Contract for Professional Architectural and Engineering Services

Project W.O. 19-12: West End Reservoir Project

In consideration of the mutual promises herein, City of Billings and HDR Engineering agree as follows. This Contract consists of:

Part I, consisting of 15 Sections of Special Provisions;

Part II, consisting of 11 Sections of General Provisions;

Appendix A consisting of 23 pages (Basic Services of Contractor);

Appendix B consisting of 2 pages (Methods and Times of Payment);

Appendix C consisting of 1 page (Additional Services of Contractor);

Appendix D consisting of 1 page (Schedule of Professional Fees);

Appendix E consisting of 1 page (Project Schedule);

Appendix F consisting of 21 pages (Certificate(s) of Insurance); and

PART I
SPECIAL PROVISIONS

Section 1. Definitions.

In this Contract:

A. "Administrator" means the City Engineer of the Engineering Division of the Public Works Department or his designee.
B. "Billings" means the City of Billings.
C. "Contractor" means HDR Engineering, Inc.

Section 2. Scope of Services.

A. The Contractor shall perform professional services in accordance with Appendix A, which is attached hereto and incorporated in this Section by reference.
B. Billings shall pay the Contractor in accordance with Section 4.
C. Billings shall not allow any claim for services other than those described in this Section. However, the Contractor may provide, at its own expense, any other services that are consistent with this Contract.

D. The Engineer shall provide as-built drawings as approved by the City of Billings, to the Administrator within 30 days after the project completion date. Final payment will be withheld until the as-built drawings are received by the City of Billings. Requirements for submitting as constructed documents of completed Private Contracts, Work Orders, Special Improvement Districts and Site plans involving any City of Billings infrastructure: a point file; 1 (*.asc, *.txt, comma delimited; point number, northing, easting, elevation and description) / 2 (*.csv, with headings for; point number, northing, easting, elevation and description), with northings and eastings to the nearest tenth of a foot, elevations to the nearest hundredth of a foot, representing new, updated or relocated City of Billings infrastructure features such as, but not limited to Sanitary Sewer Manholes, Storm Drain Manholes, Water Valves, Water Bends, Signals, Street Light, etc., in the coordinates of Montana State Plane, Zone 2500 using NAD83(2011), Horizontal and NAVD88 Vertical, Horizontal units and Vertical units will be International feet, one half size paper copy to scale, one full size paper copy to scale, two CD's or DVD's with PDF files being half size to scale and full size to scale and AutoCAD DWG files as-constructed / as-built, Version 2016, or equivalent.

Section 3. Time for Performance.

A. This Contract becomes effective when signed on behalf of Billings.
B. The Contractor shall commence performance of the Work described in Section 2 on receipt of written Notice to Proceed and complete that performance in accordance with the schedule set forth in Appendix E.
C. This Contract shall terminate at midnight on December 31, 2023.

Section 4. Compensation; Method of Payment.

A. Subject to the Contractor's satisfactory performance, Billings shall pay the Contractor no more than One Million Five Hundred Sixty-Four Thousand dollars ($1,564,000.00) in accordance with this Section and Appendix B.
B. Each month, or at the conclusion of each phase of the Work for which payment is due, as negotiated on a per-task basis, the Contractor shall present a bill to the Administrator describing the Work for which it seeks payment and documenting expenses and fees to the satisfaction of the Administrator. If any payment is withheld because the Contractor's performance is unsatisfactory, the Administrator must, within ten (10) days of the payment denial, notify the Contractor of the payment denial and set forth, with reasonable specificity, what was unsatisfactory and why. Billings will pay Contractor within 30 days of receiving an acceptable invoice.
C. The Contractor is not entitled to any compensation under this Contract, other than is expressly provided for in this Section.
D. As a condition of payment, the Contractor shall have paid all City taxes currently due and owing by the Contractor.

Section 5. Termination of the Contractor's Services.

The Contractor's services under Section 2 of this Part may be terminated:

A. By mutual consent of the parties.
B. For the convenience of Billings, provided that Billings notifies the Contractor in writing of its intent to terminate under this paragraph at least 10 days prior to the effective date of the termination.
C. For cause, by either party where the other party fails in any material way to perform its obligations under this Contract. Termination under this Subsection is subject to the condition that the terminating party notifies the other party of its intent to terminate, stating with reasonable specificity the grounds therefor, and the other party fails to cure the default within 30 days after receiving the notice.

Section 6. Duties Upon Termination

A. If Billings terminates the Contractor's services for convenience, Billings shall pay the Contractor for its actual costs reasonably incurred in performing before termination and Billings shall pay for services rendered prior to termination. Payment under this Subsection shall never exceed the total compensation allowable under Section 4 of this Part. All finished and unfinished documents and materials prepared by the Contractor shall become the property of Billings.
B. If the Contractor's services are terminated for cause, Billings shall pay the Contractor the reasonable value of the services satisfactorily rendered prior to termination, less any damages suffered by Billings because of the Contractor's failure to perform satisfactorily. The reasonable value of the services rendered shall never exceed ninety percent (90%) of the total compensation allowable under Section 4 of this Part. Any finished or unfinished documents or materials prepared by the Contractor under this Contract shall become the property of Billings at its option.
C. If the Contractor receives payments exceeding the amount to which it is entitled under Subsections A or B of this Section, he shall remit the excess to the Administrator within 30 days of receiving notice to do so.
D. The Contractor shall not be entitled to any compensation under this Section until the Contractor has delivered to the Administrator all documents, records, Work product, materials and equipment owned by Billings and requested by the Administrator.
E. If the Contractor's services are terminated for whatever reason the Contractor shall not claim any compensation under this Contract, other than that allowed under this Section.
F. If a final audit has not been performed before the Contractor's services are terminated, Billings may recover any payments for costs disallowed as a result of the final audit.
G. Except as provided in this Section, termination of the Contractor's services under Section 5 of this Part does not affect any other right or obligation of a party under this Contract.

Section 7. Insurance.

A. The Contractor shall maintain in good standing the insurance described in Subsection B of this Section. Before rendering any services under this Contract,

the Contractor shall furnish the Administrator with proof of insurance in accordance with Subsection B of this Section.

B. The Contractor shall provide the following insurance:

1. Workers' compensation and employer's liability coverage as required by Montana law.
2. Commercial general liability, including contractual and personal injury coverage's -- $1,500,000 per occurrence.
3. Commercial automobile liability -- $1,500,000 per accident.
4. Professional liability in the amount of $1,500,000 per claim.

C. Each policy of insurance required by this Section shall provide for no less than 30 days' advance notice to Billings prior to cancellation.

D. Billings SHALL be listed as an additional insured on all policies except Professional Liability and Worker's Compensation Policies. In addition, all policies except Professional Liability and Worker's Compensation shall contain a waiver of subrogation against Billings.

Section 8. Assignments.

Unless otherwise allowed by this Contract or in writing by the Administrator, any assignment by the Contractor of its interest in any part of this Contract or any delegation of duties under this Contract shall be void, and an attempt by the Contractor to assign any part of its interest or delegate duties under this Contract shall give Billings the right immediately to terminate this Contract without any liability for Work performed.

Section 9. Ownership; Publication, Reproduction and Use of Material.

A. Except as otherwise provided herein, all data, documents and materials produced by the Contractor under this Contract shall be the property of Billings, which shall retain the exclusive right to publish, disclose, distribute and otherwise use, in whole or in part, any such data, documents, or other materials. Exclusive rights shall not be attributed to portions of such materials presently in the public domain or which are not subject to copyright. Contractor shall retain rights to pre-existing proprietary property including but not limited to interactive models. The Contractor shall have the right to include photographic or artistic representations of the design and construction of the Project among the Contractor's promotional and professional materials. The Contractor's materials shall not include Billings' confidential or proprietary information regardless of whether Billings has previously advised the Contractor in writing of the specific information considered by Billings to be confidential and proprietary.

B. Equipment purchased by the Contractor with Contract funds: See Appendix A, Section 3. Scope of Work.

C. Should Billings elect to reuse Work products provided under this Contract for other than the original project and/or purpose, Billings will indemnify and hold harmless the Contractor from any and all claims, demands and causes of action of any kind or character arising as a result of reusing the documents developed under this contract. Additionally, any reuse of design drawings or specifications provided under this Contract must be limited to conceptual or preliminary use for adaptation,

and the original Contractor's or subcontractor's signature, professional seals and dates removed. Such reuse of drawings and specifications, which require professional seals and dates removed, will be signed, sealed, and dated by the professional who is in direct supervisory control and responsible for adaptation.

Section 10. Notices.

Any notice required pertaining to the subject matter of this Contract shall be either sent via facsimile (FAX) or mailed by prepaid first class registered or certified mail, return receipt requested to the following addresses:

Billings: Randy Straus
City of Billings
Engineering Division
2224 Montana Avenue
Billings, MT 59101 FAX: (406) 657-8252

Contractor: Amanda McInnis, PE
HDR Engineering, Inc.
700 SW Higgins Avenue, Suite 200
Missoula, MT 59803 FAX: (406) 532-2241

Notices are effective upon the earlier of receipt, proof of good transmission (facsimiles only), or 5 days after proof of proper posting.

Section 11. Contract Budget.

In connection with its performance under this Contract, the Contractor shall not make expenditures other than as provided in line items in the Contract budget.

Section 12. Force Majeure.

A. Any failure to perform by either party due to force majeure shall not be deemed a violation or breach hereof.
B. As used in this Contract, force majeure is an act or event of substantial magnitude, beyond the control of the delayed party, which delays the completion of this Contract, including without limitation:

1. Any interruption, suspension or interference resulting solely from the act of Billings or neglect of Billings not otherwise governed by the terms of this Contract.
2. Strikes or Work stoppages.
3. Any interruption, suspension or interference with the project caused by acts of God, or acts of a public enemy, wars, blockades, insurrections, riots, arrests or restraints of governments and people, civil disturbances or similar occurrences.
4. Order of court, administrative agencies or governmental officers other than Billings.

Section 13. Financial Management System.

The Contractor shall establish and maintain a financial management system that:

A. Provides accurate, current, and complete disclosure of all financial transactions relating to the Contract;
B. Maintains separate accounts by source of funds for all revenues and expenditures and identifies the source and application of funds for the Contractor's performance under this Contract, including information pertaining to subcontracts, obligations, unobligated balances, assets, liabilities, outlays and income;
C. Effectively controls and accounts for all municipal funds and Contract property;
D. Compares actual expenditures with budgeted amounts and relates financial information to performance or productivity data including unit cost information where applicable;
E. Allocates administrative costs to direct service delivery units;
F. Minimizes the time between receipt of funds from Billings and their disbursement by the Contractor;
G. Provides accounting records supported by source documentation; and
H. Provides a systematic method assuring the timely and appropriate resolution of audit findings and recommendations.

Section 14. Funding Requirements.

In the event that any funding source for this Contract should impose additional requirements upon Billings for the use of those funds, the Contractor agrees to abide by those additional requirements immediately upon receipt of written notice thereof from Billings.

Section 15. Subcontracts.

The Contractor may enter into subcontracts for the purchase of goods and services necessary for the performance of this Contract, provided:

A. Every subcontract shall be reduced to writing and contain a precise description of the services or goods to be provided and the nature of the consideration paid therefor.
B. Every subcontract under which the Contractor delegates the provision of services shall be subject to review and approval by the Administrator before it is executed by the Contractor.
C. Every subcontract in an amount exceeding $1,000 shall require reasonable access to business records of the subcontractor relating to the purchase of goods or services pursuant to the subcontract.

PART II
GENERAL CONTRACT PROVISIONS

Section 1. Relationship of Parties.

The Contractor shall perform its obligations hereunder as an independent Contractor of Billings. Billings may administer the Contract and monitor the Contractor's compliance with its obligations hereunder. Billings shall not supervise or direct the Contractor other than a provided in this Section. Contractor and Billings agree that no other party is an intended or unintended third-party beneficiary of this contract, and that Contractor's duties run solely to Billings.

Section 2. Nondiscrimination.

A. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, ancestry, age, sex, or marital status or who is a "qualified individual with a disability" (as that phrase is defined in the Americans With Disabilities Act of 1990). The Contractor will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, or mental or physical impairment/disability. Such action shall include, without limitation, employment, upgrading, demotion or transfer, recruitment or recruiting advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The Contractor agrees to post, in conspicuous places available to employees and applicants for employment, notices setting forth the provisions of this non-discrimination clause.
B. The Contractor shall state, in all solicitations or advertisements for employees to Work on Contract jobs, that all qualified applicants will receive equal consideration for employment without regard to race, color, religion, national origin, ancestry, age, sex or marital status, or mental or physical impairment/disability.
C. The Contractor shall comply with any and all reporting requirements that may apply to it which the City of Billings may establish by regulation.
D. The Contractor shall include the provisions of Subsections A through C of this Section in every subcontract or purchase order under this Contract, so as to be binding upon every such subcontractor or vendor of the Contractor under this Contract.
E. The Contractor shall comply with all applicable federal, state, and city laws concerning the prohibition of discrimination.
F. The Contractor and subcontractor shall abide by the requirements of 41 CFR 60-300.5(a) and 41 CFR 60-741.5(a), which prohibit discrimination against qualified protected veterans and/or qualified individuals on the basis of disability, and requires affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans and individuals with disabilities.

Section 3. Permits, Laws, and Taxes.

The Contractor shall acquire and maintain in good standing all permits, licenses and other entitlements necessary to its performance under this Contract. All actions taken by the Contractor under this Contract shall comply with all applicable statutes, ordinances, rules and regulations. The Contractor shall pay all taxes pertaining to its performance under this Contract.

Section 4. Nonwaiver.

The failure of either party at any time to enforce a provision of this Contract shall in no way constitute a waiver of the provision, nor in any way affect the validity of this Contract or any part hereof, or the right of such party thereafter to enforce each and every provision hereof.

Section 5. Amendment.

A. This Contract shall only be amended, modified or changed by a writing, executed by authorized representatives of the parties, with the same formality as this Contract was executed.
B. For the purposes of any amendment modification or change to the terms and conditions of this Contract, the only authorized representatives of the parties are:

   Contractor: Jared Harris (Area Manager) or Authorized Signatory

   Billings: City Council or Authorized Designee

C. Any attempt to amend, modify, or change this Contract by either an unauthorized representative or unauthorized means shall be void.

Section 6. Jurisdiction; Choice of Law.

Any civil action rising from this Contract shall be brought in the District Court for the Thirteenth Judicial District of the State of Montana, Billings. The law of the State of Montana shall govern the rights and obligations of the parties under this Contract.

Section 7. Severability.

Any provision of this Contract decreed invalid by a court of competent jurisdiction shall not invalidate the remaining provisions of the Contract.

Section 8. Integration.

This instrument and all appendices and amendments hereto embody the entire agreement of the parties. There are no promises, terms, conditions or obligations other than those contained herein; and this Contract shall supersede all previous communications, representations or agreements, either oral or written, between the parties hereto.

Section 9. Liability.

The Contractor shall indemnify, defend, save, and hold Billings harmless from any and all claims, causes of action, lawsuits, damages, judgments, liabilities, and litigation costs and expenses including reasonable attorneys' fees and costs, arising from any wrongful or negligent act, error or omission of the Contractor or any agent, employee or subcontractor as a result of the Contractor's or any subcontractor's performance pursuant to this Contract.

A. The Contractor shall not indemnify, defend, save and hold Billings harmless from claims, causes of action, lawsuits, damages, judgments, liabilities, and litigation costs and expenses or attorneys' fees and costs arising from wrongful or negligent acts, error or omission solely of Billings occurring during the course of or as a result of the performance of the Contract.
B. Where claims, lawsuits or liability, including attorneys' fees and costs arise from wrongful or negligent act of both Billings and the Contractor, the Contractor shall indemnify, defend, save, and hold Billings harmless from only that portion of claims, causes of action, lawsuits, damages, judgments, liabilities, and litigation costs and expenses including attorneys' fees and costs, which result from the Contractor's or any subcontractor's wrongful or negligent acts occurring as a result from the Contractor's performance pursuant to this Contract.

Section 10. Inspection and Retention of Records.

The Contractor shall, at any time during normal business hours and as often as Billings may deem necessary, make available to Billings, for examination, all of its records with respect to all matters covered by this Contract for a period ending three years after the date the Contractor is to complete performance in accordance with Section 2 of the Special Provisions. Upon request, and within a reasonable time, the Contractor shall submit such other information and reports relating to its activities under this Contract, to Billings, in such form and at such times as Billings may reasonably require. The Contractor shall permit Billings to audit, examine and make copies of such records, and to make audits of all invoices, materials, payrolls, records of personnel, and other data relating to all matters covered by this Contract. Billings may, at its option, permit the Contractor to submit its records to Billings in lieu of the retention requirements of this Section.

Section 11. Availability of Funds.

Payments under this Contract may require funds from future appropriations. If sufficient funds are not appropriated for payments required under this Contract, this Contract shall terminate without penalty to Billings; and Billings shall not be obligated to make payments under this Contract beyond those which have previously been appropriated.

IN WITNESS WHEREOF, the parties have executed this Contract on the date and at the place shown below.

City of Billings

_____
City Council or Designee

Date:_____

ATTEST:

_____
City Clerk

Date:_____

Contractor

_____

Name:_____
Title:_____
Date:_____

IRS Tax ID #_____

APPROVED AS TO FORM:

By_____
BRENT BROOKS, City Attorney

STATE OF MONTANA)
:ss.
COUNTY OF YELLOWSTONE)

On this _____ day of _____, 2019, before me, the undersigned, a Notary Public for the State of Montana, personally appeared _____, known to me to be the _____ of _____, and acknowledged to me that they executed the foregoing instrument on behalf of said corporation having first been authorized to do so.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Notarial Seal the day and year first above written.

_____
Notary Public for the State of Montana
Residing at Billings, Montana
My Commission Expires:_____

Appendix A

Basic Services of Engineer
City of Billings W.O. 19-12: West End Reservoir Project

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 Amanda McInnis working under the Principal-in-Charge, Jared Harris.

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.

B. Name a Task Director who shall be the liaison between the Engineer and Billings. For this project, the Task Director designated is Randy Straus, working under the City Engineer, Debi Meling.

Section 3. Scope of Work.

The Integrated Water Plan Supplement (IWPS) recommended further evaluation of developing the Knife River gravels pits (located on the north and south side of Hesper Road between Shiloh Road and 48th St. West) into raw water storage reservoirs that would supply water to an associated water treatment plant. This phase provides preliminary design development of the "West End Project" in order to further define the project and develop a planning level cost estimate.

Additionally the IWPS recommended a West End Water Treatment Plant (WTP). The combination of the raw water storage and West End WTP would provide a redundant raw water supply and treatment facilities that could supply the City of Billings potable water in the event the existing WTP is out of service due to an issue at the existing plant or the Yellowstone River.

The major assumptions the West End Project Preliminary Design will be based on include:

- The Knife River property on the north and south side of Hesper Road identified in the IWPS will be purchased and be a part of the project.

- The 50 acres at the SE corner of Hesper Road and 48th St. West will not be purchased and will not be a part of the project.

- The new WTP will be located on the properties described to be purchased.

- The evaluation will include consideration of several sources of water for the reservoir including: use of the BBWA canal to convey water to the reservoirs from the Yellowstone River, diversion from the Yellowstone River south of the reservoir site at a location to be determined, and diversion off of Canyon Creek. These alternative may be evaluated individually or as part of a phased development of adequate water source(s) for the reservoir.

- Reservoir seepage control will be evaluated based on geotechnical, geology, and project configuration. Several options will be reviewed; a Cut-off-Wall, an embankment liner, or the combination of the two systems.
    - A slurry wall, a cut-off wall, grout curtains in the shale, amended soil dam core, clay dam core, an embankment liner, or a combination of these seepage cutoff elements will be constructed in and/or on the outer perimeter embankments of the reservoirs to control seepage.
    - If locations are found where the Cut-off-Wall or liners are only partially effective or locations within the reservoir where subsurface conditions indicate the potential for excessive water loss – a system of low permeability material and/or membrane liners may be employed to facilitate the efficient function of the reservoirs.

- The project will impound more than 50 acre-feet therefore consultation with the Montana Dam Safety Program (MTDSP) in accordance with the Administrative Rules of Montana (ARM) 36.14.201 is required.

- The reservoirs are assumed to be high hazard facilities, as defined by MTDSP.

- Five sets of contract documents are anticipated:
    - Preliminary earthwork for Knife River to be executed under the land purchase agreement prior to the City taking possession of the property.
    - Final Earthwork, WTP Intake Pump Station, Interconnecting Piping, Reservoir Intake, Paving
    - Cut-off-Wall, Liner, or combination system Installation and Testing (if needed)
    - Landscaping
    - Raw Water Delivery Improvements and/or Modifications

The scope below outlines a process to:

- Identify the preferred configuration for conveyance of raw water to the project.
- Perform initial geotechnical evaluations of the site
- Initiate required permitting
- Complete a preliminary assessment of ground water impacts
- Develop a preliminary design report for the West End Project
- Develop preliminary design drawings
- Develop a planning level cost estimate.

Scope items to be added by future amendment include but are not limited to:

- Design services
- Bidding services
- Construction services
- Startup and training services
- SCADA programming services
- Warranty services

TASK 100 – PROJECT MANAGEMENT AND COMMUNICATION

101 – Project Initiation

The purpose of this task is to kick off the project externally and internally. A project management plan (PMP) and all the support paperwork will be developed for all team members to have available to understand the project, the project team, and the project requirements. The PMP is updated with significant changes in the project.

A project kick off meeting with the City will be conducted and will include pertinent staff from the City and Consultant team to review the project components, project schedule, and the process for completing the preliminary design. The framework for decision making will be established.

Deliverables:

- Project kick off meeting with City, agenda and meeting minutes.
- Project Schedule.

102 – Project Workshops with City Staff

During the planning process, key members of the Consultant design team will meet with the City staff to review the project. Meeting minutes will be prepared and distributed to all parties attending the meeting. Meetings will be held once every other month. Five (5) total workshops are planned. Meetings will normally be held at the Public Works Conference Room. Regular workshop attendees will include the PM, the Design Manager and a local task lead if appropriate. Regional resources who do not have another reason to be in Billings will participate via GoToMeeting.

Deliverables:

- Agenda and meeting minutes for each meeting.

103 – Project Management

Coordinate the project team with the City as well as supervise the project team. Monitor project status, maintain project schedule, coordinate with resources including sub-consultants, and prepare financial documents.

Deliverables:

- Monthly Report and Invoices

104 – Project Communication

Participate in bi weekly 30-minute project progress internal team meeting to direct the work.

TASK 200 – STAKEHOLDER INTERACTION

201 – City Council Presentations

Prepare for and present at one City Council meeting.

Deliverables:

- Presentation

202 – BBWA Coordination

Assist the City with coordinating with BBWA to develop an agreement for the City to use BBWA ditch water to supply the raw water storage reservoirs. Tasks including attending up to 3 meetings and providing back up information necessary for the agreement. Provide the draft technical requirements to be included in an example agreement based on discussions with BBWA and the City.

Note: The City may elect to redirect this effort to another irrigation entity depending on the outcome of the analysis of alternatives for supply of raw water to the project.

Deliverables:

- Meeting minutes
- Draft agreement language

203 – DEQ Coordination

Provide coordination assistance in transferring/reassigning and closeout of the gravel mine reclamation permit process. Meet with DEQ in Helena at the end of pre-design to provide update on approach with raw water reservoirs, raw water quality, water treatment plant and other pertinent items. DEQ will be invited to attend in person or via phone all predesign workshops conducted in Billings.

Deliverables:

- Presentation

204 – DNRC Coordination

Confirm with Department of Natural Resources and Conservation (DNRC) water rights and water reservation information along with agreement with the BBWA. Conduct one workshop at the end of preliminary design in Helena to present preliminary design concept and discuss DNRC interaction during final design. DNRC will be invited in person or via phone to attend all predesign workshops held in Billings.

Deliverables:

- Presentation

205 – DNRC Permitting

By State of Montana statute any impoundment of 50 ac-ft or more at maximum normal operating pool is under the jurisdiction of the Montana Dam Safety Program (MTDSP). In addition, preliminary discussions with the MTDSP have identified a need to obtain a hazard determination and a construction permit from MTDSP. The design process will comply with the requirements of the MTDSP, including their design process guidelines and state statutes. Preliminary design will include facilitation of a preliminary design meeting with MTDSP in compliance with the design process guidelines. For preliminary design the following reviews/documents are required:

- Application for Hazard Determination
- Preliminary Design Meeting
- Application for Construction Permit

Prepare the required permit applications and submittal packages to meet MTDSP requirements.

Deliverables:
- Hazard Determination Application
- Meeting Minutes from the Preliminary Design Meeting with MTDSP
- Construction Permit Application

206- Knife River Coordination

Conduct two in person meetings either at public works or on the proposed reservoir site.

Deliverables:
- Meeting minutes

TASK 300 –DATA GATHERING AND FIELD INVESTIGATION

301 – Site Survey

Mobilize a (2) two-man crew for data acquisition on-site, including a licensed pilot in command (PIC) and the LiDAR sensor technician. The planning and field efforts to ensure flight operations are performed in accordance with all federal and state aviation regulations and safety requirements. The LiDAR technician will ensure proper sensor calibration and functionality prior to flight operations. In addition, the technician will ensure that all ground survey equipment, including reference and weather stations, are operating and logging correctly during flight. LiDAR data will be sufficient to support development of 1' contours accurate to + or – 6". The extent of the survey will include an area that is generally 200' outside the property boundaries on all sides and 200' beyond Canyon Creek on the southwest side of the property.

Upon completion of data acquisition, two (2) data analysts will prepare and process all relevant flight sensor data. The LiDAR Analyst will be responsible for inertial trajectory processing, creation of the raw point cloud, and integrating the smoothed trajectory data with the ground survey(s) to ensure accuracy and proper control. The LiDAR Analyst will take the raw point cloud data and complete the scan alignment and final classifications to the decided upon deliverable specifications.

In areas where there is standing water, boats or other methods will be employed to obtain bathymetry below the water line at the time of the survey. The density of the bathymetric measurements will be sufficient to provide 1' contours accurate to + or – 6".

The site survey will be supplemented by the location of boreholes, monitoring wells, test pits and other relevant geotechnical subsurface investigation locations after geotechnical work is completed.

This scope does not include the survey work necessary to complete preliminary design for the raw water supply. Once the preferred alternative for raw water supply has been

selected by the City and specific needs for either improvements or modifications have been identified, HDR will prepare an amendment to cover the cost of the needed additional survey work.

Deliverables:

- Survey Point Data, with developed TIN and contour map in Autocad file.

302 – Geotechnical Field Investigation

Due to the uncertainty associated with the proposed configuration, location, and elevation of the proposed reservoir structures, the geotechnical work will be performed as a two-phase geotechnical study, including the work described below in this Preliminary Study, then a final phase of study at a later date. The Preliminary Geotechnical Study will include field exploration and testing, laboratory testing of soil and rock samples from the field testing, engineering analyses of bearing capacity, settlement, evaluation of reservoir and embankment seepage, and embankment (and embankment foundation) seepage analysis coupled with static/seismic slope stability of the proposed reservoir embankments, and development of conclusions and recommendations for the preliminary design of the proposed reservoir and ancillary components.

The preliminary field exploration program will consist of the following:

Field Exploration and Testing	Planned Exploration Depth (feet) [1]	Planned Location
11 Borings	50 to 80	Planned Reservoir Bottom (See Exhibit 1)
1 Boring	100	Crest of native slope just beyond the existing Gravel pit near the northeast corner of 48th Street and Hesper Road (See Exhibit 1)
20 Test Pits	10 to 15	To be determined. various locations within the planned reservoirs
4 trenches	10 to 15 feet deep and a maximum length of 40 feet	To be determined. various locations within the planned reservoirs
Lugeon packer tests	2 depth intervals within the shale of 3 borings (6 tests total)	To be determined during fielding exploration

[1] Below ground surface

Eleven of the borings will be drilled through approximately 30 to 60 feet of overburden, then the remaining depths extending into the shale bedrock at the site. One 100-foot deep boring (with a 4" casing for geophysical studies) will be drilled by a specialty subcontract driller in which suspension logging will be performed to measure low-strain compression and shear wave velocity measurements in both the overburden and shale bedrock. Because the backfill from previous reclamation efforts or the waste rock from previous

screening efforts is known to contain 18-inch-minus boulders and cobbles, all 11 geotechnical borings will be drilled using TUBEX or ODEX drilling methodologies in the overburden and HQ3 core drilling methods in the shale bedrock beneath the overburden (USACE and USBR guidelines will be used as a minimum standard). The geophysical boring will be drilled using only air-rotary drilling methods.

The borings will be advanced with both track-mounted and truck-mounted drill rigs, with the track rig being capable of drilling using auger, air-rotary, mud rotary, and rock coring equipment. Four samples will be obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. Soil sampling is typically performed using thin-wall tube and/or split-barrel sampling procedures. The split-barrel samplers are driven in accordance with the standard penetration test (SPT). The samples will be placed in appropriate containers, taken to our soil laboratory for testing, and classification by either a Geologist or a Geotechnical Engineer. In addition, we will observe and record groundwater levels during drilling and sampling. Our exploration team will prepare field boring logs as part of standard drilling operations including sampling depths, penetration distances, and other relevant sampling information. Field logs include visual classifications of materials encountered during drilling, and our interpretation of subsurface conditions between samples. Final boring logs, prepared from field logs, represent the Geotechnical Engineer's interpretation, and will include modifications based on observations and laboratory tests.

The eleven geotechnical borings will be sampled in the overburden at intervals of 2.5 to 5 feet using either standard SPT sampling, over-sized split spoons, or, where feasible, undisturbed sampling methods (such as Shelby Tube or California Ring sampling) to obtain samples of the fine-grained soils present in the section. Falling-head hydraulic conductivity will be also be performed at selected locations and depths in the overburden soils. When the shale bedrock is encountered, the drilling method will be switched to HQ3 wireline core drilling methods. Within 3 of the borings, lugeon packer tests will be performed at 2 depth intervals within the shale bedrock of the selected borings. The packer tests will be performed to provide both general horizontal conductivity of the shale bedrock as well as to provide baseline data to support foundation grouting or slurry wall design and installation.

Single well pumping tests (from converted explorations) will be completed in five of the eleven exploratory borings drilled within the confines of the property and converted to monitoring wells. The pump tests will be performed and will be reported as part of the Preliminary geotechnical study. As an option, four additional borings 50 feet in depth may be completed as additional groundwater monitoring wells up to 200 feet outside of the current property boundaries. These additional monitoring wells will be completed in the same manner as the Single Well Pumping Tests above.

The 20 test pits will be excavated into the reclaimed pit slopes and into existing piles and stockpiles of materials within the pits. In particular, the test pits excavated into the

reclaimed pit walls will be used to evaluate the material types and the depths to which the reclaimed materials extend through the overburden soils. The test pits will be mapped and photographed in-place. The existing stockpiles will be sampled in accordance with current US Bureau of Mines sampling methods. All test pits will be backfilled immediately with excavated materials upon completion of visual classification of subsurface materials and obtaining soil samples for laboratory testing.

The test trenches will be excavated (by others) to expose the shale bedrock surface at 4 locations within the proposed reservoir boundaries. The purpose of exposing the shale bedrock is to observe for the presence of vertical jointing and/or fracturing that may impact or provide flow into or out of the shale bedrock, where the shale bedrock acts as the floor of the reservoirs. These test pits will be excavated with a large excavator such that personnel can safely enter and egress the test pits without requiring shoring. This preliminary stage of bedrock mapping will not quantify seepage into or out of the bedrock surface; rather, such testing will be performed during the final phase of field studies.

Where the geotechnical borings are not completed as wells, we will backfill borings with bentonite chips and/or neat cement grout upon completion of the field exploration. Our services do not include repair of the site beyond backfilling our boreholes, and cold patching existing pavements. Excess drill cuttings will be dispersed in the general vicinity of the borehole.

Exploration efforts require borings (and possibly excavations) into the subsurface, therefore we will comply with local regulations to request a utility location service. We will consult the owner regarding potential utilities, or other unmarked underground hazards. Based upon the results of this consultation, we will consider the need for alternative subsurface exploration methods, as the safety of our field crew is a priority.

Private utilities should be marked by the owner/client prior to commencement of field exploration.

Assumptions:

Deliverables:

- Geotechnical data and field notes

303 – Subsurface Lab Investigation

We will review the field boring logs and materials and will assign laboratory tests to understand the engineering properties of various soil and bedrock strata. The anticipated laboratory testing include the following:

- Water content
- Unit dry weight
- Atterberg limits

- Unconfined compressive strength of soils and bedrock
- Triaxial Shear
- Swell/consolidation
- One dimensional consolidation
- Grain size analysis
- Direct Shear
- Constant head permeability
- Chemical Analyses – pH, Sulfates, Chloride Ion, Electrical Resistivity
- Moisture-Density Relationships

Our laboratory testing program often includes examination of soil samples by an engineer. Based on the material's texture and plasticity, we will describe and classify soil samples in accordance with the Unified Soil Classification System (USCS). For bedrock samples, rock classification will be conducted using locally accepted practices for engineering purposes; petrographic analysis (if performed) may reveal other rock types. Rock core samples typically provide an improved specimen for this classification. Boring log rock classification is determined using the Description of Rock Properties.

Deliverables:

- Lab Data Reports

304 - Geotechnical Engineering Review and Report

Results of our field and laboratory programs will be evaluated by a professional engineer. The engineer will develop a geotechnical site characterization, perform the engineering calculations necessary to evaluate preliminary geotechnical engineering aspects of the project, and to develop appropriate preliminary geotechnical engineering design criteria for earth-related phases of the project.

The Preliminary Study Geotechnical Report will summarize the results of the subsurface and laboratory investigation, provide a discussion of the geotechnical parameters selected, provide design criteria using USACE and USBR criteria, analyses model development, a summary of the engineering analyses, and preliminary geotechnical engineering recommendations. A preliminary engineer's estimate of probable construction cost for the cut-off-wall/slurry wall/grout curtain, liner embankment, and drains for the proposed reservoirs will also be included in the report.

The preliminary geotechnical engineering report will provide the following:

- Boring logs with field and laboratory data

- Stratification based on visual soil (and rock) classification
- Groundwater levels observed during and after the completion of drilling
- Site Location and Exploration Plans
- Subsurface exploration procedures
- Description of subsurface conditions
- Preliminary Seepage Analysis; which will be based on the current groundwater model, well testing, unsaturated in-situ hydraulic conductivity testing and laboratory hydraulic conductivity testing. Seepage evaluations with regard to stability analyses will be performed using the finite element module of a proprietary slope stability program. As discussed above, vertical seepage across the overburden/shale interface will, if necessary, be evaluated in the final phase of study.
- Preliminary Slope Stability Analysis of the proposed Embankment and Seepage Cutoff System; these analyses will be performed in concert with the finite element seepage model discussed above to evaluate static, steady-state slope stability and the seismic response of the proposed embankments. Rapid Drawdown analyses will also be performed as a part of these preliminary studies.
- Preliminary Filter Material Design; these studies will be initiated in the Preliminary Study, and will include review of potential embankment and filter materials, with the preliminary evaluation of materials consistent with the planned use of those materials.
- Seismic evaluation; to be based on P-and S-wave suspension logging performed in the 100-foot-deep seismic boring. These studies will also include evaluation of site classification per the IBC and will also be used to evaluate potential dam safety issues in accordance with the requirements of the Montana DNRC Dam Safety Division.
- Geophysical measurement of low-strain values of both P- and S-wave velocities in the 100-foot-deep geophysical boring
- Recommended ancillary structure foundation options and engineering design parameters
- Estimated settlement of foundations for ancillary structures
- Seismic site classification
- Preliminary Subgrade preparation/earthwork recommendations
- Review of preliminary plans and specifications

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum.

305 - BBWA Field Investigation

The Billings Bench Water Association (BBWA) canal has been identified as a candidate for conveyance of the Cities water reservation from the Yellowstone River to the site of the Billings West End Reservoir. Water would be diverted into the BBWA canal from the Yellowstone River and then conveyed approximately 9.5 miles to a location near the West End Reservoirs where the water would be pumped into new storage facilities. The condition of the canal over the 9.5 mile reach from the Yellowstone River to the storage facility site is critical to the reliability of water delivery. Identification of issues that could interrupt the water supply to the storage facility will be used to facilitate discussions with the BBWA, identify potential mitigation of issues, support the Cities assessment of reliability, and help to prioritize projects that would protect the raw water supply.

Provide an irrigation engineer, geotechnical engineer, and a staff engineer who will coordinate with the City to arrange a time for a two day visit to the site with City staff and representatives from the BBWA. The team will walk and drive the canal bank for the 9.5 mile reach of the canal in question and perform the following actions:

- Perform a visual inspection of the canal
- Identify locations where there is apparent seepage issues.
- Identify locations where animal burrows present a risk of piping through the canal embankment.
- Document any locations where the canal banks display evidence of instability.
- Interview BBWA staff to identify any concerns with operations, structural concerns for flumes, road crossings, drainage undercrossings, pipe crossings, control structures, diversions, storm drainage into the canal, or any other chronic issues with this reach of the canal.
- Document any findings with measurements, photographs and sketches (as needed) to clarify any concerns.
- Identify any locations where additional geotechnical subsurface investigations could be appropriate.
- Identify apparent encroachments on the canal or other conditions that could inhibit the ability of BBWA to perform maintenance or repair activities.

Prepare a memorandum that documents the field activities, findings, and suggestions of further investigations and analysis where necessary, and describes potential solutions. The memorandum will include discussions of the following:

- General description of the location and condition of the canal
- Description of the major structures on the canal
- Road crossings
- Diversions

- Encroachments
- Embankment / Slope stability
- Seepage
- Potential rehabilitation / repair / improvements
- Need for further investigations and analysis (geotechnical, structural, hydraulics, etc.)

Information included in the memorandum will be based on field observations and engineering experience. No geotechnical, survey, structural, or hydraulic analysis is included in this work. The memorandum will be presented to the City as a draft and then revised to a final document after the meeting with the City and after comments from the City are incorporated.

For visual inspections, Billings hereby releases, holds harmless and indemnifies and agrees to defend contractor against any claims, damages, losses, liabilities, expenses or costs arising out of any failure to detect hidden, covered, inaccessible or internal structural or material defects, or damages in structures being inspected, that are not discernable by external visual inspection through reasonable efforts.

Deliverables:

- Field notes and photographs.
- Draft evaluation memorandum
- Final evaluation memorandum.

TASK 400 –NON-RESERVOIR PRELIMINARY DESIGN

401 – System Operation and Design Criteria

Develop a strategy for operating the reservoirs and the raw water delivery system seasonally and at flows ranging from 0-60 mgd with the focus being on wintertime operation. The following are some of the considerations:

- Delivery of full capacity of the WTP in the winter in the event the existing WTP is down for whatever reason.
- Maintaining desired reservoirs levels throughout the year for recreation purposes.
- Evaluate options for ideal reservoir levels for raw water delivery and WTP use.
- Determine operation of the reservoirs through the winter if there is no raw water delivery from October 15th to April 15th.
- Determine operation of the reservoirs through the winter if raw water delivery occurs continuously except when temperatures are too extreme to operate.
- Determine operation of the reservoirs in the winter if the WTP only operates in emergencies.

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum

402 – Hesper Road Evaluation

As part of the preliminary design, reconstruction options of Hesper Rd will be analyzed to accommodate the preliminary site design and storage requirements for the proposed reservoirs. Horizontal and vertical alignments will be developed to tie-in with the proposed grading plan of the overall site design. This may include raising or lowering the existing grade of Hesper Road. Preliminary typical sections, including potential turn lanes, will be developed with consideration of proposed recreation and infrastructure facilities with access from Hesper Rd. The preliminary roadway design will include roadside safety features, as required, for proposed berms, Cut-off-Walls, or other features related to the reservoir design. Pavement sections will be based on recommendations from the geotechnical analysis, which will be developed with future traffic projections and associated ESAL's. Pavement sections will include consideration for subgrade stabilization geosynthetics to provide the most cost effective pavement section for the roadway.

Assumptions:

- Traffic studies and travel demand models will not be required for alternatives for the roadway.
- Intersection improvement options for the Hesper Rd/48th St W intersection is not included with this project.

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum.

403 –Groundwater Evaluation

A groundwater analysis will be conducted by modifying the existing MODFLOW groundwater model created for the City in 2017 for the reclaimed water aquifer recharge analysis (HDR, 2017). This model includes the West Billings area in the vicinity of the proposed reservoir.

Both reservoirs will be added to the model at full operational capacity. The model will then be used to evaluate up to three scenarios representing options to evaluate groundwater impacts around the reservoirs. The three scenarios are envisioned to include the following analysis:

- Analysis of groundwater levels in proximity of the simulated reservoirs,
- Analysis of groundwater levels in proximity of the simulated reservoirs with the addition of a slurry wall around both reservoirs,
- Analysis of groundwater levels in proximity of the simulated reservoirs with the addition of slurry walls around each individual reservoir.

A technical memorandum will be developed that provides the results of the groundwater model modifications and analysis. The technical memorandum will include a summary of methods and results. Approximately three tables summarizing results and up to four

figures showing predicted groundwater levels as a result of various groundwater control alternatives will be developed for the technical memorandum.

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum.

404 – Water Treatment Plant Siting Evaluation

Determine initial design capacity of the Water Treatment Plant (WTP) and potential ultimate capacity. Based on ultimate capacity determine site requirements for a conventional filtration WTP with full pretreatment, which would reasonably be worse case for land requirements.

Utilizing the land size required for the potential ultimate WTP capacity, evaluate three to five options for WTP location. At a minimum include the following criteria:

- Conveyance of raw water to the site
- Conveyance of treated water to the distribution system
- Hydraulic profile of the reservoir and WTP
- Access to the WTP site
- Chemical deliveries to the WTP site
- Utilities
- Safety of personnel
- Volume of reservoir used up by the site

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum.

405 – Raw Water Delivery Preliminary Design Alternatives Evaluation

Evaluate options for delivering raw water including intake, diversion structure and preliminary treatment. The focus is on needed improvements to provide for reliable long term delivery of water.

Consider alternatives for the raw water source including:

- Divert from Canyon Creek using a pump station near the southeast corner of the project site.
- A piped delivery of water from the Yellowstone River with a river diversion location south of the project site. Pump station to be located at the Yellowstone River and the pipe from the pump station to the reservoirs to be located primarily in existing

road right of way along Duck Creek Road, under Hwy 90, and then following S 48th Street W to the project site.

- Convey water from the Yellowstone River using the BBWA river diversion structure and approximately 9.5 miles of the BBWA canal to a location north of the canal and Canyon Creek on the southeast side of the reservoir site. This alternative will include consideration of both a pumping plant that exclusively diverts from the canal and a pumping plant capable of diverting from both the canal and Canyon Creek.
- Convey water from the Yellowstone River using the BBWA river diversion structure and approximately 9.5 miles of the BBWA canal to a location near where the BBWA canal crosses Neibauer Road. Divert water from the BBWA canal at this location using a new pump station and convey the water from the pump station to the reservoirs using a pipe located in road right of way. This alternative will include consideration of a pump station to divert water from the BBWA canal alone and the option to divert from either or both the BBWA canal and the Canyon Creek Ditch.
- Convey water from the BBWA at 48th Street W by gravity to a Raw Water Pump Station location near Canyon Creek from which water would be pumped to the reservoir site. This alternative would allow use of the BBWA or Canyon Creek initially.

The alternatives analysis will include consideration of the availability of winter diversions from canals, the hydraulic capacity of the canals, and the apparent reliability of the canals.

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum.

406– End Land Use Master Planning

We will gather updated base information for the development of the Site Master Plan for the City Reservoir. This base information will include existing and updated site aerial photography and site survey information as provided by the design team. This information will serve as the foundation for the Planning and Predesign effort.

We will develop the overall site master plan for the project site considering the requirements and program for both Engineering and End Land Use. We anticipate this to be an iterative process with both the design team and Client exploring options for the project that satisfy project expectations. Site planning considerations will focus on healthy water movement through the reservoir, future water plant location and end land use opportunities.

With information gathered through the site master planning process, we will develop the Final Master Plan. The plan will be detailed based on the new site survey accurately depicting the proposed site improvements as well as being graphic allowing for community presentations.

Deliverables:

- Draft end land use master plan memorandum
- Final end land use master plan memorandum.

407– End Land Use Predesign

We will continue development of the End Land Use program as identified in the planning phase. We anticipated the following program:

- Trails- Primary & Secondary
- Trail Overlooks
- Boardwalks- Suspended & Floating
- Fishing Docks
- Passive Recreation Opportunities
- Pedestrian Bridges
- Non-Motorized Boat Launch
- Parking Areas
- Shelters- Primary & Secondary
- Pathway/Security Lighting
- Signage- Interpretive & Wayfinding
- Site Furnishings
- Community Events Plaza
- Planting Strategies
- Irrigation Strategies
- Safety and Security
- ADA Accessibility
- Operation and Maintenance Considerations

We will provide Concept Design for the End Land Use that will identify what the proposed improvements will look like. We anticipate development of several design options that we will then review with the Team to ensure project expectations are consistent.

Deliverables:

- Draft end land use predesign memorandum
- Final end land use predesign memorandum.

TASK 500 – RESERVOIR PRELIMINARY DESIGN

501-Reservoir Water Quality Investigation

Evaluate existing water quality data available from the Yellowstone River and supply diversion ditch. Analysis will include an assessment the adequacy of existing data and will provide any recommendations for additional monitoring that would benefit the assessment. Based on a review of collected water quality data, identify key parameters that may influence reservoir water quality, ultimate treatability and Safe Drinking Water Act (SDWA) regulatory compliance. Key reservoir water quality considerations include dissolved metals, nutrients relevant to algae proliferation, turbidity, dissolved oxygen, temperature, and total organic carbon. An assessment of possible Contaminants of Emerging Concern (CEC) will also be completed. Identify and evaluate reservoir design and operational considerations that will enhance reservoir water quality and treatability including pre-sedimentation, reservoir geometry, circulation, and in-lake treatment enhancements to improve water quality.

Present the findings in a draft technical memorandum and meet with the City to review the findings. Comments from the City will be incorporated and a final technical memorandum will be provided to the City and incorporated into the design report.

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum.

502 – Seepage Control and Embankment Preliminary Design

The geotechnical information will be evaluated and utilized to develop preliminary design of Cut-off-Walls including width, depth, and required slurry mixture. Depending on the final configuration of the reservoir section and elevation, other seepage mitigation measures, such as an amended soil dam core and grouting into the shale bedrock may be employed instead of the slurry wall concept. Embankment material requirements and slope stability parameters will be developed. The analysis will include consideration of rapid draw down scenarios. The analysis and evaluation will include consideration of using liner materials or other geosynthetics to improve slope stability and reduce the total volume of embankment materials. Based on the evaluation of the permeability of shale and other strata below the reservoir completed in the geotechnical and groundwater analysis – identify typical approaches for limiting loss from the reservoirs.

Present the findings in a draft technical memorandum and meet with the City to review the findings. Comments from the City will be incorporated and a final technical memorandum will be provided to the City and incorporated into the design report.

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum.

503 – Reservoir Earthwork Alternatives Analysis

Based on survey and land set aside for the WTP, provide a preliminary earthwork volume and balance for the north and south reservoirs. Determine current available reservoir storage volume. Determine a desired berm height for the north and south reservoirs. Based on berm height, geotechnical information, preliminary layout of facilities and amenities determine new earthwork balance. Determine new reservoir storage volume. Adjust embankment locations to optimize use of the available property and re-model site earthwork. Iterations to adjust embankment locations and earthwork volumes will be limited to no more than three (3).

Present the findings in a draft technical memorandum and meet with the City to review the findings. Comments from the City will be incorporated and a final technical memorandum will be provided to the City and incorporated into the design report.

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum.

504 - Reservoir Preliminary Design Analysis

The following elements will be included in the preliminary design:

- Identify proposed slopes, barrier walls, ground water drain.
- Develop flow path through reservoirs with consideration for water quality.
- Develop preliminary plan for intake and pumping for water supply to WTP.
- Identify source of power for pump stations and WTP. Identify potential transmission routes and capacities of existing transmission lines.
- Structures and piping for transferring flow from south reservoir to north reservoir.
- Structures and piping for discharge flow from north reservoir.
- Develop provisions to drain the reservoirs.
- Develop provisions for emergency overflow of each reservoir.
- Identify means to use either reservoir to supply the WTP.

Preliminary designs will be developed to a conceptual level and then reviewed with the City to obtain concurrence with the concepts before completing the preliminary design. Present the findings in a draft technical memorandum and meet with the City to review the findings. Comments from the City will be incorporated and a final technical memorandum will be provided to the City and incorporated into the design report.

Assumptions:

- An outlet works pipe has been included in the list of preliminary drawings but HDR will work with MTDSP to determine if an outlet works pipe is needed.
- The preliminary plans include an overflow pipe in lieu of a spillway but conversations with MTDSP will need to be completed to confirm this approach.
- Plans for the WTP will be limited to general location and identifying areas reserved for this part of the project.

Deliverables:

- Draft evaluation memorandum
- Final evaluation memorandum.

TASK 600- PRELIMINARY DESIGN REPORT

Develop a recommended improvement program for the project and prepare a summary report. The City requires an estimate of the probable project construction cost for budget

management purposes. A construction sequence is required to anticipate shut down and areas of potential contractor interference. A construction schedule is also required to determine that the contract documents allow adequate time for construction completion.

A draft version of the preliminary design report will be prepared to describe the engineering findings. The document will include an executive summary. City comments will be addressed and final report will be prepared. Develop the individual packages identified above into construction packages, confirm construction sequencing and estimated costs, define implementation schedules, and develop design to 20 to 25 percent completion. A preliminary Table of Contents is:

Chapter 1 – Executive Summary

Chapter 2 – System Operation and Design Criteria

Chapter 3 – Geotechnical Report

Chapter 4 – Groundwater Evaluation

Chapter 5 – Hesper Road Evaluation

Chapter 6 – Pump Station/WTP Site Evaluation

Chapter 7 – BBWA Condition Assessment

Chapter 8 - Raw Water Delivery

Chapter 9 – End Land Use Design

Chapter 10 – Reservoir Water Quality

Chapter 11– Reservoir Preliminary Design

Chapter 12 – Recommended Plan

Chapter 13 – Preliminary Cost Estimate

HDR will meet with the City to present the draft preliminary design report. Comments from the City will be incorporated and a final preliminary design report will be provided to the City.

601 -Design Delivery Packaging and Approach (Recommended Plan)

Develop design and construction packaging of the anticipated five contracts. Assess construction delivery methods and recommend approach. Work with City staff to identify major permits.

602 –Preliminary Construction Sequence (Recommended Plan)

A draft written construction sequence will be prepared to optimize constructability. The sequence will identify areas of contractor interaction.

603- Preliminary Construction Cost Estimate

Update the cost estimates initially prepared during alternatives development. Prepare an opinion of probable construction cost at the preliminary design phase. The estimate, which will be subdivided by specification section number, will categorized into labor, equipment,

materials, and installation. Factors will be applied for mobilization, testing and startup, training, contractor's overhead and profit, and applicable taxes.

Deliverables:

- Draft cost estimate
- Final cost estimate.

604-Preliminary Design Drawings and Specification List (Recommended Plan)

Preliminary design drawings will be developed include:

- Cover Sheet
- Survey Control
- Geotechnical Information (3 sheets)
- Existing Site Plan and Land Ownership
- Overall Reservoir and WTP Plan
- North Reservoir Site Plan
- South Reservoir Site Plan
- Hesper Road Plan
- Hesper Road Typical Section
- Landscape Plans (2 sheets)
- Reservoir Typical Sections (2 sheets)
- Embankment Typical Sections
- Outlet and Overflow Pipe Plan and Sections
- Drain and Filter Plan
- Drain and Filter Typical Sections
- Raw Water Pump Station Plan
- Raw Water Pump Station Sections
- Reservoir Inlet Piping Plan
- Reservoir Outlet Piping Plan

A preliminary list of required specifications will also be included.

Deliverables:

- Draft drawings and specification list
- Final drawings and specification list.

605-Draft Preliminary Design Report

Prepare a draft Preliminary Engineering Report. Technical memoranda prepared during alternative development will be compiled into the draft report.

606-Final Preliminary Design Report

Prepare a draft Preliminary Engineering Report. Technical memoranda prepared during alternative development will be compiled into the draft report.

TASK 700 - QAQC

Consultant will perform internal QC review on all the deliverables identified in this scope of services before they are sent to the City. A Senior Engineer from Consultant, not specifically involved in this project, will provide the QC review. Consultant PM will identify the reviewer. Task Lead/Project Engineer will coordinate with the reviewer to implement the QC review process. Individual quality control reviews will be conducted under the discipline budgets.

701-Quality Assurance Review:

At project initiation, Consultant will conduct a quality assurance review at project commencement. Review will be by two senior engineers not associated with the project.

702-Draft System Operation and Design Criteria Quality Control Review: Conduct a quality control review of the draft technical memorandum.

703-Draft Geotechnical Report Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

704-Draft Groundwater Evaluation Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

705-Draft Hesper Road Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

706-Draft WTP Site Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

707-Draft BBWA Condition Assessment Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

708-Draft Raw Water Delivery Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

709-Draft End Land Use Quality Control Review:

Conduct a quality control review of the draft technical memorandum..

710-Draft Reservoir Water Quality Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

711-Draft Seepage and Embankment Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

712-Draft Earthwork Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

713-Draft Reservoir Preliminary Design Quality Control Review:

Conduct a quality control review of the draft technical memorandum.

714-Draft Preliminary Design Report Quality Control Review:

Conduct a quality control review of the draft Preliminary Design Report. .

715-Final Preliminary Design Report Quality Control Review:

Conduct a quality control review of the Final Design Report.

716-Draft Preliminary Drawings Quality Control Review:

Conduct a quality control review of the draft Preliminary Drawings.

717-Draft Cost Estimate Quality Control Review:

Conduct a quality control review of the draft Cost Estimate.

TASK 800 – PROJECT RESERVE

Provide professional services at the direction of the City as mutually agreed on and defined. The following subtasks may be performed if authorized by the City:

801 - Geotechnical Investigation on BBWA

At locations where issues are identified with the canal that indicate the potential for some subsurface issues up to 6 boreholes will be drilled either in the canal embankment or adjacent to the canal embankment. This work will be coordinated with the BBWA to ensure their concurrence and permission before any field work is begun. Boreholes will be completed to a depth of 50 feet using mud rotary equipment. The investigation will use split spoon samplers to obtain blow counts and material samples for evaluation by the geotechnical engineer. Ground water levels will be recorded in all locations and falling head permeability testing will be performed at three of the boreholes. The results will be included in a technical memorandum to be attached to the overall evaluation memorandum.

802 – 3D Animation of Project Site with End Land Use

Develop a 3D animation of the reservoirs and End Land Use amenities. Animation will highlight key components of the project.

Appendix B

Methods and Times of Payment
City of Billings W.O. 19-12: West End Reservoir Project

Section 1. Payments for Basic Services.

Billings shall authorize payment to the Engineer for services performed under Appendix A of this Agreement. Partial payment shall be due the Engineer upon receipt of the Engineer's pay estimate, said estimate being proportioned to the work completed by the Engineer.

Partial payment shall be made to the Engineer upon receipt of the Engineer's pay estimate, said estimate being proportioned to the work completed by the Engineer. Billings shall deduct five percent (5%) from each monthly pay estimate to be held until the completion of the final scope of work. The final payment shall be made only after acceptance of final documents by Billings, and determination that the scope of work has been satisfactorily completed.

A. For services rendered prior to construction, Appendix A, the Engineer shall be paid based upon actual time accrued, but not to exceed the following amounts:

1.	Project Management and Communication	$110,200
2.	Stakeholder Interaction	$41,100
3.	Data Gathering and Field Investigation	$374,400
4.	Non-Reservoir Preliminary Design	$358,900
5.	Reservoir Preliminary Design	$286,400
6.	Preliminary Design Report	$219,400
7.	QA/QC	$101,800
8.	Project Reserve	$71,800
		$1,564,000

B. Final payment shall be the above stated basic fee less all previous payments.

Section 2. Payments for Extra Services when Authorized by Billings.

Requests made or conditions identified by interested groups at the agency or public meetings, which are beyond the scope and intent of this study shall be paid for based on a negotiated fee.

Section 3. Corrections.

Costs of Billings work that is required for corrections to the Engineer's work which requires redoing by Billings shall be deducted from any payments due the Engineer, if the Engineer fails to make the required corrections.

Section 4. Fee Increases

For contracts and services that are expected to require more than one (1) year to complete, the above stated basic services payments may be reviewed and adjusted annually by mutual agreement of the parties, based upon documented evidence that the Engineer's costs have increased for all comparable clients.

Appendix C

Additional Services of Engineer
City of Billings W.O. 19-12: West End Reservoir Project

Extra Services of the Engineer will be paid only with written prior authorization by Billings.

A. Requests made or conditions identified which are beyond the scope and intent of the services identified under Appendix A.

Appendix D

Schedule of Professional Fees
City of Billings W.O. 19-12: West End Reservoir Project

Not used on this Contract.

Appendix E

Project Schedule
City of Billings W.O. 19-12: West End Reservoir Project

Based on a notice to proceed by Billings dated no later than March 26, 2019, the completion date for the Engineer's work shall be on or before December 31, 2023 based on the following estimated schedule for major deliverables:

A. Complete Preliminary Design – February, 2020

B. Initiate Final Design, March 2020

C. Earthwork Design to Knife River – November, 2020

D. Begin Advertising Construction Projects – March, 2021

E. Begin Awarding Construction Projects – July, 2021

F. Construction Complete – July 2023

Delays affecting the completion of the work within the time specified of more than ninety (90) days, not attributable to or caused by the Parties hereto, may be considered as cause for the renegotiation or termination of this Contract.

If the Engineer is behind on this Contract due to no fault of Billings, then the Engineer hereby acknowledges the right of Billings to withhold future Contracts to the Engineer in addition to any other remedy until this Contract is brought back on schedule or otherwise resolved.

Based on the results of the Alternatives Analysis, Engineer will reassess remainder of project schedule and revise accordingly with City's concurrence.

Appendix F

Certificate(s) of Insurance
City of Billings W.O. 19-12: West End Reservoir Project

(Attach Certificate(s) of Insurance)