

# **DRAFT SCOPE OF WORK**

## **Similkameen River Appraisal Level Study**

### **Project Background:**

Public Utility District No. 1 of Okanogan County (PUD) has submitted a Preliminary Permit Application to the Federal Energy Regulatory Commission (FERC) for a water storage and hydroelectric project located on the Similkameen River in Okanogan County, Washington. The Dam and associated facilities would be located upstream of Enloe Dam at approximately river mile 7.3 in what is commonly referred to as Shankers Bend. The Shanker's Bend Project is being proposed for study in coordination with the State of Washington, Columbia River Water Management Program. However, as part of this appraisal level analysis other dam locations may be analyzed, for example Lenton Flats.

In a cooperative effort, the PUD and Department of Ecology (Ecology) have been analyzing the next steps to achieve the goals of both organizations. The PUD has received funds from Ecology to work collectively and collaboratively in performing an appraisal level study of the Similkameen River as a potential site for water storage, power generation, and flood control facility. The PUD has also been working with the US Army Corps of Engineers (Corps), and has received a match grant. The Corps have initiated a Hydrology Water Availability Study and should be complete in late 2008.

At the appraisal-level stage, these studies will primarily involve desktop analyses, and compiling existing information, which will examine the technical, economic, financial, and environmental aspects of the Project. If the appraisal-level analysis supports further development of the project, a feasibility study of the Shanker's Bend project could then take place.

### **Project Participation and Responsibilities:**

In 2006, House Bill 2860 establishes the need for a Columbia River Basin Water Management Program directing the Washington State Department of Ecology to aggressively pursue development of water supplies. Additional mandates include benefits to both in-stream and out-of-stream uses through storage, conservation and voluntary regional water management agreements. At the end of 2006, the Public Utility District No. 1 of Okanogan County submitted an application for funding for the Shanker's Bend Water Storage and Hydroelectric Facility. Since then, the PUD and Ecology worked to define the study parameters for identifying the potential of the Similkameen River, and identified additional partners, of which is the United States Army Corps of Engineers. The Corps is currently working to develop the Similkameen River Basin Water Supply and Demand Study, which will be incorporated into the final product of this appraisal level study. Tasks 1.0 through Task 7.0 are the responsibility of the Corps. However, at the request of the PUD, the selected Consultant will coordinate and/or be directed to work with the Corps to incorporate the necessary information in the proceeding Tasks. Task 8.0 through Task 15.0 are designated to the PUD (and selected Consultant), Ecology, or other directed Agency or Tribe. Under the heading of each Task will determine the responsibility of that particular Task.

**U.S. Army Corps of Engineers**  
**SIMILKAMEEN RIVER BASIN WATER SUPPLY AND DEMAND STUDY**

**Purpose of Study** – To quantify the water supply potentially available for storage at the proposed Shankers Bend dam site in the Similkameen River.

**Detailed Scope of Work** – The following is the proposed detailed scope of work for this study. This scope of work applies only to work that will be performed by the U.S. Army Corps of Engineers. Tasks that are assumed to be performed by other entities are identified accordingly in the scope.

Task 1.0 - Review of Existing Reports and Documents Pertinent to this Study

This task will include a review of existing reports and documents pertinent to this study, including a review of reports previously produced by the Corps regarding potential water supply projects in the basin.

Task 2.0 - Characterization of the Similkameen River Basin Including Quantification of Basin Runoff

The purpose of this task is to summarize the climate and watershed characteristics of the Similkameen River basin including a quantification of natural runoff in the basin. The following sub-tasks will be performed:

2.1 Climate Characterization – Relevant climate data will be compiled and presented. A summary will be prepared that provides an overview of historical climate in the basin.

2.2 Summary of Watershed Characteristics – A summary will be prepared of general watershed characteristics including drainage basin area and stream network, basin physiography, vegetation and soils, and land use.

2.3 Summary of Historical Streamflow Records – Historical streamflow data will be compiled and presented in graphical and/or tabular format as appropriate. Data from the following gages will be summarized: Similkameen River at Princeton, Similkameen River near Hedley, and Similkameen River near Nighthawk. Additionally, data from gages in the Okanogan River downstream of the Similkameen River confluence will be included in this summary as appropriate.

2.4 Summary of Climate/Streamflow Relationship – A summary will be prepared of the relationship between current basin climate and current basin runoff and streamflow. The summary will emphasize the temporal variations in this relationship (i.e., variations over the course of a water year).

2.5 Summary of Future Climate Change Effects on Streamflow – This task will include a qualitative description of the potential effects of forecast future climate change on runoff patterns

and basin streamflow. Additionally, hydrologic simulations from the UW Climate Impacts Group showing basin streamflow sensitivity to climate change will be provided as available.

2.6 Basin Runoff Summary – Data and information from the previous sub-tasks will be used to present a summary of basin runoff under current conditions. Runoff quantities will be provided on an annual basis as well as temporally (i.e., monthly) within a year. Inter-annual variability in runoff will also be assessed.

### Task 3.0 - Assessment of Current Water Demand

The purpose of this task is to provide an assessment of current water demand in the Similkameen River basin and in the reach of the Okanogan River downstream of the Similkameen River confluence. The following sub-tasks will be performed:

3.1 Assessment of Existing Water Rights – Existing water rights in the Similkameen basin and in the reach of the Okanogan River downstream of the Similkameen River confluence will be summarized. For water rights in Washington State, it is assumed that pertinent information will be provided to the Corps by the Department of Ecology, which will minimize the Corps' effort on this task. Pertinent information will include at a minimum type of diversion (groundwater or surface water), place of diversion and place of use, amount of use and timing (i.e., year-round, seasonal, etc.), purpose of use, and consumptive use if known. It is assumed that information regarding water rights in Canada can be obtained from the Similkameen Watershed Interim Steering Committee (ISC) from their current feasibility study. It is noted that the intent of this task is to provide a reasonable estimate of overall water usage via existing water rights rather than an exhaustive summary of all existing water rights.

3.2 Assessment of Irrigation Demand – This task is essentially a sub-task of Task 3.1 as it will focus on characterizing irrigation water usage associated with current legal water rights. Similar to Task 3.1, it is assumed that the Corps' effort on this task will be relatively minor and will focus on presenting information provided by the Department of Ecology and the ISC.

3.3 Assessment of Municipal and Industrial Demand – This task is a sub-task of Task 3.1 and will focus on characterizing legal water rights associated with municipal and industrial demand. Similar to Task 3.1, it is assumed that the Corps' effort on this task will be relatively minor and will focus on presenting information provided by the Department of Ecology and the ISC.

3.4 Assessment of Instream Flow Requirements – The purpose of this task is to present the legally mandated instream flow requirements as set by the Washington State Department of Ecology for the Similkameen River and for the Okanogan River downstream of the Similkameen River confluence.

3.5 Assessment of Total Water Demand – The purpose of this task is to summarize current total water demand in the basin and along the reach of the Okanogan River downstream of the Similkameen River confluence based on water usage associated with legal water rights. Information obtained in Sub-tasks 3.1 through 3.4 will be used to perform this task.

#### Task 4.0 – Identify Water Storage Needs

The purpose of this task is to identify the current water supply shortfall in the basin and to assess the potential needs of a water supply storage project with respect to items such as flood control, ecological flow and water quality needs. This task will be comprised of the following sub-tasks:

4.1 Assessment of Water Supply Shortfall - Current shortfalls in water supply on a monthly basis in the Similkameen River and in the Okanogan River downstream of the Similkameen River confluence will be assessed by comparing water availability (Task 2.0) and current water demand (Task 3.0).

4.2 Identification of Flood Control Needs – Flood control needs downstream of the proposed Shankers Bend dam site will be identified. This task will only consider flood control needs of the lower Similkameen River and of the downstream reach of the Okanogan River to the Columbia River confluence. This task will rely solely on the use of existing information from past floods (i.e., historical peak flows and stages and associated flood impacts). Reach-specific flood control benefits will be identified using existing stage-discharge relationships (i.e., at established stream gaging sites) and will not involve the use of hydraulic modeling to estimate downstream benefits of flood control, but may utilize existing hydraulic modeling data.

4.3 Identification of Ecological Flow Improvement Needs – The purpose of this task is to summarize desired changes in streamflow for ecological purposes (i.e., improved fish habitat). Information used for this task will be obtained either from existing sources (i.e., existing reports and studies) or will be based on information provided to the Corps from sources such as the Department of Ecology and the Okanogan County PUD.

4.4 Identification of Water Quality Improvement Needs – The purpose of this task is to summarize desired changes in streamflow for water quality purposes such as water temperature. Information used for this task will be obtained either from existing sources (i.e., existing reports and studies) or will be based on information provided to the Corps from sources such as the Department of Ecology and the Okanogan County PUD.

#### Task 5.0 Quantify Water Supply Potentially Available for Storage

This task will be used to quantify the water supply potentially available for storage at the Shankers Bend dam site. The assessment will be based on a comparison of water availability in the basin, as identified in Task 2.0, and current water demand, as identified in Task 3.0. The assessment will consider the inter-annual variability of water availability. Results will be presented to show potential water availability on an intra-annual time scale (i.e., monthly).

#### Task 6.0 Reservoir Sizing Alternatives

The purpose of this task is to present a comparison of three reservoir alternatives at the Shankers Bend dam site. The three alternatives are:

- A high dam, capable of impounding a reservoir of about 1.7 million acre-feet to a maximum pool elevation of 1,289 feet;

- A medium dam, capable of impounding a reservoir of about 168,000 acre-feet to a maximum pool elevation of 1,175 feet; and,
- A low dam, capable of impounding a reservoir of about 50,000 acre-feet to a maximum pool elevation of 1,155 feet.

Included in this task will be an evaluation and comparison of the three alternatives, and will consider items such as potential to meet desired water storage needs as outlined in Task 4.0 (i.e., flood control, downstream flow needs) as well as potential for hydropower generation.

#### Task 7.0 Report Preparation

A report will be prepared that summarizes the review and assessment performed in the previously listed tasks.

### **Ecology/PUD Grant Scope**

#### **Project Title: SIMILKAMEEN RIVER/SHANKERS BEND APPRAISAL LEVEL STUDY**

**Purpose of Study** – The purpose of this study is to conduct an appraisal level analysis for assessment of environmental effects, and appraisal level engineering for a water storage, hydroelectric, flood control facility on the Similkameen River.

**Detailed Scope of Work** – The following is the proposed detailed scope of work for this study. This scope of work applies only to work that will be performed by the PUD (and selected Consultants) and Ecology. Under the heading of each task, the participant’s responsibility will be outlined for that particular task.

#### Task 8.0 Public Outreach and Consultation

The purpose of this task is to provide necessary information by means of public information, agency consultation, Tribal/First Nations consultation and any other avenue of communication with interested parties and stakeholders regarding this project. This task will be performed by the PUD and their Consultant.

#### Task 9.0 Management Services, Project Coordination and Critical Path Identification

Continue coordination efforts including efforts with the Washington State Department of Ecology, United States Corps of Engineers, and the International Steering Committee regarding the project. In addition, a project management plan will be developed that identifies project coordination and develops critical path items for the duration of the storage project study. This task will be performed by the PUD and their Consultant.

#### Task 10.0 Administration

The PUD will provide the necessary and legal documentation for grant administration required by the Department of Ecology. This task will be performed by the PUD.

### Task 11.0 – Cultural Resources Assessment

The purpose of this task is to assess and summarize the potential cultural effects of a storage project through a review of existing literature, studies and project alternatives. A summary will be prepared that provides an overview of cultural resources. Tribes and First Nations on both sides of the United States and Canadian border will actively participate in preparation, review, and approval of the summary report of Cultural Resources. This task will be performed by the PUD selected Consultant and/or Tribe(s). The Consultant should be prepared to participate and/or facilitate the development of this task with those potential Tribal governments.

### Task 12.0 – Assessment of Environmental Effects

The purpose of this task is to assess the current condition of the Similkameen river basin flora and fauna and potential effects from a new water storage reservoir project. This work will be based on a review of existing literature, studies and reservoir project alternatives. This task will be performed by the PUD selected Consultant. The following sub-tasks will be performed:

#### 12.1 Aquatics/Fisheries

- a) Utilizing existing data sources, estimate the effects from reservoir inundation upon existing aquatic life. If data sources exist and are readily available the following items should be briefly described (goals):
  - Effects on Kokanee including spawning areas,
  - Effects on Whitefish including spawning areas,
  - Effects on Freshwater mussels.
  - Effects on Warm water fish species.
  - Effects to other identified fish populations including those in Canada and those below the project.
- b) Utilizing existing data sources, estimate the impact upon the recreational and non recreational fishery.

#### 12.2 Wildlife

- a) Utilizing existing data sources, estimate the effects from reservoir inundation upon existing wildlife. If data sources exist and are readily available the following items should be briefly described (goals):
  - Effects on big game populations including habitat, migration/habitat corridors.
  - Effects on Avian species.
  - Effects on other wildlife species.
- a) Estimate the impacts of wildlife-based recreational opportunities with an emphasis on big game and waterfowl hunting, birding and other watch-able wildlife opportunities

12.3 Water Quality – Utilizing existing data sources, compare Similkameen River water quality to the Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC). Compile a list of existing deviations from State Standards and estimate the possible or likely effects of the presented reservoir options evaluated.

12.4 Wetlands and Shorelines – Utilizing existing data sources, estimate the effects from reservoir inundation upon existing and created wetlands and shorelines. Quantify the amount of wetlands and shorelines lost or gained do to reservoir inundation. These areas need to be identified and the effects of seasonal inundation need to be evaluated.

12.6 Recreation – Estimate the type and amount of gained or lost recreational opportunities caused by construction of all reservoir options.

12.7 Land Use – Quantify the amount of land lost to reservoir inundation. Breakdown the inundated lands by percentage of agricultural, forest, pastoral, or wildlife and recreation use.

12.8 Flooding of Infrastructure/Private property – Estimate the amount of public and privately owned infrastructure that would be inundated by any reservoir storage options. Provide cost estimates for mitigating the effects of this loss of infrastructure. Estimate the amount of private and publicly owned land that would be inundated by the reservoir.

### Task 13.0 - Appraisal Level Engineering

The purpose of this task is to produce rough costs that allow project sponsors and stakeholders to consider the cost of electricity generated at or water stored by a new multipurpose storage reservoir in the Shanker's Bend area. These costs, coupled with an understanding of the cultural and environmental impacts, provide the project with comparability with other potential sources of water storage and electricity. This task will be performed by the PUD selected Consultant.

13.1 Identification of Potential Sites- Utilizing the results from the "Similkameen River Basin Water Supply and Demand Study" (Supply and Demand Study) and other available data, evaluate possible water storage sites. Potential dam sites shall include Shankers Bend (with the three possible reservoir configurations discussed in the Supply and Demand Study), the Lenton Flat location, and the Corps of Engineers sites that were evaluated in the mid-1980's. The sites will each undergo a "fatal flaw" review by the consultant. This review will utilize existing geologic maps, seismic data, and potential failure mode analysis features to assess the site from a safety and constructability standpoint.

13.2 Conceptual Facility Design - From the possible dam construction sites described in 13.1 above, develop conceptual facility designs that include all appurtenant features for storage of water, production of electricity, and any necessary features designed to be protective of instream resources. If a particular dam construction site has the capacity for more than one of the reservoir storage proposals, then a design shall be provided for each storage option at that site.

13.3 Development of Construction and Operation Costs - For each storage option developed in 13.2 above, order-of-magnitude cost estimates shall be prepared. In addition, annual operation and maintenance expenses based upon project configuration will be included.

13.4 Development of new water storage sites on the Similkameen River in Canada has been considered in the past. A new Canadian investigation for a Similkameen River dam is currently underway. Coordinated operation of any of the above Washington sites, in conjunction with a Canadian water storage facility under consideration, shall be evaluated.

#### Task 14.0 – Report, Production and Distribution

The purpose of this task is to produce and distribute the “Similkameen River/ Shankers Bend Appraisal Study” report. This task will be performed by the PUD selected Consultant. This task will be comprised of the following sub-tasks:

14.1 Report - A report will be prepared that incorporates and summarizes task 11.0 through 13.0 of this amendment and the Army Corps of Engineers report identified in tasks 1.0 through 7.0 (Corps report). Additionally, the report will incorporate a regulatory processes and timing section and conclude with a Summary and Recommendation section.

14.2 Production and Distribution – The report identified in task 14.1 above will be produced in the following format and quantities: Twenty-five (25) hard copies and fifty (50) electronic (CD) copies. These copies will be distributed and made available to interested agencies, tribes and the public.

14.3 Public Informational Meetings – After the report is finalized, PUD and Ecology staff will host two public informational meetings/presentations in proximity to the study area. The PUD selected Consultant may be requested to participated in the Informational meetings

#### Task 15.0 Post Report and Next Steps

This task is intended to link this grant phase with potential future funding phases. Upon completion of the report and presentations, the PUD and Ecology will develop a next steps assessment of necessary tasks and funding amounts.

#### Assumptions and Agreements

- The Tasks and associated work will be compliant with the Grant administration requirements for recipients of Ecology Grants and Loans guidelines.
- The project must be completed by December 31, 2008, with a draft report submitted by September 1, 2008.
- A preliminary budget for this project has been approved.
- Selected Consultant will appoint one person, with decision making authority, to serve as a project coordinator/manager. Selected Consultant will provide appropriate support documentation for the successful completion of the project.
- There will be no changes to the task/job/policy data during the project.

- At the conclusion of the project, all materials developed by the project team will become the exclusive property of the PUD. In addition, any and all work sheets and other working documentation will also become the property of the PUD, all of which will be delivered to the PUD at the conclusion of this study.

**Requirements/Conditions**

Contractor indemnifies and agrees to hold harmless the District from any liability for damages to property and persons occurring as a result of Contractor's performance of this Contract.

Selected Contractor will be required to meet all criteria outline in the PUD Terms and Conditions document.