Luhdorff & Scalmanini
Consulting Engineers

September 3, 2019 LSCE File No. 18-5-034

Ms. Beth Gabor
Mr. David Block
Yolo County Administrator's Office
625 Court Street. Room 202
Woodland, CA 95965

SUBJECT: PROPOSAL TO DESIGN AN ARSENIC TREATMENT SYSTEM FOR THE WILD WINGS COUNTY SERVICE AREA PUBLIC WATER SYSTEM

Dear Ms. Gabor and Mr. Block:

In response to the County of Yolo's (County) acceptance of our *Statement of Qualifications to Design an Arsenic Treatment System for the Wild Wings County Service Area Public Water System* on July 22, 2019 and our meeting on August 6, 2019, Luhdorff and Scalmanini Consulting Engineers (LSCE) is pleased to provide this Proposal for engineering services. This Proposal includes the following section headings:

1. Background,
2. Project Understanding & Approach
3. Scope of Work
4. Proposed Budget
5. Project Schedule
6. Project Team.

The scope of work in this Proposal was developed based upon the feedback we received in our meeting. We understand that a phased approach is best suited to facilitate the proper sizing and selection of a treatment system and to allow the County to seek outside funding sources, if necessary. Phase 1 will include the evaluation of arsenic treatment alternatives, the selection of a treatment system, completion of final design and compliance with California Environmental Quality Act (CEQA). Phase 2 will include the permitting, bidding, construction and commissioning of the arsenic treatment system.

We appreciate the opportunity to provide you with this Proposal and look forward to working with you to provide an arsenic treatment system design for the Wild Wings CSA.

Sincerely,

Justin Shobe, P.E., Supervising Engineer
Luhdorff & Scalmanini Consulting Engineers

William Gustavson, Principal Project Manager
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1. Background

LSCE provided the *Statement of Qualifications (SOQ) to Design an Arsenic Treatment System for the Wild Wings CSA Public Water System* on March 4, 2019, which included required information in Exhibits A through L in response to the County's Request for Qualifications. LSCE's SOQ provided a project understanding and approach that was used to develop the scope of work contained in this proposal. Other information within the SOQ is included as part of this proposal, including the project team. This proposal provides a detailed scope of work, proposed budget, and schedule to complete the work.

2. Project Understanding & Approach

A detailed description of the project understanding and approach was provided as Exhibit F in LSCE's SOQ from March 4, 2019. This section provides a supplementary project understanding and approach as it pertains to the detailed scope of work and the meeting with the County on August 6, 2019.

Canvas Back Well has been placed on "emergency standby" status by the State Division of Drinking Water (DDW) due to arsenic levels that exceed the State Maximum Contaminant Level (MCL). Pintail Well contains arsenic levels below the MCL and is the primariy source of supply to the community. With the Canvas Back Well classified as "emergency standby" it has limited uses in the domestic water system that reduces the overall water supply reliability of the community.

The County issued an RFQ to select a qualified consultant to complete a Scope of Work that was envisioned to generally consist of:

- An alternative analysis of arsenic treatment options, which may include blending the two wells to reduce arsenic; an arsenic removal system for the Canvas Back well; and combinations that involve split flow and/or modification of piping to allow treatment of both wells.
- Design of the selected option with development of plans, specifications, and cost estimates.
- Support during construction, including submittal reviews, attendance of construction meetings, and on-site inspection services.

LSCE's approach is to complete the project in two phases.

Phase 1: This phase involves all preliminary engineering through final design. In Tasks 1 and 2 we will evaluate treatment strategies and determine the proper sizing that best meets the objectives of the Wild Wings CSA Public Water System. Treatment will be evaluated for suitability to this project in terms of feasibilty, cost, operation and integration into the existing system. LSCE understands that outside funding may be required for the construction of the arsenic treatment system, depending on the cost of the project determined in the Task 2 conceptual design. Tasks 3 through 6 are to finalize the treatment system selection through a Vednor RFP, conduct pilot testing (if required) and prepare the final Plans and the CEQA documentation, which are both necessary components for a State funding application.

Phase 2: With funding in place for the project, the final steps of the project are to complete the permitting, bidding, construction and commissioning tasks in Phase 2.

3. Scope of Work

The proposed Scope of Work includes all project elements to assist the County with the design and construction of an arsenic treatment system for the Wild Wings CSA Public Water System. The work plan is detailed below and includes all tasks from data analysis and treatment system selection through installation, startup, and commissioning.

The tasks are arranged in two phases, Phase 1 and Phase 2, and generally in the order they will be completed. Phase 1 is completion of the preliminary engineering analysis through the final design, permitting and environmental compliance with CEQA. Phase 2 is the completion of bidding, construction, commissioning, training and final permitting. After the completion of Phase 1, the County will have the information required to either directly fund the project or seek outside funding sources (e.g. loan or grant applications).

LSCE will provide project management throughout the entirety of project and work with the County staff, the Wild Wings CSA representatives, the water system operators (SUSP), regulatory agencies, contractors and vendors to complete the scope of work described herein, with the objective of commissioning a fully functioning and permitted arsenic treatment system for use.

As part of the project, LSCE will provide subconsultants for electrical design, structural design, and environmental review to complete the project. LSCE will provide oversight of all subcontractors to ensure that the work is carried out per industry standards, LSCE's specifications, and County requirements.

The Project Manager will be the primary point of contact throughout the project. The Project Manager will provide the County with regular updates via phone, email, and at regularly scheduled meetings regarding project progress, findings, recommendations, schedule, and budget.

The Scope of Work will be completed in the following tasks:

Phase 1 – Preliminary Engineering through Final Design

Task 1 – Production & Demand Analysis

Task 2 – Conceptual Treatment & Operational Strategies Design

Task 3 – RFP for Vendor Treatment Systems

Task 4 – Pilot Testing of Selected Vendor Systems

Task 5 – Treatment System Design

Task 6 – CEQA Documentation

Phase 2 – Permitting, Bidding, Construction, and Commissioning

Task 7 – Permitting

Task 8 – Construction Management

Task 9 – Startup & Commissioning

Phase 1 – Preliminary Engineering through Final Design

Task 1 – Production & Demand Analysis

LSCE's work will begin with an analysis of the available production and demand data for the Wild Wings CSA. LSCE understands that there is a gap in production data from 2011 through early 2018, so the first task is to obtain the available data from the County and system operators (presumably production data from before 2011 and since 2018) and demand data from the County's meter records. LSCE will review all available data, including records from DDW, and water system records or SCADA, to determine if there is enough information to properly size the arsenic treatment system. If it is determined that more information is necessary, LSCE will review other similar water systems in the area (Woodland, Esparto, Davis, etc.) to define maximum or minimum demand factors. A memo will be prepared to qualify the information and define the water demand factors pertaining to this system that will be used for treatment system sizing in later tasks, which are the Maximum Day Demand (MDD) and the Peak Hour Demand (PHD).

Deliverables for Task 1:

- *Memo #1 discussing production data and demand analysis definining MDD and PHD.*

Meetings for Task 1:

- *Meeting #1: Kickoff with County, Wild Wings CSA and Operators to review objectives and data.*
- *Coordination meetings with the County and Operators, as needed, to obtain and discuss data.*
- *Meeting #2: Memo review meeting to discuss findings and next steps.*

Task 2 – Conceptual Design

Under Task 2, LSCE will develop conceptual arsenic treatment and operational strategies from the water quality data, pump station schematics, well construction information, water supply requirements and water system information. The demand information in Task 1 will form a basis for the required water supply of the system and level of treatment to meet the water system demands from both wells. Design considerations will also include County and Operator preferences, existing water quality, cost, site layout, waste handling, chemical feed, pilot testing, operations and maintenance, and any other factors deemed necessary for the comparison of the different treatment options. LSCE will present the conceptual treatment and operational strategies in a memo which discusses the considerations associated with each treatment type and provides a comparison of the treatment options.

Deliverables for Task 2:

- *Memo #2 discussing the Conceptual Treatment & Operational Strategies Design, with comparison of the alternatives in terms of life cycle cost and operational complexity and supporting figures for each alternative.*

Meetings for Task 2:

- *Coordination meetings with the County and Operators, as needed, to obtain and discuss data.*
- *Meeting #3: Memo review meeting to discuss findings and next steps.*

Task 3 – RFP for Vendor Treatment Systems

To carry through the conceptual alternatives developed in Task 2, LSCE will seek information from treatment system vendors to provide more detailed descriptions and costs of the individual treatment options and pre- or post-treatment requirements for each technology. Under Task 3, LSCE will develop a Request for Proposals (RFP) to solicit proposals from treatment vendors that will enable a side-by-side comparison of the treatment system options (an outline of the RFP is at the end of this section).

Vendors will be invited to present proposals for adsorptive media or coagulation/filtration, whichever they feel is the best option given existing information. The RFP will require a cost estimate for the proposed treatment system and details of the system specifications, including but not limited to: system size and system components, operation description, pretreatment and chemical requirements, operation and maintenance cycles, replacement media cycles, solids generation, backwash/regeneration requirements, control requirements, and arsenic removal efficiency. The vendors will be required to indicate whether pilot testing is required to guarantee performance of the proposed treatment system and to provide a cost of pilot testing. Performance guarantees will be provided for each system in terms of arsenic reduction and anticipated media life expectancy.

The RFP will include a basis of design with a description of the Wild Wings facilities as they exist now, including water quality data for both the Canvas Back and Pintail wells, anticipated operating cycles, and design parameters for treatment systems. Conceptual treatment strategies from Task 2 will be presented to the vendors.

The RFP will be sent to selected vendors known to LSCE from prior projects and review of literature. LSCE will hold discussions with vendors and provide written addendums during the proposal period. The proposal period is assumed to be 3 weeks from issuance of RFP to receipt of proposals.

LSCE will review vendor proposals and evaluate cost, track record of arsenic treatment, and adherence to the requirements of the RFP. LSCE will prepare a memo for the County that recommends selection of a vendor or multiple vendors for pilot testing different treatment systems. A meeting will be held to discuss the proposals following LSCE's memo. The objective at the end of this meeting is to select a vendor to proceed with through the completion of design, either with or without pilot testing of their system, or to select a group of vendors to conduct pilot testing. It is important to note that DDW will require pilot testing if the Wild Wings CSA is to pursue funding from the State Revolving Funds (SRF).

Deliverables for Task 3:

- *Vendor RFP Document*
- *Memo #3 reviewing vendor proposals with recommendations*

Meetings for Task 3:

- *Coordination meetings with the County and Operators, as needed, to discuss vendor proposals.*
- *Meeting #4: Vendor proposal review meeting to select vendor(s) and decide on pilot testing.*

Conceptual Outline for Vendor RFP Document (Task 3)

1. Project Information
    a. Wild Wings water system information
    b. Canvas Back and Pintail well construction
    c. Pump station schematics
    d. Water quality information
    e. Pilot test parameters
    f. Pilot test report requirements
        - Optimization strategies
            - Coagulation/filtration
                - Chemical feed volumes, automation
                - Solids volume and anticipated annual waste volume
                - Backwash frequency, volume, fate
            - Adsorption
                - pH adjustment
                - Regeneration volume, frequency
                - Eluent volumes, fate
        - Treatment levels
        - Startup/mothball costs and protocols
        - Chemical storage considerations
2. Vendor proposal requirements
    a. Qualifications of vendor, years in operation
    b. Current examples of arsenic treatment in operation for drinking water
    c. Cost quote for pilot test
    d. Cost estimate for installed system
    e. Pilot test equipment
        - Description
        - Connection and waste disposal requirements
        - Test duration minimum and expected
    f. Installed system
        - Installation requirements
            - Connections, pipes, valves, pumps, tanks, enclosures, etc.
        - Power demands
        - Specifications
            - Sizes of treatment systems and associated equipment
            - Access requirements for operations, maintenance, and materials handling
        - Operations manuals

Task 4 – Pilot Testing (if required)

Under Task 4, LSCE will assist with pilot testing of the selected system(s) as determined in Task 3. LSCE will manage the installation, connection, and pilot testing under Task 4. This will include any permitting, pipe and pump modifications, or discharge handling. LSCE will coordinate pilot testing with vendors, SUSP, and the County for connection of the vendor systems to both wells. LSCE will collect water samples for lab analysis, quality assurance, and verification of system performance. Each vendor will

bring their own pilot testing trailer and connect the trailer to the system. LSCE assumes there will be one week of pilot testing by all vendors simultaneously, and that the trailers will be manned by the vendors during operation.

LSCE will visit the field daily to assess operations and QA/QC of the pilot testing. Independent water quality testing is assumed to be needed to confirm treatment operation. Water samples are assumed to be collected three times throughout the week to verify performance of the pilot systems. Each water quality sampling event includes a raw and treated sample tested for arsenic, iron, manganese, and general chemistry. Only one raw sample will be collected, and one treated sample for each pilot unit. LSCE assumes the Operator conducts water quality sampling.

Following pilot testing, the vendors will supply a report summarizing the findings in accordance with the RFP requirements. LSCE will evaluate the vendor reports and provide a memo to the County summarizing the feasibility and selected treatment system after evaluating the performance and life-cycle cost comparisons of each system, including site or well-head modifications and operations and management considerations. The results of this study will be used in selection of a system to best serve the needs of the County.

Deliverables for Task 4:

- *Pilot test results, QA/QC sample results*
- *Memo #4 presenting pilot study reports and updating design information from previous tasks*

Meetings for Task 4:

- *Vendor meetings as needed*
- *Meeting #5: Review meeting to discuss results and recommended treatment system.*

Pilot Testing Cost Assumptions:

- *Vendor costs for pilot testing is not included in LSCE's fee proposal.*
- *Water quality samples from pilot testing is not included in LSCE's fee proposal (it is assumed the County's existing laboratory services will be utilized).*

Task 5 – Final Plans and Specifications

Under Task 5, LSCE will develop the design of the facilities required to obtain contractor bids for the installation of the treatment system and upgrades to the existing production facilities. This task will incorporate the selected treatment system from the previous tasks. The design process includes development of a Basis of Design Memorandum and the design plans and specifications for contractor bidding. To the extent required, LSCE will perform permitting activities (discussed under Task 7) to obtain design reviews from outside agencies concurrently with the design development.

The design will identify modifications to the well and upgrades to existing facilities to implement the selected treatment system, and any other upgrades associated with system control, maintenance, waste discharge, materials handling, power requirements, or other needs. Upgrades will also consider other improvements to the existing system such as the PLC controls and SCADA system that can be completed

concurrently with the treatment system installation. LSCE's electrical engineering sub-consultant will prepare a design that meets the County and operator preferences for the electrical upgrades.

A pre-design meeting will be coordinated with the County, SUSP, the control integrator, LSCE, and key sub-consultants to establish preferences for controls and operation.

Design Elements:

LSCE's design includes the engineering disciplines in Civil, Mechanical, Electrical and Structural. The design will involve the following elements:

- **Modifications of existing facilities**: Pump selection, well-head modifications, treatment system connections, piping modifications.
- **Chemical feed and handling**: New and existing chemical feed systems including supply storage, waste storage, analyzers, disposal routes, controls, secondary containment, access, safety, and restocking.
- **Structure and foundation design and site modifications**: Shade structures, small prefabricated weather enclosures, grading, concrete pedestals, building modifications.
- **Solids handling**: Backwash storage and operation, solids separation and drying, disposal access, sampling requirements and sewer connections.
- **Reclaim system**: Pump stations, skimmer systems, piping and valve layouts, control logic.
- **Electrical supply and control systems programming**: Instrumentation, control logic for a complete operating facility, motor control centers (MCC), panel lineup, power supply, integration with existing SCADA components or redesign. The Wild Wings integrator will conduct the PLC and SCADA programming.

Plans, Specifications, and Cost Estimates (75%, 100%, Final Bid Set):

LSCE will prepare a complete design that consists of plans, technical specifications, and cost estimates. A basis of design memo will be provided with the initial (75%) design to define the required upgrades, sizing and operation decisions and preferences from the discussions with the County and SUSP.

The design will be provided in three completion phases: 75%, 100%, and a final bid set. It is assumed that the County will provide formal comments on the 75% submittal and the basis of design memo and on the revised design in the 100% deliverable. The final bid set will be presented with a signed and stamped set of drawings suitable for bidding to general contractors or to finalize grant/loan applications (if required). LSCE will integrate any front-end provisions the County requests for the bidding package, as applicable. LSCE will provide front-end contractual documents to include in public construction contracts. An Engineer's Estimate will also be provided for the construction at each design deliverable.

LSCE will generate a detailed performance-based specification wherein the supplier or contractor will guarantee performance, including initial commissioning and a one-year recertification of performance.

Deliverables for Task 5:

- *Draft Basis of Design Memo with 75% Plans, Specs and Estimate*
- *Final Basis of Design Memo with 100% Plans, Specs and Estimate*

- *Final Bid Set (signed and stamped)*

Meetings for Task 5:

- *Meeting #6: Pre-Design Basis Meeting*
- *Meeting #7: Design review of the 75% deliverable and Basis of Design Memo*
- *Meeting #8: Design review of the 100% deliverable*

Task 6 – CEQA Documentation

Preparation of CEQA documentation will be required prior to making modifications to the system for DDW permit amendment and any SRF loan applications that may be sought for construction. The CEQA analysis will be performed by LSCE subconsultant, Inland Ecosystems. Any mitigation measures required by CEQA will be included in the design and construction of the treatment system as needed.

Deliverables for Task 6:

- *Preliminary determination of CEQA requirements*
- *Initial Study and Mitigated Negative Declaration (if required)*

Phase 2 – Permitting, Bidding, Construction, and Commissioning

Task 7 – Permitting

LSCE will be responsible for ensuring that all permits, plans, notifications, and other documentation required from agencies with jurisdiction over the project are procured and submitted in a timely and professional manner. LSCE will ensure that the building contractor, or any other project participant, adheres to all project permit requirements. LSCE will inform the contractor(s) when operations are out of compliance and require measures be taken to comply with permit requirements. Specific permits and documents anticipated include:

Water Supply Permit Amendment with DDW: LSCE will be in contact with DDW from the beginning of the project through completion to amend the water supply permit and gain approval of the new arsenic treatment facility. Working with DDW will occur throughout all tasks, as detailed in this proposal. The work will be completed throughout the project during completion of other tasks. Below is a table of anticipated documentation for the Water Supply Permit Amendment.

DDW will be informed of the selection of a treatment system following the RFP process, and provide input on the need for a pilot testing program and review of the program if it is necessary (Task 4). Following final selection of the treatment system and preparation of design drawings, DDW will be informed of the plans and designs, and a preliminary permit amendment will be filed with all necessary information prior to contractor bidding and construction. After construction, and prior to commissioning, DDW will be consulted regarding approval of the plant and a sanitary inspection for concurrence to bring the new system online (Task 9). At the end of the project, LSCE will provide the final permit amendment information including system as-built design drawings (Task 9).

Documentation for Water Supply Permit Amendment from DDW

Item	Description
Pilot Testing Protocol	To be compliant with DDW Arsenic Treatment Pilot Study Guidelines.
Pilot Testing Results and Treatment Technology Selection	To be submitted prior to Permit Amendment Application.
Permit Amendment Application (Initial and Final)	Initial application will be sent with Plans and Specifications prior to construction. Final will be submitted after WTP is constructed and tested.
Plans and Specifications for Water Treatment Plant	Submittal will include well modifications, treatment system, and accompanying piping, instrumentation, solids handling systems, and site improvements. To be submitted with Initial Permit Amendment Application.
CEQA Documentation	Cat Ex, Neg. Dec. or Initial Study (TBD) to be submitted with Initial Permit Application
Well Construction Specifications	Submittal will include well profile and final construction specifications to be sent with the Initial Permit Application.
DWR Well Completion and Well Data Sheet	To be submitted with Initial Permit Application.
DWSAP Document	Already submitted to DDW
Filter Data Sheet and Chemical Data Sheets	To be submitted with Final Application after station is constructed and tested.
Water Quality Reports	To be submitted in Final Application. Submittal will include analytical results for well, before and after treatment, prior to going online, including disinfection testing of complete water treatment plant.

Regional Water Quality Control Board (RWQCB) Permits: LSCE's subconsultant, Inland Ecosystems, will coordinate with the RWQCB as necessary for permitting or approval associated with disposal of waste products for any onsite land disposal. There is no land disposal envisioned for this project; however, Inland Ecosystems will conduct this effort if it is necessary for onsite disposal of temporary discharge water, backwash water, or solids disposal. A Storm Water Pollution Prevention Plan (SWPPP) is not required since the disturbed surface will be under one acre.

Building Permits – No building permits are envisioned for this project as there will be no new occupied structures. LSCE assumes there will be time involved reviewing the project with County officials to confirm any required permits.

Encroachment Permit – It is assumed there will be no encroachment permit required for construction.

Deliverables for Task 7:

- *Permit submittals and letters to DDW*

Meetings for Task 7:

- *DDW phone conferences and meetings, as needed*

Task 8 – Bidding and Construction Management

Under Task 8, LSCE will assist with contractor bidding and construction management to oversee the construction of the selected treatment system and modifications to the existing system. These components are detailed below.

Contractor Bidding

LSCE will assist with bid solicitation from qualified contractors. To save time and minimize cost, it is assumed that the County can be selective in bid solicitation and permit LSCE to identify a qualified short list of contractors unless an SRF loan is obtained and public bids are necessary. LSCE will hold a pre-bidding meeting with selected contractors to describe the project and begin taking questions. During bidding, LSCE will respond to questions from bidders and provide formal written addenda (three addendums are assumed).

LSCE will evaluate the bids and recommend the contract award based on responsiveness and lowest cost. LSCE assumes that the construction contract will be between the County and the contractor that is awarded the work. LSCE assumes bidding will consist of assisting with solicitation to qualified selected contractors, attending a pre-bid meeting, responding to questions, preparing up to three addendums, evaluating bids, and recommendation for award.

Construction Management

LSCE's approach to providing construction support services involves regular interaction with the Contractor and treatment vendor and close review of construction schedule, progress, and administrative processes. A key assumption of the level of scope and budget is that the assistance during construction will span **10 months**; this accounts for the contractor submittals, procurements, site construction, startup and testing, and commissioning, training and final permitting. LSCE will act on behalf of the County and work in coordination with SUSP operators as necessary. SUSP and County roles during construction are to be determined. LSCE's construction management services consist of the following activities:

> **Pre-Construction Conference:** LSCE will hold a pre-construction conference to discuss the baseline schedule and the procedure for construction progress, RFIs, status of submittals, and any miscellaneous items throughout construction.

Bi-Weekly Construction Meetings: Bi-weekly construction meetings will be held throughout construction at the job site, County offices or LSCE's office. The meetings will be conducted to address items actively as they come up. LSCE will prepare formal agenda and meeting minutes documenting the status of all RFIs, submittals, change orders, etc. to track progress and resolve items.

Submittal Review: LSCE will complete the review and transmittal of technical submittals provided by the general contractor. A submittal spreadsheet log will be maintained for use in tracking and documenting submittal review.

Requests for Information: LSCE will review questions and provide written clarifications for any questions the general contractor has during the construction period such as details of the contract, substitutions, and alternative approaches.

Change Order Assistance: LSCE will assist in the preparation of any necessary field instructions and change orders. Anticipated assignments may include preparing requests to the general contractor for proposals for extra or changed work; review of contractor requests for change order to determine if work proposed is considered extra work; opinion of probable construction cost; and, review and negotiation of cost estimates. LSCE will also prepare drawings, sketches, or specifications for extra or changed work items.

Monthly Pay Requests: LSCE will review monthly payment requests from the Contractor based on the quantities of bid items that have been procured, installed and accepted. LSCE will approve of all payment requests of the Contractor before they are submitted to the County.

Milestone Inspection: LSCE will provide on-site milestone inspections including special inspections for electrical, structural and mechanical components. There are approximately 10 milestone inspections included. The milestone inspections include the well site modifications, subsurface piping, conduits and raceways, utility connections, earthwork preparation, concrete form/rebar and pour, Factory Acceptance Testing, and pre-system punchlists to identify incomplete or deficient items. LSCE will prepare an inspection report for each site visit indicating the date and times, people on site, material delivered, work completed, and corrections noted. LSCE will coordinate a DDW inspection required to bring the system online with an SUSP operator and DDW engineer. LSCE will provide milestone inspections with five (5) additional miscellaneous inspections as needed. Site visits will also occur as part of the bi-weekly construction meetings.

Part-time Construction Observation: LSCE is not proposing resident full-time construction observation. This project can be adequately managed through the regular meetings and milestone inspections described above. A part-time construction observation is assumed in addition to the above services at a rate of **4 hours per week of onsite observation**.

Staking: The contractor will provide their own construction staking. LSCE's scope does not include a surveyor for construction staking. This item will be included as part of the specifications, with the Contractor providing the necessary services by a licensed surveyor approved by the Engineer.

Deliverables for Task 8:

- *Bid Solicitation Document*
- *Bid Review and Recommendations*
- *Submittal Reviews, RFIs, Change Order Reviews, Pay Request Reviews*
- *Meeting agenda and minutes*
- *Inspection Reviews*

Meetings for Task 8:

- *Meeting #9: Bid Review Meeting*
- *Meeting #10: Pre-construction Meeting*
- *Meeting #11-#30: Bi-weekly Construction Meetings*

Task 9 – Startup and Commissioning

LSCE will oversee and be responsible for the approval of the contractor's startup and commissioning activities for a fully functioning and operable facility, including all equipment acceptance testing, communications and programming, and close-out permitting requirements. This process will involve coordinating the general contractor, treatment system installer/supplier, other sub-contractors, systems integrator, equipment manufacturers, County staff, SUSP operators**,** and regulatory agencies. During the commissioning period, LSCE will generate a punchlist to be completed by the contractor for final closeout. LSCE estimates that **5 days** of testing will be required for approval of the new systems including: cleared water quality testing, treatment operation, MCC panel checks, pump operation, alarms and setpoints. The contractor will be required to perform a 7-day operational commissioning test where the system will run in auto and go through all modes of operation and backwash/regeneration cycles of the treatment unit. During this time, operators will be trained to correctly operate the new system. LSCE assumes **2 days** are necessary for operator training.

At the end of the construction phase of the project, LSCE will modify the conformed project drawings into a set of project Record Drawings (as-builts) based on field changes and red-line markups from the general contractor and LSCE construction management staff. Record Drawings and Operations & Maintenance Manuals will be provided to the County after they have been reviewed and approved by LSCE. LSCE will provide a letter of acceptance of the facility.

The Final DDW Water Supply Permit Amendment will be filed under Task 9, building on the preliminary application filed under Task 7. This includes final documentation of filter system, chemical system, as-builts, engineering technical report, water system information and permit amendment.

Deliverables for Task 9:

- *Punchlist*
- *Record Drawings*
- *Final DDW Permit Amendment package*

Meetings for Task 9:

- *Punchlist Meeting*

4. Proposed Budget

LSCE's estimate of costs for the engineering services outlined above is presented in the table below. The proposed project sum presented below includes LSCE's labor under each task and outside engineering services, all as delineated in this proposal. A detailed cost estimate worksheet is attached to this Proposal that provides an estimate of hours for each activity completed within each task with the billing classification rates and outside subconsultant fees.

Task	LSCE Fee	Outside Services Fee	Total
Phase 1 – Preliminary Engineering through Final Design			
1 – Production and Demand Analysis	$6,435	$0	$6,435
2 – Conceptual Design	$12,850	$1,725	$14,575
3 – RFP for Treatment Vendors	$7,640	$0	$7,640
4 – Pilot Testing	$12,555	$0	$12,555
5 – Final Plans and Specifications	$54,860	$41,975	$96,835
6 – CEQA Documentation	$2,620	$23,000	$25,620
Phase 1 Total	**$96,960**	**$66,700**	**$163,660**
Phase 2 – Permitting, Bidding, Construction and Commissioning			
7 – Permitting	$16,060	$0	$19,800
8 – Bidding and Construction Management	$82,390	$17,870	$100,260
9 – Startup and Commissioning	$20,955	$3,450	$24,405
Phase 2 Total	**$119,405**	**$21,320**	**$140,725**
TOTAL CONTRACT	**$216,365**	**$88,020**	**$304,385**

The proposed budget is a not-to-exceed price for the scope outlined above. The costs include all direct costs for travel, subsistence, and direct expenses as outlined in the scope of work. LSCE will bill monthly for labor and materials, only as incurred, in accordance with LSCE's Schedule of Fees for Engineering and Field services (attached).

Costs not included in LSCE's propose budget are the following:

- Permit Fees: fees for permits will be assessed by agencies at the time of application. LSCE assumes the County will pay any permit fees directly.
- Capital Costs: treatment system, vendor pilot testing, or general contractor costs for installation are not included.
- Geotechnical Inspections: the specifications for construction will direct the Contractor to obtain a geotechnical engineer to confirm subgrade preparation and compaction.
- Surveying: LSCE will utilize the existing site basemaps. The specifications for constructio9n will direct the contractor to obtain a surveyor to conduct construction staking.

If LSCE is directed to deviate from the proposed scope, or as dictated by unforeseen field conditions, LSCE will provide notification of any potential changes in the estimated cost and time to complete the

work. LSCE will not proceed with any work that deviates from the approved scope and budget until approval to proceed is granted.

5. Project Schedule

LSCE will coordinate all schedule of activities with the County. At the initial meeting LSCE will prepare a detailed project schedule in Gantt Chart format showing the key milestone deliverables, tasks and outside agency reviews. The proposed project schedule below is based on the anticipated work products described under Tasks 1 through 9 above, performed by LSCE, with review time for coordinating agencies, such as DDW and the County. LSCE will complete each task as it is approved by the County, so the anticipated completion dates are subject to change given County approval and funding sources.

The completion dates below assume the contract will be initiated on **October 1, 2019.**

Task	Task Description	Anticipated Duration	Anticipated Completion Date
1	Production & Demand Analysis	1 month	November 1, 2019
2	Conceptual Treatment & Operational Strategies Design	2 months	January 1, 2020
3	RFP for Vendor Treatment Systems	2 months	March 1, 2020
4	Pilot Testing of Selected Vendor Systems (if required)	2 months	May 1, 2020
5	Treatment System Design	4 months	September 1, 2020
6	Permitting (concurrent with treatment system design)	--	--
7	Bidding and Construction Management	10 months	July 1, 2021
8	Startup & Commissioning	1 month	August 1, 2021
Total Duration		***22 months***	

6. Project Team

Project references and client references were included with Exhibit C and Exhibit E, respectively, in LSCE's SOQ provided to the County on March 4, 2019. LSCE would be happy to provide additional project and client references if requested by the County. The Statement of Assigned Personnel was included in Exhibit C of LSCE's SOQ. The updated assigned personel/ project team is as follows:

Project Manager/Design Engineer: Justin Shobe, P.E., Supervising Engineer

Mr. Shobe is a licensed civil engineer with 14 years of experience with planning, design, permitting, construction, testing, and operation of production wells, pump stations, water treatment plants and booster stations. Mr. Shobe repeatedly demonstrates that he has the skills to manage and implement design projects; communicate effectively with clients, contractors and public officials; provide sound recommendations and guidance; and effectively manage multiple scope-of-works with sub-consultants

and contractors. Mr. Shobe is currently the Project Manager for several water treatment projects, including a 1,500-gpm manganese filter plant for Sacramento Suburban Water District and an arsenic treatment system for Rural North Vacaville Water District. For the Wild Wings CSA, Mr. Shobe will be the Project Manager and the main point of contact.

Principal Oversight and QA/QC: William Gustavson, Principal Project Manager

Mr. Gustavson has 49 years of experience in groundwater and surface water development, including design, preparation of plans and specifications, construction inspection, and project management of: water wells, including surface and ground water treatment systems; water storage and distribution systems (treatment, storage, hydropnuematic tank design); chemical feed systems; booster pump stations; auxiliary power systems; telemetry and instrumentation including SCADA systems; and water distribution computer models. Mr. Gustavson has worked extensively with the Wild Wings CSA and has an engrained knowledge of the system and operations including providing guidance to operators, pump design and operation, and permitting officials. For this project, Mr. Gustavson will provide principal level oversight and review of all technical work products.

Project Engineer: Aaron King

Mr. King has 12 years of experience with civil engineering, water quality, and spatio-temporal analyses with specialization in landuse/landcover and hydrologic analyses. Mr. King is currently completing a PhD in engineering at UC Davis that includes a pilot study completed in 2014 on an advance in technology for ion-exchange (adsorption) treatment systems for nitrate and chromium for the City of Davis water supply system well number 20. Mr. King has in-depth knowledge of and experience with adsorption chemistry and the technical and operational issues that attend adsorption treatment technologies, such as regenerant preparation and metering, media selection, spent media disposal, effluent storage and disposal, and sampling and testing techniques for performance monitoring. He has field operations and laboratory experience in water quality, surface and groundwater water hydrology and hydrogeochemistry. Mr. King assisted on the analysis of arsenic removal systems for Rural North Vacaville and development of a bench scale test to confirm initial findings of adsorption feasibility with presence of high silica levels. For the Wild Wings CSA, Mr. King will provide engineering technical support during the preliminary engineering and system design and construction phases.

Staff Engineer: Allison Cronk

Ms. Cronk is an environmental engineering graduate with two years professional experience in water facility design, drafting, storm water management, and groundwater sustainability data management and reporting. Ms. Cronk has proven to be an exceptional AutoCAD draftsman that adds talent and skill to the LSCE design team. She continually demonstrating care in details and efficient implementation of direction from the lead engineers. Ms. Cronk also has experience in working with the Wild Wings CSA systems including; pump performance testing and pump extension and installation activities at both the Canvas Back and Pintail well pump stations. For this project, Ms. Cronk will be the lead draftsman and provide design, permitting, and construction assistance.

Electrical Engineering Sub-Consultant: Electrical Power Systems (EPS)

LSCE has partnered with Joe Prevendar of Electrical Power Systems (EPS) on numerous pump station projects, including the original electrical design for both Wild Wings well pump stations. Mr. Prevendar has over 30 years of extensive practical experience in electrical engineering, engineering management, major construction, and maintenance management. He has in-depth experience in designing electrical and control systems for the water and wastewater industry. In addition, he has a comprehensive background in major industrial work with paper and wood products as Plant Engineer, Senior Electrical Project Engineer and Engineering Department manager. His project experience includes power distribution, analog and digital process controls, motor controls including variable frequency drives, radio telemetry systems, SCADA and programmable controller systems, distributed control systems, material handling, and pumping systems.

CEQA Sub-Consultant: Inland Ecosystems

Dr. Glenn Merron of Inland Ecosystems has provided environmental consulting services to LSCE for over 20 years on projects throughout the State of California. The environmental firm has provided a wide range of services, including biological and cultural resource surveys, reporting, and compliance with state and federal environmental laws. Dr. Merron will provide the required CEQA documentation and work with the Regional Water Quality Control Board to ensure environmental compliance throughout the project.

Structural Engineering Sub-Consultant: William Merkel & Associates

LSCE has partnered with William Merkel and Associates, Inc. for structural designs of municipal water facilities for 30 years. Mr. William Merkel is a licensed Structural Engineer who has been performing structural design for 40 years out of his office in Sacramento. Mr. Merkel has brought innovation and practical solutions to municipal station structural design. LSCE and Mr. Merkel have developed removable roof designs that allow access to wellheads for maintenance, as well as, designs of buildings, bridge pipeline crossings, and other structures. Mr. Merkel was the original structural engineer for both Wild Wings pump stations and will provide the structural design and calculations for the masonry building, equipment anchorage, pipe supports, and any other structural elements as needed.

Client: County of Yolo
Project: Wild Wings CSA Arsenic Treatment
Estimated By: JS/WG
Date: August 30, 2019

Detailed Cost Worksheet

Luhdorff & Scalmanini Consulting Engineers

Task Name and Activities	LSCE (hours and fee)				SUBCONSULTANTS (lump sum fee)			DIRECT EXPENSES		TOTALS
	Principal Professional	Supervising Engineer	Project Engineer	Staff Engineer	Electrical Engineer	Structural Engineer	CEQA	Travel Expenses	Copies / Other	
	W. Gustavson	J. Shobe	A. King	A. Cronk	EPS	William Merkel	Inland Ecosystems			
	$210	$200	$170	$140	Lump*	Lump*	Lump*	Lump	Lump	
Phase 1										
Task 1: Production & Demand Analysis										
Data Acquisition & Analysis	2	4		6						
Draft and Final Memo	2	2		4					$12	
Meeting #1 Kickoff, and Meeting #2 Memo Review	4	6	3	3				$25		
LSCE (hours)	**8**	**12**	**3**	**13**						**36**
LSCE (cost)	**$1,680**	**$2,400**	**$510**	**$1,820**						**$6,410**
Subconsultant					**$0**	**$0**	**$0**			**$0**
Direct Expenses								**$25**	**$0**	**$25**
									Task 1 Subtotal	**$6,435**
Task 2: Conceptual Design										
Evaluation of Existing Operations & Site Considerations	2	4	4	2	$1,725					
Obtaining & Evaluating Water Quality Data		2	6							
Evaluation of Waste Management Options	1	4	4	1						
Evaluation of Treatment System Options		6	6							
Memo #2 and Conceptual Drawings	1	6	4	12					$100	
Memo Review Meeting	2	2	3							
LSCE (hours)	**6**	**24**	**27**	**15**						**72**
LSCE (cost)	**$1,260**	**$4,800**	**$4,590**	**$2,100**						**$12,750**
Subconsultant					**$1,725**	**$0**	**$0**			**$1,725**
Direct Expenses									**$100**	**$100**
									Task 2 Subtotal	**$14,575**
Task 3: RFP for Vendor Treatment Systems										
Vendor RFP Document		2	2	4						
Vendor discussions and evaluate Vendor Proposals	2	8	10	2						
Memo #3	1	2	2	2					$100	
Vendor Review Meeting		3	3							
LSCE (hours)	**3**	**15**	**17**	**8**						**43**
LSCE (cost)	**$630**	**$3,000**	**$2,890**	**$1,120**						**$7,640**
Subconsultant					**$0**	**$0**	**$0**			**$0**
Direct Expenses								**$0**	**$0**	**$0**
									Task 3 Subtotal	**$7,640**
Task 4: Pilot Testing										
Pilot Testing Prep and Oversight (5 days)		10	10	15				$125		
Pilot Study Result Review		5	5	5						
Memo #4		5	5	5						
Pilot Testing Result Review Meeting		3	3	3						
LSCE (hours)	**0**	**23**	**23**	**28**						**74**
LSCE (cost)	**$0**	**$4,600**	**$3,910**	**$3,920**						**$12,430**
Subconsultant					**$0**	**$0**	**$0**			**$0**
Direct Expenses								**$125**	**$0**	**$125**
									Task 4 Subtotal	**$12,555**
Task 5: Final Plans and Specifications										
75% Plans/Specs/Estimate and Basis of Design	2	40	40	90	$17,250	$4,025		$50	$1,000	
100% Plans/Specs/Estimate	2	20	20	50	$11,500	$1,725		$50	$1,000	
Bid Set	2	10	2	20	$5,750	$1,725			$1,500	
75% Review Meeting		3	3	3						
100% Review Meeting		3	3	3						
LSCE (hours)	**6**	**76**	**68**	**166**						**316**
LSCE (cost)	**$1,260**	**$15,200**	**$11,560**	**$23,240**						**$51,260**
Subconsultant					**$34,500**	**$7,475**	**$0**			**$41,975**
Direct Expenses								**$100**	**$3,500**	**$3,600**
									Task 5 Subtotal	**$96,835**
Task 6: CEQA Documentation										
Environmental Review and Initital Study/MND	2	4		10						
LSCE (hours)	**2**	**4**	**0**	**10**						**16**
LSCE (cost)	**$420**	**$800**	**$0**	**$1,400**						**$2,620**
Subconsultant					**$0**	**$0**	**$23,000**			**$23,000**
Direct Expenses								**$0**	**$0**	**$0**
									Task 6 Subtotal	**$25,620**
Phase 2										
Task 7: Permitting										
DDW - Amended Water Supply Permit		25	10	60						
RWQCB Permits (as needed)		2		4						
LSCE (hours)	**0**	**27**	**10**	**64**						**101**
LSCE (cost)	**$0**	**$5,400**	**$1,700**	**$8,960**						**$16,060**
Subconsultant					**$0**	**$0**	**$0**			**$0**
Direct Expenses								**$0**	**$0**	**$0**
									Task 7 Subtotal	**$16,060**
Task 8: Bidding and Construction Management										
Bid Solicitation, Contractor Questions & Bid Addenda		4		2						
Bid Review and Recommendations		4		2						
Pre-Construction Meeting		6		6						
Submittal Reviews (x40)		10	30	30	$5,750	$2,000				
RFIs, Change Order Reviews, Pay Request Reviews		40	15	10	$1,150					
Bi-Weekly Construction Meetings (x20)		40	20	20				$220		
Milesteon Inspections (x10)		50	30	20	$8,050	$920		$110		
Parti-Time Construction Observation (4hrs/week)				160				$110		
LSCE (hours)	**0**	**154**	**95**	**250**						**499**
LSCE (cost)	**$0**	**$30,800**	**$16,150**	**$35,000**						**$81,950**
Subconsultant					**$14,950**	**$2,920**	**$0**			**$17,870**
Direct Expenses								**$440**	**$0**	**$440**
									Task 8 Subtotal	**$100,260**
Task 9: Startup & Commissioning										
Commisioning, Startup, and Punchlist		25	15	10	$3,450			$50		
Punchlist Review Meeting		2		2				$25		
Operator Training		20						$50		
Record Drawings, Letter of Acceptance, and Final Report		10		30					$1,000	
LSCE (hours)	**0**	**57**	**15**	**42**						**114**
LSCE (cost)	**$0**	**$11,400**	**$2,550**	**$5,880**						**$19,830**
Subconsultant					**$3,450**	**$0**	**$0**			**$3,450**
Direct Expenses								**$125**	**$1,000**	**$1,125**
									Task 9 Subtotal	**$24,405**
Total LSCE Hours	**25**	**392**	**258**	**596**						**1271**
Total LSCE Cost	**$5,250**	**$78,400**	**$43,860**	**$83,440**						**$210,950**
Total Sub-Consultant Cost					**$54,625**	**$10,395**	**$23,000**			**$88,020**
Total Direct Expenses Cost								**$815**	**$4,600**	**$5,415**
									COST PROPOSAL - TOTAL	**$304,385**