This document provides a high-level overview of the actions to be taken and how they will complement Council’s ongoing maintenance program to improve the long-term health of the lake.

What investigations have taken place?
Research and testing that Council has conducted since March 2019 has focused on:
- water quality
- sediment quality
- aquatic ecology.

The working group engaged a National Association of Testing Authorities (NATA) accredited laboratory to conduct in-situ water readings and samples. This included:
- water column testing using a probe
- groundwater sampling to measure bore depth and groundwater levels
- lake samples from multiple sites at varying depths.

Council has been sampling surface water from the lake since 2012 and records show there are approximately 125 different species of algae in the lake, including green algae and blue-green algae species. The samples taken in March and April 2019 have confirmed that the lake water contains very high blue-green algae levels.

Tests conducted in the water indicated that there were high concentrations of nitrogen and phosphorus. All other parameters such as metals, petroleum hydrocarbons and pesticides were generally at low concentrations and not a risk to aquatic or human health.

Forest Lake – key findings
Forest Lake is surrounded by 32 hectares of public greenspace and natural habitat, available to all residents to enjoy. The clay-lined lake features concrete safety edges, viewing platforms, access points and a 3.5 kilometre hiking/biking trail around the lake.

Brisbane City Council owns and manages Forest Lake, which is an artificial lake originally designed to provide recreational and visual amenity for the surrounding community and enhance the natural environment by providing habitat for local flora and fauna.

Key environmental issue at Forest Lake
Over time, the lake has been subject to green or blue-green ‘blooms’ of algae that have had a visual impact and strong musty odour. The blooms can be harmful to humans and animals if there is contact with the water. These algal blooms may be triggered by four main factors, including increased levels of light, high nutrient levels, high temperatures and stratification (layering of water).

How is the issue being addressed?
Council developed a working group made up of Council scientists and external water experts to ensure that any future works undertaken are based on the best expert advice.

Supporting Council’s in-house water experts are Professor David Hamilton, Deputy Director of the Australian Rivers Institute, Griffith University, and Mr Tony Weber, one of Australia’s leading practitioners in the catchment modelling and water quality field.

Addressing the algae challenges at Forest Lake requires a long-term, multifaceted approach. There is no ‘quick fix’, however Council has developed a strategic management plan outlining actions to prevent and reduce the occurrence of algal blooms over time.
Sediment quality assessments were conducted on 5 March 2019 at the same 10 sites where water quality assessments were undertaken. The samples were collected and analysed by the NATA-accredited laboratory. The lake bed is dominated by silt and clay particles, with some sand and minor contribution of gravel at three of the 10 sites. Sampling focused on:

- pH levels
- nutrients
- metals and metalloids
- sulphur and silica
- total petroleum hydrocarbons
- polynuclear aromatic hydrocarbons
- organotin compounds
- acid sulphate soils.

Sediment quality assessments have indicated that nutrients are higher than that expected of natural conditions and contributing to the increase in algal blooms. Other parameters had some high concentrations but not consistently high at any of the sites to be of concern.

In mid-March 2019, aquatic ecology surveys were conducted to look at aquatic vegetation, macroinvertebrate communities (e.g. dragonflies and snails), fish, turtles and birds. A total of 16 species of aquatic vegetation were recorded, with six introduced species. The plants were found mostly around lake edges. Macroinvertebrate surveys showed a total of 35 types across three habitats – lake edge, lake bed and around aquatic plant beds. Seven native fish, three introduced fish species and one turtle species, the Brisbane River turtle, were recorded in the lake. During the research period, the team identified 53 bird species, including migratory birds. Other species found at the lake were water dragons and the eastern sedge frog.

**What is the proposed solution?**

Council is committed to building and maintaining the infrastructure for the future while protecting our unique lifestyle, local greenspaces and parks. To find the best solution for the lake, the working group has divided lake management options into four categories:

- reducing nutrient levels (both those entering the lake and those already in the lake)
- reducing light availability
- re-creating a more ‘plant-based’ lake system
- potentially increasing water movement in the lake.

To reduce nutrient loads, desilting is recommended for two areas where sediment deposition and nutrient levels were highest. Replanting is also recommended for the same two areas and then additional areas away from the desilting zones.

The two proposed zones are around Bird Island and Alexandrina Circuit.

Other options, such as aeration, were considered by the working group but will not be implemented at this stage.

The working group determined that aeration would not provide enough benefit to the lake and would not lead to long-term reductions in algal blooms. In addition, proposed changes for ongoing monitoring of the lake and ongoing maintenance activities were also discussed.

Initial sediment quality analyses and early modelling has indicated that the nutrients released from the bottom of the lake are likely a large contributor to algal blooms. Therefore, strategic desilting of the lake to reduce the sediment loads and levels of nitrogen and phosphorus available for algae growth is recommended by the working group.

Based on the findings from the strategic management plan, a separate Forest Lake Rehabilitation Plan is being developed to support this work. The rehabilitation plan will outline the methods to undertake strategic desilting in areas of the lake starting in April 2020, followed by planting in those zones and more broadly across the open water areas of the lake.

**When will works start?**

Works to implement the proposed solution will be conducted from August 2019 to late 2020. The timeline below outlines key milestones the working group are working to, to conduct the desilting and replanting.

**What else will be done at the lake?**

The proposed works will be undertaken alongside ongoing and long-term management of the lake by Council. Council undertakes a variety of operations and maintenance activities at the lake and have done so since 2000, when the lake was handed over to Council by LendLease (formerly Delfin). Current management activities at the lake include those listed below:

- Quarterly water quality monitoring at eight locations since 2012, which was increased to monthly sampling in 2019. Monthly water quality sampling will continue until water quality conditions improve.
- Salvinia harvesting and spraying has been conducted for several years at the lake to remove this weed species when it becomes a nuisance. This is typically done on an ‘as needed’ basis when the salvinia cover reaches a critical threshold, which is on average three times a year.
- Gross pollutant trap maintenance is conducted monthly to remove any excess debris caught in the traps. This includes both above-ground and below-ground traps located around the lake.
- Earlier this year, a Species Management Program was developed by Ecosure consulting, who are renowned bird management specialists in Brisbane. Recommendations from this program are being implemented over time, with work starting in 2017, to manage the wild ibis populations around the lake. This work includes removing eggs from nests during the non-breeding season to help limit population numbers. In 2019, a Vegetation Management Plan was also developed by Ecosure to strategically manage plants around the lake that are favourable to ibis nest building.
- Ongoing parkland maintenance activities such as mowing, tree trimming and path upkeep, will occur as required.

It is anticipated that these activities will continue for the life of the lake, as required.