

Contract for Professional Architectural and Engineering Services

Project W.O. 18-23: 2018 Water Master Plan Update

In consideration of the mutual promises herein, City of Billings and HDR Engineering, Inc. 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 9 pages (Basic Services of Contractor);
- Appendix B consisting of 2 pages (Methods and Times of Payment);
- Appendix C consisting of 1 pages (Additional Services of Contractor);
- Appendix D consisting of 1 pages (Schedule of Professional Fees);
- Appendix E consisting of 1 pages (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.

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 June 30, 2020.

Section 4. Compensation; Method of Payment.

- A. Subject to the Contractor's satisfactory performance, Billings shall pay the Contractor no more than Three Hundred Thirty-Three Thousand Nine Hundred and no/100 dollars (\$333,900.00) 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: Travis Harris
City of Billings
Engineering Division
2224 Montana Avenue
Billings, MT 59101

FAX: (406) 237-6291

Contractor: Amanda McInnis, PE

HDR Engineering, Inc.
970 S 29th St W
Billings, MT 59102

FAX: (406) 652-2758

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 as provided in this Section.

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, Amanda McInnis, 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

Contractor

City Council or Designee

Date: _____

Name: _____

Title: _____

Date: _____

ATTEST:

IRS Tax ID # _____

City Clerk

APPROVED AS TO FORM:

Date: _____

By _____

BRENT BROOKS, City Attorney

STATE OF MONTANA)
 :ss.
COUNTY OF YELLOWSTONE)

On this ____ day of _____, 2018, 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: _____

Note: Final contract documents will require the Contractor’s signature to be notarized.

Appendix A

Basic Services of Engineer City of Billings W.O. 18-23: Water Master Plan Update

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 Travis Harris, working under the City Engineer, Debi Meling.

Section 3. Scope of Work.

The project consists of engineering planning services for the City of Billings W.O. 18-23 – 2018 Water Master Plan Update. Overall general concepts of the Master Plan (MP) include:

- The MP evaluation will be for a 20 year period.
- The MP will be concentrated on water system infrastructure and will have minimum emphasis on operations.
- Evaluations will include the proposed water treatment plant (WTP) on the West End of Billings but only in terms of the WTP being a source of water and water storage. Nothing specific to the WTP process, exact location or operation will be evaluated.
- Population projections and water demands will be updated for each pressure zone.
- The City's current model will be updated, incorporating recent projects and projected demands, to facilitate evaluating existing infrastructure limitations and for projecting future infrastructure.
- A water system storage analysis will be performed based on updated demand projections.
- Analyzing distribution system operation
- A trigger based capital improvement plan (CIP) will be developed that will also include an initial time based implementation schedule.

The master plan excludes the following components:

- Evaluation of any water treatment facilities.
- Existing pressure zone boundary adjustments evaluation. Previous work will be included.
- Risk and resiliency analysis
- Analyzing plant operation

- Water age analysis with two plants operating
- Analyzing two plant operation for efficiency, water movement and seasonal operation.
- Condition analysis of facilities
- Emergency protocols

DETAIL SCOPE OF SERVICES

The scope of services that will be utilized on the Billings Water Master Plan Update project is presented in the summaries for Tasks 100 through 800. The scope of services is organized as follows:

<u>Task Series</u>	<u>Description</u>
100	Project Initiation, Coordination, and Management
200	Data Collection
300	Demand Projections
400	Existing Water Distribution System
500	Storage Analysis
600	Model Analysis
700	Miscellaneous
800	CIP Development
900	Master Plan Document

TASK SERIES 100 – PROJECT INITIATION, COORDINATION, AND MANAGEMENT

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. The project will be kicked off with the City with pertinent staff from the City and HDR to review the project components, schedule, and the process for completing the water master plan.

- Deliverable: Meeting with City, agenda and meeting minutes.

102 – Meetings with City Staff

During the master plan development process, key members of the Consultant 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 monthly on the average with a review meeting at the completion of the draft master plan and CIP. Fourteen (14) total meetings are planned for that could include workshops, meeting updates and conference calls.

- Deliverable: Agenda and meeting minutes for each meeting.

103 – Project Management

As part of this task, the Engineer’s Project Manager will lead coordination of the project team with the City as well as supervise the project team. Project Manager and Accountant will monitor project status, maintain project schedule and prepare financial documents.

- Deliverable: Monthly Invoices

TASK SERIES 200 – DATA COLLECTION

This task series will include obtaining all existing information from the City pertinent to the water master plan, processing the information and reviewing the results of the processed data with the City. The tasks associated with data collection include the following:

201 –Meter Data

Obtain monthly water meter data with applicable account address and customer class information and GIS-based land base with parcel attribute information. Correlate the two data sets and geocode the water meter data to parcel information to create a spatial coverage of account-level water usage.) Review and compare records to previous model demand allocation. Using Theissen polygons, distribute GIS-based demand to the pertinent model junctions. Review data from the 20 largest water users in the system and verify location of point of use. Evaluate all meter data to determine per capita use, seasonal use and compare to pump station meter data.

- Assumptions: City will provide a database that will include a unique parcel ID, geocode and all available parcel information. The database will be set up so that historical monthly meter data will be able to be linked to the database for evaluation and uploading to the water model.
- Deliverable: Data tables of meter readings, per capita use by pressure zone, GIS file with allocated meter ID, geocode, address and model junction.

202 – Pump Station Meter Data

Collect meter data for the distribution pump stations including High Service Pump Stations for the last 10 years. Analyze the data to determine any outlier data points. Perform calculations to determine supply to each pressure zone based on the pump station meter information. Evaluate results and adjust as needed to arrive at supply numbers for each zone.

- Deliverables: Summary of pump station raw meter data
Calculations to determine supply to each zone
Adjusted water supply estimate to each zone by year

203 – Zoning, Planning and Land Use Information

Collect digital City and County GIS information related to zoning, population projections, planned developments and projected land use, if available.

- Deliverable: Summarize spatially by pressure zone the data collected.

TASK SERIES 300 – DEMAND PROJECTIONS

301 – Establish Demands in Existing Pressure Zones

Use meter data collected and most recent population data to estimate existing total demands and per capita demands for each current pressure zone.

- Deliverables: Estimated existing demand in existing pressure zones
Estimated per capita demand by pressure zone

302 – Determine Growth in Each Pressure Zone

Verify boundaries of current and future pressure zones. Utilize collected planning information to estimate residential, commercial and industrial growth increases for each pressure zone over the 20-year planning period.

- Deliverables: Current and future pressure zone boundaries
Growth and type of growth by pressure zone

303 – Determine Projected Demands for Each Pressure Zone

Utilize developed per capita demands, any projected changes in per capita demands, and projected demands for commercial and industrial by pressure zone and project demands. Project demands for each pressure zone at 10 and 20 year intervals. Demand increases to 10-year and then 20-year will be assumed to be linear. A workshop will conclude this task with the goal of obtaining direction on the demand projections prior to proceeding with subsequent master planning tasks.

- Deliverables: Projected water demand by pressure zone for 10-year and 20-year intervals.

TASK SERIES 400 – EXISTING WATER DISTRIBUTION SYSTEM

401 – Facility Description of Water Distribution System

Build off of Chapter 3 of the 2006 Master Plan and provide an up to date description of the existing storage facilities, pump stations, pressure zones and major distribution mains.

- Deliverables: Water Facility Description and Summary Graphic

TASK SERIES 500 – STORAGE EVALUATION

501 – Establish Storage Requirements by Pressure Zone

Based on projected demands for current and future pressure zones, calculate the storage volume needed for fire, operating and emergency volumes to determine a total storage volume needed per pressure zone. Assume one fire in the service area at a time. Show storage needs for each pressure zone as a fire demand is placed separately in each zone.

- Deliverables: Storage volume requirement per pressure zone for current and future projected demands.

502 – Evaluate Reallocating Storage

Evaluate reallocating storage from pressure zones with excess storage to pressure zones with a storage deficiency. Evaluation to include existing provisions for moving storage as well as new potential provisions that could beneficially be used to move water between zones. Include potential storage from clearwell(s) at West End WTP.

- Deliverables: Summary of locations to move water from one pressure zone to another for the benefit of meeting storage requirements.
- Deliverables: Updated storage summary by zone.

503 – Determine Winter Storage Requirements

Based on current and projected demands during winter, update evaluation to determine wintertime storage needs. Evaluate reallocating storage between zones similar to peak demands.

- Deliverables: Storage volume requirements and storage reallocation for current and future projected wintertime demands.

504 – Storage Recommendations

Provide recommendations for future storage requirements and provisions to move storage between zones. Take into consideration: configuration of existing storage, reliability of moving water between zones, condition of existing Staples 6 MG reservoir and seasonal operation.

- Deliverable: Summary of storage recommendations.

505 – SCADA Provisions

Based on current storage volumes and provisions to move water between zones, develop a graphical representation of the distribution system storage provisions and how water can be moved from one zone to another.

- Deliverable: SCADA graphical representation and programming recommendations to represent storage system.

TASK SERIES 600 – Model Analysis

Use the City's water model to analyze the distribution system. Analysis should include the proposed West End WTP located south of Hesper Road between 48th St. West and Shiloh Road.

601 – Model Update

Update the existing water model with any recent or currently being built facilities as well as new parcel-level water demands. Review operations and controls in the model with City staff and update the model with any changes.

- Assumptions: City will provide information on recent/current facilities and controls.
All pipes, except laterals and fire hydrant pipelines, will be included in the model.
- Deliverable: Updated model.

602 – Calibrate Model

Once model has been updated, the model will be calibrated for both steady state (SS) and extended period simulation (EPS). Provide requests for the City to conduct fire hydrant tests and provide 24-hour SCADA reservoir and pump operation(s) to facilitate calibration.

- Assumptions: City will conduct fire hydrant tests and provide SCADA tank level and pump station operation records, including High Service Pump Station and Clearwells.
- Deliverable: Fire hydrant testing/model calibration plan. Final Calibrated model.

603 – Water System Analysis

Expand the calibrated model to include applicable seasonal operational control settings to evaluate the water distribution system piping, pumping and storage network. Model runs to include the following:

Base Analyses	Analysis	Average Day	Minimum Day	Maximum Day	Peak Hour
Existing	Pressure	★	★	★	★
	Velocity	★	★	★	★
	Water Age	★	★		
	Fire Flow			★	
Future	Pressure	★	★	★	★
	Velocity	★	★	★	★
	Water Age	★	★		
	Fire Flow			★	

- Existing System Improvements Analysis to address existing system deficiencies
- Existing System Improvements Analysis to address future system deficiencies
- West End WTP and Recommended Operations/Modifications Analysis

Run the calibrated model to evaluate the aforementioned scenarios. Modify piping and pumping in the model to improve model run results and address modeled deficiencies. Evaluate benefits of moving water from one zone to another in new locations. Evaluate the ability of the proposed West End WTP to provide water to the distribution system with the existing WTP off-line and if needed, determine modifications to facilitate this mode of operation. Provide recommendations for expansion, pressure adjustments and upgrades.

- Assumptions: City will provide applicable seasonal system pumping/storage/operating conditions to import into the model facility settings.
- Deliverable: Figures showing pressures, velocities and water age. Schematic for operating West End WTP only Recommended piping and pumping upgrade modifications

604 – Distribution System Operation Analysis

In conjunction with City staff brainstorm water system operations to evaluate different operation scenarios, means to increase redundancy and ways to make relatively minor capital modifications/additions to improve operations.

- Deliverable: Recommendations for means to improve operations.

TASK SERIES 700 - Miscellaneous

701 – Pressure Reducing Stations

Develop a standard design for pressure reducing stations for allowing water to safely move from a higher zone to a lower zone. Also provide recommended control and monitoring of the pressure reducing station.

- Deliverable: Pressure reducing station standard design and control.

702 – Backup Power

Review existing backup power provisions for the distribution system including High Service Pump Station. Analyze the existing and future needs. Future needs to be based on recommendations of improvements identified in previous tasks.

- Deliverable: Recommendation for backup power additions/upgrades.

703 – North Billings Water System Expansion Analysis

Review requirements and provide planning level cost estimates to serve the area north of Zone 2 East from Zone 3 East to the Yellowstone River.

- Deliverable: Draft Technical Memorandum summarizing expansion requirements and planning level costs.

TASK SERIES 800 – CIP Development

801 – Cost Estimate

Develop total project cost estimates for recommended improvements.

- Deliverable: Individual total project cost estimates.

802 – Project Worksheets

Develop project worksheets for each improvement or group of improvements. Include project description, cost estimate and a trigger for when the improvement is needed. Include a graphic as appropriate. Review worksheets with the City.

- Deliverable: Project Worksheets.

803 – CIP

Based on agreed upon projects, develop a CIP summary that includes project, estimated cost and trigger. Utilizing projected demands, time estimates of other triggers, available funding and other projected water projects, develop a time based CIP. Near term projects will be included in a 10-year CIP. Projects beyond 10-years will be listed as long-term.

- Deliverable: Trigger based CIP summary
Time based CIP

TASK SERIES 900 – Water Master Plan Document

901 – Prepare Draft Water Master Plan

Based on results in the previous tasks develop draft of the water master plan.. Submit to the City for review.

- Deliverable: Draft Water Master Plan in a *.pdf file format for internal distribution as appropriate.

902 – Finalize Water Master Plan

Incorporate City comments in the water master plan and finalize.

- Deliverable: Final Water Master Plan. (1) electronic copy and (5) hard copies.

Appendix B

Methods and Times of Payment City of Billings W.O. 18-23: Water Master Plan Update

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 Initiation, Coordination and Management	\$ 40,400
2. Data Collection	\$ 19,400
3. Demand Projections	\$ 25,900
4. Existing Water Distribution System	\$ 14,300
5. Storage Analysis	\$ 20,100
6. Model Analysis	\$ 88,900
7. Miscellaneous	\$ 37,300
8. CIP Development	\$ 41,500
9. Master Plan Document	\$ 46,100
	<hr/>
	\$ 333,900

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. 18-23: Water Master Plan Update

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. 18-23: Water Master Plan Update

Not used on this Contract.

Appendix E

Project Schedule City of Billings W.O. 18-23: Water Master Plan Update

Based on a notice to proceed by Billings dated no later than December 17, 2018, the completion date for the Engineer's work shall be:

- A. Data Collection – February 2019
- B. Demand Projection – April 2019
- C. Storage Analysis – June 2019
- D. Model Analysis – September 2019
- E. CIP Development – November 2019
- F. Finalize Master Plan – January 2020

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. 18-23: Water Master Plan Update

(Attach Certificate(s) of Insurance)