

VIA ELECTRONIC MAIL

November 8, 2021

Mr. Steve Wall, P.E.
Public Works Director
City of Camas
616 NE 4th Avenue
Camas, WA 98607

Subject: Phase 2B Draft Workplan, Lake Management Planning, First 6 months

Dear Mr. Wall,

On behalf of Geosyntec Consultants, Inc. (Geosyntec), we are pleased to present you with our draft scope of work for Phase 2B of the Lake Management Planning support to the City of Camas (City). Geosyntec's team with MacKay Sposito and JLA have developed this draft scope of work and budget for Lake Management Planning for Lacamas, Round and Fallen Leaf Lakes.

This workplan does not include conducting the field work, since the QAPP is not completed yet. Once the QAPP is near completion or submitted to Washington Department of Ecology for approval then the field workplan can be developed in detail with an associated cost.

Introduction

This workplan outlines the tasks needed to complete a Lake Management Plan, following the Washington State Department of Ecology (Ecology) Lake Cyanobacteria Management Plan (LCMP) format, for Lacamas, Round and Fallen Leaf Lakes. The workplan is intended to specify the tasks required to understand the issues of algal blooms that have become common within the lakes. Nutrients within the lake have allowed algal blooms to become more common and longer in duration. These algal blooms cause harmful toxins to enter the waterbody resulting in a public health risk for the local community. Current management of the lakes is based on an incomplete understanding of the causes of the blooms. As such, mitigation and prevention of these blooms are difficult unless a full understanding of the nutrient cycles within the lake can be developed, and external loading sources can be identified and determined. Identifying the phosphorus budget and inputs into the watershed are key to understanding and developing a comprehensive management plan for the watershed. This workplan outlines the steps towards development of such a plan.

Phase 2 can be separated into the following distinct parts:

- Phase 2a. QAPP development, to be completed via separate scope of work and agreement amendment.
- Phase 2b, Part 1: Conduct Field Work, to be developed based on the completed and approved QAPP.
- Phase 2b, Part 2: Task 2.2 (Part 2), Task 2.3, Task 2.4, and Task 2.9 (Part 2). This work would be done based on a funding request in November, 2021 and intended to run through May 2022.
- Phase 2b, Part 3: Task 2.2 (Part 3), Task 2.5, Task 2.6, Task 2.7, Task 2.8, and Task 2.9 (Part 3). This work would be done following completion of some or all of the field work. It is assumed that a funding request would be made in May, 2022, and that this phase would run from June, 2022 through June, 2023.

This workplan presents the tasks required for Phase 2b, Part 2, and Phase 2b, Part 3, but funding is currently being requested only for Phase 2b, Part 2.

Task 2A: QAPP Development

To be completed via separate scope of work agreement amendment.

Task 2.1: Conduct Field Work

To be developed based on the completed and approved QAPP.

Task 2.2 Stakeholder Involvement

Objective

The objective of this task is to conduct education and outreach with the community to generate continued awareness of the LCMP effort, collaborate with and inform key stakeholders and the broader community about the current lake conditions and potential management measures for short and long-term improvement and build consensus and support for sustainable and effective long-term management measures to improve lake water quality.

This task will focus on these three elements of engagement:

1. **Ongoing information and awareness campaign:** The project team will continue general communication with the broader community which will include maintaining the project webpage on Engage Camas, continued social media content and updating the project fact sheet. In addition, the project team will develop an informational “call to action” campaign to generate awareness of short-term management measures to improve water quality in the lakes, such as responsible pet waste practices, alternative fertilizers, etc. This campaign

could include collateral materials, such as stickers, posters, mailers, flyers and an informational video.

2. **Engage the public, key stakeholder groups and other partners to guide development of effective and sustainable long-term management measures to improve water quality in the lakes:** The project team will work with the City to develop and launch a series of three online open houses to guide the development of effective long-term management measures for the lakes informed by community goals and values. The online open houses will be designed to keep the community apprised of project progress with the field data program, the spectrum of lake management measures available, and be part of vetting and prioritizing appropriate lake management measures that will be acceptable to the community while improving lake water quality.
3. **Development of a community supported, long-term lake management recommended alternative:** In order to develop a lake management alternative (suite of management measures) that is supported by key stakeholders and the broader community, the project team will engage key stakeholder groups. These key stakeholders will include large property owners, state and local agencies, lake user groups, Camas Parks and Recreation Commission, City Council, the Lacamas Creek Watershed Advisory Committee and the broader community. Outreach and engagement will include small group meetings with key stakeholders, online surveys and online open houses to provide input on community goals, values and expectations for a long-term management alternative, these efforts will also provide an opportunity to learn about and provide input on the spectrum of lake management measures.

Activities

Activities within this task will take place in phases in the following phases:

Phase 2.2, Part 2 portion:

- A public involvement kickoff meeting to be held between the Geosyntec team and the City to inform development of the public involvement and communications plan
- Develop the public involvement and communications plan to include key messaging, awareness campaign strategies and outreach to target audiences
- Strategize with the City about how best to reach out to and maintain communication with key project stakeholders, including local and state agencies, large landowners, Camas School District, Camas Parks and Recreation Commission, City Council and lake user groups.
- Continue to update the City's Engage Camas page
- Continue to develop social media content

- Develop up to one community-wide mailer
- Develop up to one collateral material (sticker or poster)
- Host up to two informational tabling events at high traffic locations in the community
- Develop informational video describing the LMP, timeline and identified long and short-term management measures to improve water quality
- Conduct an online open house to share project progress with the field data program as well as ask questions to better understand the community values and expectations for future lake use and management measures.
- Conduct 2 meetings with key stakeholder groups, to be identified in collaboration with the City

Phase 2.2, Part 3 portion:

- Conduct an online community open house to share the spectrum of lake management measures and gather input on possible management measures for the future
- Conduct an online community open house to vet and prioritize appropriate lake management measures
- Continue to update the City's Engage Camas page for the LCMP
- Continue to develop social media content
- Develop up to one community-wide mailer
- Host up to two informational tabling events at high traffic locations in the community, including the Sept. 25th, 2022 Lake Clean-up Day
- Conduct 2 meetings with key stakeholder groups, to be identified in collaboration with the City

Deliverables

- Agenda and summary of action items from kick off meeting
- Public Involvement and Communications Plan
- Updated fact sheet (1)
- Design for collateral materials (1 sticker and 1 poster for awareness campaign)
- Development and summarizing up to three online open houses
- Coordination, attendance and summary of up to 4 tabling events
- Development of 1 mailer for distribution throughout the community
- Content for up to 12 social media posts
- Production of 1 informational video
- Up to 6 updates to the Engage Camas web page

- Agendas, discussion questions and summary report of meetings with up to 2 key stakeholder groups or individuals.

Assumptions

- The public involvement plan will undergo one round of review before being finalized
- Recognizing that the current pandemic is a constantly changing situation, the Geosyntec team will work closely with the City to determine the best methods to engage people whether that's online or through safely distanced in-person engagement

Task 2.3 Implement Short-Term Wins and Volunteer Opportunities

Objective

The objective of this task is to assist the City with implementing short-term win ideas prioritized in Phase 1.

Background

During Phase 1, we identified the following short-term wins as the most promising opportunities:

- Collaborate with Clark Conservation District on their workshop programs on watershed processes and water quality issues, and BMP technical assistance to landowners
- Optimization of stormwater operations, including checking catch basin cartridge units
- Evaluate opportunities related to the PROS plan as it is developed, in collaboration with the Camas Parks department. Opportunities may include prioritizing vegetation that exports less Phosphorus, and contributing to updated design standards and maintenance standards for trails to prevent erosion.
- Hotspot erosion control at:
 - East Lake boat ramp
 - Round Lake Parking lot (County owned)
- Screening of properties recently purchased as part of the legacy lands program. We recommend focusing on the Rose and Leadbetter properties.

Activities

- Participate in up to four (2) meetings with Clark Conservation District
- Participate in up to four (2) meetings with the City of Camas, Parks Department
- Conduct two (2) days of field work along with the City to assist with any of the potential following items:

- Checking catch basin cartridge units,
- Visiting the East Lake boat ramp for scoping erosion control opportunities,
- Visiting the Round Lake Overflow Parking Lot for scoping erosion control opportunities, or
- Screening level assessment of recently purchased properties current erosion state, and opportunities for on the ground restoration or BMP demonstration projects (Rose and Leadbetter properties),

Deliverables

- Meeting agendas and summary notes from the meetings with Clark Conservation District and the Parks Department
- Summary notes from the field activities
- Technical memo suggesting tactics to optimize stormwater operations potentially including construction erosion control inspections, ongoing facility inspection and maintenance, catch basin cleaning frequency and street sweeping.
- Technical memo outlining short term corrective actions to abate erosion.
- Technical memo regarding legacy lands, providing corrective actions to abate active erosion, and an opportunities matrix for potential restoration activities.
- Summaries of work performed

Assumptions

- Field work will be performed by 2 members of the Geosyntec team along with at least 1 City employee
- Additional field work required to complete these tasks is not part of this scope of work
- Existing fieldwork protocols can be used to evaluate recently purchased properties
- The City is able to provide complete information regarding how the stormwater program currently operates

Task 2.4 Funding Strategy and Implementation

Objective

The objective of this task is to utilize the funding strategies identified in Phase 1 to assist the City in applying for grant applications and collaborating with other agencies to pursue joint funding.

Activities

- Conduct a funding strategy Phase 2 kickoff meeting to discuss this approach. This will include discussion of developing inter-agency partnerships to pursue joint funding or

develop joint programs for project funding and implementation. Partnerships may include:

- Clark Conservation District
- Clark County
- Washington State Department of Ecology
- U.S. Department of Agriculture Natural Resources Conservation Service
- Provide limited support for the City in completing up to grant applications identified in Phase 1 (assume 18 hours of consultant time)
- Being able to identify and implement the most effective and sustainable LCMP for improving the lakes will require collaboration with other agencies and community partners. Therefore, the Geosyntec team will provide limited support, assisting the City in collaborating with local and state agencies to identify opportunities and develop long term partnerships for ongoing coordinated lake management and implementation of the Lake Management Plan (assume 24 hours of consultant time).

Deliverables

- Meeting agendas and summary notes from funding strategy session

Assumptions

- This task includes up to 50 total hours of consultant time from the Geosyntec team

Task 2.5 Field Data Analysis

Objective

The objective of this task is to analyze the field data coming in over the 12-month period to characterize the lake water quality conditions and support development of the LCMP.

Activities

- Analyze the field data and develop appropriate plots and tables and other information summarizing the data and what it tells about lake water quality conditions. This analysis includes:
 - Lake inflows, outflows and lake level
 - In-lake Temperature, Dissolved Oxygen, pH, Conductivity, and Secchi Depth
 - In-lake Phosphorus (Total and Orthophosphate), Nitrogen (Ammonium, Nitrate-Nitrite, and Total Persulfate N), Chlorophyll-a

- Concentration of Phosphorus (Total and Orthophosphate), Temperature, Dissolved Oxygen, Nitrogen (Ammonium, Nitrate-Nitrite, and Total Persulfate N), pH and Conductivity in the tributaries
- Waterfowl (qualitative)
- Aquatic vegetation
- Shoreline modification
- Lake sediment sampling, including analysis of core samples for Total Phosphorus, Phosphorus fractionation, Iron, Aluminum, Percent Water, Grain Size
- Document the results and findings in a chapter of the LCMP

Deliverables

- A chapter in the LCMP focused on the monitoring results and interpretation

Assumptions

- Completion of this Task is dependent upon an approved QAPP and field workplan and contract for collecting data being executed
- Depending on the results of the Ecology bacteria field sampling and the field sampling conducted under Task 2.4, there may be a need for conducting microbial source tracking, which would provide valuable information on bacteria sources to the lakes. Currently this is not scoped in this workplan

Task 2.6 Develop and Analyze Hydrologic and Nutrient Budget

Objective

The objective of this task is to develop quantitative budgets for water, phosphorus, and nitrogen.

Activities

- Acquire field data from other agencies such as USGS, WA Department of Ecology and others to support develop water and nutrient budgets
- Develop monthly and annual flow budget for each lake using table sand graphics, as needed
- Develop monthly and annual nutrient (total phosphorous, ortho-phosphorous, total nitrogen and nitrate-nitrate) budgets for each lake using table sand graphics, as needed
- Analyze monthly and annual loading from each of the sources, including potential internal loading, and outflows with data or other information

- Develop an analytical model of the Phosphorus balance in Lacamas/Round Lakes, using a method such as the Vollenweider (1968) model or similar, as a simple tool for predicting response to changes in loading or flow rates
- Calibrate the model by adjusting the rate coefficients to better match measured in-lake Phosphorus data
- Document the results and findings in a chapter of the LCMP

Deliverables

- A chapter in the LCMP focused on hydrologic budget, and a separate chapter on the nutrient budgets

Assumptions

- Completion of this Task is dependent upon an approved QAPP and field workplan and contract for collecting data being executed.
- This task is dependent on successful completion of the field effort

Task 2.7 Identify Management Methods for Cyanobacterial Control and Lake Restoration Planning

Objective

The objective of this task is to develop a recommended lake management plan with actionable steps, to significantly reduce algal blooms and improve overall water quality in Lacamas, Round, and Fallen Leaf Lakes, through lake and watershed management strategies.

Activities

- Develop criteria by which to measure the success of restoration and management activities
- Based on past experience and other LCMPs in WA and OR, develop a list of management measures that could be utilized to address water quality issues in the watershed and lakes. These may include at minimum: dam operations, sediment management, stormwater load reductions, agricultural best management practices, lake treatments, City ordinance changes and more
- Create a management measures matrix to evaluate and rank various measures based on factors such as cost, cost-effectiveness, sustainability, timeline to implement, funding needed, integration with City's existing goals, disruption to recreational uses and other factors

- Develop a list of potential alternatives (groups of management measures). Each alternative will contain combinations of in-lake techniques and best management practices (BMPs) at both the lake and in the watershed to control bioavailable phosphorus
- Evaluate alternatives concerning the criteria using the nutrient budgets, analytical model, lake history, and conceptual site model developed in Phase 1
- Conduct a series of workshops with the stakeholder working group, and the public at large, from Task 2.2 above to walk through the following:
 - Public Workshop 1
 - Review the past data and current data
 - Review the conceptual site model for the lakes based on the new data
 - Any differences with past conceptual model?
 - What does current conceptual model, water and nutrient budgets, data analysis tells us about the lake?
 - What do we know about sources and sinks to the lake?
 - Public Workshop 2
 - Review the universe of lake management strategies developed above, and describe and define each one of them
 - Based on the results from Phase 1 and Task 2.2 above develop a list of factors the community thinks are important to the long-term improvement of lake water quality
 - Workshop 3
 - Review the lake management measures matrix, including the factors the community thinks are important
 - Go through a charrette process or other format to gather feedback from the working group on how they would rank the various management measures.
- Output from the workshop process should be a prioritized list of management measures with City and community buy in that can be done in the short term (next 12 months) and over the longer term
- Based on the evaluation above, select a recommended alternative of management measures to pursue in the LCMP
- Develop a process for adaptive management to ensure continual improvement of lake quality
 - Measuring progress (e.g., projects on the ground, load reductions, improvements in the water quality of the lakes)
 - Deciding when to shift tactics if desired results are not achieved
 - Describe future monitoring and potential adaptive management activities that will support the recommended alternative

- Describe the funding and human resources required for the implementation of the recommended alternative

Deliverables

- A suite of community and City supported lake and watershed management measures for inclusion in the Lake Cyanobacteria Management Plan (Recommended Plan)

Assumptions

- Completion of this Task is dependent upon an approved QAPP and field workplan and contract for collecting data being executed
- The activities under this Task will be coordinated with the efforts under Task 2.2 to coordinate efforts with the stakeholder engagement and outreach and the working group to get appropriate engagement and community input for this task

Task 2.8 Develop Lake Management Plan (Lake Cyanobacteria Management Plan)

Objective

The objective of this task is to develop a complete LCMP that follows the Ecology Lake Cyanobacteria Management Plan template.

Activities

- Develop a detailed annotated LCMP outline
- Develop a draft LCMP for review by the City
- Develop PowerPoint slide decks and other material and present interim progress on the LCMP in three (3) stakeholder meetings
- Complete the draft LCMP for submission to Ecology
- Conduct potential conference call(s) with Ecology to seek additional guidance when developing the draft LCMP
- Receive and respond to comments from Ecology on the LCMP in coordination with the City.
- Conduct potential conference call(s) with Ecology to discuss feedback on the LCMP
- Develop and submit a final version to Ecology

Deliverables

- Draft and final versions of the LCMP

Assumptions

- Completion of this Task is dependent upon an approved QAPP and field workplan and contract for collecting data being executed.
- The draft LCMP will undergo one round of review with the City before being finalized for submission to Ecology
- The revised LCMP (addressing Ecology feedback will undergo one round of review with the City before being finalized for resubmission to Ecology
- There may be up to three (3) conference calls with Ecology to discuss the draft LCMP or discuss Ecology feedback on the LCMP

Task 2.9 Project Management and Progress Update Meetings

Objective

The objectives of this task are the attentive management of a project and ongoing communication with the City. This task is broken up into Task 2.9, Part 2, which covers the first 6 months, and Task 2.9, Part 3, which covers the subsequent work. Since the activities are the same for both parts, they are described here only once.

Activities

- Organize and lead a project team within to complete the tasks described below
- Maintain active communication with the City
- Convene meetings regularly, every three to four weeks, with the City and consultant team to report on:
 - Task progress
 - Problems encountered
 - Progress in reporting
- Manage the project, including scope, schedule and budget and subconsultant fees and expenses
- Prepare monthly invoices

Deliverables

- Presentations describing progress on the Tasks described below
- Monthly consolidated invoices submitted to the City
- Provide updated schedule of tasks

Assumptions

- Regular updates will be provided as agreed upon between the Geosyntec team and the City

BUDGET

As previously discussed, Phase 2, will occur in four distinct pieces:

- Phase 2a. QAPP development, to be completed via separate scope of work and agreement amendment.
- Phase 2b. Part 1: Conduct Field Work, to be developed based on the completed and approved QAPP.
- Phase 2b, Part 2: Task 2.2 (Part 2) Task 2.3, Task 2.4, Task 2.9 (Part 2). This work would be done based on a funding request in November, 2021 and intended to run through May 2022.
- Phase 2b, Part 3: Task 2.2 (Part 3), Task 2.5, Task 2.6, Task 2.7, Task 2.8, and Task 2.9 (Part 3). This work would be done following completion of some or all of the field work. It is assumed that a funding request would be made in May, 2022, and that this phase would run from June, 2022 through June, 2023.

Table 1, below provides the detailed cost estimate for Phase 2b, Part 2 only. The total fee for Phase 2b, Part 2, is \$127,500, on a time and materials basis. This budget estimate includes a 3% communications fee on Geosyntec labor only and a 10% markup on subconsultant labor and any expenses. This is based on the Geosyntec standard rate schedule as provided under the original contracts from June 8, 2021. Labor rates are adjusted to reflect the 2022 rates for each firm since this work will most likely begin in 2022. If we do start in 2021 then 2021 rates will be used for work conducted in 2021.

Task	Description	Total Cost
2A	QAPP Development	Approved
2.1	Field Work	Separate Request Coming
2.2, Part 2	Stakeholder Involvement, Next 6 months	\$57,500
2.2, Part 3	Stakeholder Involvement, Subsequent	Part of next funding request
2.3	Implement Short-Term Wins	\$34,000
2.4	Funding Strategy and Implementation	\$9,800
2.5	Field Data Analysis	Part of next funding request
2.6	Develop and Analyze Hydrologic and Nutrient Budget	Part of next funding request
2.7	Identify Management Strategies	Part of next funding request
2.8	Develop LCMP (Lake Cyanobacteria Management Plan)	Part of next funding request
2.9, Part 2	Project Management, Next 6 months	\$24,800
2.9, Part 3	Project Management, Subsequent	Part of next funding request
	Total, Phase 2b, Part 2	\$126,100
	Communications Fee, 3% (on Geosyntec labor only)	\$1,400
	Total, Phase 2b, Part 2, including Communications Fee	\$127,500

CLOSURE

If you have any questions regarding our draft scope of work for Phase 2b, Part 2, please feel free to contact me at (971) 271-5906/(503) 936-0115, or by email at RAnnear@geosyntec.com.

Thank you for the opportunity to submit this draft scope of work for your consideration.

Respectfully,

Robert Annear, Ph.D., P.E. (OR, WA, ID, FL, NC)
 Senior Principal Engineer
 971.271.5906
RAnnear@geosyntec.com
 Geosyntec Consultants

Sean Ragain, RG
 Senior Principal and Vice President
 971.271.5907
SRagain@geosyntec.com
 Geosyntec Consultants

APPENDIX: LAKE CYANOBACTERIA MANAGEMENT PLAN OUTLINE

Title Page with Approvals

Table of Contents

Table of Figures and Tables

Executive Summary

1. Background

1.1. Introduction and problem statement

1.1. Study area

1.1.1. Lake and Watershed

1.1.2. Water Quality History of the study area

1.1.3. Current Conditions

1.1.4. Community Involvement

1.1.5. Summary of previous studies and existing data

1.2. Water quality impairment studies

2. Project Description

2.1. Project goals and objectives

2.2. Information needed and tasks required

2.3. Systematic planning process

3. Monitoring Methods and Results

3.1. Monitoring Methods

QAPP

3.2 Monitoring Results

3.2.1. Lake Level, Inflows and Outflows

3.2.2. Lake water quality monitoring-field measurements

3.2.3. Phytoplankton Sampling

3.2.4. Vegetation Surveys

3.2.5. Shoreline modification survey

3.2.6. Lake sediment sampling

4. Hydrologic Budget
 - 4.1. Components
 - 4.2. Inflows
 - 4.3. Outflows
5. Nutrient Budget and Phosphorus Model
 - 5.1. External phosphorus loading
 - 5.2. Internal phosphorus loading
 - 5.3. Phosphorus Analytical model
6. Management Methods for Cyanobacteria Control and Lake Restoration
 - 6.1. Direct Algae Control
 - 6.2. Internal Loading Control Methods
 - 6.3. External Loading Control Methods
7. Management Methods Rejected
8. Recommended Management/Lake Restoration Plan
9. Future Monitoring and Adaptive Management
10. Funding Strategy
11. Roles and Responsibilities
12. References