KITTITAS COUNTY
DEPARTMENT OF PUBLIC WORKS

**AGENDA STAFF REPORT**

**AGENDA DATE:** **March 5, 2013**

**ACTION REQUESTED:** Approve and sign the professional engineering task order for the Manastash Road bridge construction project

BACKGROUND: The flooding of NF Manastash Creek at Manastash Road revealed the existing culvert to be under-sized for flood flows and to be in disrepair.

Flood water that cannot flow through the culvert is diverted into ditches upstream of the culvert eroding the road and roadside resulting in high-cost repairs and road closure. The culvert is severely rusted through nearly continuously near the high water flow elevation. Replacement of the culvert must allow for adequate flood water flow rate to reduce erosion of the road and maintain proper stream flow. Bridge construction is the best option to provide adequate stream flow. The project will require right-of-way acquisition for a temporary detour during construction.

The road fund with some support from the Flood Control District fund will pay for the project.

This project is described in the Annual Construction Program and the Six-Year Transportation Improvement Plan.

On November 10, 2011 the BOCC approved the chair to sign the on-call engineering services contract. A task order for professional services associated with this contract was prepared for BOCC approval.

INTERACTION: Public Works and Sargent Engineers

RECOMMENDATION: BOCC to approve chair signature of the professional engineering task order for Manastash Road bridge construction project.

HANDLING: Return two signed task orders to Public Works

ATTACHMENTS: Professional Engineering Services Task Order for Manastash Road Bridge Construction Project

LEAD STAFF: Douglas D'Hondt
County Engineer

**BOARD OF COUNTY COMMISSIONERS**
**COUNTY OF KITTITAS**
**STATE OF WASHINGTON**

**RESOLUTION NO. _____**

**TO AUTHORIZE CHAIR SIGNATURE FOR PROFESSIONAL ENGINEERING TASK ORDER FOR MANASTASH ROAD BRIDGE CONSTRUCTION PROJECT**

**WHEREAS:** Flooding on May 15, 2011 exposed culvert damage for North Fork Manastash Creek at Manastash Road; and

**WHEREAS:** The aforementioned flood also revealed a need for a larger stream crossing to adequately allow stream flow; and

**WHEREAS:** Professional engineering and environmental services are required for project design; and

**WHEREAS:** Sargent Engineers provided a signed task order to perform such services for $115,466; and

**WHEREAS:** On November 10, 2011 the BOCC approved the chair to sign an on-call engineering services contract through Resolution 2011-108.

**NOW, THEREFORE BE IT RESOLVED** that the Board of County Commissioners, in the best interest of the public, does hereby authorize the chair to sign the task order for professional engineering services for the Manastash Road Bridge Construction project.

**DATED** this 5th day of March, 2013, at Ellensburg, Washington.

**BOARD OF COUNTY COMMISSIONERS**
**KITTITAS COUNTY, WASHINGTON**

_____
Obie O'Brien, Chair

_____
Paul Jewell, Vice-Chair

_____
Gary Berndt, Commissioner

ATTEST:

_____
Clerk of the Board

# Formal Task Assignment Document

Task Number: 21

The general provisions and clauses of Agreement BOCC Res. No. 2011-108 shall be in full force and effect for this Task Assignment.

Location of Project: Manstash Road

Project Title: North Fork Manastash Creek Bridge on Manastash Road

Maximum Amount Payable Per Task Assignment: $115,466

Completion Date: December 31, 2013

Description of Work:
(Note attachments and give brief description)
See attached scope of work and fee.

Agency Project Manager Signature _____ Date: 02/24/13

Oral Authorization Date: _____ See Letter Dated: _____

Consultant Signature: _____ Date: 2/19/13

Agency Approving Authority: _____ Date: _____

**North Fork Manastash Creek Bridge on Manastash Road**
**Scope of Work**

North Fork Manastash Creek Bridge on Manastash Road sustained significant damage during a recent flood. Kittitas County is going to repair the road and install a bridge. The County has asked Sargent Engineers to prepare the contract documents for constructing the bridge. The geotechnical study will be performed by PanGeo, the land surveying will be provided by Cruse and Associates, the hydraulic analysis will be provided by Watershed Science and Engineering, the environmental permitting will be provided by Widener and Associates, and the civil and structural engineering will be provided by Sargent Engineers.

## Geotechnical Study

The geotechnical study shall consist of the following:

1. Perform a site visit to locate and mark the exploration location in the field and to recon the general area of the site.

2. Drill one test boring near the existing culvert up to a maximum of 50-feet deep. Truck- or track mounted drilling equipment will be used. The boring will be monitored and logged under the full-time observation of a PanGEO geotechnical engineer or engineering geologist. Standard Penetration Test samples will be obtained at approximately 5-foot intervals when drilling in soil. The site soils are assumed to be "clean" (i.e., no hazardous materials or contamination), therefore drill cuttings will be disposed of on site. Conduct laboratory testing to determine certain index properties of the on-site soils, including moisture content and grain size analysis.

3. Perform engineering analysis and evaluate data derived from item 2 above, with respect to the items listed under item 4, below.

4. Prepare a Geotechnical Report containing the results of our geotechnical study to support preparation of the PS&E, including descriptions of surface and subsurface conditions, and a site plan showing exploration locations and other pertinent features. Summary exploration logs, charts and graphs indicating laboratory test results will also be included. The results of our engineering evaluations and preliminary geotechnical engineering recommendations pertaining to the following items will be presented:

a) For the new permanent bridge; type, depth, service and nominal (ultimate) bearing resistances, bearing elevations at each abutment, and anticipated settlements associated with service bearing resistances;

b) Geotechnical design criteria for the bridge, including seismic design requirements and liquefaction hazard analysis (if applicable);

c) Abutment or approach fill walls (global stability, bearing & sliding resistance, settlement estimation);

d) Preparation of special provisions and/or advisory specifications to supplement the Special Provisions for the project; and

e) Constructability issues and concerns.

Assumptions:

- Mobilization and drilling can be accomplished during normal daylight work hours.
- Right-of-entry and permits to be provided by Kittitas County, if necessary.
- Traffic control and flagging will be provided by Kittitas County, if required.
- Test boring location will be referenced to existing site features using GPS, tape measure or rangefinder.
- The project will be developed using English units of measure.
- The above scope of work does not include evaluation of chemical or hazardous material properties of soil and groundwater, special handling or disposal, or the potential presence of wetlands on the site.

Deliverables:

- Draft and Final Geotechnical Reports.

## Land Surveying

The land surveying will include the following:

- Provide topographic map with one foot contours that will consist of the existing road bed, 300 feet each side of the culvert. The creek channel and adjacent floodplain approximately 100 feet each side of the culvert. The overbank floodplain marked on the exhibit that is north and east of the culvert.

- Provide eight cross sections of the creek channel and overbank flood plain at locations identified.

- Provide all mapping and data in AutoCAD and ASCII formats.

- All information will be to WA State Plane Coordinates (South Zone).

- Establish the county road right of way 300' each side of culvert.

## Hydraulic Study

Watershed Science & Engineering (WSE) has been asked to provide hydraulic engineering services for the Manastash Road, North Fork Manastash Creek Bridge Replacement Project in Kittitas County, Washington. The road crosses the North Fork of Manastash Creek approximately 10 miles west of the City of Ellensburg. The existing culvert is nearing the end of its functional life, therefore, the County intends to replace it with a single span steel bridge. WSE will complete a hydraulic investigation to: 1) size the bridge waterway; 2) refine the transitions of existing berms into and out of the bridge waterway; 3) determine if sediment deposition will be a concern and recommend methods to minimize its impact; 4) determine if scour and erosion protection features are needed; 5) demonstrate that the proposed crossing will not cause unacceptable impacts to neighboring land owners or habitat; 6) evaluate modifications to the left bank berm

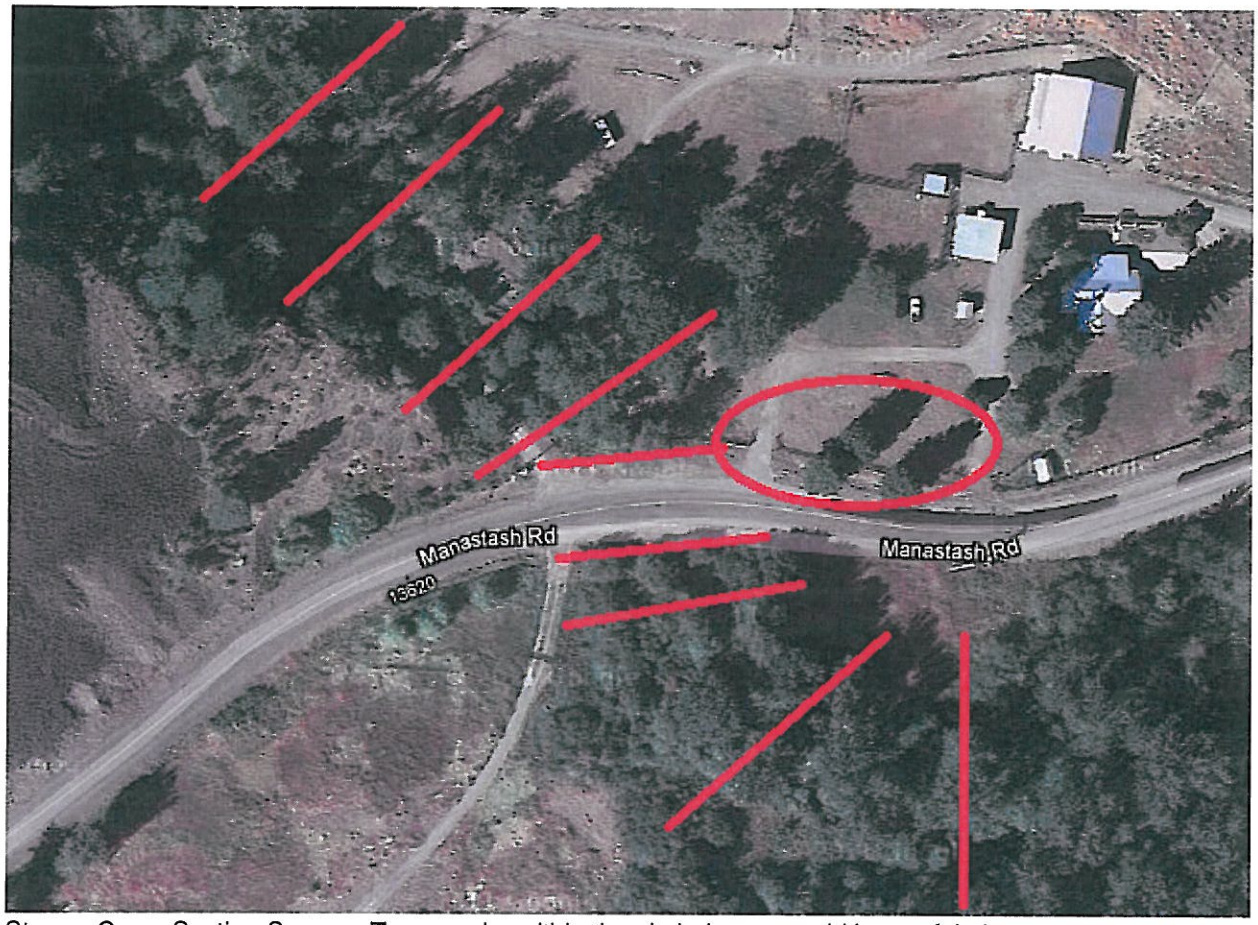
upstream; and 7) provide data and information to support Widner and Associates in their effort to obtain the required environmental permits.

Detailed descriptions of the tasks to be completed by WSE are provided below.

**Data Collection and Review**
WSE will collect and review existing data and information that may be needed for the hydraulic evaluation. This will include but not be limited to: aerial photos, crossing maintenance records, road plans, flood damage information. LiDAR data may be collected and developed for a study that the County and the Kittitas County Conservation District are about to begin on the mainstem of Manastash Creek. WSE will utilize this LiDAR data if it is available in time.

**Site Inspection**
WSE will conduct a field inspection to examine the characteristics of the stream, bridge, and surrounding floodplain with respect to hydraulic, sediment transport, erosion, and scour processes. WSE staff will meet with County staff during the visit to discuss the project.

**Channel Survey and Data Processing**
WSE will need cross section data for the stream channel and topographic data for the existing road and bridge. A subcontractor will collect the survey data which will include. approximately eight cross sections of the stream channel and overbank floodplain at roughly the locations identified in the figure below. They will also collect enough points to develop one-foot contours within the general low lying area identified by the ellipse in the figure below. The contractor will provide the data to Sargent Engineers who in-turn will provide it to WSE after converting it to a project topographic base map. Sargent will provide the survey data to WSE in both ASCII and AutoCAD formats. WSE's staff engineer will review the data and refine it so that it is in a format that can be used for the investigation and efficiently imported into a HEC-RAS hydraulic model.



Stream Cross Section Survey. Topography within the circled area would be useful also.

**Hydrology**
WSE will estimate discharges for the North Fork of Manastash Creek using USGS Stream State regional regression equations.

**Hydraulic Analysis**
WSE will develop a HEC-RAS model of the North Fork in the vicinity of the crossing using survey data provided by the County combined with data obtained from existing LiDAR. The model will not be calibrated because there are no useful flow records or highwater marks available that correspond to the existing stream / culvert / floodplain configuration. Instead, WSE will use engineering judgment to select and adjust model parameters. The model will be used to help size and define the shape of the bridge waterway and to determine how the existing berms should be modified in-order to minimize sediment deposition, impacts to neighboring properties, and stream habitat. It will also be used to provide the data needed to evaluate lateral erosion and scour potential, and to develop erosion / scour protection countermeasures should they be needed.

**Berm Modifications**
Earthen berms exist along the left (east) stream bank upstream from the crossing and along both banks downstream. Portions of these berms may need to be modified to provide appropriate flow transitions into and out of the bridge waterway. WSE will recommend appropriate modifications. In addition, the County

may desire to modify the upstream berm in-order to minimize its impact on the stream. WSE will work with the County to evaluate proposed modifications.

**Scour and Erosion Assessment and Protection**
WSE will advise the County on the need for scour and erosion protection features. It is assumed that the countermeasures will consist of simple rock riprap protection features

**Hydraulic Investigation Report**
A hydraulic report will be prepared to summarize and describe the results of the investigation. The report will include an updated bridge NBIS scour code rating for the new crossing.

**Environmental Permit Support**
WSE will supply materials to Widner and Associates as needed for the environmental permit applications.

**Meeting**
An allowance has been made for WSE personnel to attend one project meeting with the County and or WDFW personnel to discuss the project.

## Environmental Permitting

**Task 1 - Design Assistance**
Early input into the formation of project alternatives will be provided to ensure each alternative includes provisions to minimize impacts to the surrounding environment. This coordination within the various design elements of the project will identify and incorporate minimization measures early in the alternative development phase of the project and will ensure that an appropriate range of alternatives are developed prior to the agency coordination.

**Task 2 – Biological Assessment**
A BA will be prepared for the preferred alternative in accordance with Corp guidelines. The following subtasks will be undertaken in preparation of the project BA.

1. Information from Task 1 will be reviewed and a consultation strategy will be developed.
2. Initiate informal consultation with United States Fish and Wildlife Service (USFWS) and National Oceanographic and Atmospheric Administration (NOAA) Fisheries by preparing written requests for lists of endangered, threatened, proposed, and candidate species.
3. Conduct a field reconnaissance to investigate on-site habitat conditions.
4. Make telephone contact with the appropriate resource agency staff for input on species occurrence, habitat use, and potential project impacts.
5. Prepare a draft BA addressing listed species, proposed species, candidate species, species of concern, and critical habitat. The BA will include a project description, a list of species, a description of the species and their habitat, an analysis of project effects, and mitigation recommendations.
6. Provide the draft BA to the County for review and approval.
7. Revise the BA, as appropriate, and submit the final BA to USFWS and NOAA Fisheries for their review, possible negotiation of mitigation measures, and concurrence.
8. Concurrent with Endangered Species Act (ESA) consultation, Widener will coordinate with NOAA Fisheries to meet essential fish habitat (EFH) requirements under the Magnuson-Stevens Fishery

Conservation and Management Act (MSA), as amended 1996. In doing so, Widener will provide NOAA Fisheries with the BA and a cover letter requesting the initiation of consultation, stating the effect determination(s), reasoning behind them, and proposed mitigation measures if any.

9. If NOAA Fisheries responds with advisory EFH conservation recommendations, Widener will coordinate with the County and Corp to jointly discuss the recommendations.
10. Formally address and respond to NOAA Fisheries' recommendations within the regulated time frame.

Deliverables

1. Three copies of a draft BA for review by County with accompanying draft special provisions if required.
2. Three copies of a draft BA, incorporating the County's comments, for submittal to Corp.
3. Three copies of a revised draft BA, incorporating comments by CORP for submittal to NOAA Fisheries and USFWS.
4. Three copies of a final BA that incorporates NOAA Fisheries and USFWS comments.

**Task 4 - Permits**

Widener will assemble and organizing all necessary environmental permit applications to a standard acceptable by the permitting agencies. Anticipated permits include the following.

1. JARPA
2. USACE Section 404 Permit
3. Ecology Section 401 Water Quality Certification
4. WDFW Hydraulic Project Approval

Permit applications shall include all requested information, such as application forms, all necessary permit drawings, an attachment describing project location, project purpose and need, alternatives considered, and a summary of project impacts. Widener shall also provide a draft transmittal letter for submittal of the application by the County. Draft applications, including supporting information, shall be submitted to the County for review and comment. Revised permit applications shall be provided to the County for signature and submittal to permitting agencies. Widener shall perform the necessary coordination to obtain the permits.

## Roadway Design and Bridge Design

The bridge that is desired is a steel bridge approximately 50 feet in length. We will design the layout of the bridge, the abutments and the roadway improvements to tie the new bridge to the existing road. The plans will include the following:

- Cover Sheet
- Quantities Sheet
- Roadway Plan and Profile
- Roadway Details
- Bridge Layout
- Foundation Plan

- Abutment Details
- Bar List

The quantities, estimate and specifications will be prepared in accordance with WSDOT and County format. The County will review the plans at the 30 percent stage and will also review the entire contract package at the 60 percent and 90 percent stages.

| Estimate for Engineering Services | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| North Fork Manastash Creek Bridge on Manastash Road | | | | | | | | |
| | Principal | Senior Engineer | Senior Project Engineer | Project Engineer | Design Engineer | Drafter II | Business Manager | Task Cost |
| Rate: | $154.00 | $120.00 | $120.00 | $111.00 | $88.00 | $83.00 | $122.00 | |
| | | | | | | | | |
| Management | | | | | | | | $0 |
| Roadway Design | | | | 40 | | | | $4,440 |
| Bridge Abutment Design | | | | 16 | | | | $1,776 |
| Cover Sheet | | | | 1 | | 8 | | $775 |
| Quantities Sheet | | | | 1 | | 4 | | $443 |
| Roadway Plan and Profile | | | | 2 | | 16 | | $1,550 |
| Roadway Details | | | | 1 | | 16 | | $1,439 |
| Bridge Layout | | | | 2 | | 24 | | $2,214 |
| Foundation Plan | | | | 1 | | 8 | | $775 |
| Abutment Details | | | | 1 | | 16 | | $1,439 |
| Bar List | | | | 1 | | 16 | | $1,439 |
| Quantities | | | | 8 | | 8 | | $1,552 |
| Specifications | | | | 24 | | | | $2,664 |
| Project Check | 33 | | | 16 | | 39 | | $10,095 |
| Management | 2 | | | | | | 8 | $1,284 |
| | | | | | | | | |
| **Total Direct Salary Cost** | 35 | 0 | 0 | 114 | 0 | 155 | 8 | $31,885 |
| | | | | | | | | |
| **Subconsultants** | | | | | | | | |
| Hydraulic Analysis | | | | | | | | $19,424 |
| Environmental Permitting | | | | | | | | $42,437 |
| Land Surveying | | | | | | | | $7,680 |
| Geotechnical Study | | | | | | | | $14,040 |
| | | | | | | | | |
| **Total** | | | | | | | | **$115,466** |

**WATERSHED**
**Science & Engineering**
110 Prefontaine Place South, Suite 508
Seattle, WA 98104
Tel. (206)521-3000

## Estimate of Professional Services

Prepared for: Sargent Engineers
Project: North Fork Manastash Creek Bridge Replacement Hydraulic Invest.
Date: February 18, 2013
Prepared By: Jeff Johnson

| TASK DESCRIPTION | Hours | | | | | | Totals |
|---|---|---|---|---|---|---|---|
| | Prin | Sr. Eng. 1 | Engineer | Jr. Eng. | GIS Tech | Clarical | |
| 1. Data Collection and Review | 2 | | | 8 | | | $1,100.00 |
| 2. Site Inspection | 4 | | | 8 | | | $1,480.00 |
| 3. Channel Survey and Data Processing | 2 | | | 12 | | | $1,460.00 |
| 4. Hydrology | 2 | | | 4 | | | $740.00 |
| 5. Hydraulic Analysis | 8 | 2 | | 24 | 2 | | $4,150.00 |
| 6. Berm Modifications | 4 | | | 8 | | | $1,480.00 |
| 7. Scour and Erosion Assessment and Protection | 4 | | | 8 | | | $1,480.00 |
| 8. Hydraulic Investigation Report | 12 | | | 20 | 8 | | $4,680.00 |
| 9. Permit Support | 2 | | | 4 | | | $740.00 |
| 10. Meeting | 6 | | | 2 | | | $1,320.00 |
| 11. Administration | 2 | | | | | 2 | $500.00 |
| Total Hours and Direct Labor Cost (DL) | 48.0 | 2.0 | 0.0 | 98.0 | 10.0 | 2.0 | |
| Labor Rate ($/hr) | $190.00 | $160.00 | $110.00 | $90.00 | $75.00 | $60.00 | |
| TOTAL LABOR COST | $9,120 | $320 | $0 | $8,820 | $750 | $120 | $19,130.00 |

### Direct Expense Detail

| | Units | Rate | Cost |
|---|---|---|---|
| Mileage | 350 | $0.555 | $194.25 |
| Reproduction & Communication | | | $100.00 |
| | | Total | $294.25 |

### Cost Summary

| | |
|---|---|
| Total Labor | $19,130.00 |
| Total Direct Expenses | $294.25 |
| Total | $19,424.25 |

**Cost Estimate for**
**Environmental Permitting Services**
**North Fork Manastash Creek**

| | Project Manager | Project Biologist | | | |
|---|---|---|---|---|---|
| | | | | | |
| Design Coordination | 24 | 8 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Biological Assessment | | | | | |
| Draft | 24 | 120 | | | |
| Final | 16 | 24 | | | |
| Revised | 16 | 8 | | | |
| | | | | | |
| | | | | | |
| Permits/JARPA | | | | | |
| Draft | 8 | 40 | | | |
| Final | 4 | 8 | | | |
| Revisions and Coordination | 40 | 8 | | | |
| | | | | | |
| | | | | | |
| Section 106 Report | | | | | |
| Draft | 4 | 8 | | | |
| Final | 2 | 2 | | | |
| | | | | | |
| Total Hours | 138 | 226 | | | |
| | | | | | |
| **Summary** | | | **Hours** | **Rate** | **Cost** |
| **Project Manager** | | | 138 | $140.00 | $19,320.00 |
| **Project Biologist** | | | 226 | $86.80 | $19,616.80 |
| **Section 106 Field Work** | | | | | $3,500.00 |
| | | | | | |
| | | | | | |
| Assumptions | | | | | |
| | | | | | |
| Client will provide all graphics and surveying need for the project. | | | | | |
| | | | | | |
| **TOTAL ESTIMATED COST** | | | | | **$42,436.80** |
| | | | | | |

**N. Fork Manastash Culvert Replacement**
**Kittitas County, Washington**

| | |
|---|---|
| **Proj. No.:** | P-2802 |
| **Date:** | 2/9/2013 |
| **Prepared By:** | REK |
| **Revised:** | |

**Prepared for: Monte Smith, Sargent Engineers**

**ESTIMATED LABOR:**

| WORK TASK DESCRIPTION | PanGEO Labor Hours & 2013 Direct Hourly Rates | | | | | | |
|---|---|---|---|---|---|---|---|
| | Principal $72.15 | Geot. Proj. Mgr. $62.05 | Sr. Geot. Eng. $50.75 | Sr. Geologist $38.00 | Proj. Eng/Geol. $32.95 | Admin. $28.85 | COST |
| Field Explorations | | | | | | | |
| Site Reconnaissance, Mark Borings | | 1 | | | 8 | | $325.65 |
| Log Test Borings | | 1 | | | 14 | | $523.35 |
| Prepare Final Boring Logs | | | | | | | |
| Boring Log Production | | 1 | | | 2 | | $127.95 |
| Engineering Analysis | | | | | | | |
| Seismic Design Parameters | | 1 | | | 2 | | $127.95 |
| Foundation Bearing Resistances | | 2 | | | 8 | | $387.70 |
| Foundation Settlement Estimates | | 2 | | | 2 | | $190.00 |
| Construction Considerations & Specs | | 2 | | | 2 | | $190.00 |
| Geotechnical Report | | | | | | | |
| Draft Geotechnical Report | | 4 | 8 | | 16 | 4 | $1,296.80 |
| Final Geotechnical Report | | 4 | 4 | | 8 | 2 | $772.50 |
| TOTAL DIRECT LABOR: | 0 | 18 | 12 | 0 | 62 | 6 | $3,941.90 |

| LABORATORY TEST SUMMARY | | | |
|---|---|---|---|
| Test | Est. No. Tests | Unit Cost | Total Cost |
| Shear Strength (rock core or soil) | 0 | $225 | $0 |
| Sieve Analysis | 3 | $105 | $315 |
| Percent Fines | 0 | $20 | $0 |
| Atterberg Limits | 0 | $95 | $0 |
| Moisture Content | 3 | $25 | $75 |
| TOTAL LABORATORY TESTING: | | | $390 |

**Assumed Conditions:**

1. Drilling to occur during normal daylight working hours.
2. Permits (if necessary) and right of entry provided by Sargent or Kittitas County.
3. Traffic control and signing provided by Kittitas County, if required.
4. Drill cuttings to be disposed of on site in right-of-way
5. Additional assumptions as described in proposal letter dated 2/11/13 by PanGEO, Inc.

| | |
|---|---|
| OVERHEAD & PROFIT: | |
| Overhead @ 118.13% of DSC | $4,657 |
| Profit @ 30% of DSC | $1,183 |
| TOTAL LABOR COSTS: | $9,781 |
| ESTIMATED DIRECT EXPENSES: | |
| Per diem 1 @ $123/day | $123 |
| Mileage 540 @ $0.51/mi. | $275 |
| Reproduction & Field Consumables | $25 |
| TOTAL DIRECT EXPENSES: | $423 |
| SUBCONTRACTOR COSTS: | |
| Traffic Control & Sign Rental | $0 |
| Drill Rig Mobilization | $1,200 |
| Driller per diem, 2-man crew | $246 |
| Drill hole (1 ea., 50 l.ft. max. total) | $2,000 |
| TOTAL DIRECT EXPENSES: | $3,446 |
| Total Labor Cost | $9,781 |
| Lab Testing | $390 |
| Direct Expenses | $423 |
| Subcontractor Costs | $3,446 |
| TOTAL: | $14,040 |