

9.2 Technical Services**9.2.1 Maylands Lakes Management Options**

Reporting Branch: Sustainable Environment
Responsible Directorate: Technical Services
Refer: Item 12.5: OCM 15.11.16
Item 12.1.5: OCM 28.04.15
Item 8.2.2: CTFCS 22.03.17

EXECUTIVE SUMMARY**Application:**

For Council to consider a request from the Friends of Maylands Lakes to revise the approved works within the existing budget allocation for the management of Stage 1 of the Maylands Lakes rehabilitation.

Key Issues:

- At the Community, Technical, Finance and Corporate Services Committee Meeting of 22 March 2017, Council resolved to provide in principle support to progress the installation of pollutant traps, community education and revegetation at the Maylands Lakes at a cost of \$404,000 in the 2017-18 financial year. Subsequently, the necessary funds were included in the 2017-18 budget.
- In reviewing the project, the Friends of Maylands Lakes (FOML) has requested that the City consider amending the work activities within the existing budget to reduce the number of gross pollutant traps installed and utilise the remaining funding to:
 - Install floating wetlands;
 - Apply phoslock to the lake; and
 - Undertake a survey and mapping of the water body which will provide better information for future works.
- It is considered that the proposed amendment will provide more immediate environmental benefits to the Maylands Lakes and will not unduly impact on the overall budget for the project.

BACKGROUND

Water quality issues at the Maylands Lakes (Brickworks, Lakes Bungana and Brearley) have led to the occurrence of persistent algae blooms in the lakes and community concern over the issue.

After the completion of a 12 month water quality monitoring study, an independent environmental engineering company, Essential Environmental, were engaged to prepare a water quality report which reviewed the monitoring results and identified a coordinated approach using short term and long term solutions to address the poor water quality and algal blooms at the lakes as follows:

SHORT-TERM MANAGEMENT	LONG-TERM MANAGEMENT
<ul style="list-style-type: none"> • Revegetation program. • Physical removal of algae (<i>if blooms still present at the end of 2016 winter period</i>). • Installation of bat boxes. • Application of Phoslock (<i>a clay that binds phosphorus</i>). 	<ul style="list-style-type: none"> • Detailed design and project management. • Dredging of Lake Bungana and Lake Brearley (<i>including detailed bathymetric survey</i>). • Installation of solar submersible pumps. • Modification of lake shape. • Community education. • Installation of floating wetlands.
\$300K	\$3M

Accordingly, Council at its Ordinary Meeting of 15 November 2016 consider the report and resolved in part as follows:

"That Council:

1. *Receives the Lake Bungana, Lake Brearley and Brickworks Management Options Report.*
2. *Adopts Option 3 to meet with the Friends of Maylands Lakes to develop a way forward for the project."*

Officers worked with the FOML to better balance the cost of the project, community values for the area and environmental work required to improve water quality at the lakes, and as such, developed a preferred works and staging scenario for the local residents as follows.

YEAR	ACTIVITY	COST
Year 1 (2016-17)	Detailed design, survey and costing	\$50,000
Sub Total	Existing 2016-17 Capital Budget	\$50,000
Year 2 (2017-18)	Pollutant traps on drains	\$250,000
	Community education	\$10,000
	Revegetation	\$144,000
Sub - Total		\$404,000
Year 3 (2018-19)	Dredging	\$1,000,000
	Phoslock	\$80,000
	Piloting of floating wetlands	\$50,000
	Install solar pumps	\$125,000
Sub Total		\$1,255,000
Total		\$1,709,000

Council considered the matter at its Community, Technical, Finance and Corporate Services Committee Meeting of 22 March 2017 and resolved as follows:

That Council:

1. *Receives the Friends of Maylands Lakes (FOML) preferred Option 1 for the management of the Maylands Lakes.*
2. *Gives in principle support to progress the high priority actions of the Maylands Lakes report as identified by FOML 'Option 1'.*

3. *Considers the allocation of the following funds as part of the Corporate Business Plan, Long Term Financial Plan and Draft budgets for the management of the Maylands Lakes:*

BUDGET	YEAR	ALLOCATION
2017-18	2	\$404,000
2018-19	3	\$1,255,000

4. *Supports the FOML' application to seek grant funding to implement a community education program for the Maylands Lakes.*
5. *Seeks further funding from the National Resource Management NRM or equivalent fund."*

In accordance with the above, \$404,000 was allocated in this year's budget for the following works:

YEAR	ACTIVITY	COST
2017-18	Pollutant traps on drains	\$250,000
	Community education	\$10,000
	Revegetation	\$144,000
TOTAL		\$404,000

Further to the Council resolution, the FOML have further progressed their thinking with respect to the group's desired activities for the Maylands Lakes. Accordingly, the FOML met with officers and identified that they originally understood that the gross pollutant traps would prevent a greater quantity of nutrients from entering the lakes. As such, they have proposed a revised option (***Attachment 1***), which is a hybrid between the initial short term actions recommended by the consultant and the adopted activities to be undertaken this financial year.

Essentially, the changes would focus on achieving more immediate effects for the lakes and could be accommodated within the existing \$404,000 allocation as follows:

YEAR	ACTIVITY	COST
2017-18	Pollutant traps on drains	\$80,000
	160m ² floating wetlands	\$95,280
	Phoslock installation	\$90,000
	Bathymetric and water column surveys	\$20,000
	Revegetation	\$112,000
TOTAL		\$397,280

The change in works for Stage 1 will not unduly impact on the total cost for the project.

CONSULTATION

After the initial community lead public meeting at Maylands Lakes, the community who attended the meeting established the FOML to advocate on behalf of the community and condition of the lakes. The request for amending the activities within the existing budget is from this group.

Additionally, there has been extensive community consultation on the matter, including a community workshop to identify the drivers and recommended actions undertaken in late 2016.

ANALYSIS

As has been identified in previous Council reports, it should be noted that unlike the construction of a road project where the majority of variables can be identified, there are a range of uncertainties with a living lake system and as such, environmental projects carry greater project

risks. That being said, the management report has been developed by an industry leader in stormwater management and the recommendations are consistent with contemporary practices in water sensitive urban design and the information available to date.

In considering the request by FOML a review of these activities has been undertaken below.

Reduction of the use of gross pollutant traps

It is noted that algal blooms are caused by eutrophication of the lakes where more nutrients are received by the lake than it can remove within its existing ecosystem cycles. The document by Essential Environmental, reported that the evidence suggested that algal blooms are not occurring at the lake as a result of a direct point source contamination, but rather because of the level of ambient nutrients accumulated over the decade in lake sediments and the water column, the low ability of the lake to bind or remove these nutrients and the physical conditions of the lake caused by its geomorphology.

The use of gross pollutant traps in the original Stage 1 works proposal was identified to prevent nutrients, sediments and rubbish from entering the lakes through the piped stormwater system. The FOML included these in the original request as it was hoped to prevent a significant portion of nutrients in the stormwater catchment from entering the lake.

It should be noted that the final report by Essential Environmental did not include the management option to include gross pollutant traps.

In the Essential Environmental report, it was identified that a review of the lake catchment and stormwater system was recommended to identify opportunities within the stormwater infrastructure to install bioremediation nodes such as raingardens and tree pits. As the stormwater catchment is fully developed, it is expected that the review will identify that there is limited available land to place the required quantity of raingardens or tree pits and, as such, other options such as gross pollutant traps are likely to be required as part of the final suite of solutions to reduce nutrients entering into the lake from the stormwater system.

Reducing the total number of gross pollutant traps to be installed is supported.

Installing floating wetlands

The use of floating wetlands in lakes has been well demonstrated to remove or make unavailable nutrients which have been transported into the lakes.

Floating wetlands are suited to the Maylands Lakes due to the existing design of the lakes being deep with rock revetment banks which limit the opportunities for traditional planting/restoration approaches (without major earthworks and re-profiling of the lakes). The recent trial by a private start up business of a new floating wetland at the Brickworks Lake has demonstrated how the green infrastructure can be installed and maintained successfully over an extended period.

Based on the ability of the infrastructure to remove nutrients and the more recent trial to test their practicality, the expenditure on floating wetlands within the existing budget is supported.

Use of phoslock .

Phoslock is used to physically bind or make unavailable phosphorous to algae from within the water column and sediment which has been transported into lakes. This product has been well demonstrated to be effective where phosphorous levels are higher than water quality guidelines.

The application of phoslock is considered to be a short term management tool. In this lake system, the Essential Environmental report indicated that phosphorous levels are lower than the

water quality guidelines and, as such, the application of phoslock has a reduced business case. The complexity of the lake ecosystem identified in this report, however, highlighted that spikes in phosphorous can occur in the lake which can support algal blooms. Based on this factor, the report recommended that this product should be considered as a short term management option.

Therefore, the advice provided in the Essential Environmental report for the use of phoslock in the lakes is supported.

Revegetation and further survey work

Previous reports have identified support for revegetation and further survey work to support dredging of the lake, accordingly, is this also supported.

OPTIONS

The following options are available to Council:

OPTION		BENEFIT	RISK
1.	Approve the revised program of works for the Maylands Lakes as requested by the FOML. Estimated Cost: \$397,280	<ul style="list-style-type: none"> Provide a scope of works which provide more immediate environmental benefits to the lakes 	<ul style="list-style-type: none"> Reduces the response to nutrients which are imported into the lake.
3.	Not approve the revised program of works and continue works program as previously approved by Council. Estimated Cost: \$404,000	<ul style="list-style-type: none"> Undertake initial actions identified in March 2017 	<ul style="list-style-type: none"> Reduced effectiveness of expenditure. Reputational risk with FOML.

CONCLUSION

Option 1 is recommended as it will provide a more immediate environmental benefit for the Maylands Lakes and will not unduly impact on overall project costs.

FINANCIAL IMPLICATIONS

The following financial implications are applicable:

2017-18 BUDGET ALLOCATION	2017-18 BUDGET RECONSIDERATION	PROPOSED 2018-19 BUDGET ALLOCATION	ONGOING COSTS (e.g. MAINTENANCE)	LIFE OF PROJECT/LIFE EXPECTANCY OF ASSET
\$404,000	\$404,000	\$1,255,000	Dependant on 2018-19 works	50 years

STRATEGIC LINK

In accordance with the City of Bayswater's Strategic Community Plan 2017-2027, the following applies:

Theme: Our Natural Environment
 Aspiration: A green and sustainable environment.
 Outcome N1: Natural environment and biodiversity which are conserved and protected.
 Outcome N2: A resilient community that responds to sustainability challenges.

COUNCIL POLICY AND LEGISLATIVE IMPLICATIONS

Not applicable.

VOTING REQUIREMENTS

Simple Majority Required.

ATTACHMENTS

1. FOML Request

COMMITTEE RESOLUTION
(OFFICER'S RECOMMENDATION)

That Council approves the amended program of works for Stage 1 of the Maylands Lakes as requested by the Friends of Maylands Lakes.

CR DAN BULL, MAYOR MOVED, CR LORNA CLARKE SECONDED
CARRIED UNANIMOUSLY BY EN BLOC RESOLUTION: 9/0

Attachment 1

17 December 2017

Mr J Maher
Manager Sustainability and Environment
City of Bayswater
PO Box 467
MORLEY WA 6943

Dear Jeremy,

REMEDICATION OF BREARLEY AND BUNGANA LAKES

Thank you again, for your time and that of Doug Pearson, when we recently met to consider (at the request of the Friends of Maylands Lakes) amending the preferred options previously submitted by FOML in February this year, following the *'Stage 2 Management Options Report'* prepared for the City of Bayswater, by Essential Environmental. Your time and effort is much appreciated, as always.

As mentioned at the meeting, the FOML, following consultation with two independent environment professionals (water quality specialists), has become aware that GPT's would filter out only a small percentage of nutrients entering the lakes (maximum of 20%). Consequently, in order to maximise return on investment, we consider a more effective approach would be to initially install just 2 GPT's and to monitor their effectiveness over a 12 month period. The balance of GPT funds would be reallocated as per the amended table of preferred options (attached), agreed to at the meeting.

I would be grateful Jeremy, if as agreed, the appropriate City of Bayswater officer(s) would seek approval from Council at the January 2018 meeting for the reallocation of funds, so that the remediation of the Maylands lakes can commence as soon as possible.

Yours sincerely

FRIENDS OF MAYLANDS LAKES



GEOFF TROTT

Year	Activity	#	1	2	3	4	5	6	6	
		Estimated cost for activity	Consultant Rec.	Initial FOML Rec. (council adopted)	Option 1	Option 2	Option 3	Option 4	Option 5	Proposed New Approach at Officer/Community Level1 December 2017
2017-18	Dredging brickworks lake	\$ 1,000,000.00	\$ 1,000,000.00				\$ 100,000.00			
	Floating wetlands	\$ 1,000,000.00	\$ 500,000.00							
	30(10.8m2) Floating wetlands	\$ 190,560.00				\$ 190,560.00				
	20 (10.8m2) Floating wetlands	\$ 127,040.00			\$ 127,040.00					
	60 (10.8m2) Floating wetlands	\$ 381,120.00						\$ 381,120.00		
	40 (10.8m2) Floating wetlands								\$ 254,080.00	
	15 (10.8m2) Floating wetlands	\$ 95,280.00					\$ 95,280.00			\$ 95,280.00
	Phoslock installation (all lakes)	\$ 90,000.00	\$ 80,000.00			\$ 90,000.00	\$ 90,000.00			
	Phoslock installation Bungana and brickworks				\$ 50,000.00					\$ 90,000.00
	GPT traps on drains x 8 drains	\$ 250,000.00		\$ 250,000.00						
	GPT traps on drains x 3 drains	\$ 80,000			\$ 80,000.00	\$ 80,000.00				\$ 80,000.00
	Revegetation	\$112								\$ 112,000.00
	Revegetation	\$ 144,000.00		\$ 144,000.00						
	Revegetation	-				\$ 20,000.00				
	Revegetation	-			\$120,000					
	Revegetation	-					\$ 90,000.00		\$125,000	
	Community education	\$10,000		\$ 10,000.00						
	Bathymetric survey	\$10,000			\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00
	Stratification survey	\$10,000			\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00
	Total		\$ 1,580,000.00	\$ 404,000.00	\$ 397,040.00	\$ 400,560.00	\$ 395,280.00	\$ 401,120.00	\$ 399,080.00	\$ 397,280.00
2018-19	Dredging	\$ 1,000,000.00		\$1,000,000						
	Lake Shape Modification	\$500,000	\$ 500,000.00							
	Revegetation program	\$144,000	\$ 144,000.00							
	Install floating wetlands	\$1,000,000	\$ 500,000.00	\$50,000						
	Install floating pumps	\$125,000	\$ 150,000.00	\$125,000						
	Phoslock			\$80,000						
	Community education	\$10,000	\$ 10,000.00							
	Total		\$ 1,304,000.00	\$1,255,000						

Options		
No.	Option	Comment
1	-	Consultant recommendation (for reference)
2	-	Initial FOML/Council recommendation(for reference)
3	Option 1	Multi solutions approach
4	Option 2	Reduced reveg focus
5	Option 3	Includes trialling dredging at brickworks
6	Option 4	Install 650m2 of wetlands as per options report
7	option 5	Reveg and floating islands.
	option 6	Same as option 1 but phoslock all lakes.