

Appendix A

Basic Services of Engineer

Section 1. Engineer's Rights and Duties.

- A. To furnish all labor, materials, equipment, supplies, and incidentals necessary to conduct and complete the Engineer's portion of the project as defined in the scope of work and to prepare and deliver to Billings all plans, specifications, bid documents, and other material as designated herein.
- B. Ascertain such information as may have a bearing on the work from local units of government, utility companies, and private organizations and shall be authorized to procure information from other authorities besides Billings, but shall keep Billings advised as to the extent of these contacts and the results thereof.
- C. Prepare and present such information as may be pertinent and necessary in order for Billings to pass critical judgment on the features of the work. The Engineer shall make changes, amendments or revisions in the detail of the work as may be required by Billings. When alternates are being considered, Billings shall have the right of selection.
- D. Engineer's work shall be in accordance with the standards of sound engineering and present City, State, and National standards and policies currently in use.
- E. Conform to the requirements of the Montana Code Annotated Title 18 "Public Contracts" and more particularly Sections 18-2-121 and 18-2-122, and all other codes of the State of Montana applicable to providing professional services including codes and standards nationally recognized.
- F. The Engineer shall certify with the submission of final plans that the plans are in conformance with applicable sections of Title 69, Chapter 4, Part 5, of the Montana Code Annotated as pertaining to existing utilities.
- G. To perform professional services in connection with the project and will serve as Billings' representative in those phases of the project to which this agreement applies.
- H. Where Federal funds are involved, the necessary provisions to meet all requirements will be complied with and documents secured and placed in the bidding documents.
- I. Submit an estimated progress schedule as to time and costs at the beginning of the work, and monthly progress reports thereafter until complete. The reports will include any problems, potential problems, and delays as foreseen by the Engineer. Reports will be submitted in a timely manner to permit prompt resolution of problems.

- J. Contract administration duties will include review of contractor certified payrolls for wage rate compliance. Discrepancies in certified payrolls will be resolved with the Contractor. A signed Engineer's Payroll Check Sheet (included in the Standard Modifications to MPWSS) will be submitted as proof of this review with one copy of each payroll.
- K. Name a Task Director who shall be the liaison between Billings and the Engineer. For this project the Task Director designated for the Engineer is Robert E. Church, PE working under the Principal-in-Charge, Daniel M. McCauley, PE.

Section 2. Billings Rights and Duties.

- A. To furnish all labor, materials, equipment, supplies, and incidentals necessary to conduct and complete Billings' portion of the project as designated in the scope of work. Billings shall provide general inspection as necessary and pre-determined and coordinated with Engineer (Engineer will be responsible for all specialty inspections and other inspections as specifically designated in this contract or as coordinated with City).
- B. Name a Task Director who shall be the liaison between the Engineer and Billings. For this project, the Task Director designated is Will Robbins, City Staff Engineer.

Section 3. Scope of Work.

TASK 1 – PHASE 5 LANDFILL CELL PRELIMINARY DESIGN

A. Surveying/Mapping

The Engineer shall conduct a detailed topographic survey of the Phase 5 expansion area. The survey will be used to prepare a detailed design level base map of the project area.

B. Evaluate Cell Design Alternatives

The Engineer shall evaluate alternatives for the cell design within the framework of the Master Plan work that has already been completed to date. Design alternatives will be evaluated and discussed with City staff and a preferred alternative selected.

C. Draft Design Submittal

The Engineer shall prepare the necessary plans and report to be submitted to the local and State officials for the proposed expansion cell. The plans shall delineate the location of the new cell, proposed drainage ditches, on-site access roads and typical sections and details delineating the liner and leachate collection system, and cell base contours. It is anticipated the City will use the same liner design section as was utilized in the cell 4 expansion.

D. QA/QC Plan

The Engineer will prepare a Quality Assurance/Quality Control (QA/QC) plan for the construction of the Phase 5 cell expansion. The QA/QC plan will describe the quality

assurance measures to be implemented during construction to insure the project is constructed properly in accordance with the plans and specifications. The QA/QC plan will be submitted to the DEQ for approval.

TASK 2 - PHASE 5 LANDFILL CELL ALTERNATIVE LINER DEMONSTRATION & HYDROGEOLOGIC & SOILS STUDY

The landfill expansion will require the preparation of an alternative liner demonstration and hydrogeologic and soils study. Soils testing and field investigations already completed on the site from previous work will be utilized to the extent possible. However, some additional investigations will be necessary to ascertain the characteristics of subsurface of materials in the Phase 5 area. The DEQ rules have changed significantly for alternative liner demonstrations since Phase 4 was permitted. These rule changes require additional modeling and analysis. However the intent is to use the same lining design on the Phase 5 liner as was used for Phases 3 and 4.

A. Data Review

Existing reports and data will be reviewed to determine the types of information available for completing the liner-related design and evaluation. Types of information which will be compiled include groundwater elevations, groundwater flow direction, aquifer characteristics, soil types, soil permeabilities, and soil density tests. Cost estimates for this item are based on maximum use of the existing available data for the site. However, some specific data will need to be obtained from the Phase 5 cell area.

B. Geotechnical Investigations

Three boreholes will be drilled in the Phase 5 expansion area in order to determine the types of materials present and the depth to groundwater in this area. Holes will be logged, samples taken, and laboratory testing conducted on representative samples from the boreholes. All of the soil laboratory testing required under this task will be completed by Consultant.

C. Alternative Liner Demonstration

An alternative liner demonstration will be completed in accordance with the Administrative Rules of Montana. It is anticipated the City will utilize the same liner system design for Phase 5 as has been previously approved for Phase 3 and Phase 4. The alternative liner demonstration will meet the new DEQ rules governing approval of alternative liner systems. The deliverables for the task will consist of a draft and final report.

TASK 3 - PHASE 5 LANDFILL CELL FINAL DESIGN, PLANS AND SPECIFICATIONS

A. Final Cell Design

The Engineer shall finalize the design of the proposed new cell delineating the base contours and details of the liner, and leachate collection system. The final design shall incorporate changes based on the City's and DEQ's review of the preliminary design plans and supporting documentation.

B. Final Site Plan

The Engineer shall finalize the design and location of the on-site roads, ditches, ponds, etc. and prepare a final site plan.

C. On-site Roads

The Engineer shall prepare the design and necessary plans for any access roads needed for the cell.

D. Final Design Report

The Engineer's Scope of Work shall include preparing a Final Design Report and submitting the necessary information along with the plans and specifications to obtain approval from the State DEQ.

E. Permitting

The Engineer will assist the City in applying for and obtaining any required permits.

F. Plans, Specifications and Bid Documents

The Engineer shall prepare and assemble the plans, specifications and bid documents for the items listed above. This package shall be submitted to the Owner and the DEQ for review and comment.

TASK 4 - PHASE 5 LANDFILL CELL BIDDING AND AWARD PROCEDURES

For the work included in Task 4, the Engineer shall provide the necessary work to advertise and receive bids and award construction contract(s). The major tasks shall be as follows:

A. Assistance in Bidding Procedures

The Engineer shall prepare and distribute sufficient copies of plans and specifications to qualified bidders and shall assist the Owner in obtaining competitive bids. The Engineer will address questions from general contractors and prepare addendums, if necessary. The Engineer shall arrange, attend, and conduct a pre-bid conference. Engineer shall review and tabulate all bids and make a recommendation to the Owner on the selection of a general contractor. Engineer shall issue Notice of Intent to Award.

The budget does not include attendance at the bid opening by any Engineer personnel.

B. Award & Agreements

Upon award of the bids, the Engineer shall issue a Notice of Award, prepare the necessary Agreements, Performance and Payment Bond forms and Notice to Proceed forms for use in awarding the contract.

TASK 5 - PHASE 5 LANDFILL CELL CONSTRUCTION ENGINEERING

After the construction contract has been awarded, the Engineer shall provide the engineering and construction management necessary to assure that the work conforms to the plans and specifications and local, State and Federal requirements. These services shall include:

A. Excavation Staking for City Construction Activities

The City may need intermediate construction staking prior to the letting of the cell liner contract if the City elects to excavate material from Phase 5 prior to letting of the construction contract. The task has two interim surveying trips budgeted for construction staking should the City require it.

B. Pre-Construction Conference

The Engineer shall conduct a pre-construction conference to discuss all appropriate details concerning the construction of the improvements with the General Contractor, owner and Local and State officials. An on-site visit will be included.

C. Control Staking

The Engineer shall provide necessary control staking including offset lines, bench marks and other pertinent information to allow the General Contractor to construct the project and the inspector can check and approve the work.

D. Shop Drawings

The Engineer shall review all shop drawings submitted by the General Contractor to assure that all materials, systems and components meet or exceed the specifications.

E. Inspection

The Engineer shall provide inspection for the duration of the construction period. The inspector shall be responsible for construction adhering to the requirements of the plans and specifications. Inspector shall keep daily logs of the work performed and provide to the Owner weekly progress reports. The budget proposed is based on a maximum construction period of 115 calendar days, with full-time inspection included during installation of liner and piping components. The Engineer will coordinate with City inspectors during routine construction elements including excavation, embankment and liner cover activities. The Engineer will conduct periodic inspections during these construction elements.

F. Progress Meetings

The Engineer shall conduct progress meetings as necessary to provide updates to the construction schedule and tasks.

G. Quality Control

The Engineer shall perform the necessary quality control for the installation of the liner and leachate collection system. The fee estimate included in this agreement is based upon a system that includes a compacted liner subgrade, 60 mil HDPE liner, and leachate collection system with all the necessary piping to be installed in the cell. The Scope of Work shall include the following:

1. Inspecting and monitoring the installation of the liner subgrade. Specifications will be written such that the General Contractor will pay for laboratory testing required during construction.
2. Inspection and monitoring installation of HDPE liner and non-woven fabric for liner protection.
3. Inspection of the LCS system elements including inspection and testing of the drainage media, protective soil layer, piping, manholes and other pertinent materials.
4. Preparation of a QA/QC report that summarizes all inspections and tests. The QA/QC report will certify the quality of the work. Copies of the manual shall be submitted to the Owner and State DEQ.

H. Nuclear Density Testing

The Engineer's inspector will provide and/or coordinate nuclear density and moisture testing of all compacted subgrade and engineered fill. The Engineer will provide a licensed and calibrated nuclear densometer for density and moisture testing.

I. Soil Testing

Soil laboratory testing will be needed during construction. Owner will pay for all proctor, gradation, Atterberg limits and remolded permeability testing needed during construction. Engineer will coordinate collection and delivery of samples to Owner's subcontracted laboratories, and provide at least two weeks' notice for such tests.

J. Requests for Information / Change Orders

The Engineer shall review and respond to Requests for Information (RFIs) received from the Construction General Contractor. Engineer shall recommend and prepare change orders as needed to be approved and processed by the City.

K. Payment Requests

The Engineer shall review each monthly payment request submitted by the General Contractor. Upon approval of each request, Engineer shall coordinate with the Owner for payment. Construction payment applications shall conform to the City's standard format unless an alternate format is mutually agreed to. Retainage releases (for both Engineer and construction contractor) will NOT be included in payment applications, but shall be in written and signed format.

L. Final Inspection & As-Built Drawings

Upon completion of all work, the Engineer shall conduct a final inspection of the project. Upon approval of all work, the Engineer shall write a letter of acceptance to the Owner. The Engineer shall also prepare "As-Constructed" drawings and submit them to the Owner and applicable State agencies for final approval. Owner shall receive record drawings in 'D' size (11" x 17") format and a PDF file on computer disc. Two (2) copies of each format shall be provided to Owner.

Task 6 – PHASE 3 AND 4 LANDFILL CLOSURE - FINAL DESIGN, PLANS, & SPECIFICATIONS

It is anticipated that the Phase 3 and 4 closure projects will be combined into one project.

A. Surveying/Mapping

The Engineer shall conduct a detailed topographic survey of the Phase 3 and 4 closure area. The survey will be used to prepare a detailed design level base map of the project area.

B. Closure Design Plans

The Engineer shall prepare the necessary plans and report to be submitted to the local and State officials for the proposed closure area. The plans shall delineate the location of the closure area, final grading plan, drainage ditches, on-site access roads and typical sections and details delineating the final cover system. The City has obtained approval of the alternative cover design for all future closure projects at the landfill. Therefore, it is unnecessary to go through the alternative cover demonstration process for this project, but Engineer shall complete tasks necessary to obtain DEQ approval.

C. QA/QC Plan

The Engineer will prepare a Quality Assurance/Quality Control (QA/QC) plan for the construction of the Phase 3 and 4 closure project. The QA/QC plan will describe the quality assurance measures to be implemented during construction to insure the project is constructed properly in accordance with the plans and specifications. The QA/QC plan will be submitted to the DEQ for approval.

D. Final Design Report

The Engineer's Scope of Work shall include preparing a Final Design Report and submitting the necessary information along with the plans and specifications to obtain approval from the State DEQ.

E. Permitting

The Engineer will assist the City in applying for and obtaining any required permits.

F. Plans, Specifications and Bid Documents

The Engineer shall prepare and assemble the plans, specifications and bid documents for the items listed above. This package shall be submitted to the Owner and the DEQ for review and comment.

Task 7 – PHASE 3 AND 4 LANDFILL CLOSURE - BIDDING SERVICES

For the work included in Task 7, the Engineer shall provide the necessary work to advertise and receive bids and award construction contract(s). The major tasks shall be as follows:

A. Assistance in Bidding Procedures

The Engineer shall prepare and distribute sufficient copies of plans and specifications to qualified bidders and shall assist the Owner in obtaining competitive bids. The Engineer will address questions from general contractors and prepare addendums, if necessary. The Engineer shall arrange, attend, and conduct a pre-bid conference. Engineer shall review and tabulate all bids and make a recommendation to the Owner on the selection of a general contractor. Engineer shall issue Notice of Intent to Award.

B. Award & Agreements

Upon award of the bids, the Engineer shall issue a Notice of Award, prepare the necessary Agreements, Performance and Payment Bond forms and Notice to Proceed forms for use in awarding the contract.

Task 8 – PHASE 3 AND 4 LANDFILL CLOSURE CONSTRUCTION ENGINEERING

Prior to construction beginning, this task will be added via contract amendment.

Task 9 – ALTERNATIVE COVER MONITORING

As part of the approval of the Phase 2 alternative final cover design, the Montana DEQ required that the City monitor performance of the cover system over the next five years. The City submitted an amendment to the Closure/Post-Closure Plan in April 2011, which was subsequently approved by the Montana DEQ. The amendment includes a detailed Alternative Cover Monitoring Procedure (ACMP) which provides detailed data collection and reporting procedures. This contract item covers completion of those tasks through the termination date of this contract. Specific monitoring tasks included in this contract are itemized in the following sections.

A. Lysimeter Data Collection & Reporting

The City constructed a lysimeter to monitor percolation through a plot constructed to the specifications of the full scale Phase 2 closure project. Data collected from the lysimeter will be downloaded semi-annually by the Engineer. This information will be used in conjunction with annual weather data to estimate a water balance for year and evaluate the performance of the final cover design. The Engineer will submit an annual lysimeter performance report to the City and DEQ for the years 2012, 2013 and 2014. More details on the procedures are included within the ACMP. The lysimeter testing actually extends for five years, however three years was included in this scope because that is the length of the contract. The City may be able to petition the DEQ for termination of the monitoring after three years if data shows good performance. If the final two years of monitoring are required, this task may be extended by mutual consent via a contract amendment.

B. Alternative Cover Soil-Moisture Monitoring

The DEQ requires soil moisture and lab soil testing be conducted on three sites within the Phase 2 Closure area three years after completion of construction. Therefore these samples will be collected during the summer of 2014. Engineer will collect these

samples and lab testing fees are included in the contract for this task. A summary of the lab test results and findings will be submitted to the City and Montana DEQ for approval. A detailed description of the test procedures and reporting is included in the ACMP.

C. Revegetation Monitoring

The DEQ requires the City to monitor the performance of the revegetation of the Phase 2 closure area. This will include a field investigation and annual report. The approved schedule includes investigations two years and three years after completion of construction. Therefore, investigations will be completed in the early summer of 2013 and 2014. The results of these field investigations and analysis will be submitted to the DEQ and City for approval. A detailed description of the test procedures and reporting is included in the ACMP.

ADDITIONAL SERVICES Additional services that are outside the scope of this budget are listed in Appendix C of the contract.

City Staff Requirements:

We will work closely with Solid Waste Division and City Engineering staff throughout the entire project and actively solicit ideas and comments from the staff as we develop the plan. However, the actual time demands of City staff for this project will be minimal. We will need the City to provide copies of all the necessary records, and we will need staff to be available for site tours and interviews. We also expect that key staff will review and comment on draft deliverables during the course of the project. Finally, it is possible that City Solid Waste equipment and an operator may be needed in the event that additional site soils investigations become necessary during the project.

Current billing rates are attached in Exhibit D.