Proposed Scope of Professional Services

To:	Todd Fessenden (Town of Erie)
From:	Dave Colvin and Jeff Anderson (LRE Water)
Copy to:	Paul Zilis (Vranesh and Raisch, LLP)
Reviewed by:	Greg Roush
Date:	June 22, 2020
Project:	NWRF Horizontal Well Project
Subject:	Proposed HDD Well Design, Construction and Pilot Test Scope of Services

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Introduction

LRE Water is providing this memorandum as a proposed scope of work for the design, permitting, contractor procurement, pilot testing and construction oversight of a horizontal directionally drilled (HDD) well at the Town of Erie (Town) – North Water Reclamation Facility (NWRF).

The LRE Water project team (LRE Team) includes Kennedy Jenks for civil engineering support related to the design and construction oversight of an outlet structure, pumps, pipelines, connection to existing pipelines and other civil infrastructure project components. Kennedy Jenks will also subcontract additional tasks including surveying (True North), geotechnical engineering (Kumar and Associates), and floodplain permitting (Deere & Ault). Pinyon Environmental will provide water quality, environmental, and construction permitting support. An organization chart for the proposed LRE Team is included in the chart below.

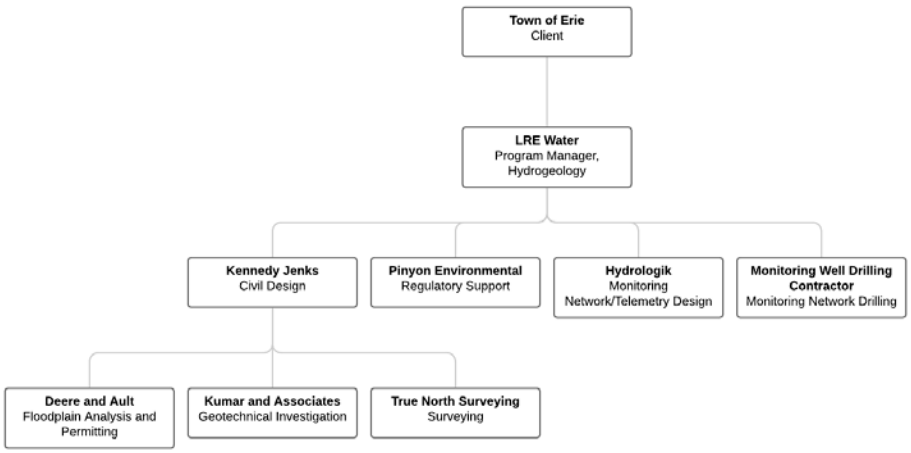


Figure 1 - Project Organizational Chart

The proposed project scope includes four primary tasks, and one supplemental task:

- Task 1 – Pre-construction Services (civil design, planning, and permitting)
- Task 2 – HDD and Monitoring Well Installation
- Task 3 - HDD Well Pilot Testing
- Task 4 – Construction Services –Facilities Build-Out and Improvements
- Task 5 – Supplemental Services

Additional detail regarding these tasks is provided in the following sections.

Task 1 – Pre-construction Services

Task 1 preconstruction services will include project design, permitting, planning, Contractor procurement, and Contractor management support. In addition, Task 1 pre-construction services will include pilot test design and water rights planning associated with the construction, pilot operations, and full-scale operations of the HDD well.

After LRE receives Notice to Proceed from the Town the following tasks will be completed:

1. A project kickoff meeting with stakeholders will be held at the Town Hall and/or as a web conference
2. An RFQ will be prepared by the LRE Team for HDD drilling Contractor selection
3. The Town will negotiate a contract with the HDD Contractor for the HDD well design only

The project design tasks will proceed after, and concurrent with, completion of these initial tasks.

Task 1.0 Project Planning and Management

The success of this project requires effective communication and coordination among the various stakeholders (i.e. the Town, the LRE Team, HDD well and Construction Contractors, etc.). At the beginning of the project, we will provide a Project Management Plan (PMP) that will detail the scope of work, baseline schedule, budget, communication, and quality control management. During the implementation of this project, we will provide monthly project management updates with details on the work completed, upcoming tasks, and any scope, schedule or budget variations from the PMP. We will provide weekly email summaries throughout the project. The LRE Water Project Manager or project team members will be available throughout the project for unplanned communication, as needed.

All draft deliverables will be provided to the Town for review and comment. The LRE Team will incorporate one round of Town comments into final deliverables. The LRE Water Project Manager will be the primary point of contact for the Town, and as such, will coordinate implementation of the PMP scope, schedule, and budget with the seven other proposed contractors, shown on Figure 1, to ensure that any deviation to the PMP is communicated to and approved by the Town.

Based on our experience managing similar projects, we have included a proposed project management budget that is 7.5% of the total LRE Water labor hours, or approximately $27,000.

Task 1.1 Project Design – Civil and Conveyance System

In Task 1, the LRE Team will provide engineering design services building off of the conceptual design shown in Figure 2.

Task 1.1 will include existing pipeline review and analysis, topographic survey, geotechnical evaluation, pipeline design, electrical and instrumentation design, and bidding services, as described further in Appendix A – Kennedy Jenks Proposal for Professional Engineering Services.

Design features may include:

- One (1) horizontal directionally drilled (HDD well);
- Two (2) HDD well submersible pumps with associated electrical connection, instrumentation and control;
- Pitless adapters and pipelines to convey water from two HDD well heads to an existing 18" drain pipeline connected to the existing Pump Station (Figure 2) that can route HDD well water into either the NWRF Reservoir or existing 24" irrigation line and the Town's non-potable water system. However, water from the HDD well will not be routed into the NWRF Reservoir.
- One (1) stream gage upstream of the HDD well and existing NWRF outlet for monitoring Boulder Creek surface water flow and quality;
- A network of monitoring wells and equipment for monitoring groundwater hydrology and water quality;
- Automated water quality and hydrologic sampling/monitoring devices; and,
- NWRF SCADA system integration.

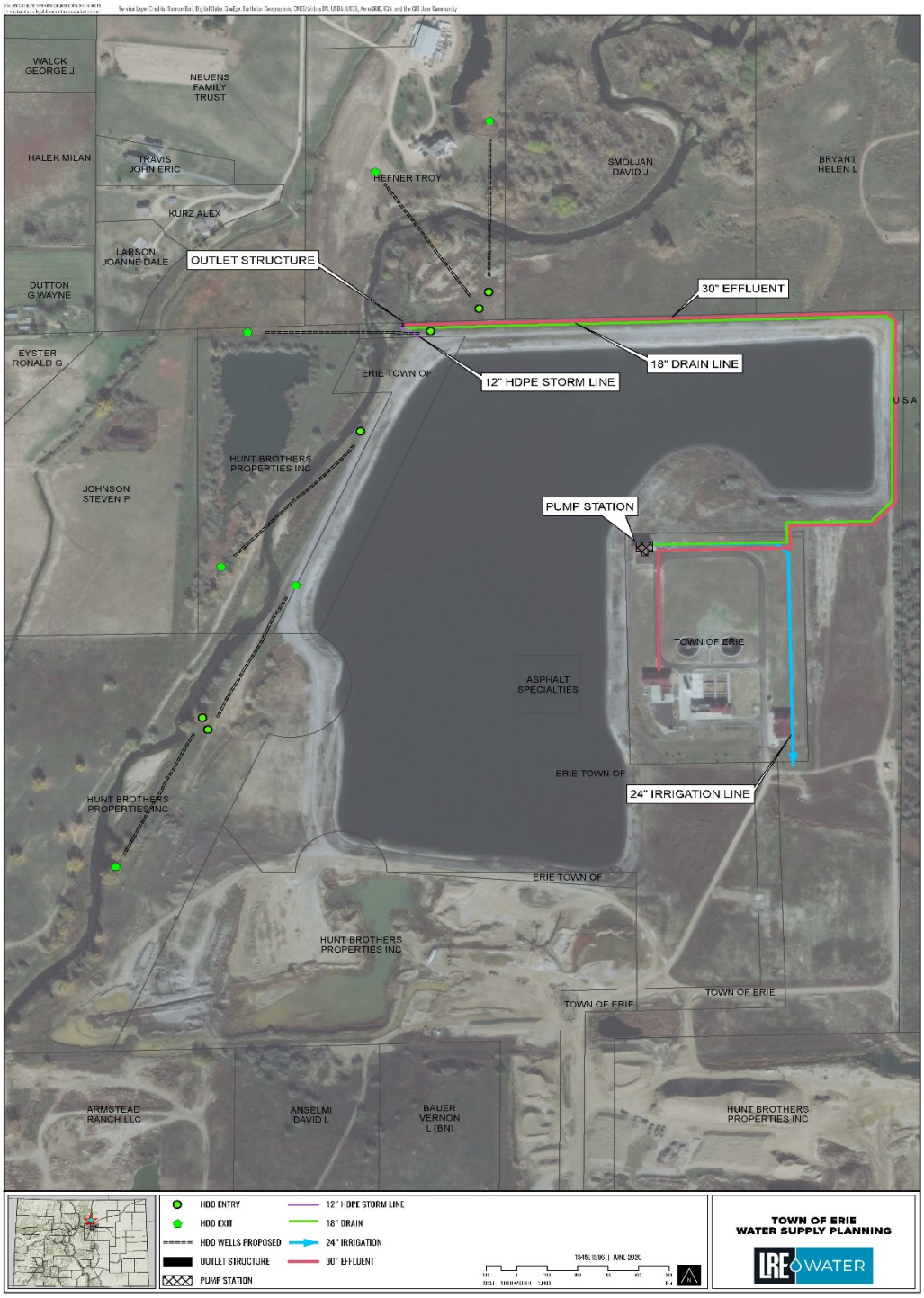


Figure 2 - Conceptual Design of NWRF Horizontal Well Project

Based on input from the Town, we are assuming that a time and materials, not to exceed budget, contracting vehicle will be used for design services (this scope) and and for engineering oversight and support during construction services. Per the Kennedy Jenks proposal in Appendix A, this project will be a design, bid, procure, build process.

Task 1.2 HDD Well Design and Pilot Test Planning

The LRE Team will advance the HDD well design to approximately a 60% design. The LRE Team will provide a request for qualifications (RFQ) package (including specifications and drawings) sufficient for a qualifications based HDD well construction Contractor selection process. We recommend a qualifications based procurement due to the specialized nature of horizontal water well drilling. Once the drilling Contractor is under contract with the Town, the LRE Team will coordinate with the Town to select one of the HDD well locations indicated on Figure 2, and advance the well design to approximately 90%. During this period, the LRE Team, Contractor and Town will collaborate on value-engineering, constructability, improving system quality and gaining access to the site. Once a final design is developed, the Contractor will be required to provide a guaranteed maximum price (GMP) for the HDD well installation and accessory services. If the GMP is deemed unacceptable by the Town or the LRE Team, it will be rejected and a public bid based on the final design may be considered. If the GMP is acceptable, the project will move into construction phase.

After the HDD well final design has been reviewed and approved by the Town, the LRE Team will apply for a technical variance from the Colorado Division of Water Resources (DWR), Board of Examiners (BOE). The BOE will require a variance approval for non-standard well design and construction. The BOE typically requests well designs for review and then a presentation at one or more of their Board meetings. Past experience indicates that the BOE will critically review the drilling fluids and well seal technical approach and design specifications. Well permits will not be issued until a variance is approved. Upon receiving BOE approval of the technical variance for the HDD well construction, the design will be considered final and complete.

During Task 1.2, the LRE Team will develop an HDD well pilot testing plan. The pilot testing plan will detail well operations, monitoring equipment types and locations, and water quality sampling locations/frequency.

Task 1.3 Environmental Permitting

Construction of the site will require permits or reviews from several regulatory agencies. In Task 1.3, the LRE Team (including Pinyon Environmental) will identify permits that are likely required and need consideration for the HDD well construction, pilot test, and operations. The listed permits and regulatory actions will be updated and initiated at the completion of Site design. Key permits and regulatory interactions include:

- Colorado Department of Public Health and Environmental (CDPHE) – NPDES permit for temporary discharge of HDD well water to Boulder Creek during pilot testing
- Army Corps Of Engineers Section 404 – Nationwide Permit
- Endangered Species
- National Historic Preservation Act
- Colorado Parks and Wildlife
- Weld County USR
- Storm Water Management Plan during construction
- Construction Dewatering
- Groundwater Under the Direct Influence (GWUDI) of Surface Water considerations
- Document that Floodplain Hazard Permit is not required for this job

Additional proposed permitting scope information is provided in Appendix B – Project Permitting Requirements.

Task 1.4 Water Rights Planning and Engineering

During the construction and pilot testing phases, there will be some water rights management and reporting required. In Task 1.4, we will develop a water rights plan including substitute water supply plan (SWSP) submission, or plan to operate under the 19CW3063 Wells Decree and 19CW3064 Augmentation Plan Decree if those decrees have been entered.

Task 1 Assumptions

We are assuming that in Task 1:

- The project will proceed per the proposed schedule that is included later in the document, and it was predicated on input received from Kennedy Jenks and Pinyon.
- The Town will provide necessary information for integration into existing infrastructure and SCADA systems.
- Planned meetings will be held in person at Town Hall and/or via web conference and will include:

  - Project kick-off meeting
  - 60% design and Contractor procurement planning meeting
  - Design coordination meeting between Town staff and the LRE Team
  - Final design meeting

- The LRE Team will provide up to 60% design/bid package for the HDD well without Contractor input.
- The LRE Team will assist in the preparation of permits. All construction related permits will be held and paid for by the construction Contractor. Other required permits will be held and paid for by the Town.
- The Town will locate and mark any onsite utilities not located by Colorado 811.
- Permitting fees, including SWSP filing and Well Permit fees, will be paid by the Town.

Task 1 Deliverables

- Project Management Plan
- HDD well contractor RFQ package
- Pipeline Analysis Report
- Geotechnical Report
- Topographic Survey
- 60%, 90% and Final HDD well Design
- HDD Drilling Contractor Bid Package
- 60%, 90%, and Final Civil Construction Design Drawings and Specifications
- HDD Well Pilot Testing Plan
- A well construction variance application for the HDD well and all other associated well permit applicationswill be prepared by LRE for signature by the Town.

- Pilot Testing, Environmental Permitting and Water Rights Substitute Water Supply Plan application.

Task 2 – HDD and Monitoring Well Installations

During Task 2, the LRE Water Team will provide construction services including:

Installation of a set of shallow monitoring wells to measure heads and monitor groundwater flow and hydrology characteristics while pilot testing the HDD well. It is anticpated that these will be 2-inch diameter, PVC cased, monitoring wells that will be instrumented to automate the collection of aquifer head data. These monitoring wells can also be used during future operation of HDD and other production well(s) to measure aquifer conditions and well performance.

Field site prepartation will be completed and it that may require grading and leveling a drilling pad and access road in order to mobilize the truck mounted drilling machine to the drilling location. Other drilling logistics such as:

- Utilities clearance,
- Preparing an area at the 'toe' of the directionally drilled well to layout the entire 600+ foot length of completion pipe and screen,
- A secure laydown area for well construction materials and equipment,
- A source of water for drilling and completion of both monitoring and HDD wells,
- Mud storage and disposal,
- Drilling cuttings disposition, and
- Other requirements that the HDD drilling Contractor may have for this job

Task 2 Assumptions

- This task is schedule critical and it is assumed to proceed per the proposed schedule included in the memo, as the conveyance and civil designs are reliant on the groundwater specific yield or volumetric discharge of the HDD test well.
- Monitoring wells can be installed immediately and LRE can contract with the monitoring well driller, or if preffered the drilling contractor can contract with the Town. We have assumed that LRE will hold the contract.

- The LRE Team design lead(s) will attend a pre-bid meeting at the Town's office and/or web conference, respond to bidder's questions, and prepare addenda as necessary. Preparation of two addenda is included in this proposal.
- An experienced and qualified HDD drilling contractor will be selected, with input from the LRE Team, and contract directly with the Town.
- The schedule will not be affected by unexpected delays in the Town contracting with the HDD Driller and/or the Board of Examiners well construction variance approval.
- The Town will accept the guaranteed maximum price, implement a Contractor procurement, and will enter into an HDD Well construction agreement directly with the Contractor.
- The Town will manage the project as a CMAR delivery with the LRE Team, Contractor and Town staff collaborating on final design.
- The selected HDD and monitoring well sites will have adequate access for the truck mounted drilling equipment.
- LRE will provide site geology support and guidance for the HDD drilling contractor that is selected by the Town of Erie.
- Surface use agreements or easements and right-of-ways will be obtained by the Town prior to drilling to allow the drilling contractor access to the HDD and monitoring well locations.
- There is an acceptable water supply readily available for the drilling contractor for the well installations.
- Drill cuttings and drilling fluids will be properly contained and disposed of by the drilling contractor.
- Adequate laydown space for well construction and a materials storage area are available for driller.

Task 2 Deliverables

- A drilling contractor will install a series of groundwater monitoring wells and a direction drilling conractor will install, and complete with pumping and monitoring equipment, a HDD well.
- A well installation report that includes, soil boring logs, well construction as-built drawings, well test results, figures, and tables.

Task 3 – HDD Well Pilot Testing

Task 3 services will include HDD well pilot test implementation, coordination of a Community Workshop, and preparation of HDD Well Best Practices Report. Much of the Task 3 scope of work

was detailed in the Colorado Water Plan (CWP) grant application, and resulted in a $200,000 Colorado Water Conservation Board (CWCB) funding approval:

> *"The Town of Erie is planning the construction and pilot testing of a Horizontally Directionally Drilled (HDD) well to divert Boulder Creek water while gaining water quality improvements through riverbank filtration (RBF) processes. HDD wells are innovative alternatives to vertical wells that address operational and maintenance challenges associated with thin alluvial aquifers in areas impacted by upstream discharge of wastewater treatment plant effluent. Horizontal wells typically have much higher yields than vertical wells in these conditions, which are common in the South Platte and Arkansas basins. Erie will initially put the water to beneficial use by pumping raw water augmented with Windy Gap effluent into a non-potable water pipeline for municipal use. Water rights and augmentation plan applications have been submitted, and a SWSP will be obtained to initiate the project.*
>
> *The CWP Grant funding would be used for partial funding of the study portion, Task 3: Pilot Operations, Reporting and Community Workshop. This task will serve as a demonstration project for other entities that may benefit from improved alluvial groundwater supply development. If approved, this grant application would partially fund an HDD pilot facility operation, development of a best practices public document, and a community workshop to share information."*

Task 3.1 – Pilot Test Operations

During Task 1 (described above), the LRE Team will develop a pilot testing plan to optimize the yield and water quality of water produced from the HDD well. We will make updates to the plan based on the results of Task 2 construction. Pilot testing will include up to six (6) long-term pumping tests (14 to 30 days each) over a range of seasonal flow conditions in Boulder Creek. Pumping tests will target maximum yield, longer hydraulic residence time (better water quality), and some compromise of the two.

To the extent possible, we will utilize automated data logging equipment to reduce the field effort (and related expense) required during pilot testing. We will coordinate pilot test data collection with the SCADA system. Collected pumping amounts will be incorporated into Task 1 SWSP water use accounting forms to calculate daily stream depletions and record augmentation supplies released. Reports to the State Administrators will be made according to terms approved in the SWSP.

Water quality samples will be collected in Boulder Creek, in intermediate monitoring wells, and from the HDD well during pumping operations. A pilot operations schedule will be developed to assess water quality changes at different pumping rates and at different creek stages. Characterizing the water quality

at different pumping rates will allow for coordination with the Town's water treatment/distribution staff so that the desired pumping rate and water quality can be identified.

Establishing a tiered list of monitoring parameters will reduce the costs of water quality monitoring during pilot operations. Certain water quality parameters can be monitored continuously or frequently and can indicate when comprehensive sampling should occur. The recommended parameters and compounds include:

- Tier 1 Physico-Chemical Parameters: Temperature, pH, Conductivity, Dissolved Oxygen (DO), Alkalinity, Turbidity.
- Tier 2 Bulk Parameters (including organic matter and major ions): Dissolved/Total Organic Carbon (DOC/TOC), Ultraviolet Absorbance 254, Specific Ultraviolet Absorbance, Ammonia (NH4-N), Nitrate (N03-N), Hardness (as CaC03), Fluoride, Chloride, Bromide, Phosphate, Sulfate, iron and manganese.
- Tier 3 Parameters – Bacteria, perflourinated compounds, 1,4 Dioxane, NDMA, arsenic, selenium, and contaminants of emerging concerns (CECs).

Monitoring Tier 1 and 2 parameters may provide indications of water quality improvements for key parameters including CECs, nutrients, and TOC. We recommend additional sampling for Tier 3 parameters at important locations and times (non-pumping baseline, maximum pumping rate, etc.).

Task 3.2 – Groundwater Model Update

Once the pilot testing results are available, we will update the existing groundwater flow model and to match observed HDD well yield and expand the model to incude fate and transport to simulate water quality. This updated model will help with system optimization and the planning of future horizontal wells.

The existing groundwater model will be re-calibrated to observed HDD well performance. Performance data will include water levels, pumping rates, and hydraulic residence time (as represented by water quality data). The updated model will be used to recalculate the estimated performance of the other five planned HDD wells. In addition, a collector well may be simulated for future site expansion considerations.

Task 3.3 – Alluvial Groundwater Community Workshop

The LRE Team will plan and coordinate a community workshop intended to provide other water suppliers with information from the HDD well planning, design, permitting, construction, and pilot testing. Because HDD wells are uncommon in Colorado, we expect that other entities would benefit from the Town's experience and would also share relevant information about their shallow alluvial groundwater systems.

We have several municipal clients that have expressed interest in an alluvial groundwater community workshop.

The LRE Team will prepare workshop presentation and handout materials for the Town's review prior to distribution. We will conduct an online survey of water providers to promote interest in the workshop and to collect information regarding workshop content. We will coordinate logistics and host the workshop in a web conference and/or at the LRE Water office in Denver.

Task 3.4 – HDD Wells Best Practices Report

The LRE Team will summarize the pilot test equipment, methodology, and results in an HDD Wells Best Practices Report to be shared with the CWCB and the Alluvial Groundwater Community Workshop attendees. The content and results of the Workshop will also be summarized in the report. The report will be intended to provide the Town and other water suppliers information helpful to the feasibility evaluation, planning, design, construction, operation, and maintenance of HDD wells.

Task 3 Assumptions

We are assuming that:

- One baseline (non-pumping) water quality sampling event will take place prior to pumping tests
- Up to six (6) 14 – 30 day pumping tests will be performed, with two (2) water quality sampling events per test, which are included in the proposed schedule that appears later in the memo
- Field staffing will be reduced by utilizing automated data collection and telemetry for water levels, pumping rates, and water quality
- The Town will contract directly with a water quality laboratory for analytical services, or will perform analyses at the NWRF facility

Pilot testing will take up to nine (9) months

Task 3 Deliverables

- Alluvial Groundwater Community Workshop materials (survey, handouts, presentation)
- HDD Wells Best Practices Report

Task 4 – Construction Services – Facilities Build-Out and Improvements

During Task 4, the LRE Team will provide construction services including:

- Part-time construction observation by LRE Water and Kennedy Jenks for associated pipeline infrastructure, electrical, controls and instrumentation. We will coordinate, review and document testing of the equipment installed by the Contractor.
- LRE and Kennedy Jenks will attend a preconstruction meeting with the Contractor and Town staff. We will review shop drawings, perform part-time construction observation and provide engineering consultation. We will coordinate, review and document testing of the equipment installed by the Contractor. We will attend weekly construction meetings by phone or on site. The LRE Team will respond to requests for information (RFIs), prepare change orders, and review/approve pay estimates.
- The LRE Team will conduct a project start-up at the well site and prepare a punch list of items to be completed by the Contractor. We will prepare record drawings based on the Contractor's redlines. We will review the Operations and Maintenance manuals provided by the material suppliers and Contractor and prepare a record controls narrative based in coordination with Town's NWRF operators.

Task 4 Assumptions

We are assuming that there will be sixty (60) shop drawings, twenty (20) resubmittals, four (4) RFQs, six (6) RFIs, five (5) change orders, and six (6) pay estimates. We are currently estimating that LRE Water and/or Kennedy Jenks field observation will consist of up to 14 hours per week over a 20 week period (included in proposed schedule). An additional hour per week is budgeted for LRE Water and Kennedy Jenks representatives (one each) to attend a construction meeting.

Task 4 Deliverables

- Record Drawings
- Controls narrative and operational guidelines

Task 5 - Supplemental Services

Due to the long planning horizon for this proposal, we are including a supplemental services task to account for unplanned work requirements. This task is proposed as 20% of the budget for Tasks 1-4 and will only be utilized when approved by the Town. The LRE Team will provide an email proposal with

scope, schedule and budget details, and will only proceed when written approval is received from the Town.

Unplanned efforts could include:

- Unexpected design or re-design efforts
- Unexpected subsurface conditions
- Unexpected permitting requirements
- Additional water rights interactions, or reporting requirements
- Weather or contractor related construction delays
- Equipment failure during pilot testing

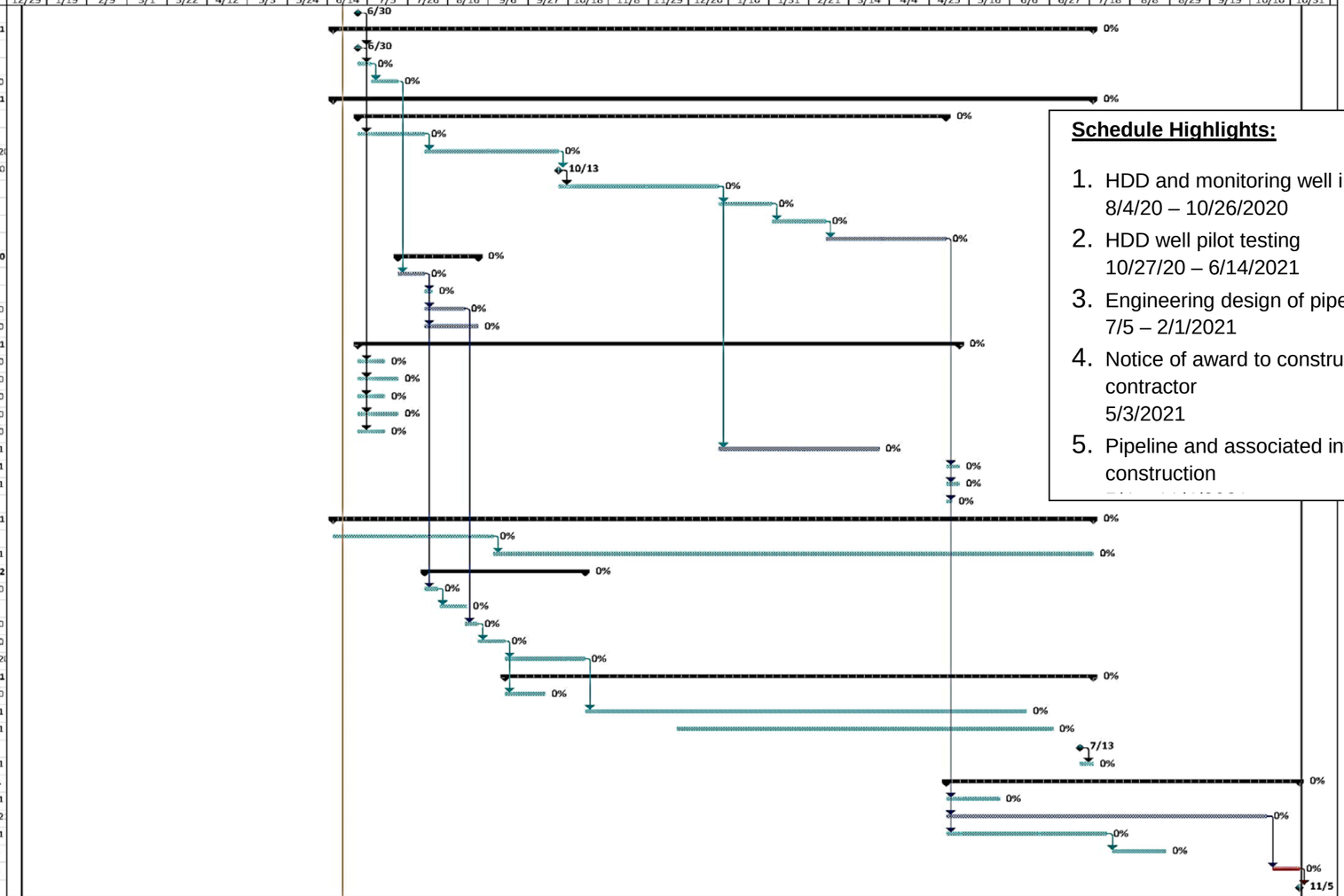
Closing

Thank you for providing us the opportunity to present this proposal to the Town of Erie for the subject HDD well and associated infrastructure. If you have further questions regarding this proposal, or would like to discuss further, please call Dave Colvin at 720-771-4403

Proposed Schedule

Initial Project Schedule - Town of Erie HDD Well

ID	WBS	Task Name	Duration	Start	Finish
1	1	**LREWater Receives NTP from Town of Erie**	0 days	Tue 6/30/20	Tue 6/30/20
2	2	**Task 1 - Pre-construction Services**	284 days	Wed 6/17/20	Mon 7/19/21
3	2.1	Project kickoff Meeting	0 days	Tue 6/30/20	Tue 6/30/20
4	2.2	RFQ for HDD Contractors	5 days	Tue 6/30/20	Mon 7/6/20
5	2.3	Erie Contracts with HDD Driller - Design Phase Only	10 days	Tue 7/7/20	Mon 7/20/20
6	2.4	**Detailed Design, Permitting, and Planning**	284 days	Wed 6/17/20	Mon 7/19/21
7	2.4.1	**Task 1.1 - Civil and Conveyance System Design**	220 days	Tue 6/30/20	Mon 5/3/21
8	2.4.1.1	Pipeline Analysis Technical Memo	25 days	Tue 6/30/20	Mon 8/3/20
9	2.4.1.2	60% Design - Conveyance System	50 days	Tue 8/4/20	Mon 10/12/2
10	2.4.1.3	United Power Application Submittal	0 days	Tue 10/13/20	Tue 10/13/20
11	2.4.1.4	90% Design - Conveyance System	60 days	Tue 10/13/20	Mon 1/4/21
12	2.4.1.5	Design Complete and Release Plans for Construction Bids	20 days	Tue 1/5/21	Mon 2/1/21
13	2.4.1.6	Bid Opening	20 days	Tue 2/2/21	Mon 3/1/21
14	2.4.1.7	Notice of Award	45 days	Tue 3/2/21	Mon 5/3/21
15	2.4.2	**Task 1.2 - HDD Well Design and Initial Well Test Planning**	30 days	Tue 7/21/20	Mon 8/31/20
16	2.4.2.1	60% HDD Well Design - Location, Depth, and Drilling Fluids	10 days	Tue 7/21/20	Mon 8/3/20
17	2.4.2.2	90% HDD Well Design	4 days	Tue 8/4/20	Fri 8/7/20
18	2.4.2.3	DWR BOE Technical Variance (mud and surface seal) = 100% D	15 days	Tue 8/4/20	Mon 8/24/20
19	2.4.2.4	Initial Well Testing - well ops, monitoring reqs, and sampling fr	20 days	Tue 8/4/20	Mon 8/31/20
20	2.4.3	**Task 1.3 - Permitting**	225 days	Tue 6/30/20	Mon 5/10/21
21	2.4.3.1	CDPHE NPDES Permit for Temp Discharge to Boulder Crk	10 days	Tue 6/30/20	Mon 7/13/20
22	2.4.3.2	ACOE Section 404 - Nationwide	15 days	Tue 6/30/20	Mon 7/20/20
23	2.4.3.3	Endangered Species	10 days	Tue 6/30/20	Mon 7/13/20
24	2.4.3.4	National Historic Preservation Act	15 days	Tue 6/30/20	Mon 7/20/20
25	2.4.3.5	Colorado Parks and Wildlife	10 days	Tue 6/30/20	Mon 7/13/20
26	2.4.3.6	Weld County USR	60 days	Tue 1/5/21	Mon 3/29/21
27	2.4.3.7	SWMP	5 days	Tue 5/4/21	Mon 5/10/21
28	2.4.3.8	Construction Dewatering	5 days	Tue 5/4/21	Mon 5/10/21
29	2.4.3.9	Document that Floodplain Hazard Permit is not Required	3 days	Tue 5/4/21	Thu 5/6/21
30	2.4.4	**Task 1.4 - Water Rights Planning and Engineering**	284 days	Wed 6/17/20	Mon 7/19/21
31	2.4.4.1	Engineering and SWSP	60 days	Wed 6/17/20	Tue 9/8/20
32	2.4.4.2	19CW3063 Wells 19CW3064 Augmentation Plan Reporting	224 days	Wed 9/9/20	Mon 7/19/21
33	3	**Task 2 - HDD and Monitoring Well Installations**	60 days	Tue 8/4/20	Mon 10/26/2
34	3.1	Procure Monitoring Well Contractor	5 days	Tue 8/4/20	Mon 8/10/20
35	3.2	Install Monitoring Wells	10 days	Wed 8/12/20	Tue 8/25/20
36	3.3	HDD Contractor Procurement for Well Installation	5 days	Tue 8/25/20	Mon 8/31/20
37	3.4	Field Logistics and Site Prep	10 days	Tue 9/1/20	Mon 9/14/20
38	3.5	Install HDD Well	30 days	Tue 9/15/20	Mon 10/26/20
39	4	**Task 3 - HDD Well Pilot Testing**	220 days	Tue 9/15/20	Mon 7/19/21
40	4.1	Install Temp Convey, Monitor, and Power System to Test HDD well	15 days	Tue 9/15/20	Mon 10/5/20
41	4.2	Pilot Test Operations 4 to 6 Longterm Tests	165 days	Tue 10/27/20	Mon 6/14/21
42	4.3	Groundwater Model Update	141 days	Mon 12/14/2	Mon 6/28/21
43	4.4	Alluvial Groundwater Community Workshop	0 days	Tue 7/13/21	Tue 7/13/21
44	4.5	HDD Wells Best Practices Report	5 days	Tue 7/13/21	Mon 7/19/21
45	5	**Task 4 - Construction Services - Facilities Build-Out and Improvement**	133 days	Tue 5/4/21	Thu 11/4/21
46	5.1	Boulder Creek Measurement Devices	20 days	Tue 5/4/21	Mon 5/31/21
47	5.2	Conveyance System (pipelines, pitless, pumps, etc.)	120 days	Tue 5/4/21	Mon 10/18/2
48	5.3	Electrical	60 days	Tue 5/4/21	Mon 7/26/21
49	5.4	Controls and Instrumentation	20 days	Fri 7/30/21	Thu 8/26/21
50	5.5	System Startup and Substantial Completion Approval by Town	10 days	Fri 10/22/21	Thu 11/4/21
51	6	**Task 5 - Supplemental Services**	0 days	Fri 11/5/21	Fri 11/5/21



Schedule Highlights:

1. HDD and monitoring well installed 8/4/20 – 10/26/2020
2. HDD well pilot testing 10/27/20 – 6/14/2021
3. Engineering design of pipeline 7/5 – 2/1/2021
4. Notice of award to construction contractor 5/3/2021
5. Pipeline and associated infrastructure construction

Critical | Task | Manual Task | Duration-only | Baseline Milestone | Summary | External Tasks | Inactive Milestone
Critical Split | Split | Start-only | Baseline | Milestone | Manual Summary | External Milestone | Inactive Summary
Critical Progress | Task Progress | Finish-only | Baseline Split | Summary Progress | Project Summary | Inactive Task | Deadline

CONNECTING WATER TO LIFE

Proposed Budget

Budget Summary								
		LRE Water						
Task No.	**Task Name**	**Hours**	**Labor Cost***	**Expenses**	**Sub Cost**		**Task Subtotal**	**Year**
1.0	Project Planning and Management	128	$27,108	$0	$36,332		$63,440	2020
1.1	Project Design - Civil and Conveyance System	164	$26,016	$0	$181,901		$207,917	2020
1.2	HDD Well Design and Initial Test Planning	176	$29,112	$0	$0		$29,112	2020
1.3	Environmental Permitting	96	$17,520	$500	$93,186		$111,206	2020
1.4	Water Rights Planning and Engineering	112	$17,432	$1,055	$0		$18,487	2020
2.0	Monitoring and HDD Well Installations	328	$53,712	$1,970	$20,000		$75,682	2020
3.0	HDD Well Pilot Testing and GWF Model Update	904	$140,607	$8,350	$0		$148,957	2021
3.3	CWCB Report and Community Workshop	280	$49,012	$960	$0		$49,972	2021
4.0	Construction Services	140	$27,501	$4,050	$174,329		$205,880	2021
	Sub totals	**2,328**	**$388,020**	**$16,885**	**$505,748**		**$910,653**	
	*Labor cost budgets increased by 3% for 2021 tasks.							
Task 5.0	Supplemental Services (20% of Tasks 1 - 4)						$182,131	
						Project Total:	**$1,092,783**	
	Summary for Subcontractors	**Proposed Pricing**			2020 Total:		$ 505,844	
	Kennedy Jenks	$418,481			2021 Total:		$ 404,809	
	Hydrologik	$12,000						
	Pinyon	$55,267						

Appendix A – Kennedy Jenks Proposal for Professional Engineering Services

Kennedy Jenks

19 June 2020

Mr. Dave Colvin
Groundwater Team Leader
Leonard Rice Engineers
1221 Auraria Pkwy
Denver, CO 80204

RE: Proposal for Professional Engineering Services
Town of Erie
NWRF Horizontal Well Project

Dear Mr. Colvin:

We are pleased to submit this proposal to provide engineering services to Leonard Rice Engineers (LRE) for the Northern Water Reclamation Facility Horizontal Well Project, which will be used to service the Town of Erie.

PROJECT CONCEPT

Leonard Rice will design the horizontal well and the associated pumping equipment to collect water from the alluvial zone around Boulder Creek. The well construction will be completed under a separate well drilling construction contract and is scheduled to be complete by September 2020. Kennedy Jenks (KJ) will provide Civil, Mechanical, Structural, Electrical, Instrumentation and Controls design services associated with the infrastructure to convey the well water into the Town of Erie's irrigation system. KJ's design will include the following:

1. Pitless Adapter well head.
2. Buried vault with flow meter, interior piping, sump pump, ventilation fan, and heater.
3. Above ground electrical pad with motor control equipment, PLC and VFD.
4. Water pipeline from the horizontal well to the NWRF irrigation line.
5. Stream gauge to monitor the flow and stage of Boulder Creek.

KJ assumes a new United Power electrical service will need to be brought to the well site to power the well pump and associated equipment. The electrical equipment will be installed on an elevated pad that is raised above the 100-year floodplain of Boulder Creek. The PLC will communicate with the plant via radio and will tie into the NWRF's SCADA system. KJ will provide a controls narrative for operation of the well.

A pipeline will be required to convey water from the proposed horizontal well at Boulder Creek to the NWRF. The NWRF has existing 18" and 30" pipelines that run from the reservoir's booster pump station to Boulder Creek. These pipelines may be used to pump water from the proposed well to the NWRF irrigation system. Kennedy Jenks will review the record drawing information and shop drawing

information for the existing 18” and 30” pipelines to determine if either have adequate capacity, restraint, and wall thickness to convey the water from the proposed well in Boulder Creek to the NWRF. For the purpose of this proposal, we have assumed design and installation of a new 18” to 24” pipeline will be required between the well and the NWRF irrigation system. The pipeline will be approximately 3,700 feet long based on the proposed horizontal well location.

KJ will also provide bidding and construction phase services that include construction observation, submittal review, and contractor coordination.

SCOPE OF SERVICES

The proposed scope of work for this project is based on our discussions with Leonard Rice and the Town of Erie. The scope includes Design, Agency Coordination, Bidding, and Construction Phase Services.

Task 1: Project Management

1. Project Management: Provide overall project management services, including project set-up, supervision of in-house staff, planning and monitoring of contract budget and schedule, preparing and reviewing monthly invoices, and coordination with the Leonard Rice Project Manager.

2. Quality Assurance/Quality Control: Provide quality assurance/quality control (QA/QC) for the project. The QA/QC includes review of recommendations and deliverables and internal QA/QC meetings with the project team. Kennedy Jenks will have internal quality control meetings at the project kickoff (Concept and Criteria Review meeting), 60% Design, and 90% Design.

3. Attend meetings at the Town of Erie during design of the project that will include:
   a. Project kick-off meeting
   b. 60% and 90% design review meetings.

Task 2: Pipeline Review and Analysis

1. Collect and review data provided by the Town for the existing 18” and 30” pipelines including record drawings, O&M Manuals, and shop drawings. Coordinate with the Town on current and future uses for the pipelines.

2. Perform hydraulic calculations to determine the necessary diameter and estimated pressures for the proposed pipeline based on projected well flows provided by LRE.

3. Calculate required restraint lengths for all fittings and joints along the existing pipelines based on the new flows and hydraulic calculations.

4. Develop a Pipeline Analysis Technical Memorandum that summarizes the findings of the pipeline review.

Task 3: Topographic Survey

1. Kennedy Jenks will coordinate with subconsultant True North Surveying and Mapping to perform a topographic survey of the project site.
   a. The survey will include topographic features with 1-foot interval contour lines, site improvements, and underground utilities surveyed to ASCE Quality Level B.
   b. The surveyor will provide three cross sections of Boulder Creek at the proposed stream gauge location.
   c. The surveyor will provide maps of the survey with topographic and planimetric data.
   d. The surveyor will provide as-built locations and elevations of the two horizontal well heads and four monitoring wells.
   e. The surveyor will perform five potholes of existing utilities located within the survey boundary, as directed by the Engineer.

2. Kennedy Jenks will perform an Engineer review of the survey documents in accordance with the Colorado Subsurface Utility Engineering Law.

Task 4: Geotechnical Evaluation

1. Kennedy Jenks will coordinate with subconsultant Kumar and Associates to perform a geotechnical evaluation of the project site.
   a. The evaluation will include geotechnical borings every 500 feet along the proposed pipeline and at the proposed vault location.
   b. Kumar and Associates will provide a geotechnical study that provides recommendations for design and construction based on their findings.

2. Kennedy Jenks will review the geotechnical report and incorporate the findings into our design.

Task 5: Civil and Mechanical Design

1. Visit the site to review the existing site conditions, field location of existing utilities, and the construction site access.

2. Perform civil design. Design an access road to the proposed well location. Design the waterline connections including isolation valves, blow-off assemblies, air release valves, and other appurtenances as necessary. Design the wellhead pitless adapter. Design the grading of the horizontal well site to raise the electrical equipment above the 100-year floodplain.

3. Perform mechanical design. Design the meter and valve vaults for the horizontal well. Perform HVAC design for the vault. Design of the pump, motor, and well level transducer will be performed by LRE.

4. Design a stream gauge for monitoring the flow of Boulder Creek.

5. Prepare the general, civil and mechanical construction drawings that include the following sheets:

    a) Cover sheet
    b) Index Sheet and Key Map
    c) Civil General Notes
    d) Civil Grading Plan
    e) Waterline Plan and Profile (4 sheets at 1" = 40' scale)
    f) Waterline Connection Details
    g) Pitless Adapter and Civil Details sheet (2 sheets)
    h) Erosion and Sediment Control (6 sheets)
    i) Mechanical General Notes
    j) Mechanical Well Vault Piping and HVAC Plan
    k) Mechanical and HVAC Details (2 sheets)

6. Prepare civil and mechanical specifications including 90% design and final. A specifications table of contents will be provided with the 60% submittal.

7. Prepare Division 0 specifications and Contract Documents using the Town of Erie project documents.

8. Prepare a Class 4 Engineer's Opinion of Probable Cost (EOPC) prior to 60% design. Prepare a Class 1 EOPC with the 90% submittal.

Task 6: Electrical and Instrumentation Design

1. Coordination with the Erie NWRF for communications to the well site. Provide radio communications for the stream gauge.

2. Based on information provided from LRE on the permanent equipment installed during well testing, KJ will design the VFD, PLC, electrical connections, and controls.

3. Prepare electrical and instrumentation plans for construction. We anticipate the plan set will consist of the following electrical and instrumentation sheets:

    a) Electrical Symbols and Abbreviations
    b) Overall Electrical Site Plan
    c) Electrical Well Site and Building Plan
    d) One-Line Diagrams and Equipment Elevations (2 sheets)
    e) VFD Wiring Diagram

f) Panelboard Schedules
g) Electrical Conduit and Cable Schedule
h) Electrical Details (2 sheets)
i) Instrumentation Legend
j) Process and Instrumentation Diagram (2 sheets)
k) SCADA Communication Block Diagram

4. Prepare electrical and instrumentation specifications including 90% design and final. A specifications table of contents will be provided with the 60% submittal.

5. Prepare a Class 4 Engineer's Opinion of Probable Cost (EOPC) prior to 60% design. Prepare a Class 1 EOPC with the 90% submittal.

Task 7: Agency Coordination.

1. United Power Utility Service Application. Prepare and submit a new utility service application to United Power for the proposed electrical equipment. Review the final design and easements provided by United Power for the new utility service. The United Power application and design fees will be paid for directly by the Town of Erie.

2. Weld County Grading Permit. Prepare and submit a Grading permit application to Weld County for the proposed piping and vault including an erosion and sediment control report. Provide one re-submittal based on County comments. Incorporate County comments into drawings.

3. Weld County Site Improvements Permit. Prepare and submit a Site Improvement Permit to Weld County. Provide one re-submittal based on County comments. Incorporate County comments into drawings.

4. Weld County Electrical Permit. Submit the 90% drawings to Weld County prior to issuing the drawings for bid. Provide one re-submittal based on County comments. Incorporate County comments into drawings.

5. Weld County Floodplain Development Permit (FDP). Deere & Ault (D&A) will prepare and submit the FDP to Weld County. Review comments from the County will be addressed by D&A. After construction of the well infrastructure, D&A will submit an as-built summary letter to the County to close out the FDP.

Task 8: Bidding Services

1. Prepare a Notice of Bid and advertise the project for bidding in the newspaper of local interest and the Daily Journal. Distribute bid documents to bidders.

2. Conduct a pre-bid meeting at the Town's office.

3. Respond to bidder's questions and prepare addenda as necessary. Preparation of two addendum is included in this proposal.

4. Receive and open proposals at the Town's office.

5. Prepare a bid tabulation sheet and provide a recommendation for contract award.

6. Prepare Contracts for signature by the Town and the contractor; coordinate the signing of the contract documents.

Task 9: Construction Services

1. Attend a preconstruction meeting with the Contractor and Town staff.

2. Review shop drawings submitted by the Contractor (civil, mechanical, structural, electrical and instrumentation). We estimate a total of 60 shop drawings, plus 20 re-submittals.

3. Perform part-time construction observation by a Kennedy Jenks Field Specialist averaging 14 hours per week for an estimated 20 weeks. Coordinate, review and document testing of the primary equipment installed by the Contractor. We have budgeted for one site visit for the electrical engineer and one site visit for the controls engineer during construction, which includes travel expenses.

4. Provide engineering consultation during construction.

5. Attend weekly construction meetings with Town staff and the Contractor. Twenty-five (25), one-hour duration meetings are anticipated. Attendance will be by phone. The field specialist and project manager will participate in the meetings.

6. Prepare up to four (4) RFQs.

7. Prepare up to ten (10) RFI responses.

8. Prepare up to five (5) Change Orders.

9. Review up to six (6) Pay Estimates.

10. Conduct an initial and final project start-up at the well site and prepare a punch list of items to be completed by the Contractor.

11. Prepare record drawings based on the Contractor's redlines. Prepare a record controls narrative based on coordination with the Contractor.

12. Review the Operations and Maintenance manuals prepared by the material suppliers and Contractor.

Deliverables

1. Pipeline Analysis Technical Memo
2. 60%, 90%, and Construction Design Drawings
3. Class 4 and Class 1EOPC
4. Erosion and Sediment Control Report
5. Record Drawings
6. Topographic Survey
7. Geotechnical Report

Exclusions

1. Design of pumping equipment
2. Utility Potholes in excess of five potholes for the pipeline
3. Environmental and Historical Site Studies (to be completed by Pinyon under separate contract)
4. Staking of the pipeline alignment
5. Full time construction observation
6. State of Colorado Construction Stormwater permits
7. Weld County Use by Special Review Permit
8. Erosion and Sediment Control Permit for horizontal well drilling
9. Fees for permits
10. RFQs in addition to those estimated
11. RFIs in addition to those estimated
12. Change Orders in addition to those estimated
13. Pay Estimates in addition to those estimated
14. Easement Acquisition and Legal Descriptions

COMPENSATION

Kennedy Jenks proposes to provide the above scope of services on an hourly basis in accordance with our attached billing rates. Below is a summary of the estimated costs for the project. A detailed fee estimate spreadsheet is enclosed. For budgeting purposes, we have included a 4% increase in our billing rates for services expected to be completed in 2021. After we define our 2021 billing rates, we will bill LRE at the set billing rates starting January 1 of that year. The billing rate increase will not exceed an average increase of 4%.

Summary of Compensation - Kennedy/Jenks

Phase	Total
Task 1: Project Management and Meetings	$36,332
Task 2: Pipeline Review and Analysis	$6,649
Task 3: Topographic Survey	$25,142
Task 4: Geotechnical Evaluation	$12,623
Task 5: Civil and Mechanical Design	$57,470
Task 6: Electrical and Instrumentation Design	$68,017
Task 7: Agency Coordination	$37,919
Task 8: Bidding Services	$8,685
Task 9: Construction Phase Services	$165,644
TOTAL	**$418,481**

SCHEDULE

Timing for the completion of the work is dependent upon completion of the well drilling and testing. Kennedy Jenks anticipates the following schedule to complete the project. In order to proceed with design, LRE will provide a general estimate of the proposed flow rate for the purpose of electrical and mechanical design. It is expected that LRE will provide final flow estimates for the well in September 2020.

Authorization to Proceed	June 30, 2020
Kickoff Meeting	July 2020
Pipeline Analysis Technical Memo Submittal	August 2020
Class 4 EOPC	September 2020
60% Submittal	October 2020
United Power Application Submittal	October 2020
90% Submittal	January 2020
Design complete/Release plans for bidding	February 2021
Bid Opening	March 2021
Notice of Award	May 2021
Construction Complete	November 2021

CLOSURE

We sincerely appreciate the opportunity to provide this proposal.

This proposal is valid for sixty (60) days after the date of this letter. At that time, Kennedy Jenks will have the right to review the proposal for any appropriate modifications.

Sincerely,

KENNEDY JENKS CONSULTANTS

Dan Phipps, P.E.
Project Engineer

Gordon C. Meurer, P.E.
Principal Consultant

Attachment No. 1 – Fee Estimate

Dwg Sht Row | Jan 3 | Water

Proposal Fee Estimate — **Kennedy Jenks**

CLIENT Name: Leonard Rice Engineers

PROJECT Description: NWRF Horizontal Well Project

Proposal/Job Number: _____ Date: 6/19/2020

January 1, 2020 Rates Classification:	Eng-Sci-9 G. Meurer (CSM)	Eng-Sci-8 J. Mohr (E&IC QC)	Eng-Sci-7 E. Hudish (Civil & Mech QC)	Eng-Sci-7 Z. Harris (HVAC)	Eng-Sci-6 P. Post (I&C)	Eng-Sci-6 Z. Devlin (EE)	Eng-Sci-5 D. Cleary (Structural)	Eng-Sci-5 D. Phipps (PM)	Eng-Sci-4 N. Melchionni (Env)	Eng-Sci-3 B. Shriber (PE)	Electrical Staff Engineer / Designer	Field Specialist	Project Admin K. Paduano	Total	KJ Labor	KJ 2021 Billing Rate Increase	KJ Comm. Charges	Sub True North Survey	Sub Kumar & Associates	Sub Deere & Ault	KJ Sub-Markup	KJ ODCs	Total Labor	Total Subs	Total Expenses	Total Labor + Subs + Expenses
Hourly Rate:	$230	$228	$199	$200	$208	$208	$185	$155	$140	$126	$130	$116	$86	Hours	Fees	4%	3%	Fees	Fees	Fees	5%	Fees				Fees
TASK 1 - PROJECT MANAGEMENT																										
1. Project Management	10							48					4	62	$10,084	$0	$303				$0		$10,084	$0	$303	$10,387
2. QA/QC	8	18	18		10	10		20		12		16		112	$20,154	$0	$605				$0		$20,154	$0	$605	$20,759
3. Review Meetings (3)					4	4		12		12				32	$5,036	$0	$151				$0		$5,036	$0	$151	$5,187
Task 1 - Subtotal	18	18	18	0	14	14	0	80	0	24	0	16	4	206	$35,274	$0	$1,058	$0	$0	$0	$0	$0	$35,274	$0	$1,058	$36,332
TASK 2 - PIPELINE REVIEW AND ANALYSIS																										
1. Data Collection								2		6				8	$1,066	$0	$32				$0		$1,066	$0	$32	$1,098
2. Hydraulic Calculations								2		8				10	$1,318	$0	$40				$0		$1,318	$0	$40	$1,358
3. Restraint Calculations								2		4				6	$814	$0	$24				$0		$814	$0	$24	$839
4. Develop Technical Memo								8		16				24	$3,256	$0	$98				$0		$3,256	$0	$98	$3,354
Task 2 - Subtotal	0	0	0	0	0	0	0	14	0	34	0	0	0	48	$6,454	$1	$194	$0	$0	$0	$0	$0	$6,454	$0	$194	$6,649
TASK 3 - TOPOGRAPHIC SURVEY																										
1. Topographic Survey														0	$0	$0	$0	$22,100			$1,105		$0	$23,205	$0	$23,205
2. KJ Review of Survey								2		12				14	$1,822	$0	$55				$0	$60	$1,822	$0	$115	$1,937
Task 3 - Subtotal	0	0	0	0	0	0	0	2	0	12	0	0	0	14	$1,822	$0	$55	$22,100	$0	$0	$1,105	$60	$1,822	$23,205	$115	$25,142
TASK 4 - GEOTECHNICAL EVALUATION																										
1. Geotechnical Study and Report														0	$0	$0	$0		$10,550		$528		$0	$11,078	$0	$11,078
2. KJ review of Study			3				2	1		3				9	$1,500	$0	$45				$0		$1,500	$0	$45	$1,545
Task 4 - Subtotal	0	0	3	0	0	0	2	1	0	3	0	0	0	9	$1,500	$0	$45	$0	$10,550	$0	$528	$0	$1,500	$11,078	$45	$12,623
TASK 5 - CIVIL AND MECHANICAL DESIGN																										
1. Site Visit								4		4				8	$1,124	$0	$34				$0	$60	$1,124	$0	$94	$1,218
2. Civil Design								8		24				32	$4,264	$0	$128				$0		$4,264	$0	$128	$4,392
3. Mechanical Design				8			6	8		22				44	$6,722	$0	$202				$0		$6,722	$0	$202	$6,924
4. Stream Gauge Design									6					6	$840	$0	$25				$0		$840	$0	$25	$865
5. Prepare General, Civil, and Mechanical Sheets								40		180				220	$28,880	$0	$866				$0		$28,880	$0	$866	$29,746
6. Prepare Civil and Mechanical Specifications				4			4	12	4	36			8	68	$9,184	$0	$276				$0		$9,184	$0	$276	$9,460
7. Prepare Divison 0 Specs								8		12			4	24	$3,096	$0	$93				$0		$3,096	$0	$93	$3,189
8. EOPC								4		8				12	$1,628	$0	$49				$0		$1,628	$0	$49	$1,677
Task 5 - Subtotal	0	0	0	12	0	0	10	84	10	286	0	0	12	414	$55,738	$0	$1,672	$0	$0	$0	$0	$60	$55,738	$0	$1,732	$57,470
TASK 6 - E&IC Design																										
1. Communications Design					4	8								12	$2,496	$0	$75				$0		$2,496	$0	$75	$2,571
2. Electrical Design						6		4						10	$1,868	$0	$56				$0		$1,868	$0	$56	$1,924
3. Prepare E&IC Plans					40	72					180			292	$46,696	$0	$1,401				$0		$46,696	$0	$1,401	$48,097
4. Prepare E&IC Specifications					30	36								66	$13,728	$0	$412				$0		$13,728	$0	$412	$14,140
5. EOPC					3	3								6	$1,248	$0	$37				$0		$1,248	$0	$37	$1,285
Task 6 - Subtotal	0	0	0	0	77	125	0	4	0	0	180	0	0	386	$66,036	$0	$1,981	$0	$0	$0	$0	$0	$66,036	$0	$1,981	$68,017

Dwg Sht Row | Jan 3 | Water

Proposal Fee Estimate

Kennedy Jenks

CLIENT Name: Leonard Rice Engineers

PROJECT Description: NWRF Horizontal Well Project

Proposal/Job Number: _____ **Date:** 6/19/2020

January 1, 2020 Rates Classification:	Eng-Sci-9 G. Meurer (CSM)	Eng-Sci-8 J. Mohr (E&IC QC)	Eng-Sci-7 E. Hudish (Civil & Mech QC)	Eng-Sci-7 Z. Harris (HVAC)	Eng-Sci-6 P. Post (I&C)	Eng-Sci-6 Z. Devlin (EE)	Eng-Sci-5 D. Cleary (Structural)	Eng-Sci-5 D. Phipps (PM)	Eng-Sci-4 N. Melchionni (Env)	Eng-Sci-3 B. Shriber (PE)	Electrical Staff Engineer / Designer	Field Specialist	Project Admin K. Paduano	Total	KJ Labor	KJ 2021 Billing Rate Increase	KJ Comm. Charges	Sub True North Survey	Sub Kumar & Associates	Sub Deere & Ault	KJ Sub-Markup	KJ ODCs	Total Labor	Total Subs	Total Expenses	Total Labor + Subs + Expenses
Hourly Rate:	$230	$228	$199	$200	$208	$208	$185	$155	$140	$126	$130	$116	$86	Hours	Fees	4%	3%	Fees	Fees	Fees	5%	Fees				Fees
TASK 7 - AGENCY COORDINATION																										
1. United Power Service Application						20		4			6			30	$5,560	$0	$167				$0		$5,560	$0	$167	$5,727
2. Weld County Grading Permit								8		20				28	$3,760	$0	$113				$0		$3,760	$0	$113	$3,873
3. Weld County Site Improvements Permit								4		12				16	$2,132	$0	$64				$0		$2,132	$0	$64	$2,196
4. Weld County Electrical Permit						16		2						18	$3,638	$0	$109				$0		$3,638	$0	$109	$3,747
5. Weld County Floodplain Development Permit								8		4				12	$1,744	$0	$52			$19,600	$980		$1,744	$20,580	$52	$22,376
Task 7 - Subtotal	0	0	0	0	0	36	0	26	0	36	6	0	0	104	$16,834	$0	$505	$0	$0	$19,600	$980	$0	$16,834	$20,580	$505	$37,919
TASK 8 - BIDDING SERVICES																										
1. Prepare advertisement and distribute bid documents								1		4			2	7	$831	$33	$25				$0	$250	$864	$0	$275	$1,139
2. Pre-Bid Meeting								4		4			2	10	$1,296	$52	$39				$0	$60	$1,348	$0	$99	$1,447
3. Answer Questions and Prepare two Addendum					3	6		2		8				19	$3,190	$128	$96				$0		$3,318	$0	$96	$3,413
4. Receive and Open Proposals								4						4	$620	$25	$19				$0	$60	$645	$0	$79	$723
5. Prepare Bid Tabulation and Contractor Recommendation								1		4			2	7	$831	$33	$25				$0		$864	$0	$25	$889
6. Contract Documents								1		4			4	9	$1,003	$40	$30				$0		$1,043	$0	$30	$1,073
Task 8 - Subtotal	0	0	0	0	3	6	0	13	0	24	0	0	10	56	$7,771	$311	$233	$0	$0	$0	$0	$370	$8,082	$0	$603	$8,685
TASK 9 - CONSTRUCTION SERVICES																										
1. Attend Preconstruction Meeting					1	1		4		4		4		14	$2,004	$80	$60				$0	$150	$2,084	$0	$210	$2,294
2. Review Shop Drawings					40	44		30		80			16	210	$33,578	$1,343	$1,007				$0		$34,921	$0	$1,007	$35,928
3. Part-Time Construction Observation					12	20						336		368	$45,632	$1,825	$1,369				$0	$8,000	$47,457	$0	$9,369	$56,826
4. Engineering Consultation					12	12		16						40	$7,472	$299	$224				$0		$7,771	$0	$224	$7,995
5. Weekly Construction Meetings (25)					10	10		30						50	$8,810	$352	$264				$0		$9,162	$0	$264	$9,427
6. Prepare up to 4 RFQs					8	8		4		8				28	$4,956	$198	$149				$0		$5,154	$0	$149	$5,303
7. Prepare up to 10 RFI Responses					12	12		10		22				56	$9,314	$373	$279				$0		$9,687	$0	$279	$9,966
8. Prepare up to 5 Change Orders					8	8		8		15				39	$6,458	$258	$194				$0		$6,716	$0	$194	$6,910
9. Review up to 6 Pay Estimates								4		9		9		22	$2,798	$112	$84				$0		$2,910	$0	$84	$2,994
10. Project Walk-Throughs and Punch List / Start-ups					16	8		20				16		60	$9,948	$398	$298				$0	$5,000	$10,346	$0	$5,298	$15,644
11. Prepare Record Drawings					2	2		6		20	8			38	$5,322	$213	$160				$0	$120	$5,535	$0	$280	$5,815
12. Review and Transmit O&Ms					8	8		6		12			4	38	$6,114	$245	$183				$0		$6,359	$0	$183	$6,542
Task 9 - Subtotal	0	0	0	0	129	133	0	138	0	170	8	365	20	963	$142,406	$5,696	$4,272	$0	$0	$0	$0	$13,270	$148,102	$0	$17,542	$165,644
All Phases Total	**18**	**18**	**21**	**12**	**223**	**314**	**12**	**362**	**10**	**589**	**194**	**381**	**46**	**2200**	**$333,835**	**$6,008**	**$10,015**	**$22,100**	**$10,550**	**$19,600**	**$2,613**	**$13,760**	**$339,842**	**$54,863**	**$23,775**	**$418,481**

Attachment No. 2 – Subconsultant Proposals

P 20042 R3
June 19, 2020

Kennedy/Jenks Consultants
Attn: Dan Phipps, PE
165 Union Boulevard, Suite 570
Lakewood, Colorado 80228

RE: Surveying Services – Town of Erie Survey

Dear Mr. Phipps:

TRUE NORTH Surveying & Mapping, LLC is pleased to have been selected to write the following professional surveying services proposal. This proposal is valid for 30 days from the date shown above. After said 30 days, the CONSULTANT has the right to adjust services, schedule or fee. If the LOCATION OF PROJECT AND SURVEY LIMITS, PROJECT UNDERSTANDING AND SCOPE OF SERVICES, PROJECT SCHEDULE, DELIVERABLES, COMPENSATION and CONTRACT REQUIREMENTS, CONTRACT AGREEMENT INCLUDING INSURANCE LIMITS are acceptable to **Kennedy/Jenks Consultants**, hereinafter referred to as the "CLIENT", thence this AGREEMENT IS MADE between **TRUE NORTH Surveying & Mapping, LLC**, hereinafter referred to as the "CONSULTANT" and the CLIENT per the signature and date listed at the end of this agreement.

CONTRACT REQUIREMENTS: The acceptance of this proposal by the CLIENT means that all the terms of this proposal as laid out hereon along with this entire proposal are acceptable to the CLIENT and will not be changed without the written approval of both CONSULTANT and CLIENT. This proposal will be null and void if CLIENT cannot meet these terms.

1). Insurance requirements as shown under Contract Agreement Section D

2). All survey files will be delivered in AutoCAD 2018 format along with a Land XML file. These files will not be Civil 3D Files.

3). All deliverables are limited to PDF, AutoCAD, txt file and Land XML.

LOCATION OF PROJECT AND MAPPING LIMITS – This project is defined on the enclosed exhibit. The survey also includes three (3) 1000-foot cross sections as shown on said exhibit. *NOTE: This proposal was written based upon the site conditions as of the date of this proposal. Changes to the site before work is commenced may require a change order.*

PROJECT UNDERSTANDING AND SCOPE OF SERVICES – The CLIENT is requesting the CONSULTANT to provide the following services:

9623 Mallard Pond Way • Littleton, Colorado 80125 • WWW.TRUENORTHSurvey.com •

UTILITY CORRIDOR MAP that includes the follows:

CONTOURS: A combination of aerial mapping and a ground survey will be used to create 1-foot contours across the entire mapping limits. The contours files will include breaklines and a tin.

IMPROVEMENTS: A combination of aerial mapping and a ground survey will be used to locate all visible improvements along the survey limits too include: Sidewalk, roadway, paint stripes, fences, signs, major trees, edge of Boulder Creek, edge of water, 3 cross sections, buildings / building roof lines, etc.

Access to any private property to obtain the 3 cross sections will be obtained by the CLIENT. Cross section endpoints must be provided by the CLIENT. Cross section will be located on the ground within 4 inches +/-.

UTILITIES: CONSULTANT will locate the visible and marked underground utilities, sanitary and storm manholes and inverts, top of nut of waterline valves. Inverts of sanitary, storm or other manholes which are unlocked, not gated and less than 25 feet deep will be shown if they are inside the survey limits. CONSULTANT will not enter any manhole or confined space. ALL manhole holes must be visible to the CONSULTANT. Non-visible manholes may not be located. Sanitary sewer service lines from the building to the main line cannot be located.

Subsurface Utilities - As requested by the CLIENT, **Quality Level B** standards will be required for this project. Sanitary sewer lines, storm sewer lines and non-metallic / asbestos water lines will be **Quality Level C**. Utilities that are potholed will be shown as **Quality Level A**. All overhead utility lines will be shown as one line even if there are multiple lines. Larger overhead utility lines will show the exterior lines on the utility pole. The CLIENT will be the engineer in charge and will be required to meet the minimum standards for **Colorado Subsurface Utility Law (SB18-167).**

> ***Quality Level - D**: Most basic, existing records and verbal recollections*
>
> ***Quality Level – C**: Surveying visible above ground utility facilities*
>
> ***Quality Level – B**: (2D information) Use of appropriate geophysical methods to determine the existence and horizontal position of virtually all subsurface utilities. 1). Utility Quality Level B (QLB) is value assigned to a utility segment or subsurface utility feature whose existence and position are based upon geophysical methods combined with professional judgment and whose location is tied to the project survey datum. QLB is more uncertain than QLA and less uncertain than QLC or QLD. 2). Approximate horizontal location of utility.*
>
> ***Quality Level – A**: (3D information) Precise mapping through exposure of utility (potholing); provides type, size, conditions and material.*

Underground utilities will be located by a private utility locate company arranged by the CONSULTANT. It will be the CLIENTS responsibility as the engineer in charge to

work with private utility locate company. The CLIENT will provide the CONSULTANT the name of the engineer in charge to listed on the survey documents.

CLIENT understands that the actual location of the underground utility is not visible to the CONSULTANT and that the CONSULTANT is relying upon the private locate company to mark the location of the underground utility. These markings are 18" +/-, and in some cases, may have greater error. If the actual location of the utility is required, potholing the utility is suggested. ONLY known and traceable underground utilities can be located. Utilities made of concrete, asbestos, PVC or like material must have a tracer wire.

All above ground utility lines will be shown as one line even if there are multiple lines. All above ground utility lines will be considered and shown as a utility line.

At a later date with a separate mobilization, the CONSULTANT will locate (North, East and ground Elevations) of 6 monitor wells (installed by others). The deliverables for the 6 wells will be limited to a AutoCAD drawing with symbols of the 6 wells along with the north, east and ground elevation.

HORIZONTAL AND VERTICAL DATUM: The horizontal and vertical control will be based upon Modified State Plane Coordinates (Horizontal NAD 83) (Vertical NAVD 88).

NOT A BOUNDARY SURVEY / EASEMENTS: DORA Board Rule Notice 6.5.5.2 - A utility corridor map is not a Land Survey Plat, Improvement Survey Plat or Improvement Location Certificate. Platted right-of-way, property and easements lines will be shown per the recorded subdivision plats and rotated on found property pins or section corners. NOT all easement lines will be shown. These lines will not be exact and should not be used as if they are. If the true locations of these lines are required a boundary survey on each parcel will be required at an additional cost to the CLIENT. ***Additional easements may affect this site; if these easements are required a title commitment on each parcel will be required at an additional cost to CLIENT.

ADDITIONAL SERVICES WITH FEES INVOICED TO DIRECTLY TO CLIENT:

POTHOLES: CONSULTANT will arrange the services of a pothole company to pothole up to 5 potholes. This site is on private property so no permits or traffic control would be necessary. The repair material will be flow fill/cold patch or pea gravel, material disposal, two survey mobilizations to the site (one to stake the proposed hole and one to locate the drilled hole), an AutoCAD drawing showing the pothole data and field log notes are all included in the base fee of each pothole. CLIENT understands that some underground utilities will not be found, and that additional holes may be required in the attempt to find the underground utility. When possible, the CLIENT will be contacted before any additional holes are drilled. The pothole search area per hole is limited to 10 feet deep by 3 feet wide.

The proposal from the pothole firm is attached. The invoice for the actual potholes will be invoiced to the CLIENT.

SURVEYING POTHOLES: All surveying related to the potholes will be invoiced at our hourly rate as shown on the attached 2020 Professional Service Rates and will include 1- or 2-man Field Crew, Office Technician, Professional Licensed Surveyor and mileage to and from the site.

ITEMS NOT INCLUDED BUT MAYBE REQUESTED FOR AN ADDITIONAL FEE:

- This proposal does not include the creation of legal descriptions and exhibits but can be completed at $500.00 each.
- Staking of the proposed alignment is not part of the proposal but can be completed for additional fee.

- This proposal does not include any meetings. If meetings are required, they will be invoiced per the attached 2020 Professional Service Rates.

DELIVERABLES: The final products will be created on an AutoCAD 2018 platform using the CLIENTS symbols, line types and layers. These files are not Civil 3D files. The final product will be delivered via e-mail and will include the following: AutoCAD drawing, PDF's of the map, survey related and drafting related files. If the site is flown with aerial mapping, a tif image of the site will be part of the deliverables.

REIMBURSABLES for the project as defined above are included in the compensation. Reimbursables for any change orders will be invoiced per the professional services rates as attached hereon.

PROJECT SCHEDULE STATEMENT – A scheduled will be determined **AFTER** written notices to proceed along with all required documents are received by CONSULTANT.

If the weather does not allow field surveying a week before the start date, your project start date may shift along with all other projects. For the safety of the survey crews and equipment, field work will not be conducted during weather conditions. The CLIENT will be kept informed on all scheduling dates and changes. In addition, before any work can commence, all previous invoices due by the CLIENT must be paid in full.

COMPENSATION – The CLIENT agrees to pay for above-named Professional Surveying services according to the following schedule. Invoices shall be billed and payable monthly based on the percent completed. The CONSULTANT will submit invoices to the CLIENT monthly. The CLIENT agrees to pay the CONSULTANT within thirty (30) days. Payment must be made by check or cash. Credit cards are not accepted.

Lump Sum Fee: $19,500
Survey estimate associated with potholes: $1,600
Pothole estimate (to be invoiced directly to CLIENT) $1,000

TRUE NORTH Surveying & Mapping, LLC looks forward to working with you on this project. Should you have any questions or comments, please contact me at 303-484-8886. or BillB@TRUENORTHSurvey.com.

TRUE NORTH Surveying & Mapping, LLC

Bill Buntrock, PLS
President

The undersigned represents that he/she is fully authorized to execute this AGREEMENT on behalf of the CLIENT identified herein. THIS AGREEMENT IS ACCEPTED AND TRUE NORTH SURVEYING & MAPPING, LLC IS HEREBY AUTHORIZED TO PROCEED.

_____	_____	_____	_____
Authorized Signature	Printed Name	Title	Date

2020 Professional Service Rates

Professional Staff	
Survey Division Manager / President / Principal	$125/hr
Professional Licensed Surveyor	$125/hr
One-Man Field Crew (Robotic Total Station or GPS)	$150/hr
Two-Man Field Crew (Robotic Total Station or GPS)	$165/hr
Three-Man Field Crew (Robotic Total Station or GPS)	$185/hr
3D Laser Scanning (HDS) Trimble VX (Field Crew + Equipment)	$300/hr
3D Laser Scanning (HDS) Office Technician	$200/hr
Office Technician (Drafting)	$95/hr
Research (City/County/State/Government)	$95/hr
Expert Witness	$300/hr

Reimbursables	
Sub Consultants (outside consultant fee under $1000)	Rate + 20%
Sub Consultants (outside consultant fee over $1000)	Rate + 15%
Mileage - GSA standard rate	Cost
Delivery (FEDEX, Courier, US Mail)	Cost + 15%
Per Diem - $150 per person/per day	
Travel Expenses (other than mileage)	Cost + 15%
Expenses (research, plats, maps, construction materials, etc.)	Cost + 15%
Reproduction: 11 x 17	$1/page
Reproduction: 18 x 24	$3/page
Reproduction: 24 x 36	$5/page
Mylar's for recording	$200/page


Survey 25' past property line
Survey to edge of Boulder Creek
Erie NWRF
Three Cross Sections. Approximately 1,000 ft long each
Google Earth
© 2020 Google
N
1000 ft

Kumar & Associates, Inc.®
Geotechnical and Materials Engineers
and Environmental Scientists

2390 South Lipan Street
Denver, CO 80223
phone: (303) 742-9700
fax: (303) 742-9666
email: kadenver@kumarusa.com
www.kumarusa.com

An Employee Owned Company

Office Locations: Denver (HQ), Parker, Colorado Springs, Fort Collins, Glenwood Springs, and Summit County, Colorado

April 14, 2020
Revised June 18, 2020

Mr. Dan Phipps
Kennedy Jenks
165 South Union Boulevard, Suite 570
Lakewood, Colorado 80228

Subject: Proposal for Geotechnical Engineering Study, Proposed Erie NWRF Horizontal Well Project, Erie, Colorado

Proposal No. P-20-345

Dear Mr. Phipps:

Kumar & Associates, Inc. (K+A) is pleased to submit this proposal to conduct a geotechnical engineering study for the proposed NWRF Horizontal Well Project located in Erie, Colorado.

Project Understanding: We understand the proposed NWRF Horizontal Well project will consist of the construction of a horizontal well, meter vault, electric pad (cabinet), and approximately 4,900 linear feet of water pipeline. We assume the buried depth of the waterline will be approximately 5 feet.

Anticipated Subsurface Conditions: K+A previously performed a geotechnical engineering study for the original construction of the NWRF Wastewater Treatment Facility. Based on information from that study and apparent previous site development, we anticipate the site is generally overlain by several feet of existing fill, resulting from the construction of the reservoir embankments, underlain by sandstone bedrock extending to claystone bedrock at depths ranging from about 15 to 20 feet. Groundwater is not anticipated to be encountered within the embankment fill but may be encountered at depths ranging from about 8 to 12 feet outside the limits of the embankments.

Scope of Work: Based on the information provided, we propose the following:

1. K+A will obtain written approval and any required permits from the owner prior to drilling on. We assume these permits will be provided at no cost to K+A. We will also obtain direction in regards to handing of drilling spoils and bore hole backfill.

2. Drill twelve (12) exploratory borings; one boring for the horizontal well, one for the meter vault, and ten borings for the water pipeline. The borings drilled for the waterline will be spaced at approximate 500-foot intervals. One waterline boring will be drilled near the limits of the electrical pad. The borings drilled for the proposed meter vaults, horizontal well and electric pad will be drill to depths ranging from about 15 to 25 feet. The borings drilled for the proposed waterline will be drilled to depths ranging from about 10 to 15 feet with the final depths of the borings determined in the field as drilling progresses and as the subsurface profile becomes evident. The borings will be made to obtain information on the subsurface profile, to obtain samples for laboratory testing, and to estimate the groundwater level and depth to bedrock, if encountered within the drilled

depths. The proposed borings locations and current site plan layout are presented in the attached Fig. 1. We understand the location of the wells, vault and electric pad may change to other locations along the pipeline alignment.

We will coordinate with the Utility Notification Center of Colorado (UNCC) to locate buried utilities prior to drilling. Utilities cleared through this service will not include facility-owned utilities. The owners of any utilities not located by UNCC should review the proposed boring locations once they are marked in the field and verify the borings are clear of facility-owned underground utilities. If active private utility lines are believed to be located within the study area but their location is uncertain, a private locate may be necessary. The fees for a private locate are included in this proposal. We also understand we will need to coordinate with the team surveyor to shoot our borings locations.

California drive or split-spoon samples will be taken at variable depth intervals to obtain samples and data on the consistency of the soils and bedrock encountered. For the equipment pad and structure borings sampling will be increased in the upper 10 feet and for borings drilled in the proposed pipeline alignment sampling will be increased at depths between about 5 and 10 feet. Sampling the split-spoon sampler is the standard penetration test (SPT) described by ASTM D1586. Sampling with the California drive sampler is similar to the SPT and is commonly used locally to obtain samples of cohesive soils. A proposed sampling schedule is attached.

Several of the borings will be left open following the completion of drilling in order to measure stabilized groundwater levels. If caving soil conditions are encountered, temporary piezometers consisting of slotted PVC pipe will be installed in selected borings. The groundwater levels will be measured during a follow-up site visit approximately one week after completion of drilling, and the piezometers, if installed, will be removed. The bore holes will be backfilled with soil cuttings generated from the drilling process.

Copies of the field borings logs will be provided to Kennedy Jenks the morning following each day's drilling. Upon completion draft borings logs can also be provided.

3. Conduct a laboratory testing program on selected samples obtained from the borings to determine:

- Moisture content
- Density of undisturbed fine-grained samples
- Gradation characteristics of coarse-grained samples
- Atterberg limits
- Swell-Consolidation potential of fine-grained soil samples
- Moisture-Density Relationships (modified Proctor)
- Water-soluble sulfates
- pH
- Electrical soil resistivity

We will coordinate with Kennedy Jenks on which samples will be tested prior to initiating testing.

4. Analyze the data obtained from the field and laboratory portions of the study to provide engineering recommendations for:
    - Foundation type or types, depths, and allowable bearing pressures for the vault structure
    - Axial and lateral geotechnical design parameters of deep foundations, if applicable
    - Foundation construction criteria
    - Lateral earth pressure criteria for below-grade structures
    - Allowable bearing pressures for thrust blocks
    - Estimated settlement and potential heave of the proposed vault and electrical pad
    - Earthwork recommendations including suitability of on-site soils for re-use and fill placement and compaction criteria
    - Construction excavation considerations including temporary excavation slopes, difficult excavation, dewatering and shoring.
    - Waterline modulus of soil reaction (E')
    - Corrosion considerations
    - Mitigation of sulfate attack, if any, on concrete

5. Prepare a report summarizing the site exploration data and laboratory test results and providing our conclusions and recommendations. The field work and report preparation will be supervised by a registered professional engineer in the State of Colorado.

6. Provide post-report consultation on an as-requested basis to assist with geotechnical related questions about the report. We can also review project plans and specifications for construction.

Fees: We propose to perform the above-described scope of work for an estimated fee of **$10,550.** A breakdown of the estimated fee is provided in the attached table. The fee is based on the hourly rates and unit fees in accordance with the attached Fee Schedule and Terms & Conditions. Please note the Terms & Conditions contain a limit of K+A liability. Modifications to the scope of work, if required, and associated fees, will be discussed with you and approval obtained prior to exceeding the above estimated fee.

Schedule: We propose to initiate the study immediately upon given notice to proceed. Our field exploration services will be performed as soon as utility location is completed and site access is available. We anticipate the field exploration program will be completed within approximately 1 to 2 weeks upon receipt of notice to proceed, and preliminary design information will be available one week after completion of the field exploration program. The geotechnical engineering report will be available within two to three weeks of completion of the field exploration program. Specific times may vary somewhat if weather or other conditions beyond our control delay filed exploration activities. In any event, we will notify you of our progress and any available information.

If this proposal meets your approval, please sign one copy and return it to this office. If you have any questions about the scope of work, please call. Thank you for considering us for the study of this project.

Sincerely,

KUMAR & ASSOCIATES, INC.

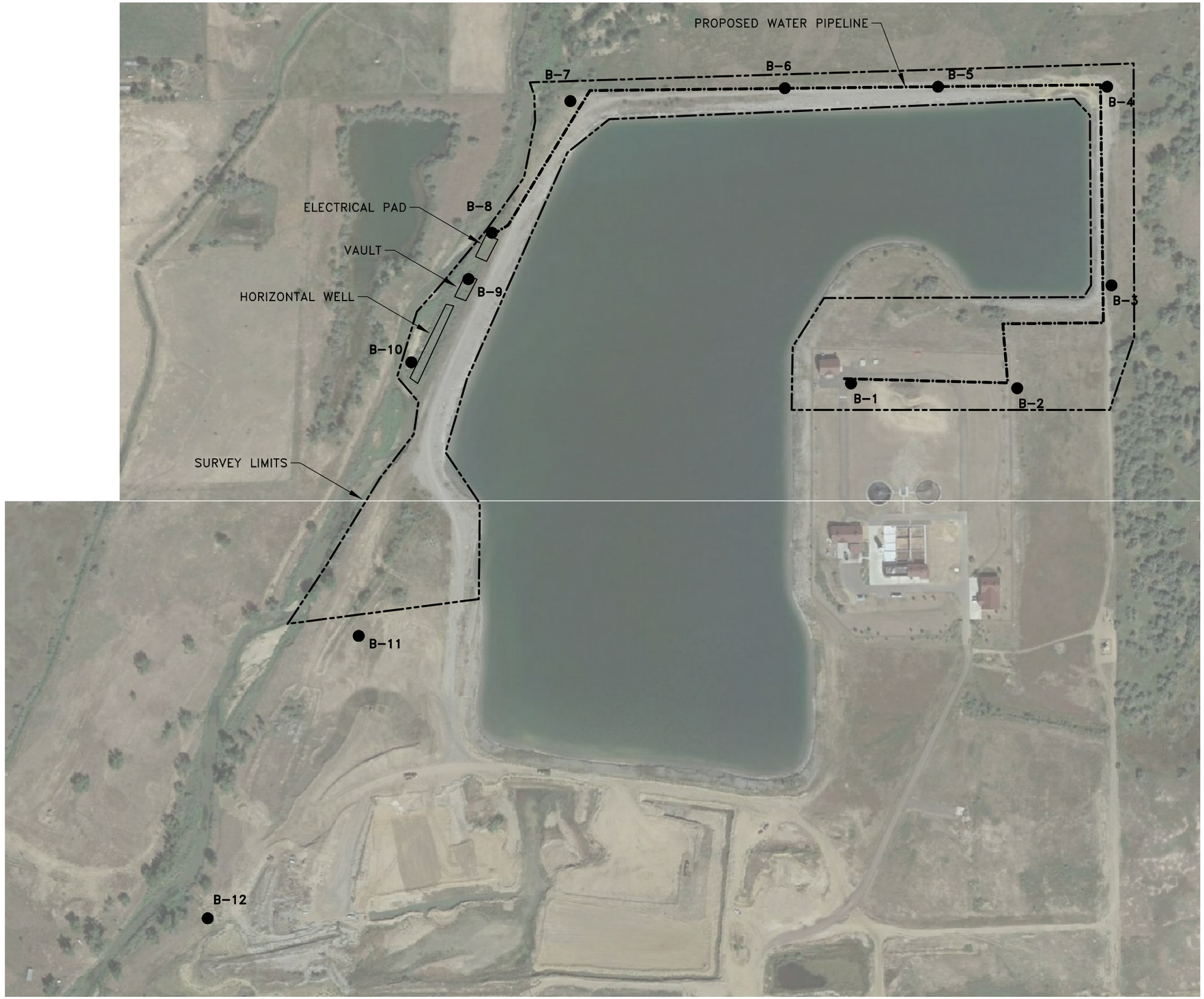
By _____
Justin Cupich, E.I.

JDC/as
Rev. By: CMB
Enclosures

Agreed to this _____ day of _____, 2020

_____
Organization

By _____ _____
Printed Name



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APPROXIMATE SCALE-FEET

June 17, 2020 - 09:53am
V:\Temp Drawings\2020\P20-345 (Jepperson)\P20-345-01.dwg

P20-345	Kumar & Associates	NWRF HORIZONTAL WELL, ERIE, COLORADO	PROPOSED BORING LOCATIONS	Fig. 1

TABLE 1
PROPOSED NWRF HORIZONTAL WELL PROJECT
GEOTECHNICAL ENGINEERING STUDY
ITEMIZATION OF ESTIMATED COST
April 14, 2020
Revised June 18, 2020

TASK	PRINCIPAL ENGINEER REVIEW	STAFF ENGINEER	FIELD ENGINEER	DRAFTING	WORD PROCESSING	TASK HOURS	OTHER DIRECT COST (ODC)
GEOTECHNICAL ENGINEERING SERVICES							
Field Exploration							
Setup/Site Visit and Utilities (including mobilization)		1	5				
Drilling and Sampling (including mobilization) (10 Borings)			16				$2,675
Follow-up Groundwater Measurements and Backfill			4				
Geotechnical Laboratory testing							
Setup		1					
Moisture Content/ Density (33)							$495
-200 sieve (13)							$390
Gradation Analysis (3)							$240
Atterberg Limits (15)							$750
Swell-Consolidation (8)							$560
Moisture-Density Relationshipts (modifed Proctor)							$200
pH (3)							$120
Electrical Resistivity (3)							$450
Water-soluble sulfate (3)							$150
Engineering and Reporting							
Project Management		4					
Geotechnical Engineering Report	1	10		5	1		
Post-Report Consultation	2	4					
TOTAL HOURS	3	20	25	5	1		
RATE	$205	$85	$70	$80	$55		
LABOR COST	$615	$1,700	$1,750	$400	$55		
		Labor Total =	**$4,520**	**ODC Total =**	**$6,030**	**Estimate Total =**	**$10,550**

Kumar & Associates, Inc.®

PROFESSIONAL SERVICES FEE SCHEDULE

ENGINEERING, ENVIRONMENTAL AND FIELD TECHNICAL SERVICES

Principal Engineer	$180.00 - $210.00/hr.
Senior Project Engineer/Geologist/Manager	$120.00 - $150.00/hr.
Project Engineer/Geologist/Scientist	$95.00 - $125.00/hr.
Staff Engineer/Geologist/Scientist	$75.00 - $100.00/hr.
Project Supervisor	$90.00 - $130.00/hr.
Construction Inspector I	$65.00 - $75.00/hr.
Construction Inspector II	$75.00 - $90.00/hr.
Environmental Specialist/Scientist	$90.00 - $135.00/hr.
Environmental Field Technician/Geologist	$70.00 - $80.00/hr.
Safety Professional	$110.00 - $125.00/hr.
Project Administrator	$110.00 - $120.00/hr.
Staff Administrator	$70.00 - $80.00/hr.
Exploration Field Engineer/Technician/Geologist	$60.00 - $80.00/hr.
Construction Materials Testing Technicians:	
▪ Field Observation	$65.00 - $75.00/hr.
▪ Concrete	$50.00 - $60.00/hr.
▪ Soils, Reinforcing Steel, Asphalt	$53.00 - $62.00/hr.
▪ Piers, Masonry	$60.00 - $70.00/hr.
▪ Fireproofing	$70.00 - $80.00/hr.
▪ Structural Steel	$75.00 - $85.00/hr.
▪ Post-Tensioning	$50.00 - $60.00/hr.
▪ Floor Flatness	$70.00 - $80.00/hr.
Word Processing	$45.00 - $55.00/hr.
Drafting	$70.00 - $90.00/hr.
Laboratory Technician	$45.00 - $55.00/hr.
Litigation/Expert Witness/Deposition	$175.00 - $350.00/hr.

OTHER DIRECT CHARGES

Auto or Pickup Mileage	$0.75/mile
Out of Town Expenses, Travel, Rental Etc...	Cost + 15%
Expedited Laboratory Services: 1.35 x Test Price (See No. 16 on Reverse Side)	

SUBSURFACE EXPLORATION, SAMPLING, MONITORING WELL INSTALLATION

Exploration Subcontractor Subconsultant's (4-Inch Solid Auger, Hollow Stem Auger, Rotary and Diamond Core Drilling, Exploratory Pit Excavation, ATV Drill Rig, Geophysical Exploration, Specialty Sampling, etc.)	Cost + 15%
Materials/Equipment Rental/Outsourced Laboratory Testing/Subconsultants	Cost + 15%
Falling Weight Deflectometer (Includes Operator)	$200.00/hr.
Concrete/Asphalt Coring	$75.00/hr.
Photoionization Detector	$100.00/Day
LEL/CO/H_2S/O_2 Meter	$100.00/Day
Conductivity, Temperature, pH Tester	$25.00/Day
Personal Protective Equipment	Rates Quoted on Project Basis

LABORATORY TESTING

Soils

Moisture Content (ASTM D2216)	$10.00 ea.
Moisture Content & Density (ASTM D2216)	$15.00 ea.
Gradation (ASTM D6913)	$85.00 ea.
Hydrometer (ASTM D7928)	$85.00 ea.
Double Hydrometer (ASTM D4221)	$225.00 ea.
Percent Less than #200 Sieve (ASTM D1140)	$30.00 ea.
Atterberg Limits (ASTM D4318) Method A	$75.00 ea.
Atterberg Limits (ASTM D4318) Method B	$50.00 ea.
Standard Proctor (ASTM D698)	$95.00 ea.
Modified Proctor (ASTM D1557)	$110.00 ea.
Soil/Cement Proctor (ASTM D558)	$135.00 ea.
Proctor Checkpoint (ASTM D698 or ASTM D1557)	$50.00 ea.
Relative Density (ASTM D4253 and ASTM D4254)	$175.00 ea.
Specific Gravity (ASTM D854)	$80.00 ea.
Standard Swell-Consolidation (ASTM D4546)	$70.00 ea.
Air-Dried Swell-Consolidation (ASTM D4546)	$80.00 ea.
Remolded Swell-Consolidation (ASTM D4546)	$100.00 ea.
Time/Consolidation (ASTM D2435)	$325.00 ea.
Unconfined Compressive Strength (ASTM D2166)	$60.00 ea.
Slake Durability (ASTM D4644)	$100.00 ea.
Pinhole Dispersion (ASTM D4647)	$150.00 ea.
Water Soluble Sulfates (AASHTO T290, CP-L 2103)	$50.00 ea.
pH (ASTM E70)	$40.00 ea.
Chloride (AASHTO T291, CP-L 2104)	$50.00 ea.
Electrical Resistivity (ASTM G57)	$150.00 ea.
Organics (AASHTO T267)	$70.00 ea.
R-Value (ASTM D2844)	$350.00 ea.
California Bearing Ratio (ASTM D1883) 1-Pt.	$150.00 ea.
California Bearing Ratio (ASTM D1883) 3-Pt.	$400.00 ea.
Soil/Lime, Soil/Cement Mix Analysis (Cost Will Vary Depending on Specification Requirements)	Call for Pricing
Freeze/Thaw (ASTM D560)	$350.00 ea.
Wet/Dry (ASTM D559)	$350.00 ea.
Compressive Strength of Soil-Cement (ASTM D1633)	$60.00 ea.
Direct Shear/per point (ASTM D3080)	
Unconsolidated-Undrained (Quick Test)	$150.00 ea.
Residual Strength, Additional Per Carriage Reversal	$50.00 ea.
Drained Tests Quoted on Project-Specific Basis	
Soil Suction (ASTM D6836 Method D)	$50.00 ea.

Miscellaneous

Sample Preparation	$50.00/hr.

DEERE & AULT
A SCHNABEL ENGINEERING COMPANY

May 20, 2020

Mr. Dan Phipps
Kennedy Jenks
165 S. Union Boulevard, Suite 570
Lakewood, Colorado 80228

Subject: **Project 20P26008.00, Floodplain Development Permit for Erie Horizontal Well Erie, Colorado**

Dear Mr. Phipps:

DEERE & AULT (D&A), A SCHNABEL ENGINEERING COMPANY is pleased to present this proposal to serve as a subconsultant to Kennedy Jenks (KJ) for floodplain permitting assistance with the Erie Horizontal Well. The proposed project includes the design and construction of a horizontal well on the east overbank of Boulder Creek near Erie, Colorado. This well is expected to be constructed in the 100-year floodplain which will require a Floodplain Development Permit (FDP) from either Weld County or the Town of Erie, depending on the final location of the well.

SCOPE OF WORK

This scope of work assumes that the project will be located either entirely within unincorporated Weld County or entirely within the Town of Erie, and that only one FDP will be required. Weld County is currently regulating the 100-year floodplains within its jurisdiction using the effective FEMA floodplain maps and the draft floodplain maps from the Colorado Hazard Mapping Program (CHAMP), where available. D&A has been unable to confirm but will assume that the Town of Erie is also regulating the floodplain using these two studies. D&A will therefore request from the County (or Town) the latest FEMA and CHAMP floodplain models of the study reach which we will review and verify can be incorporated into our study without major modifications.

D&A will provide guidance to KJ for well placement and design to streamline the floodplain permitting process and ensure that all applicable floodplain regulations are observed. D&A also proposes a site visit with KJ to visually inspect the prospective well sites and to discuss any concerns relating to the floodplain permitting aspect of the project.

D&A will add cross sections to the floodplain model to represent existing conditions topography at the proposed well pad. D&A will then modify the cross sections to represent proposed conditions based on the well pad design drawing to be provided by KJ. The existing and proposed conditions models will be run, and the results will be compared to determine the hydraulic effect that the proposed well pad will have on the floodplain. A maximum increase of 0.5 feet to the Base Flood Elevation (BFE) is allowed for developments in the 100-year floodplain fringe, while a maximum increase of 0.00 feet (a.k.a. “no-rise”) is

allowed for developments in the floodway. A preliminary review of floodplain mapping for the site and discussions with KJ indicate that the well site may be located within the floodway. Therefore, this scope of work assumes that a "no-rise" condition will be needed to obtain an FDP. Based on D&A's experience with similar projects, we expect the proposed pad to cause a small increase to the BFE on the order of several hundredths of a foot. To offset this BFE increase and achieve a "no-rise" condition, compensatory grading adjacent to the well pad will be necessary. D&A will use the proposed conditions hydraulic model to estimate the extent of compensatory grading needed, and D&A will coordinate with the KJ design team to incorporate this additional grading into their design.

D&A will prepare and submit a complete FDP application package with "No-Rise" Certification to the Weld County or Town of Erie floodplain administrator. Review comments received from the floodplain administrator pertaining to the FDP application will be addressed by D&A. After construction of the well pad is completed, D&A will compose an as-built summary letter to the floodplain administrator to close out the FDP. The letter will summarize as-built dimensions and elevations of the well pad (to be provided by KJ), any known deviations from the approved design, and the hydraulic impact of these design deviations. Minor revisions to the hydraulic modeling are included in this task if needed to adequately represent the as-built improvements. D&A will coordinate with KJ as to what as-built survey data is needed to close out the FDP.

SCHEDULE

D&A will request the hydraulic models from the floodplain administrator immediately after receiving Notice to Proceed, and we expect to immediately be available for design coordination with KJ. D&A will submit the FDP application package to the floodplain administrator within approximately 3 weeks of receiving design drawings from KJ.[1] The estimated review period by the floodplain administrator is 45 days.[2] Following construction, we expect to submit the FDP close out letter to the floodplain administrator within approximately 30 days after receiving as-built data from KJ.

COST

The total cost estimate for the engineering services described in this proposal is $19,600.[3] A breakdown of the costs is provided in the attached Table 1.

[1] Draft plans are acceptable if subsequent plan revisions do not affect D&A's hydraulic modeling as a result of changes to the geometry of the well pad.
[2] The typical Weld County review period is 45 days. The typical Town of Erie review period is unknown to D&A at the time of this proposal but is likely similar to the Weld County review period of 45 days.
[3] This total includes a Weld County FDP review fee of $180 plus D&A's standard 10 percent markup. The Town of Erie FDP review fee is currently unknown to D&A.

Thank you for the opportunity to provide floodplain permitting assistance for the Erie Horizontal Well project. If this proposal meets with your approval, we will provide an Agreement for Professional Services. We look forward to working with you on this project. Please contact the undersigned if you have any questions regarding this proposal.

Sincerely,

DEERE & AULT, A SCHNABEL ENGINEERING COMPANY

Mark Severin, PE
Principal

Grant Johnson, PE
Senior Engineer

Attachment

TABLE 1

Floodplain Development Permit for Town of Erie Horizontal Well

5/20/2020

Task	Description	Mark Severin	Grant Johnson	CAD Technician	SUBTOTAL	Expenses	Total by Task (rounded to nearest $100)
	Hourly Rates	$210	$121	$121			
1	**Floodplain Development Permit Application**						
	Request and Review FEMA and CHAMP Models		4		$484		$500
	Site Visit	6	6		$1,986	$50	$2,000
	Coordinate Well Placement & Design with Kennedy Jenks	4	24	2	$3,986		$4,000
	Existing and Proposed Conditions Modeling	2	40		$5,260		$5,300
	Prepare & Submit Weld County or Erie FDP Application	2	28		$3,808	$198	$4,000
	Address Review Comments from Floodplain Administrator		4		$484		$500
	As-Built FDP Closeout Letter to Floodplain Administrator	2	24		$3,324		$3,300
	Totals	**16**	**130**	**2**	**$19,332**	**$248**	**$19,600**

Appendix B – Project Permitting Requirements

The following table summarizes environmental permits that may be required for the Town of Erie North Water Reclamation Facility Horizontal Well Project. Time frames are ballpark estimates. Pinyon will work closely with the project design team to evaluate the specific project components requiring permitting and level of effort for each as the project progresses.

Agency	Permit/Consultation	Estimated Time to Submit Application	Estimated Time to Obtain Approval	Comments
U.S. Army Corps of Engineers	Clean Water Act Section 404 Permit	2 months	2 months	Only required if there will be placement of fill material within the limits of Waters of the U.S. Time frame assumes a Nationwide permit. Cost estimate includes wetland delineation and permitting.
U.S. Fish and Wildlife Service	Endangered Species Act Section 7 Consultation Compliance with Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act	2 months	2 months	Section 7 consultation may be required if a Section 404 permit is required. (The Town is already a member of SPWRAP.) Survey and development of avoidance measures for migratory birds, including raptors and eagles, is recommended.
Colorado Office of Archaeology and Historic Preservation (SHPO)	National Historic Preservation Act Section 106 Consultation	2 months	3 months	Section 106 consultation may be required if a Section 404 permit is required.
Colorado Parks and Wildlife (CPW)	Coordination regarding state listed species, species of special concern, and raptors	1 month	1 month	Coordination may be required if sensitive species are identified in the project area.

Agency	Permit/Consultation	Estimated Time to Submit Application	Estimated Time to Obtain Approval	Comments
	Discharge Permit to Boulder Creek	1 month	1 month	Required for pilot testing HDD well prior to construction and installation of permanent conveyance system.
Colorado Department of Public Health and Environment (CDPHE)	Construction Stormwater Permit/Stormwater Management Plan (SWMP)	1 month	1 month	Required prior to soil disturbance of 1 acre or more.
	Construction Dewatering Permit	1 month	1 month	Required when groundwater is encountered during construction activities, where the groundwater needs to be discharged to surface water or back to the ground.
Weld County	Special Review Permit	1 month (coordination with County to confirm permit is not required) 2-3 months to prepare and submit application, if a permit is required.	Up to 12 months if a permit is required.	Likely not required for construction of well; however, a Use by Special Review permit may be required for pipeline construction. Pinyon assumes that no 1041 permit will be required based on project size and location. Coordination with Weld County is recommended to confirm permitting requirements.
	Floodplain Hazard Permit	1 month (work to verify permit is not required)	N/A	Likely not required; the wells will not cause either a rise in base flood elevation or changes to the floodway and floodplain delineations.

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T: 303.980.5200 F: 303.980.0089
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Clean Water Act Section 404 Permit				
Description	**Quantity**	**Unit**	**Rate**	**Extension**
Labor Rates				
Project Manager	4.0	hours	$150.00	$600.00
Scientist I	4.0	hours	$125.00	$500.00
Scientist	50.0	hours	$115.00	$5,750.00
CAD/GIS Specialist I	8.0	hours	$115.00	$920.00
Field Specialist / Project Assistant	2.0	hours	$85.00	$170.00
Equipment/Material Unit Rates				
Truck/Van Mileage	80.0	miles	$0.58	$46.40
Biological Field Visit	1.0	days	$250.00	$250.00
			Task Subtotal	***$8,236.40***

Assumptions:
- A wetland delineation will be conducted by one biologist in one day
- Impacts will be covered under a Nationwide permit
- No mitigation is assumed to be required

Endangered Species Act Section 7 Consultation				
Description	**Quantity**	**Unit**	**Rate**	**Extension**
Labor Rates				
Project Manager	1.0	hour	$150.00	$150.00
Scientist I	2.0	hours	$125.00	$250.00
Scientist	14.0	hours	$115.00	$1,610.00
			Task Subtotal	***$2,010.00***

Assumptions:
- Habitat assessment will be conducted during wetland delineation
- Assumes a "may affect, not likely to adversely affect" determination for listed species
- No mitigation is assumed to be required

National Historic Preservation Act Section 106 Consultation				
Description	**Quantity**	**Unit**	**Rate**	**Extension**
Labor Rates				
Project Manager	1.0	hour	$150.00	$150.00
Archaeologist/ Historian II	2.0	hours	$150.00	$300.00
Archaeologist/ Historian	24.0	hours	$115.00	$2,760.00
CAD/GIS Specialist I	8.0	hours	$115.00	$920.00
Equipment/Material Unit Rates				
COMPASS Database	1.0	lump sum	$150.00	$150.00
General Field Visit - Day	1.0	day	$50.00	$50.00
Truck/Van Mileage	80.0	miles	$0.58	$46.40
			Task Subtotal	***$4,376.40***

Assumptions:

- Includes a desktop (Class I) review for historic resources, and a one-day site visit by an archaeologist
- Assumes a finding of "no historic properties affected"
- No mitigation is assumed to be required

Colorado Parks and Wildlife Coordination

Description	Quantity	Unit	Rate	Extension
Labor Rates				
Project Manager	1.0	hour	$150.00	$150.00
Scientist	12.0	hours	$115.00	$1,380.00
			Task Subtotal	***$1,530.00***

Assumptions:

- Costs include phone and email coordination with CPW
- No in-person meetings are assumed

Construction Stormwater Permit/Stormwater Management Plan (SWMP)

Description	Quantity	Unit	Rate	Extension
Labor Rates				
Project Manager	2.0	hours	$150.00	$300.00
Engineer II	4.0	hours	$150.00	$600.00
Engineer I	18.0	hours	$125.00	$2,250.00
CAD/GIS Specialist I	15.0	hours	$115.00	$1,725.00
Equipment/Material Unit Rates				
General Field Visit - Day	1.0	day	$50.00	$50.00
Truck/Van Mileage	80.0	miles	$0.58	$46.40
			Task Subtotal	***$4,971.40***

Assumptions:

- One Erosion and Sediment Control Plan is assumed
- The project will fall under General Permit COR400000 for stormwater discharges associated with construction activities
- One, 1-day field visit will be conducted by a Pinyon engineer to document baseline conditions

Discharge Permit for Well Development and Pumping Test Activities

Description	Quantity	Unit	Rate	Extension
Labor Rates				
Project Manager	2.0	hour	$150.00	$300.00
Engineer II	2.0	hours	$150.00	$300.00
Engineer I	30.0	hours	$125.00	$3,750.00
			Task Subtotal	***$4,350.00***

Assumptions:

- The project will fall under General Permit COG6080000 for discharges from short-term well development activities

Construction Dewatering Permit

Description	Quantity	Unit	Rate	Extension
Labor Rates				
Project Manager	1.0	hour	$150.00	$150.00

Engineer II	2.0	hours	$150.00	$300.00
Engineer I	20.0	hours	$125.00	$2,500.00
			Task Subtotal	***$2,950.00***

Assumptions:

- The project will fall under General Permit COG080000 for discharges from short-term construction dewatering activities

Weld County Special Review Permit				
Description	**Quantity**	**Unit**	**Rate**	**Extension**
Labor Rates				
Project Manager	20.0	hours	$150.00	$3,000.00
Scientist II	20.0	hours	$150.00	$3,000.00
Scientist I	60.0	hours	$125.00	$7,500.00
Scientist	80.0	hours	$115.00	$9,200.00
CAD/GIS Specialist I	20.0	hours	$115.00	$2,300.00
Equipment/Material Unit Rates				
Truck/Van Mileage	160.0	miles	$0.58	$92.80
			Task Subtotal	***$25,092.80***

Assumptions:

- Costs assume a Special Review Permit is required; no 1041 permit is assumed
- Pinyon will prepare the permit application, with information supplied by the Town of Erie and the engineering team as necessary to describe the project
- Two in-person meetings are assumed for public hearing support
- Permit application fees are not included in the cost estimate

Floodplain Hazard Permit				
Description	**Quantity**	**Unit**	**Rate**	**Extension**
Labor Rates				
Project Manager	1.0	hour	$150.00	$150.00
Scientist II	4.0	hours	$150.00	$600.00
Scientist I	8.0	hours	$125.00	$1,000.00
			Task Subtotal	***$1,750.00***
			Project Total	**$55,267.00**

Assumptions:

- A Floodplain Hazard Permit application will not be required
- Costs include coordination and support to document that no permit is needed