

C-43 West Basin Storage Reservoir Water Quality Feasibility Study

Deliverable 1.2.2 FINAL Study Work Plan

Prepared for
South Florida Water Management District



September 6, 2019

Prepared by
J-Tech, an alliance of Jacobs and Tetra Tech



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Appendix

Appendix A Project Schedule

LIST OF ACRONYMS

CERP	Comprehensive Everglades Restoration Plan
DEP	Department of Environmental Protection
HAB	Harmful Algae Bloom
LA-MSID	Lehigh Acres Municipal Services Improvement District
NEEP	Northern Everglades and Estuary Protection Program
NTP	Notice to Proceed
PDF	Portable Document Format
QA	Quality Assurance
SFWMD	South Florida Water Management District
SME	Subject Matter Expert
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
WBSR	West Basin Storage Reservoir
WQFS	Water Quality Feasibility Study
WSI	Wetland Solutions, Inc.

1.0 Background/Introduction

1.1 Project Purpose

J-Tech has been selected for the completion and delivery of the C-43 West Basin Storage Reservoir (WBSR) Water Quality Feasibility Study (Study). The objectives of the Study are to: (1) conduct a review of existing pertinent studies/literature; (2) review and evaluate applicable water quality treatment technologies suitable for use; (3) conduct public meetings; (4) prepare a cost-benefit, alternatives, and trade-off analysis from which cost-effective, available, technically feasible, and conventional and innovative biological, chemical, and physical treatment technologies for water quality improvement for eventual pre-treatment, in-reservoir treatment, and/or post-treatment application to the C-43 WBSR, and (5) identify cost-effective options that reduce discharge of nutrients which may contribute to blue-green algal blooms from the C-43 WBSR to the downstream Caloosahatchee Estuary. The Study will need to consider and maintain the current Comprehensive Everglades Restoration Plan (CERP) construction schedule and congressionally approved project purposes for the C-43 WBSR.

CERP was authorized by Congress in 2000. Since CERP was approved, progress in the planning, design, construction, and operation of South Florida ecosystem restoration projects has been made. The C-43 WBSR is one of 68 components authorized under CERP and is currently under construction. It is imperative that the current C-43 WBSR construction schedule and all project purposes are not impacted by the recommendations ultimately provided in the Study.

To examine conventional and innovative biological, physical, and chemical technologies available and applicable for reducing nutrient loading from C-43 WBSR or potential algal biomass within the C-43 WBSR, the South Florida Water Management District (SFWMD), Florida Department of Environmental Protection (DEP), and local governments are partnering to develop the Study. Collectively, representatives of SFWMD, DEP, Hendry County, Lee County, City of Cape Coral, City of Sanibel, and Lehigh Acres Municipal Services Improvement District (LA-MSID) make up the C-43 WBSR Water Quality Feasibility Study Working Group (Working Group) for the Study. Additional local governments within the Caloosahatchee Basin may join the Working Group. The Working Group will provide guidance to the SFWMD Project Manager responsible for administering the contract and acting as the liaison between the Working Group and the Study Consultant (J-Tech).

1.2 Project History

On January 10, 2019, Governor Ron DeSantis signed Executive Order 19-12, calling for greater protection of Florida's environment and water quality. The Executive Order directed the state agencies to take a more aggressive approach to address some of the environmental issues plaguing the state, with a significant emphasis on South Florida and the harmful algal blooms (HABs) associated with blue-green algae. Specifically, the Executive Order directed DEP to "work with the SFWMD to add stormwater treatment to the C-43 Reservoir to provide additional treatment and improve the quality of water leaving this important storage component" of CERP.

The C-43 WBSR project is designed to capture and store water during Florida's rainy season and provide dry-season flows to the estuary. The reservoir is under construction on a 10,500-acre parcel owned by SFWMD in Hendry County (**Figure 1**) and is a 50-50 cost share between SFWMD and the U.S. Army Corps

of Engineers. Depending on storage needs, water depth in the reservoir will range from 15 to 25 feet. Water stored in the reservoir is protected by a water reservation rule and will be released on a regulated schedule to meet minimum flow requirements at the S-79 structure (Franklin Lock and Dam) during dry season low flow conditions. This project is one component of a larger restoration project for the Caloosahatchee River and Estuary, and will comprise a significant portion of the overall water storage requirement for the Caloosahatchee River Basin.

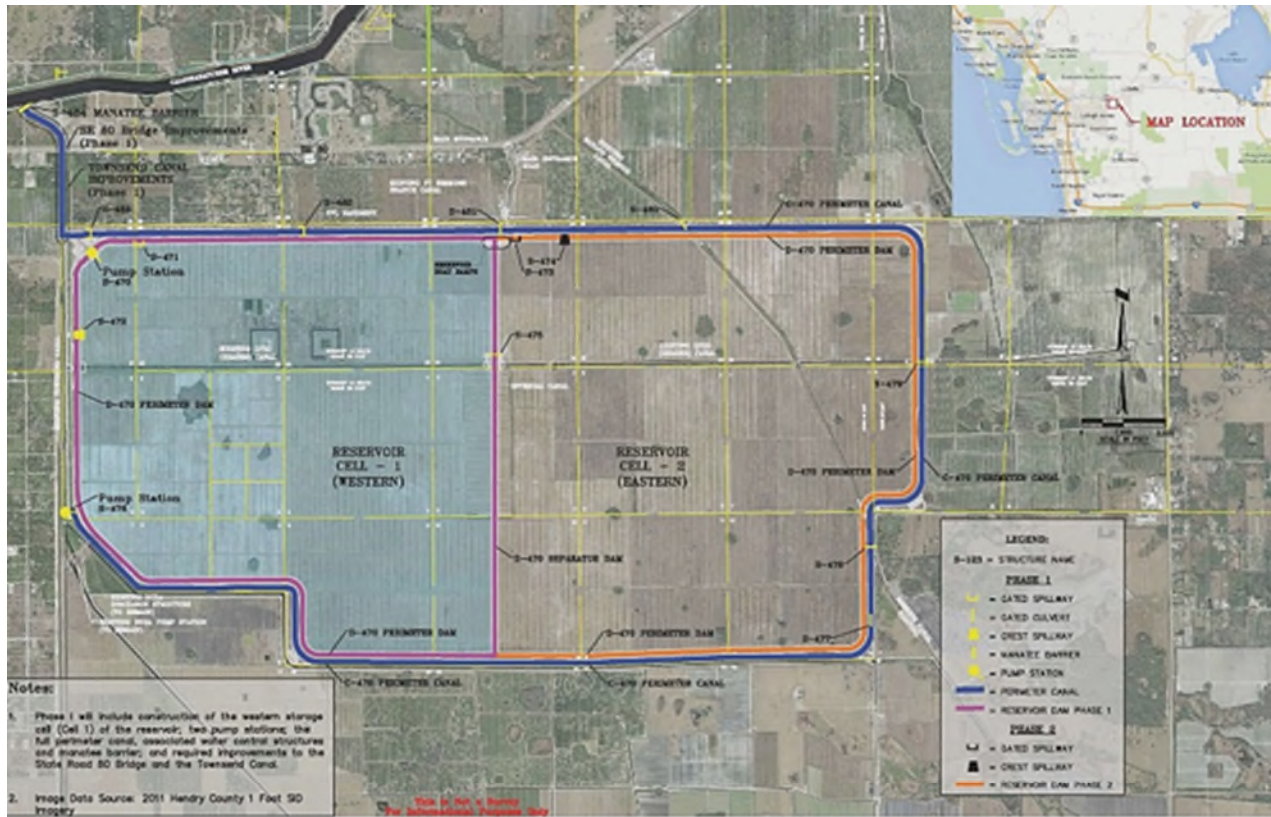


Figure 1. C-43 West Basin Storage Reservoir

The C-43 WBSR will serve multiple purposes. It is intended to support restoration of flows to the Caloosahatchee Estuary by attenuating peak stormwater flows during the wet season and providing additional baseflow to the estuary during the dry season. The reservoir will capture and store a portion of the basin runoff and regulatory releases from Lake Okeechobee, reducing the frequency and volume of discharges to the Caloosahatchee Estuary during the wet season. In addition, it is envisioned to provide public access and recreational opportunities, and the perimeter canal is intended to maintain allocated water supply to the local agricultural areas adjacent to the reservoir.

It is imperative that releases from the C-43 WBSR do not contribute to impairments of downstream water quality constituents compared to existing conditions in the Caloosahatchee River Basin. DEP has identified the Caloosahatchee Estuary to be impaired for total nitrogen (TN). DEP has not identified the Caloosahatchee Estuary to be impaired for total phosphorus (TP), but this nutrient should be considered for reduction as well. The reduction of nutrient concentrations and loads to these waterbodies is required by the Northern Everglades and Estuary Protection Program (NEEPP) passed by the Florida

Legislature and signed into law in 2007 and amended in 2016, and by the Caloosahatchee Estuary Total Maximum Daily Load (TMDL) adopted in 2009 by DEP.

2.0 Project Team and Accomplishment of Work

2.1 Project Management Structure

The SFWMD Project Manager is Kim Fikoski. Ms. Fikoski will be the principal point of contact between SFWMD and J-Tech on all contract and technical matters related to the Study. The J-Tech Contract Manager is Shawn Waldeck, P.E. Mr. Waldeck will be the main point of contact for the Study Work Order and contract-related issues. The J-Tech Deputy Project Manager is Georgia Vince. Ms. Vince will be the lead point of contact for the Study Work Order including work products, schedule, and Working Group coordination. The Wetland Solutions, Inc. (WSI) Project Manager is Chris Keller, P.E. Mr. Keller will be the principal point of contact on all contract and technical matters between WSI and SFWMD. The Ingenuity Lab Project Manager is Dave Fleming. Mr. Fleming will be facilitating the public meetings under Task 3. **Table 1** provides a complete list of project contacts. **Figure 2** provided below shows the organization structure and responsibility for the operations of the project as well as individual subject matter experts (SME).

Table 1. Project Contact List

Staff Member	Office Phone #	Cell Phone #	E-mail
SFWMD			
Kim Fikoski	239-338-2929 x 7737	239-851-3487	kfikoski@sfwmd.gov
Ansley Marr	561-682-6419		amarr@sfwmd.gov
Jose Otero	561-682-6578	561-312-2526	jotero@sfwmd.gov
Matt Morrison	561-682-6844	772-631-2698	mjmorris@sfwmd.gov
J-Tech			
Shawn Waldeck	561-799-3855	561-846-2858	Shawn.Waldeck@jacobs.com
Georgia Vince	772-781-3441	561-236-8692	Georgia.Vince@tetrattech.com
Jim Bays	813-281-7705	813-765-9286	Jim.Bays@jacobs.com
Marcy Frick	850-536-8115	904-476-3141	Marcy.Frick@tetrattech.com
Wetland Solutions, Inc.			
Chris Keller	386-462-9286	352-262-3098	ckeller@wetlandsolutionsinc.com
Dr. Bob Knight	386-462-9286	352-538-6620	bknight@wetlandsolutionsinc.com
Ingenuity Lab			
Dave Fleming		520-289-7411	dave@myingenuitylab.com

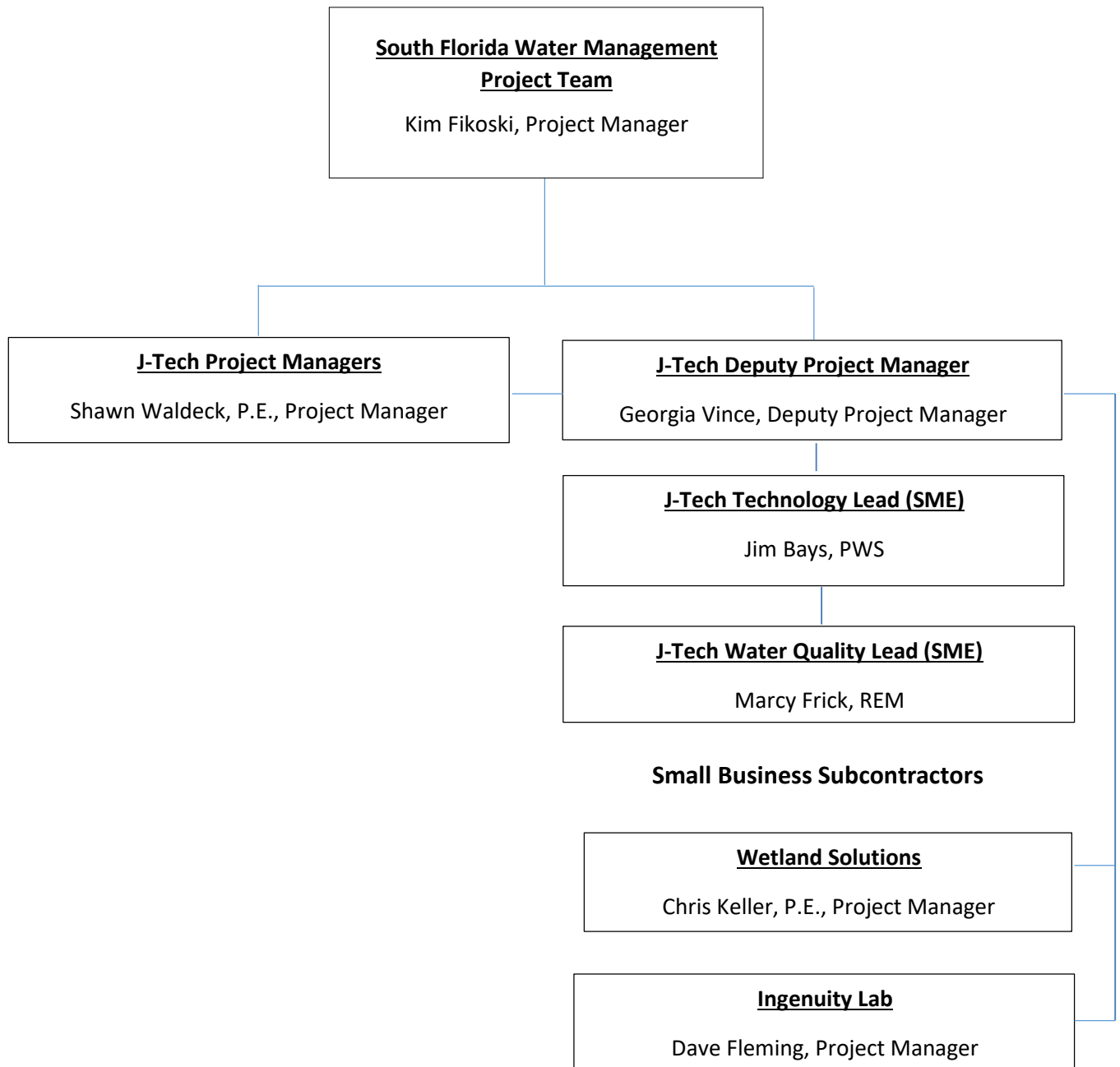


Figure 2. Organizational Chart

2.2 Working Group Team Members

The Study Working Group is made up of several governmental entities including representatives of SFWMD, DEP, Hendry County, Lee County, City of Cape Coral, City of Sanibel, and LA-MSID. The primary individuals and contact information for each member is provided below in **Table 2**. Alternates may attend as needed and will be designated by the primary Working Group member.

Table 2. Working Group Members

Agency/Entity	Contact Name	Phone	Email
SFWMD	Kim Fikoski	239-851-3487	kfikoski@sfwmd.gov
DEP	Ed Smith	850-245-3169	Edward.C.Smith@FloridaDEP.gov
DEP	Alyssa Gilhooly	239-344-5658	Alyssa.Gilhooly@FloridaDEP.gov
Hendry County	Shane Parker	863-675-5222	sparkar@hendryfla.net
Lee County	Roland Ottolini	239-533-8109	rottolini@leegov.com
City of Cape Coral	Maya Robert	239-574-0745	mrobert@capecoral.net
City of Sanibel	James Evans	239-472-3700	James.evans@mysanibel.com
LA-MSID	Michael Cook	239-292-7491	mcook@la-msid.com

2.3 C-43 WBSR Water Quality Feasibility Study SharePoint Site

To coordinate communication among the team (SFWMD staff, J-Tech, subcontractors and Working Group members), a project-specific SharePoint site has been prepared to provide a common documentation location for deliverables, work products, project calendar, and available literature/studies. The SharePoint site will be accessible to users via the internet. Permissions settings will be visitors (read only), members (edit/contribute), and administrators (full control). The site will include versioning and history control for all document libraries. The site will allow both internal and external access. The SFWMD Project Manager and Georgia Vince of J-Tech will have full control to add other members (internal or external), as needed.

2.4 SFWMD Website

J-Tech will coordinate with SFWMD staff to prepare a public information website about the Study. The webpage will be updated periodically with important project related data, including public meeting dates, meeting notes/summaries, access to literature to be included in the Study, and other pertinent project information requested or recommended by the Working Group. The webpage content will ultimately be managed by SFWMD staff.

3.0 Work Plan Purpose and Need

To formulate a mutual understanding of available existing data, project coordination, and the expected review process, J-Tech has developed this Work Plan for the Study and has coordinated closely with SFWMD staff to define related technical details and develop an overall project schedule (Appendix A). The intent of this Work Plan is to define the roles and responsibilities of J-Tech, SFWMD, and the Working Group consistent with SFWMD Work Order No. 4600003984-WO1.

Task 1 of this Work Plan defines the staffing plan and participation necessary to support project coordination through meetings with SFWMD's Project Manager and the Working Group and includes the scope development of this Study Work Plan. Task 2 defines the staffing, methodologies, and tasks necessary for developing an Information Collection Summary Report as the result of a literature review and an overview of the available treatment technologies. Task 3 of this Work Plan defines the roles and responsibilities for the four (4) public meetings. Task 4 defines the staffing plan and the methodologies to develop the Study with cost-benefit, alternatives, and trade-off analysis, as well as recommendations.

3.1 Task 1: Meetings and Work Plan

3.1.1 Kickoff Meeting

J-Tech attended and facilitated a half-day informal kick-off meeting at the SFWMD's Fort Myers Service Center on July 3, 2019 with SFWMD staff and Working Group members. The objective of this meeting was to introduce the Working Group and J-Tech's team members and define their roles. There was also discussion about J-Tech's proposed approach that includes a detailed overview of the study's objectives, workplans, methods, work breakdown structure, schedule, team members and roles, and required deliverables. The J-Tech Team also took the opportunity to present additional details related to major components of the project including C-43 WBSR, treatment wetland technologies, water quality treatment technologies, and watershed and water quality modeling updates with the intent of integrating the information into future tasks.

The Project Kick-off Meeting Summary was provided to SFWMD on July 15, 2019, which included the sign in sheet and action items.

Deliverable 1.1.1: Study Kick-off Agenda, Presentations, Facilitation, and Meeting Summary

3.1.2 Study Work Plan

J-Tech Team has developed this detailed draft Work Plan for completing Tasks 1 through 4 and will describe the objectives for each task in detail, major questions addressed by each task, rationale for the task, and detailed methods that incorporate conclusions reached during the project kick-off. This Work Plan includes:

1. A description of the Study that reflects J-Tech's understanding of the C-43 WBSR goals and objectives as they align with the Study's goals, objectives, and associated tasks;
2. The methodologies for how the tasks will be accomplished, including staff roles;
3. The specific deliverables expected for each task;
4. The format(s) of documents to be provided to SFWMD; and
5. A Gantt chart with the schedule of tasks/deliverables (**Appendix A**).

Deliverable 1.2.1: Draft Study Work Plan

The Working Group will provide review comments on the Draft Study Work Plan within two (2) weeks of receipt via the SFWMD Project Manager and the SharePoint site. J-Tech will submit a Final Study Work Plan incorporating the Working Group comments within two (2) weeks following receipt and resolution of the comments.

Deliverable 1.2.2: Final Study Work Plan

The SFWMD Project Manager will approve the Final Study Work Plan, and any subsequent SFWMD-approved revisions, and it will become a binding document for this Work Order once the SFWMD's Project Manager has agreed to it in writing. J-Tech will proceed with the performance of this Work Order in accordance with the approved Final Study Work Plan and any subsequent SFWMD-approved revisions, as well as the requirements of the Statement of Work. In the event of any conflict between the Statement of Work and the Final Study Work Plan, the Statement of Work will take precedence. To ensure the Study Statement of Work remains in accordance with the Working Group, the SFWMD

Project Manager, as the Working Group liaison, must provide approval of any revisions to Study Work Plan prior to J-Tech proceeding with work.

3.1.3 Monthly and Quarterly Progress Meetings

The J-Tech Team will prepare for, attend, and facilitate monthly progress review meetings with SFWMD including agendas and monthly progress status reports to update on progress towards the Statement of Work. Monthly progress meetings will take place via teleconference or web meeting. Approximately twelve (12) meetings are budgeted with up to six (6) being held in-person in Fort Myers. The J-Tech representatives at each meeting will include Georgia Vince and Marcy Frick. Shawn Waldeck will attend as needed.

J-Tech will conduct quarterly progress meetings with the Working Group at the SFWMD Fort Myers Service Center to update on progress towards the Statement of Work. Approximately four (4) quarterly progress meetings will be scheduled. J-Tech will prepare and distribute the agenda and meeting notes for each progress meeting. These meetings will be attended by the J-Tech's Deputy Project Manager and members of the J-Tech Team, SFWMD Project Manager, Working Group members, and others as needed based on the progress of the project. Other attendees may participate via conference call. The first Quarterly Meeting has been scheduled for August 28, 2019 in advance of the first public meeting.

The Monthly and Quarterly Project Status Reports will include, but not necessarily be limited to, the following:

1. Activities accomplished;
2. Problems and present concerns encountered in the Study;
3. Planned actions; and
4. Updated Study Schedule.

Deliverable 1.3.1: Monthly Progress Agenda and Meeting Minutes

Deliverable 1.3.2: Quarterly Progress Agenda and Meeting Minutes

3.2 Task 2. Information Collection and Review

J-Tech will prepare draft and final versions of the Information Collection Summary Report (literature review) covering the following key topics:

- C-43 WBSR design and operational information
- Water quality and watershed assessments of the Caloosahatchee River Basin;
- Techniques for improving water quality in the Caloosahatchee River Basin; and
- Prevention and management of blue-green algae blooms in similar waterbodies.

The Information Collection Summary Report will selectively review water quality assessments and technologies that could be implemented to improve the quality of water in the C-43 WBSR and its discharge to the Caloosahatchee River. The Information Collection Summary Report will include documentation of the work performed and a list of documents reviewed.

3.2.1. Draft Information Collection Summary Report

A Draft Information Collection Summary Report will be prepared that compiles pertinent information on the key topics of Caloosahatchee River Basin water quality, water quality improvement technologies,

and blue-green algae ecology and management. Specific information needs are described in the following sections.

Documents to be reviewed will be identified and selected from these general topic categories:

- Applicable watershed assessments;
- Basin-specific feasibility studies/water quality improvement strategies;
- DEP Technology Library for Water Issues;
- Existing C-43 WBSR design information documents;
- Existing C-43 WBSR water quality testing documents;
- Previous treatment technology assessments by SFWMD and DEP; and
- Published literature on algae and nutrient management and control with a focus on water bodies similar to the Caloosahatchee River Basin.

J-Tech will obtain the above documents in electronic format from all available sources, including the Working Group and other public sources. Documents will be identified through review of the initial document list provided in **Table 3**, existing literature files by project team members, and through copies and direct links provided by Working Group members. Other documents will be identified through focused keyword searches and retrieved from existing public internet sites (e.g., www.sfwmd.gov, floridadep.gov) and selected search engines (e.g., Google, Scopus, Science Direct).

Upon retrieval of the documents, the J-Tech team will quickly review the document to confirm relevance, record the citation information into a standardized bibliographic format, and categorize the document to correspond to the key areas of interest of the project (i.e., Caloosahatchee River, blue-green algae management, treatment technology). Documents will be pre-sorted for review and assigned to J-Tech staff for review and retrieval of technical content by focus areas, as described in the following sections. Copies of documents will be compiled on the C-43 WQFS SharePoint and the SFWMD Study webpage and organized into folders labeled by the key areas of interest.

Caloosahatchee River Basin Water Quality

This section of the Information Collection Summary Report will provide an overview of water quality conditions in the Caloosahatchee River Basin. Factors that have contributed to blue-green algae blooms in the Caloosahatchee River Estuary and similar subtropical estuaries, such as excessive nutrients in runoff and lake releases, seasonal differences, and climate, will be described.

The literature review and data extraction effort will focus on summarizing available information on the values and dynamic range of nitrogen and phosphorus species and algal communities within the Caloosahatchee River Basin, including expected seasonality and factors affecting concentration ranges. Nutrient and solids loads within the Caloosahatchee River Basin will be summarized. Adverse effects of prior algal bloom incidents will be summarized.

The Governor's executive order also created the Blue-Green Algae Task Force which will be reviewing algae specific treatment technologies through a separate process. The Study may consider some of the technologies that are vetted by the Task Force. Algae control methods known to have been implemented in the South Florida environment will be identified and their effectiveness will be summarized in the Study.

Technologies for Improving Water Quality in the Caloosahatchee River Basin

This section will prepare a summary of available, technically feasible, conventional and innovative biological, chemical, and physical treatment technologies for water quality improvement for eventual pre-treatment, in-reservoir treatment, and/or post-treatment application to the C-43 WBSR. Conventional technologies to be considered include, but are not limited to, physical and chemical methods used in water treatment, wastewater treatment, and environmental remediation. Physical methods separate solids from water by use of filtration technologies. Chemical methods remove solids or nutrients by introducing a chemical compound to coalesce particles for enhanced settling or to inactivate nutrients. Natural treatment systems include, but are not limited to, ponds; treatment wetlands dominated by emergent aquatic vegetation, floating aquatic vegetation, submerged aquatic vegetation, periphyton, or mixed marsh; and media filtration systems, such as vertical downflow subsurface flow systems (managed and passive).

In a summary format, J-Tech will describe performance-related factors useful for evaluation and selection of treatment technologies. The literature review and data extraction effort will focus on summarizing available information on nutrient concentration reduction, nutrient load reduction, literature-based unit costs (e.g., cost per unit area or per unit volume), scalability, connectivity to C-43 WBSR, operation and maintenance requirements, regulatory constraints, schedule for implementation, general land area requirements, undesirable byproducts and implications of additional treatment requirements, energy requirements, and ancillary benefits (e.g., wildlife habitat creation). A conceptual nutrient concentration range will be developed based upon the results of the Caloosahatchee River Basin data summary and used to establish a standardized basis of comparison for assessing reduction of nutrients and algal concentrations, where applicable, across all technologies. The evaluation of cost-benefit, alternatives, trade-offs, and presentation of results in a matrix format will be produced under Task 4. Findings of the treatment technology review will be presented to the Working Group for discussion and to obtain concurrence during scheduled meetings.

As part of the review, operational strategies for the C-43 WBSR will be investigated and summarized that could be incorporated into the reservoir project without causing impact to the schedule of implementation or other project objectives. It can be expected that individuals from the public may present new water quality treatment technologies that have not been previously vetted by DEP or SFWMD. Any new treatment technologies that have *not* previously been included in the DEP Technology Library for Water issues (http://fldeploc.dep.state.fl.us/tech_portal/search.asp) that are presented to any member of the team will need to provide sufficient details and data to support the implementation of the technology and will be screened by the team for potential inclusion in the Study. The Working Group will also have the opportunity to review potential technologies and may propose the technology be submitted to DEP for review and inclusion, in the Technology Library, if appropriate. The Study may also consider some of the technologies that are vetted by the Blue-Green Algae Task Force.

Based upon the results of this summary, the J-Tech Team will provide an overview for up to 25 applicable treatment technologies identified from the literature review, to be further evaluated under Task 4. A narrative will be included describing the basis for selection of the 25 applicable technologies and a rationale for excluding remaining technologies.

Prevention and Management of Blue-Green Algae Blooms and Causal Factors in Similar Waterbodies

This section will summarize current literature on the factors that are known to control blue-green algae blooms and their causal factors, particularly nutrients. The literature review and data extraction effort will focus on summarizing available information on factors affecting algal growth potential pertinent to the operation and environmental setting of the C-43 WBSR. These factors will include nutrient concentration ranges and ratios, algal community composition and biomass. Emphasis will be placed on identifying literature and findings from water bodies similar to the Caloosahatchee River Basin and the C-43 WBSR.

The Draft Information Collection Summary Report will be submitted at a minimum of eight (8) months from notice to proceed (NTP) and will demonstrate the J-Tech Team has full understanding of the information reviewed and restate that knowledge to the Working Group. The Working Group will provide review comments on the Draft Information Collection Summary Report within two (2) weeks of receipt via the SFWMD Project Manager and the SharePoint site. J-Tech will submit a Final Information Collection Summary Report incorporating the Working Group comments within two (2) weeks following receipt and resolution of the comments.

The J-Tech Team leads, quality assurance (QA) reviewers, and technical editors assigned to develop the Task 2 report are summarized in **Table 4**.

The report is anticipated to conform to the following abbreviated outline:

- Executive Summary
- Introduction/Background
- Summary of Potential Water Quality Issues Related to the C-43 WBSR Project
- Treatment Technologies Identification and Description
 - Reservoir Pre-treatment
 - Natural Treatment Alternatives
 - Conventional Treatment Alternatives
 - In-Reservoir Treatment
 - Natural Treatment Alternatives
 - Conventional Treatment Alternatives
 - Post-reservoir Treatment
 - Natural Treatment Alternatives
 - Conventional Treatment Alternatives
- Treatment Technology Ranking (Top 25)

Deliverable 2.1: Draft Information Collection Summary Report

3.2.2 Final Information Collection Summary Report

The Working Group will provide review comments on the Draft Information Collection Summary Report within two (2) weeks of receipt via the SFWMD Project Manager. J-Tech will submit a Final Information Collection Summary Report incorporating the Working Group comments within two (2) weeks following receipt and resolution of the comments.

Deliverable 2.2: Final Information Collection Summary Report

Table 3. Available Reference List

Item	Available Reference	Date	Source
1	Treatment Wetlands – 1 st Edition (Kadlec and Knight)	1996	CRC Press
2	Constructed Wetlands for Pollution Control	2000	IWA
3	Advanced Treatment Technologies for Treating Stormwater Discharges into Everglades Protection Area (Chapter 4: Everglades Consolidated Report)	2001, 2001, 2003	SFWMD
4	PSTA Research and Demonstration Project Phase 1, 2, and 3 Summary Report	2003	CH2M HILL
5	Existing Treatment Facilities Evaluation	2004	WSI
6	Water Quality Assessment Report Caloosahatchee	2005	FDEP
7	Caloosahatchee River/Estuary Nutrient Issues White Paper	2005	SFWMD
8	Small Scale Constructed Wetland Treatment Systems: Feasibility, Design Criteria and O&M Requirements – 1 st Edition (Scott Wallace & Rob Knight)	2006	IWA
9	Lake Hancock Outfall Treatment Project Alternative Treatment Technologies Evaluations	2007	Parsons, ERD, and WSI
10	C-43 Water Quality Treatment and Demonstration Project: Total Nitrogen Reduction Technologies Review	2008	CH2M HILL
11	Treatment Wetlands – 2 nd Edition (Kadlec and Wallace)	2008	CRC Press
12	Technical Assistance for the Northern Everglades Chemical Treatment Pilot Project	2009	SFWMD
13	Current Research and Trends in Alum Treatment of Stormwater Runoff	2009	H. Harper
14	Natural Systems for Wastewater Treatment	2010	WEF
15	C-43 Water Quality Treatment Area – Expert Review Panel Consolidated Report	2010	WSI
16	Evaluate Wetland Systems for Treated Wastewater Performance to Meet Competing Effluent Water Quality Goals	2011	SFWMD & Bureau of Reclamation
17	Evaluation of Total Nitrogen Reduction Options for the C-43 Water Quality Treatment Area Test Facility	2012	WSI
18	Conceptual Design of C-43 Water Quality Treatment Area Nutrient Removal/Reduction Test Facility – Final Report	2012	WSI
19	Alternative Treatment Technologies Evaluations -September 2011 to June 2013	2013	SFWMD

Item	Available Reference	Date	Source
20	New Alternative Technology Assessment (NATA) Program	2013	SFWMD
21	FDEP Technology Library - Approved Water Treatment Technologies	2015	FDEP
22	Harmful Algal Bloom Control Methods		NEIWPC
23	Loveland Water and Power: Algal Mitigation Assessment	2017	Corona
24	Documentation on the Nutrient Reduction Facility	2018	Lake County Water Authority
25	C-43 Water Quality Treatment Area Test Facility – Mesocosm Operation and Sampling	2019	J-Tech & WSI
26	South Florida Environmental Report	2019	SFWMD
27	C-43 Water Quality Treatment Area Test Facility – Final Report	2019	J-Tech & WSI
28	C-43 Reservoir Water Quality Summit: Presentations, Links and Supporting Documentation	2019	SFWMD
29	Ultrasonic Algae Control Technology	2019	LGSonics
30	Protecting Water Quality Using Natural Treatment Systems: Applications of Large-Scale Sand Filters and Constructed Wetlands for Improving Mine Water Quality by J.S. Bays et al	2019	American Institute of Chemical Engineers

Table 4. J-Tech Leads, QA Reviewers, and Technical Editors for Task 2

Task 2 Section	Description of Work	SME/Technical Staff Lead	QA Reviewer	Technical Editor
2.1.1	C-43 Design Information	Shawn Waldeck, P.E.	Rebecca Serra, P.E.	Dave Gravender
2.1.2	C-43 Water Quality Testing	Chris Keller, P.E.	Georgia Vince	Dave Gravender
2.1.3	Watershed Assessments	Marcy Frick, REM	Lisa Canty	Dave Gravender
2.1.4	DEP Treatment Technologies	Jim Bays, PWS	Stuart McGahee, P.E.	Dave Gravender

3.3 Task 3. Public Involvement

J-Tech will work with the SFWMD Project Manager to coordinate, organize, and facilitate public involvement for this project including coordination and identifying meeting goals. The J-Tech Team

includes Dave Fleming of the Ingenuity Lab to lead the meetings and act as the meeting facilitator. The Statement of Work includes four (4) public meetings. The anticipated meeting dates and locations are summarized in **Table 5**, which includes one evening meeting to accommodate working members of the public. Three (3) meetings will be held in Lee County and one (1) meeting will be held in Hendry County. The J-Tech staff attending each meeting include Georgia Vince, Marcy Frick, Jim Bays, and Chris Keller (WSI).

Dave Fleming with Ingenuity Lab will coordinate with the Working Group to identify the key outcomes for each meeting so that he can structure each meeting agenda and discussion to achieve those outcomes. As facilitator, he will ensure that all voices are heard during the meeting while keeping the discussion focused on the Study and the input needed at that stage in the process. A meeting management tool such as “Menti” may be utilized to track public comments, questions, and feedback during the meetings. The meetings may be audio and/or video recorded by the SFWMD communication group and the recordings may be posted to the internet for the public to access. The specific intent of each meeting is described below.

Table 5. Anticipated Meeting Dates

Meeting Number	Potential Date(s)	Location
1	September 27, 2019 2-4 pm	The Collaboratory, 2031 Jackson Street, Suite 100, Fort Myers, FL 33901
2	January 10, 2020 2-4 pm	Hendry County Cooperative Extension Services, 1085 Pratt Boulevard, LaBelle, FL 33935
3	March 25, 2020 (evening) 6-8 pm	The Collaboratory, 2031 Jackson Street, Suite 100, Fort Myers, FL 33901
4	July 16, 2020 2-4 pm	The Collaboratory, 2031 Jackson Street, Suite 100, Fort Myers, FL 33901

3.3.1 Public Meeting 1

An initial public meeting will be held about three (3) months after notice to proceed to review studies and literature that J-Tech has identified to date and to solicit input on additional information that should be reviewed for potential pre-treatment, in-reservoir treatment, and/or post-treatment application to the C-43 WBSR. The feedback obtained during the public meeting will be evaluated and used, as appropriate, in the Draft Information Collection Summary Report identified in Task 2.

Deliverable 3.1.1: Initial Public Meeting, Agenda/Materials, and Meeting Notes

3.3.2 Public Meeting 2

The second public meeting will be scheduled approximately three (3) months after the initial public meeting to provide an update on the literature and data review and to discuss the feasibility of pertinent studies and literature with information on conventional and innovative biological, physical, and chemical treatment technologies to the C-43 WBSR. The feedback obtained during the public meeting will be evaluated and used, as appropriate, to further improve the Draft Information Collection Summary Report identified in Task 2.

Deliverable 3.1.2: Second Public Meeting, Agenda/Materials, and Meeting Notes

3.3.3 Public Meeting 3

The third public meeting will be scheduled approximately three (3) months after the second public meeting. This meeting will occur prior to the completion of the Preliminary Draft Feasibility Study to present findings of the Final Information Collection Summary Report and take public comment. The feedback obtained during the public meeting will be evaluated and used, as appropriate, to further improve the Preliminary Draft Feasibility Study produced under Task 4.

Deliverable 3.1.3: Third Public Meeting, Agenda/Materials, and Meeting Notes

3.3.4 Public Meeting 4

The fourth and final public meeting will be scheduled approximately three (3) months after the third public meeting. This meeting will occur prior to completion of the Draft Feasibility Study to present findings and take final public comment. The feedback obtained during the public meeting will be evaluated and used, as appropriate, to further improve the Draft Feasibility Study produced under Task 4.

Deliverable 3.1.4: Fourth Public Meeting, Agenda/Materials, and Meeting Notes

The J-Tech Team will combine the meeting notes and provide an overall summary of the feedback and main ideas identified in the four public meetings. The meeting summary will capture common comments, concerns or questions that were discussed. The meeting summary will become an appendix to the Study under Task 4.

Deliverable 3.1.5: Summary of all Public Meetings

3.4 Task 4. C-43 WBSR Water Quality Feasibility Study with Cost Benefit, Alternative and Tradeoff Analysis

Using the information in the Final Information Collection Summary Report compiled under Task 2, the J-Tech Team, with input from the Working Group, will identify the most effective 10 technologies to be evaluated for the Study including pre-treatment, in-reservoir treatment, and/or post-treatment applications. Criteria for selection and evaluation will be developed for review and concurrence by the Working Group. The standardized basis of comparison developed during Task 2 will be used to provide direct estimates of nutrient and algal concentration reduction for all technologies. J-Tech will prepare a summary matrix based on the evaluation criteria for 10 alternatives considered including the combination of treatment technologies. The criteria for each alternative considered may include, but is not limited to, the same criteria utilized in Task 2 to identify and compare attributes of each technology. The estimated literature based total lifecycle cost of proposed alternatives will be included in the matrix evaluation, including but not limited to, long-term monitoring and reporting requirements. If appropriate, criteria will be weighted and the basis for weighting will be described.

J-Tech will summarize and compile the technology matrix and supporting information into a C-43 WBSR Water Quality Feasibility Study Report (Report). The Report will be prepared and submitted in Preliminary Draft, Draft, and Final versions with review of each version by the Working Group. Each draft will be reviewed by a QA reviewer and formatted by a technical editor, prior to submittal. It is

envisioned that the study will include, but not be limited to, the sections listed below; however, this is subject to refinement by the SFWMD Project Manager and/or Working Group.

1. Executive Summary
2. Introduction/Background
3. Identify Problems, Constraints, and Opportunities
4. Formulate Alternatives
5. Evaluate Alternatives
6. Compare Alternatives
7. Recommendations and Next Steps
8. Appendices:
 - a. Review of Literature Specific to the Water Quality of the Caloosahatchee River Basin
 - b. Review of Literature on Blue-Green Algae Management and Control in Other Similar Waterbodies
 - c. Review of Feasible Water Quality Treatment Technologies
 - d. Public Meeting Summary and Materials

3.4.1 Subtask 4.1: Preliminary Draft Feasibility Study

The Preliminary Draft Feasibility Study will be submitted to the SFWMD Project Manager at a minimum of 12 months from NTP. The Working Group review and comments on the Preliminary Draft Feasibility Study will be completed and provided to J-Tech by the SFWMD Project Manager and the SharePoint site no later than four (4) weeks after receipt of the Preliminary Draft Feasibility Study.

Deliverable 4.1.1: Preliminary Draft Feasibility Study

3.4.2 Subtask 4.2: Draft Feasibility Study

The J-Tech Team will submit a Draft Feasibility Study that addresses all comments/edits to the satisfaction of the Working Group within four (4) weeks of receiving the comments from the SFWMD Project Manager. The Working Group review and comments on the Draft Feasibility Study will be completed and provided to J-Tech by the SFWMD Project Manager and the SharePoint site no later than four (4) weeks after receipt of the Draft Feasibility Study.

Deliverable 4.2.1: Draft Feasibility Study

3.4.3 Subtask 4.3: Final Feasibility Study

The Final Feasibility Study will be submitted within four (4) weeks of receiving the Draft Feasibility Study Report comments from the SFWMD Project Manager. The Final Feasibility Study Report will identify a minimum of the three (3) most cost-effective and technically feasible, conventional and innovative biological, chemical and physical water quality treatment technologies currently available at a scale necessary (or ready to be scaled) for long-term pre-treatment, in-reservoir treatment, and/or post-treatment options that limit conditions suitable for blue-green algal bloom development and/or conditions that improve the quality of water leaving the C-43 WBSR to the Caloosahatchee River and its downstream estuarine ecosystem, while maintaining the current C-43 WBSR construction schedule and project purpose. Within four (4) weeks following the Final Feasibility Study Report submittal, J-Tech will coordinate, organize, and facilitate an overview and findings presentation of the Study at a location to be determined.

Deliverable 4.3.1: Final Feasibility Study

Deliverable 4.3.2: Presentation of Final Feasibility Study, Presentation Materials, and Meeting Notes

For the purposes of this Study, no more than a concept plan, along with conceptual cost-benefit, alternatives, and trade-off analysis will be prepared for each alternative. After the Final Feasibility Study Report presentations are complete, the Working Group will review the alternatives and trade-offs to determine which alternative(s) will move forward for preliminary (30%) engineered design, which will be scoped under a separate contract.

4.0 Deliverables and Quality Certificate of Compliance

For each deliverable, J-Tech will submit one (1) electronic copy and two (2) hard copies. All project deliverables (e.g., reports, presentations, and spreadsheets) will be compatible with Microsoft Office Professional 2010 and included on the project SharePoint site. All final deliverables will be in portable document format (PDF), distributed to the Working Group via email and included on the project SharePoint site.

A signed *Quality Certificate of Compliance*, as developed by SFWMD, will be submitted for any engineering deliverable. This certificate will confirm that J-Tech has performed all internal quality assurance/quality control reviews, and that the contents of the submittal are complete and meet the requirements as stated in the Work Order. J-Tech will complete the certificate with the required information specific to the deliverable being submitted.

