MEMORANDUM
Comfort Lake-Forest Lake Watershed District

To: Board of Managers **Date:** March 21, 2019

From: Mike Kinney

Subject: Claros Technologies

Background/Discussion

At the January 24, 2019 regular board meeting, John Brockgreitens from Claros Technologies gave a presentation on Claros as a company and their new Clarosorb technology. At the March 4, 2019 special meeting, the Board adopted a resolution allowing the District to submit a grant proposal to the Legislative-Citizen Commission on Minnesota Resources (LCCMR) Environment and Natural Resource Trust Fund (ENRTF) grant program. The title of the grant is "Field Testing of a New Phosphorus Removal Technology in the Comfort Lake-Forest Lake Watershed District." The draft grant proposal has since been submitted and staff is awaiting feedback from LCCMR staff for comments and question. The final LCCMR grant proposal will be due by April 15th. By July of this year we should have an initial indication as to whether our proposal will be funded or not. If it is to be funded, it is anticipated that grant funds won't be available until July 1, 2020. As such, the grant proposal was written from the perspective of performing initial testing sites this year and next, then being ready to implement larger Clarosorb projects after grant funds are available.

Another potential funding source may be the Clean Water Partnership loan. Though it wasn't originally intended for this specific project, it is written in a way that this project could be applicable to the approved loan scope. Staff is looking into this and will discuss with PCA, and as such we will have a firmer understanding by the March 28th meeting.

At the January 24th meeting, the Board delegated authority to the District Administrator to work with EOR and Claros on the project and to pursue grant opportunities. The motion indicated that the District could pay Claros up to $5,000 with the goal of bringing a more detailed proposal back to the Board.

At this point, staff is recommending further funding be allocated to progress toward implementing test sites this year. There are three initial tests sites that have currently been identified. Cost ranges to implement these test sites are included in the enclosed memo. The table below summarizes the upper end of the given ranges.

Site from Memo	Estimated Costs (Upper End)				
	Estimated Construction Cost	Claros Media	Engineering	Monitoring	Total Per Site
Hayward Avenue Drainage Outlet	$30,000	$2,400	$20,000	$15,000	$67,400
Moody Wetland - Peterson Pond	$10,000	$2,400	$10,000	$15,000	$37,400
Lake Trial	$500	$600	$4,000	$6,000	$11,100
TOTAL ALL 3 SITES	$40,500	$5,400	$34,000	$36,000	**$115,900**

Recommended Action

At this time, staff recommends that the Board authorize funding for one or more of the test sites this year.

Proposed Motion: Manager _____ moves to authorize the Administrator to enter into contracts with Emmons & Olivier Resources and Claros Technologies to implement test sites at _____ locations and in an amount not to exceed $_____. Seconded by Manager _____.

Attached: Technical Memo – Project Feasibility

technical memo

Project Name |	Claros Technology	**Date** |	March 21, 2019
To / Contact info |	CLFLWD Board of Managers		
Cc / Contact info |	Mike Kinney, District Administrator		
From / Contact info |	Greg Graske & Kyle Crawford		
Regarding |	Project Feasibility		

Introduction

On January 11, 2019, EOR met with the District and Claros Technology to discuss new nanotechnology for removing phosphorus designed by Claros. At the January 2019 District board meeting, the Board authorized Mike Kinney to further assess potential projects and grant opportunities. On February 4th, EOR and the District again met with Claros to discuss engineering specifics of installation and project feasibility; a few primary sites were discussed as possible locations for implementation.

Hayward Avenue Drainage Outlet

The first site identified was one of the outlets of the Hayward Avenue subwatershed near the intersection of North Shore Trail and North Shore Circle. Runoff from the ditch on the north side of the road flows through a culvert under North Shore Trail into a ditch connecting it to Forest Lake (2nd Lake). This ditch presents an excellent opportunity for testing the aggregate technology Claros has developed. Multiple installation options are possible; ditch checks comprised of Claros aggregate or a subsurface permeable drain trench were deemed the best options. An additional benefit of this site is the gravel driveway/boat landing located adjacent along the length of the ditch providing excellent access for any improvements. The ditch and road are on a 30' parcel owned by a private landowner, so landowner permission will be required for any projects along this stretch. A survey of the site would be needed to determine elevation change over the length of the ditch, ditch capacity, and the most appropriate places to install the media and aggregate.

Estimated Construction Cost including removal of Claros material and site restoration after trial period = $15,000-$30,000 (does not include the cost of Claros media)

Claro Media = $600-$2,400 (depends on quantity used in final design)

Engineering Cost and Construction Administration/Oversight = $10,000-$20,000

Monitoring Cost = $5,000-$15,000 (cost could be highly variable depending on the intensity of monitoring desired)

Moody Wetland – Peterson Pond

A second site identified as a potential location for the Claros aggregate is the downstream pond of the Moody wetland system, commonly referred to as the Peterson pond. Even with

the significant improvements upstream, this pond still receives phosphorus loading as water flows south to Moody Lake. Because the water within the pond generally does not experience high flows, we propose hanging the Claros aggregate from floatation buoys and anchoring to the shoreline. How the material is suspended and ensuring flow through the material without loss of aggregate will need to be determined with further design work. Depending on the proposed timing of the pond excavation of Wetland C and outlet work this winter, some of these components could be installed in tandem with that work. There are no anticipated landowner permission issues here as the owner, Curt Peterson, has worked extensively with the District.

Monitoring for results could be performed in two different ways. The first would be to do traditional monitoring at both the inlet and outlet of the pond over the course of the season to determine reductions through the pond. The second option would be to have Claros bring the media back to the lab after the season is over and analyze the material to determine the total pounds of phosphorous captured.

Estimated Construction Cost = $5,000-$10,000 (does not include the cost of Claros media)

Claros Media = $600-$2,400 (depends on quantity used in final design)

Estimated Engineering Cost, Construction Administration/Oversight = $5,000-$10,000

Monitoring Cost = $5,000-$15,000 (cost could be highly variable depending on the intensity of monitoring desired)

Sunrise River – Highway 61 trail crossing

The third site considered is on the Sunrise River just west of Highway 61. The proposed site is along the multi-use trail within the Washington County Regulatory Railroad Authority right-of-way. The primary difficulty with this location is the high flows that are seen in the ditch and properly securing the Claros aggregate. We have investigated placing the aggregate along the banks of the river; however we have concerns securing the treatment aggregate as surrounding areas appear to be wetland with very soft subsoils. Due to the high costs and uncertainty related to construction of a project at this site, it is recommended that this site not be included in the initial trials. It could be considered in the future if initial testing of the material at other locations shows promising results.

Lake Trial

Another potentially simple project to test the effectiveness of this material would be to suspend it in a lake and assess the ability for the material to pull phosphorus from the water column in a natural setting. To date the material has only been tested in a controlled lab setting, so this could provide some valuable results regarding how the material performs in a real world scenario. This could be done from a volunteer's dock with some of

the Claros media placed in a flow-through minnow bucket (or similar containment device attached to a dock). This could be left suspended from the dock for a set period of time and then the material could be brought back to the Claros lab for analysis of the amount of phosphorus bound to the Claros media. The cost of this option could be minimal if there were volunteers from the local neighborhoods willing to participate. Precautions would need to be taken to make sure invasive species are not transported with the Claros media to other waterbodies.

It should be noted that the scale of this trial would be small and would have negligible effect on water quality in a lake. Treatment of an entire lake would likely be more cost-effective utilizing alum treatment which has the added benefit of binding with sediments. However, Claros has indicated that they had only tested this material in a controlled lab and not out in the environment. It would potentially be useful to see if the Claros media can remove phosphorous from the water column particularly at low lake water concentrations. This could also be used as a way to engage some of the residents on the lake(s).

Estimated Construction Cost = up to $500 for supplies (does not include the cost of Claros media)

Claros Media = up to $600 (depends on quantity used)

Estimated Engineering Cost to provide recommendation for the trial and review results = $1,000-$4,000

Monitoring Cost = $3,000-$6000

LCCMR Grant

The District has recently completed an application for a grant from the Legislative-Citizen Commission on Minnesota Resources (LCCMR). If the grant application is successful, the funds will be available July 2020. With the understanding that the District would like to keep things moving and not wait until 2020, the District could likely proceed with one or two of the test sites that require minimal capital expenditures prior to award of the grant. The grant funds would then be used for implementation of more capital intensive projects and possible additional projects that may target Nitrogen in addition to Phosphorous. These funds could also be used for maintenance of the projects listed above, cleaning and testing of the media, and extended monitoring.

NOTE: All costs in this memo are for planning purposes only. Claros media and lab costs are estimated based on preliminary data from Claros Technologies. Further design and coordination with Claros Technologies will be needed to determine more refined costs.