

**EXHIBIT 2**  
**PROFESSIONAL ENGINEERING SERVICES**  
**FOR**  
**ALLRED AND JOHN PAINE ROAD TRANSMISSION LINE**  
(CONTRACT #6478)

THIS AGREEMENT is made and entered into this date \_\_\_\_\_, by and between the City of Denton, Texas, a Texas municipal corporation, with its principal office at 215 East McKinney Street, Denton, Denton County, Texas 76201, hereinafter called "Owner" and Kimley-Horn and Associates, Inc., with its corporate office at 421 Fayetteville Street, Raleigh, North Carolina, 27601, hereinafter called "Design Professional," acting herein, by and through their duly authorized representatives.

In consideration of the covenants and agreements herein contained, the parties hereto do mutually agree as follows:

**SECTION 1**  
**EMPLOYMENT OF DESIGN PROFESSIONAL**

The Owner hereby contracts with the Design Professional, a licensed Texas engineer, as an independent contractor. The Design Professional hereby agrees to perform the services in conjunction with the **ALLRED AND JOHN PAINE ROAD TRANSMISSION LINE** project as described herein and in the Proposal (**Exhibit 5**), the General Conditions (**Exhibit 4**), and other attachments to this Agreement that are referenced in Section 4. The Project shall include, but shall not be limited to, the following major components (for a more precise or comprehensive description of the Scope refer to **Exhibit 5**, Attachment E):

**BASIC SERVICES:**

A. **Schematic Design Phase**

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Preliminary Site Investigation
- Preliminary Property and Right-of-Way Investigation
- Purchasing Department Coordination
- Preparation of Alternate Alignment Technical Memorandum
- Preparation of Design Narrative Technical Memorandum

Task 2: Southwest Pump Station Flow Control Valve

- Hydraulic Analysis
- Schematic Layout of Proposed Valve

Task 3: Redundant Railroad Crossing

- Provide Location Recommendations
- Schematic Layout of Proposed Crossing Location

B. Preliminary Design Phase

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Project Management
- Field Verification
- Preliminary Water Line Layout
- Preliminary Water Line Plan/Profile Preparation
- Preliminary Traffic Control and Detour Plans
- Franchise Utility Coordination
- Design Coordination Meetings

Task 2: Southwest Pump Station Flow Control Valve

- Field Verification
- Preliminary Yard Piping Layout
- Preliminary Yard Piping Plan/Profile Preparation
- Electrical Engineering Design

Task 3: Redundant Railroad Crossing

- Field Verification
- Preliminary Water Line Layout
- Preliminary Water Line Plan/Profile Preparation
- Preliminary Traffic Control and Detour Plans

C. Final Design Phase

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Incorporation of Preliminary Design Comments
- Incorporation of Franchisee Utility Investigation Information
- Preparation of Erosion Control Plan and Details
- Final Design Review Meeting

Task 2: Southwest Pump Station Flow Control Valve

- Incorporation of Preliminary Design Comments
- Incorporation of Franchisee Utility Investigation Information
- Preparation of Erosion Control Plan and Details

Task 3: Redundant Railroad Crossing

- Incorporation of Preliminary Design Comments
- Incorporation of Franchisee Utility Investigation Information
- Preparation of Erosion Control Plan and Details

D. Construction Documents Phase

Task 1: Preparation of Bid Specifications and Construction Contract Documents

E. Bidding Phase and Construction Contract Execution

Task 1: Bidding Phase Services

- Preparation of Notice to Bidders

- Provide Owner Assistance During Bidding Phase
- Provide Conformed Plans and Specifications

F. Record Drawings

Task 1: Record Drawing Updates for Allred and John Paine Road 24/30-Inch Water Line, Southwest Pump Station Flow Control Valve, and Redundant Railroad Crossing

G. Construction Phase Services

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Pre-Construction Conference
- Control Staking
- Site Visits
- Shop Drawing and Samples Review

Task 2: Southwest Pump Station Flow Control Valve

- Shop Drawing and Samples Review

Task 3: Redundant Railroad Crossing

- Shop Drawing and Samples Review

ADDITIONAL SERVICES:

A. Design Survey

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Utility and Property Owner Coordination
- Design Survey

Task 2: Southwest Pump Station Flow Control Valve

- Utility and Property Owner Coordination
- Design Survey

Task 3: Redundant Railroad Crossing

- Utility and Property Owner Coordination
- Design Survey

B. Geotechnical

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Perform Geotechnical Analysis

Task 2: Redundant Railroad Crossing

- Perform Geotechnical Analysis

C. Subsurface Utility Engineering (SUE)

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Level A SUE Investigation

Task 2: Southwest Pump Station Flow Control Valve

- Level A SUE Investigation

Task 3: Redundant Railroad Crossing

- Level A SUE Investigation

D. Cathodic Protection System

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Document Review and Project Management
- Cathodic Protection Field Survey
- Data Analysis and Lab Work
- Corrosion Protection Design

Task 2: Redundant Railroad Crossing

- Document Review and Project Management
- Cathodic Protection Field Survey
- Data Analysis and Lab Work
- Corrosion Protection Design

E. Easement Instruments of Conveyance Preparation

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Preparation of Permanent and Temporary Easement Instruments

Task 2: Redundant Railroad Crossing

- Preparation of Permanent and Temporary Easement Instruments

F. Easement Acquisition

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- Performed by Owner

Task 2: Redundant Railroad Crossing

- Performed by Owner

G. Permitting

Task 1: Allred and John Paine Road 24/30-Inch Water Line

- TxDOT UIR Permit Acquisition

Task 2: Redundant Railroad Crossing

- TxDOT UIR Permit Acquisition
- Railroad Permit Acquisition

**SECTION 2**  
**COMPENSATION AND SCHEDULE**

Total compensation for the Design Professional contemplated under the terms of this agreement **shall be a total not-to-exceed \$504,500** for all services including reimbursable expenses. The Owner shall compensate the Design Professional as follows:

**2.1 BASIC SERVICES**

**2.1.1** For Basic Services the total compensation shall be a lump sum amount of **\$306,700**

**2.1.2** Progress payments for Basic Services shall be paid monthly based on the actual work satisfactorily completed per month in each phase as a percentage of the overall compensation for that phase, with the following amounts of the total compensation for the Basic Services for each phase of the Project:

A) Schematic Design Phase	\$ 70,900
B) Preliminary Design Phase	\$121,500
C) Final Design Phase	\$ 61,300
D) Construction Documents Phase	\$ 9,600
E) Bidding Phase	\$ 13,900
F) Record Drawings	\$ 7,600
G) Construction Phase	<u>\$ 21,900</u>
<b>Total</b>	<b><u>\$306,700</u></b>

**2.2 ADDITIONAL SERVICES**

**2.2.1** For Additional Services the total compensation shall be **\$189,500**. Compensation for Additional Services shall be based on actual services authorized and performed with lump sum or maximum not to exceed subtotals depending on the service provided all as shown in **Exhibit 5**, Attachment A. The schedule for the hourly rates is attached as **Exhibit 7**.

**2.2.2** Compensation for Additional Services of consultants, including additional structural, mechanical and electrical engineering services, geotechnical services, right-of-way services, etc. shall be based on a multiple of 1.1 times the amounts billed to the Design Professional for such additional services.

**2.3 REIMBURSABLE EXPENSES** Reimbursable Expenses shall be a multiple of 1.1 times the expenses incurred by the Design Professional, the Design Professional's employees and consultants in the interest of the Project as defined in the General Conditions but not to exceed a total of **\$8,300.00** without the prior written approval of the Owner. This amount does not include appraisals, escrow fees, abstract fees, title fees, FEMA review fees, 404 permit fees, and TDLR fees.

**2.4 SCHEDULE** The Design Professional will be authorized to commence work on the Project upon execution of this AGREEMENT and agrees to complete the detailed design services in a total of approximately **670 calendar days** as shown on the schedule included in **Exhibit 6**.

Exhibit 5: Attachment A - Summary of Engineering Fees

Basic Services (Lump Sum) - Task Budget Detail Summary	Allred Waterline	Southwest Pump Station Flow Control Valve	Redundant Railroad Crossing	Total
Task A: Schematic Design	\$ 53,400	\$ 11,300	\$ 6,200	\$ 70,900
Task B: Preliminary Design	\$ 78,700	\$ 27,900	\$ 14,900	\$ 121,500
Task C: Final Design	\$ 42,400	\$ 9,900	\$ 9,000	\$ 61,300
Task D: Bid Specifications and Construction Contract Documents	\$ 9,600	\$ -	\$ -	\$ 9,600
Task E: Bidding Phase	\$ 13,900	\$ -	\$ -	\$ 13,900
Task F: Record Drawings	\$ 7,600	\$ -	\$ -	\$ 7,600
Task G: Construction Phase Services	\$ 14,700	\$ 4,400	\$ 2,800	\$ 21,900
<b>Total</b>	<b>\$ 220,300</b>	<b>\$ 53,500</b>	<b>\$ 32,900</b>	<b>\$ 306,700</b>
Additional Services (Hourly Not to Exceed) - Task Budget Detail Summary	Allred Waterline	Southwest Pump Station Flow Control Valve	Redundant Railroad Crossing	Total
Task A: Design Survey	\$ 52,400	\$ 2,900	\$ 3,400	\$ 58,700
Task B: Geotechnical	\$ 13,400	\$ -	\$ 3,200	\$ 16,600
Task C: Subsurface Utility Engineering	\$ 8,300	\$ 8,300	\$ 8,300	\$ 24,900
Task D: Cathodic Protection	\$ 49,300	\$ -	\$ 15,200	\$ 64,500
Task E: Easement Instrument Preparation	\$ 13,500	\$ -	\$ 3,800	\$ 17,300
Task F: Easement Acquisition	\$ -	\$ -	\$ -	\$ -
Task G: Permitting	\$ 3,700	\$ -	\$ 3,800	\$ 7,500
<b>Total</b>	<b>\$ 140,600</b>	<b>\$ 11,200</b>	<b>\$ 37,700</b>	<b>\$ 189,500</b>
<b>Reimbursable Expenses Summary</b>	<b>\$ 6,600</b>	<b>\$ 300</b>	<b>\$ 1,400</b>	<b>\$ 8,300</b>
<b>Grand Total</b>	<b>\$ 367,500</b>	<b>\$ 65,000</b>	<b>\$ 72,000</b>	<b>\$ 504,500</b>

**Exhibit 5: ATTACHMENT B**  
**PROJECTED PLAN SHEETS**

- 1 – Cover Sheet
- 2 – General Notes and Sheet Index
- 3 & 4 – Project Control

Allred and John Paine Road 24/30-Inch Waterline and Redundant Railroad Crossing Sheets:

- 5 – Shutdown and Sequencing
- 6 & 7 – Existing Water Line Layout
- 8 & 9 – Proposed Water Line Layout
- 10 thru 27 – Allred & John Paine Waterline Plan and Profile
- 28 – Redundant Railroad Crossing Waterline Plan and Profile
- 29 thru 32 – City Standard Details
- 33 & 34 – Custom Connection Details
- 35 thru 37 – Erosion Control Plan and Details
- 39 thru 44 – Cathodic Protection Sheets
- 45 thru 49 – Traffic Control Plans

Southwest Pump Station Flow Control Valve Sheets:

- 50 – Site Plan
- 51 – Yard Piping Plan and Profile
- 52 – Mechanical Plan
- 53 – Shutdown and Sequencing
- 54 – City Standard Details
- 55 – Custom Connection Details
- 56 thru 65 – Electrical and Instrumentation Sheets

**Exhibit 5: ATTACHMENT C**  
**ORGANIZATIONAL CHART**

<b>Firm</b>	<b>Primary Responsibility</b>
<b>Design Professional</b>	
Kimley-Horn and Associates, Inc.	Design, Bidding and Construction Phase Services
<b>Proposed Sub-Consultants</b>	
Shrader Engineering Inc.	Electrical Engineering Services
Gorron dona & Associates, Inc.	Survey and Easement Services
CMJ Engineering, Inc.	Geotechnical Services
The Rios Group	Subsurface Utility Engineering
V&A Consulting Engineers, Inc.	Cathodic Protection Services



<b>Client:</b> City of Denton	<b>Date:</b> 5/22/2017
<b>Project:</b> Allred and John Pain Road 24/30-Inch Water Line	<b>Prepared By:</b> JCK
<b>KHA No.:</b> 061024xxx	<b>Checked By:</b> JRA

<b>Title:</b> Summary
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Project Description			Total
<u>Allred and John Pain Road 24/30-Inch Water Line</u>	14,140	LF	\$5,200,000
<u>Southwest Pump Station Flow Control Valve</u>			\$290,000
<u>Redundant Railroad Crossing</u>	360	LF	\$470,000
	<b>Project Total</b>		<b><u>\$5,960,000</u></b>

**Basis for Cost Projection:**

- No Design Completed
- Preliminary Design
- Final Design

**This total does not reflect engineering or technical services.**

The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

**Exhibit 5 - Attachment D**

**Opinion of Probable Construction Cost**

<b>Client:</b> City of Denton	<b>Date:</b> 5/22/2017
<b>Project:</b> Allred and John Pain Road 24/30-Inch Water Line	<b>Prepared By:</b> JCK
<b>KHA No.</b> 061024xxx	<b>Checked By:</b> JRA

**Title:** Allred and John Pain Road 24/30-Inch Water Line

Line No.	Description	Quantity	Unit	Unit Price	Cost
1	30-Inch AWWA C-303 Concrete Water Pipe w/ Fittings	5,780	LF	\$ 275.00	\$ 1,589,500.00
2	30-Inch AWWA C-303 Concrete Water Pipe w/ Fittings and Restrained Joints	1,000	LF	\$ 300.00	\$ 300,000.00
3	24-Inch AWWA C-303 Concrete Water Pipe w/ Fittings	6,360	LF	\$ 225.00	\$ 1,431,000.00
4	24-Inch AWWA C-303 Concrete Water Pipe w/ Fittings and Restrained Joints	1,000	LF	\$ 250.00	\$ 250,000.00
5	Flexible Base Pavement Repair	12,500	SY	\$ 12.00	\$ 150,000.00
6	Asphalt Pavement Repair	3,000	SY	\$ 50.00	\$ 150,000.00
7	8-Inch Blow Off Valve Assembly and Piping	2	EA	\$ 15,000.00	\$ 30,000.00
8	30-Inch Resilient Seated Gate Valve and Vault	3	EA	\$ 20,000.00	\$ 60,000.00
9	24-Inch Resilient Seated Gate Valve and Vault	3	EA	\$ 15,000.00	\$ 45,000.00
10	4-Inch Air Release Valve and Vent Piping	2	EA	\$ 12,000.00	\$ 24,000.00
11	Exploratory Excavation	4	EA	\$ 2,000.00	\$ 8,000.00
12	Connect to Existing 24-Inch Water Line	1	EA	\$ 25,000.00	\$ 25,000.00
13	Connect to Existing 20-Inch Water Line	1	EA	\$ 20,000.00	\$ 20,000.00
14	Cathodic Protection	1	LS	\$120,000.00	\$ 120,000.00
15	Trench Safety	14,140	LF	\$ 5.00	\$ 70,700.00
16	Traffic Control	12	MO	\$ 2,000.00	\$ 24,000.00
17	Temporary Erosion Control Measures	1	LS	\$ 20,000.00	\$ 20,000.00
18	Storm Water Pollution Prevention Plan	1	LS	\$ 10,000.00	\$ 10,000.00

- No Design Completed
- Preliminary Design
- Final Design

Subtotal:		\$ 4,327,200.00
Conting. (%,+/-)	20	\$ 872,800.00
<b>Total</b>		<b>\$ 5,200,000.00</b>

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**Exhibit 5 - Attachment D**

**Opinion of Probable Construction Cost**

<b>Client:</b> City of Denton	<b>Date:</b> 5/22/2017
<b>Project:</b> Allred and John Pain Road 24/30-Inch Water Line	<b>Prepared By:</b> JCK
<b>KHA No.</b> 061024xxx	<b>Checked By:</b> JRA

**Title:** Southwest Pump Station Flow Control Valve

Line No.	Description	Quantity	Unit	Unit Price	Cost
1	~12" Flow Control Valve and Vault	1	LS	\$ 50,000.00	\$ 50,000.00
2	Restrained Ductile Iron Yard Piping and Fittings	1	LS	\$ 10,000.00	\$ 10,000.00
3	Electrical	1	LS	\$ 20,000.00	\$ 20,000.00
4	12-Inch Resilient Seated Gate Valve and Box	2	EA	\$ 2,000.00	\$ 4,000.00
5	24-Inch Resilient Seated Gate Valve and Vault	4	EA	\$ 15,000.00	\$ 60,000.00
6	Exploratory Excavation	2	EA	\$ 2,000.00	\$ 4,000.00
7	Connect to Existing 30-Inch Water Line	2	EA	\$ 25,000.00	\$ 50,000.00
8	Trench Safety	3	LF	\$ 5.00	\$ 15.00
9	Temporary Erosion Control Measures	1	LS	\$ 20,000.00	\$ 20,000.00
10	Storm Water Pollution Prevention Plan	1	LS	\$ 10,000.00	\$ 10,000.00
11	Site Restoration	1	LS	\$ 10,000.00	\$ 10,000.00

- No Design Completed
- Preliminary Design
- Final Design

Subtotal:		\$	238,015.00
Conting. (%,+/-)	20	\$	51,985.00
<b>Total</b>		<b>\$</b>	<b>290,000.00</b>

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**Exhibit 5 - Attachment D**

**Opinion of Probable Construction Cost**

<b>Client:</b> City of Denton	<b>Date:</b> 5/22/2017
<b>Project:</b> Allred and John Pain Road 24/30-Inch Water Line	<b>Prepared By:</b> JCK
<b>KHA No.</b> 061024xxx	<b>Checked By:</b> JRA

**Title: Redundant Railroad Crossing**

Line No.	Description	Quantity	Unit	Unit Price	Cost
1	24-Inch AWWA C-303 Concrete Water Pipe w/ Fittings and Restrained Joints	120	LF	\$ 250.00	\$ 30,000.00
2	48-Inch Steel Casing Pipe (by other than open cut)	240	LF	\$ 700.00	\$ 168,000.00
3	24-Inch AWWA C-303 Concrete Water Carrier Pipe w/ Fittings and Restrained Joints	240	LF	\$ 150.00	\$ 36,000.00
4	Flexible Base Pavement Repair	500	SY	\$ 12.00	\$ 6,000.00
5	Asphalt Pavement Repair	500	SY	\$ 50.00	\$ 25,000.00
6	24-Inch Resilient Seated Gate Valve and Vault	2	EA	\$ 15,000.00	\$ 30,000.00
7	4-Inch Air Release Valve and Vent Piping	1	EA	\$ 12,000.00	\$ 12,000.00
8	Exploratory Excavation	2	EA	\$ 2,000.00	\$ 4,000.00
9	Connect to Existing 24-Inch Water Line	1	EA	\$ 25,000.00	\$ 25,000.00
10	Connect to Existing 20-Inch Water Line	1	EA	\$ 20,000.00	\$ 20,000.00
11	Cathodic Protection	1	LS	\$ 20,000.00	\$ 20,000.00
12	Trench Safety	120	LF	\$ 5.00	\$ 600.00
13	Traffic Control	3	MO	\$ 2,000.00	\$ 6,000.00
14	Temporary Erosion Control Measures	1	LS	\$ 5,000.00	\$ 5,000.00
Subtotal:					\$ 387,600.00
Conting. (%,+/-) 20					\$ 82,400.00
<b>Total</b>					<b>\$ 470,000.00</b>

- No Design Completed
- Preliminary Design
- Final Design

**This total does not reflect engineering or technical services.**

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**EXHIBIT 5 – ATTACHMENT E  
SCOPE OF SERVICES AND DELIVERABLES**

**PROJECT UNDERSTANDING**

Provide engineering design services for the following tasks:

- Allred and John Paine Road 24/30-Inch Water Line:
  - The construction of approximately 14,000 linear feet of 24 to 30-inch waterline. The line will be in or adjacent to existing City/County/TxDOT Right-of-way along Allred Road from Bonnie Brae Street west to John Paine Road, and continuing south and terminating at an existing 20-inch stub out at the Southwest Pump Station. This line will provide a redundant feed to the Southwest Pump Station.
- Southwest Pump Station Flow Control Valve:
  - The construction of a flow-control valve adjacent to an existing flow-control valve which will be installed at existing pipe stub-outs. This will allow additional flow into the existing ground storage tanks on the Southwest Pump Station.
- Redundant Railroad Crossing:
  - The construction of an additional railroad crossing near Bonnie Brae Road, Union Pacific Railroad and US Highway 377. This will allow for system operational flexibility if one of the Southwest Pump Station transmission lines is taken out of service.

The CONSULTANT's scope of services is as follows:

**BASIC SERVICES**

**A. SCHEMATIC DESIGN PHASE**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

a) Preliminary Investigation

i) Data Collection and Record Research

- (1) Gather existing survey and topographic data.
- (2) Gather existing aerial photographs.
- (3) Gather existing water, sanitary sewer and storm sewer record drawings.
- (4) Gather existing paving plans.
- (5) Gather existing development plans.
- (6) Gather existing plat information.
- (7) Collect property owner and record information.
- (8) Gather existing right-of-way and easement information.
- (9) Gather existing franchise utility record information.
- (10) Organize record information into project database.

ii) Site Investigation

**EXHIBIT 5 – ATTACHMENT E  
SCOPE OF SERVICES AND DELIVERABLES**

- (1) Walk general alignment.
  - (2) Document alignment corridor with photographs.
  - (3) Identify potential alignment, conflicts and issues.
  - iii) Data Review with Owner's staff
    - (1) Meet with Owner's staff to review accuracy of record information.
    - (2) Interview Owner's staff concerning historical, existing and future City plans along the alignment.
  
  - b) Preliminary Property and Right-of-Way Investigation
    - i) Determine City Limit location.
    - ii) Coordination with Denton County.
      - (1) Determine existing County street maintenance agreements along Allred Road.
    - iii) Provide assistance to Owner related to meetings with Hillwood.
    - iv) Coordinate with City Attorney to determine feasibility of installation of utilities within prescriptive rights-of-way.
    - v) Analyze existing elevations to determine southwest and central pressure plane boundary location.
    - vi) Research TxDOT right-of-way limits and ownership/maintenance agreements for John Paine Road adjacent to IH-35.
  
  - c) Purchasing Department Coordination.
    - i) Determine feasibility of Competitive Sealed Proposal contract procurement method.
  
  - d) Prepare Alternate Alignment Technical Memorandum.
    - i) Analysis of alternate alignments indicating merits and challenges for each.
      - (1) Easement acquisition schedule and cost impacts.
      - (2) Pavement repair cost impacts.
      - (3) Incorporation of mobility plan.
      - (4) Engineer's OPCC for each alignment.
  
  - e) Prepare Design Narrative Technical Memorandum
    - i) Pipe Material Assumptions
    - ii) Pipe Restraint Assumptions
    - iii) Pipe Cathodic Protection Assumptions
- 2) SOUTHWEST PUMP STATION FLOW CONTROL VALVE**
- a) Perform hydraulic analysis calculations to determine appropriate valve sizing
  
  - b) Provide schematic layout of proposed flow control valve.
  
  - c) Provide Engineer's OPCC.

**EXHIBIT 5 – ATTACHMENT E  
SCOPE OF SERVICES AND DELIVERABLES**

**3) REDUNDANT RAILROAD CROSSING**

- a) Provide recommendations for redundant water line crossing locations.
- b) Provide schematic layout of proposed redundant water line crossing locations for Owner review.
- c) Provide Engineer's OPCC.

**B. PRELIMINARY DESIGN PHASE**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

- a) Preliminary Design
  - i) Project Management
    - (1) Develop project communication plan.
      - (a) Develop project contact list.
      - (b) Conduct progress meetings to monitor the development of the project. During this phase of the project, conduct up to:
        - (i) Three (3) meetings with the Owner regarding project status and coordination issues
      - (c) Prepare and e-mail progress reports to the project team once a month (Owner and Design Professional Staff).
    - (2) Document design criteria (coordinate with the Owner's staff)
    - (3) Project Administration
      - (a) Prepare project correspondence and invoicing documents.
  - ii) Field verification of survey and base map
  - iii) Preliminary water line layout approval
    - (1) Prepare horizontal layout of water line on base map.
    - (2) Prepare cross sections at key locations for clarity.
    - (3) Identify horizontal and vertical clearances and conflicts.
    - (4) Identify temporary easement requirements.
    - (5) Identify locations for additional subsurface utility investigations.
    - (6) Identify permitting requirements.
    - (7) Meet with the Owner's staff for review and consensus on the preliminary layout.
  - iv) Preliminary Water Line Plan/Profile Preparation
    - (1) Prepare (22"x34") Plan/Profile sheets at a 1"=40' horizontal and 1"=4' vertical scale.
    - (2) Plan view of the base map shall have all above ground features shown and clearly labeled along with existing utilities based on field ties and record information.
    - (3) Plan view shall include design notes for stationing, connections, tees, fire hydrants, valves, and horizontal bends.
    - (4) Profile shall include design notes for stationing, size, slope, top of pipe, pipe material, embedment, length and construction method.

**EXHIBIT 5 – ATTACHMENT E  
SCOPE OF SERVICES AND DELIVERABLES**

- (5) Prepare preliminary water line design details, including a cathodic protection system.
- (6) Site verification of preliminary design.
- v) Preliminary Traffic Control and Detour Plan Preparation.
- vi) Franchise Utility Coordination
  - (1) Send one set of plans to each franchise utility for their review. Request each franchise utility to mark up the plans to show the size, type, and location of their utilities.
  - (2) Coordinate with the franchise utilities if any relocations are required. Notify the Owner if any relocations will be required.
- vii) Prepare preliminary general notes and details.
- viii) Prepare preliminary special technical specifications.
- ix) Compile and prepare an updated opinion of probable construction cost for the entire project using recent average unit bid prices which are representative of similar types of construction in the local area.
- x) Deliverables - Preliminary design submittal (60%)
  - (1) Submit four (4) copies to the Owner for review and comment.
  - (2) Submittal shall include the following:
    - (a) Preliminary design plans (22"x34")
    - (b) Preliminary technical specification
    - (c) Opinion of probable construction cost
  - (3) Address Owner comments and submit four (4) final (11"x17") preliminary plan sets.
- xi) Meetings
  - (1) Attend one (1) meeting with the Owner's staff to kick-off preliminary design.
  - (2) Attend one (1) meeting with the Owner's staff on-site prior to submittal of preliminary plans.
  - (3) Attend one (1) meeting with the Owner's staff to present and review the draft preliminary plan.

**2) SOUTHWEST PUMP STATION FLOW CONTROL VALVE**

- a) Preliminary Design
  - i) Field verification of survey and base map
  - ii) Preliminary yard piping layout approval
    - (1) Prepare horizontal layout of yard piping on base map.
    - (2) Prepare cross sections at key locations for clarity.
    - (3) Identify horizontal and vertical clearances and conflicts.
    - (4) Identify temporary easement requirements.
    - (5) Identify locations for additional subsurface utility investigations.
    - (6) Identify permitting requirements.
    - (7) Meet with the Owner's staff for review and consensus on the preliminary layout.
  - iii) Preliminary Yard Piping Plan/Profile Preparation
    - (1) Prepare (22"x34") Site-Plan/Profile sheets at a 1"=10' horizontal and 1"=1' vertical scale.



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- (2) Plan view of the base map shall have all above ground features shown and clearly labeled along with existing utilities based on field ties and record information.
- (3) Plan view shall include design notes for stationing, connections, tees, fire hydrants, valves, and horizontal bends.
- (4) Profile shall include design notes for stationing, size, slope, top of pipe, pipe material, embedment, length and construction method.
- (5) Prepare preliminary water line design details, including a cathodic protection system.
- (6) Site verification of preliminary design.
- iv) Prepare preliminary general notes and details.
- v) Prepare preliminary special technical specifications.
- vi) Compile and prepare an updated opinion of probable construction cost for the entire project using recent average unit bid prices which are representative of similar types of construction in the local area.
- vii) Deliverables - Preliminary design submittal (60%)
  - (1) Submit four (4) copies to the Owner for review and comment.
  - (2) Submittal shall include the following:
    - (a) Preliminary design plans (22"x34")
    - (b) Preliminary technical specification
    - (c) Opinion of probable construction cost
  - (3) Address Owner comments and submit four (4) final (11"x17") preliminary plan sets.
- b) Electrical Engineering Design
  - (1) Perform one (1) site visit to evaluate existing site conditions.
  - (2) Provide power feeders to the high-flow control valve.
  - (3) Provide control signals to the valve and interface with the Southwest Pump Station's existing control system.
  - (4) Electrical Design Drawings:
    - (a) General Sheets (legend, general notes)
    - (b) Site Plan and Elevation
    - (c) One-Line Diagram
    - (d) Instrumentation Symbols and Legend

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**3) REDUNDANT RAILROAD CROSSING**

- a) Preliminary Design
  - i) Field verification of survey and base map
  - ii) Preliminary water line layout approval
    - (1) Prepare horizontal layout of water line on base map.
    - (2) Prepare cross sections at key locations for clarity.
    - (3) Identify horizontal and vertical clearances and conflicts.
    - (4) Identify temporary easement requirements.
    - (5) Identify locations for additional subsurface utility investigations.
    - (6) Identify permitting requirements.
    - (7) Meet with the Owner's staff for review and consensus on the preliminary layout.
  - iii) Preliminary Water Line Plan/Profile Preparation
    - (1) Prepare (22"x34") Plan/Profile sheets at a 1"=40' horizontal and 1"=4' vertical scale.
    - (2) Plan view of the base map shall have all above ground features shown and clearly labeled along with existing utilities based on field ties and record information.
    - (3) Plan view shall include design notes for stationing, connections, tees, fire hydrants, valves, and horizontal bends.
    - (4) Profile shall include design notes for stationing, size, slope, top of pipe, pipe material, embedment, length and construction method.
    - (5) Prepare preliminary water line design details, including a cathodic protection system.
    - (6) Site verification of preliminary design.
  - iv) Preliminary Traffic Control and Detour Plan Preparation.
  - v) Franchise Utility Coordination
    - (1) Send one set of plans to each franchise utility for their review. Request each franchise utility to mark up the plans to show the size, type, and location of their utilities.
    - (2) Coordinate with the franchise utilities if any relocations are required. Notify the Owner if any relocations will be required.
  - vi) Prepare preliminary general notes and details.
  - vii) Prepare preliminary special technical specifications.
  - viii) Compile and prepare an updated opinion of probable construction cost for the entire project using recent average unit bid prices which are representative of similar types of construction in the local area.
- ix) Deliverables - Preliminary design submittal (60%)
  - (1) Submit four (4) copies to the Owner for review and comment.
  - (2) Submittal shall include the following:
    - (a) Preliminary design plans (22"x34")
    - (b) Preliminary technical specification
    - (c) Opinion of probable construction cost
  - (3) Address Owner comments and submit four (4) final (11"x17") preliminary plan sets.

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**C. FINAL DESIGN PHASE**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

- a) Final Design
  - i) Incorporate the preliminary design submittal review comments (one (1) round of comments anticipated in proposed effort).
  - ii) Prepare updated opinion of probable construction cost.
  - iii) Incorporate franchise utility investigation information.
  - iv) Prepare erosion control plan and details.
  - v) Deliverables:
    - (1) Final design submittal (95%)
    - (2) Submit four (4) copies to the Owner for review and comment.
    - (3) Submittal shall include the following:
      - (a) Final design plans
      - (b) Technical specifications
      - (c) Opinion of probable construction cost
    - (4) Submit final plans to the following regulatory agency for review: Texas Commission on Environmental Quality (TCEQ) and the Texas Historical Commission.
  - vi) Meetings
    - (1) Meeting with Owner to review 95% Plans.

**2) SOUTHWEST PUMP STATION FLOW CONTROL VALVE**

- a) Final Design
  - i) Incorporate the preliminary design submittal review comments (one (1) round of comments anticipated in proposed effort).
  - ii) Prepare updated opinion of probable construction cost.
  - iii) Incorporate franchise utility investigation information.
  - iv) Prepare erosion control plan and details.
  - v) Deliverables:
    - (1) Final design submittal (95%)
    - (2) Submit four (4) copies to the Owner for review and comment.
    - (3) Submittal shall include the following:
      - (a) Final design plans
      - (b) Technical specifications
      - (c) Opinion of probable construction cost
    - (4) Submit final plans to the following regulatory agency for review: N/A

**3) REDUNDANT RAILROAD CROSSING**

- a) Final Design
  - i) Incorporate the preliminary design submittal review comments (one (1) round of comments anticipated in proposed effort).
  - ii) Prepare updated opinion of probable construction cost.
  - iii) Incorporate franchise utility investigation information.
  - iv) Prepare erosion control plan and details.
  - v) Deliverables:

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- (1) Final design submittal (95%)
- (2) Submit four (4) copies to the Owner for review and comment.
- (3) Submittal shall include the following:
  - (a) Final design plans
  - (b) Technical specifications
  - (c) Opinion of probable construction cost
- (4) Submit final plans to the following regulatory agency for review: N/A

**D. CONSTRUCTION DOCUMENTS PHASE**

**1) Bid Specifications and Construction Contract Documents**

- a) Based on comments from the OWNER regarding the 95% plans and technical specification, the CONSULTANT will prepare construction contract documents, bid plans, and opinion of probable construction cost.
  - i) The construction contract documents will consist of the following:
    - (1) Notice to Bidders – Standard form provided by the OWNER. Specific project information will be added by the CONSULTANT.
    - (2) Proposal - Standard form provided by the OWNER. Specific project information will be added by the CONSULTANT.
    - (3) Contract Agreement – Standard form provided by the OWNER.
    - (4) Performance Bond - Standard form provided by the OWNER.
    - (5) Payment Bond - Standard form provided by the OWNER.
    - (6) Certificate of Insurance - Standard form provided by the OWNER.
    - (7) Invoice Attachment and Instructions - Standard form provided by the OWNER.
    - (8) General Conditions – Standard form provided by the OWNER.
    - (9) Supplementary Conditions – Project specific supplementary information for modification or addition to the general conditions produced by the CONSULTANT in accordance with the OWNER's approval.
    - (10) Technical Specifications – Produced by the CONSULTANT as outlined in the Final Design.
  - ii) The bid plans will consist of the final plans, sign and sealed by a licensed professional engineer in the State of Texas and in accordance with comments provided by the OWNER during final design.

**E. BIDDING PHASE AND CONSTRUCTION CONTRACT EXECUTION**

**1) Bidding Phase Services**

- a) The CONSULTANT will prepare and deliver two (2) sets of bid documents to the City project manager. If additional sets are required, it will be considered additional services.
- b) The CONSULTANT will provide electronic bid documents to the City purchasing department for bidding.

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- c) The CONSULTANT will provide the Notice to Bidders to the OWNER for publication. The OWNER will be responsible for publication of the notice. The OWNER will be responsible for distribution of bidding documents to prospective contractors, suppliers and plan rooms.
- d) The CONSULTANT will provide assistance to the OWNER during the bidding phase by providing the following services:
  - i) Preparation of addenda and delivery to the OWNER for distribution to the plans holders.
  - ii) Responses to questions submitted by plan holders.
  - iii) Attend bid opening facilitated by the OWNER.
  - iv) Preparation of bid tabulation.
  - v) Evaluation of bid results.
  - vi) Preparation of recommendation of award letter.
- e) Conformance plans and specifications
  - i) Based on potential questions and addenda from the bidding phase, prepare conformance set of plans and specifications to be used during construction.
    - (1) Provide six (6) sets to the OWNER for execution.

**F. RECORD DRAWINGS**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

- a) Record Drawings
  - i) Obtain and review comments and field changes on the construction plans from Owner and/or Contractor.
  - ii) Prepare record drawings based on comments and field changes. Since the Design Professional will not be providing resident engineering services and not observing on a full-time basis, the Design Professional will not seal the record drawings. The record drawings will be provided in the following format:
    - (a) Mylar Hardcopy (1) copy
    - (b) PDF (1) electronic copy

**2) SOUTHWEST PUMP STATION FLOW CONTROL VALVE (INCLUDED AS PART OF THE ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE)**

- a) Record Drawings
  - i) Obtain and review comments and field changes on the construction plans from Owner and/or Contractor.
  - ii) Prepare record drawings based on comments and field changes. Since the Design Professional will not be providing resident engineering services and not observing on a full-time basis, the Design Professional will not seal the record drawings. The record drawings will be provided in the following format:
    - (a) Mylar Hardcopy (1) copy

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(b) PDF (1) electronic copy

**3) REDUNDANT RAILROAD CROSSING (INCLUDED AS PART OF THE ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE)**

a) Record Drawings

- i) Obtain and review comments and field changes on the construction plans from Owner and/or Contractor.
- ii) Prepare record drawings based on comments and field changes. Since the Design Professional will not be providing resident engineering services and not observing on a full-time basis, the Design Professional will not seal the record drawings. The record drawings will be provided in the following format:
  - (a) Mylar Hardcopy (1) copy
  - (b) PDF (1) electronic copy

**G. CONSTRUCTION PHASE SERVICES**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

a) Construction Phase Services

- i) Pre-Construction Conference
  - (1) Design Professional will attend a Pre-Construction Conference prior to commencement of Work at the Site.
- ii) Control Staking
  - (1) Using information provided with the design surveys, provide the selected contractor with the necessary on-site survey control data to facilitate the Contractor's efforts to provide construction staking for the project.
- iii) Site Visits
  - (1) CONSULTANT will visit the construction site up to **two (2)** times during construction.
- iv) Shop Drawings and Samples
  - (1) CONSULTANT will review and approve or take other appropriate action in respect to water pipe line materials and lay schedule which Contractor is required to submit, but only for conformance with the information given in the Contract Documents. Such review and approvals or other action will not extend to means, methods, techniques, equipment choice and usage, sequences, schedules, or procedures of construction or to related safety precautions and programs.

**2) SOUTHWEST PUMP STATION FLOW CONTROL VALVE**

a) Construction Phase Services

- i) Pre-Construction Conference (included as part of the Allred and John Paine 24"/30" Water Line)
  - (1) Design Professional will attend a Pre-Construction Conference prior to commencement of Work at the Site.

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- ii) Control Staking (included as part of the Allred and John Paine 24"/30" Water Line)
  - (1) Using information provided with the design surveys, provide the selected contractor with the necessary on-site survey control data to facilitate the Contractor's efforts to provide construction staking for the project.
- iii) Site Visits (included as part of the Allred and John Paine 24"/30" Water Line)
  - (1) CONSULTANT will visit the construction site up to **two (2)** times during construction.
- iv) Shop Drawings and Samples
  - (1) CONSULTANT will review and approve or take other appropriate action in respect to Shop Drawings, Samples and other data which Contractor is required to submit, but only for conformance with the information given in the Contract Documents. Such review and approvals or other action will not extend to means, methods, techniques, equipment choice and usage, sequences, schedules, or procedures of construction or to related safety precautions and programs.

**3) REDUNDANT RAILROAD CROSSING (INCLUDED AS PART OF THE ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE)**

- a) Construction Phase Services
  - i) Pre-Construction Conference
    - (1) Design Professional will attend a Pre-Construction Conference prior to commencement of Work at the Site.
  - ii) Control Staking
    - (1) Using information provided with the design surveys, provide the selected contractor with the necessary on-site survey control data to facilitate the Contractor's efforts to provide construction staking for the project.
  - iii) Site Visits
    - (1) CONSULTANT will visit the construction site up to **two (2)** times during construction.
  - iv) Shop Drawings and Samples
    - (1) CONSULTANT will review and approve or take other appropriate action in respect to water pipe line materials and lay schedule which Contractor is required to submit, but only for conformance with the information given in the Contract Documents. Such review and approvals or other action will not extend to means, methods, techniques, equipment choice and usage, sequences, schedules, or procedures of construction or to related safety precautions and programs.

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**ADDITIONAL SERVICES**

**A. DESIGN SURVEY**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

a) Design Survey

i) Utility and Property Owner Coordination

- (1) Coordinate with DIG TESS and City of Denton to locate and mark existing franchise and public utilities prior to performing the field survey.
- (2) The Owner shall arrange and make all provisions for access to perform the services specified within this scope. The surveyor shall provide the Owner with the name and address of the property owners.

ii) Design Survey

- (1) The limits of the survey shall be a 60 foot wide alignment generally running in or adjacent to Allred Road and John Paine Road.
- (2) Establish up to ten (10) horizontal control points based on the City of Denton Coordinate System using ½-inch rebar with identifiable plastic cap, specific for this project.
- (3) Establish a vertical control benchmark circuit tied to the City of Denton benchmark system, specific for this project.
- (4) Perform a field survey to identify and locate existing topographic elements within the alignment corridor including, but not limited to, the following:
  - (a) Property pins
  - (b) Existing pavement, curbs, sidewalks, barrier free ramps, etc.
  - (c) Lane striping
  - (d) Driveways
  - (e) Existing storm sewer inlets, manholes, junction boxes, outfalls, and erosion control
  - (f) Culverts and bridges
  - (g) Guardrail
  - (h) Utility manholes, vaults, water valves, water meters, sprinkler heads, telephone poles, power poles, utility markers, other public utilities, and franchise utilities
  - (i) Traffic signal poles, cabinets, and other signal equipment
  - (j) Signs (excluding temporary signs)
  - (k) Trees, 6-inch caliper and up
  - (l) Buildings
  - (m) Retaining walls
  - (n) Fence limits and material types
  - (o) Other applicable physical features that could impact design:
    - (i) Field ties to the existing edge of pavement on Allred Road and John Paine Road will be collected.



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- (ii) Field sketches of utility manholes and structures.
- (iii) Prepare a final topographic drawing in digital format (including one foot contours and breaklines) showing the features located in the field as well as right-of-way strip map information, an ASCII coordinate file of the points located in the field, and a hard copy of the coordinates and feature descriptions.

**2) SOUTHWEST PUMP STATION FLOW CONTROL VALVE**

- a) Design Survey
  - i) Utility and Property Owner Coordination
    - (1) Coordinate with DIG TESS and City of Denton to locate and mark existing franchise and public utilities prior to performing the field survey.
    - (2) The Owner shall arrange and make all provisions for access to perform the services specified within this scope. The surveyor shall provide the Owner with the name and address of the property owners.
  - ii) Design Survey
    - (1) The limits of the survey shall be approximately a 100'x100' area on the Southwest Pump Station Property generally centered around the proposed and existing flow control valve area.
    - (2) Establish up to 3 (3) horizontal control points based on the City of Denton Coordinate System using ½-inch rebar with identifiable plastic cap, specific for this project.
    - (3) Establish a vertical control benchmark circuit tied to the City of Denton benchmark system, specific for this project.
    - (4) Perform a field survey to identify and locate existing topographic elements within the alignment corridor including, but not limited to, the following:
      - (a) Property pins
      - (b) Existing pavement, curbs, sidewalks, barrier free ramps, etc.
      - (c) Driveways
      - (d) Existing storm sewer inlets, manholes, junction boxes, outfalls, and erosion control
      - (e) Utility manholes, vaults, water valves, water meters, sprinkler heads, telephone poles, power poles, utility markers, other public utilities, and franchise utilities
      - (f) Buildings
      - (g) Fence limits and material types
      - (h) Other applicable physical features that could impact design:
        - (i) Field sketches of utility manholes and structures.
        - (ii) Prepare a final topographic drawing in digital format (including one foot contours and breaklines) showing the features located in the field as well as right-of-way strip map information, an ASCII coordinate file of the points located in

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the field, and a hard copy of the coordinates and feature descriptions.

**3) REDUNDANT RAILROAD CROSSING**

a) Design Survey

i) Utility and Property Owner Coordination

- (1) Coordinate with DIG TESS and City of Denton to locate and mark existing franchise and public utilities prior to performing the field survey.
- (2) The Owner shall arrange and make all provisions for access to perform the services specified within this scope. The surveyor shall provide the Owner with the name and address of the property owners.

ii) Design Survey

- (1) The limits of the survey shall be approximately a 300'x50' area across existing UPRR and TxDOT (US 377) Right-of-way.
- (2) Establish two (2) horizontal control points based on the City of Denton Coordinate System using ½-inch rebar with identifiable plastic cap, specific for this project.
- (3) Establish a vertical control benchmark circuit tied to the City of Denton benchmark system, specific for this project.
- (4) Perform a field survey to identify and locate existing topographic elements within the alignment corridor including, but not limited to, the following:
  - (a) Property pins
  - (b) Existing pavement, curbs, sidewalks, barrier free ramps, etc.
  - (c) Lane striping
  - (d) Driveways
  - (e) Existing storm sewer inlets, manholes, junction boxes, outfalls, and erosion control
  - (f) Culverts and bridges
  - (g) Guardrail
  - (h) Utility manholes, vaults, water valves, water meters, sprinkler heads, telephone poles, power poles, utility markers, other public utilities, and franchise utilities
  - (i) Traffic signal poles, cabinets, and other signal equipment
  - (j) Signs (excluding temporary signs)
  - (k) Trees, 6-inch caliper and up
  - (l) Buildings
  - (m) Retaining walls
  - (n) Fence limits and material types
  - (o) Other applicable physical features that could impact design:
    - (i) Field ties to the existing edge of pavement on Bonnie Brae Street, and US Highway 377 will be collected.
    - (ii) Field sketches of utility manholes and structures.

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- (iii) Prepare a final topographic drawing in digital format (including one foot contours and breaklines) showing the features located in the field as well as right-of-way strip map information, an ASCII coordinate file of the points located in the field, and a hard copy of the coordinates and feature descriptions.

**B. GEOTECHNICAL**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

a) Geotechnical

- i) Perform a geotechnical analysis of the site utilizing a qualified geotechnical laboratory to determine subsurface conditions and make recommendations regarding design parameters. The geotechnical analysis shall include the following:
  - (1) Subsurface exploration including up to **nine (9)** sample bores at approximately fifteen (15) feet depths.
  - (2) Laboratory tests for classification purposes and strength characteristics
  - (3) Engineering services that address soil and groundwater conditions as well as recommendations for earthwork.
- ii) A geotechnical report will be furnished by the geotechnical engineer to present the results of the field and laboratory data as well as analyses and recommendations. Three (3) copies of the report will be provided by the geotechnical engineer, with one (1) copy going to the Owner. The data contained in the geotechnical report will be made available to contractors during the bidding process for information purposes.

**3) REDUNDANT RAILROAD CROSSING**

a) Geotechnical

- i) Perform a geotechnical analysis of the site utilizing a qualified geotechnical laboratory to determine subsurface conditions and make recommendations regarding design parameters. The geotechnical analysis shall include the following:
  - (1) Subsurface exploration including **two (2)** sample bores at approximately **twenty-five (25)** feet depths.
  - (2) Laboratory tests for classification purposes and strength characteristics
  - (3) Engineering services that address soil and groundwater conditions as well as recommendations for earthwork.
- ii) A geotechnical report will be furnished by the geotechnical engineer to present the results of the field and laboratory data as well as analyses and recommendations. Three (3) copies of the report will be provided by the geotechnical engineer, with one (1) copy going to the Owner.

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The data contained in the geotechnical report will be made available to contractors during the bidding process for information purposes.

**C. SUBSURFACE UTILITY ENGINEERING (SUE)**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

- a) Subsurface Utility Engineering (SUE)
  - i) Level A investigation existing of water line connection points. The Level A investigation shall consist of performing **two (2)** level A test-holes or “locates” of existing 30-inch water line stub-out near Allred Road and Bonnie Brae Street, and existing 20-inch water line stub-out on the Southwest Pump Station Property. The Level A investigation will be conducted in accordance to ASCE Publication CI/ASCE 38-02 and include the location of said utility in two dimensions obtained through non-destructive surface geophysical methods.

**2) SOUTHWEST PUMP STATION FLOW CONTROL VALVE**

- a) Subsurface Utility Engineering (SUE)
  - i) Level A investigation existing of water line connection points. The Level A investigation shall consist of performing **two (2)** level A test-holes or “locates” of existing 30-inch water line stub-outs on the Southwest Pump Station Property adjacent to the existing flow-control valve. The Level A investigation will be conducted in accordance to ASCE Publication CI/ASCE 38-02 and include the location of said utility in two dimensions obtained through non-destructive surface geophysical methods.

**3) REDUNDANT RAILROAD CROSSING**

- a) Subsurface Utility Engineering (SUE)
  - i) Level A investigation existing of water line connection points. The Level A investigation shall consist of performing **two (2)** level A test-holes or “locates” of existing 24-inch water line along Bonnie Brae Street, and existing 20-inch water along US Highway 377. The Level A investigation will be conducted in accordance to ASCE Publication CI/ASCE 38-02 and include the location of said utility in two dimensions obtained through non-destructive surface geophysical methods.

**D. CATHODIC PROTECTION SYSTEM**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

- a) Cathodic Protection System
  - i) Document Review and Project Management

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This task consists of all the preparatory work required for the task. The specific elements are as follows:

- (1) The Design Professional will review the water line alignment with respect to crossings of foreign pipelines and paralleling utility systems. Existing cathodic protection systems and locations of foreign line test stations will be identified. Foreign pipeline crossings will be considered.
  - (2) The Design Professional will evaluate the water line alignment for possible induced AC interference and the need for protection under fault conditions.
- ii) Cathodic Protection Field Survey
- (1) The Design Professional will obtain soil resistivity measurements at intervals not to exceed 1,000-feet using ASTM G-57-95. The measurements will be taken to depths of 5, 10, and 15-feet.
  - (2) The Design Professional will test soil samples for moisture content, pH, chloride ion and conductivity. Water samples will be similarly tested with the addition of sulfate ions.
  - (3) The Design Professional will create dimensional field sketches of possible locations for cathodic protection anodes. Locations of secondary AC service and sites for the installation of power supplies will be noted.
- iii) Data Analysis and Lab Work
- (1) The Design Professional will evaluate soil resistivity test data including the use of Barnes Layer techniques for determining resistivities of the soil layer where the proposed water line is to be installed.
  - (2) The Design Professional will test soil samples in the laboratory for moisture content, pH, chloride ion concentration, sulfide ion concentration and conductivity. Water samples will be similarly tested, with the exception of moisture content. Sulfate ion concentrations will be determined for water samples as well.
  - (3) The Design Professional will tabulate and analyze AC and DC interference test data using computer models.
  - (4) The Design Professional will compile data and analyze the conditions for galvanic and electrolytic corrosion along the proposed pipeline route will be performed.
- iv) Corrosion Protection Design
- Following the analysis of the electrical data and the soil test results, corrosion protection and AC/DC interference mitigation requirements will be defined for 2 pipe types (bar wrapped concrete pressure pipe and ductile iron pipe) for the proposed water line. Design criteria will include minimizing the impact of the severe soil stresses in the area and a preference for sacrificial anode versus impressed current cathodic protection. Specific design deliverables will include:
- (1) Prepare recommendations for protective coatings based upon AWWA standards for the proposed water line.

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- (2) Prepare a report that documents test data, analysis and an opinion of probable construction cost for cathodic protection and interference control systems, plans and specifications.

**3) REDUNDANT RAILROAD CROSSING**

a) Cathodic Protection System

i) Document Review and Project Management

This task consists of all the preparatory work required for the task. The specific elements are as follows:

- (1) The Design Professional will review the water line alignment with respect to crossings of foreign pipelines and paralleling utility systems. Existing cathodic protection systems and locations of foreign line test stations will be identified. Foreign pipeline crossings will be considered.
- (2) The Design Professional will evaluate the water line alignment for possible induced AC interference and the need for protection under fault conditions.

ii) Cathodic Protection Field Survey

- (1) The Design Professional will obtain soil resistivity measurements at intervals not to exceed 1,000-feet using ASTM G-57-95. The measurements will be taken to depths of 5, 10, and 15-feet.
- (2) The Design Professional will test soil samples for moisture content, pH, chloride ion and conductivity. Water samples will be similarly tested with the addition of sulfate ions.
- (3) The Design Professional will create dimensional field sketches of possible locations for cathodic protection anodes. Locations of secondary AC service and sites for the installation of power supplies will be noted.

iii) Data Analysis and Lab Work

- (1) The Design Professional will evaluate soil resistivity test data including the use of Barnes Layer techniques for determining resistivities of the soil layer where the proposed water line is to be installed.
- (2) The Design Professional will test soil samples in the laboratory for moisture content, pH, chloride ion concentration, sulfide ion concentration and conductivity. Water samples will be similarly tested, with the exception of moisture content. Sulfate ion concentrations will be determined for water samples as well.
- (3) The Design Professional will tabulate and analyze AC and DC interference test data using computer models.
- (4) The Design Professional will compile data and analyze the conditions for galvanic and electrolytic corrosion along the proposed pipeline route will be performed.

iv) Corrosion Protection Design

Following the analysis of the electrical data and the soil test results, corrosion protection and AC/DC interference mitigation requirements will

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be defined for 2 pipe types (bar wrapped concrete pressure pipe and ductile iron pipe) for the proposed water line. Design criteria will include minimizing the impact of the severe soil stresses in the area and a preference for sacrificial anode versus impressed current cathodic protection. Specific design deliverables will include:

- (1) Prepare recommendations for protective coatings based upon AWWA standards for the proposed water line.
- (2) Prepare a report that documents test data, analysis and an opinion of probable construction cost for cathodic protection and interference control systems, plans and specifications.

**E. EASEMENT INSTRUMENTS OF CONVEYANCE PREPARATION**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

- a) Easement Instruments of Conveyance Preparation
  - i) Prepare permanent and temporary easement instruments (narrative and graphic exhibits as required for proposed water line along or adjacent to Allred Road and John Paine Road).
    - (1) Up to twelve (12) instruments are anticipated
  - ii) Individual parcel exhibits shall be on 8 ½"x11" paper, shall be sealed, dated, and signed by a Registered Professional Land Surveyor (three (3) originals of each, Owner to provide standard language), shall conform to standard format provided by the Owner and shall contain the following at a minimum:
    - (1) Parcel number
    - (2) Area required
    - (3) Area remaining
    - (4) Legal description
    - (5) Current owner
    - (6) Any existing platted easements or easements filed by separate instrument including easements provided by utility companies
    - (7) All physical features
    - (8) Metes and bounds description of temporary easements to be acquired. The description shall be provided on a separate sheet from the exhibit. Each type of easement shall be described separately
    - (9) The Owner will be responsible for preparing the legal instruments.

**3) REDUNDANT RAILROAD CROSSING**

- a) Easement Instruments of Conveyance Preparation
  - i) Prepare permanent and temporary easement instruments (narrative and graphic exhibits as required for the crossing of private property adjacent to UPRR and TxDOT ROW).
    - (1) Up to three (3) instruments are anticipated

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- ii) Individual parcel exhibits shall be on 8 ½"x11" paper, shall be sealed, dated, and signed by a Registered Professional Land Surveyor (three (3) originals of each, Owner to provide standard language), shall conform to standard format provided by the Owner and shall contain the following at a minimum:
  - (1) Parcel number
  - (2) Area required
  - (3) Area remaining
  - (4) Legal description
  - (5) Current owner
  - (6) Any existing platted easements or easements filed by separate instrument including easements provided by utility companies
  - (7) All physical features
  - (8) Metes and bounds description of temporary easements to be acquired. The description shall be provided on a separate sheet from the exhibit. Each type of easement shall be described separately
  - (9) The Owner will be responsible for preparing the legal instruments.

**F. EASEMENT ACQUISITION**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

- a) Easement Acquisition
  - i) The Owner will perform easement acquisition.

**3) REDUNDANT RAILROAD CROSSING**

- a) Easement Acquisition
  - i) The Owner will perform easement acquisition.

**G. PERMITTING**

**1) ALLRED AND JOHN PAINE ROAD 24/30-INCH WATER LINE**

- a) TxDOT UIR Permit
  - i) Prepare the TxDOT UIR application and associated drawings related to installation of proposed waterline in John Paine Road, if proposed installation is within TxDOT ROW.
  - ii) Submit the application to the Owner for processing.
  - iii) Owner shall pay all fees associated with the TxDOT permit.

**3) REDUNDANT RAILROAD CROSSING**

- a) TxDOT UIR Permit
  - i) Prepare the TxDOT UIR application and associated drawings related to a required permit for crossing US Highway 377.
  - ii) Submit the application to the Owner for processing.



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- iii) Owner shall pay all fees associated with the TxDOT permit.
- b) Railroad Permit
  - i) Prepare the Railroad application and associated drawings related to a required permit for crossing the Union Pacific Railroad.
  - ii) Submit the application to the Owner for processing.
  - iii) Owner shall pay all fees associated with the railroad permit.

## **EXHIBIT 5 – ATTACHMENT E SCOPE OF SERVICES AND DELIVERABLES**

### **Extra Services**

Services not specifically identified in the Scope of Services above shall be considered extra, and shall be performed on an individual basis upon authorization by the Owner. Such services shall include, but are not limited to, the following:

- Additional Construction Site Visits
- Additional Construction Shop Drawing and Sample Review and Comment
- Construction Final Walkthrough and Punchlist Preparation
- Additional Traffic Control Plan Details
- Traffic signal design
- Sidewalk design
- Design of any offsite drainage improvements beyond the improvements identified in the scope
- Preparation for and attendance at public meetings
- Furnish additional copies of review documents and/or bid documents in excess of the number of the same identified above.
- Assist the Owner as an expert witness in litigation in connection with the project or in hearings before approving and regulatory agencies.
- Redesign to reflect project scope changes requested by the Owner, required to address changed conditions or change in direction previously approved by the Owner, mandated by changing governmental laws, or necessitated by the Owner's acceptance of substitutions proposed by the contractor.
- Easement acquisition services beyond that in the scope:
  - Appraisals
  - Contacting property owners
  - Condemnation support
  - Offer letters
- Submittal to Texas Department of Licensing and Registration (TDLR) for ADA requirements.
- Construction staking
- Landscape / Irrigation Design
- Retaining wall design
- "Value engineering" after bidding
- Traffic studies or reports
- SWPPP inspections / coordination
- Any services not listed in the Scope of Services

**EXHIBIT 5 – ATTACHMENT E  
SCOPE OF SERVICES AND DELIVERABLES**

**Budget Detail**

The following detail outlines the budget for each task in the above Scope of Services. Compensation for the project is detailed in Section 2 of the Professional Services Agreement and General Conditions Section 8.3.

Basic Services - Task Budget Detail Summary	Allred Waterline	Southwest Pump Station Flow Control Valve	Redundant Railroad Crossing	Total
Task A: Schematic Design	\$ 53,400	\$ 11,300	\$ 6,200	\$ 70,900
Task B: Preliminary Design	\$ 78,700	\$ 27,900	\$ 14,900	\$ 121,500
Task C: Final Design	\$ 42,400	\$ 9,900	\$ 9,000	\$ 61,300
Task D: Bid Specifications and Construction Contract Documents	\$ 9,600	\$ -	\$ -	\$ 9,600
Task E: Bidding Phase	\$ 13,900	\$ -	\$ -	\$ 13,900
Task F: Record Drawings	\$ 7,600	\$ -	\$ -	\$ 7,600
Task G: Construction Phase Services	\$ 14,700	\$ 4,400	\$ 2,800	\$ 21,900
<b>Total</b>	<b>\$ 220,300</b>	<b>\$ 53,500</b>	<b>\$ 32,900</b>	<b>\$ 306,700</b>
Additional Services - Task Budget Detail Summary	Allred Waterline	Southwest Pump Station Flow Control Valve	Redundant Railroad Crossing	Total
Task A: Design Survey	\$ 52,400	\$ 2,900	\$ 3,400	\$ 58,700
Task B: Geotechnical	\$ 13,400	\$ -	\$ 3,200	\$ 16,600
Task C: Subsurface Utility Engineering	\$ 8,300	\$ 8,300	\$ 8,300	\$ 24,900
Task D: Cathodic Protection	\$ 49,300	\$ -	\$ 15,200	\$ 64,500
Task E: Easement Instrument Preparation	\$ 13,500	\$ -	\$ 3,800	\$ 17,300
Task F: Easement Acquisition	\$ -	\$ -	\$ -	\$ -
Task G: Permitting	\$ 3,700	\$ -	\$ 3,800	\$ 7,500
<b>Total</b>	<b>\$ 140,600</b>	<b>\$ 11,200</b>	<b>\$ 37,700</b>	<b>\$ 189,500</b>
Reimbursable Expenses Summary	\$ 6,600	\$ 300	\$ 1,400	\$ 8,300
<b>Grand Total</b>	<b>\$ 367,500</b>	<b>\$ 65,000</b>	<b>\$ 72,000</b>	<b>\$ 504,500</b>