufficient signage to communicate prohibitions outlined in this management plan (refer 0)</li> </ol>
<b>Corrective action</b>	<ul style="list-style-type: none"> <li>• Pollution spill, fish kill or other environmental incident - report to the Department of Environment and Science to ensure that appropriate investigations and testing are undertaken</li> <li>• Address and/or rectify incident, complaint and/or non-compliance</li> <li>• Review customer service requests and incident/non-compliance register and implement improvement to processes and/or signage where deemed necessary</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>• Follow up monitoring to be undertaken in the event of an environmental incident</li> <li>• Maintain customer service request records and incident/non-compliance register</li> </ul>
<b>Reporting</b>	Complete the appropriate incident report/debrief when required or requested
<b>Responsibility</b>	SCC

## 9 Maintenance

### 9.1 General

Maintenance of the lake and its assets are the responsibility of council and includes routine, planned and reactive maintenance work activities.

Maintenance work is managed through an asset management system and includes activities such as inspection, assessing condition, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

Routine maintenance is performed on a regular cycle to upkeep visual amenity and/or replacement of components/sub-components of assets. This work generally falls below the capital threshold. Planned maintenance comprises larger scale repair work (below the capital threshold) or asset renewal (capital work). Reactive maintenance is unplanned repair work carried out in response to service requests and management/supervisory directions.

Types of maintenance may include:

- on-going maintenance of the navigation locks and inlet/outlet weirs;
- on-going maintenance of the salinity exchange system;
- removal of siltation from bed and banks of the lake, as required, to ensure that it does not become a constraint on the function of the lake;
- removal of debris, rubbish and undesirable marine organisms/weeds from the lake and public foreshore areas;
- maintaining the revetment walls where they front public lands;
- maintaining scour that supports all revetment walls; and
- maintaining navigation aids within the lake etc.

Refer Table 6 which outlines the entire maintenance framework and regimes.

## 9.2 Maintenance management

The following section provides an overview of the maintenance framework for lake features and assets to meet specific management plan objectives outlined in Table 1. Refer Appendix E to view associated weir and lock maintenance procedures.

Table 6: Maintenance framework overview

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
<b>Waterway feature</b>						
Litter, debris etc.	Waterways are free of litter and debris that are impacting on amenity, health and/or safety	a) Inspection and maintenance schedules met b) Reactive works undertaken in a timely manner c) No complaints	<ul style="list-style-type: none"> <li>Officers undertaking litter removal should ensure that appropriate precautions are taken against hazardous objects such as discarded hypodermic syringes</li> <li>Collected litter should be recorded in AMDI database and disposed of at council's refuse tip</li> <li>A public education programme should be considered by council if litter is a persistent problem</li> <li>If fishing equipment (e.g. crab pot or fish trap) is found either unmarked and/or in state of disrepair to a point of it being non-functional then it shall be removed as marine litter (report to DAFF for their agency to remove)</li> </ul>	Monthly	Monthly	SCC Waterways team
Undesirable marine organisms / weeds	Growth of undesirable marine organisms is absent or regulated	a) Inspection schedule met b) Reactive works undertaken in a timely manner c) No complaints	<ul style="list-style-type: none"> <li>Any vegetation or plant material, living or dead, located below the level of the highest astronomical tide (approximately RL 1.05m AHD) is classified as "marine vegetation" under the Fisheries Act. Refer to relevant fisheries <i>accepted development requirements</i> before undertaking any works involving marine vegetation</li> <li>Although herbicides are a possible means of weed control, only herbicides registered for use in aquatic environments should be used</li> <li>All removed vegetation should be disposed of at council's refuse tip</li> <li>In the event of algal blooms, refer to <a href="#">Queensland Harmful Algal Bloom Response Plan 2014</a>. Appropriate laboratory testing should be undertaken to determine the species present and likely cause of the outbreak. If testing indicates the presence of toxic species, specialist advice should be sought regarding any necessary health precautions.</li> </ul>	6 monthly	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Lakes and Wetlands team
Lake profile	Lake is maintained to acceptable tolerances from design profile	a) Survey completed as scheduled b) Maintenance is undertaken in a timely manner before degradation of waterway profile affects vessel movement or the stability of revetment walls c) No complaints	<ul style="list-style-type: none"> <li>Appropriate geotechnical and chemical testing should be undertaken of material proposed to be dredged or excavated in maintenance operations</li> <li>Approvals to undertake dredging, or other excavation, within a waterway are required under the Planning Act 2016 (Tidal Works) and the Environmental Protection Act 1994 (ERA 16) (dependant on volume of material to be managed)</li> </ul>	7 yearly	No routine maintenance performed. Any required works are determined based on visual observation and 7 yearly lake survey	SCC Coast & Canals team
Constructed beaches	Accessible, safe and provides adequate amenity and visual quality	a) Open for use 90% of the time b) Clear of marine fouling and debris c) Safe d) Inspection schedule met e) Reactive works undertaken in a timely manner f) No complaints	<ul style="list-style-type: none"> <li>Weeding is performed by physical / mechanical means, no herbicides to be used</li> <li>Sand profiles are maintained as designed</li> </ul>	6 monthly	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
<b>Infrastructure</b>						



Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
Tidal exchange system	The system is operating as designed and providing effective flood management and water flows	a) Water is turned over every 60 days b) Floods successfully mitigated c) Inlet and outlet structures are not impeded by marine growth or sedimentation d) Inspection and maintenance schedules met e) Reactive works undertaken in a timely manner f) No complaints	Underwater inspections of the structures are likely to be required. This applies particularly to the inlet structure. A qualified commercial diver should be employed for this work and the required safety measures implemented	Fortnightly	Annual	SCC Coast & Canals team
Lock	Provides effective and safe access for registered marine vessels transporting in and out of the lake system	a) Inspection and maintenance schedules met b) Reactive works undertaken in a timely manner c) No complaints from lock access card holders	Refer Appendix E for maintenance procedures. Refer Section 5.4.1 for more information on lock access and cards	Fortnightly	As per maintenance procedures	SCC Coast & Canals team Contractor
Weirs	The system is operating as designed and providing effective flood management	a) Floods successfully mitigated b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints	Refer Appendix E for maintenance procedures	Fortnightly	As per maintenance procedures	SCC Coast & Canals team
Revetment wall	Revetments are maintained in a suitable condition to provide satisfactory protection to adjacent land and assets	a) Structure maintained to design b) Inspection schedules met c) Reactive works undertaken in a timely manner d) No complaints	<ul style="list-style-type: none"> <li>The stability of revetment walls and other concrete structures is heavily reliant on the condition of the associated scour (see scour maintenance below)</li> <li>The maintenance of revetments is the responsibility of the abutting landowner (i.e. council for public land only). However, council are responsible for the associated scour and thus must ensure it is adequate to protect private landowners' revetment</li> </ul>	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Scour	Scour are maintained in a suitable condition to provide satisfactory protection to revetment walls	a) Structure maintained to design b) Inspection schedules met c) Reactive works undertaken in a timely manner d) No complaints	<ul style="list-style-type: none"> <li>The stability of revetment walls and other concrete structures can be rapidly compromised due to the loss of foundation support if the associated scour are not well maintained</li> <li>Council are responsible for maintaining all scour including those abutting private land</li> </ul>	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Stormwater outlets	Provides effective drainage of stormwater run-off	a) Structure maintained to design standards b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints	Piping failures, resulting in loss of support behind and beneath stormwater drainage outlet structures can result in rapid deterioration of these structures. This damage can quickly spread to adjacent revetment walls. It is important, for the longevity of these structures, to ensure that piping problems are promptly addressed	Annually	Annually	SCC Stormwater Services team
GPT's	Provides an effective pollutant trap to minimise litter, debris and sediment from entering the lake system	a) Structure maintained to design b) Inspection and maintenance schedules met	Refer to manufacturer for design standard details	Monthly	Annually	SCC Stormwater Services team

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
		<ul style="list-style-type: none"> <li>c) Reactive works undertaken in a timely manner</li> <li>d) No complaints</li> <li>e) Minimal litter, debris and sediment entering the lake directly from stormwater outlets</li> </ul>				
Viewing platform	Accessible and safe, providing additional enjoyment of the lake amenity	<ul style="list-style-type: none"> <li>a) Structure maintained to design</li> <li>b) Open for use 90% of the time</li> <li>c) Inspection schedule met</li> <li>d) Reactive works undertaken in a timely manner</li> <li>e) No complaints</li> </ul>		6 monthly	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Transport Infrastructure team
Jetty/pontoon	Accessible, user-friendly and safe, providing additional access and enjoyment of the lake	<ul style="list-style-type: none"> <li>a) Structure maintained to design</li> <li>b) Open for use 90% of the time</li> <li>c) Clear of marine fouling and debris</li> <li>d) Inspection schedule met</li> <li>e) Reactive works undertaken in a timely manner</li> <li>f) No complaints</li> </ul>		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Waterway accesses (including portages)	Accessible, user-friendly and safe, providing additional access and enjoyment of the lake	<ul style="list-style-type: none"> <li>a) Structure maintained to design</li> <li>b) Open for use 90% of the time</li> <li>c) Clear of marine fouling and debris</li> <li>d) Inspection schedule met</li> <li>e) Reactive works undertaken in a timely manner</li> <li>f) No complaints</li> </ul>		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Signs	Signs are reader-friendly, clearly visible, safe, and do not impact on the visual qualities of the lake	<ul style="list-style-type: none"> <li>a) Structure maintained to design</li> <li>b) Inspection schedule met</li> <li>c) Reactive works undertaken in a timely manner</li> <li>d) Vessel operators are compliant with marine safety laws</li> <li>e) No complaints</li> </ul>	If non-compliance and/or complaints register indicate a growing trend of users whom are not complying with regulations, assess suitability of all forms of public education, including signage. Implement any improvements where determined necessary (see more section 8)	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Beacons, piles and channel markers	Effectively assist vessel operators to safely navigate the lake, without negatively impacting on vessel traffic or amenity	<ul style="list-style-type: none"> <li>a) Structure maintained to design</li> <li>b) Inspection schedule met</li> <li>c) Reactive works undertaken in a timely manner</li> <li>d) No complaints or on-water incidents</li> </ul>		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team

### 9.3 Standards and specifications

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

1. Building Code of Australia
  - a) BCA Vol 2 Part 3.1.2.0 – Drainage (AS 3500.3.2)
  - b) BCA Vol 2 Part 3.1.2.2 (d) – Excavation and Piling near Sewers and Drains
  - c) BCA Vol 2 Part 3.1.1 – Earthworks
2. Australian Standards
  - a) AS 1141: Methods for sampling and testing aggregates
  - b) AS 1428: Design for Access and Mobility
  - c) AS 1604: Treatment of piles
  - d) AS 1664.1: Aluminium Structures Code
  - e) AS 1665: Welding
  - f) AS 1170.1 and 1170.2: Loading Codes
  - g) AS 1650 Galvanising
  - h) AS 1720: Timber Structures Code
  - i) AS 2159: Piling Code
  - j) AS 2239: Galvanic (Sacrificial) Anodes for Cathodic protection
  - k) AS 2312 Two Pack Epoxy Paints
  - l) AS 2832.3 Guide to the Cathodic protection of metals-fixed immersed structures.
  - m) AS 3500: Part 3.2, Stormwater Drainage – Acceptable Solutions
  - n) AS 3600: Concrete Structures Code
  - o) AS 3700: Masonry Structures Code
  - p) AS 3706: Geotextiles Methods of test
  - q) AS/NZ 3004: Marinas and Recreational Boats
  - r) ANZECC: Guidelines for fresh and Marine Water Quality
  - s) AS 3962: Guidelines for Design of Marinas Code
  - t) AS 4110: Steel Structures Code
  - u) AS 4133: Methods of testing rocks for engineering purposes
  - v) AS 4997: Guidelines for the design of maritime structures
3. SEQ Restoration Framework, Guideline & Manual
4. Healthy Waterways – Water sensitive Urban Design – Technical Design Guidelines for SEQ
5. Healthy Waterways – Water by Design Construction and Establishment Guidelines
6. Any other relevant regulations, policies, codes and/or guidelines that fall under the Acts listed in section 3.5.

## 10 Contacts

Entity	Contact details	Enquiry type
Sunshine Coast Council - Customer Service	(07) 5475 7272 1300 007 272	All
Maritime Safety Queensland	(07) 5373 2310 A/H (07) 3305 1700	Marine safety and marine pollution, including oil spills
Mooloolaba Coast Guard	Radio: 88-90, 16-67-21-73-80 (07) 5444 3222	Marine safety
Sunshine Coast District Water Police	(07) 5457 6711 A/H 0438 200 705	Search and rescue, on-water criminal matters and marine safety complaints
Queensland Boating and Fisheries Patrol	(07) 5444 4599 (Mooloolaba)	Marine safety and fisheries complaints
Department of Environment & Science	1300 130 372	Involving pollution, environmental harm, fish kills and marine strandings
Department of Agriculture and Fisheries	(07) 3404 6999	Involving marine plants
RSPCA QLD	1300 ANIMAL (1300 264 625)	Involving injured wildlife. Will likely be attended by Queensland Parks and Wildlife Service (QPWS)

## 11 Review

This document may be reviewed and updated as determined necessary by council in response to new information, challenges in implementation or changing external factors such as technology, land use, the environment, legislation and community values.

**Appendix A: Structure Y Design Drawings**

**Appendix B:            Structure Z Design Drawings**

**Appendix C: Quay Line Plan**



**Appendix D:**

**Design Standards for pontoons, Ramps and  
and Decks**

**Appendix E: Parrearra Navigation Lock and Weir  
Maintenance Procedures**



[www.sunshinecoast.qld.gov.au](http://www.sunshinecoast.qld.gov.au)

[mail@sunshinecoast.qld.gov.au](mailto:mail@sunshinecoast.qld.gov.au)

**T** 07 5475 7272 **F** 07 5475 7277

Locked Bag 72 Sunshine Coast Mail Centre Qld 4560