

March 28, 2013

Mr. Brian Williams
Washington Department of Fish and Wildlife
P.O. Box 1100
La Conner, WA 98257

**RE: PROPOSAL - FIR ISLAND FARM, PHASE 2.1 AND 2.2 ENGINEERING
DESIGN AND PERMITTING CONTRACT – 100-00202, CAPS 10-1431,
AMENDMENT NO. 7**

Dear Mr. Williams:

Shannon & Wilson and our teaming partners are pleased to provide this contract (Contract 100-00202, CAPS 10-1431) amendment proposal for engineering design and environmental permitting services for the Fir Island Farm Estuary Restoration Project. The proposed scope of services and schedule are enclosed in Appendix A and the proposed cost estimate is enclosed in Appendix B. The proposed field exploration and groundwater data collection plan is enclosed in Appendix C. Important information about the geotechnical and environmental proposal is contained in Appendix D.

In developing the proposal, we modified the scope of services and budgets to reflect current project timelines, our understanding of the project scope needs and changes since the grants were submitted, while meeting the requirements of the Salmon Recovery Funding Board (SRFB) Grant No. 12-1205. Certain Phase 2.2 tasks need to occur earlier in Phase 2.1 to perform the 60 percent design on schedule. The following is a list of changes you will find in the enclosed scope and cost estimates when compared to the SRFB grant:

- Washington Department of Fish and Wildlife (WDFW) topographic, bathymetric, and structure surveys moved from Phase 2.2 to 2.1 to facilitate project schedule and design in Phase 2.2.
- Increase the number of geotechnical field exploration locations and associated costs. Field explorations were added to better characterize existing dike conditions in an attempt to mitigate contractor field change conditions claims, and increased testing locations to provide a more comprehensive characterization of excavation areas for cultural and archaeological resources studies (Appendix C).

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- Groundwater observation well and equipment configurations have changed. We recommend installation of stick-up wells in steel casings to reduce potential removal and damage from farm equipment. A field exploration and data collection plan is included in the scope of services (Appendix C).
- Interior and farm drainage groundwater observations will need to start in 2013 when the geotechnical field explorations are performed and equipment can be installed. This will require an additional year of data collection and observations. The additional observations were not included in the original SRFB grant application budget. These additional services have been included in this scope of services and cost estimate. The enclosed cost estimate remains below the SRFB grant application budget.
- Reduction in budgets and scope that were originally shown in the SRFB grant as Consultant budgets, to reflect the project services that are now dedicated to The Nature Conservancy (TNC) under contract to WDFW.

We also recommend moving forward the Phase 2.2.4.2 geotechnical engineering design to Phase 2.1, or perform the task in late 2013 to facilitate the schedule for completing 60 percent design by June 2014. If this proposal and project contract amendment is awarded for both Phases 2.1 and 2.2, then we can advance the Phase 2.2 geotechnical engineering schedule as needed without formal changes in scope or schedule.

Overall, our cost estimate for performing Phase 2.1 and 2.2 services using a time and materials, not to exceed contract, with multiple additions to the original grant scope of services is \$836,656.

The SRFB grant and the project scope of services recognizes that project uncertainties may result in the need for response studies and use of contingency funds. A summary of potential project risks, uncertainties and response studies (and associated SRFB budgets) have been identified in (Appendix A). If a known project risk with an identified response study is needed, Shannon & Wilson will submit a change order request to WDFW, who will then coordinate access of the response study funds with the SRFB.

We have also identified a number of additional risk items that do not have dedicated SRFB response study funding. If a project outcome identifies a risk that does not have a designated response study (or funding), we will notify WDFW and coordinate with your agency to determine the best path forward.

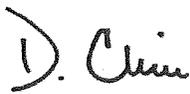
Prior to finalizing this proposal, WDFW provided to Shannon & Wilson cost estimate (fee) guidelines from the Washington Office of Financial Management for architecture and engineering fees for building projects. We reviewed the guidelines and it is our opinion that the enclosed scope of services and cost estimate for Phase 2.1 and 2.2 services adhere to the fee

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guidelines, and fall within the allowable fees for basic and extra services. We can provide more information upon request from WDFW.

We appreciate the opportunity to present this proposal and be of service to you. Please let me know if you have questions regarding this proposal.

Sincerely,
SHANNON & WILSON, INC.



Digitally signed by
David Cline, P.E.
Date: 2013.03.28
14:22:33 -07'00'

David Cline, P.E.
Senior Associate - Hydraulic Engineer

DRC/gjb

Enc: Appendix A – Scope of Services and Schedule
Appendix B – Cost Estimate
Appendix C – Field Exploration and Data Collection Plan
Appendix D – Important Information About Your Geotechnical Proposal

APPENDIX A
SCOPE OF SERVICES AND SCHEDULE

**Fir Island Farm
Phase 2.1 and 2.2 Restoration – Engineering Design and Permitting
Scope of Services**

Revised – March 26, 2013

Overview

The Washington Department of Fish and Wildlife (WDFW) is sponsoring the Fir Island Farm habitat restoration project in Skagit County Washington, on Fir Island in the Skagit River Delta and Skagit Bay area. The project involves a 5,800-foot-long coastal dike setback to restore 130 acres of tidal marsh. The restoration project will benefit multiple species and, in particular, will restore coastal, estuarine tidal marsh habitat that are key habitats for migrating juvenile Chinook salmon. The estimated construction cost of the project is approximately \$12.5M, with contingencies of \$3.5M (in 2011 dollars).

Phase 2.1 involves final engineering and environmental baseline studies needed for design and permitting. There are various studies being completed including geotechnical explorations, hydrogeology and groundwater studies, interior drainage modeling, coastal engineering and hydrodynamic modeling, cultural resource, environmental studies, and an adaptive management and monitoring plan. In addition to engineering and environmental studies, project communications, outreach and coordination activities with project teaming partners, stakeholders, and landowners, are planned to facilitate project development.

Phase 2.2 will bring the project to the 60 percent design level, as well as development and submittal of project permit applications.

This scope of services does not include Phase 2.3 Final Design and Permit Acquisition. Construction is currently planned to start in summer of 2015. Phase 2.3 is shown for reference in the project schedule at the end of this scope of services.

Included in the scope of services are project and contract management services. Considering the size, scale, and complexity of the project, a special risk management process has been included in the scope of services. This includes a risk management strategy, risk register and Independent Technical Review (ITR) at the end of each major project Phase 2.1 and 2.2.

The following scope of services for Phase 2.1 and 2.2 engineering design and permit services has been developed with an assumed 15-month schedule (April 2013 through June 2014), and in the opinion of Shannon & Wilson (S&W) is in adherence with the scope and contract language provided for the Salmon Recovery Funding Board Grant 12-1205.

Project Team and Responsibilities

There are various parties involved with development of the project. The following is a summary of roles and responsibilities for the various project parties.

Washington Department of Fish and Wildlife (WDFW)

WDFW is the project sponsor (Owner) who is responsible for:

- Contract management, documentation, and implementation of the project study and design.
- WDFW will provide project funding, financial and grant management, reporting, and coordination with the Skagit Watershed Council, the Salmon Recovery Funding Board, and National Oceanic and Atmospheric Administration (NOAA) Community Based Restoration grants, as well as other grants that may be obtained during the project. WDFW is responsible for funding additional studies, design, permitting, and data collection needed to complete the project.
- Provide right-of-entry and access to WDFW Snow Goose Reserve and adjacent properties as needed to complete project design and construction. WDFW may need to reissue or amend the Shannon & Wilson right of entry for the Snow Goose Reserve site.
- Project outreach coordination with the various stakeholders and property owners.
- Steering Committee management, organization, member participation and selection, and communications.
- Development and negotiation of the landowner and property agreements, and associated costs. WDFW is the primary landowner for the proposed coastal dike setback project. Adjacent properties and easement (e.g., Skagit County Consolidated Dike and Drainage District No. 22 [CDD22], The Hunt and Miss Gun Club, Haytons, and Skagit County Roads) may be affected. WDFW is responsible for all coordination and landowner and easement owner agreements.
- WDFW will provide professional land survey data, mapping, and services for the project.
- Review and provide comments on deliverables in a timely manner (15 calendar days) and provide approval and acceptance (or rejection) of engineering studies and design plans performed by the Consultant Team including geotechnical, groundwater, interior drainage, coastal, civil design reports, plans, and specifications.
- Review and comment in a timely manner (15 calendar days) and approval and acceptance (or rejection) of environmental studies and permit documents developed by the Consultant Team.
- Obtaining, implementing, and complying with necessary permits for the project.
- Development and implementation, including on the ground field data collection and survey (for certain elements – see tasks below) of the adaptive management plan.

- Selection of the ITR team members and decision-making regarding ITR comments and findings.
- WDFW is the project sponsor (owner) and decision-making authority on the project.
- Review all written change order requests submitted by Consultant in a timely manner.
- Approve or deny change orders where and when appropriate.

Consultant Design Team

Shannon & Wilson Inc. (S&W) is the prime consultant leading the design team. S&W is responsible for:

- Consultant project management and subconsultant team management. This includes administrative tasks, scheduling, change management, and risk management strategies and recommendations.
- Administration of the contract with WDFW.
- Meeting attendance, agendas, and minutes.
- Engineering studies, data collection, plans, designs and specifications, and engineering opinion of cost and engineer of record. S&W is responsible for geotechnical, hydrogeology and groundwater, interior drainage surface water, and civil design.
- Environmental studies, data collection, report, permit documents, and applications.
- Overseeing hydrodynamic modeling, cultural resource, and field exploration subconsultant and subcontractor services.
- Providing support and technical assistance to WDFW for Steering Committee and outreach meetings, construction funding strategies, landowner agreements, and adaptive management and monitoring strategies.
- The Consultant is responsible for managing the ITR subconsultant contracts, but not responsible for the findings and recommendations made by the ITR subconsultants, nor the decisions made by WDFW resulting from ITR.
- Complying with necessary permits for the project.
- Submit written change order requests to WDFW for review and approval prior to implementing. The Consultant will not implement change order requests without prior WDFW approval.

Shannon & Wilson Subconsultant Battelle – Pacific Northwest National Laboratory (Battelle) is responsible for:

- Hydrodynamic modeling and coastal engineering services. Specifically, Battelle will be responsible for providing modeling and coastal engineering analyses and associated design recommendations.

- Attendance at two meetings with WDFW and two internal meetings with S&W to coordinate and present modeling information and findings. S&W will rely on Battelle's hydrodynamic modeling and design recommendations for establishing dike elevations and developing erosion protection, tidal channel excavation, and breach sizing designs.

Shannon & Wilson Subconsultant Equinox Research and Consulting International (ECRI) is responsible for:

- Providing expertise in archaeological, cultural resources, and Section 106 advance coordination services.
- ERCI will be responsible for providing field assistance (senior archaeologist) during geotechnical explorations, field pedestrian survey, shovel testing, and backhoe testing for up to ten days in the field. This includes observing backhoe test pits along the existing levee, pedestrian survey of the project area, and shovel testing in select locations within the areas of proposed disturbance.
- ERCI will review plans and areas of likely disturbance for potential archaeological and cultural resource impacts.
- ERCI will provide a professional report documenting the project plans, consultation with tribal governments, assessment of historic properties, and analyses considering the effects of project alternatives on cultural resources.
- ERCI will provide recommendations for avoidance, minimization and/or mitigation of adverse effects, and contingency mitigation planning.
- ERCI will communicate findings and report to the Washington State Department of Archaeological and Historic Preservation and to tribal representatives.

Shannon & Wilson Subconsultant Independent Technical Review (ITR) Subconsultants are responsible for:

- Performing ITR of project considering standards of practice, engineering design guidelines, regulations and project goals and objectives.
- Performing backchecks on ITR comments for agreement that comments have been resolved.

Shannon & Wilson Field Exploration Subcontractors will be hired by S&W and will provide:

- Field exploration equipment and services to support geotechnical studies.
- Field exploration equipment and services to install groundwater and surface water observation and data collection equipment.
- Field exploration equipment and services to assist the archaeological subconsultant in performing test pit explorations.

Other Project Team Members

The Nature Conservancy (TNC) is under contract to WDFW and responsible for:

- Assistance with project and grant contract management.
- Review of project documents and recommendations.
- Participation and assistance in developing construction grant funding applications.
- Participation as an ITR team member.
- Consult and coordinate with the project archaeologist on Section 106 advance coordination activities.
- Coordinate with WDFW regarding Skagit County permits and special hearing examiner review.
- Participate in development of adaptive management and monitoring plans.
- Provide input and review of landowner agreements.

The Steering Committee is a committee organized by WDFW for the Fir Island Farm project and includes WDFW, Consolidated Dike District No.22 (CDD#22), Western Washington Agriculture Association, Seattle City Light, and TNC. Their responsibilities are:

- Attend quarterly project update meetings.
- Provide input and recommendations to WDFW regarding project decisions.
- Review project studies and plans and provide technical review assistance.
- Assist WDFW in landowner and stakeholder outreach and coordination.

Phase 2.1 – Final Engineering and Environmental Studies

Phase 2.1 will include the engineering and environmental studies to be completed prior to 60 percent design and permit application Phase 2.2 services. Phase 2.1 is scheduled for nine months during 2013. The following describes the tasks for Phase 2.1.

Task 2.1.1 – Project Management and Contract Administration

The Consultant will provide project management services during Phase 2.1, including:

- Consultant and subconsultant contract management
- Health and safety plan
- Invoicing and progress reporting
- Scheduling
- Change management
- Risk management

The Consultant will provide contract management services. This will include management of contract documents and coordinating with WDFW contracting staff. The Consultant will provide monthly invoices and progress reports to WDFW.

The Consultant will provide subcontract administration services to support the project. Subconsultant services include coastal engineering and hydrodynamic modeling, cultural and archaeological studies, field exploration subcontractors, and ITRs.

The Consultant will develop project schedule and provide quarterly progress updates to WDFW, the Steering Committee, and the project team.

The Consultant will keep a change management record, to be included with the monthly progress report.

The Consultant will provide risk management services for Phase 2.1. The Consultant will provide a risk management strategy specific to the Fir Island Farm Final Design Project. The risk management strategy will be an open-file report, using a risk record (ledger), to be updated at specific intervals and milestones by the Consultant, WDFW, the Steering Committee, and the project team. The Risk Management strategy submittals are as follows:

- DRAFT Risk Management Strategy Report to WDFW and Steering Committee for Review at the second quarterly meeting. The DRAFT Risk Management Strategy Report will include a risk management framework, initial identification of project risks and risk record (ledger), and recommended strategies for managing the risks. WDFW and the Steering Committee will provide review comments.

- A REVISED Risk Management Strategy to be provided to WDFW at the end of Phase 2.1 for use in following phases.
- Risk Record (Ledger) quarterly updates (or as needed as risks are identified). The Consultant will provide and update the Risk Record at monthly WDFW and Steering Committee meetings.
- FUTURE REVISIONS (2) of the Risk Management Strategy. The Consultant will provide revisions and updates to the Risk Management Strategy at the outset and conclusion of each following major design Phases 2.2 and 2.3.

WDFW Responsibilities

- Manage project budgets and contracts.
- Manage project grants and reporting.
- Manage landowner communications and negotiations.
- Manage and review WDFW, Steering Committee, and TNC tasks and products.
- Review and provide comments on Risk Management Strategy within 15 calendar days of submittal.

S&W Deliverables

- Monthly invoices and progress reports during Phase 2.1.
- Project schedule and up to four quarterly updates.
- DRAFT and REVISED Risk Management Strategy Reports.

Assumptions

- The duration of Phase 2.1 will be limited to nine months (April 2013 through December 2013).

Task 2.1.2 – Project Coordination, Meetings, and Conference Calls

The Consultant will attend meetings and conference calls. This task is designed to be flexible and allow for attendance at scheduled meetings (such as the quarterly Steering Committee meetings) and ad hoc project coordination calls, and meetings. Meetings and calls with WDFW and the Steering Committee will be tracked on this task, regardless of the specific project management, design, and permitting task.

- The Consultant will attend three quarterly, two-hour meeting consisting of a one hour project management meeting and a one hour Steering Committee meetings in nearby La Conner. The Consultant Project Manager will attend three meetings. The Consultant Principal-in-Charge will attend two meetings (as necessary) and a Civil Engineer, Geotechnical Engineer, Environmental Permit Specialist, or Hydrogeologist will attend two meetings. For each meeting, the Consultant will require two hours for preparation,

two hours travel, two hours to attend, and one hour for debrief and meeting minute review time. WDFW will provide meeting minutes.

- Steering Committee meetings will be held during the second hour of the quarterly meetings. Three quarterly meetings are planned for Phase 2.1. The assumption is that the quarterly updates will be presented during the Steering Committee meetings. The length of the combined quarterly project management and steering committee meeting will remain at two hours.
- Consultant will attend up to four project outreach and coordination meetings with WDFW in La Conner. The purpose of these meetings is to support WDFW in coordinating with Skagit County CDD22, private landowners, Skagit River Systems Cooperative, the Skagit Watershed Council, and other stakeholders. For each project outreach and coordination meeting, the Consultant will require two hours for preparation, two hours travel time, two hours for attendance, and one hour for debriefing and meeting minute review. WDFW will provide meeting minutes.

WDFW Responsibilities

- Schedule and attend meetings.
- Coordinate with parties who will attend meetings.
- Steering committee meeting minutes.
- Provide review and comments on design meeting minutes within one week of minute submittal.

S&W Deliverables

- Quarterly design meeting agendas (3).
- Quarterly design meeting minutes for review by WDFW (3).
- Review and comment on Steering Committee meeting minutes (3).
- Additional meeting minutes for review by WDFW (4).

Assumptions

- The number of meetings for this phase is limited to those listed above in this task.

Task 2.1.3 – Grant Funding and Construction Financing

The Fir Island Farm Restoration project has an estimated construction budget of \$12.5M to \$16M. Dedicated resources will be necessary to coordinate grant funding application and acquisition from a variety of sources. Phase 2.1 grant funding and construction financing efforts will focus on developing a funding strategy utilizing a dedicated team comprised of key WDFW, Steering Committee, and Consultant team members. Phase 2.1 efforts will focus on research and grant funding strategy. Phases 2.2 and 2.3 will focus on grant application and award. Phase 2.1 grant funding and construction financing tasks will include:

- Research and identify applicable grants, funds available, granting agency points of contact, and grant submittal timelines and deadlines.
- Coordinate with grant agencies through phone calls, meetings, and site visits.

WDFW Responsibilities

- Convene grant funding team.
- Manage and coordinate the activities of the grant funding team.
- Assist the grant funding team to research grant funding opportunities.
- Assist the grant funding team to develop a grant funding strategy.

S&W Deliverables

- Participate on grant funding team.
- Assist grant funding team to research grant funding opportunities.
- Assist grant funding team to develop a grant funding strategy.

Assumptions

- S&W participation on the grant funding team is a technical supporting role, and does not in create a fiduciary duty to the project and to WDFW.
- WDFW will be the lead and will be responsible for Task 2.1.3 and developing the grant funding strategy.
- S&W will only provide services for the hours shown in the cost estimate.
- Funding team members may include:
 - Brian Williams – WDFW
 - TBD – Skagit Watershed Council
 - Mike Shelby – Western Washington Agriculture Association
 - Jenny Baker – TNC
 - Dave Cline – S&W
 - Polly Hicks – NOAA
 - Betsy Lyons – WDFW
 - Ginger Phalen - USFWS
 - Others – TBD

Task 2.1.4 – Site Survey

WDFW will provide a topographic land and bathymetric survey for the project. The survey will include establishment of survey control; ground topography and channel bathymetry; structure surveys (roads, fences, utilities, drainage, etc.); property lines; boundaries; legal descriptions; and easements and information for updating the Washington Administrative Code (WAC) for the reserve status.

WDFW Responsibilities

- Coordinate site survey with the Consultant.
- Provide a site survey basemap stamped by a Professional Land Surveyor, registered in the State of Washington.
- File survey record with Skagit County assessor's office for formal boundary line surveys, observations and adjustments as required by the County (may be submitted at a later date).
- Provide electronic CAD plans, topographic and bathymetric surfaces in AutoCAD, and Civil3D using WDFW survey and CAD standards.

S&W Deliverables

- Provide a survey plan request to WDFW.
- Provide review of WDFW survey basemap, topography, structures, and surfaces within 15 calendar days from receipt of survey and drawings.

Assumptions

- WDFW will provide site survey by a registered professional land surveyor.

Task 2.1.5 – Geotechnical Engineering Field Explorations

The Consultant will perform geotechnical field studies that will provide data to support final engineering design. Field studies include subsurface explorations by drilling soil borings, excavating test pits, and performing cone penetration tests (CPTs). The Consultant will use the subsurface exploration data to develop a geotechnical data report. The explorations will be located in the vicinity of the preferred restoration plan project elements (Appendix C), including:

- Preferred dike embankment alignment
- Dike pipe penetration areas
- Existing dike breach zones
- Existing drainage ditch fills
- New tidal channel excavations
- Stormwater pond
- Soil and rock material salvage materials, processing and mixing
 - Stormwater pond dike materials
 - Existing rock protection
 - Topsoil
 - New tidal channel excavations
- Temporary construction facilities
 - Site access roads, staging areas, haul routes and parking lot
 - Temporary irrigation structure
 - Construction dewatering locations

- Pipe penetrations
- Breach grading areas and tidal channels
- Stormwater pond and drainage channels

The subsurface explorations will include up to four mud-rotary borings, eight CPTs, and ten days of test pit explorations. The geotechnical field sampling and testing will include coordination and observation with the Cultural Resources Archaeologist.

Additional test pit explorations have been added to the scope of services satisfy the baseline documentation needs for cultural and archaeological, Section 106 advance coordination, and for geotechnical documentation of the baseline soil type and moisture contents during similar summer season to future construction. The subsurface explorations will be located using hand-held resource grade Global Positioning System mapping (horizontal accuracy ± 1 meter) equipment.

Anticipated geotechnical laboratory analyses will include grain size analyses using sieve and hydrometer tests, Atterberg Limits, organic content, water content, consolidation tests, triaxial compression tests, and compaction tests.

The subsurface explorations and laboratory test results will be compiled with geologic interpretation to support geotechnical design. The geologic interpretations will include the following information:

- Borings, CPT, and test pit soil profiles at the exploration location.
- Interpreted subsurface profile along the length of the proposed dike setback alignment.
- Interpreted subsurface profile across the proposed stormwater pond.

WDFW Responsibilities

- Provide right-of-entry and access to WDFW Snow Goose Reserve and adjacent properties identified in subsurface exploration plan.
- Review and provide comments on geotechnical reports within 15 calendar days of submittal.

WDFW and Steering Committee comments (and other comments from the public or private landowners) shall be compiled into a single comment form and organized by WDFW.

S&W Deliverables

- Geotechnical exploration plan.
- New drilling permits and utility locate requests, as the original shoreline exemption permits are not applicable to current drilling and instrumentation installations.
- DRAFT and FINAL Geotechnical Data Report (10 copies).

Assumptions

- The geotechnical data report will be limited to field data collection and laboratory analysis and geologic interpretations. Geotechnical engineering design will be performed in the following Phase 2.2.
- Unanticipated discovery of cultural and archaeological resources may be encountered during field explorations. If cultural and archaeological resources are encountered, WDFW will be notified, and response study would be triggered (originally Task 2.1.4.a in the SRFB Grant Application).
- DRAFT geotechnical data report will be provided to WDFW, the Steering Committee, and ITR team for review and comment. The review comments will be addressed and included in the FINAL geotechnical data report.
- No hazardous waste and/or contamination studies have been included. If unanticipated evidence of hazardous waste and/or contamination is encountered during field explorations, S&W will report the discovery and collect samples per Washington State regulations. Testing and laboratory analysis are an addition to this scope of services. A Phase II Contaminated Media study may also be necessary.

Task 2.1.6 – Groundwater and Interior Drainage Final Explorations, Observations, and Modeling

The feasibility study concluded that the dike setback could be designed to mitigate changes to the interior drainage system. The proposed design involves building new interior storage ponds on the farm side of the dikes and drainage structures through the dikes. To date, preliminary pond size estimates were based on interior drainage surface water and groundwater baseflow from upstream drainages. An HEC-RAS unsteady-state flow model of surface water runoff predicted the feasibility of the ponds to mitigate for losses to interior drainage storage. The interior drainage storage pond size and drainage structure designs need to accommodate tidal groundwater inflow and outflow conditions as part of final design. The following hydrogeologic studies will be performed in support of finalizing the interior drainage design:

- Install three pairs of dual-depth groundwater monitoring wells and associated pressure transducer equipment to provide long-term observations and data collection, and document the existing conditions baseline.
- Reinstall up to six surface water loggers.
- Use data observations to evaluate future project effects on groundwater seepage, mounding, and saltwater intrusion.
- Perform a slug test in each of the groundwater monitoring wells.
- Download and analyze surface water and groundwater monitoring well data from the dedicated dataloggers.
- Evaluate the effects of groundwater level changes and saltwater intrusion using a conceptual hydrologic/hydrogeologic model of the existing drainage system and available data.

- If groundwater studies indicate a pump station or special drainage structure will be required, then a response study would be required (originally Task 2.1.5.2a in the SRFB Grant Application).

2.1.6.1 – Groundwater Observations & Data Collection

New groundwater observation wells will be installed for the project. Original groundwater monitoring wells were established at GP-01, GP-02, and GP-03 (WDFW Fir Island Farm Restoration Feasibility Study, 2010). We assume the GP-01 well and datalogger located in the existing dike near Dry Slough remain intact. The wells installed in GP-02 located in the Hayton Bay Field and GP-03 located north on the Hayton farm fields were removed by the landowner in 2012.

Three pairs of dual-depth groundwater observation wells will be installed to evaluate seepage effects on the interior drainage system and observe long-term effects on the WDFW and Hayton properties.

The objective of the paired wells with the tidal surface water logger is to document effects of tidal conditions on groundwater elevation and salinity along the margin of the dike setback and the interior drainage pond system.

2.1.6.2 – Initial Groundwater Effects Analyses

The Consultant will perform an initial groundwater effects analyses for the proposed construction conditions to estimate likely changes in groundwater seepage conditions. The analyses will use the program SEEP/W or a comparable modeling code. Salinity effects will be evaluated using advection-dispersion equations. Input for the equations will use SEEP/W modeling output (head gradients and seepage rates). The following parameters will be evaluated:

- Likely changes of interior farm groundwater elevations in the spring and early summer growing season,
- Likely changes of salinity conditions in the spring and early summer growing season, and
- Seepage estimates to the interior drainage stormwater ponds and channels for the spring and early summer growing seasons and the fall/winter flood seasons.

If the analyses predict that changes in groundwater elevation affecting interior drainage storage capacity, salinity, and seepage rates will occur, additional numerical groundwater modeling (MODFLOW) may be required and is not included in this scope of services.

2.1.6.3 – Interior Drainage Surface Water HEC-RAS Modeling

We will use the results of the groundwater effects analyses, the interior drainage surface water (HEC-RAS) model to design the size, length, depth, and width of the interior drainage storage pond facility, and to identify if additional interior drainage culverts and pipes will be necessary to provide adequate drainage. The HEC-RAS model will be evaluated for the following conditions:

- Spring groundwater and tidal cycle condition,
- Spring groundwater, tidal cycle and stormwater flood event condition, and
- Project design flood conditions considering groundwater inflows.

2.1.6.4 – Interior Drainage and Groundwater Effects Sensitivity Analysis

An analysis will be performed to evaluate the sensitivity of selected key factors/parameter values on interior drainage surface water and groundwater conditions. The following describe these key factors/parameters:

- Tidal tailwater conditions affect upstream interior drainage storage capacity and conveyance. Factors that can affect tidal tailwater conditions including sea level rise, tidal marsh, and tidal channel sedimentation. As sea level rises, tailwater conditions will increase, thereby reducing interior drainage conveyance and storage capacity. Sedimentation and deposition in downstream tidal drainage channels and marsh areas can reduce interior drainage conveyance and storage capacity.
- Upstream (headwater) factors that can impact interior drainage conditions include the establishment and growth of freshwater wetland vegetation and sedimentation in the proposed interior drainage storage pond facility. These factors reduce storage, reduce flow conveyance, and have the potential to increase upstream water surface elevations.
- Other factors that could impact drainage performance will be considered including climate changes that result in increased long-term precipitation or variability in soil permeability that could result in differing groundwater flow and elevation conditions.

The Consultant will perform a sensitivity analysis to estimate the relative influence of the key factors on interior drainage storage capacity and conveyance. Probabilistic methods and Monte Carlo simulations will be used to develop five headwater and five tailwater scenarios that would represent a likely range of upstream and downstream conditions. Based on the estimated probabilities associated with the headwater and tailwater scenarios, the Consultant will calculate the probability associated with interior drainage storage capacity and conveyance for each combination of headwater/tailwater scenario analyzed. Sensitivity scenarios will be analyzed during Phase 2.1. The sensitivity analysis findings will be used to develop final design criteria for Phases 2.2 and 2.3.

2.1.6.5 – Interior Drainage and Groundwater Effects and Design Recommendations

Using the results of the groundwater analysis and interior drainage analysis, the Consultant will provide a summary of interior drainage and groundwater effects and recommendations for use in project design and permitting.

WDFW Responsibilities

- Provide up to six Solinst level loggers for new and reinstallation.
- Provide input for long-term surface and groundwater observation locations.
- Assist Consultant with install and downloads surface water data loggers.

- Provide right-of-entry and access to surface and groundwater observation locations.
- Provide review and comment on the groundwater and surface water interior drainage reports within 15 calendar days of submittal.
- WDFW and Steering Committee comments (and other comments from the public or private landowners) shall be compiled into a single comment form and organized by WDFW.

S&W Deliverables

- DRAFT and FINAL Report (10 copies).

Assumptions

- Surface water and groundwater data downloads will be performed quarterly (three times) during the nine-month Phase 2.1 study period as part of the adaptive management and monitoring plans.
- Groundwater observations and data collection will be performed using the three new “dual-depth” observation wells.
- The scope of services assumes that surface water storage pond areas and tidegate designs will mitigate interior drainage, surface water, and groundwater effects. If the Phase 2.1 groundwater studies show otherwise, (contingency) for additional groundwater modeling may be required. The response study was originally Task 2.1.5.2a in the SRFB Grant Application and was for groundwater modeling study. The groundwater modeling study would need to be performed during Phase 2.2, due to scheduling. The results of the modeling may indicate a need for sheetpiles, cutoffs, relief wells, and/or pump station design. A pump station design response study is included in the Phase 2.3, Task 2.3.4.3b in the SRFB-2013 and ESRP grant applications (and not a response study for current Phases 2.1 and 2.2). Sheet piles, cutoffs and relief wells are not specifically called out as response studies, but may be similar types of structures to a pump station that could be used to mitigate drainage impacts.
- The scope of services assumes that the CDD22 Consent Decree for the Dry Slough project is separate from the Fir Island Farm project, and it will not be constructed; therefore, modeling analysis and evaluation of project effects from the Consent Decree project are not required.
- Subsurface conditions have similar hydraulic properties along the extent of the dike setback between the field exploration locations.

Task 2.1.7 – Coastal Engineering

The Fir Island Engineering Design and Permitting – Phase 2 will include detailed coastal engineering, hydrodynamic modeling, and meeting attendance. Battelle will perform the following are the coastal engineering design tasks.

2.1.7.1 – Management, Administration, and Meetings

Battelle will provide project and contract management and administration and attend two meetings in La Conner with WDFW and attend two additional internal meetings with S&W.

2.1.7.2 – Hydrodynamic Modeling Data Output

Hydrodynamic modeling for the Fir Island Farm Restoration Site and adjacent Skagit Bay area is a key aspect of the engineering phase of study. Battelle will develop and coordinate a method for delivering hydrodynamic modeling results including velocity, depth and shear stress that can be viewed using Arc-GIS or a Surface-water Modeling System software program. The model will include the marsh restoration levee setback area. This includes the marsh restoration area shown in Fir Island Farm Restoration Feasibility Study - SkagitBay_VelDep_Alt_April-14-2003_zoom.avi files. The model output parameters will include depth, velocity, shear stress, and salinity. S&W engineers will review the hydrodynamic modeling results for consistency and to evaluate depth, overtopping, scour and erosion, and sedimentation potential.

2.1.7.3 - Wave Height Analysis and Sea Level Rise Review

Battelle will perform a significant wave height and sea level rise review. Significant water surface elevations (significant wave height) will be calculated based on the combination of:

- Extreme tides,
- Wave run-up,
- Wind storm surge (local) using long-term historical data, empirical formulation, and new Skagit Bay hydrodynamic model with Fir Island Farm restoration site, and
- Dike elevation adjustments for long-term sea level rise based on current Northwest Climate Impacts Group assessments and models.

Battelle will provide a DRAFT and FINAL report summarizing their analysis results. S&W and WDFW will review and comment on the report to be finalized addressing comments provided.

2.1.7.4 – Spur Dike Modeling

Battelle will perform an evaluation of the hydrodynamic effects on the Brown Slough tidegates and the western dike rock protection conditions with a spur dike configuration. S&W will develop a grading plan that retains a portion of the existing dike along Browns Slough. Battelle will modify the model grid to include the spur dike and perform one model simulation. Battelle will provide a report summarizing the modeling analysis. S&W and WDFW will review and comment on the report to be finalized addressing comments provided.

2.1.7.5 – Breach Opening Erosion Analysis

S&W will estimate the opening sizes of the tidal reconnection channels, through the full dike removal areas, using the results from the Skagit Bay hydrodynamic model. Iterative modeling of different breach openings using the hydrodynamic will not be performed. Instead, coastal

engineering equilibrium theory and empirical equations will be used to estimate the breach opening size. Granting agencies were not willing to fund separate modeling runs for estimating tidal channel breach sizes at the site and, therefore, alternate methods will be used for estimating breach widths based on channel equilibrium theory. S&W will perform a tidal channel breach analysis based on equilibrium threshold criterion including velocity thresholds, volume flux, and shear stress. An iterative analysis of breach width will be performed to estimate threshold criterion for sediment transport to indicate likely stable tidal channel dimensions.

WDFW Responsibilities

- Provide review and comments on the coastal engineering and hydrodynamic modeling studies within 15 calendar days of submittal.
- WDFW and Steering Committee comments (and other comments from the public or private landowners) shall be compiled into a single comment form and organized by WDFW.

S&W Deliverables

- Hydrodynamic modeling report (DRAFT and FINAL 10 copies).

Assumptions

- An output data file will be prepared and delivered, in the agreed to software output format, with special instructions for download and viewing using the SkagitBay_VelDep_Alt_April-14-2003 modeling file. This alternative is the Complete Dike Removal Alternative.
- The deliverables listed above may be combined into one or more reports.
- Ten reports will include a Drafts for Prime Consultant (three copies), WDFW (four), and ITR review (three copies). The FINAL report(s) will address comments received.
- Drainage flow rates and stream discharges into the project site and configuration of the tidegates will be based on existing data.
- Modeling conducted by Battelle will use the same model boundary conditions and forcing as was done in Phase I of the project, Hydrodynamic Modeling Analysis of Fir Island Farm Restoration – Baseline Condition (Yang and Wang, 2011).¹
- Sea level rise predictions will use information available from the Northwest Region Climate Impacts Group assessments (and other relevant studies).
- S&W and WDFW reviews will be performed within 15 calendar days of submittal of the DRAFT report. Battelle will address comments and resubmit the report within 15 calendar days of receiving comments.

¹ Yang, Z., and Wang, T, 2011 – Hydrodynamic Modeling Analysis of Fir Island Farm Restoration Preferred Alternative (PNWD-4306)

Task 2.1.8 – Permit Pre-application Coordination

The Consultant will perform advance coordination and attend pre-application meetings with key regulatory agencies in design phase 2.1. The objective of these pre-application meetings is to better define permitting and design requirements, prior to completion of the 60 percent design documents. Permits will then be submitted in design Phase 2.2 upon completion of the 60 percent design documents. Technical memoranda will be provided summarizing coordination and meeting feedback for each of the permits outlining the permit requirements for project design and permitting.

Pre-application coordination will be attempted with the following agencies and organizations:

- U.S. Army Corps of Engineers (Section 404 Permit)
- NOAA (Limit 8 – Section 7 Consultation)
- U.S. Fish and Wildlife Service (Biological Opinion for Bull Trout – Section 7 Consultation)
- Federal Emergency Management Agency (FEMA) Bi-Op and floodplain fill permit requirements)
- Washington Department of Fish and Wildlife (Hydraulic Project Approval [HPA] and State Environmental Policy Act [SEPA])
- Washington State Department of Ecology (Section 401 Water Quality Certification, National Pollutant Discharge Elimination System Permit, Wetlands Mitigation)
- The Washington Department of Archaeological and Historic Preservation (DAHP), and U.S. Army Corps of Engineers) will coordinate with the Swinomish Tribe, Upper Skagit Tribe, Stillaquamish Tribe for Section 106 Consultation. The Consultant will provide initial advance coordination with the Tribes (Coordinating communications to the tribes through WDFW).
- Skagit County (Shoreline, Lot Certifications, Special Use, Critical Areas, Fill/Grading, Temporary Access)

Given the project description and location, we anticipate additional effort will be required during the pre-application phase for certain permits, namely the Section 106 advanced coordination, the Skagit County Special Use and Temporary Access Permits, and the FEMA Floodplain permit. In order for WDFW to complete permitting, a final cultural and archaeological study will be needed for the preferred dike realignment and removal plan. An archaeological consultant will perform the site studies, tribal DAHP, and U.S. Army Corps of Engineers advance coordination to meet the requirements of Section 106 of the National Historic Preservation Act. An incidental discovery and recovery plan will likely be required as a contingency if the archaeologist or others find cultural or archaeological resources during final studies or construction, which could trigger additional mitigation plans, design revisions, and consultations.

WDFW Responsibilities

- Attend pre-application meetings organized by archaeologist subconsultant when attendance is required.
- Coordinate SEPA and identify other lead agency and inter-agency permitting activities.
- Continue coordination with the Swinomish Tribe, Upper Skagit Tribe, Stillaquamish Tribe.

S&W Deliverables

- Meeting Minutes from Pre-Application and Coordination Meetings
- DRAFT and FINAL– Permit Pre-Application Summary
- DRAFT and FINAL– Section 106 Advanced Coordination and Site Exploration Report

Assumptions

- Pre-application meetings will be coordinated by the Consultant.
- Pre-application meetings will be held at the offices of each stated agency or at the WDFW offices in La Conner or Mill Creek.
- The Consultant and WDFW will attend the pre-application permit meetings.
- The Consultant, archaeological subconsultant, and WDFW will attend Section 106 advanced coordination meetings scheduled by the archaeological subconsultant.

Task 2.1.9 – Adaptive Management and Monitoring Plan Phase 2.1

Investing in a large and complex restoration project will likely have numerous long-term ecosystem, vegetation, and drainage performance adaptive management and monitoring requirements and opportunities. Developing an adaptive management and monitoring plan will provide a framework by which the objectives of the Fir Island Farm Restoration Project can be evaluated and site management decision made that support these objectives. Phase 2.1 will focus on developing a DRAFT Adaptive Management and Monitoring Plan, that clearly identifies monitoring objectives and criteria. A Final Adaptive Management and Monitoring Plan and baseline data collection will be completed in design phases 2.2 and 2.3.

WDFW Responsibilities

- WDFW is the lead and primary author for developing a DRAFT Adaptive Management and Monitoring Plan, with input and review from the project team.

S&W Deliverables

- Consultant will provide input to the DRAFT – Draft Adaptive Management and Monitoring Plan Drainage, surface and groundwater monitoring methods
 - Dikes and structures monitoring methods

- Marsh vegetation and invasive species monitoring methods
- Consultant will perform surface and groundwater baseline monitoring and reporting for nine-month period (three quarters) in FY-2013.

Assumptions

- WDFW will be the lead for developing the Draft Adaptive Management and Monitoring Plan. S&W will provide technical support, review, and assistance in developing the plan.
- The Draft Adaptive Management and Monitoring Plan will utilize existing baseline monitoring studies to the extent feasible.
- The Draft Adaptive Management and Monitoring Plan will require coordination, and possible work requests, with other agencies and resources. Coordination will be the responsibility and performed by WDFW.

Task 2.1.10 – Real Estate and Landowner and Partner Agreements

In Phase 2.1, WDFW will begin negotiating real estate, landowner and partner agreements, easements, and rights-of-way. The Consultant will provide up to 34 hours to provide technical assistance to WDFW (such as CAD drawings, descriptions of construction features, activities and locations, schedule, and review of documents).

WDFW Responsibilities

- Lead for real estate and landowner and partner agreements.

S&W Deliverables

- Provide data, files, CAD drawings, schedules, and project descriptions as requested by WDFW in support of Landowner and Partner Agreements.

Assumptions

- Consultant will provide support on an as-needed basis. Consultant hours and budget will be limited to the amounts shown in the cost estimate.
- Support for CD22 Consent Decree negotiations are not needed.

Task 2.1.11 – Independent Technical Review (ITR)

A team of qualified professionals, separate from the Consultant, WDFW, and the Steering Committee, will perform an ITR. The ITR team will review the Phase 2.1 DRAFT documents listed below, provide review comments, participate in a technical review meeting with WDFW and the design team, and backcheck that comments were resolved in subsequent project phases.

WDFW Responsibilities

- Review ITR Subconsultant list and modify as necessary.
- Participate in ITR Subconsultant telephone interviews.
- Select ITR Subconsultant and authorize contracting.
- Review and approve ITR Subconsultant budget.
- Participate in ITR meeting with Consultant and ITR Subconsultant.

S&W Deliverables

- ITR Subconsultant candidate list.
- Subconsultant ITR Comments on Phase 2.1 deliverables.
- ITR meeting minutes.
- ITR Comment responses by Consultant team and WDFW.

Assumptions

- WDFW and the Consultant will participate in up to four 1-hour phone interviews to select the ITR team.
- Phase 2.1 ITR Subconsultant will review technical documents that will be the basis subsequent engineering designs:
 - DRAFT Geotechnical Baseline Data Report
 - DRAFT Groundwater and Interior Drainage Report
 - DRAFT Coastal Engineering Report
- The Consultant will provide an electronic copy of documents to the ITR team for review.
- The ITR team will provide review and comments organized using a standard ITR comment form.
- WDFW, Consultant, and ITR team will meet in the WDFW La Conner office to discuss review comments prior to Consultant revising documents.
- The ITR team will provide backcheck review comments and update the standard ITR comment form.

Phase 2.2 – 60 Percent Engineering Design, Permits, and Baseline Monitoring

Phase 2.2 will include 60 percent engineering design, development and submittal of project permits, and continuance of construction funding grant application and acquisition.

Task 2.2.1 – Project Management and Contract Administration

The Consultant and WDFW will provide project management for Phase 2.2. Project management and administration services will be similar to those outlined in Phase 2.1, with the following exceptions:

- Update to the REVISED Risk Management Strategy Report at the outset of Phase 2.2.
- Risk Record (Ledger) quarterly (or as needed) updates – The Consultant will provide and update the Risk Record at monthly WDFW and Steering Committee meetings.

WDFW Responsibilities

- Manage project budgets and contracts.
- Manage project grants and reporting.
- Manage landowner communications and negotiations.
- Manage and review WDFW, Steering Committee, and TNC tasks and products.
- Review and provide comments on Risk Management Strategy.

S&W Deliverables

- Six invoices and progress reports provided monthly
- REVISED Risk Management Strategy Report

Assumptions

- Phase 2.2 will be a six-month period from January 2014 through June 2014.

Task 2.2.2 – Project Coordination, Meeting Attendance, and Calls

The Consultant will attend meetings and conference calls in support of the project in Phase 2.2. Project management and administration services will be similar to those outlined in Phase 2.1 with the following exceptions.

- Two steering committee meetings.
- Two additional meetings.

WDFW Responsibilities

- Schedule and attend meetings.
- Coordinate with parties who will attend meetings.
- Steering committee meeting minutes.
- Provide review and comments on design meeting minutes within one week of minute submittal.

S&W Deliverables

- Quarterly project management meeting agendas (2).
- Quarterly project management meeting minutes for review by WDFW (2).
- Review and comment on Steering Committee meeting minutes (2).
- Additional meeting minutes for review by WDFW (2).

Assumptions

- The number of meetings and calls are limited to the amounts listed in the tasks above.
- ITR Subconsultant meetings are separate tasks.

Task 2.2.3 – Grant Funding and Construction Financing

Phase 2.2 grant funding and construction financing will continue building upon Phase 2.1 grant tasks. Phase 2.2 services will primarily focus on developing and submitting grant applications.

WDFW Responsibilities

- Develop and submit construction funding grant applications.
- Oversee grant funding application activities of others.
- Coordinate and schedule reviews.
- Submit grant applications.
- Perform coordination, site visits, and meetings with grant agencies.

S&W Deliverables

- Review and provide comments on Construction Funding Grant Applications.
- Attend site visits with WDFW and grant agencies.

Assumptions

- Consultant will provide 40 hours of services for technical grant support.

Task 2.2.4 – 60 Percent Design, Specifications, Schedule, and Opinion of Probable Construction Cost

The Consultant will develop a 60 percent design package including plans, specifications outline, opinion of probable construction cost and bid sheet, and likely construction schedule for review and comment by WDFW.

2.2.4.1 – Site Survey Support

For the 60 percent engineering design of the site, WDFW will continue to provide land surveying tasks primarily related to real estate agreements, boundaries, legal descriptions, easements, and information for updating the WAC for the reserve status.

WDFW Responsibilities

- Real estate, legal boundary descriptions, and exhibits for landowner agreements.
- Filing records of survey with the local jurisdictions.

S&W Deliverables

- Not applicable.

Assumptions

- WDFW will provide survey reports, plans, and legal descriptions by a professional land surveyor registered in the State of Washington.
- WDFW is responsible for survey record fees and filings.

2.2.4.2 – Geotechnical Engineering Design

The Consultant will provide geotechnical design for the 60 percent Design Plans. This will include design analyses for the design items listed above in Phase 2.1, including settlement; seepage (through and under the dike); slope stability (end-of-construction, long-term steady state, and rapid drawdown); seismic hazards; reuse; phasing of on-site materials; haul route designs; pipe bedding design; ditch fill compaction; and dewatering for pipe installations. Liquefaction and seismic analysis will be performed to evaluate seismic hazards and potential impacts to the proposed setback dike. This includes identification of seismic potential mitigation strategies. The geotechnical dike evaluation and analyses will be in accordance with the following publications:

- NEH Section 16 “Drainage of Agricultural Land,” Chapter 6: Dikes
- USACE EM 1110-2-1913 “Design and Construction of Levees”
- USACE EM 1110-2-1902 “Slope Stability”
- USACE ETL 1110-2-569 “Design Guidance for Levee Underseepage”

WDFW Responsibilities

- WDFW and Steering Committee comments (and other comments from the public or private landowners) shall be compiled into a single comment form and organized by WDFW.

S&W Deliverables

- DRAFT and Final Geotechnical Design Letter Report (10 copies)

Assumptions

- Contaminated soils are not present at the site. Unanticipated contaminated soils discovery, testing, and mitigation planning are not included in this scope of services.
- Seepage and stability analyses will be completed on three cross-sections of the proposed dike.
- Long-term steady state seepage analyses will be analyzed using the 100-year flood elevation.
- Rapid drawdown analyses will be evaluated using the 100-year flood elevation dropping to grade adjacent to the dike.
- Designing for dike and structural seismic resistance is not included in this scope of services.

2.2.4.3 – Civil Design

The Consultant will provide civil design for the 60 percent Design Plans. This includes construction access, utility locates, survey control, earthwork, fill, excavation grading, erosion protection, drainage structures, temporary erosion and sediment control, landscaping and vegetation plans, details, sections, etc. Civil design will include development of Engineer's opinion of probable construction cost and construction schedule. The 60 percent plan submittal will include a specifications outline. A 60 percent Design Report will be developed documenting design criteria and engineering analyses, as well as provide other supporting design information.

WDFW Responsibilities

- Review and provide comments on 60 percent design plans, outline specifications, cost estimates, schedule, and sequencing within 15 calendar days of submittal.
- Provide local tribes with opportunity to review and comment on 60 percent design plans. WDFW will provide the Consultant with the tribal comments.

S&W Deliverables

- 60% Design Plans (10 copies)

- DRAFT 60% Design Report (10 copies)
 - Outline Specifications
 - Engineer opinion of probable cost
 - Engineer opinion of probable construction schedule and sequencing

Assumptions

- Civil, structural, and foundation design of a floodgate and the Fir Island Road entrance and siding design and log-boom debris deflectors are not included in this scope of services.
- Structural and foundation design of the CDD22 floodgate are not included in this scope of services.
- Comments received on the 60 percent Design Plans and Report will be revised and updated in the Phase 2.3
- Phase 2.3 90 percent Design Plans and Specifications are not included in this phase of work and scope of services.

Task 2.2.5 – Independent Technical Review 60 Percent Design Plans

The ITR team will review Phase 2.2 DRAFT 60 percent Design documents. The ITR team will provide comments, which will be addressed in the 90 percent design phase. The ITR team will meet with WDFW and the Consultant team to discuss comments and questions as part of Phase 2.2.

WDFW Responsibilities

- Backcheck revisions to Phase 2.1 deliverables in response to ITR comments and meeting.
- Participate in Phase 2.2 60 percent ITR meeting with Consultant and ITR Subconsultant.

S&W Deliverables

- The ITR team will backcheck revisions based on Phase 2.1 review comments and update the standard ITR comment form.
- Phase 2.2 ITR Subconsultant review of 60 percent plans and supporting documents and provide comments on the reports.

Assumptions

- WDFW, Consultant, and ITR team will meet in La Conner WDFW offices to discuss review comments.
- The ITR team will provide comments organized using a standard ITR comment form.
- The Consultant will address ITR comments in Phase 2.3 90 percent design.

Task 2.2.6 – Permit Applications and Coordination

The Consultant will develop and submit the following permit applications and supporting documents in conjunction with the 60 percent design submittal:

- Joint Aquatic Resource Permit Application for the Section 404.
- Section 401, HPA, and Skagit County Shoreline Substantial Development Permit).
- Limit 8 checklist for salmon for Section 7 consultation.
- Biological evaluation for Section 7 consultation.
- SEPA checklist (WDFW lead agency) and associated Skagit County permit forms for lot certification, critical areas review, fill/grade, and special use permit.
- Several permits require notifications, pre-application and permit meetings, and attendance at hearing examiner meetings.

WDFW Responsibilities

- Provide review and comment on permit applications. Sign and submit permit applications to the agencies.
- Provide public notices, notifications, and advertisements and pay associated fees.
- Pay or obtain waivers for permit related fees.
- Serve as the SEPA lead agency.

S&W Deliverables

- Permit applications submitted to WDFW.
- Attend permit and hearing examiner meetings.

Assumptions

- The project can be permitted through a nationwide permit similar to other recent Skagit County levee setback projects.
- An environmental impact statement will not be required for Fir Island Farm by the SEPA lead agency.
- WDFW will act as the SEPA lead and a Mitigated Determination of Non-significance will be issued.
- The wetland delineation can use an aerial delineation and will not require a field survey. This assumption is in accord with the Consultant's previous communications on this topic with the Corps of Engineers Project Manager.
- A FEMA Change Letter of Map Condition (CLOMR) and Skagit County floodplain grading permit will not be required for the project.

- A temporary right-of-way and access permit will not be required for Skagit County permits.
- This scope of services includes development of permit applications. It does not include services for permit coordination, tracking, and permit award that will occur in Phase 2.3.
- Attendance at meetings is included. Preparation and attendance at meetings and hearing examiner are included in this scope of services.
- Filing and fees for public notices and notifications are not included in this scope of services.

Task 2.2.7 – Adaptive Management and Monitoring Plan

The Draft Adaptive Management and Monitoring Plan developed in design Phase 2.1 will be finalized in design phase 2.2. Baseline field monitoring will be based on the requirements outlined in the Adaptive Management and Monitoring Plan. Baseline data collection will be initiated

The Consultant will perform baseline surface and groundwater observations, baseline dike structure condition assessment, and baseline marsh vegetation observations.

WDFW Responsibilities

- Oversee performance of baseline monitoring activities.
- Perform baseline marsh channel surveys.
- Finalize the Monitoring and Adaptive Management Plan.

S&W Deliverables

- DRAFT Vegetation Baseline Report.
- DRAFT Interior Drainage and Groundwater Observation and Data Report.
- DRAFT Dike Condition Report.

Assumptions

- Field monitoring and observations performed by both WDFW and the Consultant team, and possibly others, will be performed per the Adaptive Management Plan and Monitoring Plan developed in design phases 2.1 and 2.2.

Task 2.2.8 – Real Estate and Landowner and Partner Agreements

WDFW will further negotiate real estate, landowner and partner agreements, easements, and rights-of-way based on Phase 2.1 study findings and requirements of the Adaptive Management and Monitoring Report. The Consultant will provide up to 42 hours of technical assistance, such as CAD drawings, descriptions of construction features, activities and locations, and schedule information.

WDFW Responsibilities

- Developing real estate and landowner and partner agreements.

S&W Deliverables

- Data, files, CAD drawings, schedules, and project descriptions as requested by WDFW in support of Landowner and Partner Agreements.

Assumptions

- Consultant will provide support on an as-needed basis. Consultant hours and budget will be limited to the 42 hours and amounts shown in the cost estimate. Tasks beyond these budgets will be performed after receipt of a contract amendment to be provided by WDFW.
- Budgets were developed with the assumption that CDD22 and Hayton property landowner agreements would be needed. Additional landowner agreements will likely require additional budget and resources and contract amendment.
- This scope and budget do not include resources to support CDD22 Consent Decree negotiations.

Risks and Contingencies

A number of potential project risks and contingencies were identified during the granting process. The following list of potential risks may or may not occur during the project and could require access of contingency funds. The following is a list of project risks and “response studies” that may need to be addressed. The following list of risks is limited and there may be other unknown or unforeseen risks that could occur.

- Discovery of cultural and archaeological resources during field explorations (and other future project phases) could require additional site characterization, consultation, and mitigation. ***SRFB Grant Response Study Task 2.1.4.a.***
- Subsurface conditions have similar properties along the extent of the levee setback between the field exploration locations. This uncertainty can affect performance of the levee and drainage system, and could have a potential changed condition during construction. ***No SRFB Grant response study funding.***
- Unanticipated discovery of contaminated media, soils, or pollutants could require a Phase II site investigation and characterization, and contaminant mitigation design. ***No SRFB Grant response study funding.***
- Loss and damages to data logging equipment. Replacement costs for losses of data loggers, recently and into the future, are not included in this scope of services. ***No SRFB Grant response study funding.***
- Geotechnical log boom field explorations and designs may be requested by CDD22 and are not included in this scope of services. ***SRFB Grant Response Study Task 2.1.4.b and Task 2.2.4.2a.***
- Based on our understanding and opinion of the U.S. Army Corps of Engineers and National Resource Conservation Service design guidelines, geotechnical seismic liquefaction mitigation design of levee and foundation soils is not included in this scope of services. Seismic analysis is limited to evaluating seismic effects and impacts for owner reference and maintenance information. The owner is responsible for deciding to either accept seismic risks or to mitigate seismic risks using various methods. Seismic mitigation design is not included in this scope of services. ***No SRFB Grant response study funding.***
- Groundwater studies including SEEP-W modeling may show that groundwater and interior drainage impacts will occur and cannot be mitigated for using gravity drainage design. More robust numerical modeling, such as MODFLOW, or other analyses in addition to this scope of services, may be necessary to evaluate drainage mitigation measures. ***SRFB Grant Response Study Task 2.1.5.2a.***
- Interior drainage studies may indicate that engineering design of an interior drainage pump station is required. This is not included in this scope of services and cost estimate. ***SRFB Grant Response Study Task 2.3.4.3b.***

- Interior drainage studies may indicate that farm drain tiles may be needed. Farm drain tile design is not included in this scope of services. ***No SRFB Grant response study funding. May be alternative structure to interior drainage pump station.***
- Sheet pile and cutoff structure designs are not included in the design scope of services. ***No SRFB Grant response study funding. May be alternative structure to interior drainage pump station.***
- Interior drainage studies have been developed to demonstrate groundwater and seepage impacts to interior drainage. Project teaming partners and stakeholders may not agree with the Consultant technical studies and findings, which could require additional engineering study and/or designs, and additional stakeholder coordination and communication beyond the level of services in this scope. ***SRFB Grant Response Study Task 2.1.5.2a.***
- Coastal engineering design of the tidal breach channels is limited to empirical engineering equations and equilibrium analysis. Hydrodynamic modeling of breach size is not included, due to the granting agency review and budget reductions. There is a risk that the breach may erode and deposit sediments in an undesirable patterns and locations that could affect site drainage. This may require future adaptive management and field corrections and maintenance, which are the approaches proposed in this scope of services and considered acceptable risks by WDFW and their stakeholders. ***No SRFB Grant response study funding.***
- CDD22 requested a floodgate to be included in the project. This feature was removed from consideration in the Feasibility Study per the direction of WDFW and the Steering Committee. Grant funds have not been identified and engineering design of this structure is not included in this scope of services. ***No SRFB Grant response study funding.***
- Bioengineering and large wood debris restoration features are not included in the analysis and design scope of services, as they were not approved in grant funding applications. ***No SRFB Grant response study funding.***
- Fir Island road design modifications are not included in this scope of services. ***No SRFB Grant response study funding in Phase 2.2. Potential SRFB and ESRP Grant response study funding in Phase 2.3, Task 2.3.4.3c.***
- The permit scope of services assumes that a Nationwide 27 permit will be used, similar to other recent projects on the Skagit River Delta of similar in size and scope. The federal or local agencies may require an individual 404 permit, which is not included in this scope of services. ***SRFB Grant Response Study Task 2.2.6a.***
- The permit scope of services assumes that an Environmental Impact Statement is not required. ***No SRFB Grant response study funding.***
- The permit scope of services assumes, based on communications with the Corps during the feasibility study, that delineation of wetlands via aerial maps is an acceptable method and that a field delineation and survey is not required. ***No SRFB Grant response study funding.***

- Based on previous projects and experiences with Skagit County, the permit scope of services assumes that a floodplain development permit and FEMA CLOMR will not be required. ***No SRFB Grant response study funding.***
- Project schedule delays outside the control of the Consultant will require additional funding. ***No SRFB Grant response study funding.***
- Consultant management of the ITR team could have a perceived conflict of interest. Participation of project team members in both project development and on the ITR team could also be a conflict of interest.
- ITR budgets were limited by the SRFB technical advisory committee comments. Once the ITR subconsultant is selected and the scope of service finalized, the budget may need to be revised. ***No SRFB Grant response study funding.***
- Landowner agreements may be difficult to obtain and in a timely manner, which could impact the project schedule and costs. ***No SRFB Grant response study funding.***
- Constructability and value engineering review have not been included in this scope of services. ***No SRFB Grant response study funding.***
- Adaptive management and monitoring budgets were reduced at the request of the SRFB granting agencies. The adaptive management and monitoring plan has not been developed at the time of grants and this scope of services. Additional funding may be necessary. ***No SRFB Grant response study funding.***

Note: 2012 SRFB Grant Tasks for Phase 2.1 have been shifted as shown in this scope of services. Example: SRFB Grant Task 2.1.4 Geotechnical Engineering Field Explorations is now Task 2.1.5 this scope of services. Need to check both SRFB Grant and this scope of services for original and current task number.

Proposal Limitations

The following limitations apply to the attached scope of services and proposal.

- S&W is not responsible for services provided by others outside of S&W's contractual obligations.
- The site is subject to harsh environmental conditions, and potential vandalism and theft. This scope of services does not warrant replacement of damaged, lost, or stolen data logging or other project equipment.
- S&W will provide technical support in developing grant funding applications. S&W does not have a fiduciary duty or financial interest in the project.
- Services for evaluating unanticipated discovery of cultural and archaeological resources are not included in this scope of services. Proposal addresses as potential response studies (Task 2.1.4.a). Actual costs for performing additional studies are dependent upon the nature and character of the discovery, and may be more or less, and not limited to the estimated costs presented in the grant applications budgets.
- Services for evaluating unanticipated discovery of contaminated soils or media are not included in this scope of services and proposal. We will notify WDFW immediately and secure the site and collect samples following typical Washington State discovery protocols if this situation arises. Actual costs for performing additional studies are dependent upon the nature and character of the discovery.
- S&W and their Subconsultants are not responsible for climate change predictions made by others, and will use these reports as the best available science.
- S&W is not responsible for the legal aspects of landowner agreements and adaptive management and monitoring strategies. S&W will provide technical information related to engineering and environmental for others to use in developing landowner and real estate agreements.
- S&W will estimate and project tidal marsh and vegetative community response, but cannot guarantee the environmental and ecological restoration outcomes and benefits of the project as the site is limited and there will be minimal construction modifications to the farm and proposed tidal marsh restoration area. The marsh response is beyond our control.
- 60 percent response designs include those features shown in the Feasibility Study report plans, but do not include sheet pile cutoffs or contaminated soils mitigation plans.

**FIR ISLAND FARM RESTORATION
STANDARD SCHEDULE**

TASK	2014						
	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Final Design & Permitting							
2.1.1 Project Management and Contract Administration							
2.1.2 Project Meetings and Calls							
2.1.3 Construction Grants and Funding Strategy							
2.1.4 WDFW Survey (60% Design)							
2.1.5 Geotech Field Explorations							
2.1.6 Groundwater / Interior Drainage Study							
2.1.7 Coastal Hydraulics							
2.1.8 Permit Pre-Application Coordination							
2.1.9 Adaptive Management and Monitoring Plan (Year							
2.1.10 Real Estate, Landowner and Partner Agreements							
2.1.11 Independent Technical Review							
Final Studies Completed							
2.2.1 Project Management and Contract Administration							
2.2.2 Project Meetings and Calls (60% Design & Permit							
2.2.3 Construction Grants and Funding Strategy							
2.2.4 60% Design							
2.2.4.1 WDFW Survey (60% Design)							
2.2.4.2 Geotech Design (60% Design)							
2.2.4.3 Civil Design (60% Design)							
2.2.5 Independent Technical Review (60% Design & Per							
2.2.6 Permits Application Submittal (60% Design)							
2.2.7 Adaptive Management and Monitoring Plan (Basel							
2.2.8 Real Estate, Landowner and Partner Agreements							
60% Design Completed							
2.3.1 Project Management and Contract Administration (
2.3.2 Project Meetings and Calls (90% and Final Design)							
2.3.3 Construction Grants and Funding Strategy (90% an							
2.3.4A 90% Design							
2.3.5 Independent Technical Review (90% and Final Des							
2.3.4B Final Design							
2.3.6 Permit Approvals							
2.3.7 Adaptive Management and Monitoring Plan (Year							
2.3.8 Real Estate, Landowner and Partner Agreements							
90% and Final Design Completed							

APPENDIX B
COST ESTIMATE

APPENDIX B

COST ESTIMATE

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TABLE B-1 FIR ISLAND FARM, PHASE 2.1 COST ESTIMATE, LABOR COSTS

TASKS	Labor									Expenses			TOTAL		
	PIC/QC	Senior Assoc.	Assoc.	Princ. & Sr Princ.	Senior Prof.	Prof. III - IV	CAD/GIS	Admin, Repro, WP	HOUR TOTAL	HOUR COST	ODCs	SUBS		EXPENSE SUBTOTAL	
Labor Rates	\$220.00	\$185.00	\$165.00	\$135.00	\$110.00	\$100.00	\$100.00	\$90.00							
2.1.01	Project Management and Contract Administration	8	84	0	0	48	0	0	58	198	\$27,800	\$15	\$0	\$15	\$27,815
2.1.02	Project Meetings and Calls	8	96	0	16	64	0	0	8	192	\$29,440	\$633	\$0	\$633	\$30,073
2.1.03	Construction Grants and Funding Strategy	0	16	0	0	8	0	0	0	24	\$3,840	\$294	\$0	\$294	\$4,134
2.1.04	WDFW Basemap Survey	0	2	0	0	14	0	10	0	26	\$2,910	\$0	\$0	\$0	\$2,910
2.1.05	Geotech Field Explorations	4	5	0	72	96	198	40	12	427	\$46,965	\$35,087	\$41,432	\$76,519	\$123,484
2.1.06	Groundwater / Interior Drainage Study	4	12	40	80	300	0	96	52	584	\$67,780	\$21,616	\$0	\$21,616	\$89,396
2.1.07	Coastal Hydraulics	5	10	0	0	120	0	76	0	211	\$23,750	\$0	\$113,677	\$113,677	\$137,427
2.1.08	Permit Pre-Application Coordination & Studies	4	8	0	0	0	80	0	0	92	\$10,360	\$407	\$5,584	\$5,991	\$16,351
2.1.09	Adaptive Management and Monitoring Plan (Year 1)	3	6	6	0	88	40	32	16	191	\$21,080	\$203	\$0	\$203	\$21,283
2.1.10	Real Estate, Landowner and Partner Agreements	2	8	0	0	8	0	8	8	34	\$4,320	\$0	\$0	\$0	\$4,320
2.1.11	Independent Technical Review	8	32	0	0	48	0	0	8	96	\$13,680	\$68	\$8,334	\$8,403	\$22,082
	Phase 2.1 BASE Subtotal	46	279	46	168	794	318	262	162	2,075	\$251,925	\$58,323	\$169,027	\$227,350	\$479,275

TABLE B-2 FIR ISLAND FARM, PHASE 2.1 COST ESTIMATE, REIMBURSABLE EXPENSES

Explanation of Reimbursable Expenses	Unit	Amount	Unit Price	Total
2.1.01 Risk Management Reports	PG	150	\$0.10	\$15
2.1.02 Quarterly Mtgs. La Conner	MI	560	\$0.57	\$316
2.1.02 4 Additional Mtgs. La Conner	MI	560	\$0.57	\$316
2.1.03 2 Construction Grant Agency Mtgs.	MI	280	\$0.57	\$158
2.1.03 2 Construction Grant Site Visits	MI	240	\$0.57	\$136
2.1.05 Skagit County - Drilling Permits	LS	1	\$500.00	\$500
2.1.05 Private Utility Alignments Layouts	MI	240	\$0.57	\$136
2.1.05 Private Utility Locate	LS	1	\$1,000.00	\$1,000
2.1.05 Geotechnical Borings - Drilling Subcontractor	LS	1	\$19,978.95	\$19,979
2.1.05 Borings - S&W Travel	MI	600	\$0.57	\$339
2.1.05 CPTs	LS	1	\$11,024.64	\$11,025
2.1.05 CPTs - S&W Travel	MI	120	\$0.57	\$68
2.1.05 Test Pits - Excavator	LS	1	\$11,880.00	\$11,880
2.1.05 Test Pits - S&W Travel	MI	600	\$0.57	\$339
2.1.05 Test Pits - ERCI Field Assistance	LS	1	\$10,428.33	\$10,428
2.1.05 S&W Laboratory Testing	LS	1	\$20,426.00	\$20,426
2.1.05 Report Reproduction (8.5x11 B&W)	EA	1000	\$0.10	\$100
2.1.05 Report Reproduction (8.5x11 Color)	EA	100	\$1.00	\$100
2.1.05 Report Reproduction (11x17 B&W)	EA	100	\$1.00	\$100
2.1.05 Report Reproduction (11x17 Color)	EA	50	\$2.00	\$100
2.1.06 Groundwater Well Borings - Drilling Subcontractor & Well Development Equip.	LS	1	\$7,805.16	\$7,805
2.1.06 Groundwater - S&W Travel	MI	600	\$0.57	\$339
2.1.06 Surface and Groundwater LTC Loggers	LS	1	\$13,236.19	\$13,236
2.1.06 HDPE Tubing	FOOT	90	\$0.40	\$36
2.1.06 Report Reproduction (8.5x11 B&W)	EA	500	\$0.10	\$50
2.1.06 Report Reproduction (8.5x11 Color)	EA	50	\$1.00	\$50
2.1.06 Report Reproduction (11x17 B&W)	EA	50	\$1.00	\$50
2.1.06 Report Reproduction (11x17 Color)	EA	25	\$2.00	\$50
2.1.07 Battelle Hydrodynamic Modeling	LS	1	\$113,677.00	\$113,677
2.1.08 Pre-Application Permit Mtgs	MI	480	\$0.57	\$271
2.1.08 Section 106 Coordination Mtgs.	MI	240	\$0.57	\$136
2.1.08 Subconsultant Section 106 Coordination Mtgs.	LS	1	\$5,583.88	\$5,584
2.1.09 SW/GW Monitoring Travel	MI	360	\$0.57	\$203
2.1.10 Subconsultant ITR Review	LS	1	\$5,000.00	\$5,000
2.1.10 Subconsultant ITR Mtg.	LS	1	\$1,667.00	\$1,667
2.1.10 Subconsultant ITR Backcheck	LS	1	\$1,667.00	\$1,667
2.1.10 ITR Mtg. Travel	MI	120	\$0.57	\$68
Phase 2.1 ODC Subtotal				\$227,350

TABLE B-3 FIR ISLAND FARM, PHASE 2.2 COST ESTIMATE, LABOR COSTS

TASKS		Labor								Expenses				TOTAL	
		PIC/QC	Senior Assoc.	Assoc.	Princ. & Sr Princ.	Senior Prof.	Prof. III - IV	CAD/GIS	Admin, Repro, WP	HOUR TOTAL	HOUR COST	ODCs	SUBS		EXPENSE SUBTOTAL
Labor Rates		\$226.60	\$190.55	\$169.95	\$139.05	\$113.30	\$103.00	\$103.00	\$92.70						
2.2.01	Project Management and Contract Administration (60% Design & Permits)	8	36	0	32	0	0	0	66	142	\$19,240	\$15	\$0	\$15	\$19,255
2.2.02	Project Meetings and Calls (60% Design & Permits)	8	48	0	16	32	0	0	8	112	\$17,551	\$316	\$0	\$316	\$17,868
2.2.03	Construction Grants and Funding Strategy	0	32	0	0	8	0	0	0	40	\$7,004	\$294	\$0	\$294	\$7,298
2.2.04	60% Design	24	100	16	120	672	0	508	32	1,472	\$175,327	\$1,800	\$0	\$1,800	\$177,127
2.2.05	Independent Technical Review (60% Design & Permits)	14	40	0	0	8	0	0	6	68	\$12,257	\$79	\$12,667	\$12,746	\$25,003
2.2.06	Permits Application Submittal (60% Design)	16	28	0	0	324	30	192	8	598	\$69,278	\$1,390	\$0	\$1,390	\$70,668
2.2.07	Adaptive Management and Monitoring Plan (Baseline Year 2)	4	24	0	0	208	0	44	0	280	\$33,578	\$610	\$0	\$610	\$34,188
2.2.08	Real Estate, Landowner and Partner Agreements	2	16	0	0	8	0	8	8	42	\$5,974	\$0	\$0	\$0	\$5,974
Phase 2.2 BASE Subtotal		76	324	16	168	1,260	30	752	128	2,754	\$340,209	\$4,505	\$12,667	\$17,172	\$357,381
Phase 2.1 & 2.2 Total															\$836,656

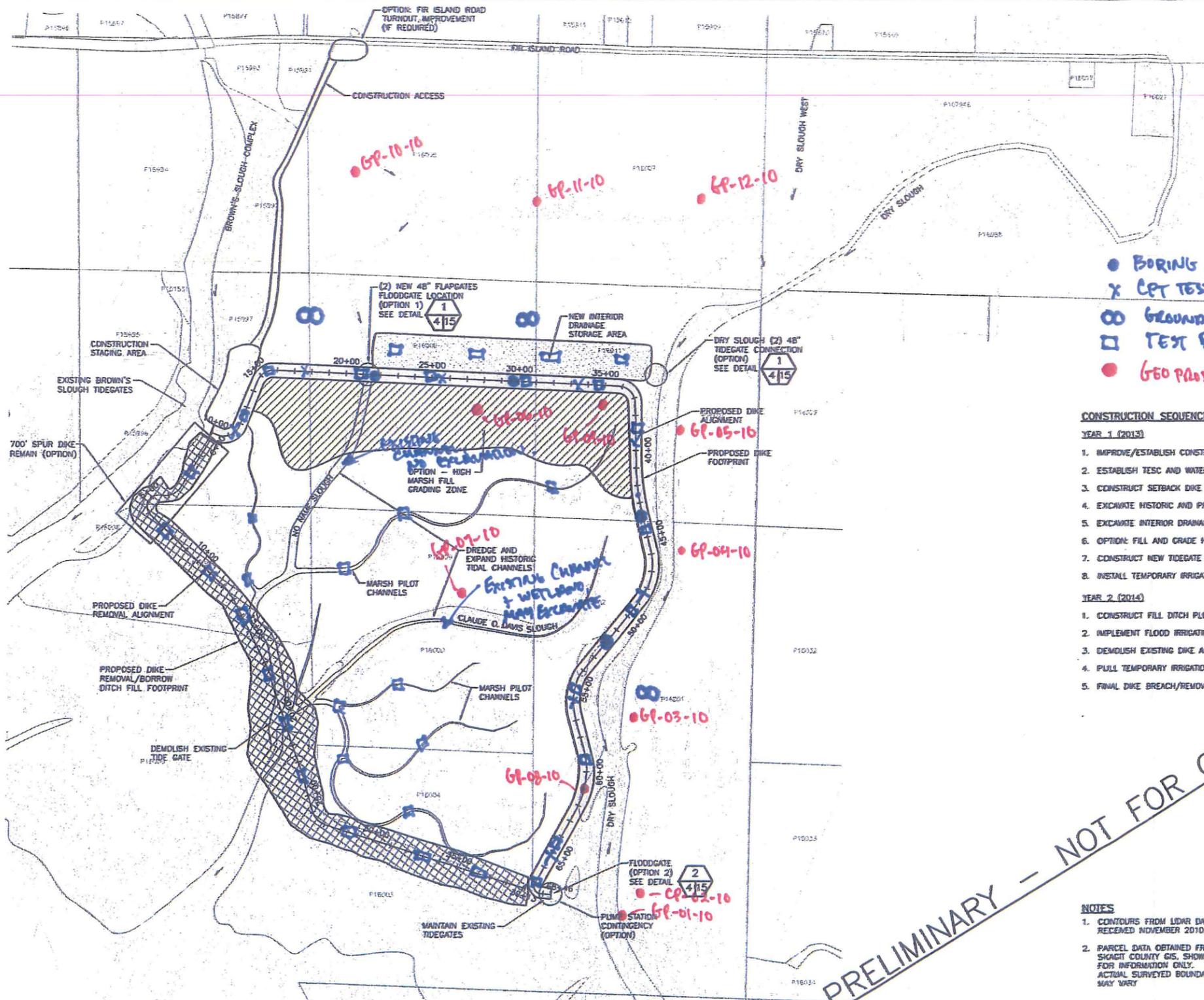
TABLE B-4 FIR ISLAND FARM, PHASE 2.2 COST ESTIMATE, LABOR COSTS

Explanation of Reimbursable Expenses		Unit	Amount	Unit Price	Total
2.2.01	Risk Management Reports	PG	150	\$0.10	\$15
2.2.02	Quarterly Mtgs. La Conner (2)	MI	280	\$0.57	\$158
2.2.02	2 Additional Mtgs. La Conner	MI	280	\$0.57	\$158
2.2.03	2 Construction Grant Agency Mtgs.	MI	280	\$0.57	\$158
2.2.03	2 Construction Grant Site Visits	MI	240	\$0.57	\$136
2.2.04	Geotech Report Reproduction (8.5x11 B&W)	EA	1000	\$0.10	\$100
2.2.04	Geotech Report Reproduction (8.5x11 Color)	EA	100	\$1.00	\$100
2.2.04	Geotech Report Reproduction (11x17 B&W)	EA	500	\$1.00	\$500
2.2.04	Geotech Report Reproduction (11x17 Color)	EA	100	\$2.00	\$200
2.2.04	60% Design Report Reproduction (8.5x11 B&W)	EA	1000	\$0.10	\$100
2.2.04	60% Report Reproduction (8.5x11 Color)	EA	100	\$1.00	\$100
2.2.04	60% Report Reproduction (11x17 B&W)	EA	500	\$1.00	\$500
2.2.04	60% Report Reproduction (11x17 Color)	EA	100	\$2.00	\$200
2.2.05	ITR Mtg. Travel	MI	140	\$0.57	\$79
2.2.05	Subconsultant ITR Review	LS	1	\$6,667.00	\$6,667
2.2.05	Subconsultant ITR Mtg.	LS	1	\$3,000.00	\$3,000
2.2.05	Subconsultant ITR Backcheck	LS	1	\$3,000.00	\$3,000
2.2.06	Permit Reproduction (8.5x11 B&W)	EA	2000	\$0.10	\$200
2.2.06	Permit Reproduction (8.5x11 Color)	EA	200	\$1.00	\$200
2.2.06	Permit Reproduction (11x17 B&W)	EA	500	\$1.00	\$500
2.2.06	Permit Reproduction (11x17 Color)	EA	200	\$2.00	\$400
2.2.06	Special Hearing Examiner	MI	160	\$0.57	\$90
2.2.07	Marsh Vegetation Monitoring	MI	480	\$0.57	\$271
2.2.07	SW/GW Monitoring Travel	MI	480	\$0.57	\$271
2.2.07	Dikes & Structures Travel	MI	120	\$0.57	\$68
	Phase 2.2 ODC Subtotal				\$17,172

APPENDIX C

FIELD EXPLORATION AND DATA COLLECTION PLAN

- LEGEND**
-  DIKE REMOVAL
 -  OPTION - MARSH FILL
 -  INTERIOR DRAINAGE STORAGE AREA
 -  NEW DIKE



- BORINGS
- × CPT TEST
- GROUNDWATER MONITORING WELLS
- TEST PITS
- GEO PROBES 2010 (30'-40' DEEP)

- CONSTRUCTION SEQUENCE**
- YEAR 1 (2013)**
1. IMPROVE/ESTABLISH CONSTRUCTION ACCESS
 2. ESTABLISH TESC AND WATER CONTROL
 3. CONSTRUCT SETBACK DIKE
 4. EXCAVATE HISTORIC AND PILOT TIDAL CHANNELS
 5. EXCAVATE INTERIOR DRAINAGE POND
 6. OPTION: FILL AND GRADE HIGH MARSH ZONE
 7. CONSTRUCT NEW TIDEGATE AND FLOOD RETURN STRUCTURE
 8. INSTALL TEMPORARY IRRIGATION STRUCTURES
- YEAR 2 (2014)**
1. CONSTRUCT FILL DITCH PLUGS
 2. IMPLEMENT FLOOD IRRIGATION OPERATIONS
 3. DEMOLISH EXISTING DIKE AND FILL EXISTING BORROW DITCHES
 4. PULL TEMPORARY IRRIGATION STRUCTURES
 5. FINAL DIKE BREACH/REMOVAL

- NOTES**
1. CONTOURS FROM LIDAR DATA, RECEIVED NOVEMBER 2010.
 2. PARCEL DATA OBTAINED FROM SPOKANE COUNTY GIS, SHOWN FOR INFORMATION ONLY. ACTUAL SURVEYED BOUNDARIES MAY VARY.

30% PRELIMINARY - NOT FOR CONSTRUCTION

SITE PLAN
SCALE: 1" = 300'-0"

DATE: 12-28-2011

SW
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants
400 North 34th Street, Suite 100
P.O. Box 300303
Seattle, Washington 98103
(206) 422-8220 FAX: (206) 423-6777

WASHINGTON STATE
DEPARTMENT OF FISH AND WILDLIFE

SYM	DATE	REVISION DESCRIPTION	BY
		APPROVED AND RELEASED FOR CONSTRUCTION	
DESIGNED BY		DRC	
CHECKED BY		ADH	
DRAWN BY		ENT	
DATE		DECEMBER 2011	

FIR ISLAND FARM ECOSYSTEM RESTORATION		PROJECT NO. ST-R4:11-3
FIR ISLAND		SHEET OF
SITE PLAN		4 XX
AND CONSTRUCTION PHASING		

APPENDIX D

**IMPORTANT INFORMATION ABOUT YOUR
GEOTECHNICAL/ENVIRONMENTAL PROPOSAL**



Date: March 15, 2013
To: Mr. Brian Williams
Washington Department of Fish and Wildlife

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL PROPOSAL

More construction problems are caused by site subsurface conditions than any other factor. The following suggestions and observations are offered to help you manage your risks.

HAVE REALISTIC EXPECTATIONS.

If you have never before dealt with geotechnical or environmental issues, you should recognize that site exploration identifies actual subsurface conditions at those points where samples are taken, at the time they are taken. The data derived are extrapolated by the consultant, who then applies judgment to render an opinion about overall subsurface conditions; their reaction to construction activity; appropriate design of foundations, slopes, impoundments, recovery wells; and other construction and/or remediation elements. Even under optimal circumstances, actual conditions may differ from those inferred to exist, because no consultant, no matter how qualified, and no subsurface program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time.

DEVELOP THE SUBSURFACE EXPLORATION PLAN WITH CARE.

The nature of subsurface explorations—the types, quantities, and locations of procedures used—in large measure determines the effectiveness of the geotechnical/environmental report and the design based upon it. The more comprehensive a subsurface exploration and testing program, the more information it provides to the consultant, helping to reduce the risk of unanticipated conditions and the attendant risk of costly delays and disputes. Even the cost of subsurface construction may be lowered.

Developing a proper subsurface exploration plan is a basic element of geotechnical/environmental design, which should be accomplished jointly by the consultant and the client (or designated professional representatives). This helps the parties involved recognize mutual concerns and makes the client aware of the technical options available. Clients who develop a subsurface exploration plan without the involvement and concurrence of a consultant may be required to assume responsibility and liability for the plan's adequacy.

READ GENERAL CONDITIONS CAREFULLY.

Most consultants include standard general contract conditions in their proposals. One of the general conditions most commonly employed is to limit the consulting firm's liability. Known as a "risk allocation" or "limitation of liability," this approach helps prevent problems at the beginning and establishes a fair and reasonable framework for handling them, should they arise.

Various other elements of general conditions delineate your consultant's responsibilities. These are used to help eliminate confusion and misunderstandings, thereby helping all parties recognize who is responsible for different tasks. In all cases, read your consultant's general conditions carefully and ask any questions you may have.

HAVE YOUR CONSULTANT WORK WITH OTHER DESIGN PROFESSIONALS.

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a consultant's report. To help avoid misinterpretations, retain your consultant to work with other project design professionals who are affected by the geotechnical/environmental report. This allows a consultant to explain report implications to design professionals affected by them, and to review their plans and specifications so that issues can be dealt with adequately. Although some other design professionals may be familiar with geotechnical/environmental concerns, none knows as much about them as a competent consultant.

OBTAIN CONSTRUCTION MONITORING SERVICES.

Most experienced clients also retain their consultant to serve during the construction phase of their projects. Involvement during the construction phase is particularly important because this permits the consultant to be on hand quickly to evaluate unanticipated conditions, to conduct additional tests if required, and when necessary, to recommend alternative solutions to problems. The consultant can also monitor the geotechnical/environmental work performed by contractors. It is essential to recognize that the construction recommendations included in a report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site.

Because actual subsurface conditions can be discerned only during earthwork and/or drilling, design consultants need to observe those conditions in order to provide their recommendations. Only the consultant who prepares the report is fully familiar with the background information needed to determine whether or not the report's recommendations are valid. The consultant submitting the report cannot assume responsibility or liability for the adequacy of preliminary recommendations if another party is retained to observe construction.

REALIZE THAT ENVIRONMENTAL ISSUES MAY NOT HAVE BEEN ADDRESSED.

If you have requested only a geotechnical engineering proposal, it will not include services needed to evaluate the likelihood of contamination by hazardous materials or other pollutants. Given the liabilities involved, it is prudent practice to always have a site reviewed from an environmental viewpoint. A consultant cannot be responsible for failing to detect contaminants when the services needed to perform that function are not being provided.

ONE OF THE OBLIGATIONS OF YOUR CONSULTANT IS TO PROTECT THE SAFETY, PROPERTY, AND WELFARE OF THE PUBLIC.

A geotechnical/environmental investigation will sometimes disclose the existence of conditions that may endanger the safety, health, property, or welfare of the public. Your consultant may be obligated under rules of professional conduct, or statutory or common law, to notify you and others of these conditions.

RELY ON YOUR CONSULTANT FOR ADDITIONAL ASSISTANCE.

Your consulting firm is familiar with several techniques and approaches that can be used to help reduce risk exposure for all parties to a construction project, from design through construction. Ask your consultant, not only about geotechnical and environmental issues, but others as well, to learn about approaches that may be of genuine benefit.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland