REQUEST FOR PROPOSALS No. 20-053

Nanoose Bay Pollution Control Centre Secondary Treatment Upgrade Preliminary and Detailed Design Engineering Services and Construction Services

ISSUED: September 29, 2020

CLOSING DATE AND TIME:
Submissions must be received at the Closing Location on or before:
3:00 PM (15:00 hrs) Local Time on October 21, 2020

Regional District of Nanaimo (RDN) Contact for Questions:

James Haddou
Project Engineer
Regional District of Nanaimo
6300 Hammond Bay Road, V9T 6N2
Phone: 250-390-6560
Email: jhaddou@rdn.bc.ca

Questions are requested five (5) business days before the closing date.

Proponent's Information Meeting:

A non-mandatory site meeting is scheduled for 2 p.m. On October 6, 2020 at the Nanoose Bay Pollution Control Centre, 3260 Schooner Cove Drive, Nanoose Bay, BC. Attendees are required to wear standard PPE: Hard hat, high visibility vest or equivalent, safety glasses, and steel toed boots.

Proposals will not be opened in public

Instructions to Proponents

Closing Date/Time/Location

Submissions must be received **BY EMAIL ONLY** at or before 3:00 PM (15:00 hrs), Pacific Time, on October 21, 2020.

1. By Email: With "Proposal: Nanoose Bay Pollution Control Centre Secondary Treatment Upgrade" as the subject line at this electronic address:
   jhaddou@rdn.bc.ca
   Please note: Maximum email file size limit is 20MB or less.

Proposals received by hand or facsimile are not accepted.

Amendment to Proposals

Proposals may be amended in writing and sent via email to jhaddou@rdn.bc.ca on or before the closing. Such amendments should be signed by the authorized signatory of the Proponent.

Addenda

If the RDN determines that an amendment is required to this RFP, the RDN will post the Addendum on the RDN (www.rdn.bc.ca) and BC Bid (www.bcbid.gov.bc.ca) websites. Each addendum will be incorporated into and become part of the RFP. No amendment of any kind to the RFP is effective unless it is contained in a written addendum issued by the RDN. It is the sole responsibility of the Proponent to check and ensure any and all amendments are included prior to submitting their final Proposal submission.

Withdrawal of Proposals

The Proponent may withdraw their Proposal at any time by submitting a written withdrawal email to jhaddou@rdn.bc.ca on or before the closing.

Unsuccessful Proponents
The District will offer debriefings to unsuccessful Proponents, on request, at a mutually agreeable time.

1. INTRODUCTION

The Regional District of Nanaimo currently owns and operates the Nanoose Bay Pollution Control Centre located at 3260 Schooner Cove Drive in Nanoose Bay, B.C. The purpose of this Request for Proposal is to solicit submissions from qualified firms to complete the preliminary and detailed design for the replacement/upgrade of the Nanoose Bay Pollution Control Centre.

Contract award is subject to approval from the Board of Directors of the Regional District of Nanaimo at its November 10 or December 8, 2020 Regular Board Meeting.

2. BACKGROUND

The Regional District of Nanaimo (RDN) owns and operates the Nanoose Bay Pollution Control Centre (NBPCC), located at 3260 Schooner Cove Drive in Nanoose Bay, B.C. The current facility was constructed in 1988 and provides screening and chemically enhanced primary wastewater treatment to a population of approximately 1350 people. The existing facility consists of the following processes:

- Raw Sewage Screening: One screw auger screen, discharges screenings to a tote;
- Grit Removal: One aerated grit settling chamber, periodic removal of settled grit via vac truck;
- Primary Settling: Two parallel primary sedimentation tanks (PSTs);
- Chemical injection diffuser system and storage tank for ferrous chloride addition (PAX-XL 6);
- Sludge Handling: Primary settled sludge is pumped to two above ground polymer storage tanks prior to transport to the French Creek Pollution Control Centre for processing.
- Primary treated effluent exits the PSTs v-notch weirs, and is stored in a final effluent chamber. The final effluent is pumped out an existing outfall;
- Below ground basement rooms house the two aeration/IA blowers and two sludge pumps.
- Standby above ground tank-mounted power generator (100 KW/125kVA) permanently connected to onsite electrical system, sized for 12 hours;
- There is currently no process PLC control.

To meet the Liquid Waste Management Plan commitments and updated federal and provincial wastewater effluent quality regulations, the Nanoose Bay Pollution Control Centre must be upgraded to provide secondary treatment. A detailed description of the upgrade design basis can be found in sections 3 and 4 of this RFP. The site is remote and the operational philosophy is to minimize physical operator interaction such that effective operation can be maintained with two site visits per week.

A Process Selection Report was completed in 2019 which established a shortlist of viable treatment technologies. The study also developed preliminary influent and effluent design criteria, a conceptual

design and cost estimate for the Stage 4 Expansion. RDN's preferred process is the Sequencing Batch Reactor (SBR) process.

The property extends into riparian areas, and the existing fenceline is in close proximity to riparian areas. Regulatory and local setback bylaws will need to be considered. The design footprint is to remain within the existing property fenceline.

Existing documents, drawings, and reports can be downloaded from the following link:
https://cloud.rdn.bc.ca/s/oBzrPAi45GkjdPW

3. SCOPE OF SERVICES

The general scope of services requested as part of this RFP includes:

- Review all available record documents and complete a topographic survey to provide a base plan for design;
- Preliminary and detailed design to replace and/or upgrade the Nanoose Bay Pollution Control Centre to provide secondary treatmtment compliant with federal and provincial regulations;
- Preliminary and detailed design to upgrade electrical utility and backup power capacity if required;
- Preliminary and detailed design to upgrade the communications/PLC/SCADA system to allow local control and remote monitoring from the French Creek Pollution Control Centre facility;
- Preliminary and detailed design of a new odour control system;
- Design calculation to be submitted to the owner for record;
- Explore, identify, review with RDN, and icorporate green/sustainable technologies into the design. The RDN's goal is a be a community leader and demonstrate excellence in green initiatives. Targets to this effect are:
    - The use of wood where possible. Refer to RDN's Wood First Policy.
    - Prioritization, exploration, and implementation of green initiatives including GHG and energy reduction. Refer to RDN's Green Policy and Energy Policy.
    - Contribute to the RDN's goal to be net-zero by year 2032.
- Provide an expansion plan and layout to meet future requirements:
    - Population milestones: 3000, 6000, 10000, 20000
    - Solids processing on site
    - Tertiary treatment

Participate in a value engineering session facilitated by the RDN with a third party engineering firm.

4. DELIVERABLES AND OUTCOMES

Preliminary Design
Project Management

- Attend project kickoff meeting;

- Monthly Progress Report and invoicing;
- Preliminary projet code of accounts;
- Weekly project update call;
- Facilitate biweekly design reviews;
- Maintain project management documentation such as a task list and decision log;
- Quality, cost and schedule management;
- Preliminary Project Execution Plan (PEP);
- Class C (+/-) 30% Installed Cost Estimate;
- Level 3 Project Schedule in MS Project Format and .PDF, with milestones and critical path defined, and updated monthly;
- Preliminary Risk Management Plan;
- Quality Plan;
- Management of Change Plan;
- Regulatory review and identification of applicable regulations, permits, and licenses;
- Regulatory permitting schedule and applications prepared;
- Support Development Permit application;
- Detailed Work Breakdown Structure for Detailed Design;

Engineering and Design

- Detailed wastewater characterization to determine design parameters to provide for a design population of 2000;
- Preliminary 3D design and drawings including but not limited to:
    - Demolition and decommissioning;
    - Process Flow Diagrams;
    - Utility Flow Diagrams;
    - Liquid and solid stream hydraulic profiles;
    - Preliminary equipment sizing;
    - Process tie in locations;
    - Equipment layout;
    - Site access and drainage plans;
    - Site topographical survey;
    - Site services plan;
    - Site plan;
    - Earthworks/excaation plan;
    - Underground corridors plan (ductbanks, etc.);
    - Electrical load list;
    - Single line diagram;
    - Electrical Block Diagrams;
    - Electrical plot space requirements;
    - Electrical hazardous area classification drawings;

  - Cable tray routing plan;
  - Instrument index;
  - Instrument power and air;
  - General instrument design criteria;
  - Instrument and controls block diagram;
  - Communication and control system architecture drawing;
- Drawings are to be provided in hard copy, pfd, and .dwg format;
- Design basis memorandum;
- Environmental Impact Study (Including but not limited to impacts to air, water, soil, fish, wildlife, human health, cultural, etc.);
- Detailed Geotechnical report and analysis including ground improvement requirements;
- Fire protection and suppression requirements;
- Building protection and communication system philosophy;
- Preliminary mechanical equipment list;
- Preliminary electrical equipment list;
- Preliminary instrumentation and controls equipment list;
- Preliminary Major mechanical ,electrical, instrumentation, and controls equipment datasheets and specifications;
- Preliminary line list including process data and sizing;
- Piping specifications;
- Design of a new generator / switchgear / MCC and utility metering to support the upgraded plant. Review of existing service transformers, fuses, and cables for suitability and design for replacement if required;
- Preliminary power system studies to validate design;
- Discussions, planning and negotiation with BC Hydro relating to system changes;
- Design for minimal interruption of electrical power to existing facilities during construction;
- Lighting philosophy;
- Earthing and grounding philosophy;
- Equipment and Process spare/redundancy philosophy;
- Equipment selection and configuration is to meet the redundancy requirements of RDN Bylaw 500;
- Preferred Vendors List;
- Upgrading the facility to meet the requirements of future flood levels if required;
- Assessment of anticipated staffing requirements including a benchmarking study;
- Participate in preliminary operability/maintainability review facilitated by the RDN – assume one day duration;
- Participate in Process Hazard Analysis(PHA) facilitated by the RDN – assume one week duration;Eliminate through design confined spaces for operation and general maintenance;
- Provide through design: Access, lifting devices, and methods to allow for safer operation, maintenance and replacement of components;

- Consideration and allowance for future expansion;

The preliminary design process is expected to occur in the sequence outlined in APPENDIX A – Key Milestone Activities and in line with the deliverables in APPENDIX B – Project Deliverables Guideline.

Detailed Design
The successful proponent shall provide detailed 3D model and design drawings and specifications to support the project through to completion. The expected level of engineering effort is for a complete engineered design. The contractor is not expected to require engineering support beyond construction engineering and review of submittals and shop drawings for contractor-supplied equipment. The transfer of engineering to the contractor will only be acceptable on approval by the RDN Project Manager.

The detailed design process is expected to occur in the sequence outlined in APPENDIX A – Key Milestone Activities and in line with the deliverables in APPENDIX B – Project Deliverables Guideline.

The detailed design completed by the successful proponent is expected to include, but not be limited to, the following key elements, suitable for each respective stage of the design:

Project Management
- Monthly Progress Report and invoicing;
- Project Schedule in MS Project Format and .PDF, updated monthly;
- Class A (+/-) 10% Installed Cost Estimate**;**
- Weekly project update call;
- Biweekly 3D model reviews;
- Facilitate design reviews;
- Tender Document preparation;
- Project Execution Plan (PEP);
- Maintain project management documentation such as a task list and decision log;
- Construction management plan;
- Commissioning and handover management plan;
- Risk Analysis;
- Quality, cost and schedule management;
- Application and management of required permits on behalf of the RDN;

Engineering and Design
- Detailed scope of work for all aspects of the construction;
- Piping & Instrumentation Diagram including process conditions;

- Participate in detailed Process Hazard Analysis(PHA) facilitated by the RDN – assume one week duration;
- Participate in detailed operability/maintainability review facilitated by the RDN – assume two day duration;
- Pump seals and other potable water users are to be designed and selected to eliminate potable water use where possible, and minimize potable use where elimination is not possible;
- Specify and provide datasheets and/or drawings for owner-supplied equipment for the RDN to purchase;
- Mechanical equipment list;
- Piping line List;
- Complete and detailed specifications, 3D model, and design drawings including but not limited to:
    - Mechanical, piping, HVAC, electrical and instrumentation equipment selection, including sizing, layout and specifications, datasheets, and detail drawings;
    - Structural, civil, architectural, fire protection, and security drawings, details, standards and specifications;
    - Piping material selection, taking into account corrosion mitigation;
    - Burried pipe plan and profile drawings;
    - Piping isometric drawings with detailed bill of materials for all piping larger than 50mm(2" NPS);
    - Pipe support standards and special support design;
    - Civil and structural engineering design criteria and specifications;
    - Site survey, site plan and plot plan;
    - Access road standards and specifications;
    - Ground improvement design and installation standards and specifications;
    - Concrete construction standards, design criteria and specifications;
    - Structural steel fabrication and erection design criteria and specifications;
    - Earthwork cut and fill plans and quantities;
    - Underground corridor layout plans for utilities;
    - Electrical general specifications;
    - Electrical site plan;
    - Electrical single line diagrams;
    - I/O List;
    - Cable routing and cable tray plans;
    - Lighting and power plans;
    - Lighting panel schedules and lighting controls drawing;
    - Electrical power distribution plans;
    - Interconnection and wiring diagrams;
    - MCC layout;
    - MCC schematics and wiring drawings;
    - Back-up Generator system;

  - Grounding plans;
  - Grounding single line diagram;
  - Instrumentation and control system block diagrams;
  - Control panel layout, bill of materials, schematic, I/O, and termination drawings;
  - Electrical block diagrams;
  - Electrical hazardous area classification drawings;
  - Process Control Narratives for overall process and subsystems including functional descriptions, system interlock, process alarms, callouts, and commissioning test plan and checklist;

- Drawings are to be provided in hard copy, pfd, and .dwg format;
- Environmental assessment and determination of construction windows to match construction methodology;
- Power system study including short circuit, arc flash, and protection and coordination studies; and harmonics or other studies as required;
- Electrical equipment lists;
- Instrument list;
- Process Control (SCADA) system design. PLC and SCADA programming by others;
- MTO's;
- Project QA/QC requirements per discipline;
- Pertinent design calculations;
- Commissioning plan including roles, responsibilities, handover systems, sequence, and the role of the Engineer as the commissioning lead;
- Operations Manual for the overall plant and subsystems;
- Standard Operating Procedures for the overall plant and subsystems;
- Develop a Site Preparation Plan including site access and material storage/laydown areas;
- IFT commissioning plan;
- Table of Contents for post-construction O&M/QC/QA/Warranty/Commissioning documentation.

Construction Services (Assume one year construction duration)

- Tender Services
  - Prepare and administer the construction tender documents including Q&A and Addenda;
  - Preparation of contract documents including construction drawings and specifications;
  - Review and evaluation of construction bids and the preparation of a recommendation for award;
- Resident Engineering Services
  - One full time site inspector / resident engineer
  - Quality assurance
  - Environmental monitoring

- Provide drawing and specification revisions and issue field design drawings and sketches as required to support the contractor.
- Perform periodic inspections of the work by all disciplines, including environmental monitoring, as required to verify that the work is proceeding in conformance with the design and in accordance with all applicable codes and standards and authorities having jurisdiction. Prepare and have available weekly site progress and inspection reports complete with pictures.
- Maintain up-to-date redlines.
- Prepare record drawings/specifications.

- Post Construction Services
  - Prepare and submit "Record" drawings to RDN in both hardcopy (signed and sealed by a professional Engineer registered in the Province of British Columbia) and in electronic format compatible with RDN's AutoCAD Standards.
  - Prepare and submit a Project Closure Report.
- Construction Management
  - Act as the Coordinating Registered Professional.
  - Management of the project and team participants through the tendering, construction, and commissioning/close-out.
  - Act as the Consultant as defined by the Canadian Construction Documents Committee (CCDC).
  - Review, monitoring, and tracking of contractor's progress against the contractor's minimum level 3 schedule with CP and milestones.
  - Prepare and arrange for the printing and distribution of the construction contract documents.
  - Provide document control and tracking for all submittals, change management documentation, requests for information, and communication with external stakeholders.
  - Coordinate with and obtain permits from utilities. RDN to pay for any associated permit costs.
  - Resolve contractor's enquiries regarding conflicts in the contract documents. Generate and issue supplemental documentation as necessary to correct these conflicts.
  - Review contractor's requests for material substitution and design changes. Perform technical reviews of vendor's shop drawings and include owner review for contractor supplied and pre-purchased equipment and materials.
  - Lead, document, and distribute minutes for the project kick-off meeting and bi-weekly construction meetings throughout the construction or as required to facilitate completion of the work.
  - Perform substantial performance and total performance inspections. Prepare deficiency lists and estimates to complete deficient or incomplete work.
  - Review, verify, and issue substantial completion certificate at completion.
  - Provide a Letter of Assurance or equivalent upon completion.

- Contract Administration
    - Construction contract oversight and interpretation as required.
    - Review/assessment of scope change and delay claims.
    - Prepare and submit to RDN recommendations for Change Order and Progress Payments to RDN's project manager using RDN templates.
- Commissioning Services
    - Prepare commissioning plans;
    - Lead commissioning activities;
    - Log issues, modifications, and resolutions throughout commissioning.

5. PROCESS TECHNOLOGY REVIEW

The proposal will be based on the Sequencing Batch Reactor process.

After award and prior to commencing the preliminary design, the RDN wishes to review and assess the feasibility of alternate process technologies. Once the final process technology has been selected, the RDN and the successful bidder can assess impact to the WBS and/or deliverables and negotiate in good faith to an agreement.

6. SCHEDULE

The successful proponent shall deliver a Class C (+/-) 30% Installed Cost Estimate along with preliminary design documents no later than June 30, 2021.

The successful proponent shall deliver a Class A (+/-) 10% Installed Cost Estimate along with complete design documents no later than April 30, 2022.

The final design documents shall be ready to be issued for Tender by May 30, 2022.

7. ENGINEERING INFORMATION REQUEST

The RDN may require the highest ranked proponent to provide additional examples and information prior to final proponent selection.

8. PROPOSAL SUBMISSION AND EVALUATION

Proposals will be evaluated on the following basis: 60% Technical, 40% Financial.

Proposals are to include separate prices and WBS for:

1. Preliminary design including the alternate technology review and assessment;
2. Detailed design;
3. Construction services.

To assist in receiving similar and relevant information, and to ensure your Proposal receives fair evaluation, the RDN asks Proponents to provide the following information.

Please include with your proposal the following technical information:

- Corporate experience;
- Similar project references;
- Project team and breadth of experience;
- Approach and methodology including timeline and milestones;
- Project management process to assure quality ;
- List of deliverables per project stage;
- Comprehensive proposed fee, in Canadian Dollars, in a Schedule of Effort Table (WBS), identifying all project contributors, their per hour charge out rates, individual tasks, hours and all disbursements including travel;
- A list of engineering software tools that will be used for tasks such as power system studies; hydraulic calculations; structural steel design analysis etc;
- 3D modelling software;
- 3D model review standard or schedule of completed items to be reviewed in the model per review stage;
- CAD software, and example drawings from each discipline: civil, structural, process mechanical, building mechanical, piping isometric, instrumentation, power distribution, communications, P&ID;
- Detail expertise, experience and excellence in the use of wood as a primary building material, and how the use of wood could be incorporated in the project;
- Detail expertise, experience and excellence in green technologies and net-zero design;
- Examples demonstrating company and team experience designing with and overcoming the following technical challenges. Similar project scope is preferred.
    - Small footprint;
    - Assessing whether to reuse or replace existing infrastructure;
    - Upgrading a functioning facility while maintaining a continuous process;
    - Environmentally sensitive site in close proximity to riparian areas;
    - Expandable to meet future demands;
    - High peaking factors during storm flows;
    - Sustainable design.

Proposals submitted should be in enough detail to allow the RDN to determine the Proponent's qualifications and capabilities from the documents received. Every effort should be made to include complete details of the proposed work. The selection committee, formed at the RDN's sole discretion, will score the Proposals in accordance with the criteria provided.

Following selection of the successful bidder, a Purchase Order will be issued for the preliminary design portion of the work only. It is the RDN's intention to proceed with the detailed design and construction services with the successful proponent based on consultant performance, budget being available and obtaining the required approvals for each stage of the project.

The selection committee may proceed with an award recommendation or the RDN may proceed to enter into negotiations with the highest evaluated proponent with the intent of developing an agreement. If the parties after having bargained in good faith are unable to conclude a formal agreement, the RDN and the Proponent will be released without penalty or further obligations other than any surviving obligations regarding confidentiality and the RDN may, at its discretion, contact the Proponent of the next best rated Proposal and attempt to conclude a formal agreement with it, and so on until a contract is concluded or the RFP is cancelled.

The RDN reserves the right to award the assignment in whole or in part or to add or delete any portion of the work, or to reissue the request for proposals at a later date with the same or different terms.

Throughout the evaluation process, the evaluation committee may seek additional clarification on any aspect of the Proposal to verify or clarify the information provided**.**

9. PROPOSED PURCHASE CONTRACT

The RDN's preferred form of Contract is the standard Client-Consultant MMCD contract, and is included along with this request for proposal in the reference documents. Proponents should carefully review this form of Contract. Proponents may (but are not required to) request that RDN consider making revisions to the form of Contract, including the scope of Services. Proponents should submit such requests to the RDN well before the Closing Date and Time. If the RDN agrees to a request received prior to the Time, then RDN will issue an Addendum to modify the Contract. Failure to do so means acceptance of the agreement as presented.

10. GENERAL CONDITIONS

10.1 No Contract

By submitting a Request for Proposal and participating in the process as outlined in this RFP, proponents expressly agree that no contract of any kind is formed until a fully executed contract is in place.

10.2 Privilege Clause

The lowest or any proposal may not necessarily be accepted.

10.3 Acceptance and Rejection of Submissions

This RFP does not commit the RDN, in any way to select a preferred Proponent, or to proceed to negotiate a contract, or to award any contract. The RDN reserves the right in its sole discretion cancel this RFP, up until award, for any reason whatsoever

The RDN may accept or waive a minor and inconsequential irregularity, or where applicable to do so, the RDN may, as a condition of acceptance of the Submission, request a Proponent to correct a minor or inconsequential irregularity with no change in the Submission.

10.4 Conflict of Interest

Proponents shall disclose in their Proposals any actual or potential Conflict of Interest and existing business relationships it may have with the RDN, its elected officials, appointed officials or employees.

10.5 Solicitation of Board Members and RDN Staff

Proponents and their agents will not contact any member of the RDN Board or RDN Staff with respect to this RFP, other than the RDN Contact named in this document.

10.6 Litigation Clause

The RDN may, in its absolute discretion, reject a Proposal submitted by Proponent, if the Proponent, or any officer or director of the Proponent is or has been engaged either directly or indirectly through another corporation in legal action against the RDN, its elected or appointed officers and employees in relation to:

(a) any other contract for works or services; or
(b) any matter arising from the RDN's exercise of its powers, duties, or functions under the Local Government Act, Community Charter or another enactment within five years of the date of this Call for Proposals.

In determining whether to reject a Proposal under this clause, the RDN will consider whether the litigation is likely to affect the Proponent's ability to work with the RDN, its consultants and representatives and whether the RDN's experience with the Proponent indicates that the RDN is likely to incur increased staff and legal costs in the administration of this Contract if it is awarded to the Proponent.

10.7 No Claim for Compensation

Proponents are solely responsible for their own expenses in preparing and submitting a Proposal and for any meetings, negotiations, or discussions with the RDN. The RDN will not be liable to any Proponent for any claims, whether for costs, expense, losses or damages, or loss of anticipated profits, or for any other matter whatsoever, incurred by the Proponent in preparing and submitting a Proposal, or participating in negotiations for a Contract, or other activity related to or arising out of this RFP. Proponents agree that by participating in the RFP process they have no claim for compensation.

10.8 Ownership of Proposals

All Proposals, including attachments and any documentation, submitted to and accepted by the RDN in response to this RFP become the property of the RDN.

10.9 Freedom of Information

All submissions will be held in confidence by the RDN. The RDN is bound by the Freedom of Information and Protection of Privacy Act (British Columbia) and all documents submitted to the RDN will be subject to provisions of this legislation. The successful vendor and value of the award is routinely released.

END OF PROPOSAL DOCUMENT

REGIONAL DISTRICT OF NANAIMO

APPENDIX A: KEY MILESTONE ACTIVITIES

KEY ENGINEERING MILESTONE ACTIVITIES



Key Milestone Activities - Review existing reports and studies. -Develop and issue P&ID for Review. -Develop and issue Process Functional descriptions for Review. -Develop conceptual 3D model to 30%. -30% Model review -Issue P&ID for PH&EA. -Attend PH&EA Issue P&ID for Design. -Develop design criteria documents by discipline and issue for review. -Issue Design Criteria documents for design. -Issue Process Functional descriptions for Design. Develop Class D (+/-50%) estimate.	**Key Milestone Activities** -Develop 3D Model to 60% -Develop Project Lists -Develop Class C (+/-30%) estimate -Environmental assessment complete. Develop long-lead item procurement list. -Update schedules. -Permitting requirements. -Facilitate 60% Model review	**Key Milestone Activities** -Develop 3D Model to 90% -Develop Project Lists -Develop Class B (+/-15-20%) estimate. -Receive firm quotations for all major equipment. -Update schedules. -Facilitate 90% Model review	**Key Milestone Activities** -Issue Drawings for Review. -Issue Lists for Review. -Develop construction tender documents. -Issue drawings and documents for tender.	**Key Milestone Activities** -Issue Drawings, documents and lists for Approval - Issue Drawings, documents and lists for Construction. -Assist RDN with review of construction Tenders	**Key Milestone Activities** -Construction Management. -Review of Vendor drawings. - Review of Structural Steel Shop Drawings. -Review of Piping spool drawings. - Permitting where required by engineer or on behalf of RDN.	**Key Milestone Activities** -Overall management of the commissioning; training and handover to RDN Operations	**Key Milestone Activities** -Management and handover to the RDN of all final project documentation and record drawings.

-Finalize engineering phase schedule. -Preliminary construction phase schedule.							

REGIONAL DISTRICT OF NANAIMO

APPENDIX B: PROJECT MILESTONES GUIDELINE

RDN Project Deliverables Guideline

		IDENTIFY	SELECT	DEFINE	EXECUTE			OPERATE	
		Phase 1 Approval Main Party: RDN	Phase 2 Approval to commence FEED Main Party: RDN, Consultant	Phase 3 Project Sanction Main Party: Consultant	Phase 4 Ready for Operations and/or introduction of process fluids/loads. Installation completion. Main Party: Consultant, Contractor			Phase 5 Project Close Out Main Party: RDN, Consultant	
Accuracy		-50% to +100%	-25% to +40%	-15% to +25%	-10% to +15%	-5% to +10%			
% of Design Complete		0 - 3%	0 - 15%	15 - 40%	40-100%	90 - 100%			
PHASE		1. Opportunity Identification	2. Process/Concept Selection	3. Preliminary Engineering	4. Detailed Engineering	5. Procurement	6. Fabrication & Construction	7. Start Up & Operate	8. Close Out
Key Deliverables	CORPORATE CONSIDERATIONS	Pre-feasibility study	Project & scope deliverables clarified	Independent project review / value engineering	Asset management plan	Board report award		Post project business review	Project staff reassignment
		Preliminary risk assessment	Initial partner strategy	Community engagement	Community Engagement				Capital projects review
		Include project in budget and/or10-year capital plan. Budget approved for process/concept selection.	Community Engagement	Board report for detailed design	Revised budget				
			Budget included in 10 year capital plan and approved for preliminary engineering						
	PROJECT CONSIDERATIONS	Project charter(s) (Scoping Sheet) initiated	Project charter(s) completed (scoping sheet updated)	Project charter(s) completed (scoping sheet updated)	Project controls	Invitation to Tender (IFT)	Construction management plan	Finalize commissioning	All documentation completed
		Lessons learned review	Project execution strategies (e.g. Design-bid-build, design-build, P3,etc.)	Project organization and team management	Final design complete	Bid evaluations	Construction safety plan	Deficiencies managed	Project close out
			Preliminary project execution plan (PEP)	Quality plan	Engineering work packages issued	Award contracts	Complete fabrication	Testing and performance verification	Finalize and communicate lessons learned
			FEED scope defined	Capital cost estimate		Purchase orders issued	Complete construction		
			Capital cost estimate	Schedule (level 3)		Quality assurance plan	Ops review		
			Schedule (level 1)	Risk management plan		Vendor document control plan	Pre-commissioning and commissioning		
			Risk management	Management of change plan (biogas)			Lessons learned review		
			EH&S strategy defined	Final project execution plan					
			IT strategy selected	Contracting and procurement plan					
			Initial decommissioning/phasing plan	Project controls strategy					
			Preliminary hazard assessment	Document management strategy					
			Design basis memorandum (DBM) completed	Decommissioning/phasing plan incorporated into design					
			Lessons learned review	Lessons learned review					
	OPERATIONS CONSIDERATIONS		Operational philosophy	Operability / Maintainability review	Operability / Maintainability review	Operability / Maintainability review	Recruit operating or ready for operations organization	Spares management	
				Hand over / Start up systems identified	Develop operating manual	Constructability reviews	Training	Complete sign off	
				Design improvement LCVA completed	Hand Over / Start up systems finalized		Turnover documents in place	Warranty Management	
				Process hazard and environmental analysis (PH&EA) conducted			Verification of readiness review		
				Sparing philosophy			Hand over plan completed		
							Update/create safety and operating procedures		
							Emergency response plan completed		
	EXTERNAL CONSIDERATIONS	Preliminary regulatory review	Regulatory strategy (includes environmental assessment)	Define permitting strategy	Licenses and permits obtained			License to operate obtained	
			Preliminary Building/Development Permit discussion	Regulatory applications prepared / Approved	Certifying authority plan				
			Preliminary archaeological discussion	Communications Plan					
			First Nations Notification	Inclusion in Blanket Archaeological Permit					
	KEY PROJECT OBJECTIVES			Finalize the project scope and complete preliminary design and specifications	Complete all engineering and design and issue contract packages	Award major contracts	Manage all construction and field safety activities	Dry and Wet Function test equipment and instrument systems	
				Complete the project execution plan	Specify and purchase all equipment and transport to site		Review and implement the commissioning and turnover plan	Complete initial fill of process fluids	
				Complete detailed estimate (class 3) and project control budget	Complete construction planning		Complete civil mechanical, E/I, controls construction	Prepare the facility for initial operation	
		Obtain concept approval and funding for next phase		Obtain full funding for the project execution phase	Monitor and control all project activities to the sanctioned budget and schedule		Complete pre-commissioning and turn over facilities to commissioning team	Start up the facility and monitor initial operations	

Estimate:		-50% to +100%	-25% to +40%	-15% to +25%	-10% to +15%	-5% to +10%			
% of Design Complete:		0 - 3%	0 - 15%	15 - 40%	40-100%	70 - 100%			
PHASE		1. Opportunity Identification	2. Process/Concept Selection	3. Preliminary Engineering	4. Detailed Engineering	5. Procurement	6. Fabrication & Construction	7. Start Up & Operate	8. Close Out
Key Project Deliverables	Consultant Supported Owner's Activities	Life cycle value assessment definition of environmental, social and economic criteria for success	Land acquisitions	Stakeholder consultation	Public / Stakeholder consultation	Tender support	Operator training	Manage Comm. / Start up activities	
		Order of magnitude (+/- 100%) capital and operating cost estimating	Stakeholder interface plan	Participate in process and model reviews	Participate / Approve design reviews	Contractor pre-qualification	Participate in site status / Safety meetings	Purchase and installing signage	
		Risk assessment and management plan	Business case economic analysis	Preferred vendor list review and approval	PO and contract review and approval	Tender document development	Review construction progress / Costs	Energizing electrical systems	
				Public consultation process	Operations / Maintenance input to design / PHA	Tender evaluation	Construction Management	Purging piping systems	
				Approval of project execution plan	Benchmarking / Operator / Maintenance hiring / Training		Construction inspection & monitoring	Shutdown key verification	
				Participate in preliminary process hazard and environmental analysis	Planning of maintenance program			Purchasing and installing furniture	

Key Project Deliverables

Design Consu			Approval of engineering design specification	Capital spares procurement and warehousing			Selection and purchase first fills for all chemical storage tanks	
							System by system start up and verification of rates and set points	
							Introduce first feedstock to process	
							Proving process system capacity in accordance with DBM specifications	
Project Management	Capacity based cost estimates	Preliminary scope of work	Finalize PEP and kick off project	Ensure adequate resources in place	Monthly reports	Manage construction interface	Commissioning support	Close out
	Identify stakeholders and develop a preliminary interface strategy	Preliminary project execution plan	Detailed scope of work - IFD	Finalize construction / Fabrication strategy	Manage construction interface			
		Preliminary construction / Fabrication / strategy	Monitor / Direct all project activities	Finalize procurement and contracting strategy				
		Preliminary procurement and contracting strategy	Construction / fabrication strategy	Finalize Labor / Staffing strategy				
		Preliminary labour / Staffing strategy	Procurement and contracting strategy	Finalize management and support manhours				
		Preliminary management and support manhours	Labour / Staffing strategy	Monthly status / progress reports				
		Monthly progress reports	Quality plan	Monitor / Direct all project activities				
			Cost estimate risk assessment	Manage owner / construction interfaces				
			Monthly reports	Set detailed construction support manhour estimates				
			Preliminary manhour estimates					
			Set detailed design manhour estimates					
Project Planning Estimating & Controls		Preliminary scope of work	Detailed scope of work - IFD	Weekly / Monthly cost / Schedule updates	Weekly / Monthly cost / Progress / Schedule updates	Weekly / Monthly cost / Progress / Schedule updates	Weekly / Monthly cost / Progress / Schedule updates	Close out
		Class 4/C capital cost estimate (factored)	Class 3 capital cost estimate (MTO based)	Invoice review and processing	Weekly/Monthly schedule tracking	Weekly/Monthly schedule tracking	Weekly/Monthly schedule tracking	
		Milestone schedule – critical path defined	Develop detailed level 3 schedule	Class 2/A capital cost estimate (as required)				
		Cash flow schedule (annual capital)	Develop control budget / Cost codes	Set detailed estimates				
		Preliminary WBS	Defined WBS					
			Defined escalation strategy					
		Preliminary escalation strategy	Defined risk analysis					
		Preliminary risk analysis	Preliminary and detailed anhour estimates					
			Set detailed design manhour estimates					
Procurement	Market surveys – labor, escalation, deliveries, competing projects, resoures available	Preliminary scope of work	Detailed scope of work - IFD		Final vendor data	Final vendor data books (for CMT, commissioning and operations teams)		Close out
		Major equipment budget pricing / Delivery	Procurement and logistics plan		Vendor / Contractor payment approvals			
			Preliminary requisition index		Preliminary vendor data books (for CMT, commissioning and operations teams)			
			Equipment budget pricing and deliveries		Engineering data books			
			Preferred vendor list					
			Fabrication and shop QA plan					
			Preliminary design manhour estimates					
			Set detailed design manhour estimates					
Project Engineering		Preliminary scope of work	Detailed scope of work - IFD	Engineering discipline coordination	Procurement support	Field engineering support	Commissioning support	Close out
		Communications plan	Approved plot plan	Weekly engineering progress and model reviews reports		Final start up plan		
		DBM coordination / Assembly	DBM update	Plot plan				
		Preliminary plot plan	Operations review coordination	Engineering work packages for all disciplines				
		Study reports	Monthly engineering progress reports	Preliminary start up plan				
		Weekly engineering progress reports	Facilitate 30% 3D model review	Facilitate 60% and 90% 3D model review				
			Develop 3D model to 30%	Develop 3D model to 90%				
			Preliminary design manhour estimates					
			Set detailed design manhour estimates					
Process	Available technology data	Preliminary scope of work	Detailed scope of work - IFD	PH&EA if process changes made		Field engineering support	Commissioning support	Close out
		Design capacities defined	PFD finalized - IFD	P&I diagrams finalized - IFC		record P&I diagrams		
			PFD issued for PH&EA					
		Technology evaluation	P&ID's reviewed and approved - IFD	Line list finalized - IFC				
		Process and other study reports	Preliminary equipment sizing (all) - IFD	Operating manual issued - IFC				
		Block flow diagram / PFD - IFD	Mechanical and instrumentation datasheets - IFD	Process drawings - EWP's				
			Line list process data and sizing - IFD					
		Mass balance (inc. utilities)	Operations review / PH&EA					
		Preliminary equipment sizing (major)	Tie-in index – IFD					
		Define process tie in locations	DBM update - IFD					
		Air emissions data	Preliminary design manhour estimates					
		Process description for DBM	Set detailed design manhour estimates					
Mechanical / Piping	Conceptual cost based on historical data	Preliminary scope of work	Detail scope of work - IFD	Scope of work – IFC quality	Vendor drawing reviews	Construction support	Commissioning support	Close out
		Study reports (equipment / driver options)	Equipment list	Equipment list IFC	MTOs	record drawings		
		Mechanical equipment list (prelim)	Major mechanical equipment datasheets	Technical Safety BC applications	Access & conflict review	ITP Inspections		
		Major mechanical equipment costs / Factored	Equipment and piping specifications	Material requisitions – mechanical equipment				
		Mechanical and piping description (DBM)	Mechanical equipment budget costs	Vendor drawing reviews				
		Site plan studies and preliminary site plan	3-D piping study / Estimate model	Mechanical drawings – EWP's - IFC				
		Equipment layout / Plot plan (prelim.)	Equipment layout / Plot plan (final)	3D piping model - IFC				
			Materials selection / Corrosion prot. plan	Piping DWGs IFC				
			Piping MTO's	Piping isometrics				

Key Project Deliverables

			Preliminary design manhour estimates					
			Set detailed design manhour estimates					
Linear Infrastructure	Conceptual cost based on historical data	Preliminary scope of work	Detail scope of work - IFD	Scope of work – IFC quality	Material certificates and inspections	Construction support	Commissioning support	Close out
		Study reports	Preliminary plans and profile drawings	Pipeline drawings – EWP's - IFC	Vendor drawing reviews	ITP Inspections		
		Preliminary routing	Preliminary hydraulic calculations		MTOs	record drawings		
		Pipeline specifications for DBM write up (not sure what DBM is)	Pipeline profile drawings					
		Preliminary creek crossing designs (for DFO)	Pipeline MTO's					
		Pipeline material selection	Land owner list and crossing list					
		Basic areal geotechnical and topographical analysis and report.	Corrosion mitigation pipeline integrity planning					
			Preliminary design manhour estimates					
			Set detailed design manhour estimates					
Civil / Structural	Conceptual cost based on historical date	Preliminary scope of work	Scope of work – IFD quality	Scope of work – IFC quality	Procurement support	Construction support	Commissioning support	Close out
		Basic areal geotechnical and topographical analysis and report.	Topographical report – IFD quality	Soils & Hydrology – Defined – IFC quality		Record drawings		
		Site access and grading / Drainage plans	Geotechnical report and analysis – IFD quality	Detailed geotechnical report – IFC quality		ITP Inspections		
		Infrastructure and meteorological evaluation study	Civil / structural engineering design criteria and specifications – IFD quality	Building authority and detailed building authority application.		Building authority occupation permits		
		Ground water issues	Site survey and site plan – IFD quality	Underground scope defined – IFC quality				
		Study reports (foundation / structures)	Building authority and overall permit application	Above ground scope defined – IFC quality				
		Civil / Structural cost quantities / Factored	UG piping standards and specification – IFD quality	UG piping hydraulic calculations – IFC quality				
		Borrow pit locations and material availability study (gravel)	Access roads, grading and infrastructure plans, standards and specifications – IFD quality	3D Modell – IFC quality				
		Site topographical or Lidar surveys	Ground improvement and piling material installation standards, typical designs, specifications and MTOs – IFD quality	Infrastructure design & calculations – IFC quality				
		Civil / Structural DBM	Concrete construction standards, design criteria and specifications. – IFD quality	Ground improvement and piling design and calculations– IFC quality				
			Structural steel / fabrication erection standard designs, fireproofing, specifications & MTOs. – IFD quality	Concrete/Rebar design and calculations – IFC quality				
			Earthwork cut and fill plans and MTOs – IFD quality	Structural steel design and calculations – IFC quality				
			Site infrastructure preliminary design and MTOs – IFD quality	Architectural design & HVAC calculations – IFC quality				
			Underground corridors for piping, power, gas, communications, plans and MTOs – IFD quality	Grading / Earthwork drawings – IFC quality				
			Foundation plans and MTOs – IFD quality	Concrete – IFC quality				
				Architectural – IFC quality				
			Structural studies, standards and specifications for mechanical equipment and MTOs – IFD quality	Structural – IFC quality				
			Preliminary design manhour estimates	Detail MTOs – IFC quality				
			Set detailed design manhour estimates	Landscape and irrigation plan - IFC				
			Landscape and irrigation plan - IFD	EWP's				
Electrical	Capacity based loads / Power costs	Preliminary scope of work	Scope of work - IFD	Final electrical area and hazard area classifications. - IFC	Procurement support	Construction support	Commissioning support	record drawings
	Conceptual cost based on historical data	Plot plan space requirements	Electrical general narrative specification - IFD	Detailed power system study		FAT/SAT		Close out
		Power supply philosophy and grid evaluation studies	Electrical area classification drawing - IFD	Switch gear single line diagram - IFC		record drawings		
		Electrical load list	Key single line diagrams - IFD	Above ground drawings or model – IFC		ITP Inspections		
		Single line diagrams (preliminary)	Cable tray routing plan - IFD	Underground drawing or model - IFC		Finalize power system study		
		Major electrical equipment cost factored	Electrical equipment list / budget costs - IFD	3D model and reviews - IFC		Electrical vendor drawing reviews		
		Electrical supply and distribution philosophy for DBM	Electrical building layouts and budget cost - IFD	Defined electrical narrative specifications - IFC				
			Emergency power supply study / equipment cost	UPS instrumentation power supply single diagrams - IFC				
			Electrical equipment specifications - IFD	Final electrical single line diagram				
			Electrical MTO's	Electrical equipment list - IFC				
			Key line lists and diagrams IFD	EWPs				
			Lighting philosophy - IFD	Electrical vendor drawing reviews				
			Earthing and grounding philosophy - IFD	Electrical drawings – IFC				
			Definition of building protection and communications systems - IFD	Panel layout - IFC				
			Miscellaneous system block diagrams - IFD	Termination drawings IFC				
			Preliminary design manhour estimates	Motor schedmatics - IFC				
			Detailed design manhour estimates	Electrical Load List - IFC				
			Electrical block diagrams	Cable / Trench / Tray routing plan - IFC				
			Review of existing service transformers, fuses, and cables for suitability and design for replacement if required	Final equipment layouts - IFC				
				Electrical heat trace design data - IFC				

Key Project Deliverables

				Relay / Fuse coordination study report - IFC				
				Lighting and power plan - IFC				
				Installation specifications - IFC				
				Instrument and junction box location plans - IFC				
				Cable list and schedules - IFC				
				Instrument and computer earthing and grounding plan - IFC				
				Electrical heat trace design data - IFC				
				Electrical site plan - IFC				
				Lighting panel schedules and lighting controls drawing - IFC				
				MCC layout, schematics, and wiring drawings - IFC				
				Grounding plan and single line diagram - IFC				
Instrumentation	Conceptual cost based on historical date	Preliminary scope of work	Detailed scope of work - IFD	Instrument list - IFC	Procurement support	Construction support	Commissioning support	Close out
		Study reports	Instrument index	Instrument datasheets - IFC		record drawings		
		Instrument philosophy for DBM	Instrument datasheets	Instrument specifications - IFC		ITP Inspections		
		Preliminary instrument counts or cost factored	Instrument specifications	Instrumentation drawings/ EWP's - IFC		Vendor drawing reviews		
		Preliminary instrument index	Tagged item budget costs	Instrument locations and access requirements - IFC				
		General instrument design criteria	Instrument installation material MTO's	Instrumentation and control systems block diagrams - IFC				
		Instrument power and air data	3D model review					
			Instrument and controls block diagram					
AUTOMATION & Controls	Conceptual cost based on historical date	Preliminary scope of work	Scope of work - IFD	Scope of work - IFC	Procurement support	Construction support	Commissioning support	Close out
		Study reports	I&C control philosophy – final	Shutdown key - IFC		record drawings	Control system function test	
		Functional system controls block diagram	Hardware and configuration diagram	EWPs - IFC		ITP Inspections		
		I&C control philosophy for DBM	Preliminary shutdown key	Control system - IFC		Control System FAT/SAT		
		Control system cost / Factored	Communication and control system architecture drawing	Data and voice communication - IFC		Vendor drawing reviews		
		Communications system design / Cost	Controls equipment specifications - IFD	Cause and affect logic diagrams - IFC				
		Equipment layout buildings (input)	DCS / PLC equipment budget costs	I/O list and loading - IFC				
		Miscellaneous system block diagrams	3D model review	Process graphic display specification				
			Preliminary design manhour estimates	Loop diagrams - IFC				
			Detailed design manhour estimates	3D model review - IFC				
			Typical installation hookups and details - IFD	Panel layout, BOM, schematic, I/O, and termination drawings - IFC				
Safety and Security Systems		Preliminary fire detection and suppression and monitoring design basis	Preliminary fire detection and suppression and monitoring design drawings and specifications	Final fire detection and suppression and monitoring design drawings and specifications - IFC	Review vendor design and drawings	ITP Inspections	Commissioning support	
		Preliminary security system and monitoring design basis	Preliminary security system and monitoring drawings and specifications	Final security system and monitoring design drawings and specifications - IFC			Fire Safety Plan	
		Preliminary access control design basis	Preliminary access control drawings and specifications	Final access control system design drawings and specifications - IFC				
Regulatory & Environmental	Preliminary regulatory review and permit timelines (historical)	Regulatory permit plan for DBM	Commission EIS (includes effect on air, water, soil, fish, wildlife, human health, cultural, etc.)	Tree removal plan		Environmental monitoring and review	Notifications to regulatory bodies per permit plan	Close out
		Preliminary archaeological assessment	Odour management plan	Archaeological impact monitoring plan		Archaeological monitoring		
			Apply for regulatory permits identified in permit plan	Noise impact assessment				
			Insert updated regulatory plan in the PEP	Prepare and submit applications, and obtain permits identified in permit plan				
				Identify construction QEP requirements				
Construction Management			Preliminary construction execution plan	Construction execution plan		Construction deficiency lists	Commissioning manager leads commissioning	Close out
				Construction permit applications		Final overall system commissioning plan		
			Constructability review	Preliminary overall system commissioning plan		System by system checkout and turnover to commissioning team		
				IFC commissioning specifications		Coordinate all construction contractors or designate prime contractor		
						Implement / Monitor HS&E plan		
						Measure construction progress		
						Monitor field costs and changes		
						Site construction QA / Reports		
						Construction completion check lists		
Other								