CITY OF SAPULPA

NOTICE TO BIDDERS

Sealed proposals will be accepted in the Office of the City Clerk, City of Sapulpa, 425 East Dewey, Sapulpa, Oklahoma, 74066, until 2:00 p.m., **Tuesday, November 1st, 2022,** for the following item(s):

BID NO. COS10095

Intersection Improvements on S. 49th W. Ave. at State Highway 117

Proposals will be opened at 2:00 p.m. on **Tuesday, November 1st, 2022,** and will be considered for award at the regular City Council meeting, at 7:00 p.m. in the City Council Chambers, Second Floor, 425 East Dewey, Sapulpa, Oklahoma. Notwithstanding any provision or language to the contrary, the City of Sapulpa reserves the right to reject any, and all bids for any reason whatsoever in the sole discretion of the City.

Specifications may be obtained on the City of Sapulpa website in the Quicklinks tab in the upper right corner, then select Bid Opportunities.

Please address any questions concerning specifications and/or to schedule an onsite visit too: Michael Russell, mrussell@sapulpaok.gov

Bids will only be accepted in hard copy at the City Clerk's office. Faxed or e-mail bids will not be considered. Write the bid number, opening date/time and title on the lower left corner of you bid envelope.

Michael Russell
Project Manager
City of Sapulpa
(918) 224-3040
mrussell@sapulpaok.gov

BIDDER INFORMATION SHEET

To be completed by all Bidders
For Contracts/BID PROPOSALS with
the City of Sapulpa
(Please print in ink or type)

Project/Bid No. or Description _____

_____

Full Name of Bidder _____

Legal Identity _____
(Corporation, Partnership,
Individual, etc.)

Address _____

Telephone No. _____

Fax No. _____

Taxpayer Identification No. _____

Contact Person _____

E-mail address (Optional) _____

BID FORM

I, _____ (Bidder), having read all the specifications and requirements in the bid documents, do hereby propose to furnish:
materials and supplies at a firm price of:

Roadway Improvements S 49th W Ave at State Highway 117	$_____
Rural Water #2 Waterline Relocation 49th W Ave & SH-117	$_____
TOTAL BID:	**$_____**

Number of days (after award) for delivery: _____

Company _____

Name _____

Title _____

Signature _____ Date _____

I attest that the above signature is true and valid.

_____
Notary

(SEAL)

_____
My commission expires:

(This form must be notarized, or bid will be rejected.)

CITY OF SAPULPA
AFFIDAVITS

STATE OF_____}
} SS
COUNTY OF_____}

1. _____, of lawful age, being first duly sworn, on oath, says that (s) he is the agent authorized by the bidder to submit the attached bid. Affiant further states that the nature of any partnership, joint venture, or other business relationship presently in effect or which existed within one (1) year prior to the date of this statement with the architect, engineer, or other party to the project is as follows:

_____

Affiant further states that the names of all persons having any such business relationships and positions they hold with their respective companies or firms are as follows:

_____

(If none of the business relationships herein above mentioned exist, affiant should so state.)

2. Affiant states that no officer or employee of the City of Sapulpa either directly or indirectly, owns any interest in the bidder's business.

Affiant further states that the following officer's and/or employee of the City of Sapulpa have some direct or indirect interest in the bidder's business.

3. Affiant further states that the bidder has not been a part to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding; or with any State, County, or City official or employee as to quantity, quality, or price in the prospective Contract, or in any other terms of said prospective Contract; or in any discussions between bidder and any State, County, or City official concerning exchange of money or other thing of value for special consideration in the letting of a Contract.

Further Affiant Sayeth Not.

_____ _____
Signature Title

Subscribed and sworn to before me this _____ day of _____, 20___.

_____
Notary Public

My Commission Expires: _____

CITY OF SAPULPA

General Information

INTENT:

The intent of these specifications is to set minimum requirements, not to otherwise limit bidding for the supply of above stated product/equipment/service.

Bidders shall quote on new, latest production model equipment which shall include all standard advertised equipment, accessories and safety items which are included as standard in the advertised and published literature for the equipment. No such item of equipment or accessories shall be removed or omitted for the reason that it was not specified in the bid. Standard production items may be removed only where it is necessary to install other items in lieu thereof to comply with these specifications, which are to be considered minimum requirements.

WARRANTY:

All bids for equipment shall require a standard manufacturer's warranty to testify to the integrity of the products to be furnished and the manufacturer's responsibility for the repair and/or replacement of parts found to be defective.

The City of Sapulpa shall expect the manufacturer/distributor to have an adequate stock of replacement parts available to service the equipment and to make delivery within a reasonable time of all normal replacement parts to their dealers in the Sapulpa and/or Tulsa Metropolitan area who service the equipment. The City further expects that warranty service and repairs as well as non-warranty service and repairs will be handled in an expeditious manner when required.

ERRORS OR OMISSIONS:

Bidders are cautioned to examine all terms, conditions, specifications, drawings, exhibits, addenda, delivery instructions and special conditions pertaining to the Bid. Failure of the Bidder to examine all pertinent documents shall not entitle him to any relief from the conditions imposed in the contract.

PRICES QUOTED:

Deduct trade discounts, and quote firm net prices. Give both unit price and extended total, if requested. In the case of a discrepancy in computing the amount of the bid, the unit price quoted will govern.

The City of Sapulpa is exempt from Federal Excise Tax and Oklahoma State Taxes on direct purchases of tangible property.

APPROVED EQUAL:

When the technical specifications call for a brand name, manufacturer, make, model, or vendor catalog number with acceptance of APPROVED EQUAL, it shall be for the purpose of establishing a level of quality and features desired and acceptable to the City. In such cases, the City will be receptive to any unit that would be considered by qualified City personnel as an approved equal. In that the specified make and model represent a level of quality and features desired by the City, the Bidder must state clearly in his bid any variance from those specifications. It is he Bidder's responsibility to provide adequate information, in his bid, to enable the City to ensure that the bid meets the required criteria. If adequate information is not submitted with the bid, it may be rejected. The City will be the sole judge in determining if the item bid qualifies as an approved equal.

SAMPLES AND DEMONSTRATIONS:

Samples or inspection of product/equipment may be requested to determine suitability. Samples or inspection will be made either before or after the opening of the bid, but before award of the bid is made. When requested, samples must be furnished free of expense to the City and if not used in testing or destroyed, will upon request of the Bidder, be returned within thirty (30) days of bid award at Bidder's expense. When required, the City may request full demonstrations of units prior to award. When such demonstrations are requested, the Bidder shall respond promptly and arrange a demonstration at a location chosen by the City and convenient to both parties, barring any special conditions. Failure to provide samples or demonstrations, if requested by the City, may result in rejection of a bid.

USE OF OTHER GOVERNMENTAL CONTRACTS:

The City reserves the right to reject any part or all of any bids received and utilize other available governmental contracts, if such action is in its best interest.

COMPLIANCE TO SPECIFICATIONS, LATE DELIVERIES:

Items offered may be tested for compliance to bid specifications. Items delivered which do not conform to bid specifications may be rejected and returned at Contractor's expense. Any violation resulting in contract termination for cause or delivery of items not conforming to specifications, or late delivery may also result in:

- Bidder's name being removed from the City's bidder mailing list for a specified time and Bidder will not be recommended for any award during that period.
- All City Departments being advised to refrain from doing business with the Bidder.
- All other remedies in law or equity

ACCEPTANCE:

The product delivered in response to ITB award shall remain the property of the Seller until accepted to the satisfaction of the City. The product must comply fully with the terms of the ITB, be of the required quality, new, and the latest model. All containers shall be suitable for storage and shipment by common carrier, and all prices shall include standard commercial packaging. The City will not accept substitutes of any kind. Any substitutes or material not meeting specifications will be returned at the Bidder's expense. Payment will be made only after City receipt and acceptance of products or services.

HOLD HARMLESS:

The Contractor/Vendor agrees to protect, defend, indemnify, and hold harmless the City of Sapulpa and its officers, employees and agents from and against any and all losses, penalties, damages, settlements, claims, costs, charges for other expenses, or liabilities of every and any kind including attorney fees, in connection with or arising directly or indirectly out of the work agreed to or performed by Contractor under the terms of any agreement that may arise due to the bidding process. Without limiting the foregoing, any and all such claims, suits, or other actions relating to personal injury, death, damage to property, defects in materials or workmanship, actual or alleged violations of any applicable Statute, ordinance, administrative order, rule or regulation, or decree of any court shall be included in the indemnity hereunder.

TERMINATION FOR CAUSE/CONVENIENCE:

If, through any cause, the Contractor shall fail to fulfill in a timely and proper manner its obligations under this Agreement, or if the Contractor shall violate any of the provisions of this Agreement, the City may upon written notice to the Contractor terminate the right of the Contractor to proceed under this agreement, or with such part or parts of the agreement as to which there has been default, and may hold the Contractor liable for any damages caused to the City by reason of such default and termination. In the event of such termination, any completed services performed by the Contractor under this Agreement shall, at the option of the City, become the City's property and the Contractor shall be entitled to receive equitable compensation for any work completed to the satisfaction of the City. The Contractor, however, shall not be relieved of liability to the City for damages sustained by the City by reason of any breach of the Agreement by the Contractor, and the City may withhold any payments to the Contractor for the purpose of setoff until such time as the amount of damages due to the City from the Contractor can
be determined.

The City also reserves the right, in its best interest as determined by the City, to cancel contract by giving written notice to the Contractor thirty (30) days prior to the effective date of such cancellation.

NON-APPROPRIATION OF FUNDS:

The obligation of the City for payment to a contractor is limited to the availability of funds appropriated in a current fiscal period, and continuation of the contract into a subsequent fiscal period is subject to appropriation of funds, unless otherwise authorized
by law.

PERMITS, TAXES, LICENSES:

The successful Contractor shall, at his own expense, obtain all necessary permits, pay all licenses, fees and taxes, required to comply with all local ordinances, state and federal laws, rules and regulations applicable to business to be carried on under this contract.

UNUSUAL CIRCUMSTANCES:

If during a contract term where costs to the City are to remain firm or adjustments are restricted by a percentage or CPI cap, unusual circumstances that could not have been foreseen by either party to the contract occur, and those circumstances significantly affect the Contractor's cost in providing the required items or services, then the Contractor may request adjustments to the costs to the City to reflect the changed circumstances. The circumstances must be beyond the control of the Contractor, and the requested adjustment must be fully documented. The City may, after examination, refuse to accept the adjusted costs if they are not properly documented, increases are considered to be excessive, or decreases are considered to be insufficient. In the event the City does not wish to accept the adjusted costs and the matter cannot be resolved to the satisfaction of the City, the City will reserve the following options:

- The contract can be canceled by the City upon giving thirty (30) days written notice to the Contractor with no penalty to the City or Contractor. The Contractor shall fill all City requirements submitted to the Contractor until the termination date contained in the notice.
- The City requires the Contractor to continue to provide the items and services at the firm fixed (non-adjusted) cost until the termination of the contract term then in effect.
- If the City, in its interest and in its sole opinion, determines that the Contractor in a capricious manner attempted to use this section of the contract to relieve themselves of a legitimate obligation under the contract, and no unusual circumstances had occurred, the City reserves the right to take any and all action under law or equity. Such action shall include, but not be limited to, declaring the Contractor in default and disqualifying him for receiving any business from the City for a stated period of time.

ASSIGNMENT:

Contractor shall not transfer or assign the performance required by this ITB without the prior 'written consent of the City. Any award issued pursuant to this ITB, and the monies, which may become due hereunder, are not assignable except with the prior written approval of the City Manager or selected designee.

BIDDER'S LIABILITY AND INSURANCE REQUIREMENTS:

General Liability — The City shall not be held liable or responsible for any accident, loss, assault, battery, defamations, false arrest, false imprisonment, invasion of privacy, intentional or negligent infliction of emotional distress, injury (including death), or damages happening or occurring during the term of the performance of the work, to persons and/or property, and the Contractor shall fully indemnify and protect the City from and against the same. In addition to the liability imposed by law on the Contractor for damage or injury (including death) to persons or property by reason of negligence of the Contractor or his agents, such liability is not impaired or otherwise affected hereby and the Contractor hereby assumed liability for and agrees to save the City harmless and indemnify him for every expense, liability or payment by reasons or any damage or injury (including death) to persons or property suffered or any of his subcontractors or anyone directly or indirectly employed by either of them or arising in any way from the work called for in the contract.

Liens — Contractor shall agree to indemnify and hold the City harmless from all claims, demands, causes or actions or suits of whatever nature arising out the services, labor and materials furnished by the Contractor or his subcontractors under the scope of this contract and from all laborers', materials men's and mechanics' liens upon the real property upon which the work is located or any property of the City of Sapulpa.

Insurance Requirements - The Contractor, and any sub-contractors, shall carry and keep in force during the term of the contract policies of public liability and insurance including any contractual liability assumed under the contract in the minimum amounts set forth below and worker's compensation and employer's liability insurance in the amount required by law. The Contractor shall also furnish an owner's protective policy in the same amounts with the City of Sapulpa as the named assured by the same insurance company as the insurer of Contractor's liability coverage.

Personal Injury, each person	$ 100,000
Personal Injury, each occurrence	$1,000,000
Property Damage, each person	$ 25,000
Property Damage, each occurrence	$ 100,000

The policy shall provide a clause stating that it cannot be cancelled by the insurer without the insurer first giving the City ten (10) days written notice of cancellation. The Contractor shall furnish the City a certificate of insurance showing such coverage within ten (10) days following the award of the contract by the City prior to starting work. The City of Sapulpa shall be listed as an additional insured on all certificates of insurance.

EMPLOYMENT DISCRIMINATION BY CONTRACTOR PROHIBITED:

During the performance of this contract, the contractor agrees he will not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin, except where religion, sex, or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor.

ADDENDA AND INTERPRETATIONS:

If it becomes necessary to revise any part of this bid, a written addendum will be provided to all the bidders. The City of Sapulpa is not bound by any oral representation, clarifications or changes made in the written specifications by the City of Sapulpa employees unless such clarification or change is provided to bidders in written addendum form from the Purchasing Director.

AWARD OF BID:

The bid shall be awarded to the firm whose proposal is responsive to the bid and is most advantageous to the City, considering the factors in the bid and set forth below.

1. Authority of the City Council: The City Council shall have the authority to award contracts within the parameters of ordinances and City Charter of the City of Sapulpa.

2. Lowest qualified bidder: Contracts shall be awarded to the lowest qualified bidder meeting specifications. In determining "lowest qualified bidder", in addition to price, the following factors shall be considered:

    A. The ability, capacity, and skill of the bidder to perform the contract or provide the equipment required.

    B. Whether the bidder can perform the contract or provide the equipment promptly or within the time specified, without delay or interference.

    C. The character, integrity, reputation, judgment, experience, and efficiency of the bidder.

    D. The quality of performance of previous contracts or services.

    E. The previous and existing compliance by the bidder with laws and ordinances relating to the contract or service.

    F. The sufficiency of the financial resources and ability of the bidder to perform the contract or provide the service and/or equipment.

    G. The quality, availability, and adaptability of the equipment to the particular use required.

    H. The ability of the bidder to provide future maintenance and service for the use of the subject of the contract.

    I. Where an earlier delivery date would be of great benefit to the requisitioning agency, the date and terms of delivery may be considered in the bid award.

    J. The number and scope of conditions (if any) attached to the bid.

IRREGULAR PROPOSALS:

Proposals will be considered irregular and may be rejected as non-responsive if:

1. The Proposal is on a form other than that approved by the City of Sapulpa, or if the form is altered or incomplete.

2. There are unauthorized additions, conditional or alternate bids, or irregularities of any kind that may tend to make the Proposal incomplete, indefinite, or ambiguous.

3. The bidder adds provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award. This does not exclude a proposal limiting the maximum gross amount of awards acceptable to any one bidder bid letting, provided that selection of awards in make by the City.

4. The Proposal does not contain a unit price for each pay item listed except in the case of authorized alternate pay items.

5. Any of the unit bid prices are significantly unbalanced to the potential detriment of the City.

6. The Proposal is not properly signed.

7. The Proposal is not typed or completed in ink.

8. The bidder fails to sign the non-collusive bidding certification.

9. The Proposal fails to comply with any other material requirement of the invitation for bids.

REJECTION OF BIDS:

Any of the following reasons may be considered just cause for the rejection of a bid or bids.

1. More than one Proposal for the same work from an individual, firm partnership, joint venture, or corporation whether under the same or different name.

2. The prospective bidder is debarred or ruled unacceptable by the City, a Federal Agency or other Governmental Agency.

3. Submission of irregular Proposal as set forth in previous section.

4. Unsatisfactory performance on previous work.

5. Uncompleted work which, in the judgment of the City, might hinder or prevent the prompt completion of additional work if awarded.

6. Default under previous Contract(s).

7. Errors in preparation of the Proposal.

8. Failure to settle bills for labor or materials on past or current contracts.

CITY OF SAPULPA

AGREEMENT

THIS AGREEMENT, made this ____ day of _____, 20___, between the City of Sapulpa, hereinafter called OWNER and _____ doing business as a (Individual, partnership, or corporation) hereinafter called the CONTRACTOR.

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The Contractor will commence and complete Project, as shown in the plans and specifications.

2. The Contractor will furnish all of the material, supplies and labor and other services necessary for the completion of the Project described in specifications.

3. The Contractor will commence the work required in the specifications within _____ (00) calendar days after the date of the **Notice To Proceed** and will complete the same within _____ days (00) calendar days unless the period for completion is extended by agreement of both parties.

4. The Contractor agrees to perform all of the Work described in the Specifications and comply with the terms therein.

5. During the Continuance of this Contract, the Contractor shall carry public liability insurance, property damage insurance up to the limits of the Tort Claims Act and Workman's Compensation Insurance as required by the State of Oklahoma.

Property:	$ 25,000
Personal Injury, each person:	$ 100,000
Personal Injury Aggregate:	$1,000,000
Property, Aggregate	$ 100,000

6. Contractor shall hold the City harmless for any loss, damage or claims arising from or related to your performance of the Agreement herein. Contractor must exercise all reasonable and customary precaution to prevent any harm or loss to all persons and property related to this Agreement.

7. The Contractor shall furnish certificates of insurance which shall provide that such insurance will not be canceled by the insurer without the insurer first giving the Owner ten (10) days written notice of cancellation.

8. Before executing this Agreement, the Contractor shall furnish the Owner for approval a list of sub-contractors proposed by the Contractor for us in this project, if applicable. Included in the listing shall be a detailed accounting of the work to be performed by respective sub-contractors The Contractor under contract shall be solely responsible for maintaining the progress of work done by the sub-contractors. Failure of the subcontractor to complete such work in a timely manner does not relieve the Contractor from contractual obligations with Owner and/or any penalties imposed on the Contractor by the Owner.
Definition of Sub-Contractor: An individual, partnership, joint venture, firm, or corporation, being a separate and independent entity, to whom the Contractor contracts part of the work under contract. Insurance requirements: In the event that any of the work to be performed by the Contractor on the project is sublet or assigned or is otherwise to be performed by anyone other than the Contractor's own employees, then the insurance specified for the Contractor shall be extended to cover such work.

9. TIME AND PROGRESS

A. The work shall be commenced within _____ (00) days from and after the date of a written order from the Owner. The Contractor agrees that the work shall be prosecuted regularly, diligently, and uninterruptedly at a uniform rate of progress so as to ensure completion within the number of days stated in Section three (3) of this Agreement. It is expressly understood and agreed that the said time for the completion of the work described herein is a reasonable time for the completion of the same.

B. The Contractors may be required to furnish the owner with a progress schedule in a format approved by the Owner, setting forth in detail the procedure he proposes to follow, and giving the date on which he expects to start and to complete separate portions of the work. If at any time, in the opinion of the Owner, proper progress is not being maintained, such changes shall be made in the schedule of operations which will satisfy the Owner that the work will be completed within the period stated in the proposal.

C. If the Contractor shall fail to complete the work within the specified time, then the contractor agrees to pay to the Owner, not as a penalty, but as liquidated damages for such breach of Contract, the sum of $1,000.00 for each day of failure to complete the work after the specified impracticability and extreme difficulty of fixing and ascertaining the actual damage the Owner would in such event sustain.

D. It is further agreed that time is of the essence of each and every portion of this Contract and the specifications wherein a definite and certain time is fixed for the performance of any act whatsoever; and where under the contract an allowance of

extra time for the completion of any work is made, the new time fixed by such extension shall be of the essence of this Contract.

E. Should the Contractor be delayed in the final completion of the work by any act or neglect of the Owner, or of any employees of either, or by strikes, injunctions, fire, or other cause or causes outside of and beyond the control of the Contractor and which, in the opinion of the Owner, could have been neither anticipated nor avoided, then an extension of time sufficient to compensate for the delay, as determined by the Owner, shall be granted by the Owner, provided, however, that the Contractor shall give the Owner notice in writing of the cause of the delay in each case within ten (10) days after the delay.

F. Extensions of time will not be granted based on inadequate construction force, or the failure of the Contractor to place orders for equipment or materials a sufficient time in advance to ensure delivery when needed. Extensions of time will be provided if, in the opinion of the Owner, weather conditions have prevented performance within the time as herein specified. Any extension of time by the Owner shall not release the Contractor and surety herein from payment of liquidated damages for a period of time not included in the original Contract or the time extension as herein provided.

G. Failure to complete the project within the specified time, as set forth in this Contract may be grounds for disqualification for future contracts with the City of Sapulpa.

OWNER:

CITY OF SAPULPA

_____
Craig Henderson, Mayor

ATTEST: (SEAL)

APPROVED AS TO FORM:

_____
Shirley Burzio, City Clerk

_____
David R. Widdoes, City Attorney

CONTRACTOR:

ATTEST: (SEAL)

Name_____

By _____

Title_____

Name _____

My Commission Expires: _____

NON-INTEREST AFFIDAVIT

State of Oklahoma)
)§.
County of _____)

_____, of lawful age, being first duly sworn, states that Affiant is the agent authorized by the Bidder to submit the attached Bid.

Affiant further states that neither the chief administrative officer nor members of the governing body of the City of Broken Arrow or their relatives within the third degree of consanguinity or affinity is interested directly or indirectly through stock ownership, partnership interest or otherwise in the subject contract. In addition, no officer or employee of the City of Broken Arrow, either directly or indirectly, owns more than a twenty-five percent (25%) interest in the Bidder's business or the stock therein or any percentage which constitutes a controlling interest.

Affiant further states that currently and within one year prior to the date of this affidavit, neither Bidder nor an officer or a director of Bidder is engaging or has engaged in a partnership, joint venture or other business relationship with the architect, engineer, or other party to this Project, or one of its officers or directors, except as disclosed in full below:

The nature of such business relationship is as follows:

_____

The names of each person having such business relationship and the position he/she holds with the respective company or firm are:

_____

_____

_____
Agent Authorized by Bidder/Contractor

_____
Legal Name of Bidder/Contractor

Subscribed and sworn to me this _____day of _____, 20___.

My Commission Expires: _____

_____
Notary Public

NON-COLLUSION AFFIDAVIT

The following affidavit is to accompany the Bid:

State of Oklahoma)
)§.
County of _____)

_____, of lawful age, being first duly sworn, states that Affiant is the agent authorized by the Bidder to submit the attached Bid for the purpose of certifying the facts pertaining to the existence of collusion among bidders and between bidders and state officials or employees, as well as facts pertaining to the giving or offering of things of value to government personnel in return for special consideration in the letting of any contract pursuant to the bid to which this affidavit is attached;

Affiant further states that he/she is fully aware of the facts and circumstances surrounding the making of the bid to which this affidavit is attached and has been personally and directly involved in the proceedings leading to the submission of such bid; and

Affiant further states that neither the Bidder nor anyone subject to the Bidder's direction or control has been a party:

a. to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding,

b. to any collusion with any state official or employee as to quantity, quality or price in the prospective contract, or as to any other terms of such prospective contract,

c. in any discussions between bidders and any state official concerning exchange of money or other thing of value for special consideration in the letting of a contract, nor

d. to any collusion with any state agency or political subdivision official or employee as to create a sole-source acquisition in contradiction to Section 85.45j.1 of this title.

Affiant certifies that, if awarded the contract, whether competitively bid or not, neither the Bidder nor anyone subject to the Bidder's direction or control has paid, given or donated or agreed to pay, give or donate to any officer or employee of the City of Broken Arrow any money or other thing of value, either directly or indirectly, in procuring the contract which is the subject of this Bid.

Certified this _____ day of_____ 20__.

_____
Agent Authorized by Bidder/Contractor

_____
Legal Name of Bidder/Contractor

Subscribed and sworn to before me this _____day of _____, 20___.

My Commission Expires:_____

_____
Notary Public

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS

The prospective participant certifies to the best of its knowledge and belief that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency; and

(b) Have not within a three-year period preceding this Proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission or embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property; and

(c) Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification; and

(d) Have not within a three-year period preceding this application/Proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

I understand that any false statements on this certification may be grounds for rejection of this Proposal or termination of the award. In addition, under Title 18 U.S.C.A. § 1001, *et. seq*. a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years or both.

_____

Typed Name & Title of
Authorized Representative

_____

Signature of
Authorized Representative

☐ I am unable to certify the above statements. My explanation is attached.

AFFIDAVIT OF NON-PAYMENT FOR PROCUREMENT OF CONTRACT

State of Oklahoma)
) §.
County of _____)

_____, of lawful age, being first duly sworn, an oath says, that Affiant is the agent authorized by _____ _____, to execute the Contract of which this affidavit is part. Affiant further states that the Contractor has not paid, given or donated or agreed to pay, give or donate to any officer, or employee of the City of Broken Arrow or any of its Trusts or Authorities, any money or anything of value, either directly or indirectly, in the procuring of this Contract.

_____
Agent Authorized by Bidder/Contractor

_____
Legal Name of Bidder/Contractor

Subscribed and sworn to before me this _____ day of _____, 20___.

My Commission expires:_____

_____
Notary Public

REFERENCES

Please list references of past projects, which are similar to the project being Bid.

Type of Project:_____

Name of Company worked for:_____

Contract Person & Phone Number:_____

Address:_____

Location of Project:_____

Approximate Cost of Project:_____

Type of Project:_____

Name of Company worked for:_____

Contract Person & Phone Number:_____

Address:_____

Location of Project:_____

Approximate cost of project:_____

Type of Project:_____

Name of Company worked for:_____

Contract Person & Phone Number:_____

Address:_____

Location of Project:_____

Approximate Cost of Project:_____

STATUTORY BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____, as Principal(s) and _____ _____, a Corporation organized under the laws of the State of _____, and authorized to transact business in the State of Oklahoma, as Surety, are held and firmly bound unto the State of Oklahoma, in the penal sum of _____ _____ dollars ($_____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our successors and assigns, jointly and severely, firmly by these presents. Signed and sealed and delivered this ____ day of _ _____, 20___, in triplicate counterparts.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH THAT WHEREAS, the said _____has on this ___day of _____, 20___, entered into a written Contract with the City of Sapulpa, State of Oklahoma for _____ _____according to the Plans and Specifications attached to said Contract, which includes the furnishing of all necessary tools, equipment, material and labor, in accordance with the Plans and Specifications contained in said Contract and made a part thereof, which Contract, Plans and Specifications, are by reference thereto made a part of this bond. The said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder or the Terms and Conditions accompanying the same shall in any way affect its obligations on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the Terms and Conditions of the Contract or to the Work or to the Plans and Specifications.

NOW, THEREFORE, if said _____ shall pay all indebtedness incurred by the Contractor, or his Subcontractor who perform Work, in the performance of such Contract, for labor and materials and repairs to and parts for equipment used and consumed in the performance of said Contract, then this obligation shall become null and void; otherwise to be in full force and effect.

By: _____

_____
Surety Company

By:_____
Attorney in Fact

(Accompany this bond with Attorney-in-Fact's authority from Company) (One copy to be filed with the Clerk of the District Court)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____, and _____ with general offices in _____, a corporation organized under the laws of the State of _____and authorized to transact business in the State of Oklahoma, as Surety, and held and firmly bound unto the City of Sapulpa, Oklahoma, a municipal corporation existing under the laws of the State of Oklahoma, in the penal sum of _____ _____ dollars ($_____) lawful money of the United States, in payment of which sum well and truly to be made, the said Principal and Surety bind themselves, their successors and assigns, jointly and severally, firmly by these presents. Signed, sealed and delivered this __day of _____, 20____.

WHEREAS, said Principal has entered into a written Contract with the City of Sapulpa dated ____ _____, 20____, according to the Plans and Specifications attached to said Contract, which includes the furnishing of all necessary tools, equipment, materials, and labor, a copy of which Contract, together with all Plans and Specifications is hereto attached and made a part hereof as if set out in full herein; and for the payment to the City of Sapulpa, Oklahoma, of all sums due, or which may become due, by the terms of this Contract, as well as by reason of any violation thereof by the Principal herein; and for the payment of any and all judgments, costs of suits and actions brought against the City of Sapulpa, Oklahoma, or its officers, for any cause whatever arising from, or on account of, any injuries or damage to life or property, suffered or sustained by any person, or persons, firm, or corporation, caused by the Principal herein, its agents, servants, or employees, in the construction of said Work, or by or in consequence of, any negligence, carelessness, or misconduct, in guarding or protecting the same, or from any improper defective materials used in the construction of said Work, or any act of omission of said Principal, or its agents, servants, or employees; and for the protection of the City of Sapulpa, Oklahoma, against all suits or claims for infringements, or alleged infringements, or patent rights or processes. The said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the Terms and Conditions of the Contract or to the Work to be performed thereunder or the Plans and Specifications accompanying the same shall in any way affect its obligations on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the Terms and Conditions of the Contract or to the Work or to the Plan and Specifications.

NOW, THEREFORE, the said Principal has caused these presents to be executed in its name, and its corporate seal to be hereto affixed by its duly authorized officers, and the said Surety has caused these presents to be executed in its name, and its corporate seal to be hereunto affixed, by its attorney in fact, duly authorized thereunto to do so, the day and year first above written and these presents have been executed in triplicate counterparts.

By:_____

_____
Surety Company

By:_____

_____
Attorney in Fact

MAINTENANCE BOND

WHEREAS, the undersigned, _____ has executed Contract No. _____, dated the ____ day of _____, 20___, designated and known as _____ _____ for the construction of _____ including all of the Work mentioned and described in said Contract, and to be performed by the undersigned strictly and punctually in accordance with the Terms and Conditions and the Plans and Specifications thereof.

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS, that _____ _____, of _____as Principal, and as Surety, are jointly and severally, firmly held and bound into the City of Sapulpa the sum of _____ dollars ($_____) lawful money of the United States of American, same being the approximate cost of the Contract herein referred to, for the payment of which sum well and truly to be made, we hereby bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND is such that the said Principal and Surety herein named do hereby agree and bind themselves unto and guarantee the City of Sapulpa that all work done under said Contract was constructed with materials and in such a manner that the same shall endure without need of any repair whatsoever for a period of one (1) year from and after the formal acceptance of said project by the City of Sapulpa, and that all the expense of said Principal and/or Surety, all failures occurring and arising from any defect in material or workmanship within said period of _____ (_____) year shall be promptly repaired, within ten (10) days after notice to said Principal by letter deposited in the United States mail, addressed to said Principal at _____ and copied to said Surety; and it being further agreed that upon the neglect, failure or refusal of the Principal to make any needed repairs or backfills upon said project or any work connected therewith within the aforesaid ten (10) day period or other City negotiated period that the said Principal and Surety shall jointly and severally be liable to the City of Sapulpa, Oklahoma, for the costs and expenses of making such repairs or backfills, or making good such defects or imperfections.

NOW, THEREFORE, if the said Principal and Surety shall faithfully and securely keep and perform all the obligations herein provided to be kept and performed by them, or either of them, then this obligation shall be null and void and of no force and effect, otherwise to be and remain in full force and effect at all times.

Signed, sealed and delivered the _____ day of _____, 20____.

_____
Contractor Principal

Attest: By:_____

_____ _____
Title Title (seal)

_____ _____
Surety (seal) Attorney in Fact

(Accompany this bond with Power of Attorney)

Approved as to Form:

_____
Attorney

SURVEY CONTROL DATA

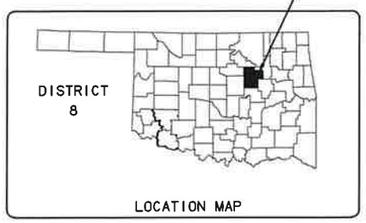
HORIZONTAL DATUM:
OKLAHOMA NORTH ZONE (3501) NAD 83. BEARINGS ARE BASED ON STATE PLANE GRID, AND ARE NOT ASTRONOMIC.

VERTICAL DATUM:
NAVD 1988

NO SCALE FACTOR

DESIGN DATA
49TH W. AVE

AADT	2022	= 3,000
AADT	2042	= 5,418
V		= 30 MPH
20yr.Flex ESALS		= 4.0 M



SCALES 1"

PLAN	1" = 20'
PROFILE HOR.	1" = 20'
VER.	1" = 5'
LAYOUT MAP	1" = 5,280'

CONVENTIONAL SYMBOLS

- PROPOSED ROAD
- RAILROADS
- RANGE & TOWNSHIP
- SECTION LINES
- PROPERTY LINES (P)
- FENCES
- GROUND LINE
- EXISTING ROADS
- BASE LINE
- GRADE LINES
- TELEPHONE & TELEGRAPH
- POWER LINES
- BUILDINGS
- OILWELL
- DRAINAGE STRUCTURES - IN PLACE
- DRAINAGE STRUCTURES - NEW
- RIGHT-OF-WAY LINES - EXISTING
- RIGHT-OF-WAY LINES - NEW
- CONTROLLED ACCESS
- MAILBOX
- EXISTING CENTERLINE
- EXISTING SANITARY SEWERS
- EXISTING GAS LINES
- EXISTING WATER LINES
- EXISTING TELEPHONE CABLES UNDERGROUND

2019 OKLAHOMA STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION - ENGLISH GOVERN. APPROVED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION, SEPTEMBER 1, 2020.

The City of Sapulpa
Oklahoma's Most Connected City

PLAN OF PROPOSED

ROADWAY IMPROVEMENTS

FOR

CITY OF SAPULPA

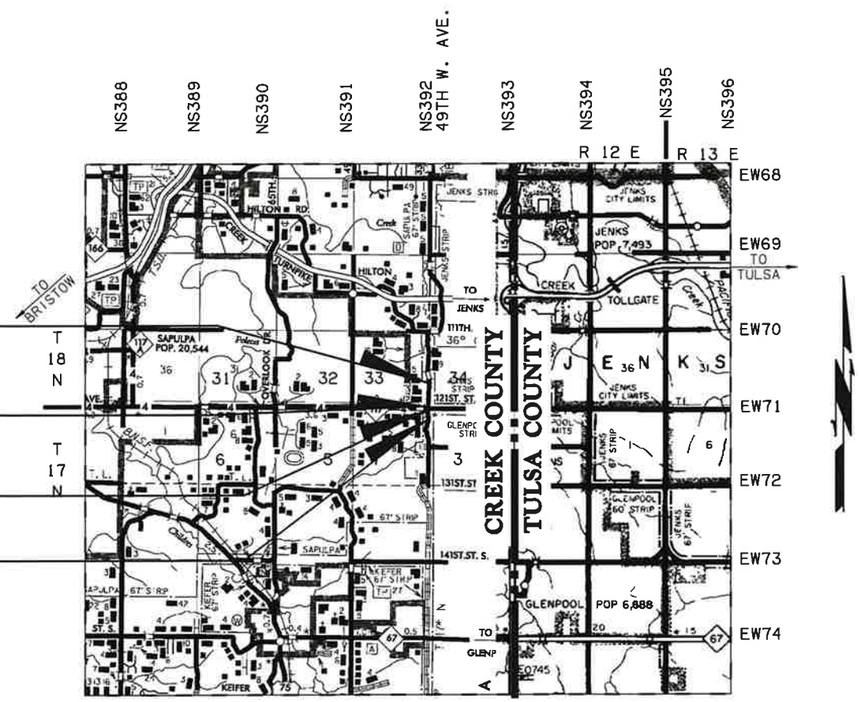
INTERSECTION IMPROVEMENTS ON S. 49TH W. AVE. AT STATE HIGHWAY 117

STA. 278+00.00
END PROJECT

STA. 270+47.50
END PROJECT EXCEPTION

STA. 269+84.50
BEGIN PROJECT EXCEPTION

STA. 262+85.00
BEGIN PROJECT



INDEX OF SHEETS

THE FOLLOWING ODOT STANDARD DRAWINGS ARE REQUIRED

ROADWAY (2019)	TRAFFIC CONTROL (2009)
SSS-2-0	SBS1-1-00
TSC2-4-0	SSP1-1-02
TSD-3-0	PM1-1-03
TFL-2-0	PM3-1-02
ASCD-6-0	PM6-1-00
PED-4-0	RSD1-1-00
PSE-2-0	GMS1-1-00
CET4S-4-1	TCS1-1-01
SMD-4-1	TCS2-1-00
SSCD-4-0	TCS4-1-01
CI-2-1	TCS5-1-00
SPI-5-1	TCS7-1-02
SPB-2-1	TCS9-1-01
FHTCP-4-0	TCS14-1-00
MI-4-1	TCS15-1-00
RDI-4-0	
DC-4-0	
RWF3-3-1	

ROADWAY LENGTH _____ 1452.00 FT 0.275 MI.
PROJECT LENGTH _____ 0.275 MI.

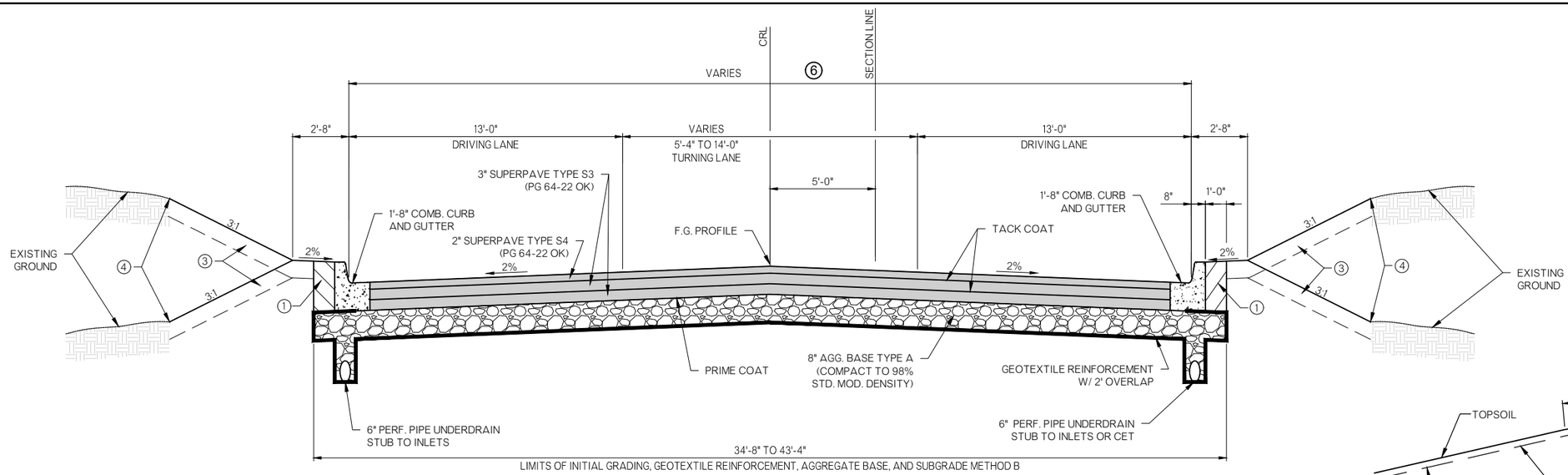
EQUATIONS : NONE
EXCEPTIONS : ROADWAY = 269+84.50 TO STA. 270+47.50 - 63'

APPROVED BY: _____ _____
CITY OF SAPULPA, CITY ENGINEER DATE

SUBMITTED BY
GUY ENGINEERING
Certificate of Authorization No. 1427
Renewal Date: June 30, 2024
9-26-2022
ANDRES BECKER, P.E. NO. 32388
(THIS SEAL COVERS SHEETS 1-5, 7-20, 24-27, X01-X017)

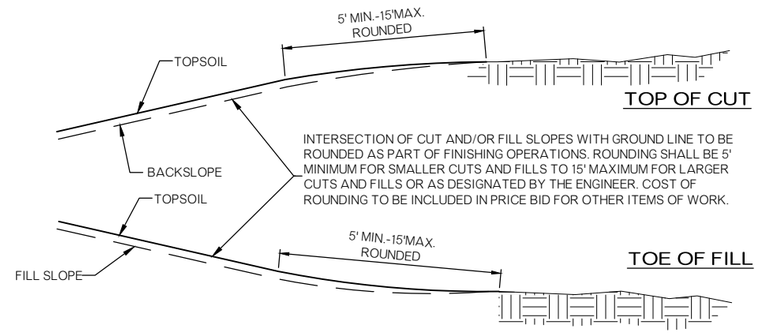
LICENSED PROFESSIONAL ENGINEER
ANDRES BECKER
32388
OKLAHOMA

CITY OF SAPULPA — CITY MANAGER: JOAN RILEY



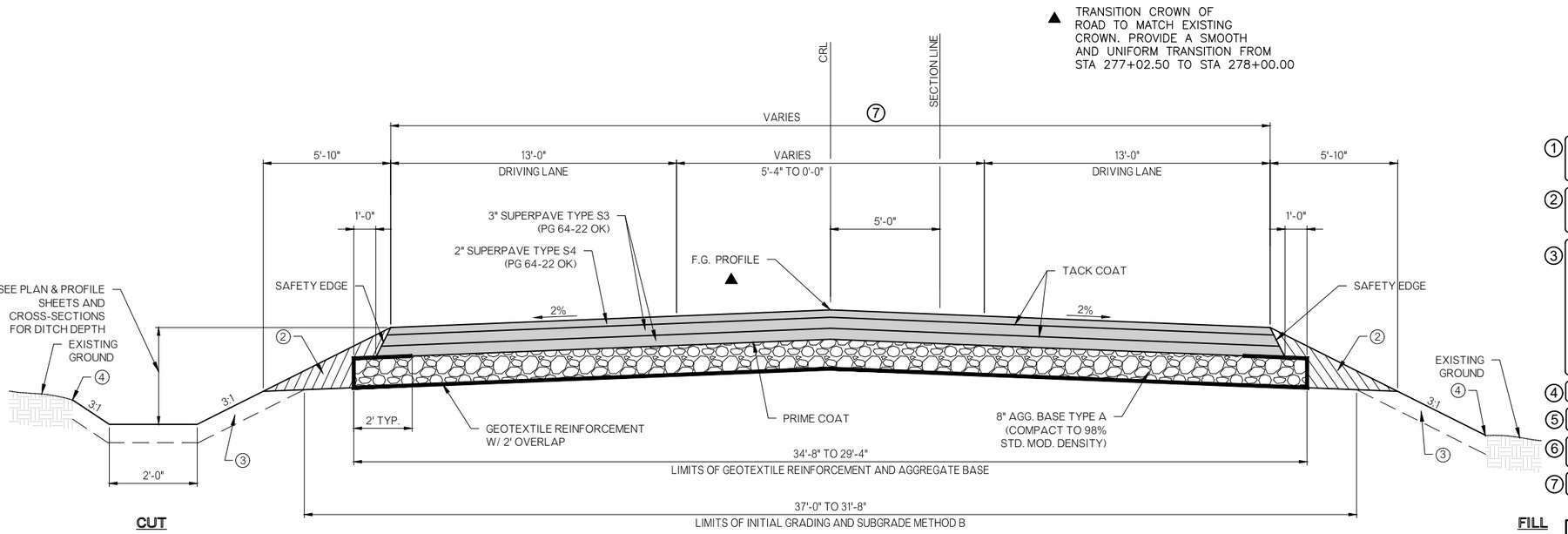
TYPICAL SECTION #1

STA. 264+50.00 TO STA. 269+84.50
STA. 270+47.50 TO STA. 277+02.50
Not to Scale



ROUNDING DETAIL

Not To Scale



TYPICAL SECTION #2

STA. 277+02.50 TO STA. 278+00.00
Not to Scale

1. BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

2. BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E.

3. TOPSOIL NOTE:
THE CONTRACTOR SHALL STRIP ALL OF THE AVAILABLE TOPSOIL, STOCKPILE IT, AND PLACE IT BACK ON THE SECTION IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS. RESERVED TOPSOIL SHALL BE SPREAD FIRST ON THE COMPLETED SLOPES OF THE CUT SECTIONS AND THE REMAINDER ON COMPLETED FILL SLOPES OR OTHER PRIORITY AREAS LOCATED BY THE ENGINEER. ALL ADDITIONAL COSTS ASSOCIATED WITH OPERATION SHALL BE INCLUDED IN THE PAY ITEM FOR SALVAGED TOPSOIL, LUMP SUM.

THE GRADING LINE AS SHOWN ON THE TYPICAL IS TO THE TOP OF THE TOPSOIL. EARTHWORK QUANTITIES WERE NOT ADJUSTED FOR SALVAGE AND THE TOPSOIL QUANTITY IS INCLUDED IN THE EARTHWORK BALANCE.

4. SEE ROUNDING DETAIL, THIS SHEET.

5. VARIES FROM 24'–0" AT STA. 262+85.00 TO 34'–0" AT STA. 264+50.00

6. VARIES FROM 34'–0" AT STA. 264+50.00 TO 40'–0" AT STA. 267+50.00
VARIES FROM 40'–0" AT STA. 275+60.00 TO 31'–4" AT STA. 277+02.50

7. VARIES FROM 31'–4" AT STA. 277+02.50 TO 26'–0" AT STA. 278+00.00

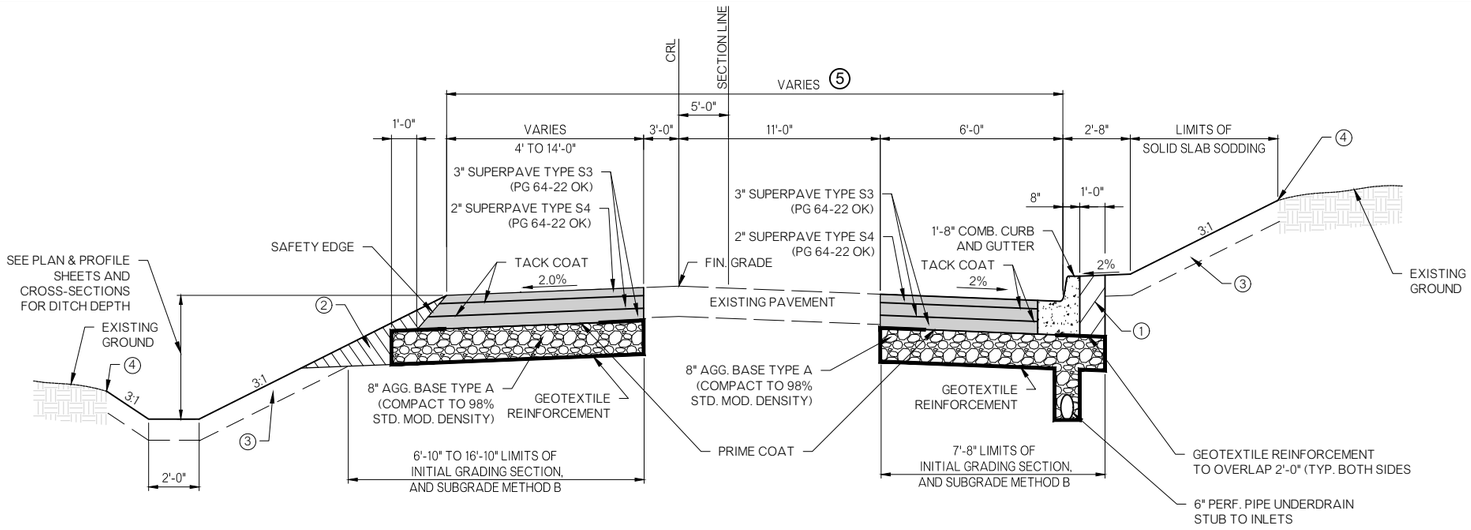
DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

TYPICAL SECTIONS 1 OF 2

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 2

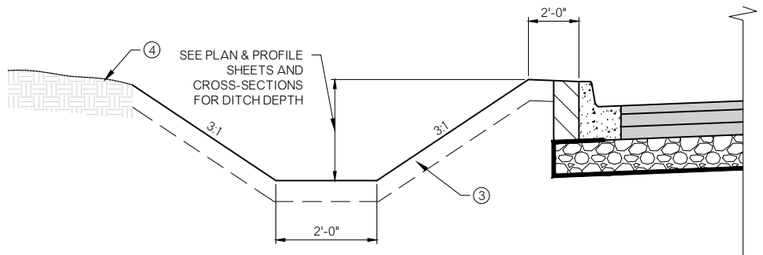
49TH W. AVE. & SH 117



TYPICAL SECTION #3

STA. 262+85.00 TO STA. 264+50.00

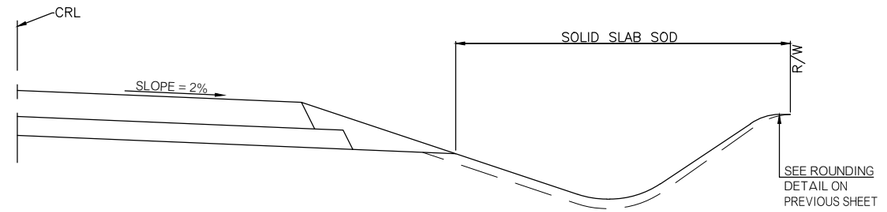
Not to Scale



DITCH BEHIND CURB DETAIL

STA. 276+19.00 TO STA. 277+02.50

Not to Scale



TYPICAL SLAB SODDING

Not To Scale

① BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

② BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E.

③ TOPSOIL NOTE:
THE CONTRACTOR SHALL STRIP ALL OF THE AVAILABLE TOPSOIL, STOCKPILE IT, AND PLACE IT BACK ON THE SECTION IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS. RESERVED TOPSOIL SHALL BE SPREAD FIRST ON THE COMPLETED SLOPES OF THE CUT SECTIONS AND THE REMAINDER ON COMPLETED FILL SLOPES OR OTHER PRIORITY AREAS LOCATED BY THE ENGINEER. ALL ADDITIONAL COSTS ASSOCIATED WITH OPERATION SHALL BE INCLUDED IN THE PAY ITEM FOR SALVAGED TOPSOIL, LUMP SUM.

THE GRADING LINE AS SHOWN ON THE TYPICAL IS TO THE TOP OF THE TOPSOIL. EARTHWORK QUANTITIES WERE NOT ADJUSTED FOR SALVAGE AND THE TOPSOIL QUANTITY IS INCLUDED IN THE EARTHWORK BALANCE.

④ SEE ROUNDING DETAIL, PREVIOUS SHEET.

⑤ VARIES FROM 24'–0" AT STA. 262+85.00 TO 34'–0" AT STA. 264+50.00

DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

TYPICAL SECTIONS 2 OF 2

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 3

49TH W. AVE. & SH 117

GENERAL CONSTRUCTION NOTES

(G-1) IN ACCORDANCE WITH THE OKLAHOMA UNDERGROUND FACILITIES DAMAGE PREVENTION ACT THE CONTRACTOR SHALL NOTIFY THE OKLAHOMA ONE-CALL SYSTEM, INC. 48 HOURS PRIOR TO BEGINNING EXCAVATION. OKLAHOMA ONE-CALL SYSTEM, INC. "CALL OKIE" 1-800-522-6543 OR 811.

(G-6) ALL TREES, BRUSH, AND OTHER DEBRIS THAT MIGHT INTERFERE WITH THE FLOW OF WATER SHALL BE CLEANED OUT TO THE RIGHT-OF-WAY LINE, AT EACH STRUCTURE AND BRIDGE, IN A MANNER APPROVED BY THE ENGINEER. ALL COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

(G-8) ALL FLOWLINES THAT ARE TO BE FILLED SHALL BE THOROUGHLY TAMPED BEFORE CONSTRUCTION OR EXTENSION OF DRAINAGE STRUCTURES. ALL COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

(G-9) IN ORDER TO ALLEVIATE DUST CONDITIONS DURING GRADING OPERATIONS AND BEFORE PAVEMENT WORK IS COMPLETED, THE CONTRACTOR SHALL SPRINKLE GRADING AT INTERVALS APPROVED BY THE ENGINEER. ALL COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

(G-11) THE CONTRACTOR SHALL NOT WASTE ANY EXCESS EXCAVATION UNTIL ALL PLANNED EMBANKMENTS AND BACKFILLS ARE COMPLETED. EXCESS UNCLASSIFIED EXCAVATION MATERIAL DETERMINED BY THE ENGINEER TO BE SUITABLE FOR BACKFILL SHALL BE USED TO REDUCE ANY UNCLASSIFIED BORROW NEEDED. COST OF SECOND HANDLING SHALL BE INCLUDED IN OTHER ITEMS OF WORK. ANY REMAINING EXCESS EXCAVATION SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND BE DISPOSED OF IN A MANNER APPROVED BY THE ENGINEER.

(G-23) AREAS ON WHICH SALVAGED TOPSOIL IS TO BE REPLACED SHALL HAVE 18-46-0 FERTILIZER APPLIED, AT THE RATE OF 150 POUNDS PER ACRE, JUST PRIOR TO THE REPLACEMENT OF SALVAGED TOPSOIL.

(G-25) AT THE BEGINNING OF TURFING OPERATIONS, ANY AREAS INCLUDED IN PLANNED QUANTITIES THAT HAVE GROWN A SATISFACTORY VOLUNTEER TURF OF PERENNIAL GRASS, AS DETERMINED BY THE ENGINEER, SHALL BE FERTILIZED AND WATERED AS CALLED FOR ON THE PLANS, BUT SHALL NOT BE SEEDED, SODDED, OR SPRIGGED.

(G-26) PIPE UNDERDRAIN QUANTITIES ESTIMATED ONLY. LOCATION, IF AND WHERE REQUIRED, TO BE DETERMINED BY THE ENGINEER.

(G-27) THE CONTRACTOR SHALL REMOVE AND RESET MAILBOXES AS NECESSARY. MAILBOXES ARE TO BE MAINTAINED IN AN UPRIGHT POSITION AND ACCESSIBLE TO MAIL CARRIER'S CAR DURING CONSTRUCTION. ANY DAMAGE TO BOXES OR SUPPORTS SHALL BE REPAIRED BY THE CONTRACTOR. ALL COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

(G-30) SURFACING OF RETURNS, UNLESS OTHERWISE SHOWN ON THE PLANS, SHALL BE OF THE SAME MATERIAL (BASE AND SURFACE) AS THAT OF THE ABUTTING SHOULDER OF THE MAINLINE. BASE AND SURFACE THICKNESS SHALL BE THE THICKNESS SHOWN ON PLANS.

(G-31) T.B.S.C. SURFACES SHALL BE SPRINKLED WITH WATER AND ROLLED WITH A PNEUMATIC ROLLER IN A MANNER APPROVED BY THE ENGINEER.

(G-38) PRIOR TO FINAL ACCEPTANCE, ALL EXPOSED CURB SURFACES SHALL BE CLEANED OF ALL DISCOLORATION SUCH AS ASPHALT STAIN, TIRE MARKS, OR OTHER DISFIGUREMENT.

(G-39) EXCESS ASPHALT AT JOINTS AND CRACKS IN EXISTING PAVEMENT SHALL BE REMOVED FLUSH TO TOP OF PAVING IN A MANNER APPROVED BY THE ENGINEER.

PAY QUANTITY NOTES (ROADWAY)

(R-4) AN ESTIMATED QUANTITY OF 1,186 C.Y. TOPSOIL TO BE RESERVED FOR REPLACEMENT OF APPROXIMATELY 5" ON COMPLETED FORESLOPES, DITCHES, AND BACKSLOPES. THIS QUANTITY IS INCLUDED IN THE EARTHWORK BALANCE. ANY ADDITIONAL EXCAVATION REQUIRED IN CUT SECTIONS TO ALLOW FOR PLACEMENT OF TOPSOIL TO FINAL GRADE, SHALL BE INCLUDED IN THE PRICE BID.

(R-6) FOR SOLID SLAB SODDING PRICE BID TO INCLUDE COST OF 18-46-0 FERTILIZER, ESTIMATED AT 150 POUNDS PER ACRE.

(R-7) FOR SOLID SLAB SODDING PRICE BID TO INCLUDE COST OF WATERING, ESTIMATED AT 80 GALLONS PER S.Y.

(R-8) PRICE BID TO INCLUDE COST OF ALL NECESSARY MAINTENANCE, MAINTAINING DEVICE IN PROPER UPRIGHT POSITION, REMOVAL OF DEVICE, AND REMOVAL OF SEDIMENT WHEN IT REACHES HALF THE HEIGHT OF THE DEVICE.

(R-11) THE QUANTITIES ESTIMATED FOR TEMPORARY EROSION AND SEDIMENT CONTROL IS 3.20 ACRES.

(R-18) ESTIMATED AT 140 LBS. PER CU. FT.

(R-21) PRIME COAT SHALL BE APPLIED AT AN ESTIMATED RATE OF 0.25 GAL. PER SQ. YD. WHEN APPLIED TO AGGREGATE BASE. THE ACTUAL CUTBACK PRIME COAT REQUIRED FOR PLACEMENT OPERATIONS WILL BE DETERMINED BY THE CONTRACTOR, AND SHALL CONSIDER THE RESIDUE FROM DISTILLATION PERCENTAGE SHOWN IN SECTION 708.03 OF THE STANDARD SPECIFICATIONS.

(R-23) ESTIMATED AT 0.075 GALLONS PER SQUARE YARD OF ORIGINAL EMULSION OF TACK COAT (BEFORE DILUTION FOR APPLICATION) IN ACCORDANCE WITH SECTION 407 OF THE STANDARD SPECIFICATIONS.

(R-24) ESTIMATED AT 112 LBS. PER SQ. YD. PER 1" THICK.

(R-31) QUANTITY INCLUDES AN ESTIMATED 10 C.Y. TO BE USED AS DIRECTED BY THE ENGINEER.

(R-32) PRICE BID TO INCLUDE COST OF BARRIER CURB HOODS, FRAMES AND GRATES.

(R-33) THE PRECAST CONCRETE OPTION MAY BE USED INSTEAD, PER DIRECTION OF THE ENGINEER.

(R-37) INCLUDES REMOVAL OF ALL EXISTING ROADWAY DRAINAGE STRUCTURES, HEADWALLS (UNLESS OTHERWISE SPECIFIED), INLETS, AND OTHER STRUCTURES WITHIN THE RIGHT OF WAY.

(R-38) TO BECOME THE PROPERTY OF AND BE DISPOSED OF BY THE CONTRACTOR IN A MANNER APPROVED BY THE ENGINEER.

(R-39) MATERIALS REMOVED SHALL NOT BE MEASURED FOR PAYMENT UNDER SECTION 202.06 UNCLASSIFIED EXCAVATION.

1. CONSTRUCTION STAKING SHALL INCLUDE ESTABLISH AND RE-ESTABLISH STAKING OF CENTERLINE, BENCHMARKS, AND RIGHT-OF-WAY. INCLUDES SLOPE STAKING, STRUCTURE STAKING, ROADWAY STAKING (DRIVEWAYS INCLUDED), BLUETOPPING, AND CHECKING ALIGNMENTS AND ELEVATIONS AS REQUIRED.

2. GEOTEXTILE REINFORCEMENT SHALL BE MIRIFI HP 570 OR APPROVED EQUAL.

3. ADDITIONAL DEPTH OF CURB INLETS WITH JUNCTION BOXES SHALL BE PAID AS ADDITIONAL DEPTH IN CURB INLET.

CITY OF SAPULPA

PAY QUANTITIES

0100 ROADWAY ITEMS

ITEM		DESCRIPTION	PAY NOTES	UNIT	QUANTITY
201(A)	1200	CLEARING AND GRUBBING		L. SUM	1
202(A)	2400	ROCK EXCAVATION	R-2	C.Y.	5,693
205(A)	6200	TYPE A - SALVAGED TOPSOIL	R-4	L. SUM	1
221(B)	2300	TEMPORARY SILT FENCE	R-8	L.F.	1,743
221(E)	2600	TEMPORARY SILT DIKE	R-8	L.F.	56
221(G)	2800	TEMPORARY FIBER LOG	R-8	L.F.	821
230(A)	2806	SOLID SLAB SODDING	R-6,R-7	S.Y.	7,528
233(A)	2817	VEGETATIVE MULCHING	R-11	AC.	3.20
303(A)	1200	AGGREGATE BASE TYPE A		C.Y.	1,616
310(B)	5300	SUBGRADE, METHOD B		S.Y.	6,421
326(A)	1200	GEOTEXTILE REINFORCEMENT	2	S.Y.	8,263
402(E)	2600	TRAFFIC BOUND SURFACE COURSE TYPE E	R-18	TON	49
407(B)	7300	TACK COAT	R-23	GAL	857
408	8100	PRIME COAT	R-21	GAL	1,696
411(B)	1330	SUPERPAVE, TYPE S3 (PG 64-22 OK)	R-24	TON	2,007
411(C)	1430	SUPERPAVE, TYPE S4 (PG 64-22 OK)	R-24	TON	673
509(B)	0300	CLASS A CONCRETE		C.Y.	37.0
509(D)	0500	CLASS C CONCRETE	R-31	C.Y.	21.9
511(A)	2200	REINFORCING STEEL		LB.	3,101
601(B)	1100	TYPE I PLAIN RIPRAP WITH FILTER BLANKET		TON	35
609(B)	4330	1'-8" COMB. CRB. & GUT. (6" BARRIER)		LF	2,539
610(B)	5300	6" CONCRETE DRIVEWAY (H.E.S.)		S.Y.	499
611(G)	0144	INLET W/ LRG JCT. BOX, CI, DES. 2	R-32,R-33	EA.	1
611(G)	0264	INLET W/ SMALL JCT. BOX, CI, DES. 2	R-32,R-33	EA.	4
611(G)	0268	INLET W/ SMALL JCT. BOX, CI, DES. 2(D)	R-32,R-33	EA.	1
611(G)	0350	INLET (SMD-TYPE 1)	R-33	EA.	4
611(G)	7754	INLET CI DES. 2 (STD)	R-32,R-33	EA.	1
611(G)	7758	INLET CI DES. 2 (B)	R-32,R-33	EA.	2
611(G)	7766	INLET CI DES. 2 (D)	R-32,R-33	EA.	2
611(H)	0400	ADDITIONAL DEPTH IN INLET		V.F.	5
611(H)	0414	ADD'L DEPTH IN INLET CI DES. 2	R-33,3	V.F.	31
613(A)	5204	15" R.C. PIPE CLASS III		L.F.	5
613(A)	5208	18" R.C. PIPE CLASS III		L.F.	620
613(A)	5216	24" R.C. PIPE CLASS III		L.F.	317
613(A)	5224	36" R.C. PIPE CLASS III		L.F.	20
613(A)	5232	48" R.C. PIPE CLASS III		L.F.	20
613(A)	5358	28" X 18" R.C.PIPE ARCH CLASS A-III		L.F.	103
613(A)	5374	51" X 31" R.C.PIPE ARCH CLASS A-III		L.F.	36
613(H)	0450	6" PERFORATED PIPE UNDERDRAIN ROUND		L.F.	2,539
613(I)	1096	6" NON-PERF. PIPE UNDERDRAIN RND.		L.F.	84
613(M)	6960	TYPE A4 CULVERT END TREATMENT		EA.	2
613(M)	6964	TYPE B4 CULVERT END TREATMENT		EA.	3
613(M)	6972	TYPE D4 CULVERT END TREATMENT		EA.	1
613(M)	6976	TYPE E4 CULVERT END TREATMENT		EA.	1
619(A)	6200	REMOVAL OF STRUCTURES & OBSTRUCTIONS	R-37	L. SUM	1
619(B)	4726	REMOVAL OF CURB AND GUTTER	R-38,R-39	LF	339
619(B)	4728	REMOVAL OF ASPHALT PAVEMENT	R-38,R-39	S.Y.	4,107
619(C)	6600	SAWING PAVEMENT		L.F.	668
625(B)	4300	REMOVE AND RECONSTRUCT FENCE		L.F.	33

CITY OF SAPULPA

PAY QUANTITIES

0600 STAKING

ITEM		DESCRIPTION	PAY NOTES	UNIT	QUANTITY
642(B)	3300	CONSTRUCTION STAKING LEVEL II	1	L. SUM	1

CITY OF SAPULPA

PAY QUANTITIES

0640 CONSTRUCTION

ITEM		DESCRIPTION	PAY NOTES	UNIT	QUANTITY
220	1100	SWPPP DOCUMENTATION AND MANAGEMENT		L. SUM	1
641	2110	MOBILIZATION		L. SUM	1

DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

SUMMARY OF PAY QUANTITIES AND NOTES (ROADWAY)

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 4

49TH W. AVE. & SH 117

SURFACING SUMMARY

STATION EXTENTS	AGGREGATE BASE TYPE A 303(A)	SUBGRADE METHOD B 310(B)	GEOTEXTILE REINFORCEMENT 326(A)	TRAFFIC BOUND SURFACE COURSE TYPE E 402(E)	TACK COAT 407(B)	PRIME COAT 408	SUPERPAVE, TYPE S3 (PG 64-22 OK) 411(B)	SUPERPAVE, TYPE S4 (PG 64-22 OK) 411(C)	1'-8" COMB. CRB. & GUT. (6" BARRIER) 609(B)	REMOVAL OF ASPHALT PAVEMENT 619(B)	REMOVAL OF CURB AND GUTTER 619(B)	SAWING PAVEMENT 619(C)
	C.Y.	S.Y.	S.Y.	TONS	GAL.	GAL.	TONS	TONS	L.F.	S.Y.	L.F.	L.F.
49TH WEST AVE.												
262+85.00 TO 264+50.00	73	342	485	22	39	82	96	30	165	136	0	352
264+50.00 TO 269+84.50	566	2,426	3,298	0	334	636	749	250	1,069	1,575	139	136
270+47.50 TO 277+00.00	701	3,010	4,073	0	415	789	930	310	1,305	2,116	200	136
277+00.00 TO 278+00.00	77	429	407	27	46	87	108	35	0	280	0	25
HILLSIDE DR. (CENTERLINE STA 274+19) ◢												
274+07.72 TO 274+29.89	48	214	214	0	11	54	61	25	0	0	0	19
TOTALS =	**1,465**	**6,421**	**8,263**	**49**	**846**	**1,648**	**1,954**	**650**	**2,539**	**4,107**	**339**	**668**

◢ STREET RETURNS TO BE 30' RADII

SUMMARY OF DRIVES

STATION	RETURN RADIUS	DRIVE WIDTH	LENGTH	AGGREGATE BASE TYPE A 303(A)	TACK COAT 407	PRIME COAT 408	SUPERPAVE, TYPE S3 (PG 64-22 OK) 411(B)	SUPERPAVE, TYPE S4 (PG 64-22 OK) 411(C)	6" CONCRETE DRIVEWAY (H.E.S.) 610(B)
	FT.	FT.	L.F.	C.Y.	GAL.	GAL.	TONS	TONS	S.Y.
263+80.00 RT.	15	14	39	15					70
264+21.00 RT.	10	22	36	21					95
264+80.75 LT.	10	22	30	16					73
265+22.00 LT.	10	12	17	6	2	7	8	4	
265+29.50 RT.	10	20	63	32					143
266+07.50 RT.	10	28	38	26					118
269+10.00 RT.	20	22	39	25	6	29	32	13	
276+36.00 RT.	10	14	26	10	3	12	13	6	
TOTALS =				**151**	**11**	**48**	**53**	**23**	**499**

SUMMARY OF MAILBOX INSTALLATIONS

LOCATION			DESIGN	MAILBOX INSTALLATION-SINGLE
				629(A)
STATION	OFFSET	SIDE		EA.
264+47.00	23	RT	1	1
264+51.00	23	RT	1	1
			TOTAL =	2

FENCE SUMMARY

STATION EXTENTS	REMOVAL OF FENCE 619(B)	REMOVE AND RECONSTRUCT FENCE 625(B)
	L.F.	L.F.
263+00.00 TO 264+57.00 LT.	164	
264+57.00 TO 264+89.00 LT.		33
264+89.00 TO 268+02.21 LT.	317	
TOTALS =	**481**	**33**

SUMMARY OF EROSION CONTROL

STATIONS		TEMPORARY SILT FENCE	TEMPORARY SILT DIKE	TEMPORARY FIBER LOG	SOLID SLAB SODDING	VEGETATIVE MULCHING	TYPE I PLAIN RIPRAP W/ FILTER BLANKET
		221(B)	221(E)	221(G)	230(A)	233(A)	601(B)
FROM	TO	L.F.	L.F.	L.F.	S.Y.	AC.	TONS
262+85.00	269+84.50	951	42	574	4,541	1.68	25
270+47.50	278+00.00	792	14	247	2,986	1.51	10
TOTALS =		1,743	56	821	7,528	3.20	35

DITCH TREATMENT SUMMARY

STATION EXTENTS	TYPE	BOTTOM WIDTH	CURTAIN WALLS	CLASS C CONCRETE 509(D)
		FT.	EA.	C.Y.
268+40.00 TO 268+66.50 RT.	DESIGN NO. 1	2	1	1.5
276+27.00 TO 277+50.00 LT.	DESIGN NO. 1	2	2	6.6
270+60.00 CURB OPENING	DESIGN NO. 2			1.4
277+00.00 CURB OPENING	DESIGN NO. 1			1.2
277+00.00 CURB OPENING	DESIGN NO. 1			1.2
			TOTALS =	8.1

EARTHWORK SUMMARY

STATION EXTENTS	ROCK EXCAVATION 202(C)	EMBANKMENT +15%	EXCESS EXCAVATION	WASTE
	C.Y.	C.Y.	C.Y.	C.Y.
49TH W. AVE SOUTH				
262+85.00 TO 269+84.50	2,881	569	2,312	2,312
49TH W. AVE NORTH				
270+47.50 TO 278+00.00	2,812	175	2,637	2,637
TOTALS =	**5,693**	**744**	**4,949**	**4,949**

- QUANTITIES ARE ESTIMATES.

SUMMARY OF UNDERDRAIN

STATION EXTENTS			6" PERF. PIPE UNDERDRAIN ROUND	6" NON-PERF. PIPE UNDERDRAIN RND.
			L.F.	L.F.
262+85.00	TO	264+50.00	165	5
264+50.00	TO	269+84.50	1,069	37
270+47.50	TO	277+00.00	1,305	42
		TOTALS =	**2,539**	**84**

SCHEDULE OF DRAINAGE STRUCTURES

STR NO	LOCATION STATION	LOCATION OFFSET	CITY OF TULSA DWG. NO.	ODOT STD. DWG. NO.	R.C.PIPE CLASS III 613(A) 15" L.F.	18" L.F.	24" L.F.	36" L.F.	48" L.F.	R.C.PIPE ARCH CLASS A-III 613(A) 28" X 18" L.F.	51" X 31" L.F.	CITY OF TULSA STD. DOUBLE GRATE CURB INLET WITH SMAL JCT. BOX DES. 2 EA.	DES. 2(D) EA.	DOUBLE GRATE CURB INLET WITH LARGE JCT. BOX DES. 2 EA.	ADD'L DEPTH IN INLET DES. 2 EA.	OKLAHOMA DEPARTMENT OF TRANSPORTATION STANDARDS INLET SMD 611(G) TYPE 1 EA.	ADDITIONAL DEPTH IN INLET 611(H) SMD TYPE 1 V.F.	INLET CI DES. 611(G) DES. 2 EA.	DES. 2(B) EA.	DES. 2(D) EA.	ADD'L DEPTH IN INLET CI DES. 2 611(H) DES. 2 V.F.	CULVERT END TREATMENT 613(M) A4 EA.	B4 EA.	D4 EA.	E4 EA.
1	264+60.00	30.00' LT		SMD-4-1		187										1	1								
2	263+50.00	17.00' RT	761			106							1		2										
3	264+60.00	17.10' RT	761			44						1			1										
4	266+50.00	19.00' RT		CI-2-1		34													1		4				
5	266+50.00	19.00' LT	761				216					1			7										
A	268+70.00	40.00' RT		CET4S-4-1				20																1	
7	268+70.00	20.00' LT		CI-2-1					20									1			4				
8	268+70.00	20.00' RT		CI-2-1							36			1	3										
B	268+70.00	44.70' LT		CET4S-4-1																					1
10	269+84.00	63.00' RT		CI-2-1	5															1	1				
11	270+48.00	65.50' RT		CI-2-1		20														1	4				
12	270+63.60	47.00' RT		SMD-4-1						103						1	2								
C	270+62.70	58.29' LT		CET4S-4-1																			1		
14	273+75.00	20.00' RT		CI-2-1		9													1		1				
16	274+75.00	30.50' RT		SMD-4-1		130										1	2								
17	275+50.00	20.00' LT	761				64					1			2										
18	275+50.00	20.00' RT	761				37					1			2										
19	275+07.00	31.00' RT		SMD-4-1		40										1									
D	276+16.70	24.86' LT		CET4S-4-1																			1		
E	276+16.00	28.53' RT		CET4S-4-1		50																1			
F	276+63.00	28.49' RT		CET4S-4-1																		1			
				TOTALS =	5	620	317	20	20	103	36	4	1	1	17	4	5	1	2	2	14	2	3	1	1

DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

SUMMARY SHEET (ROADWAY)

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 5

49TH W. AVE. & SH 117

Thursday, September 22, 2022 3:24:33 PM
V:\19-1236E - 49th W Ave & SH-117, City Of Sapulpa\CIV3D\PLANS\1236-PQ ROADWAY.dwg

REVISIONS		
NO.	DESCRIPTION	DATE

GENERAL CONSTRUCTION NOTES

SYMBOLS AND LEGENDS ARE DIAGRAMMATIC ONLY AND LOCATIONS SHALL BE ADJUSTED FOR EXISTING FIELD CONDITIONS, BUT NO MAJOR ALTERATIONS OR RELOCATIONS WILL BE MADE WITHOUT FIRST CONSULTING WITH THE TRAFFIC ENGINEERING DIVISION AT (405)521-2861.

ALL BROKEN CONCRETE, WASTE MATERIAL, AND DEBRIS SHALL BECOME THE PROPERTY OF THE CONTRACTOR, AND SHALL BE REMOVED FROM THE LIMITS OF THE PROJECT AND DISPOSED OF IN AN AREA APPROVED BY THE ENGINEER. NO PAYMENT WILL BE MADE FOR THE DISPOSAL OF THIS MATERIAL.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE HE MAY INFLICT TO THE EXISTING UNDERGROUND UTILITIES WITHIN THE PROJECT AREA AS A RESULT OF HIS DIGGING, TRENCHING, BORING, ETC.... PRIOR TO DIGGING NEAR THE UTILITIES, THE CONTRACTOR SHALL CALL FOR A LIST OF ALL UNDERGROUND FACILITIES REGISTERED IN THE AREA OF CONSTRUCTION LISTED WITH THE FOLLOWING AGENCIES:
THE "OKIE" NOTIFICATION CENTER 811 OR (405)522-6543 OR WWW.CALLOKIE.COM OR THE LOCAL COUNTY CLERK'S OFFICE.

PAY QUANTITY NOTES

(1) POLYMER CONCRETE PULL BOXES SHALL BE USED.

(2) THE LUMINAIRES TO BE INSTALLED ON THIS PROJECT SHALL BE LED MONGOOSE FIXTURES MANUFACTURED BY HOLOPHANE, MODEL NUMBER MGLED-P4-40K-120-MR-VH-GRSD, OR AN APPROVED EQUAL.

(3) THIS PAY ITEM IS TO BRING POWER TO THE CONTROLLER CABINET FROM THE SERVICE POLE.

(4) THE CONTROLLER(S) TO BE FURNISHED ON THIS PROJECT SHALL HAVE A NATURAL ALUMINUM FINISH AND BE VEHICLE ACTUATED SOLID STATE DIGITAL CONTROLLER(S) WITH VOLUME DENSITY FEATURES. THE CONTRACTOR SHALL FURNISH THE CONTROLLER(S) AND MOUNTING FRAMES AS FOLLOWS:

INTERSECTION	TYPE	CONFLICT & USER FLASH
SH 117 & S. 49TH W. AVE.	8 PHASE	ALL RED

THE CONTROLLER(S) WITH 2P - 4P CAPABILITY SHALL BE FURNISHED WITH 8 LOAD RECEPTACLE BAYS. CONTROLLER(S) WITH 5P - 8P CAPABILITY SHALL BE FURNISHED WITH 16 LOAD SWITCH RECEPTACLE BAYS. ALL CORRESPONDING RECEPTACLE WIRING IN THE CABINET AND FIELD WIRING SHALL BE INSTALLED FOR THE CONTROLLER AS REQUIRED EXCEPT FOR ADDITIONAL DETECTOR CONNECTING CABLES WHEN THE CONTROLLER IS EXPANDED. THE CONTROLLER(S) SHALL BE CAPABLE OF PERFORMING AS SHOWN ON PHASE & SEQUENCE DIAGRAMS. PEDESTRIAN ISOLATION SHALL BE PROVIDED IN THE CONTROLLER CABINET. ALL N.E.M.A. FUNCTIONS SHALL TERMINATE IN THE CONTROLLER CABINET.

CABINET SHALL HAVE A 120V RECEPTACLE INSTALLED INSIDE OF THE CABINET IN ADDITION TO OR IN LIEU OF A RECEPTACLE INSTALLED ON THE DOOR. ALSO, ALL CABINETS THAT ARE TO BE INSTALLED IN A SIGNAL INTERCONNECT SYSTEM SHALL HAVE A PULL- OUT COMPUTER SHELF AND DRAWER INSTALLED FOR LAPTOP USE AT THE CONTROLLER CABINET.

(5) THE CONTROLLER TO BE USED ON THIS PROJECT SHALL BE ECONOLITE COBALT IN ORDER TO BE COMPATIBLE WITH THE CONTROLLER CURRENTLY IN USE BY THE CITY.

(6) CONTROLLERS SHALL BE EQUIPPED WITH CONTINUOUS POWER UNIT. THIS UNIT SHALL PROVIDE 400 WATTS OF CONTINUOUS POWER FOR A MINIMUM OF 8 HOURS. THIS UNIT SHALL ALSO INCLUDE BATTERIES, CABINET, WIRING AND PAD IF NECESSARY. THIS POWER UNIT SHALL INCLUDE AN INTERCHANGEABLE HARD DISK THAT IS CAPABLE OF STORING AND RETRIEVING ALL ACTIVITY DATA, SUCH AS TIME, DATE, AND DURATION OF EVENTS. ALSO THE SURGE PROTECTORS TO BE SUPPLIED ON THIS PROJECT FOR THE TRAFFIC SIGNALS SHALL BE INNOVATIVE TECHNOLOGY, INC. SURGE PROTECTORS, MODEL NO. HS-P-SP-120A-60A-RJ, OR APPROVED EQUAL.

(7) THE INSTALLED SERVICE SHALL BE FULLY OPERATIONAL AND ANY COSTS CHARGED BY THE UTILITY COMPANY FOR THE SERVICE INSTALLATION SHALL BE PAID BY THE CONTRACTOR AND IS INCLUDED IN THIS PAY ITEM.

(9) RED, YELLOW AND GREEN LED TRAFFIC SIGNAL HEADS SHALL BE FURNISHED AND INSTALLED ON THIS PROJECT. THE LED TRAFFIC MODULES, LENSES, AND ALL ASSOCIATED MATERIAL AND EQUIPMENT SHALL CONFORM TO I.T.E. VEHICLE TRAFFIC CONTROL SIGNAL HEAD (VTCSH) STANDARDS IN EFFECT AT THE TIME THAT THE ORDER IS PLACED. LED HEADS SHALL BE CAPABLE OF OPERATING WITHOUT A REFLECTOR.

THE LED SIGNALS SHALL HAVE AN INCANDESCENT LOOK.

(17) REFLECTIVE SHEETING SHALL BE EITHER 3M BRAND DG3 (SERIES 4000) SHEETING OR AN ASTM CLASS XI APPROVED EQUAL.

(18) BACKPLATES FURNISHED SHALL BE BLACK, ALUMINUM, LOUVERED, AND WITH A 2" REFLECTIVE TAPE BORDER.

(20) THIS PROJECT INVOLVES THE INSTALLATION OF A RADAR VEHICLE DETECTION SYSTEM. THEREFORE, THE CONTRACTOR SHALL FURNISH AND INSTALL THE FOLLOWING:

THE STOP LINE DETECTION SHALL BE PROVIDED WITH 'WAVETRONIX SMARTSENSOR MATRIX AND THE ADVANCE DETECTION SHALL BE PROVIDED WITH WAVETRONIX SMARTSENSOR ADVANCE RADAR DEVICES.

THE INSTALLATION SHALL INCLUDE MOUNTING HARDWARE, CABLES, CABINET INTERFACE EQUIPMENT, AND ALL OTHER ITEMS REQUIRED TO FURNISH A FULLY OPERATIONAL SYSTEM. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ALL SETUP, SENSOR SETTINGS, AND CONFIGURATION OF THE SENSORS TO THE INTERSECTION, INCLUDING VERIFICATION AND TESTING.

PAY QUANTITIES

0300 TRAFFIC

ITEM	DESCRIPTION	UNIT	TOTAL
802(B) 0308	1" PVC SCH. 40 PLASTIC CONDUIT TRENCHED	LF	25
802(B) 0324	2" PVC SCH. 40 PLASTIC CONDUIT TRENCHED	LF	40
802(B) 0332	3" PVC SCH. 40 PLASTIC CONDUIT TRENCHED	LF	30
802(C) 0435	3" HIGH DENSITY PE PIPE - BORED	LF	265
803(A) 1210	PULL BOX (SIZE I) (1)	EA	3
803(A) 1220	PULL BOX (SIZE II) (1)	EA	1
804(A) 2200	STRUCTURAL CONCRETE (TP-1)	CY	18.4
804(B) 2300	REINFORCING STEEL (TP-1)	LB	2790
805(A) 3252	(PL)REMOVAL OF EXISTING SIGNS (TR-27)	EA	6
806(A) 4252	32' MH POLE 40' TS & 10' LMA (G.STL.)	EA	2
806(A) 4316	POLE & 30' TS MST. ARM (G.STL.)	EA	2
809(A) 7200	ROADWAY LUMINAIRE (2)	EA	2
810(A) 8200	SERVICE POLE (TL-35)(7)	EA	1
811 9120	1/C NO.6 ELECT.COND. (TP-1)(3)	LF	200
811 9130	1/C NO.10 ELECT.COND. (TP-1)	LF	640
825 8100	TRAFFIC SIGNAL CONTROLLER ASSEMBLY (4,5,6,27,28)	EA	1
831 3120	1WAY 3SEC. ADJ. SIG. HD. S-6 (KS-1)(9)	EA	8
831 3144	1WAY 4SEC. ADJ. SIG. HD. S-13 (KS-1)(9)	EA	4
833 5100	BACKPLATE (18)	EA	12
834(A) 6205	5/C TRAFFIC SIGNAL ELECTRICAL CABLE (TP-1)	LF	340
834(A) 6210	7/C TRAFFIC SIGNAL ELECTRICAL CABLE (TP-1)	LF	240
834(A) 6235	21/C TRAFFIC SIGNAL ELECTRICAL CABLE (TP-1)	LF	495
850(C) 1400	MAST ARM MOUNTED SIGNS (ALUM.) (17)	SF	74.0
890 1100	(PL)TRAFFIC ITEMS (20)	LSUM	1

(27) THE CONFLICT MONITOR INSTALLED ON THIS PROJECT SHALL HAVE AN LCD DISPLAY.

(28) THE CONTROLLER CABINET SHALL BE MOUNTED ON AN 18" ALUMINUM RISER. THE COST OF THE RISER SHALL BE INCLUDED IN THE PRICE BID FOR THIS ITEM AND SHALL INCLUDE ALL EQUIPMENT AND LABOR NECESSARY FOR PROPER INSTALLATION.

(TR-27) ALL SIGNS REMOVED SHALL BECOME THE PROPERTY OF THE CITY. THE CONTRACTOR SHALL NEATLY STACK SUCH REMOVED MATERIAL AT A LOCATION ON THE JOB SITE AS DIRECTED BY THE ENGINEER. THE PRICE BID SHALL INCLUDE THE REMOVAL OF ALL FOOTINGS BELOW GROUND LEVEL OR AS DIRECTED BY THE ENGINEER. FOOTINGS TO BECOME THE PROPERTY OF THE CONTRACTOR.

(KS-1) TRAFFIC SIGNAL HEAD FACES ARE TO BE EITHER TURNED AWAY FROM APPROACHING TRAFFIC OR COMPLETELY COVERED IN A MANNER APPROVED BY THE TRAFFIC ENGINEER FROM THE TIME THEY ARE INSTALLED UNTIL PLACED IN FLASHING OR FULL OPERATION. COVERING THE LENSES ONLY IS NOT ACCEPTABLE. PLASTIC GARBAGE BAGS, DUCT TAPE, GUNNY SACKS AND SIMILAR METHODS WILL NOT BE ACCEPTED.

(TL-35) FOR ADDITIONAL INFORMATION CONCERNING THE SERVICE POLE, CONTACT THE FOLLOWING PRIOR TO INSTALLATION:
OKLAHOMA GAS & ELECTRIC

(TP-1) PAYMENT FOR THIS ITEM WILL BE BASED ON PLAN QUANTITY. SEE THE 2019 SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

JON H. ESHELMAN, P.E. # 10253
C.A. # 1160, RENEWAL 06-30-23
5/27/22
DATE
Traffic Engineering Consultants, Inc.
6931 S. 66th E. Ave., Suite 100 - Tulsa, OK 74133,
Ph: 918-481-8484, Web: www.tecusa.com

REGISTERED PROFESSIONAL ENGINEER JON H. ESHELMAN 10253 OKLAHOMA

Design	JHE	6/23/2022
Drawn	TCC	6/23/2022

TEC A CLEAR DIRECTION

SIGNAL PAY QUANTITIES & NOTES
S.H. 117 & S. 49th W. AVE.

Project No. _____ Sheet No. 6

CREEK COUNTY

6/23/2022 G:\10Projects\10-929 SH-117 & 49th W. Ave. Traffic Signal - Sapulpa\CAD\ATD\10-QUANT.dgn

TRAFFIC PAY NOTES

(TC-26) ALL CONSTRUCTION TRAFFIC CONTROL WILL BE IMPLEMENTED ACCORDING TO CONSTRUCTION PLANS, AND INSTALLED IN A MANNER APPROVED BY THE ENGINEER, IN ACCORDANCE WITH CHAPTER VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, (CURRENT EDITION), AND COMPLIANT WITH APPLICABLE O.D.O.T STANDARD DRAWINGS. PRICE BID FOR THIS ITEM SHALL BE PAYMENT IN FULL FOR THE INSTALLATION, MAINTENANCE AND SUBSEQUENT REMOVAL OF ALL NECESSARY CONSTRUCTION TRAFFIC CONTROL DEVICES REQUIRED FOR COMPLETION OF THE PROJECT.

ALL SIGNS AND BARRICADES WHICH ARE SHOWN WITH TYPE 'A' LIGHTS IN THE STANDARD DRAWINGS SHALL HAVE THE CORRESPONDING LIGHT ATTACHED DURING NON-DAYLIGHT HOURS.

(TC-33) ALL CONSTRUCTION WORK ZONE SIGNS SHALL HAVE FLUORESCENT SHEETING. THE FLUORESCENT SHEETING SHALL MEET THE REQUIREMENTS OF ASTM D4956 (LATEST REVISION)

THE MANUFACTURER SHALL FURNISH A TYPE 'D' CERTIFICATION IN ACCORDANCE WITH O.D.O.T STANDARD SPECIFICATIONS (CURRENT EDITION) SUBSECTION 106.04. THE CERTIFICATION SHALL INCLUDE TEST RESULTS ON MATERIAL SUBMITTED FOR APPROVAL.

(TC-84) 100 CONSTRUCTION CALENDAR DAYS WERE USED TO COMPUTE THE SIGN DAY PAY ITEMS. THE AMOUNT OF CALENDAR DAYS USED TO COMPUTE THE SIGN DAY PAY ITEMS IS AN ESTIMATED QUANTITY ONLY, BASED ON THE CURRENT O.D.O.T. STANDARDS AND SUGGESTED CONSTRUCTION SEQUENCE FOR THE PROJECT. THESE ESTIMATED SIGN DAY QUANTITIES MAY CHANGE AS THE PROJECT'S CONSTRUCTION TRAFFIC CONTROL IS MODIFIED DURING CONSTRUCTION.

(TS-24) QUANTITY INCLUDES 753 L.F. TRAFFIC STRIPE (MULTI-POLYMER)(WHITE) AND 44347 L.F. TRAFFIC STRIPE(MULTI-POLYMER)(YELLOW) AND WILL BE MEASURED BY THE LINEAR FOOT OF FOUR INCH (4") WIDE TRAFFIC STRIPE.

(TS-26) QUANTITY INCLUDES 82 L.F. TRAFFIC STRIPE (MULTI-POLYMER)(WHITE) AND 368 L.F. TRAFFIC STRIPE(MULTI-POLYMER)(YELLOW) AND WILL BE MEASURED BY THE LINEAR FOOT OF EIGHT INCH (8") WIDE TRAFFIC STRIPE.

(TS-28) QUANTITY INCLUDES 156 L.F. TRAFFIC STRIPE (MULTI-POLYMER)(WHITE) AND WILL BE MEASURED BY THE LINEAR FOOT OF TWENTY-FOUR INCH (24") WIDE TRAFFIC STRIPE.

(TS-41) "REMOVAL OF EXISTING SIGNS" SHALL INCLUDE THE REMOVAL OF A COMPLETE SIGN ASSEMBLY WHICH MAY INCLUDE MULTIPLE SIGNS, POSTS, FOOTINGS, AND ANY FOOTINGS ADJACENT TO THE SIGN ASSEMBLY. WHEN APPROVED BY THE ENGINEER, FOOTINGS MAY BE OBLITERATED TO A POINT BELOW GROUND LEVEL IN LIEU OF BEING COMPLETELY REMOVED.

(1) FIVE (5) CHANGEABLE MESSAGE SIGNS ARE TO BE USED FOR SEVEN (7) DAYS PRIOR TO CONSTRUCTION TO ADVISE DRIVERS OF UPCOMING CONSTRUCTION AND ROAD CLOSURES. SEE "CHANGEABLE SIGN LAYOUT", NEXT SHEET.

CITY OF SAPULPA

PAY QUANTITIES

0300 TRAFFIC ITEMS

ITEM		DESCRIPTION	PAY NOTES	UNIT	QUANTITY
805(A)	3252	(PL)REMOVAL OF EXISTING SIGNS	TS-41	EA.	11
850(A)	1200	SHEET ALUMINUM SIGNS		S.F.	51
851(C)	2405	1 1/2" SQUARE TUBE POST		L.F.	4
851(C)	2410	1 3/4" SQUARE TUBE POST		L.F.	100
851(C)	2430	2 1/2" SQUARE TUBE POST		L.F.	30
856(A)	8200	TRAFFIC STRIPE (MULTI-POLY.) (4" WIDE)	TS-24	L.F.	5,100
856(A)	8208	TRAFFIC STRIPE (MULTI-POLY.) (8" WIDE)	TS-26	L.F.	450
856(A)	8216	TRAFFIC STRIPE (MULTI-POLY.) (24" WIDE)	TS-28	L.F.	156
856(B)	8304	TRAFFIC STRIPE (MULTI-POLY.) (ARROWS)		EA.	8
880(B)	6300	CONSTRUCTION SIGNS 0 TO 6.25 SF	TC-26,33,84	S.D.	1,800
880(B)	6310	CONSRTUCTION SIGNS 6.26 SF TO 15.99 SF	TC-26,33,84	S.D.	405
880(B)	6320	CONSTRUCTION SIGNS 16.0 SF TO 32.99 SF	TC-26,33,84	S.D.	225
880(C)	6405	CONSTRUCTION BARRICADES (TYPE II)		S.D.	50
880(C)	6510	CONSTRUCTION BARRICADES (TYPE III)		S.D.	450
880(E)	6600	WARNING LIGHTS (TYPE A)		S.D.	950
880(F)	6700	DRUMS			1,350
880(G)	6805	CHANNELIZER CONES			1,350
882(A)	8210	PORT. CHANGEABLE MESSAGE SIGN	1	S.D.	50

DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

SUMMARY OF PAY QUANTITIES AND PAY NOTES (TRAFFIC)

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 7

49TH W. AVE. & SH 117

SIGN SUMMARY

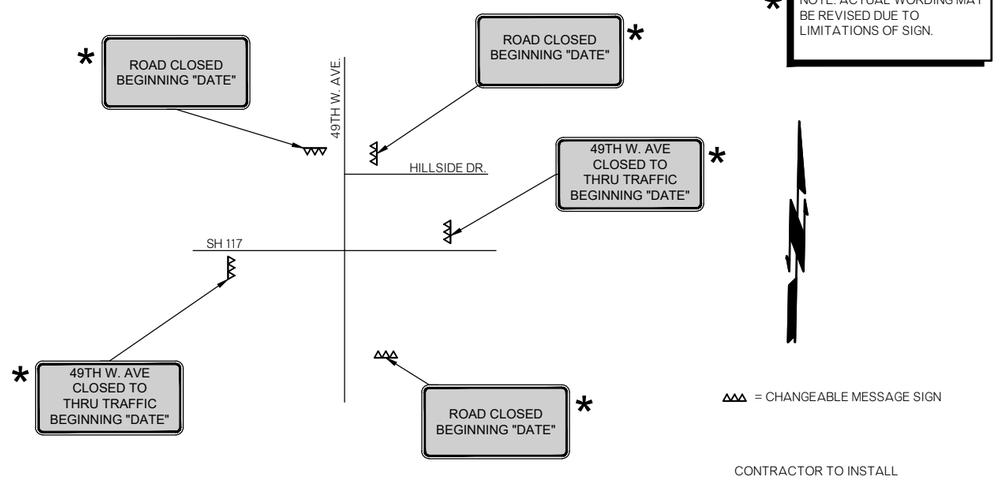
SIGN NO.	APPROX CRL STATION	OFFSET LOCATION	DESCRIPTION	SIGN	(PL) REMOVAL OF EXISITNG SIGNS 805(A)	SHEET ALUMINUM SIGNS 850(A)	1 1/2" SQUARE TUBE POST 851(C)	1 3/4" SQUARE TUBE POST 851(C)	2" SQUARE TUBE POST 851(C)
					EA.	S.F.	L.F.	L.F.	L.F.
1	263+00.00	24' RT.	SPEED LIMIT - 30	R2-1		5.00		10	3
2	263+00.00	19' LT.	SPEED LIMIT - 40	R2-1		5.00		10	3
3	264+84.50	19' RT.	STOP AHEAD	W3-1	1				
4	268+94.00	40' RT.	NO THRU TRAFFIC	CUSTOM SIGN	1	6.25		10	3
5	269+33.35	18' LT.	WEIGHT LIMIT 12 TONS	R12-1	1	5.00		10	3
6	269+69.97	28' RT.	STOP SIGN	R1-1	1			10	3
7	270+72.77	11' LT.	STOP SIGN	R1-1	1				
8	272+45.00	26' RT.	SPEED LIMIT - 30	R2-1	1	5.00		10	3
9	273+87.52	15' LT.	STOP AHEAD	W3-1	1				
10	274+38.93	36' RT.	STREET SIGN	D3-1	1				
11	274+45.00	36' RT.	STOP SIGN	R1-1	1	6.25		10	3
12	274+45.00	36' RT.	STREET NAME (49TH W. AVE.)	D3-1		1.50	2		
13	274+45.00	36' RT.	STREET NAME (HILLSIDE DR.)	D3-1		1.50	2		
14	277+23.00	25' RT.	WEIGHT LIMIT 11 TONS	R12-1	1	5.00		10	3
15	277+95.00	22' RT.	SPEED LIMIT - 40	R2-1		5.00		10	3
16	277+95.00	17' LT.	SPEED LIMIT - 30	R2-1	1	5.00		10	3
				TOTALS =	11	50.50	4	100	30

SUMMARY OF PAVEMENT MARKINGS (PERMANENT)

STATION EXTENTS	TRAFFIC STRIPE (MULTI-POLY.) (4" WIDE) WHITE 856(A)	TRAFFIC STRIPE (MULTI-POLY.) (4" WIDE) YELLOW 856(A)	TRAFFIC STRIPE (MULTI-POLY.) (8" WIDE) WHITE 856(A)	TRAFFIC STRIPE (MULTI-POLY.) (8" WIDE) YELLOW 856(A)	TRAFFIC STRIPE (MULTI-POLY.) (24" WIDE) WHITE 856(A)	TRAFFIC STRIPE (MULTI-POLY.) (ARROWS) 856(B)
	L.F.	L.F.	L.F.	L.F.	L.F.	EA.
262+85.00 TO 264+50.00	330	590	52	26	0	0
264+50.00 TO 269+79.00	215	1,589	30	138	33	3
269+79.00 TO 273+53.00	0	0	0	0	90	0
273+53.00 TO 277+00.00	208	1,812	0	184	33	5
277+00.00 TO 278+00.00	0	356	0	20	0	0
TOTALS =	753	4,347	82	368	156	8

CONSTRUCTION SIGN SUMMARY

PHASE	CONSTRUCTION TIME	CONSTRUCTION SIGNS 0 TO 6.25 SF 880(B)		CONSTRUCTION SIGNS 6.26 SF TO 15.99 SF 880(B)		CONSTRUCTION SIGNS 16.0 SF TO 32.99 SF 880(B)		TYPE II BARRICADES 880(C)		TYPE III BARRICADES 880(C)		WARNING LIGHTS (TYPE A) 880(E)		DRUMS 880(F)		CHANNELIZER CONES 880(G)		PORT. CHANGEABLE MESSAGE SIGN 882(A)
	DAYS	EA.	S.D.	EA.	S.D.	EA.	S.D.	EA.	S.D.	EA.	S.D.	EA.	S.D.	EA.	S.D.	EA.	S.D.	S.D.
PRECONSTRUCTION	10	0	0	0	0	0	0	5	50	0	0	5	50	0	0	0	0	50
PHASE 1 - NORTH	45	0	0	4	180	0	0	0	0	5	225	10	450	15	675	15	675	0
PHASE 2 - SOUTH	45	40	1,800	5	225	5	225	0	0	5	225	10	450	15	675	15	675	0
TOTALS =	100	40	1,800	9	405	5	225	5	50	10	450	25	950	30	1,350	30	1,350	50



* NOTE: ACTUAL WORDING MAY BE REVISED DUE TO LIMITATIONS OF SIGN.

CONTRACTOR TO INSTALL CHANGEABLE MESSAGE SIGNS AS DIRECTED BY CITY

ADVANCE WARNING LAYOUT

NOT TO SCALE

DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

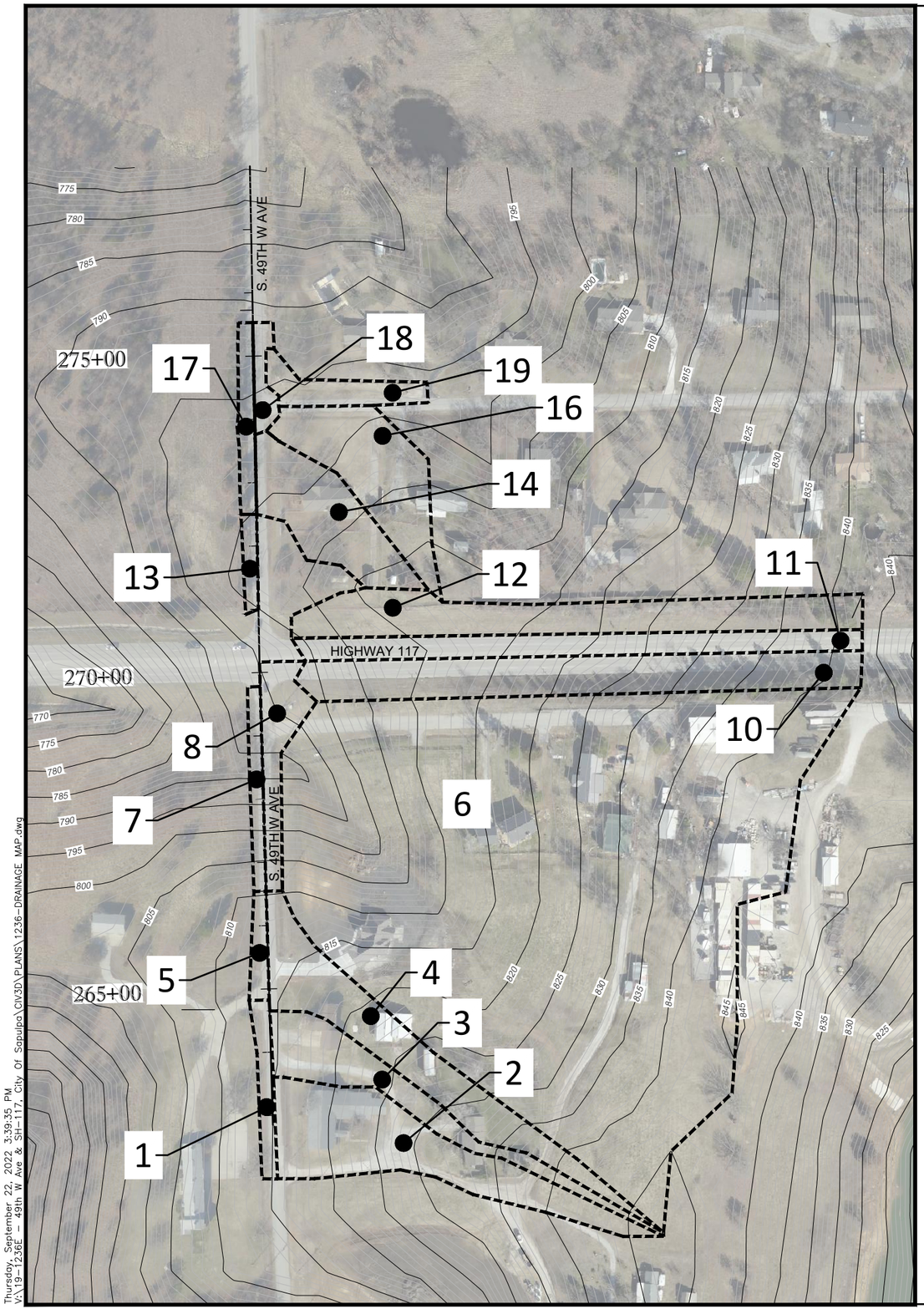
CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

SUMMARY SHEET (TRAFFIC)

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 8

49TH W. AVE. & SH 117

Thursday, September 22, 2022 3:24:58 PM
V:\19-1236E - 49th W Ave & SH-117, City Of Sapulpa\CIV3D\PLANS\1236-PQ TRAFFIC.dwg



Thursday, September 22, 2022 3:39:35 PM
V:\19-12.36E - 49th W Ave & SH-117, City Of Sapulpa\CIVIL\3D\PLANS\12.36-DRAINAGE MAP.dwg

PROPOSED INLET HYDRAULIC ANALYSIS

STR NO.	SUMP/ GRADE	DESIGN	NUMBER OF GRATES	NUMBER OF ADD'L THROATS	TOP OF CURB	TOP OF GRATE	FLOWLINE	INNER STR HEIGHT	LONGITUDINAL SLOPE AT INLET	CROSS SLOPE AT INLET	CLOGGING FACTOR	Q_{100}	SPREAD AT INLET	DEPTH AT INLET	$Q_{INTERCEPT}$	BYPASS	BYPASS TO STR NO.
					ELEV	ELEV	ELEV	VF	%	%		CFS	FT	FT	CFS	CFS	
1	SUMP	SMD	1	0		814.80	811.34	3.46	SUMP		0.0	1.11		0.20	1.11	0.00	-
2	ON GRADE	INLET CI DES. 2(D)	2	4	819.14	818.60	814.15	4.45	1.60%	2.00%	1.0	7.80	12.1	0.25	5.37	2.43	3
3	ON GRADE	INLET CI DES. 2(STD)	2	0	816.68	816.14	812.03	4.11	3.60%	2.00%	1.0	3.20	10.6	0.22	4.18	1.45	4
4	ON GRADE	INLET CI DES. 2(B)	2	2	805.81	805.27	798.80	6.47	7.50%	2.00%	1.0	6.70	10.2	0.21	6.41	1.75	8
5	ON GRADE	INLET CI DES. 2(STD)	2	0	805.81	805.27	795.95	9.32	7.50%	2.00%	1.0	0.83	4.5	0.09	0.83	0.00	-
7	SUMP	INLET CI DES. 2(STD)	2	0	796.29	795.75	789.20	6.55	SUMP		0.7	1.57	1.11	0.02	4.00	0.00	-
8	SUMP	INLET CI DES. 2(STD)	2	0	796.29	795.75	790.38	5.37	SUMP		0.7	3.17	4.10	0.09	4.92	0.00	-
12	SUMP	SMD	1	0		797.82	793.26	4.56	SUMP		0.0	3.14		0.50	3.14	0.00	OFFSITE
14	ON GRADE	INLET CI DES. 2(B)	2	2	798.44	797.90	794.90	3.00	4.50%	2.00%	1.0	3.94	8.4	0.26	3.06	0.88	18
16	SUMP	SMD	1	0		797.17	793.45	3.72	SUMP		0.0	5.00		0.50	5.00	0.00	-
17	ON GRADE	INLET CI DES. 2(STD)	2	0	790.75	790.21	785.88	4.34	5.20%	2.00%	1.0	1.90	6.6	0.21	1.72	0.19	20
18	ON GRADE	INLET CI DES. 2(STD)	2	0	790.75	790.21	786.01	4.21	5.20%	2.00%	1.0	1.16	6.8	0.21	1.80	0.24	OFFSITE
19	SUMP	SMD	1	0		791.33	788.51	2.82	SUMP		0.0	1.47		0.40	1.47	0.00	-

PROPOSED PIPE ANALYSIS TABLE

START NODE STR NO.	END NODE STR NO.	DIA	LENGTH	SLOPE	INV UP	INV DN	T/R UP/ T/G UP	T/R DN/ T/G DN	HGL UP	HGL DN	EGL UP	EGL DN	Q_{100}	$Q_{CAPACITY}$	VELOCITY
		INCH	LF	%	ELEV	ELEV	ELEV	ELEV	ELEV	ELEV	ELEV	ELEV	CFS	CFS	FPS
1	5	18" RCP	187.00	4.96%	811.34	802.07	814.80	805.27	813.89	804.62	815.76	806.49	10.66	23.38	10.98
2	3	18" RCP	106.00	2.00%	814.15	812.03	818.60	816.14	816.00	813.88	817.33	815.21	5.37	14.85	9.24
3	1	18" RCP	44.00	1.57%	812.03	811.34	816.14	814.80	814.58	813.89	815.62	814.93	9.55	13.15	8.19
4	5	18" RCP	34.00	2.50%	798.80	797.95	805.27	805.27	800.21	799.36	801.35	800.50	6.41	16.60	8.55
5	7	24" RCP	216.00	2.20%	795.95	791.20	805.27	795.75	798.57	793.82	800.43	795.68	17.90	33.51	10.93
A	8	36" RCP	20.00	2.40%	791.48	791.00		795.75	796.88	796.40	800.39	799.91	67.52	103.18	15.03
7	B	48" RCP	20.00	0.50%	789.20	789.10	795.75		794.00	793.90	795.29	795.19	94.34	101.54	9.13
8	7	51"X31" ARCH	36.00	0.50%	790.38	790.20	795.75	795.75	795.70	795.52	800.15	799.97	72.44	71.13	16.94
11	12	18" RCP	20.00	0.50%	793.36	793.26	799.83	797.82	795.53	795.43	795.85	795.75	5.49	5.49	4.54
12	C	28"X18" ARCH	103.00	0.52%	793.26	792.72	797.82	OFFSITE	795.86	795.32	796.57	796.03	3.14	3.14	6.76
14	16	18" RCP	9.00	5.00%	794.90	794.45	797.90	797.92	795.87	795.42	797.37	796.92	3.06	23.48	9.83
16	19	18" RCP	130.00	3.80%	793.45	788.51	797.17	797.90	795.25	790.31	797.21	792.27	8.06	20.47	11.24
17	D	24" RCP	64.00	0.35%	785.88	785.65	790.21		787.98	787.75	788.34	788.12	13.05	13.37	4.85
18	17	24" RCP	37.00	0.35%	786.01	785.88	790.21	790.21	787.83	787.70	788.16	788.03	11.33	13.37	4.60
19	18	18" RCP	40.00	3.00%	788.51	787.31	791.33	797.17	790.61	789.41	792.25	791.05	9.53	18.19	10.29

HYDROLOGIC SUMMARY

AREA LABEL	AREA (ACRES)	C	OVERLAND TRAVEL LENGTH (FT)	OVERLAND TRAVEL SLOPE (FT/FT)	OVERLAND TRAVEL VEL. (FPS)	OVERLAND TRAVEL T_o (MIN)	CHANNELIZED TRAVEL LENGTH (FT)	CHANNELIZED TRAVEL SLOPE (FT/FT)	CHANNELIZED TRAVEL VEL. (FPS)	CHANNELIZED TRAVEL T_t (MIN)	TOTAL T_c (MIN)	I (IN/HR)	Q_{100} (CFS)
1	0.16	0.56	21	0.08	5.65	0.06	262	0.02	2.60	1.68	1.74	12.20	1.11
2	1.15	0.61	92	0.03	3.42	0.45	631	0.04	3.23	3.26	3.71	11.14	7.80
3	0.63	0.46	91	0.03	2.84	0.54	655	0.04	3.32	3.29	3.82	11.10	3.20
4	1.04	0.58	90	0.03	2.81	0.53	761	0.05	3.63	3.49	4.02	11.00	6.70
5	0.08	0.80	19	0.06	5.00	0.06	118	0.04	4.15	0.47	0.54	12.95	0.83
6	10.93	0.54	135	0.03	3.56	0.63	851	0.06	4.05	3.50	4.13	10.96	65.08
7	0.17	0.72	19	0.01	1.54	0.21	217	0.09	6.08	0.59	0.80	12.75	1.57
8	0.35	0.72	53	0.06	4.78	0.18	134	0.02	2.80	0.80	0.98	12.69	3.17
9	0.63	0.72	21	0.01	2.13	0.16	429	0.05	4.34	1.65	1.81	12.14	5.51
10	1.24	0.72	33	0.01	2.40	0.23	877	0.05	4.44	3.29	3.52	11.24	10.04 ☆
11	0.71	0.95	33	0.01	2.03	0.27	866	0.05	4.47	3.23	3.50	11.24	7.66 ☆
12	1.15	0.25	41	0.04	3.06	0.22	874	0.05	3.61	4.04	4.26	10.91	3.14
13	0.08	0.88	20	0.02	2.87	0.12	154	0.02	2.64	0.97	1.09	12.62	0.88
14	0.70	0.48	130	0.04	1.99	1.09	265	0.04	3.11	1.42	2.51	11.75	3.94
16	0.78	0.53	48	0.02	2.33	0.34	373	0.04	3.24	1.92	2.26	11.91	5.00
17	0.18	0.88	20	0.02	2.87	0.12	300	0.03	3.63	1.38	1.49	12.38	1.90
18	0.11	0.80	21	0.02	3.20	0.11	165	0.05	4.36	0.63	0.74	12.82	1.16
19	0.25	0.48	43	0.01	1.28	0.56	256	0.03	2.57	1.66	2.22	11.91	1.47

GRAPHIC SCALE
(HORIZ.)
1 inch = 100' ft.
100' 0 100' 200'

LEGEND
1 DRAINAGE AREA DESIGNATION
DRAINAGE AREA BOUNDARY

☆ DRAINAGE AREA IS SERVED BY AN EXISTING STORM SEWER ALONG THE HIGHWAY, UPSTREAM OF THE EXISTING INLET. THE EXISTING INLET IS TO BE REPLACED WITH A SIMILAR SIZE INLET.

ODOT CURB OPENING IN CONCRETE CURB.

DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

DRAINAGE AREA MAP

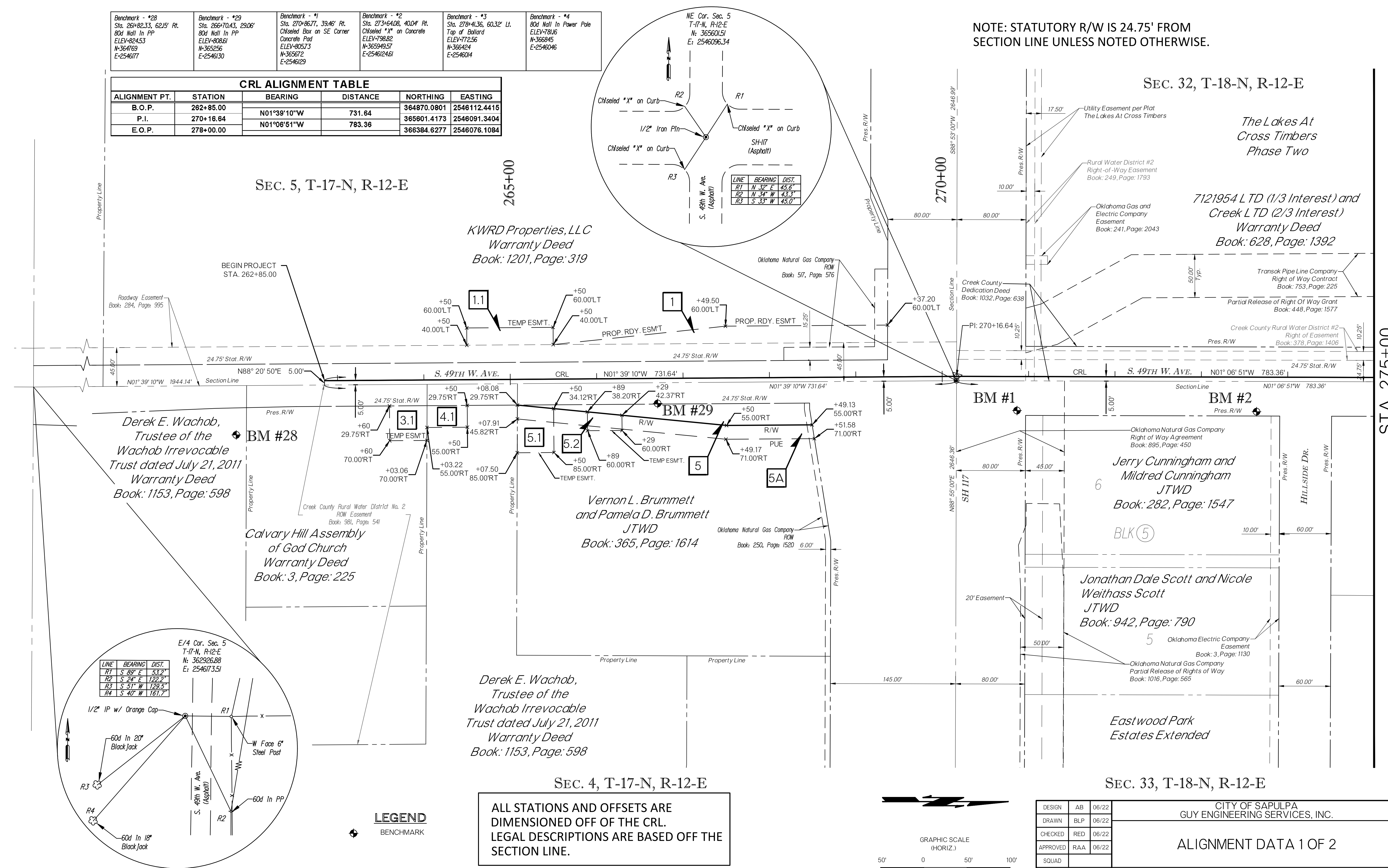
COUNTY CREEK HWY./RD. 49TH W. AVE. COUNTY JOB NO. _____ SHEET NO. 9

Benchmark - #28 Sta. 261+82.33, 62.15' Rt. 80d Nail In PP ELEV=824.53 N=364769 E=2546177	Benchmark - #29 Sta. 266+70.43, 29.06' 80d Nail In PP ELEV=808.61 N=365256 E=2546130	Benchmark - #1 Sta. 270+86.77, 39.46' Rt. Chiseled Box on SE Corner Concrete Pad ELEV=805.73 N=365672 E=2546129	Benchmark - #2 Sta. 273+64.08, 40.04' Rt. Chiseled "X" on Concrete ELEV=798.82 N=365949.57 E=2546124.61	Benchmark - #3 Sta. 278+41.36, 60.32' Lt. Top of Bollard ELEV=772.56 N=366424 E=2546014	Benchmark - #4 80d Nail In Power Pole ELEV=781.16 N=366845 E=2546046

CRL ALIGNMENT TABLE

ALIGNMENT PT.	STATION	BEARING	DISTANCE	NORTHING	EASTING
B.O.P.	262+85.00			364870.0801	2546112.4415
		N01°39'10"W	731.64		
P.I.	270+16.64			365601.4173	2546091.3404
		N01°06'51"W	783.36		
E.O.P.	278+00.00			366384.6277	2546076.1084

NOTE: STATUTORY R/W IS 24.75' FROM SECTION LINE UNLESS NOTED OTHERWISE.



NE Cor. Sec. 5
T-17-N, R-12-E
N: 3656015.1
E: 2546096.34
Chiseled "X" on Curb
1/2" Iron Pin
Chiseled "X" on Curb
SH-117 (Asphalt)
S. 49th W. Ave. (Asphalt)
LINE BEARING DIST.
R1 N 32° E 45.6'
R2 N 34° W 43.3'
R3 S 33° W 45.0'
SEC. 5, T-17-N, R-12-E
SEC. 32, T-18-N, R-12-E
SEC. 4, T-17-N, R-12-E
SEC. 33, T-18-N, R-12-E
265+00
270+00
STA. 275+00
The Lakes At Cross Timbers Phase Two
KWRD Properties, LLC
Warranty Deed
Book: 1201, Page: 319
7121954 LTD (1/3 Interest) and Creek LTD (2/3 Interest)
Warranty Deed
Book: 628, Page: 1392
BEGIN PROJECT
STA. 262+85.00
Utility Easement per Plat The Lakes At Cross Timbers
Rural Water District #2 Right-of-Way Easement Book: 249, Page: 1793
Oklahoma Gas and Electric Company Easement Book: 241, Page: 2043
Oklahoma Natural Gas Company ROW Book: 517, Page: 576
Creek County Dedication Deed Book: 1032, Page: 638
Transok Pipe Line Company Right of Way Contract Book: 753, Page: 225
Partial Release of Right Of Way Grant Book: 448, Page: 1577
Creek County Rural Water District #2 Right of Easement Book: 378, Page: 1406
Roadway Easement Book: 284, Page: 995
PI: 270+16.64
TEMP ESM'T.
PROP. RDY. ESM'T
S. 49TH W. AVE.
CRL
N01° 39' 10"W 731.64'
N01° 06' 51"W 783.36'
N88° 20' 50"E 5.00'
N01° 39' 10"W 1944.14'
Section Line
24.75' Stat. R/W
BM #28
BM #29
BM #1
BM #2
Derek E. Wachob, Trustee of the Wachob Irrevocable Trust dated July 21, 2011
Warranty Deed
Book: 1153, Page: 598
Calvary Hill Assembly of God Church
Warranty Deed
Book: 3, Page: 225
Creek County Rural Water District No. 2 ROW Easement Book: 981, Page: 541
Vernon L. Brummett and Pamela D. Brummett
JTWD
Book: 365, Page: 1614
Oklahoma Natural Gas Company ROW Book: 250, Page: 1520
Jerry Cunningham and Mildred Cunningham
JTWD
Book: 282, Page: 1547
Oklahoma Natural Gas Company Right of Way Agreement Book: 895, Page: 450
BLK 5
Jonathan Dale Scott and Nicole Weithass Scott
JTWD
Book: 942, Page: 790
Oklahoma Electric Company Easement Book: 3, Page: 1130
Oklahoma Natural Gas Company Partial Release of Rights of Way Book: 1016, Page: 565
20' Easement
Eastwood Park Estates Extended
SH 117
HILLSIDE DR.
Property Line
Pres. R/W
PUE
E/4 Cor. Sec. 5
T-17-N, R-12-E
N: 362926.88
E: 2546173.51
LINE BEARING DIST.
R1 S 89° E 53.2'
R2 S 24° E 122.2'
R3 S 51° W 129.5'
R4 S 40° W 161.7'
1/2" IP w/ Orange Cap
60d In 20" Black Jack
W Face 6" Steel Post
60d In PP
60d In 18" Black Jack
S. 49th W. Ave. (Asphalt)

LEGEND

BENCHMARK

ALL STATIONS AND OFFSETS ARE DIMENSIONED OFF OF THE CRL.
LEGAL DESCRIPTIONS ARE BASED OFF THE SECTION LINE.

GRAPHIC SCALE (HORIZ.)
50' 0 50' 100'

DESIGN	AB	06/22	CITY OF SAPULPA GUY ENGINEERING SERVICES, INC.
DRAWN	BLP	06/22	
CHECKED	RED	06/22	ALIGNMENT DATA 1 OF 2
APPROVED	RAA	06/22	
SQUAD			

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. SHEET NO. 10

49TH W. AVE. & SH 117

Benchmark - #28	Benchmark - #29	Benchmark - #1	Benchmark - #2	Benchmark - #3	Benchmark - #4
Sta. 261+82.33, 62.15' Rt. 80d Nail In PP ELEV=824.53 N=364769 E=2546177	Sta. 266+70.43, 29.06' 80d Nail In PP ELEV=808.61 N=365256 E=2546130	Sta. 270+86.77, 39.46' Rt. Chiseled Box on SE Corner Concrete Pad ELEV=805.73 N=365672 E=2546129	Sta. 273+64.08, 40.04' Rt. Chiseled "X" on Concrete ELEV=798.82 N=365949.57 E=2546124.61	Sta. 278+41.36, 60.32' Lt. Top of Bollard ELEV=772.56 N=366424 E=2546014	80d Nail In Power Pole ELEV=781.16 N=366845 E=2546046

CRL ALIGNMENT TABLE					
ALIGNMENT PT.	STATION	BEARING	DISTANCE	NORTHING	EASTING
B.O.P.	262+85.00			364870.0801	2546112.4415
P.I.	270+16.64	N01°39'10"W	731.64	365601.4173	2546091.3404
E.O.P.	278+00.00	N01°06'51"W	783.36	366384.6277	2546076.1084

NOTE: STATUTORY R/W IS 24.75' FROM SECTION LINE UNLESS NOTED OTHERWISE.

STA. 275+00

SEC. 32, T-18-N, R-12-E

The Lakes At Cross Timbers Phase Two

7121954 LTD (1/3 Interest) and Creek LTD (2/3 Interest) Warranty Deed Book: 628, Page: 1392

15.00'

Utility Easement per Plat The Lakes At Cross Timbers

50.00' TYP.

Transok Pipe Line Company Right of Way Contract Book: 753, Page: 225

Partial Release of Right Of Way Grant Book: 448, Page: 1577

Creek County Dedication Deed Book: 1032, Page: 638

BM #3

END PROJECT STA. 278+00.00

Pres. R/W

N01° 06' 51"W 783.36' CRL

N88° 53' 09"E 5.00'

N01° 06' 51"W 1856.34'

10.25'

40.00'

24.75'

Creek County Rural Water District #2 Right of Easement Book: 378, Page: 1406

24.75' Stat. R/W

Section Line

BM #4

Pres. R/W

N01°06'51"W 2639.77'

Property Line

50.00' TYP.

5.00'

Pres. R/W

26

John P. & Vivian McCarthy Trust Warranty Deed Book: 739, Page: 60

BLK (1)

Sidney A. McVey and Beverly A. McVey Corrected GWD Book: 104, Page: 1482

Creek County Rural Water District No. 2 Subscription and Right-of-Way Easement Book: 10, Page: 172

20' Easement

Property Line

Eastwood Park Estates Extended

25

Jones Family Revocable Trust Dated November 10th, 2014 QCD Book: 945, Page: 611

Property Line

100.00'

Oklahoma Gas and Electric Company Easement (Approximate Location) Book: 286, Page: 118

Partial Release of Easement Book: 307, Page: 2044

10.00'

Public Utility Easement Book: 1031, Page: 466

Property Line

10.00'

SEC. 33, T-18-N, R-12-E

S88° 52' 23"W 5296.12'

Section Line

W/4 Cor. Sec. 33
T-18-N, R-12-E
N: 368240.72
E: 2546045.01

60d Nail In E Side of Power Pole

60d Nail In W Side of Power Pole

1/2" Iron Pin

R1 Mag Nail

R2

R3

R4

R5

80d Spike In 10" Post Oak

S. 49th W. Ave. (Asphalt)

LINE	BEARING	DIST.
R1	S 85° E	26.0'
R2	N 79° W	36.6'
R3	S 76° W	50.1'
R4	S 76° W	100.3'
R5	S 76° W	157.1'

ALL STATIONS AND OFFSETS ARE DIMENSIONED OFF OF THE CRL. LEGAL DESCRIPTIONS ARE BASED OFF THE SECTION LINE.

LEGEND

BENCHMARK

GRAPHIC SCALE (HORIZ.)

50' 0 50' 100'

DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

ALIGNMENT DATA 2 OF 2

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 11

49TH W. AVE. & SH 117

Thursday, September 22, 2022 3:41:59 PM
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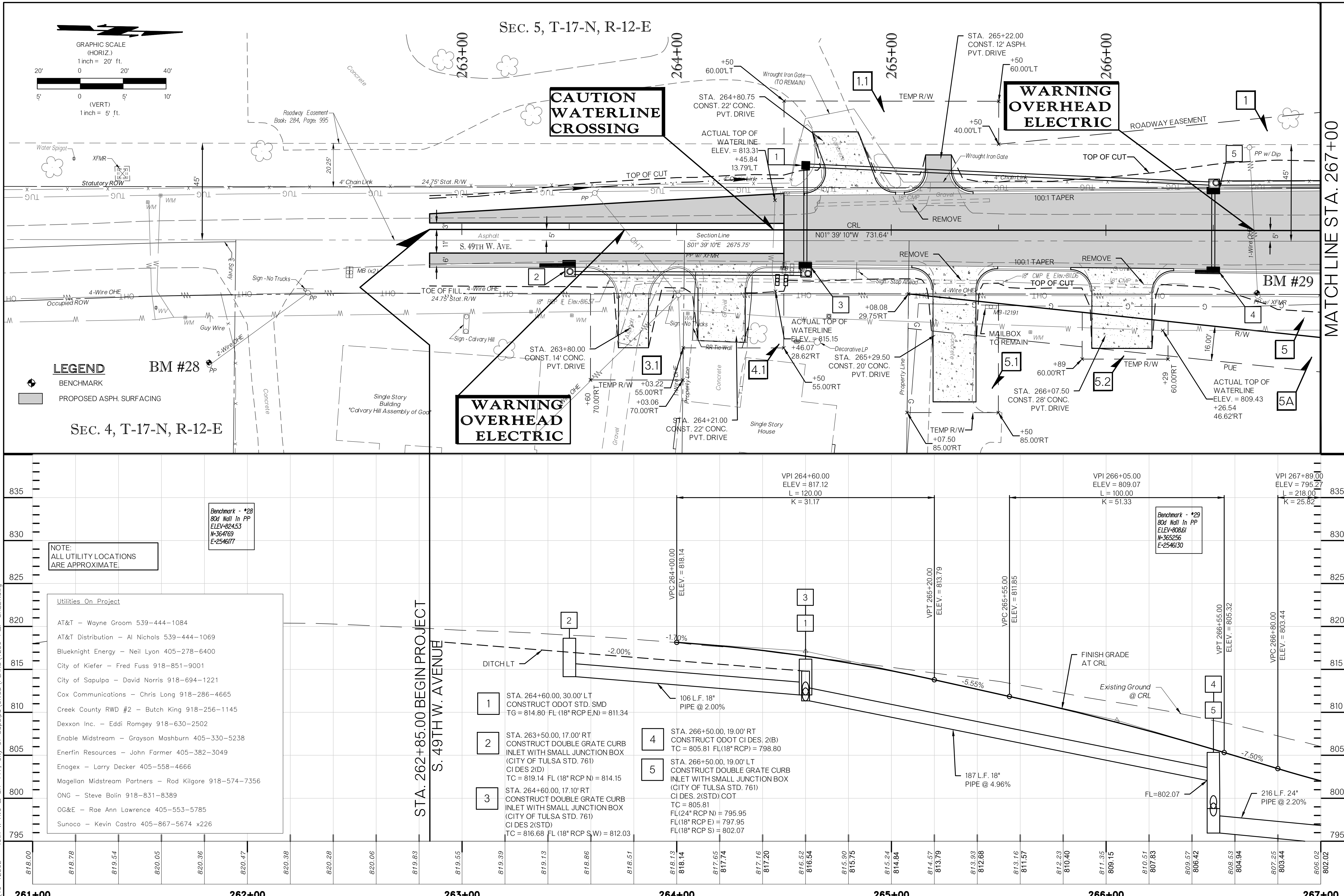

SEC. 5, T-17-N, R-12-E
SEC. 4, T-17-N, R-12-E
GRAPHIC SCALE
(HORIZ.)
1 inch = 20' ft.
(VERT)
1 inch = 5' ft.
CAUTION WATERLINE CROSSING
WARNING OVERHEAD ELECTRIC
WARNING OVERHEAD ELECTRIC
263+00
264+00
265+00
266+00
MATCH LINE STA. 267+00
S. 49TH W. AVE.
CRL
N01° 39' 10"W 731.64'
Section Line
S01° 39' 10"E 2675.75'
100:1 TAPER
100:1 TAPER
TOP OF CUT
TOE OF FILL
REMOVE
TEMP R/W
ROADWAY EASEMENT
BM #28
BM #29
STA. 264+80.75
CONST. 22' CONC.
PVT. DRIVE
STA. 265+22.00
CONST. 12' ASPH.
PVT. DRIVE
ACTUAL TOP OF WATERLINE
ELEV. = 813.31
+45.84
13.79'LT
ACTUAL TOP OF WATERLINE
ELEV. = 815.15
+46.07
28.62'RT
ACTUAL TOP OF WATERLINE
ELEV. = 809.43
+26.54
46.62'RT
STA. 263+80.00
CONST. 14' CONC.
PVT. DRIVE
STA. 264+21.00
CONST. 22' CONC.
PVT. DRIVE
STA. 265+29.50
CONST. 20' CONC.
PVT. DRIVE
STA. 266+07.50
CONST. 28' CONC.
PVT. DRIVE
MAILBOX TO REMAIN
Single Story Building
"Calvary Hill Assembly of God"
Single Story House
LEGEND
BENCHMARK
PROPOSED ASPH. SURFACING
NOTE:
ALL UTILITY LOCATIONS ARE APPROXIMATE.
Benchmark - #28
80d Nail In PP
ELEV=824.53
N=364769
E=2546177
Benchmark - #29
80d Nail In PP
ELEV=808.61
N=365256
E=2546130
Utilities On Project
AT&T – Wayne Groom 539-444-1084
AT&T Distribution – Al Nichols 539-444-1069
Blueknight Energy – Neil Lyon 405-278-6400
City of Kiefer – Fred Fuss 918-851-9001
City of Sapulpa – David Norris 918-694-1221
Cox Communications – Chris Long 918-286-4665
Creek County RWD #2 – Butch King 918-256-1145
Dexxon Inc. – Eddi Romgey 918-630-2502
Enable Midstream – Grayson Mashburn 405-330-5238
Enerfin Resources – John Farmer 405-382-3049
Enogex – Larry Decker 405-558-4666
Magellan Midstream Partners – Rod Kilgore 918-574-7356
ONG – Steve Bolin 918-831-8389
OG&E – Rae Ann Lawrence 405-553-5785
Sunoco – Kevin Castro 405-867-5674 x226
STA. 262+85.00 BEGIN PROJECT
S. 49TH W. AVENUE
VPI 264+60.00
ELEV = 817.12
L = 120.00
K = 31.17
VPI 266+05.00
ELEV = 809.07
L = 100.00
K = 51.33
VPI 267+89.00
ELEV = 795.27
L = 218.00
K = 25.82
VPC 264+00.00 ELEV. = 818.14
VPT 265+20.00 ELEV. = 813.79
VPC 265+55.00 ELEV. = 811.85
VPT 266+55.00 ELEV. = 805.32
VPC 266+80.00 ELEV. = 803.44
-2.00%
-1.70%
-5.55%
-7.50%
DITCH LT
FINISH GRADE AT CRL
Existing Ground @ CRL
106 L.F. 18" PIPE @ 2.00%
187 L.F. 18" PIPE @ 4.96%
216 L.F. 24" PIPE @ 2.20%
FL=802.07
1 STA. 264+60.00, 30.00' LT
CONSTRUCT ODOT STD. SMD
TG = 814.80 FL (18" RCP E,N) = 811.34
2 STA. 263+50.00, 17.00' RT
CONSTRUCT DOUBLE GRATE CURB INLET WITH SMALL JUNCTION BOX
(CITY OF TULSA STD. 761)
CI DES 2(D)
TC = 819.14 FL (18" RCP N) = 814.15
3 STA. 264+60.00, 17.10' RT
CONSTRUCT DOUBLE GRATE CURB INLET WITH SMALL JUNCTION BOX
(CITY OF TULSA STD. 761)
CI DES 2(STD)
TC = 816.68 FL (18" RCP S,W) = 812.03
4 STA. 266+50.00, 19.00' RT
CONSTRUCT ODOT CI DES. 2(B)
TC = 805.81 FL(18" RCP) = 798.80
5 STA. 266+50.00, 19.00' LT
CONSTRUCT DOUBLE GRATE CURB INLET WITH SMALL JUNCTION BOX
(CITY OF TULSA STD. 761)
CI DES. 2(STD) COT
TC = 805.81
FL(24" RCP N) = 795.95
FL(18" RCP E) = 797.95
FL(18" RCP S) = 802.07
261+00
262+00
263+00
264+00
265+00
266+00
267+00

MATCH LINE STA. 267+00.00

SEC. 4, T-17-N, R-12-E

SEC. 5, T-17-N, R-12-E

CAUTION WATERLINE CROSSING

CAUTION GAS LINE CROSSING

CAUTION TUG & FIBER CROSSINGS

WARNING OVERHEAD ELECTRIC

CAUTION WATERLINE CROSSING

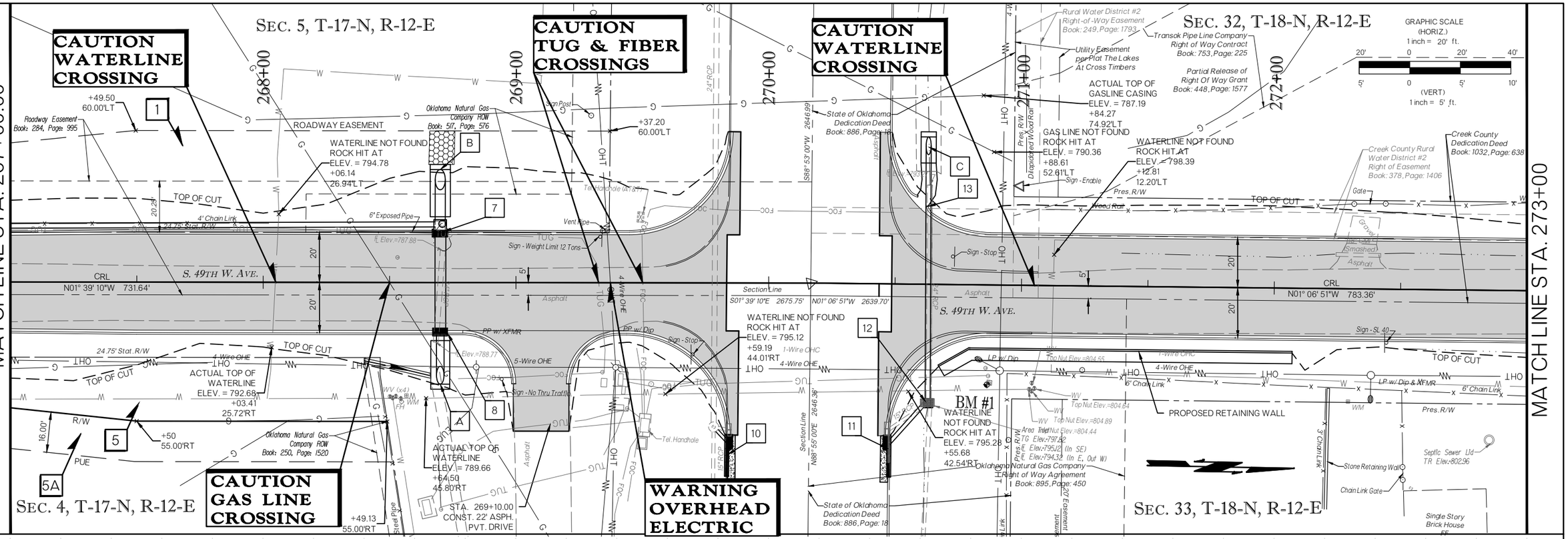
SEC. 32, T-18-N, R-12-E

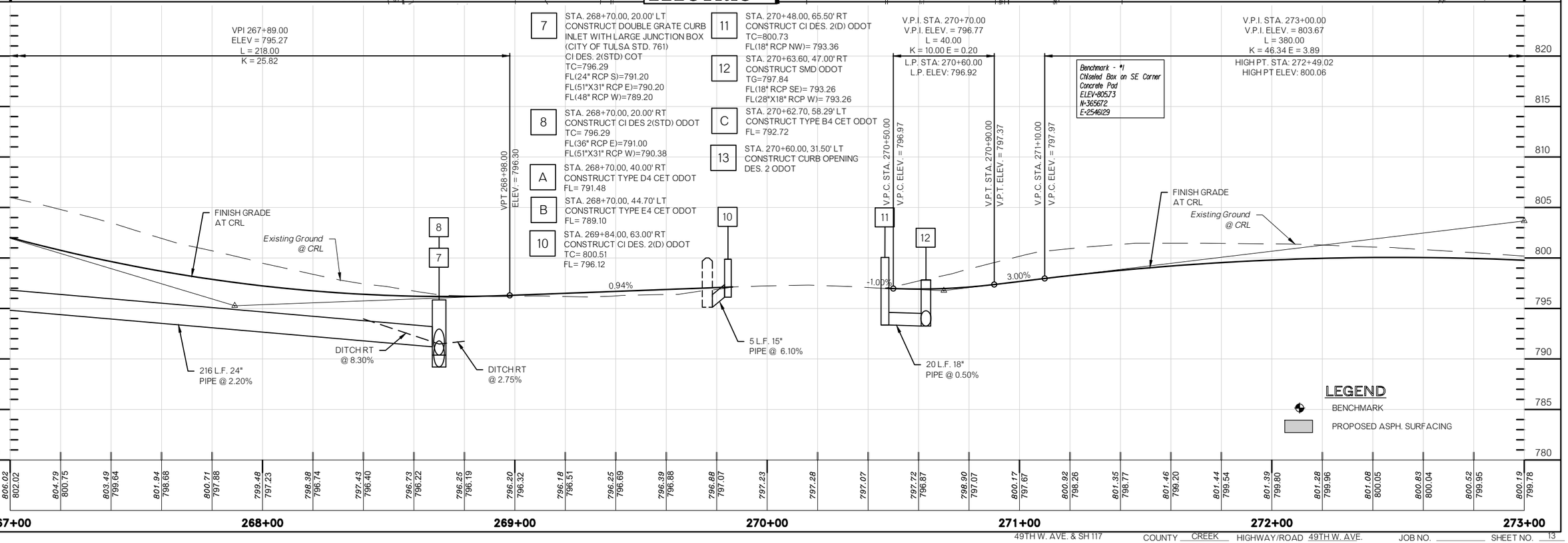
SEC. 33, T-18-N, R-12-E

MATCH LINE STA. 273+00

GRAPHIC SCALE (HORIZ.) 1 inch = 20' ft.

(VERT) 1 inch = 5' ft.





7 STA. 268+70.00, 20.00' LT
CONSTRUCT DOUBLE GRATE CURB INLET WITH LARGE JUNCTION BOX (CITY OF TULSA STD. 761)
CI DES. 2(STD) COT
TC=796.29
FL(24" RCP S)=791.20
FL(51"X31" RCP E)=790.20
FL(48" RCP W)=789.20

8 STA. 268+70.00, 20.00' RT
CONSTRUCT CI DES 2(STD) ODOT
TC= 796.29
FL(36" RCP E)=791.00
FL(51"X31" RCP W)=790.38

A STA. 268+70.00, 40.00' RT
CONSTRUCT TYPE D4 CET ODOT
FL= 791.48

B STA. 268+70.00, 44.70' LT
CONSTRUCT TYPE E4 CET ODOT
FL= 789.10

10 STA. 269+84.00, 63.00' RT
CONSTRUCT CI DES. 2(D) ODOT
TC= 800.51
FL= 796.12

11 STA. 270+48.00, 65.50' RT
CONSTRUCT CI DES. 2(D) ODOT
TC=800.73
FL(18" RCP NW)= 793.36

12 STA. 270+63.60, 47.00' RT
CONSTRUCT SMD ODOT
TG=797.84
FL(18" RCP SE)= 793.26
FL(28"X18" RCP W)= 793.26

C STA. 270+62.70, 58.29' LT
CONSTRUCT TYPE B4 CET ODOT
FL= 792.72

13 STA. 270+60.00, 31.50' LT
CONSTRUCT CURB OPENING DES. 2 ODOT

LEGEND
BENCHMARK
PROPOSED ASPH. SURFACING

Thursday, September 22, 2022 4:09:47 PM
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49TH W. AVE. & SH 117

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 13

STA. 274+19.00
CONST. 26' ASPH.
STREET

STA. 276+36.00
CONST. 14' ASPH.
PVT. DRIVE W/ SD.

CONST. CONCRETE CURB OPENING
SEE ODOT STD SSCD

CONST. CONCRETE CURB OPENING
SEE ODOT STD SSCD

GRAPHIC SCALE
(HORIZ.)
1 inch = 20' ft.
20' 0 20' 40'
5' 0 5' 10'
(VERT)
1 inch = 5' ft.

LEGEND

◆	BENCHMARK
▨	PROPOSED ASPH. SURFACING

NOTE:
ALL UTILITY LOCATIONS
ARE APPROXIMATE.

V.P.I. STA. 273+00.00
V.P.I. ELEV. = 803.67
L = 380.00
K = 46.34 E = 3.89
HIGH PT. STA: 272+49.02
HIGH PT ELEV: 800.06

VPI 276+80.00
ELEV = 783.91
L = 200.00
K = 64.52

Benchmark - #2
Chiseled "X" on Concrete
ELEV=798.82
N=365949.57
E=2546124.61

Benchmark - #3
Top of Bollard
ELEV=772.56
N=366424
E=2546014

130.00 L.F. 18"
PIPE @ 3.80%

37.00 L.F. 18"
PIPE @ 3.00%

64.00 L.F. 24"
PIPE @ 0.35%

14 STA. 273+75.00, 20.00' RT
CONSTRUCT ODOT CI DES. 2(B)
TC = 798.44
FL (18" RCP E) =794.40

16 STA. 274+75.00, 30.50' RT
CONSTRUCT ODOT STD. SMD
TG = 797.17
FL (18" RCP W)= 794.45
FL (18" RCP N)= 793.45

19 STA. 275+07.00, 31.00' RT
CONSTRUCT ODOT STD. SMD
TG = 791.33
FL (18" RCP S,NW) = 788.51

17 STA. 275+50.00, 20.00' LT
CONSTRUCT DOUBLE GRATE CURB
INLET WITH SMALL JUNCTION BOX
(CITY OF TULSA STD. 761)
CI DES 2(STD)
TC = 790.75 FL (24" RCP E,N) = 785.88

18 STA. 275+50.00, 20.00' RT
CONSTRUCT DOUBLE GRATE CURB
INLET WITH SMALL JUNCTION BOX
(CITY OF TULSA STD. 761)
CI DES 2(STD)
TC = 790.75 FL (18" RCP SE) = 787.31
FL (24" RCP W) = 786.01

D STA. 276+16.70, 24.86' LT
CONSTRUCT TYPE B4 CET ODOT
FL= 785.65

E STA. 276+16.00, 28.53' RT
CONSTRUCT TYPE A4 CET ODOT
FL= 783.96

F STA. 276+63, 28.49' RT
CONSTRUCT TYPE A4 CET ODOT
FL= 783.71

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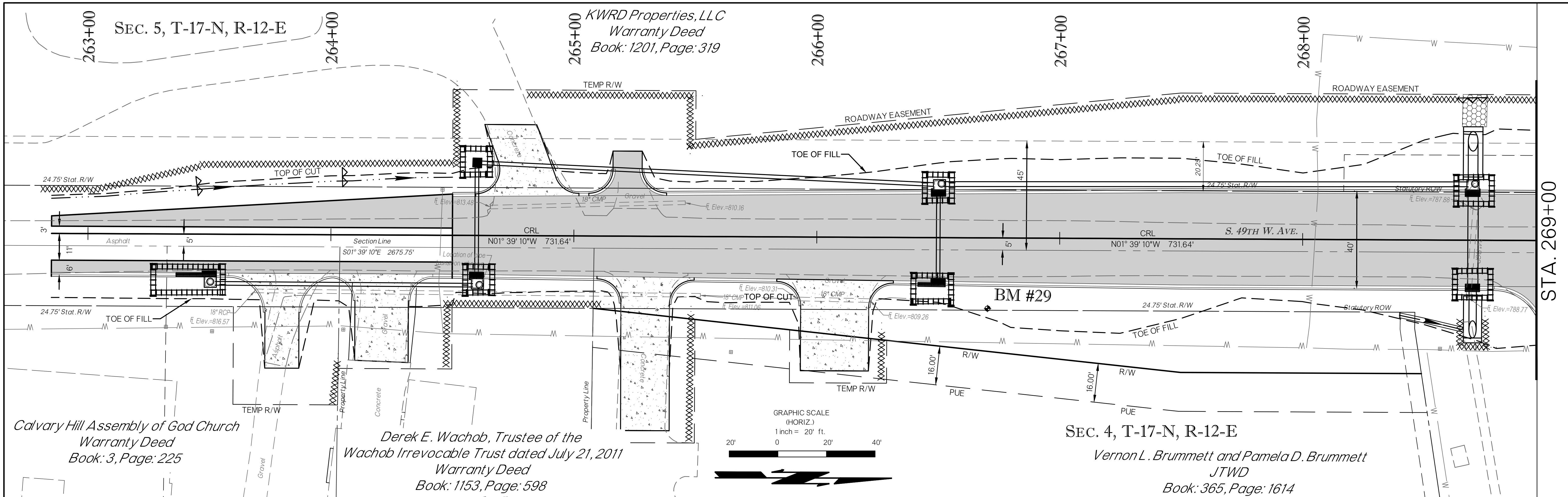
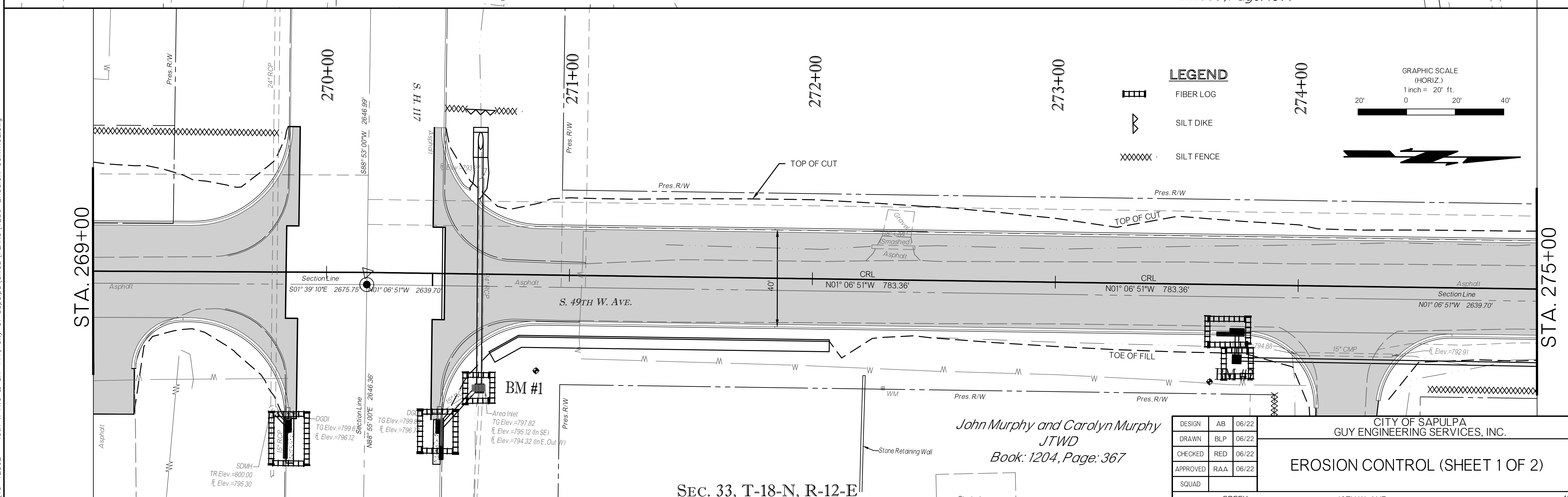


263+00
264+00
265+00
266+00
267+00
268+00
SEC. 5, T-17-N, R-12-E
KWRD Properties, LLC
Warranty Deed
Book: 1201, Page: 319
TEMP R/W
ROADWAY EASEMENT
TOE OF FILL
TOP OF CUT
24.75' Stat. R/W
18" CMP
Gravel
CRL
N01° 39' 10"W 731.64'
S. 49TH W. AVE.
Section Line
S01° 39' 10"E 2675.75'
Asphalt
Statutory ROW
BM #29
R/W
PUE
16.00'
45'
40'
5'
Calvary Hill Assembly of God Church
Warranty Deed
Book: 3, Page: 225
Derek E. Wachob, Trustee of the
Wachob Irrevocable Trust dated July 21, 2011
Warranty Deed
Book: 1153, Page: 598
GRAPHIC SCALE
(HORIZ.)
1 inch = 20' ft.
SEC. 4, T-17-N, R-12-E
Vernon L. Brummett and Pamela D. Brummett
JTWD
Book: 365, Page: 1614
STA. 269+00



STA. 269+00
270+00
271+00
272+00
273+00
274+00
S.H. 117
Pres. R/W
TOP OF CUT
TOP OF FILL
TOE OF FILL
Section Line
S01° 39' 10"E 2675.75'
N01° 06' 51"W 2639.70'
CRL
N01° 06' 51"W 783.36'
S. 49TH W. AVE.
Asphalt
40'
BM #1
BM #2
15" CMP
Area Inlet
SDMH
Stone Retaining Wall
LEGEND
FIBER LOG
SILT DIKE
SILT FENCE
GRAPHIC SCALE
(HORIZ.)
1 inch = 20' ft.
John Murphy and Carolyn Murphy
JTWD
Book: 1204, Page: 367
SEC. 33, T-18-N, R-12-E
STA. 275+00

DESIGN	AB	06/22	CITY OF SAPULPA GUY ENGINEERING SERVICES, INC.
DRAWN	BLP	06/22	
CHECKED	RED	06/22	EROSION CONTROL (SHEET 1 OF 2)
APPROVED	RAA	06/22	
SQUAD			

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. SHEET NO. 15

49TH W. AVE. & SH 117

Friday, July 1, 2022 3:16:32 PM
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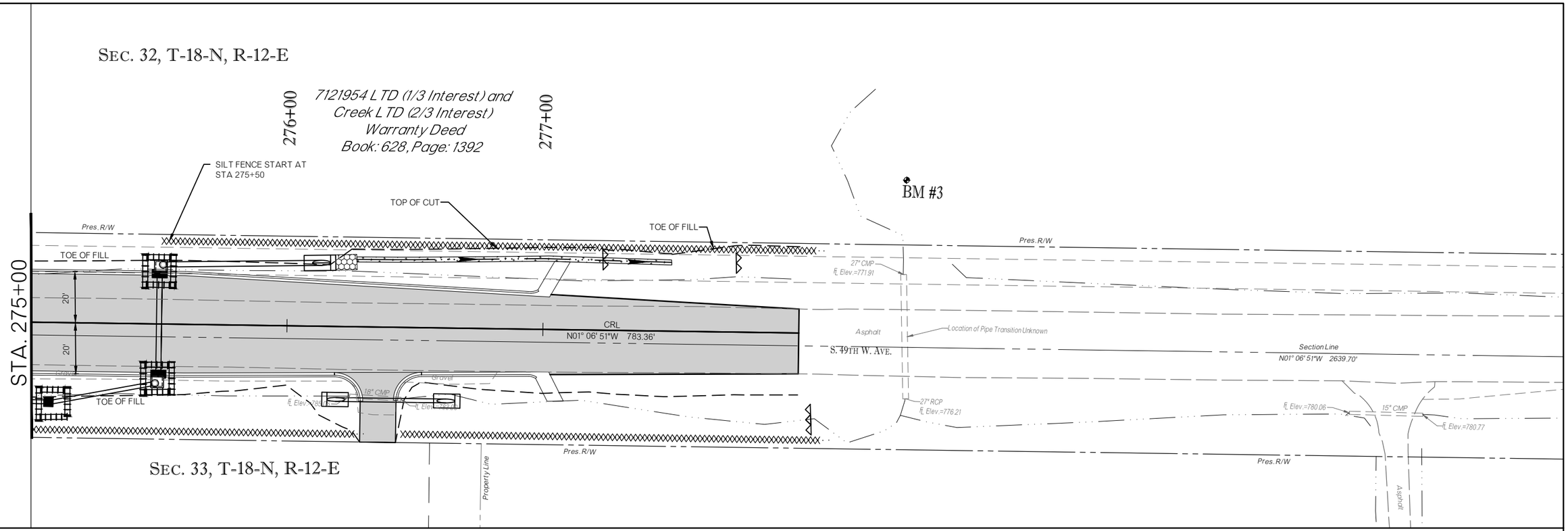

LEGEND

- FIBER LOG
- SILT DIKE
- SILT FENCE

GRAPHIC SCALE
(HORIZ.)
1 inch = 20' ft.

20' 0 20' 40'

DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

EROSION CONTROL (SHEET 2 OF 2)

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 16

49TH W. AVE. & SH 117

Friday, July 1, 2022 3:16:39 PM
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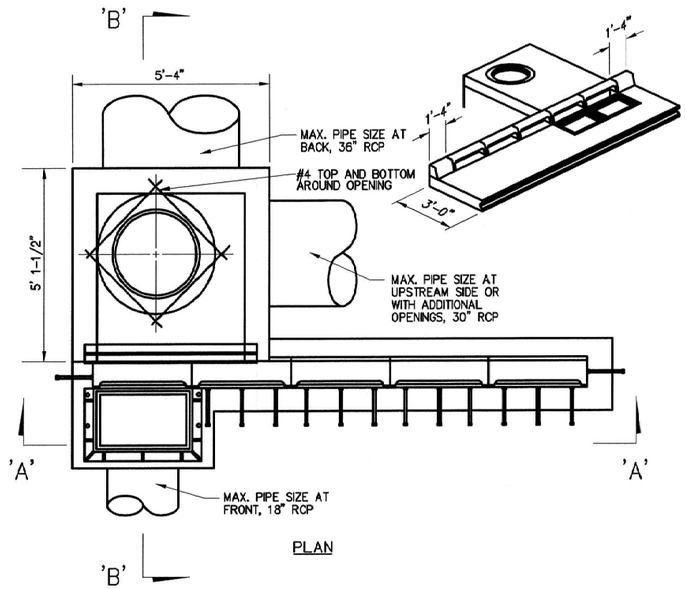
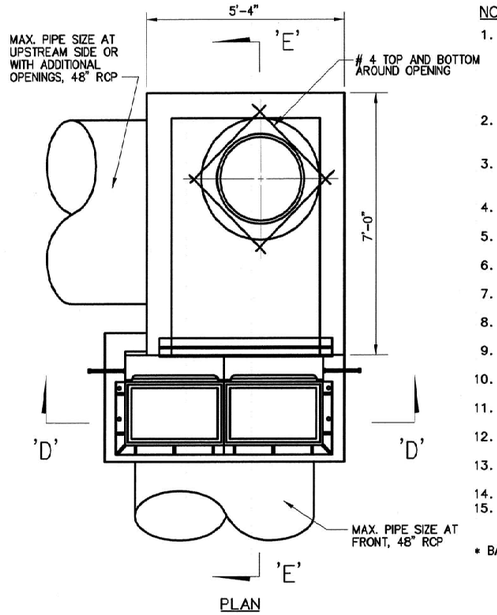


PLAN

QUANTITIES FOR INLETS							
INLET	CURB OPENING	CLASS "A" CONCRETE	INLET		INLET FRAME AND GRATE	CAST IRON CURB INLET	MH FRAME AND COVER
DESIGN	DESIGNATION	CU. YD.	BASE AM'T.	ADD'L. C.F. PER VERT. FT.	EACH	EACH	EACH
1 WITH SMALL JUNCT. BOX		1.50	43.56	15.84	1	1	1
	"A"	1.60	47.34	17.43	1	2	1
	"B"	1.73	55.44	21.03	1	3	1
	"C"	1.86	62.26	24.63	1	4	1
	"D"	1.99	68.03	28.23	1	5	1
2 WITH SMALL JUNCT. BOX		1.70	47.84	17.40	2	2	1
	"A"	1.83	57.01	21.00	2	3	1
	"B"	1.96	64.86	24.60	2	4	1
	"C"	2.08	71.70	28.20	2	5	1
	"D"	2.21	77.28	31.80	2	6	1
1 WITH LARGE JUNCT. BOX		2.11	50.44	18.34	1	1	1
	"A"	2.21	54.22	19.93	1	2	1
	"B"	2.34	62.32	23.53	1	3	1
	"C"	2.47	69.14	27.13	1	4	1
	"D"	2.60	74.91	30.73	1	5	1
2 WITH LARGE JUNCT. BOX		2.31	54.72	19.90	2	2	1
	"A"	2.43	63.89	23.50	2	3	1
	"B"	2.57	71.74	27.10	2	4	1
	"C"	2.69	78.58	30.70	2	5	1
	"D"	2.82	84.16	34.30	2	6	1

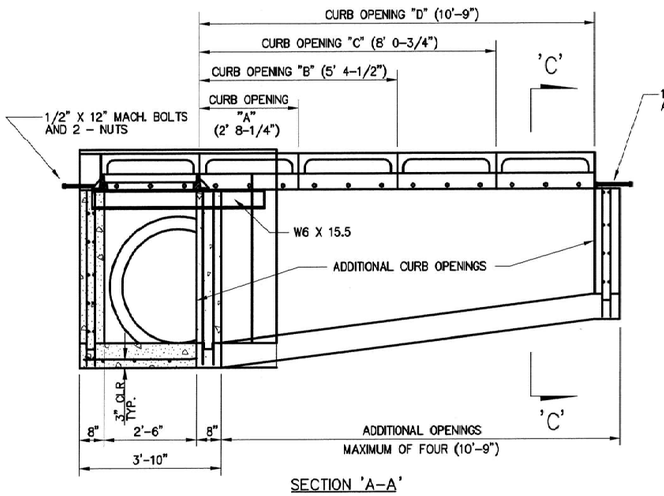


PLAN

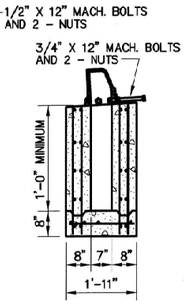
NOTES:

1. (a) WHEN THE INLET IS BUILT IN EXISTING PAVEMENT, THE APRON AROUND THE INLET SHALL BE OF THE SIZE SHOWN IN THE PLAN ON THIS SHEET, AND BUILT OF P.C. CONCRETE TO A MINIMUM 8" THICKNESS.
   (b) THERE WILL BE NO DEDUCTION OF PAYMENT FOR CONCRETE CURB AND GUTTER FOR THE LENGTH OR AREA OCCUPIED BY THE CONSTRUCTION OF CAST IRON CURB INLETS OR CAST IRON CURB INLET FRAME AND GRATE.
2. RUBBER COATED REINFORCED STEEL STEPS SHALL BE PLACED AT THE HEADERS IN ALL INLETS 4' OR MORE IN DEPTH. COST OF STEPS SHALL BE INCLUDED IN THE PRICE BID FOR INLET.
3. GRATING AND FRAMES TO BE USED IN THIS INLET ARE SHOWN ON THE STANDARD DRAWINGS STD 765, STD 766, DESIGNATED AS "STANDARD STORM SEWER GRATES AND FRAMES."
4. THE STANDARD DRAWING DESIGNATION NO., DESIGN NO., AND NUMBER OF ADDITIONAL OPENINGS SHALL BE INDICATED ON THE PLANS.
5. COST OF STRUCTURAL STEEL I-BEAMS AND ANGLE IRON TO BE INCLUDED IN THE PRICE BID FOR INLET. ANGLE IRON SHALL CONFORM TO ASTM-A7 OR A36.
6. CASTING SHALL CONFORM TO ASTM SPECIFICATION FOR GREY IRON CASTINGS, SERIAL DESIGNATION A-48-CLASS 20.
7. NO WORDING OR MARKING OF ANY KIND OTHER THAN THOSE SHOWN ON THE PLANS WILL BE PERMITTED ON THESE CASTINGS.
8. ALL NUTS AND BOLTS REQUIRED FOR THESE STRUCTURES SHALL BE CADMIUM PLATED OR GALVANIZED.
9. CAST IRON CURBS TO BE USED ON THIS INLET ARE SHOWN ON STANDARD DRAWING DESIGNATED AS "STANDARD CAST IRON CURB."
10. ALL MORTAR JOINTS TO BE 3/8" MAXIMUM, EVERY FIFTH COURSE OF BRICK MASONRY TO BE HEADER COURSE.
11. CURB INLETS SHALL BE PLACED ON UPSTREAM SIDE OF GRATE INLETS FOR TYPICAL INSTALLATIONS.
12. CONCRETE TROUGH FOR CURB INLETS AND STORM SEWER INLETS SHALL BE CONSTRUCTED AS ONE UNIT.
13. IF PRECAST INLET IS USED, FLOWABLE FILL MUST BE USED AS BACKFILL AROUND THE ENTIRE INLET.
14. USE MANHOLE FRAME AND LID AS SHOWN ON STANDARD DRAWING NO. 754
15. MANHOLE FRAME AND LID MUST BE FLUSH WITH TOP OF THE SURROUNDING CONCRETE SLAB.

* BASES TO BE FORMED WITH 1 X 6 FORMS AND POURED IN PLACE.



SECTION 'A-A'



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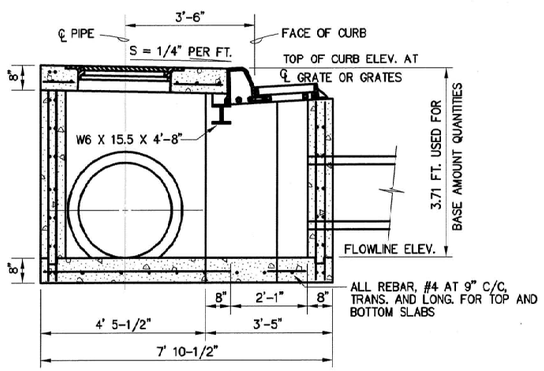

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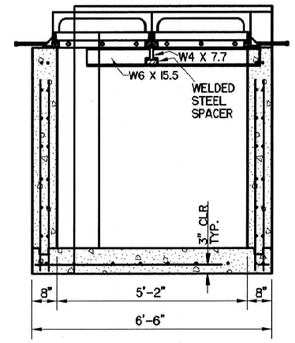

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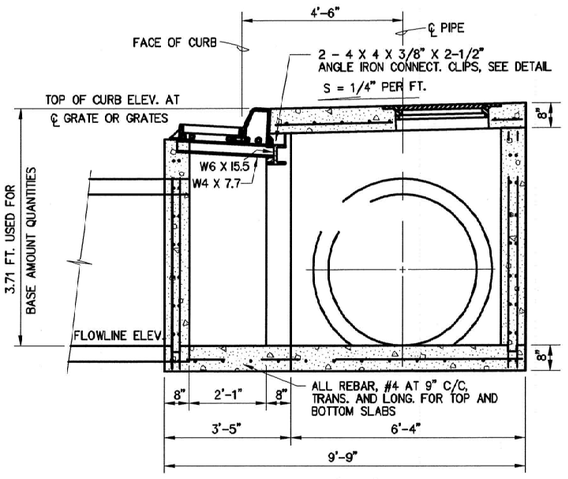
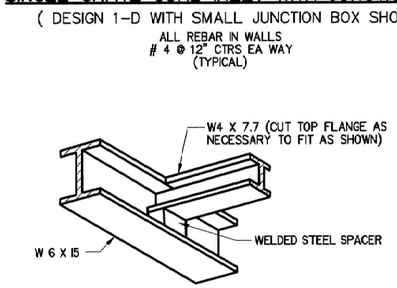


SECTION 'E-E'

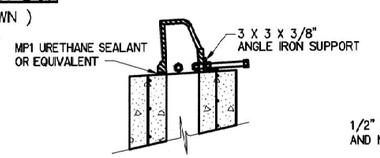
SINGLE GRATE CURB INLET WITH JUNCTION BOX

(DESIGN 1-D WITH SMALL JUNCTION BOX SHOWN)

ALL REBAR IN WALLS # 4 @ 12" CTRS EA WAY (TYPICAL)

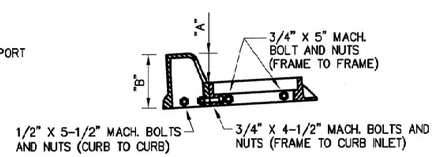


I-BEAM CONNECTION DETAIL FOR DOUBLE GRATE



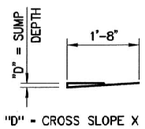
ADDITIONAL CURB OPENING DETAILS

ANGLE IRON LENGTHS	
OPENING	LENGTH
"A"	2' 5-3/8"
"B"	5' 1-5/8"
"C"	7' 9-7/8"
"D"	10' 6-1/8"



FRAME AND CURB DETAILS

C.I. CURB HEIGHTS		
TYPE	"A"	"B"
4" MOUNTABLE	4-1/2"	9-1/2"
6" MOUNTABLE	6-1/2"	11-1/2"
6" BARRIER	6-1/2"	11-1/2"
8" BARRIER	8-1/2"	13-1/2"



"D" = CROSS SLOPE X 1.67' + 0.04

DOUBLE GRATE CURB INLET WITH JUNCTION BOX

(DESIGN 2 WITH LARGE JUNCTION BOX SHOWN)

18" THRU 30" LONGITUDINAL PIPE REQUIRES SMALL JUNCTION BOX

ALL REBAR IN WALLS # 4 @ 12" CTRS EA WAY (TYPICAL)

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
6 11.06 (E)	INLET	EA.
6 11.06 (F)	ADDITIONAL DEPTH IN INLET	VERT. FT.
6 11.06 (G)	INLET FRAME AND GRATE	EA.
6 11.06 (D)	MANHOLE FRAME AND COVER	EA.
6 11.06 (K)	CAST IRON CURB INLETS	EA.

REVISION	BY	DATE

CITY ENGINEER

DESIGN MANAGER

CITY OF TULSA, OKLAHOMA
ENGINEERING SERVICES DEPARTMENT

STANDARD INLETS AND GRATES W/ACCESS MANHOLE BACK OF CURB

DATE: OCTOBER 2013 STD. 761

PATH NAME: /E1/PARTS/STD/03N_STDS/761-STD-MSNRY-INLET-ACCESS MH.DGN SBW 07/19/2012

STORM WATER MANAGEMENT PLAN

SITE DESCRIPTION

PROJECT LIMITS: 49TH W AVE APPROXIMATELY 750 FT NORTH AND 750 FT SOUTH FROM THE INTERSECTION OF 49TH W AVE AND SH 117.

PROJECT DESCRIPTION: ROADWAY PLANS FOR 49TH W AVE. THE PROJECT WIDENS THE ROAD TO INCLUDE LEFT TURN LANES AND A SIGNALIZED INTERSECTION.

SUGGESTED SEQUENCE OF EROSION CONTROL ACTIVITIES:

PRIOR TO INITIATING SOIL DISTURBING ACTIVITIES, THE CONTRACTOR WILL INSTALL ALL PERIMETER TEMPORARY SEDIMENT CONTROLS SPECIFIED. STRIP, STOCKPILE AND STABILIZE TOPSOIL. CLEAR AND GRUB ONLY IN NECESSARY AREAS, PRESERVING AS MUCH NATIVE VEGETATION AS POSSIBLE. INSTALL, MAINTAIN AND/OR MOVE TEMPORARY SEDIMENT ITEMS WITH CONSTRUCTION OPERATIONS AS PRACTICAL. IF DIRECTED BY THE ENGINEER, PLANT TEMPORARY SEEDING. REPLACE SALVAGED TOPSOIL AND DEVICES WHEN AN ACCEPTABLE VEGETATIVE COVER (AT LEAST 70%) HAS BEEN ATTAINED. AS SITE CONDITIONS WARRANT, THE CONTRACTOR MAY CHOOSE TO MODIFY THE TYPE OR ARRANGEMENT OF SPECIFIED PRACTICES TO IMPROVE THEIR EFFECTIVENESS AS APPROVED BY THE ENGINEER. THE CONTRACTOR WILL MAINTAIN A LOG OF MAJOR SOIL DISTURBANCE ACTIVITIES, AND ALSO THE DATES OF INSTALLATION OF EROSION CONTROL MEASURES.

SOIL TYPE: BIGHEART–NIOTAZE–ROCK OUTCROP

TOTAL AREA OF THE CONSTRUCTION SITE: 3.20 ACRES (139,268 SF)

ESTIMATED AREA TO BE DISTURBED: 2.04 ACRES (88,942 SF)

OFFSITE AREA TO BE DISTURBED: (FOR CONTRACTOR USE)

TOTAL IMPERVIOUS AREA PRE-CONSTRUCTION: 0.88 ACRES (38,233 SF)

TOTAL IMPERVIOUS AREA POST-CONSTRUCTION: 1.39 ACRES (60,919 SF)

POST-CONSTRUCTION RUNOFF COEFFICIENT OF THE SITE: 0.70

LATITUDE & LONGITUDE OF CENTER OF PROJECT: N35°59'18" W96°02'51"

PROJECT WILL DISCHARGE TO:

NAME OF RECEIVING WATERS: TRIBUTARY TO POLECAT CREEK

SENSITIVE WATERS OR WATERSHEDS:	YES [ ]	NO [X]
303(D) IMPAIRED WATERS:	YES [ ]	NO [X]
IF YES, LIST IMPAIRMENT:		
LOCATED IN A TMDL:	YES [ ]	NO [X]
LAKE THUNDERBIRD TMDL:	YES [ ]	NO [X]
MS4 ENTITY	YES [X]	NO [ ]

IF YES, LOCATION: CITY OF SAPULPA

NOTE:
THIS SHEET SHOULD BE USED IN CONJUNCTION WITH A DRAINAGE MAP THAT ILLUSTRATES THE DRAINAGE PATTERNS/PATHWAYS AND RECEIVING WATERS FOR THIS PROJECT. THIS SHEET SHOULD ALSO BE USED WITH THE EROSION CONTROL SUMMARIES, PAY ITEMS, & NOTES.

EROSION AND SEDIMENT CONTROLS

SOIL STABILIZATION PRACTICES:

- [X] TEMPORARY SEEDING
- [X] PERMANENT SODDING, SPRIGGING OR SEEDING
- [X] VEGETATIVE MULCHING
- [ ] SOIL RETENTION BLANKET
- [X] PRESERVATION OF EXISTING VEGETATION

NOTE: TEMPORARY EROSION CONTROL METHODS MUST BE USED ON ALL DISTURBED AREAS WHERE CONSTRUCTION ACTIVITIES HAVE CEASED FOR OVER 14 DAYS. METHODS USED WILL BE AS SHOWN ON PLANS, OR AS DIRECTED BY THE ENGINEER.

STRUCTURAL PRACTICES:

- [ ] STABILIZED CONSTRUCTION EXIT
- [X] TEMPORARY SILT FENCE
- [X] TEMPORARY SILT DIKES
- [X] TEMPORARY FIBER LOG
- [ ] DIVERSION, INTERCEPTOR OR PERIMETER DIKES
- [ ] DIVERSION, INTERCEPTOR OR PERIMETER SWALES
- [ ] ROCK FILTER DAMS
- [ ] TEMPORARY SLOPE DRAIN
- [X] PAVED DITCH W/ DITCH LINER PROTECTION
- [ ] TEMPORARY DIVERSION CHANNELS
- [ ] TEMPORARY SEDIMENT BASINS
- [ ] TEMPORARY SEDIMENT TRAPS
- [ ] TEMPORARY SEDIMENT FILTERS
- [X] TEMPORARY SEDIMENT REMOVAL
- [X] RIP RAP
- [ ] INLET SEDIMENT FILTER
- [ ] TEMPORARY BRUSH SEDIMENT BARRIERS
- [ ] SANDBAG BERMS
- [ ] TEMPORARY STREAM CROSSINGS

OFFSITE VEHICLE TRACKING:

- [X] HAUL ROADS DAMPENED FOR DUST CONTROL
- [X] LOADED HAUL TRUCKS TO BE COVERED WITH TARPAULIN
- [ ] EXCESS DIRT ON ROAD REMOVED DAILY

NOTES:

THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR THE FOLLOWING:

MAINTENANCE AND INSPECTION:

ALL EROSION AND SEDIMENT CONTROLS WILL BE MAINTAINED IN GOOD WORKING ORDER FROM THE BEGINNING OF CONSTRUCTION UNTIL AN ACCEPTABLE VEGETATIVE COVER IS ESTABLISHED. INSPECTION BY THE CONTRACTOR AND ANY NECESSARY REPAIRS SHALL BE PERFORMED ONCE EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.5 INCH AS RECORDED BY A NON-FREEZING RAIN GAUGE TO BE LOCATED ON SITE. POTENTIALLY ERODIBLE AREAS, DRAINAGEWAYS, MATERIAL STORAGE, STRUCTURAL DEVICES, CONSTRUCTION ENTRANCES AND EXITS ALONG WITH EROSION AND SEDIMENT CONTROL LOCATIONS ARE EXAMPLES OF SITES THAT NEED TO BE INSPECTED.

WASTE MATERIALS:

PROPER MANAGEMENT AND DISPOSAL OF CONSTRUCTION WASTE MATERIAL IS REQUIRED BY THE CONTRACTOR. MATERIALS INCLUDE STOCKPILES, SURPLUS, DEBRIS AND ALL OTHER BY-PRODUCTS FROM THE CONSTRUCTION PROCESS. PRACTICES INCLUDE DISPOSAL, PROPER MATERIALS HANDLING, SPILL PREVENTION AND CLEANUP MEASURES. CONTROLS AND PRACTICES SHALL MEET THE REQUIREMENTS OF ALL FEDERAL, STATE AND LOCAL AGENCIES.

HAZARDOUS MATERIALS:

PROPER MANAGEMENT AND DISPOSAL OF HAZARDOUS WASTE MATERIALS IS REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR FOLLOWING MANUFACTURER'S RECOMMENDATIONS, STATE AND FEDERAL REGULATIONS TO ENSURE CORRECT HANDLING, DISPOSAL, SPILL PREVENTION AND CLEANUP MEASURES. EXAMPLES INCLUDE BUT ARE NOT LIMITED TO: PAINTS, ACIDS, CLEANING SOLVENTS, CHEMICAL ADDITIVES, CONCRETE CURING COMPOUNDS AND CONTAMINATED SOILS.

GENERAL NOTES:

A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IS REQUIRED TO COMPLY WITH THE OKLAHOMA POLLUTION DISCHARGE ELIMINATION SYSTEM (OPDES) REGULATIONS. THIS PLAN IS INITIATED DURING THE DESIGN PHASE, CONFIRMED IN THE PRE-WORK MEETINGS AND AVAILABLE ON THE JOB SITE ALONG WITH COPIES OF THE NOTICE OF INTENT (NOI) FORM AND PERMIT CERTIFICATE THAT HAVE BEEN FILED WITH THE OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ). THE PLAN MUST BE KEPT CURRENT WITH UP-TO-DATE AMENDMENTS DURING THE PROGRESSION OF THE PROJECT. ALL CONTRACTOR OFF-SITE OPERATIONS ASSOCIATED WITH THE PROJECT MUST BE DOCUMENTED IN THE SWPPP, I.E., BORROW PITS, WORK ROADS, DISPOSAL SITES, ASPHALT/CONCRETE PLANTS, ETC. THE BASIC GOAL OF STORM WATER MANAGEMENT IS TO IMPROVE WATER QUALITY BY REDUCING POLLUTANTS IN STORM WATER DISCHARGES. RUNOFF FROM CONSTRUCTION SITES HAS A POTENTIAL FOR POLLUTION DUE TO EXPOSED SOILS AND THE PRESENCE OF HAZARDOUS MATERIALS USED IN THE CONSTRUCTION PROCESS. THE PREVENTION OF SOIL EROSION, CONTAINMENT OF HAZARDOUS MATERIALS AND/OR THE INTERCEPTION OF THESE POLLUTANTS BEFORE LEAVING THE CONSTRUCTION SITE ARE THE BEST PRACTICES FOR CONTROLLING STORM WATER POLLUTION.

THE FOLLOWING SECTIONS OF THE 2009 ODOT STANDARD SPECIFICATIONS SHOULD BE NOTED:

103.05	BONDING REQUIREMENTS
104.10	FINAL CLEANING UP
104.12	CONTRACTOR'S RESPONSIBILITY FOR WORK
104.13	ENVIRONMENTAL PROTECTION
106.08	STORAGE AND HANDLING OF MATERIAL
107.01	LAWS, RULES AND REGULATIONS TO BE OBSERVED
107.20	STORM WATER MANAGEMENT
220	MANAGEMENT OF EROSION, SEDIMENTATION AND STORM WATER POLLUTION PREVENTION AND CONTROL
221	TEMPORARY SEDIMENT CONTROL

IN ADDITION:

"ODEQ GENERAL PERMIT (OKR10) FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITIES WITHIN THE STATE OF OKLAHOMA." ODEQ, WATER QUALITY DIVISION, SEPTEMBER 13, 2017.

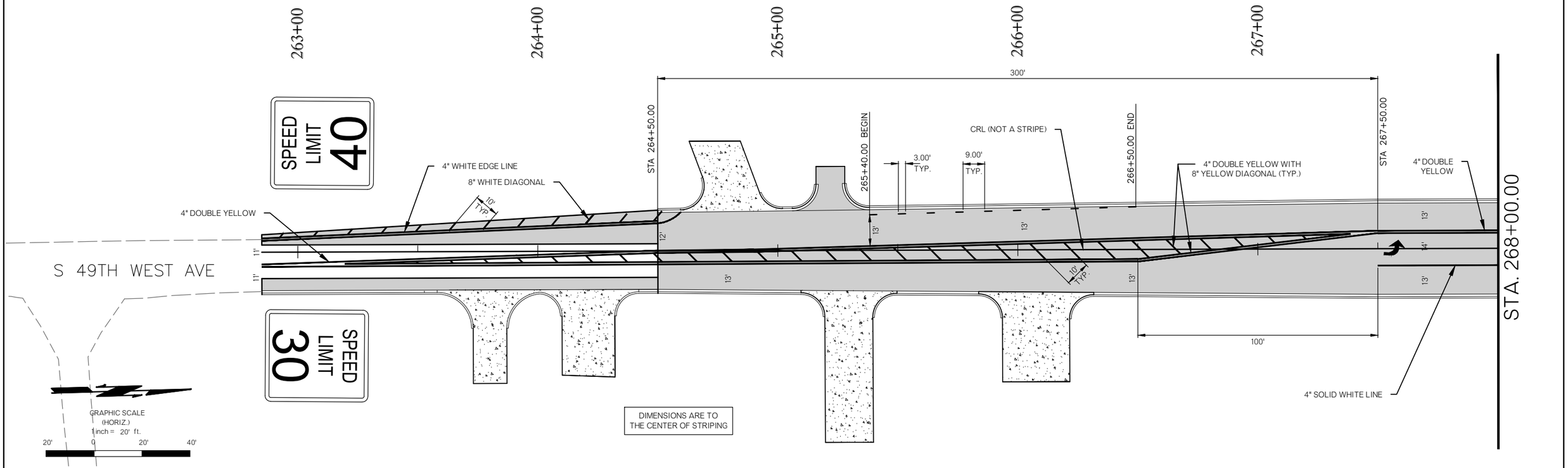
DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

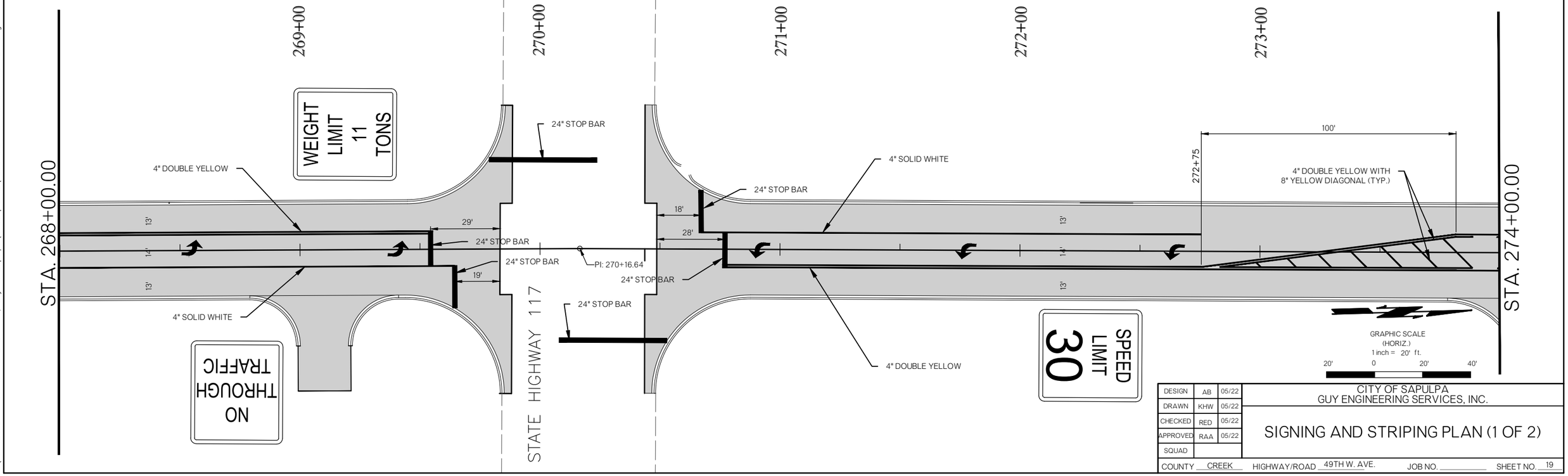
CITY OF TAHLEQUAH
GUY ENGINEERING SERVICES, INC.

STORM WATER MANAGEMENT PLAN

COUNTY CREEK ROAD 49TH W. AVE. SHEET NO. 18

REVISED 07 / 13 / 2017





DESIGN	AB	05/22
DRAWN	KHW	05/22
CHECKED	RED	05/22
APPROVED	RAA	05/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

SIGNING AND STRIPING PLAN (1 OF 2)

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 19

Thursday, September 22, 2022 4:19:52 PM
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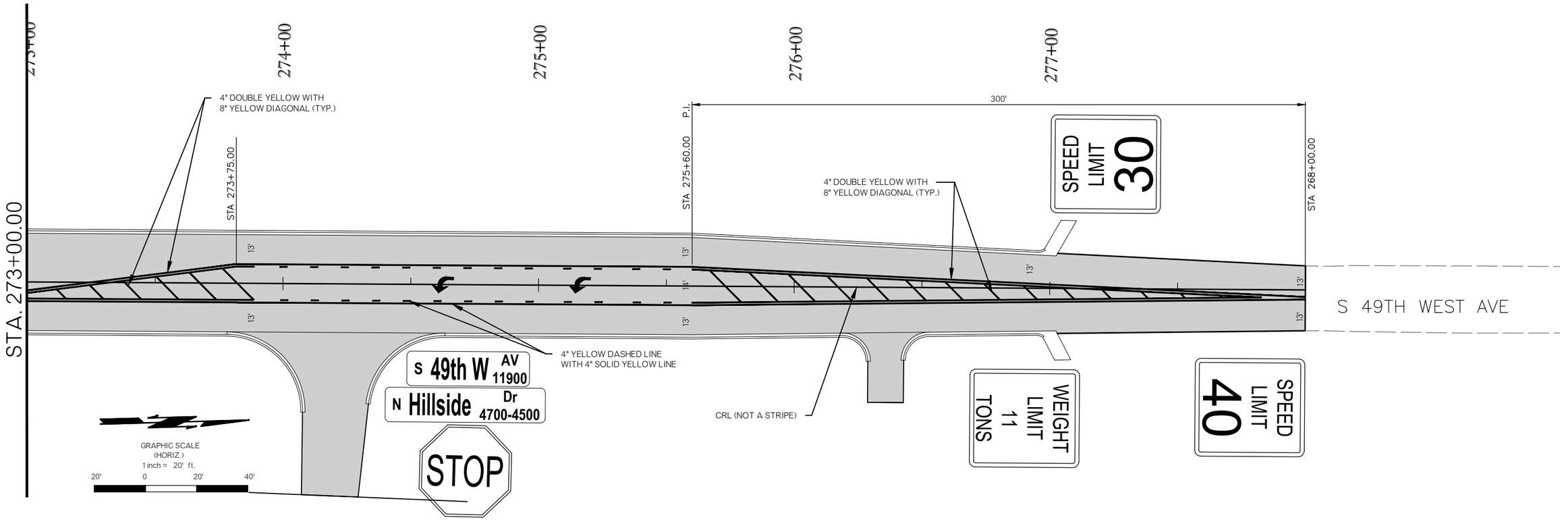


DESIGN	AB	05/22
DRAWN	KHW	05/22
CHECKED	RED	05/22
APPROVED	RAA	05/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

SIGNING AND STRIPING PLAN (2 OF 2)

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 20

Thursday, September 22, 2022 4:20:00 PM
V:\19-1236E - 49th W Ave & SH-117, City Of Sapulpa\CIV3D\PLANS\1236-SIGNING AND STRIPING PLAN.dwg

REVISIONS		
NO.	DESCRIPTION	DATE

R10-12ML (MODIFIED LEFT)
30"X36"
LEGEND, SYMBOL & BORDER - BLACK NON-REFLECTIVE
ARROW - YELLOW REFLECTIVE
BACKGROUND - WHITE REFLECTIVE

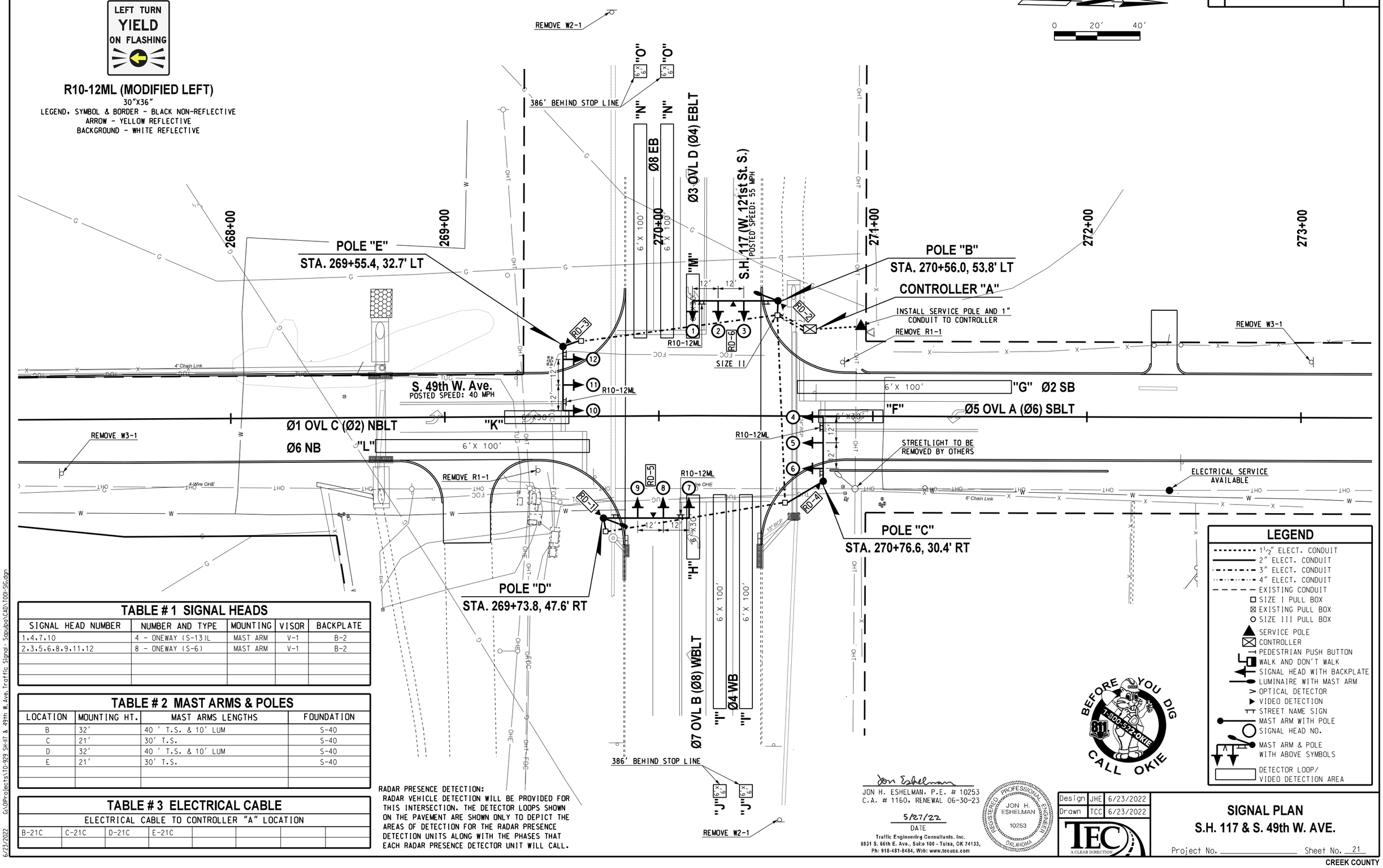


TABLE # 1 SIGNAL HEADS

SIGNAL HEAD NUMBER	NUMBER AND TYPE	MOUNTING	VISOR	BACKPLATE
1,4,7,10	4 - ONEWAY (S-13)L	MAST ARM	V-1	B-2
2,3,5,6,8,9,11,12	8 - ONEWAY (S-6)	MAST ARM	V-1	B-2

TABLE # 2 MAST ARMS & POLES

LOCATION	MOUNTING HT.	MAST ARMS LENGTHS	FOUNDATION
B	32'	40 ' T.S. & 10' LUM	S-40
C	21'	30' T.S.	S-40
D	32'	40 ' T.S. & 10' LUM	S-40
E	21'	30' T.S.	S-40

TABLE # 3 ELECTRICAL CABLE

ELECTRICAL CABLE TO CONTROLLER "A" LOCATION							
B-21C	C-21C	D-21C	E-21C				

RADAR PRESENCE DETECTION:
RADAR VEHICLE DETECTION WILL BE PROVIDED FOR THIS INTERSECTION. THE DETECTOR LOOPS SHOWN ON THE PAVEMENT ARE SHOWN ONLY TO DEPICT THE AREAS OF DETECTION FOR THE RADAR PRESENCE DETECTION UNITS ALONG WITH THE PHASES THAT EACH RADAR PRESENCE DETECTOR UNIT WILL CALL.

LEGEND

- 1½" ELECT. CONDUIT
- 2" ELECT. CONDUIT
- 3" ELECT. CONDUIT
- 4" ELECT. CONDUIT
- EXISTING CONDUIT
- SIZE I PULL BOX
- EXISTING PULL BOX
- SIZE III PULL BOX
- SERVICE POLE
- CONTROLLER
- PEDESTRIAN PUSH BUTTON
- WALK AND DON'T WALK
- SIGNAL HEAD WITH BACKPLATE
- LUMINAIRE WITH MAST ARM
- OPTICAL DETECTOR
- VIDEO DETECTION
- STREET NAME SIGN
- MAST ARM WITH POLE
- SIGNAL HEAD NO.
- MAST ARM & POLE WITH ABOVE SYMBOLS
- DETECTOR LOOP/ VIDEO DETECTION AREA

Jon Eshelman
JON H. ESHELMAN, P.E. # 10253
C.A. # 1160, RENEWAL 06-30-23
5/27/22
DATE

Traffic Engineering Consultants, Inc.
6931 S. 66th E. Ave., Suite 100 - Tulsa, OK 74133,
Ph: 918-481-8484, Web: www.tecusa.com

REGISTERED PROFESSIONAL ENGINEER
JON H. ESHELMAN
10253
OKLAHOMA

Design	JHE	6/23/2022
Drawn	TCC	6/23/2022

TEC
A CLEAR DIRECTION

SIGNAL PLAN
S.H. 117 & S. 49th W. AVE.

Project No. _____ Sheet No. 21

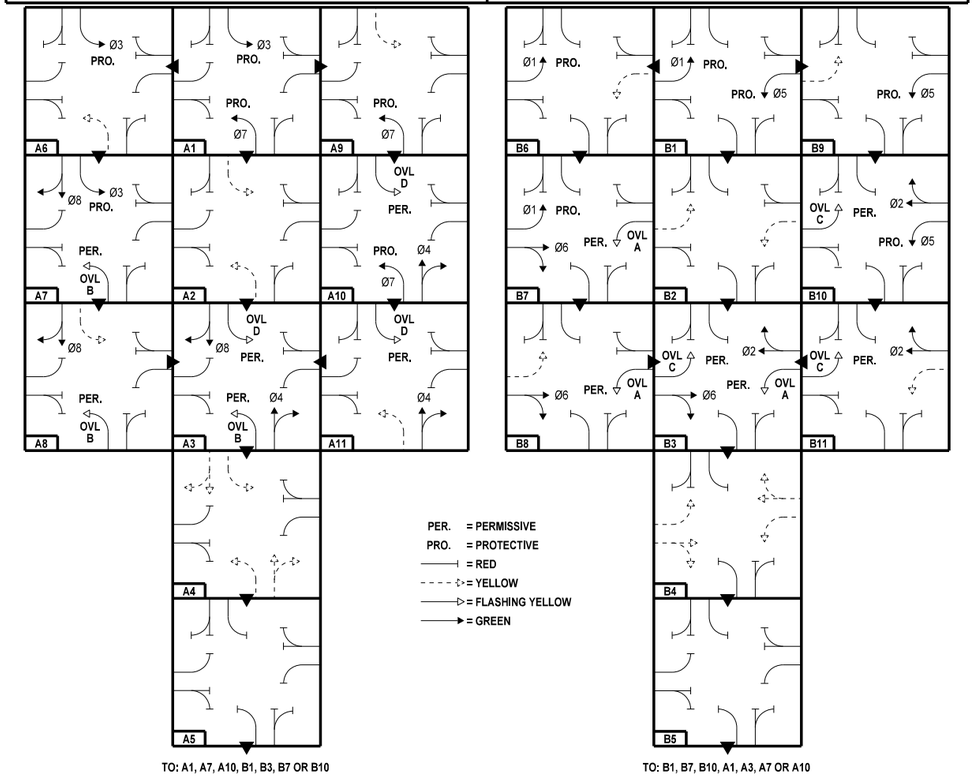
CREEK COUNTY

6/23/2022 G:\0Projects\TO-929 SH-117 & 49th W. Ave. Traffic Signal - Sapulpa\CAD\T00-SIG.dgn

REVISIONS		
NO.	DESCRIPTION	DATE

PHASING DIAGRAM

PHASE "A"	PHASE "B"
S.H. 117	S. 49th W. AVE.

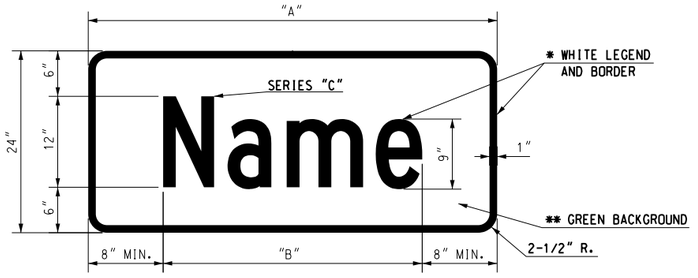


TO: A1, A7, A10, B1, B3, B7 OR B10

TO: B1, B7, B10, A1, A3, A7 OR A10

SEQUENCE CHART

DIRECTION	BLOCK NO.	PHASE Ø7 OVL B	Ø4	Ø1 OVL C	Ø6	Ø3 OVL D	Ø8	Ø5 OVL A	Ø2
		SIGNAL HEAD NO. 1	2,3	4	5,6	7	8,9	10	11,12
Ø3, Ø7 ROW	A1	~~G~~	R	~~R~~	R	~~G~~	R	~~R~~	R
Ø3, Ø7 CL	A2	~~Y~~	R	~~R~~	R	~~Y~~	R	~~R~~	R
OVL B, Ø4, OVL D, Ø8 ROW	A3	F	G	~~R~~	R	F	G	~~R~~	R
OVL B, Ø4, OVL D, Ø8 CL	A4	~~Y~~	Y	~~R~~	R	~~Y~~	Y	~~R~~	R
ALL RED	A5	~~R~~	R	~~R~~	R	~~R~~	R	~~R~~	R
Ø3 ROW & Ø7 CL	A6	~~Y~~	R	~~R~~	R	~~G~~	R	~~R~~	R
Ø3, OVL B, Ø8 ROW	A7	F	R	~~R~~	R	~~G~~	G	~~R~~	R
OVL B, Ø8 ROW & Ø3 CL	A8	F	R	~~R~~	R	~~Y~~	G	~~R~~	R
Ø7 ROW & Ø3 CL	A9	~~G~~	R	~~R~~	R	~~Y~~	R	~~R~~	R
OVL D, Ø4, Ø7 ROW	A10	~~G~~	G	~~R~~	R	F	R	~~R~~	R
OVL D, Ø4 ROW & Ø7 CL	A11	~~Y~~	G	~~R~~	R	F	R	~~R~~	R
Ø5, Ø1 ROW	B1	~~R~~	R	~~G~~	R	~~R~~	R	~~G~~	R
Ø5, Ø1 CL	B2	~~R~~	R	~~Y~~	R	~~R~~	R	~~Y~~	R
OVL C, Ø2, OVL A, Ø6 ROW	B3	~~R~~	R	F	G	~~R~~	R	F	G
OVL C, Ø2, OVL A, Ø6 CL	B4	~~R~~	R	~~Y~~	Y	~~R~~	R	~~Y~~	Y
ALL RED	B5	~~R~~	R	~~R~~	R	~~R~~	R	~~R~~	R
Ø1 ROW & Ø5 CL	B6	~~R~~	R	~~G~~	R	~~R~~	R	~~Y~~	R
Ø1, Ø6, OVL A ROW	B7	~~R~~	R	~~G~~	G	~~R~~	R	F	R
Ø6, OVL A ROW & Ø1 CL	B8	~~R~~	R	~~Y~~	G	~~R~~	R	F	R
Ø5 ROW & Ø1 CL	B9	~~R~~	R	~~Y~~	R	~~R~~	R	~~G~~	R
OVL C, Ø2, Ø5 ROW	B10	~~R~~	R	F	R	~~R~~	R	~~G~~	G
OVL C, Ø2 ROW & Ø5 CL	B11	~~R~~	R	F	R	~~R~~	R	~~Y~~	G
FLASHING OPERATION	–	~~FR~~	FR	~~FR~~	FR	~~FR~~	FR	~~FR~~	FR



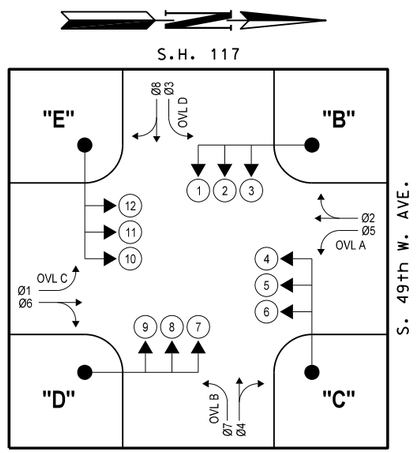
SUMMARY OF MAST ARM MOUNTED SIGNS

MESSAGE	POLE LOCATION	NO. OF SIGN	A (IN.)	HEIGHT (IN.)	B (IN.)	SIGN AREA (SQ.FT.)	TOTAL SIGN AREA (SQ.FT.)
SH 117	C,E	2	54.0	24.0	38.6	9.00	18.00
49th W AVE	B,D	2	78.0	24.0	64.4	13.00	26.00
R10-12ML	B,C,D,E	4	30	36		7.5	30.00
						TOTAL	74.00

* - TYPE VIII VIP REFLECTIVE SHEETING SHALL BE USED

** - TYPE III VIP REFLECTIVE SHEETING SHALL BE USED

INTERSECTION PHASING & SIGNAL HEAD NO.'S



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REGISTERED PROFESSIONAL ENGINEER
JON H. ESHELMAN
10253
OKLAHOMA

Design	JHE	6/23/2022
Drawn	TCC	6/23/2022

TEC A CLEAR DIRECTION

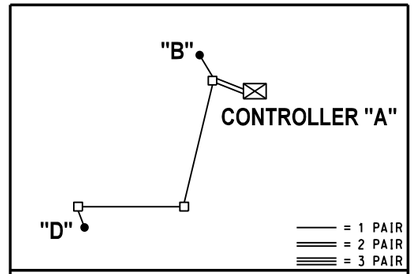
SIGNAL DETAIL
S.H. 117 & S. 49th W. AVE.

Project No. _____ Sheet No. 22

CREEK COUNTY

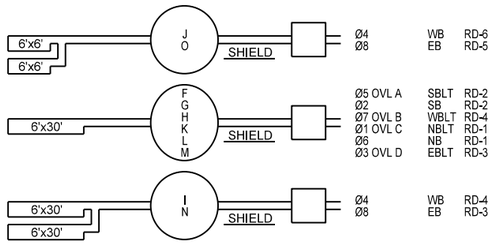
6/23/2022 G:\0Projects\10-929 SH-117 & 49th W. Ave, Traffic Signal - Sapulpa\CAD\T002-DET.dgn

REVISIONS		
NO.	DESCRIPTION	DATE

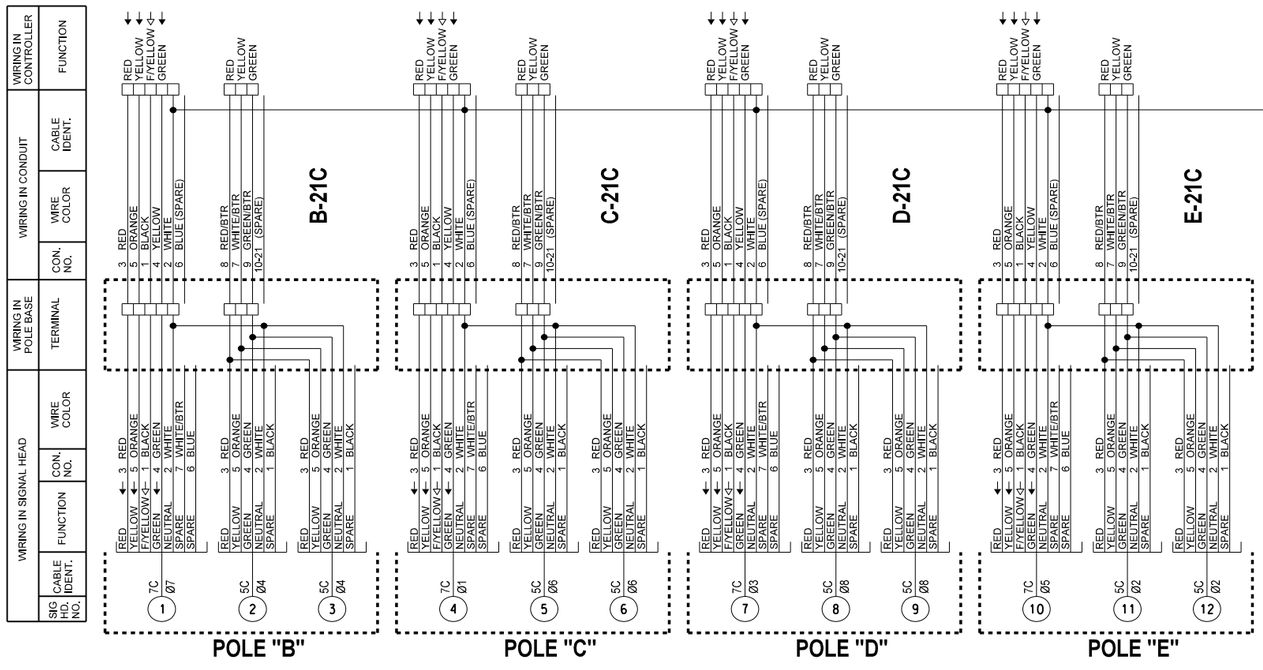


NOTE: STREET LIGHT WIRING

ONE PAIR EQUALS TWO CONDUCTORS (1/C-10AWG COPPER) ONE BLACK, ONE WHITE. CONDUCTORS SHALL BE SPLICED ONLY AT THE TERMINAL BLOCK AT EACH POLE BASE. A FUSE HOLDER SHALL BE PROVIDED IN THE HANDHOLE OF EACH COMBINATION TRAFFIC SIGNAL AND STREET LIGHT POLE. THE FUSE HOLDER SHALL BE INSTALLED IN THE LINE SIDE CONDUCTOR FOR THE LUMINAIRE. THE FUSE HOLDER SHALL BE A WATERPROOF INLINE FUSE HOLDER. IT SHALL BE SIMILAR TO BUSSMAN MFG. CO. TYPE "TRON" HEB. OR OTHER APPROVED EQUAL. COMPLETE WITH A PROPERLY SIZED TYPE KTK FUSE.



RADAR DETECTION AREAS



NOTE:
IF JUMPERS OR OTHER CONNECTIONS ARE MADE IN THE FIELD DURING INSTALLATION, AND ARE ACCEPTED BY THE ENGINEER THIS SHOULD BE SHOWN ON THE WIRING DIAGRAM FOR FUTURE REFERENCE.

Jon Eshelman
JON H. ESHELMAN, P.E. # 10253
C.A. # 1160, RENEWAL 06-30-23

5/27/22
DATE

Traffic Engineering Consultants, Inc.
6931 S. 66th E. Ave., Suite 100 - Tulsa, OK 74133,
Ph: 918-481-8484, Web: www.tecusa.com

REGISTERED PROFESSIONAL ENGINEER
JON H. ESHELMAN
10253
OKLAHOMA

Design	JHE	6/23/2022
Drawn	TCC	6/23/2022

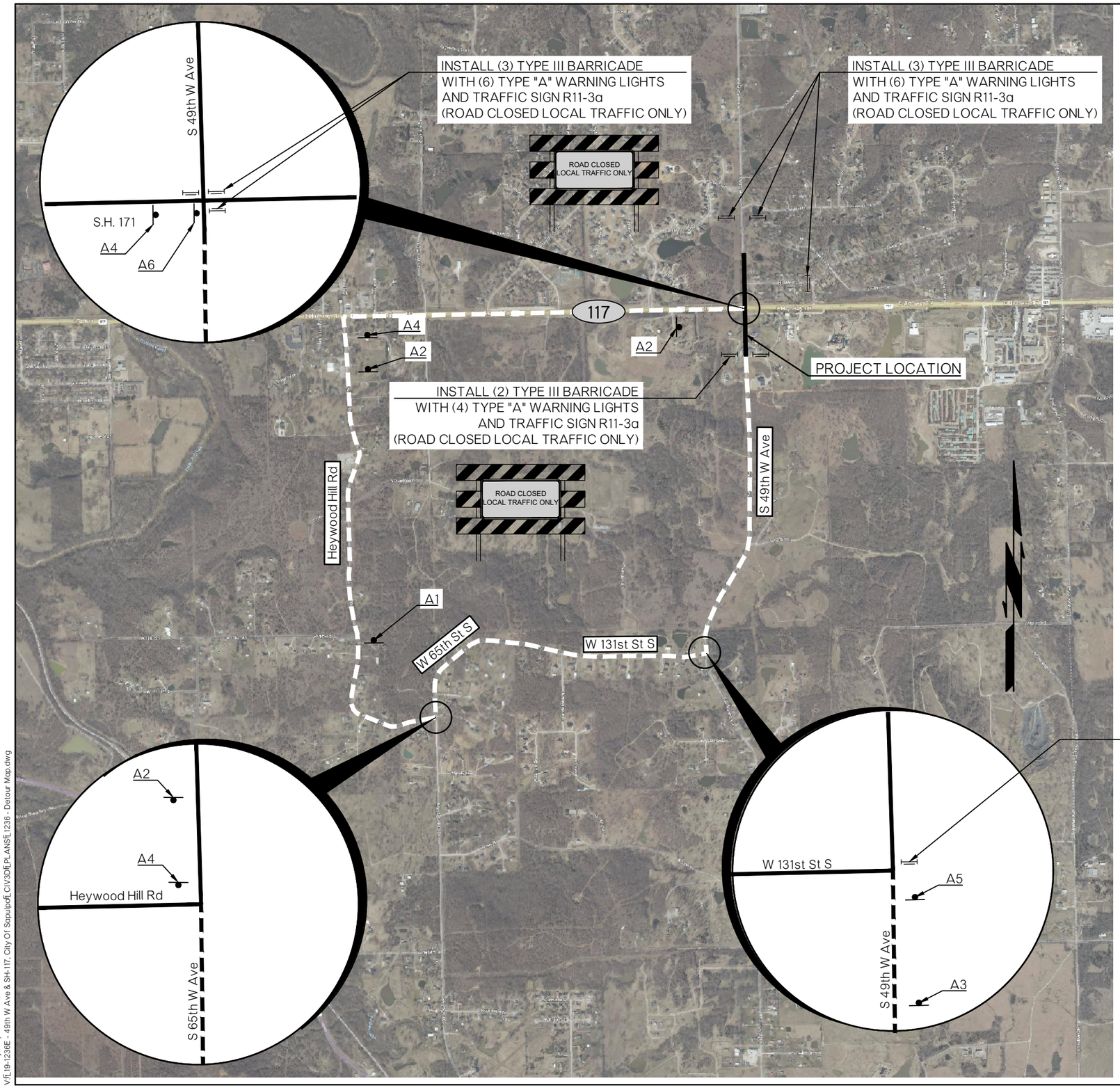
TEC A CLEAR DIRECTION

SIGNAL WIRING DIAGRAM
S.H. 117 & S. 49th W. AVE.

Project No. _____ Sheet No. 23

CREEK COUNTY

6/23/2022 G:\0Projects\10-929 SH-117 & 49th W. Ave. Traffic Signal - Sapulpa\CAD\T003-WIRE.dgn



SIGN SCHEDULE

	A
	DETOUR M4-8 NORTH M3-4 49th W Ave
1	M6-3
2	M5-1(R)
3	M5-1(L)
4	M6-1(R)
5	M6-1(L)
6	END M4-6

NOTES

1. THE CONTRACTOR SHALL PROVIDE A PROPOSED TRAFFIC CONTROL PLAN FOR APPROVAL BY THE ENGINEER PRIOR TO BEGINNING WORK.
2. ALL CONSTRUCTION TRAFFIC CONTROL WILL BE IMPLEMENTED ACCORDING TO CONSTRUCTION PLANS, AND INSTALLED IN A MANNER APPROVED BY THE ENGINEER, IN ACCORDANCE WITH CHAPTER VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, (CURRENT EDITION), AND COMPLIANT WITH APPLICABLE O.D.O.T. STANDARD DRAWINGS.

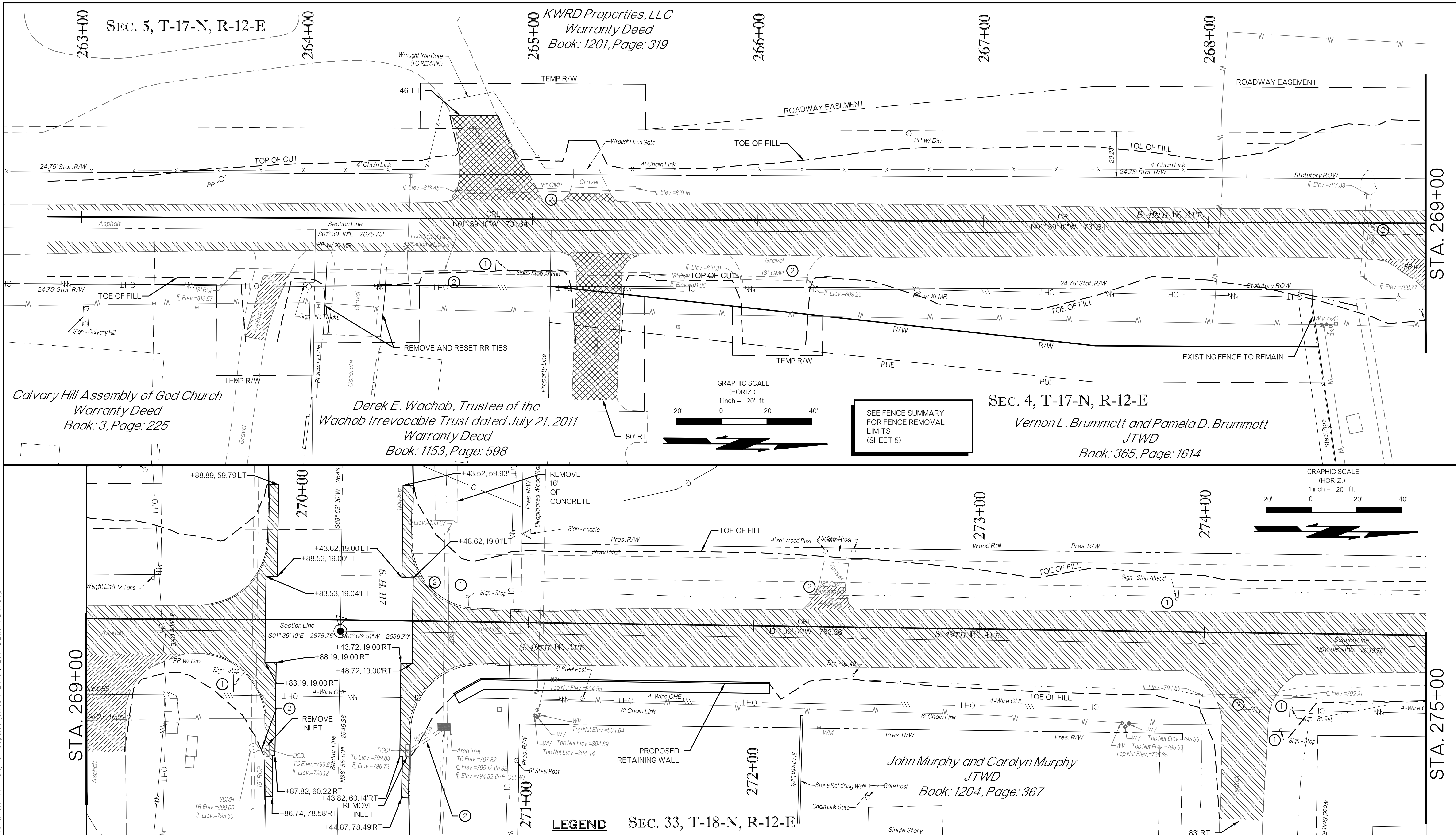
DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

OKLAHOMA DEPARTMENT OF TRANSPORTATION
GUY ENGINEERING SERVICES, INC.

DETOUR MAP

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. STATE JOB NO. _____ SHEET NO. 24

49TH W. AVE. & SH 117


SEC. 5, T-17-N, R-12-E
263+00
264+00
265+00
266+00
267+00
268+00
KWRD Properties, LLC
Warranty Deed
Book: 1201, Page: 319
Wrought Iron Gate (TO REMAIN)
TEMP R/W
46' LT
ROADWAY EASEMENT
TOE OF FILL
Wrought Iron Gate
PP w/ Dip
TOP OF CUT
4' Chain Link
24.75' Stat. R/W
18" CMP
Gravel
Statutory ROW
CRL
N01° 39' 10"W 731.64'
S. 49TH W. AVE.
Section Line
S01° 39' 10"E 2675.75'
Asphalt
PP w/ XFMR
Sign - Stop Ahead
Sign - No Trucks
Sign - Calvary Hill
REMOVE AND RESET RR TIES
PP w/ XFMR
R/W
PUE
EXISTING FENCE TO REMAIN
Property Line
Concrete
80' RT
GRAPHIC SCALE (HORIZ.)
1 inch = 20' ft.
SEE FENCE SUMMARY FOR FENCE REMOVAL LIMITS (SHEET 5)
SEC. 4, T-17-N, R-12-E
Calvary Hill Assembly of God Church
Warranty Deed
Book: 3, Page: 225
Derek E. Wachob, Trustee of the Wachob Irrevocable Trust dated July 21, 2011
Warranty Deed
Book: 1153, Page: 598
Vernon L. Brummett and Pamela D. Brummett
JTWD
Book: 365, Page: 1614
STA. 269+00
270+00
+88.89, 59.79'LT
+43.52, 59.93'LT
REMOVE 16' OF CONCRETE
+43.62, 19.00'LT
+88.53, 19.00'LT
+48.62, 19.01'LT
+83.53, 19.04'LT
S.H. 117
Sign - Enable
Pres. R/W
TOE OF FILL
Wood Rail
273+00
274+00
Weight Limit 12 Tons
Sign - Stop
Sign - Stop Ahead
CRL
N01° 06' 51"W 783.36'
S. 49TH W. AVE.
N01° 06' 51"W 2639.70'
+43.72, 19.00'RT
+88.19, 19.00'RT
+48.72, 19.00'RT
+83.19, 19.00'RT
PP w/ Dip
Sign - Stop
4-Wire OHE
6" Steel Post
6' Chain Link
REMOVE INLET
PROPOSED RETAINING WALL
+87.82, 60.22'RT
+43.82, 60.14'RT
+86.74, 78.58'RT
+44.87, 78.49'RT
REMOVE INLET
Area Inlet
271+00
272+00
Stone Retaining Wall
Gate Post
Chain Link Gate
John Murphy and Carolyn Murphy
JTWD
Book: 1204, Page: 367
Single Story Brick House
83' RT
Sign - Street
STA. 275+00
SEC. 33, T-18-N, R-12-E
Sign - Calvary Hill

LEGEND

1. REMOVE SIGN
2. REMOVE PIPE

- REMOVAL OF ASPHALT PAVEMENT
- REMOVAL OF ASPHALT DRIVEWAY
- REMOVAL OF CONCRETE DRIVEWAY

DESIGN	AB	06/22
DRAWN	SEK	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

DEMOLITION PLAN (SHEET 1 OF 2)

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. SHEET NO. 25

49TH W. AVE. & SH 117

Friday, July 1, 2022 3:17:10 PM V:\19-1236E – 49th W Ave & SH-117, City Of Sapulpa\CIV3D\PLANS\1236-DEMO PLAN.dwg

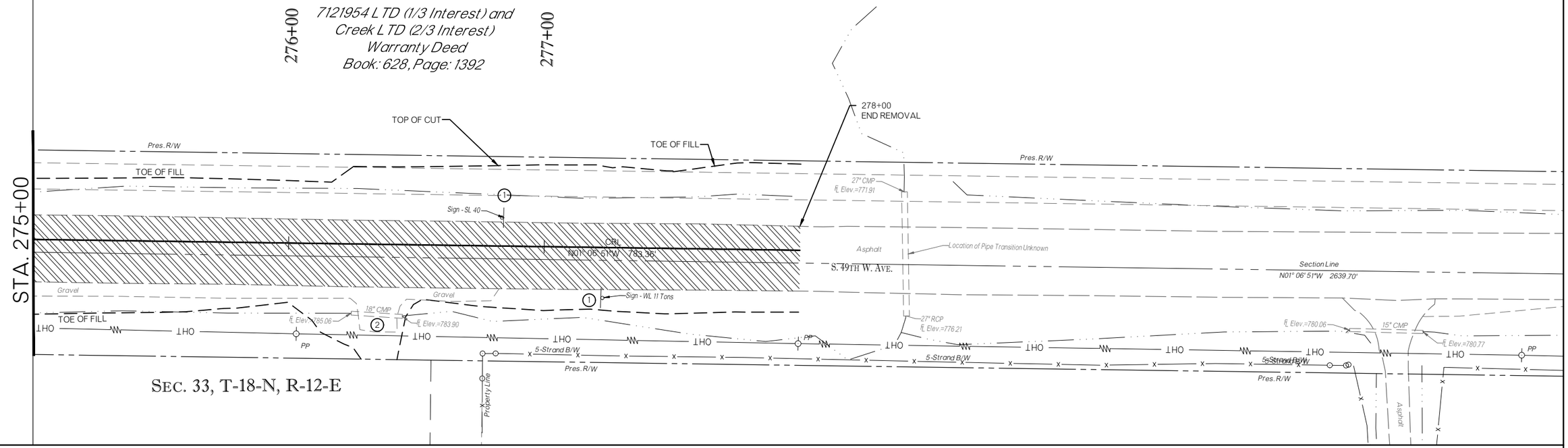
SEC. 32, T-18-N, R-12-E

276+00

277+00

7121954 L TD (1/3 Interest) and
Creek L TD (2/3 Interest)
Warranty Deed
Book: 628, Page: 1392

STA. 275+00



SEC. 33, T-18-N, R-12-E

LEGEND

- (1) REMOVE SIGN
- (2) REMOVE PIPE
- REMOVAL OF ASPHALT PAVEMENT
- REMOVAL OF ASPHALT DRIVEWAY
- REMOVAL OF CONCRETE DRIVEWAY

GRAPHIC SCALE
(HORIZ.)
1 inch = 20' ft.
20' 0 20' 40'

DESIGN	AB	06/22
DRAWN	SEK	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

DEMOLITION PLAN (SHEET 2 OF 2)

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. JOB NO. _____ SHEET NO. 26

49TH W. AVE. & SH 117

Friday, July 1, 2022 3:17:19 PM
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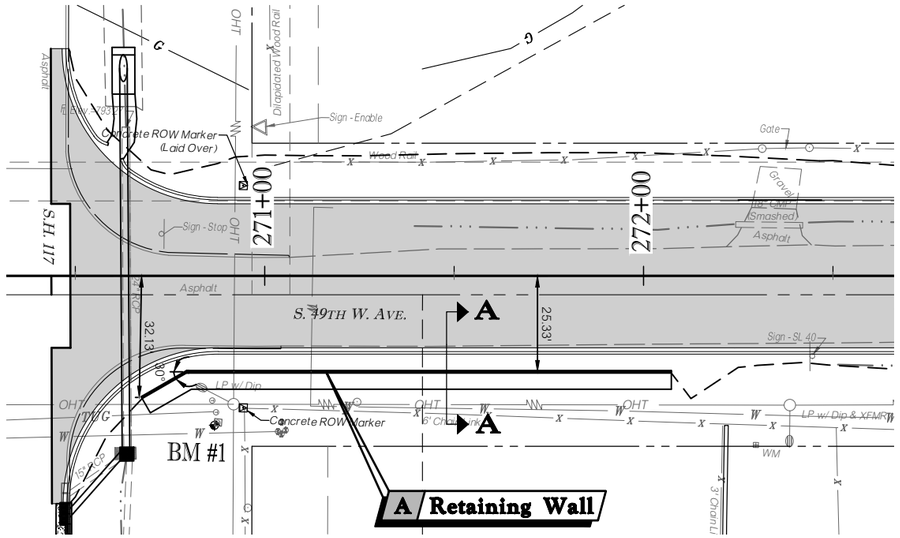


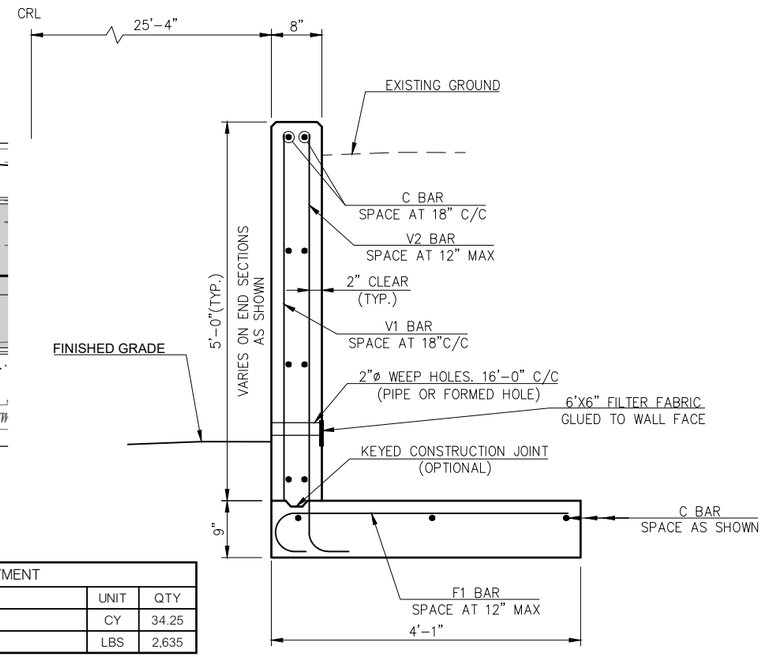
GRAPHIC SCALE
(HORIZ.)
1 inch = 20' ft.
20' 0 20' 40'
5' 0 5' 10'
(VERT)
1 inch = 5' ft.

BAR LIST – RETAINING WALL

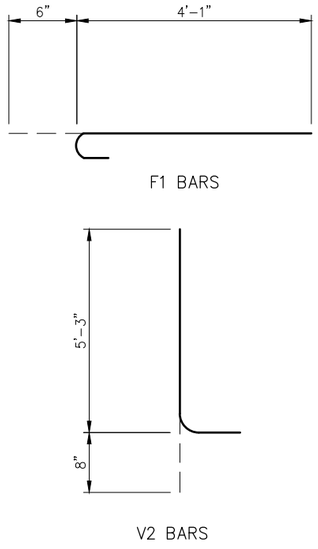
MARK	SIZE	NO.	FORM	LENGTH
C	#4	11	STR.	145'–2"
F1	#5	146	BNT.	4'–7"
V1	#4	98	STR.	4'–10"
V2	#4	146	BNT.	5'–11"

BASIS OF PAYMENT

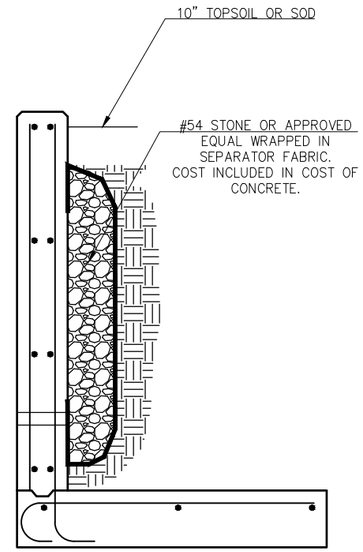
SPEC. NO.	DESCRIPTION	UNIT	QTY
509(B)	CLASS A CONCRETE	CY	34.25
511(A)	REINFORCING STEEL	LBS	2,635



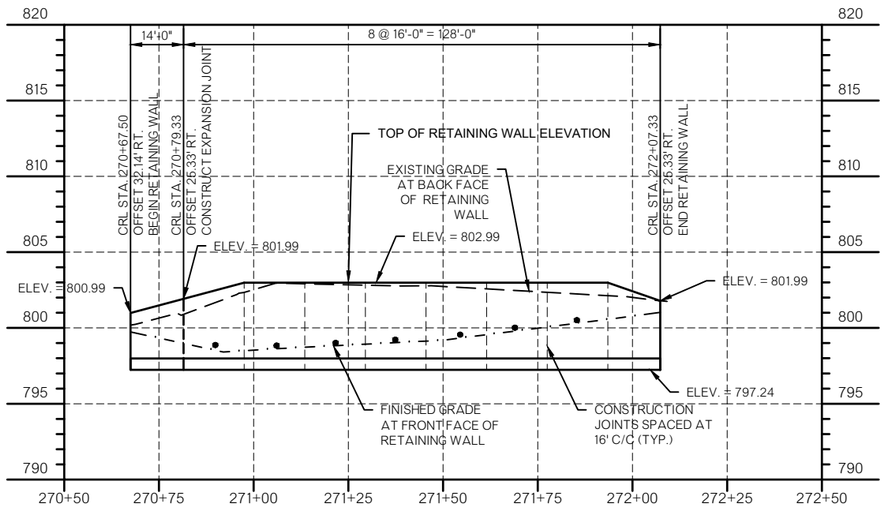
SECTION A-A
NOT TO SCALE



BAR BENDING DIAGRAM
NOT TO SCALE



FILTER FABRIC DETAIL
NOT TO SCALE

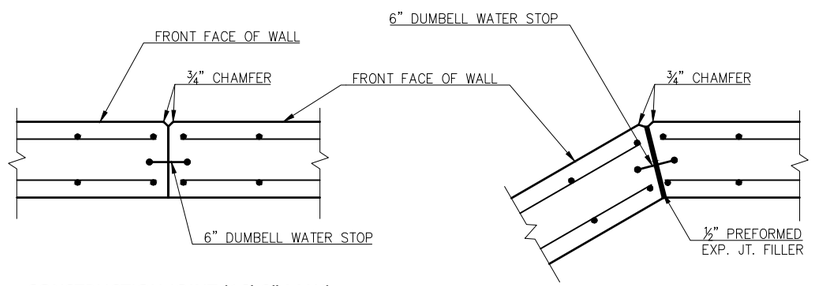


A Retaining Wall

CONSTRUCTION NOTES

1. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE 2019 OKLAHOMA STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION AND SPECIAL PROVISIONS.
2. ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" CHAMFER UNLESS OTHERWISE SHOWN OR NOTED. ALL CHAMFER STRIPS SHALL BE SIZED LUMBER.
3. ALL CONCRETE SHALL BE POURED IN THE DRY.
4. CONCRETE SHALL BE CLASS A f'c=3,000 P.S.I. MINIMUM STRENGTH AT 28 DAYS.
5. NO WELDING OR TACK WELDING OF REINFORCING BARS WILL BE PERMITTED.
6. ALL BAR BEND DIMENSIONS ARE OUT TO OUT.
7. ALL REINFORCING STEEL SHALL HAVE 2" CLEAR COVER UNLESS OTHERWISE SHOWN OR NOTED.
8. SPLICES NOT SPECIFICALLY SHOWN AND DIMENSIONED ON THESE PLANS SHALL BE STAGGERED SUCH THAT NO MORE THAN HALF OF THE SPLICES WILL OCCUR WITHIN ONE SLICE LENGTH.
9. REINFORCING STEEL SHALL BE ASTM A615 GRADE 60.
10. CONTRACTOR TO INSTALL HYDROPHILIC WATERSTOP IN ALL HORIZONTAL CONSTRUCTION JOINTS. USE HYDROTITE MODEL CJ 1020-2K-SH OR CJ 0725-3K-SDH OR APPROVED EQUAL.
11. ON WALL SECTIONS WITH SLOPING TOPS, CUT V1 AND V2 BARS TO MAINTAIN 2" COVER AT TOP.

NOTE:
WATERSTOP AND EXPANSION JOINT FILLER SHALL BE PLACED FULL HEIGHT OF WALL AND SHALL BE INCLUDED IN OTHER ITEMS OF WORK.



CONSTRUCTION JOINT (16'-0" MAX)
NOT TO SCALE

EXPANSION JOINT
NOT TO SCALE

DESIGN	AB	06/22
DRAWN	BLP	06/22
CHECKED	RED	06/22
APPROVED	RAA	06/22
SQUAD		

CITY OF SAPULPA
GUY ENGINEERING SERVICES, INC.

RETAINING WALL DETAILS

COUNTY CREEK HWY./RD. 49TH W. AVE. COUNTY JOB NO. _____ SHEET NO. 27

Thursday, September 22, 2022 4:21:41 PM
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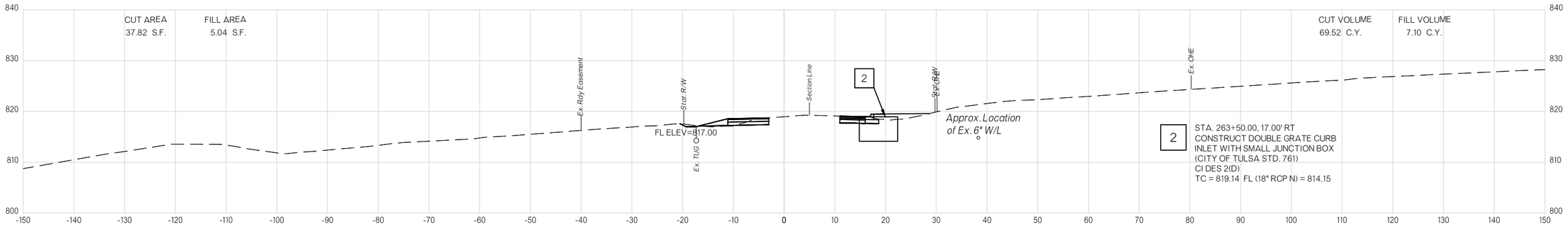

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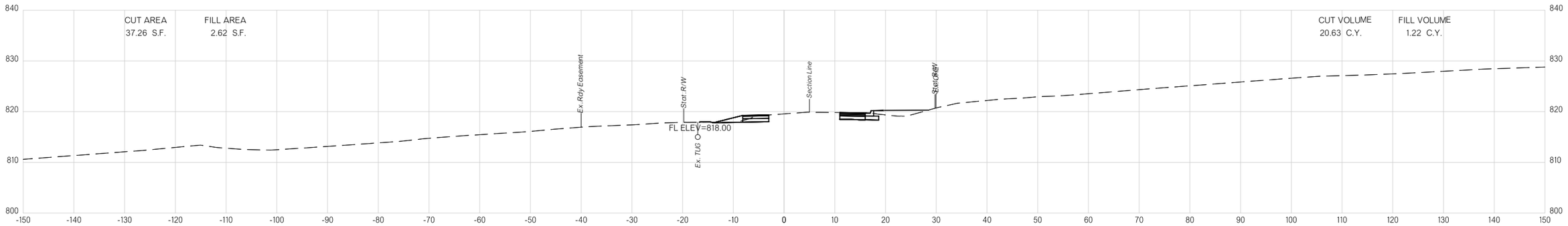

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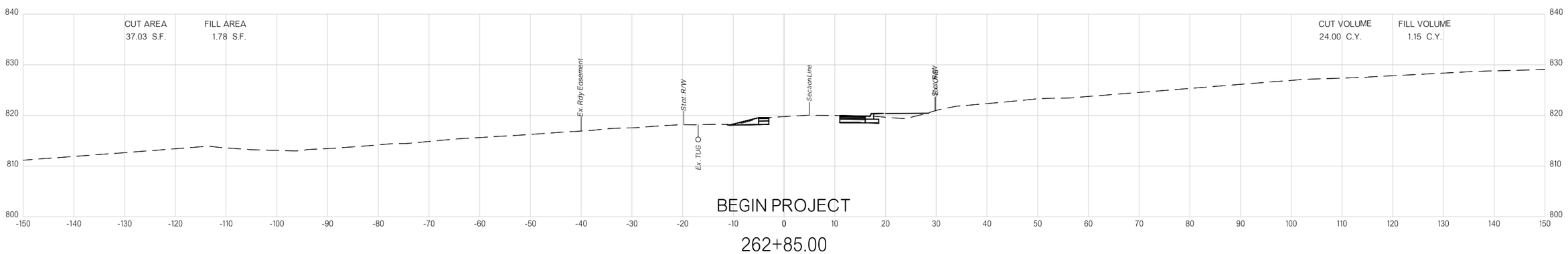
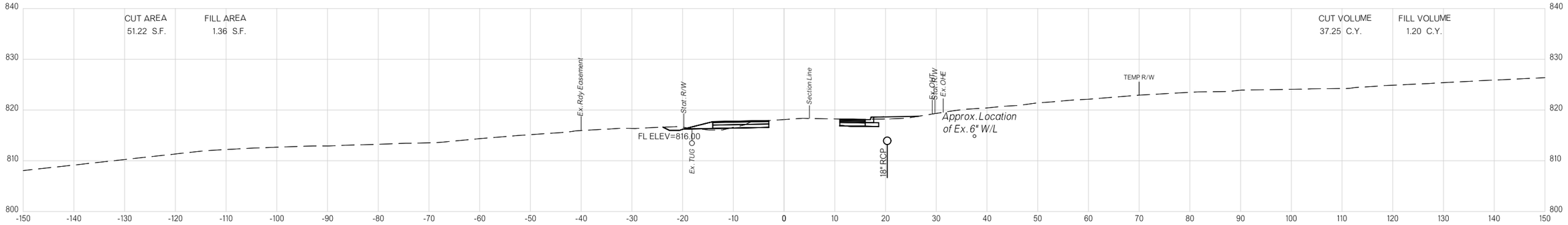


BEGIN PROJECT

262+85.00

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. STATE JOB NO. _____ SHEET NO. X01



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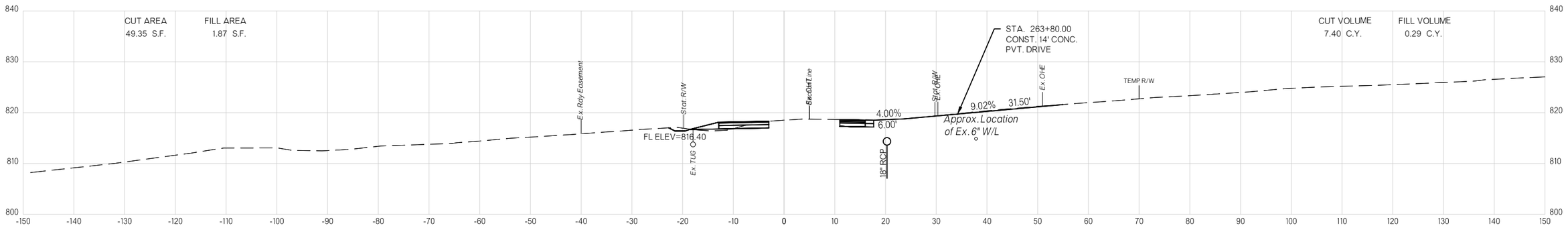

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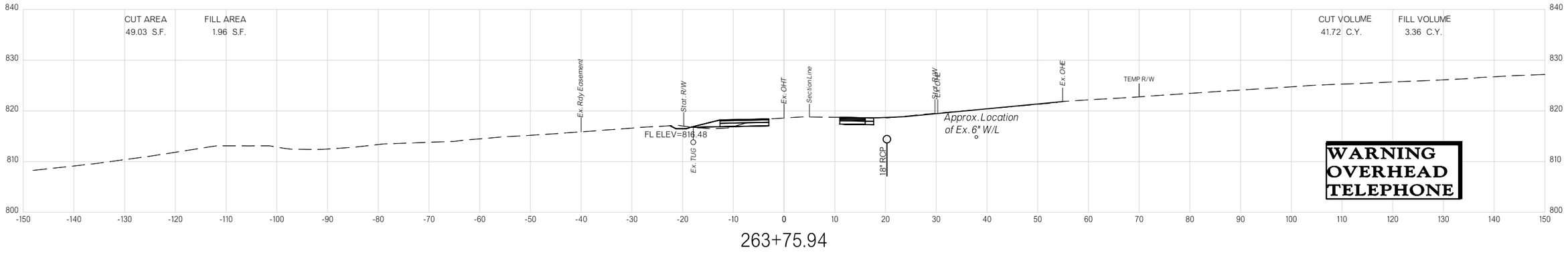
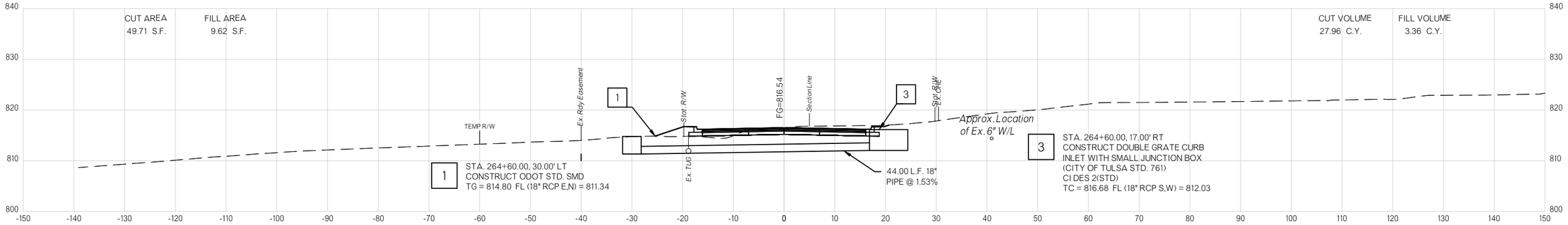


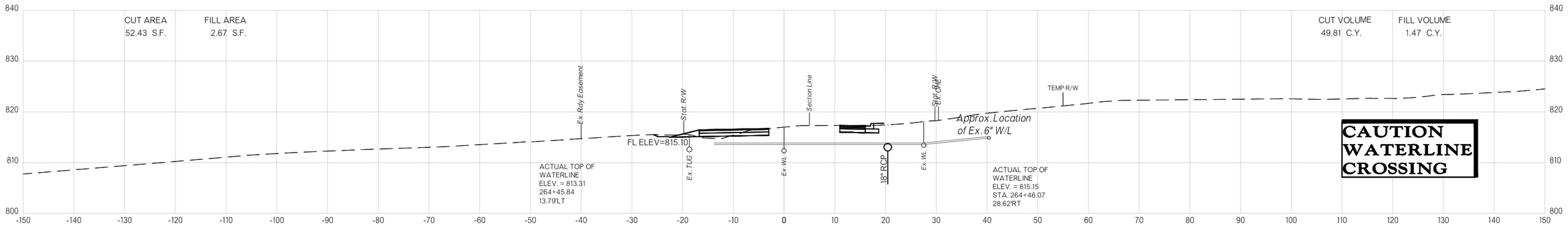
263+75.94

Friday, September 23, 2022 8:53:40 AM
V:\19-1236E - 49th W Ave & SH-117, City Of Sopulpa\CIV3D\PLANS\1236-CROSS SETIONS.dwg

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. STATE JOB NO. _____ SHEET NO. X02



264+60.00



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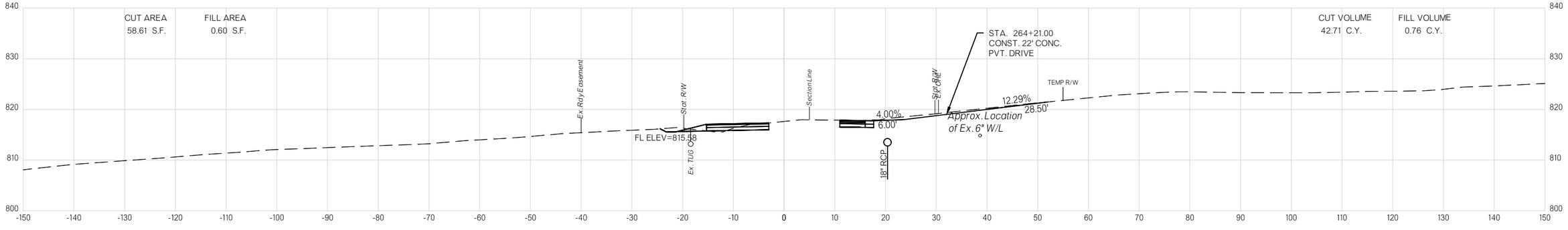

264+21.00

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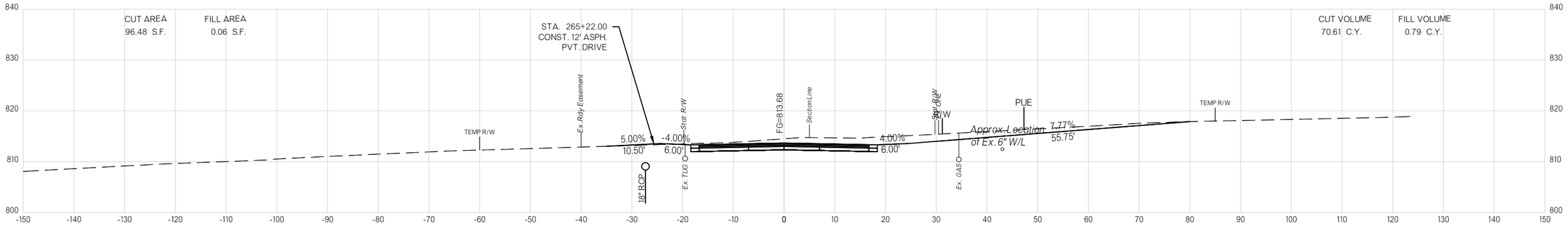

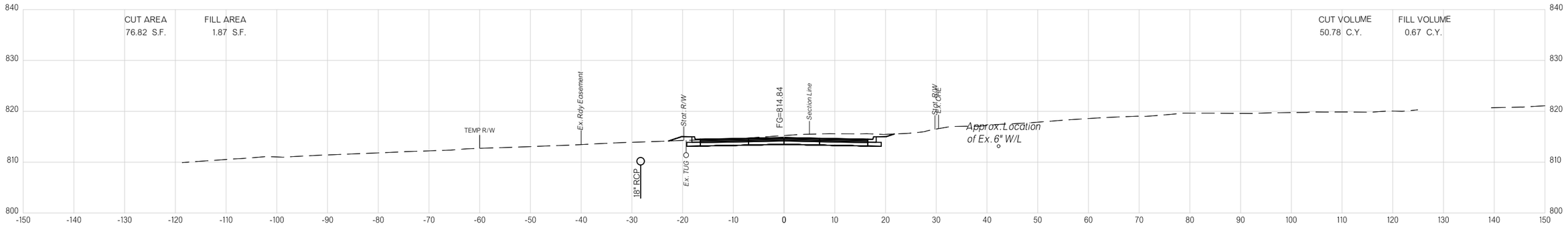

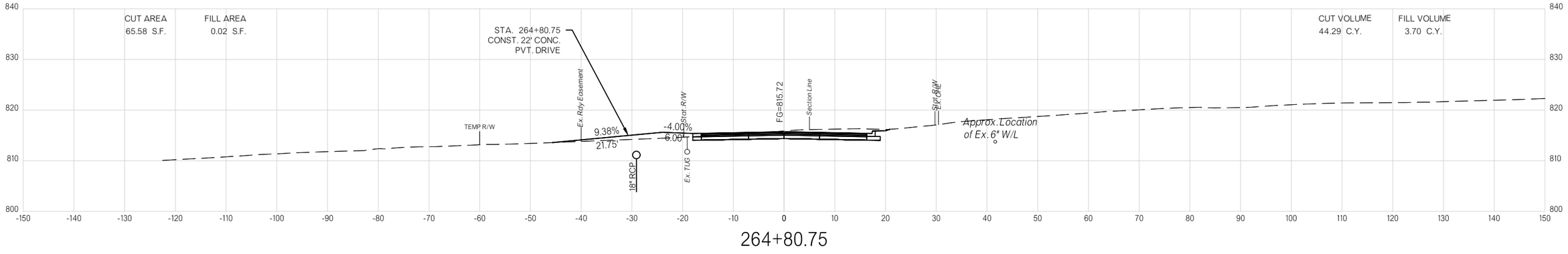

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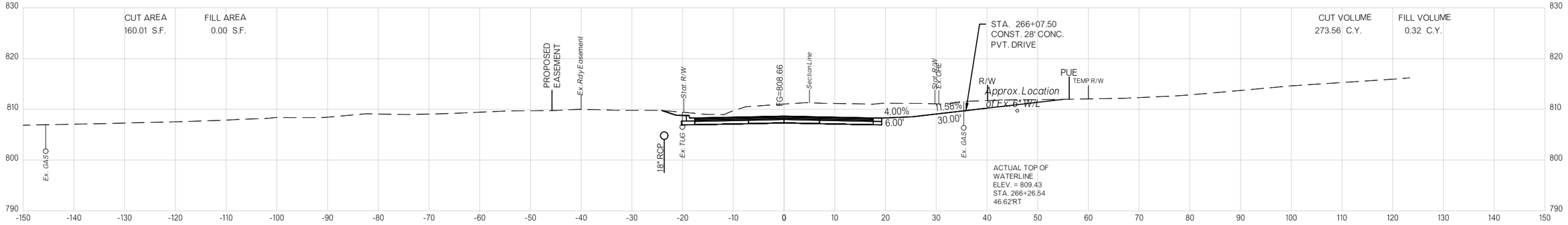

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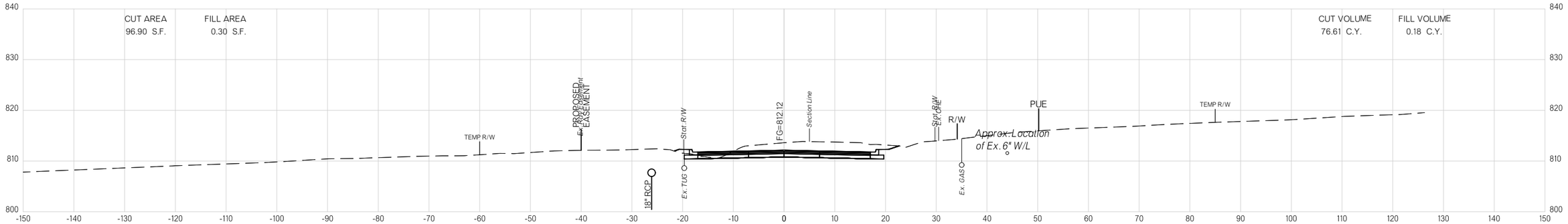
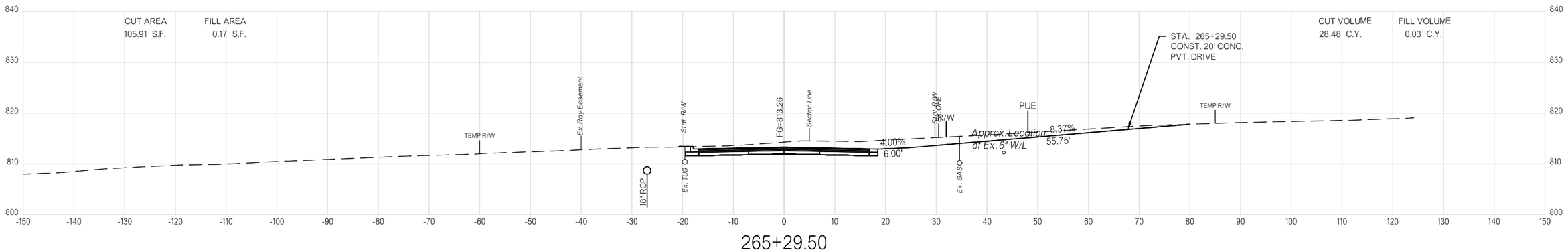
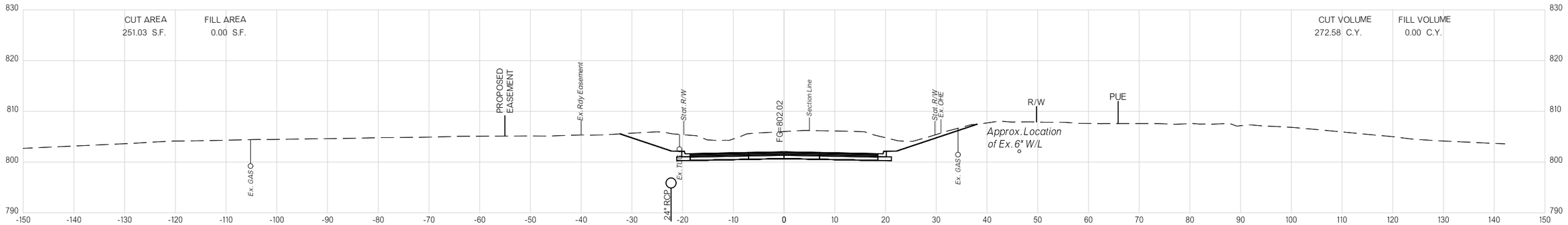


265+50.00

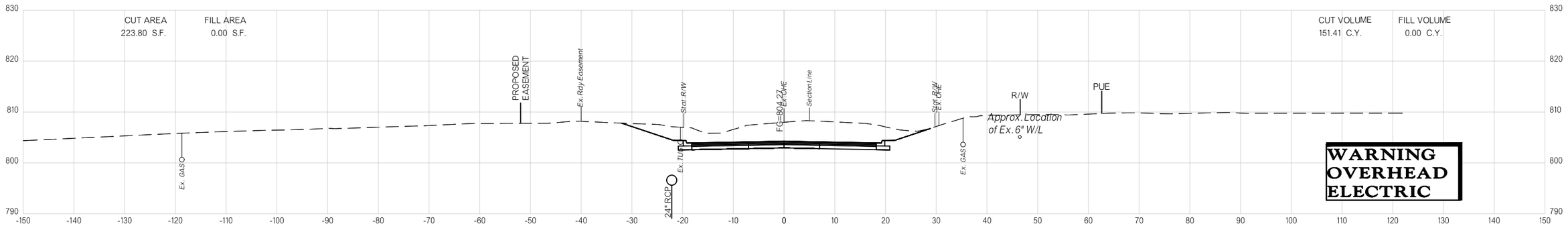


265+29.50

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. STATE JOB NO. _____ SHEET NO. X05



267+00.00



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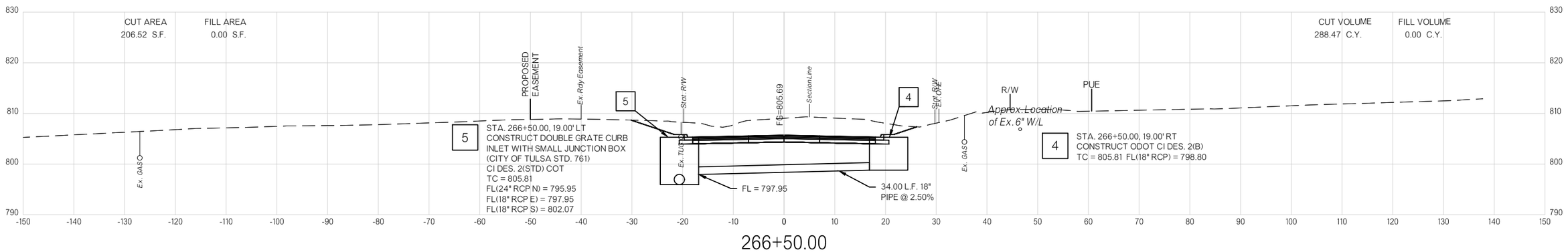
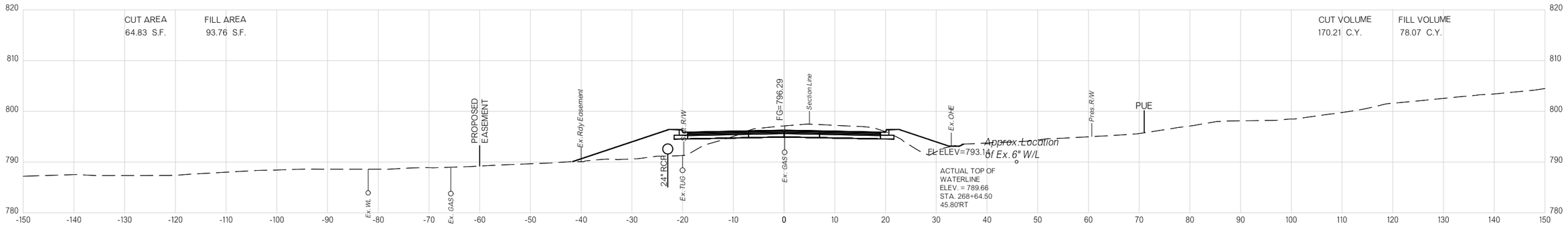


266+50.00

COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. STATE JOB NO. _____ SHEET NO. X06



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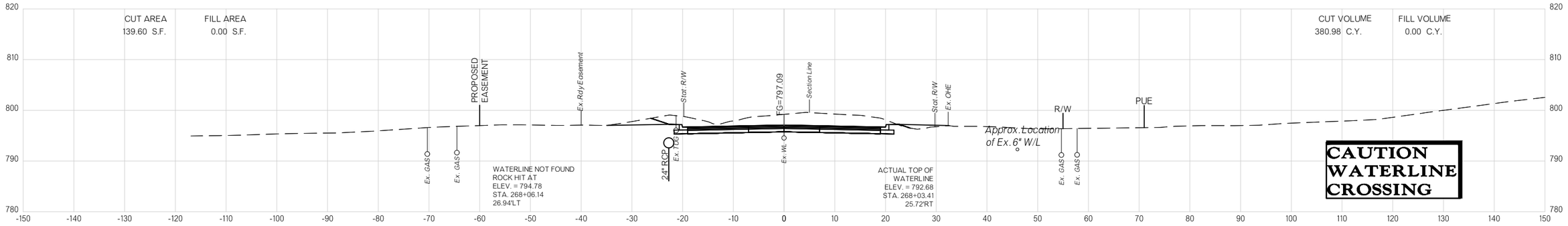

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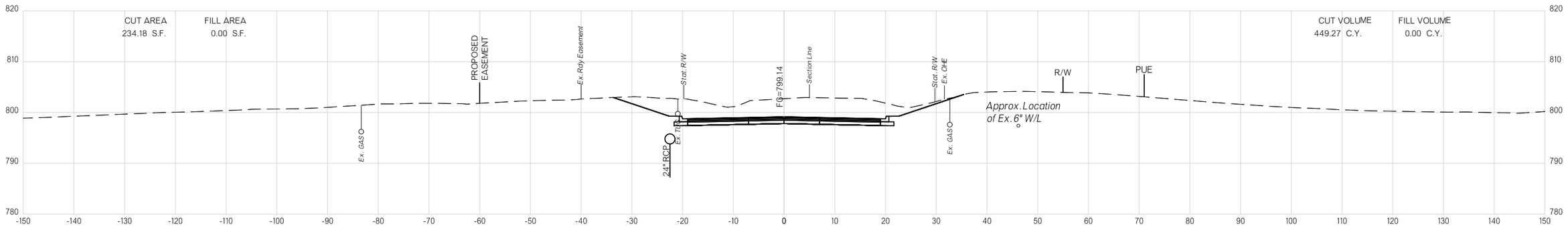

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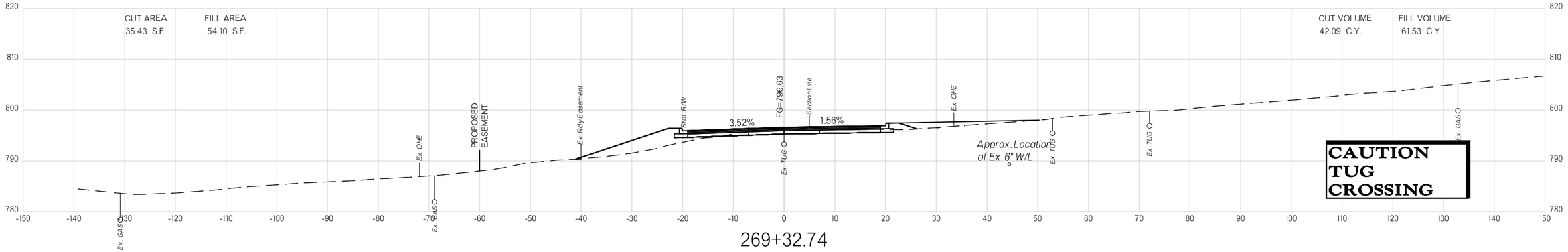

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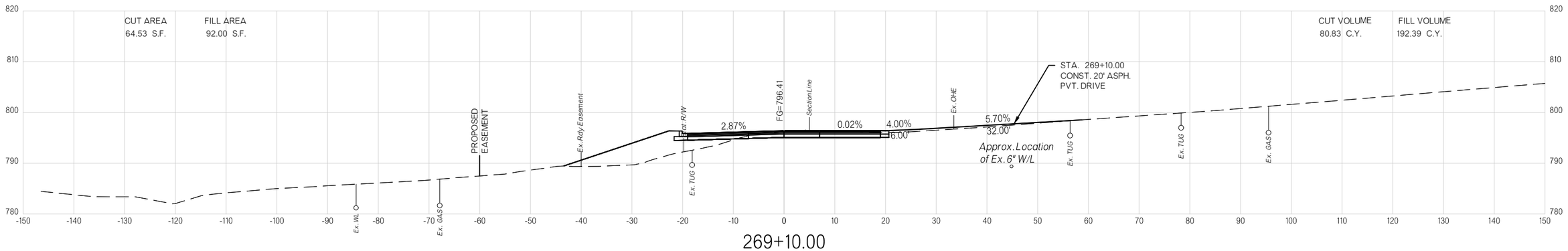

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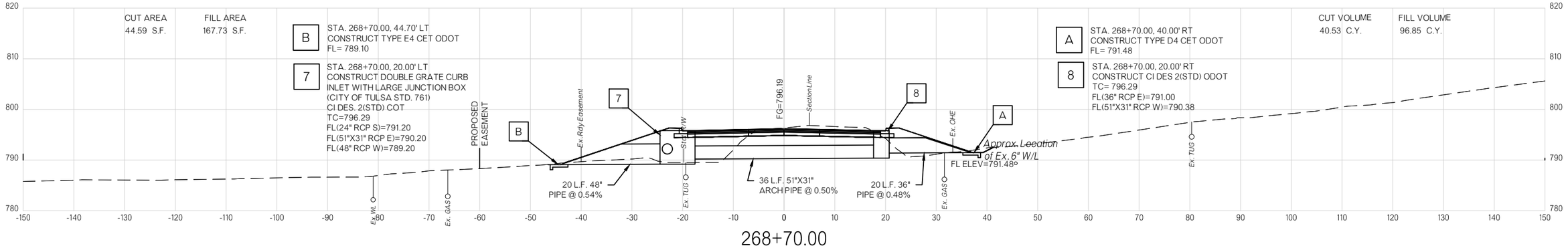

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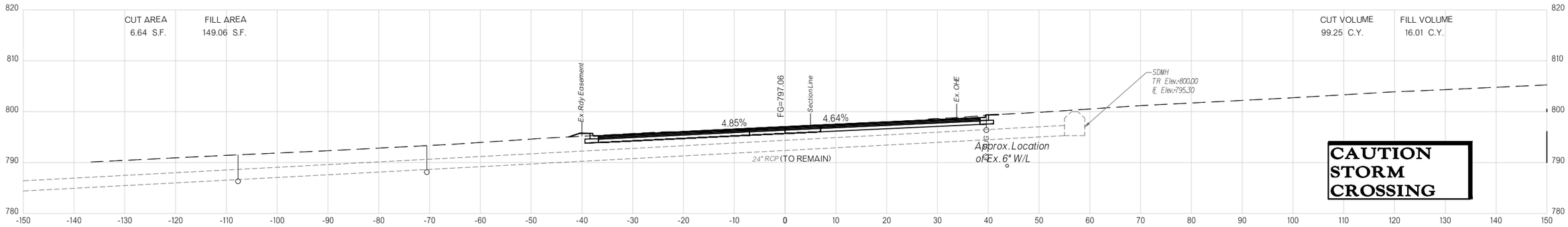

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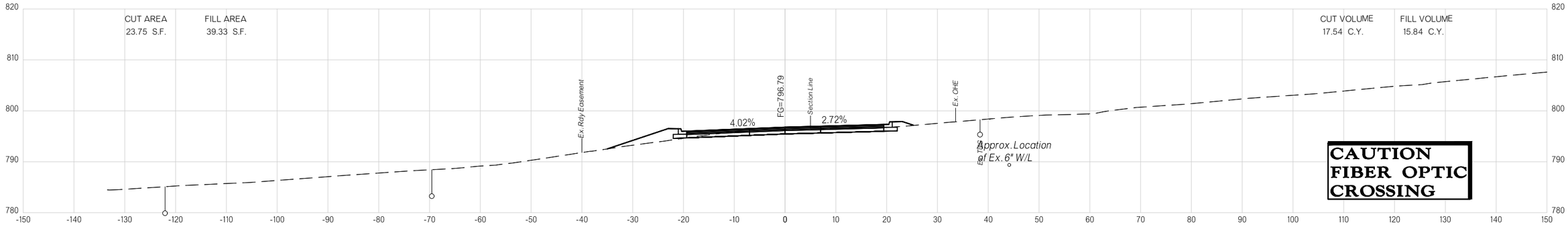

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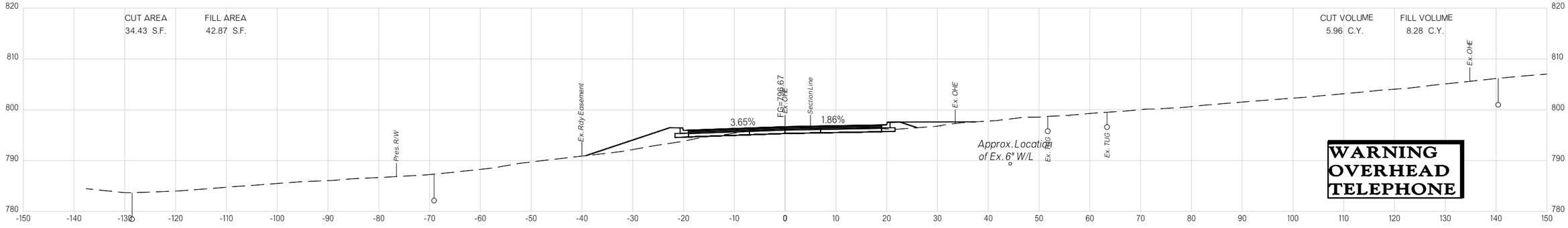

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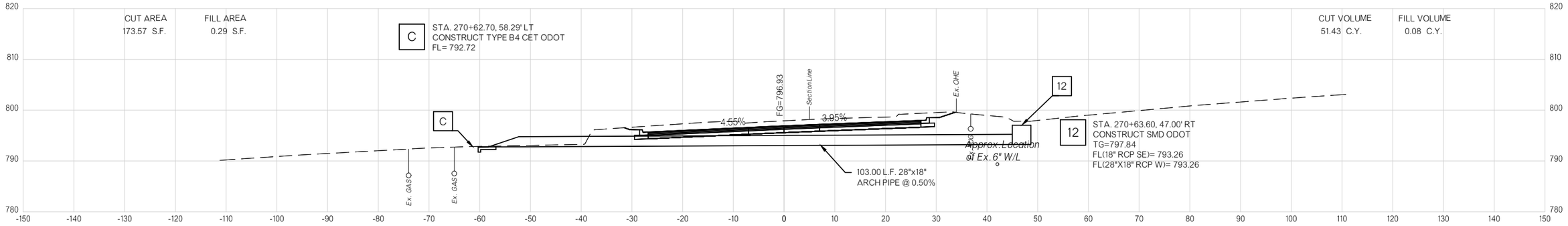

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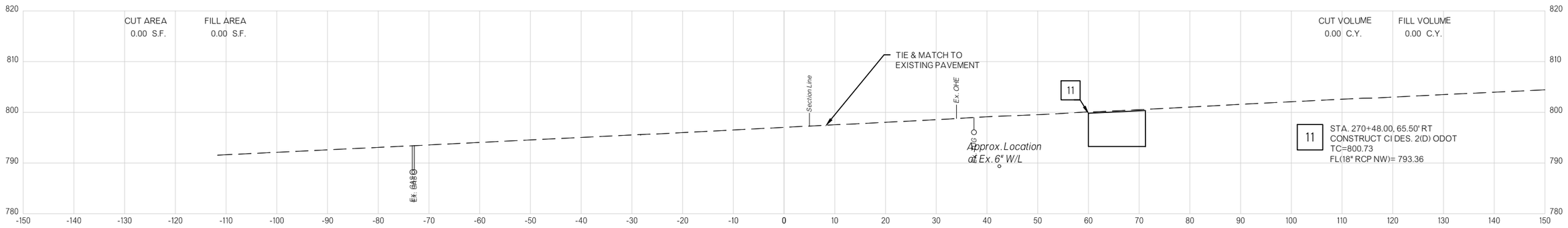

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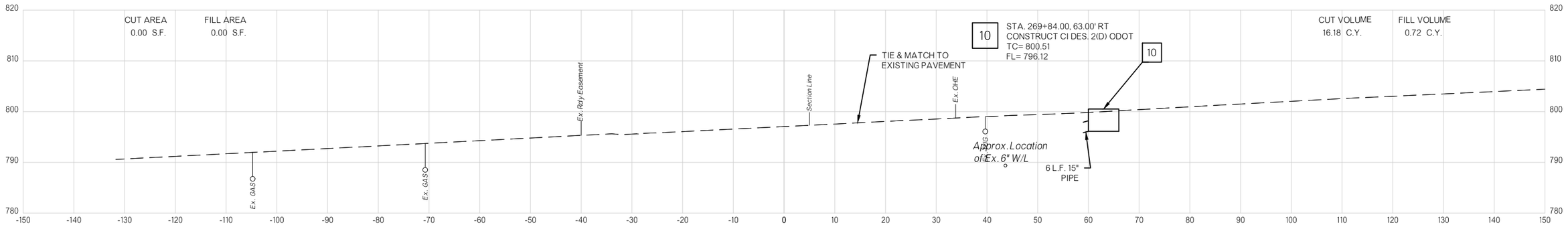

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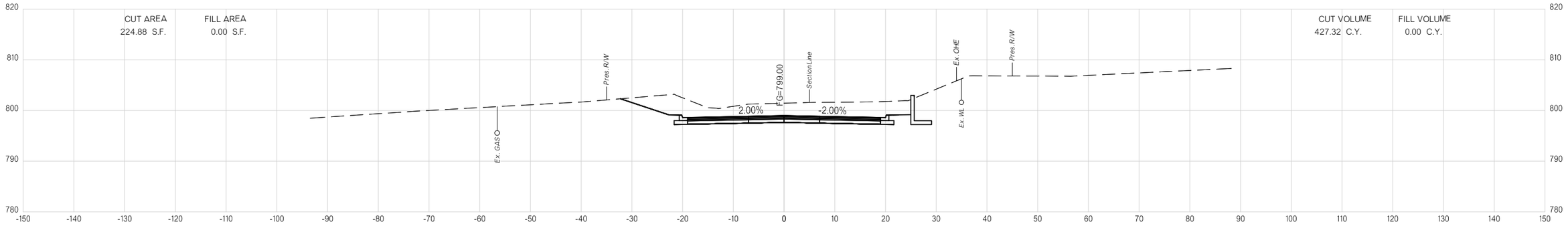

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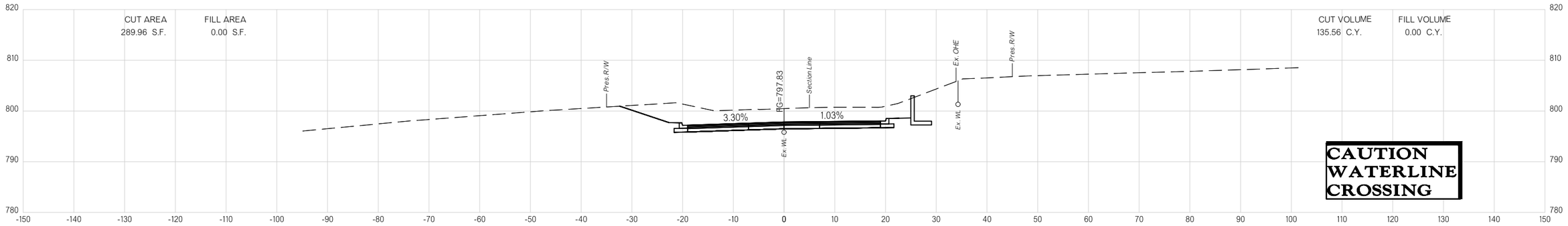

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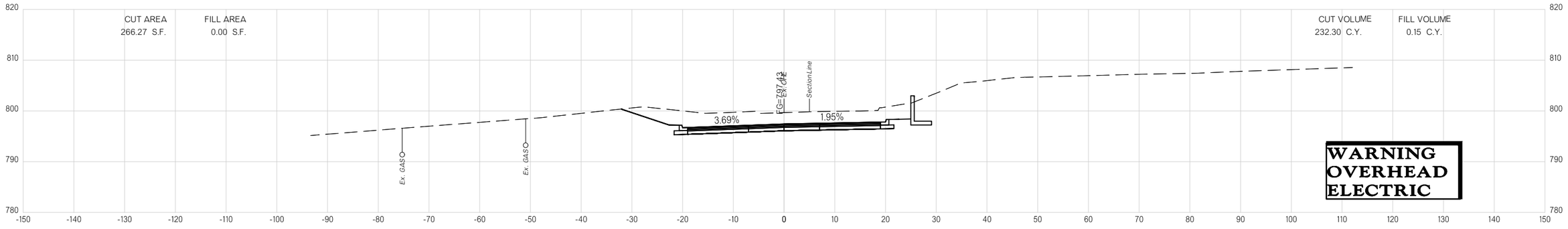

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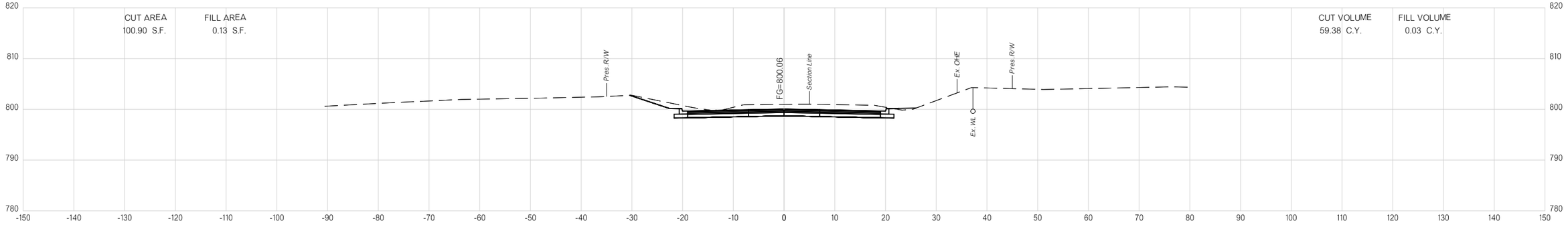

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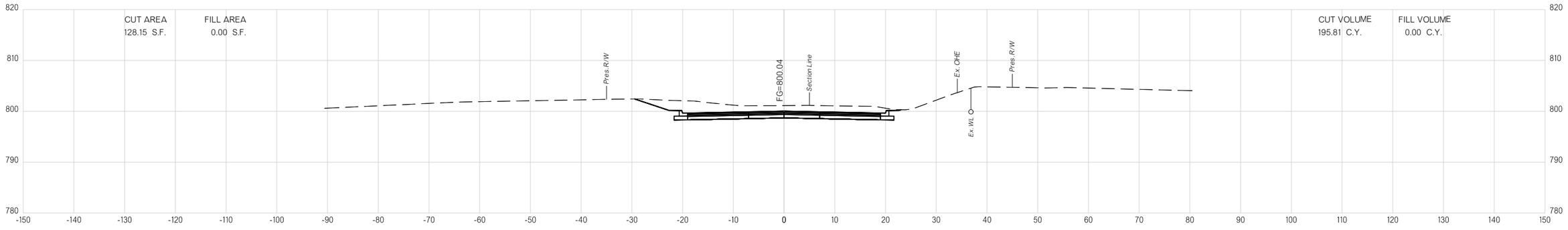

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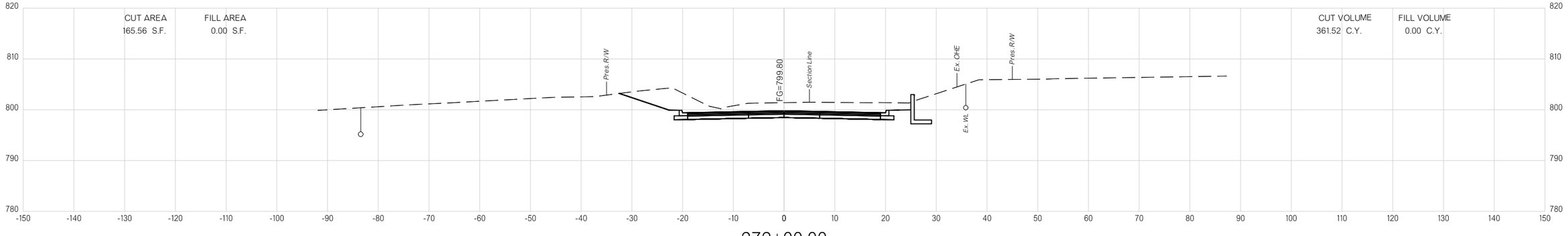

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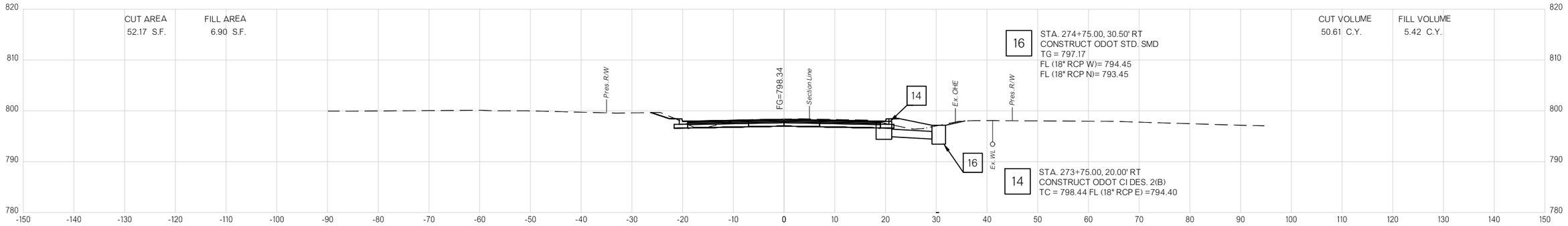

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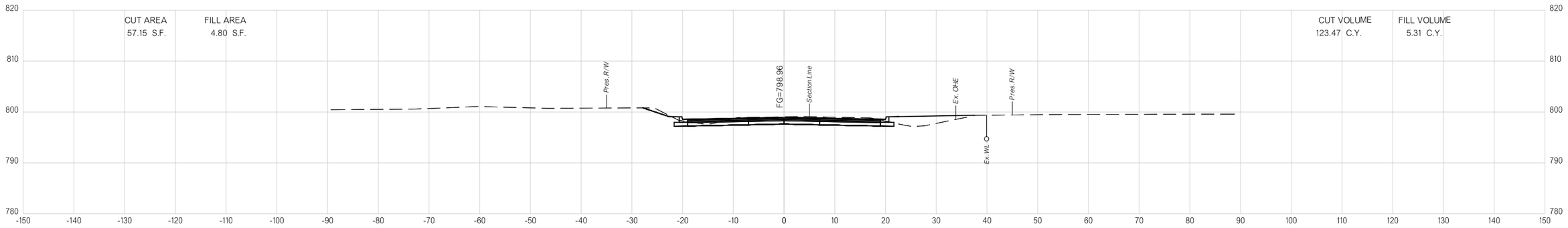

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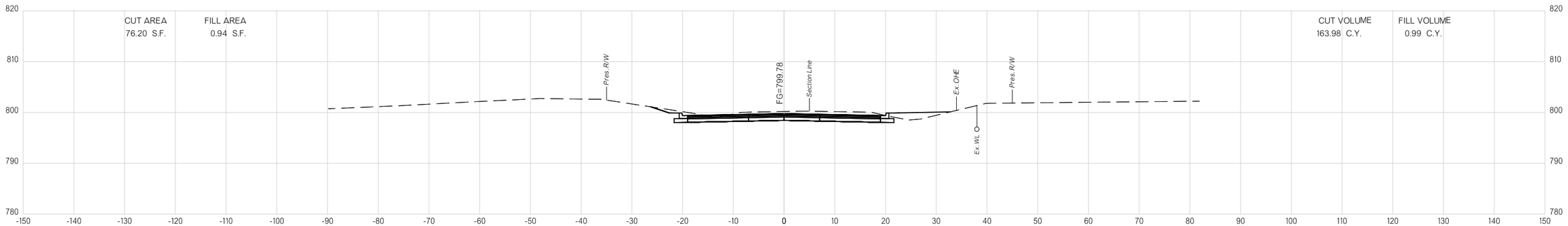

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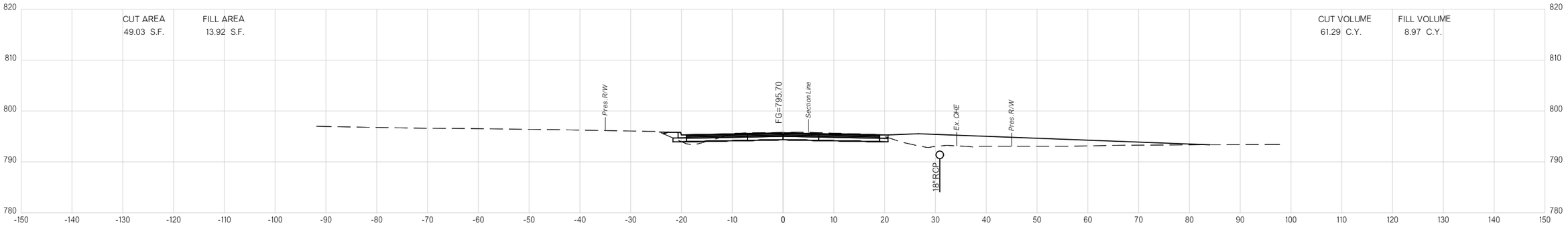

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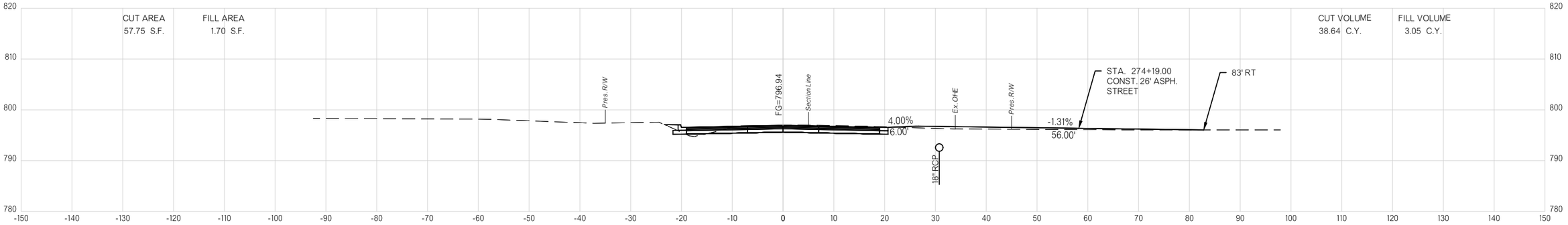

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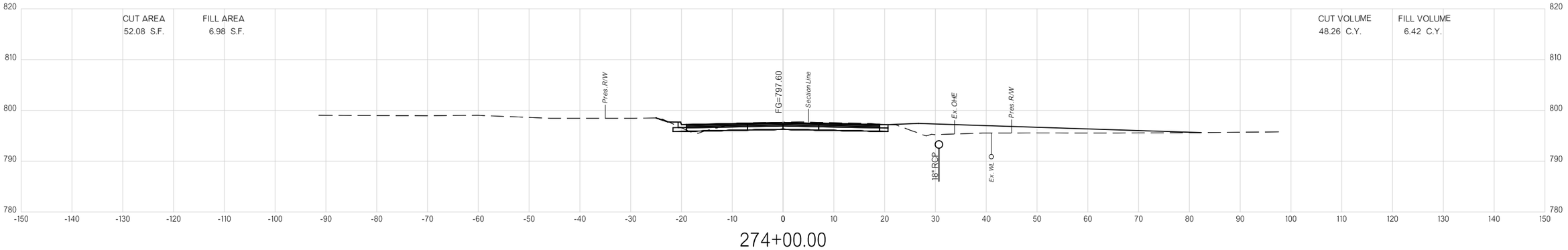

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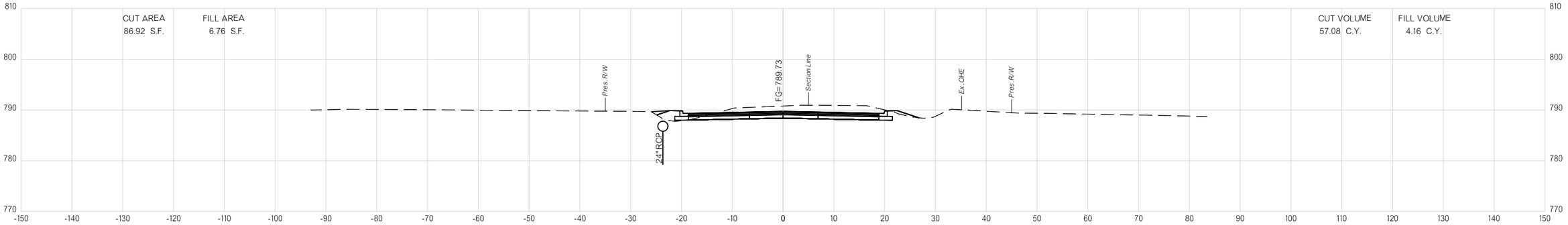

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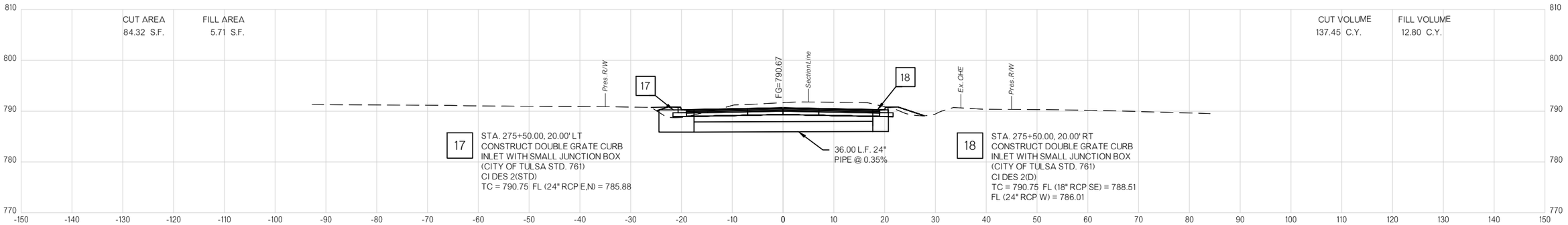

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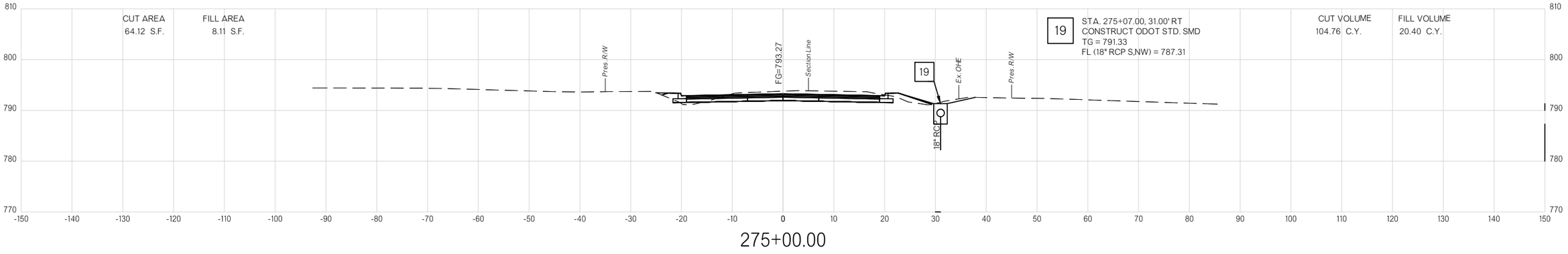

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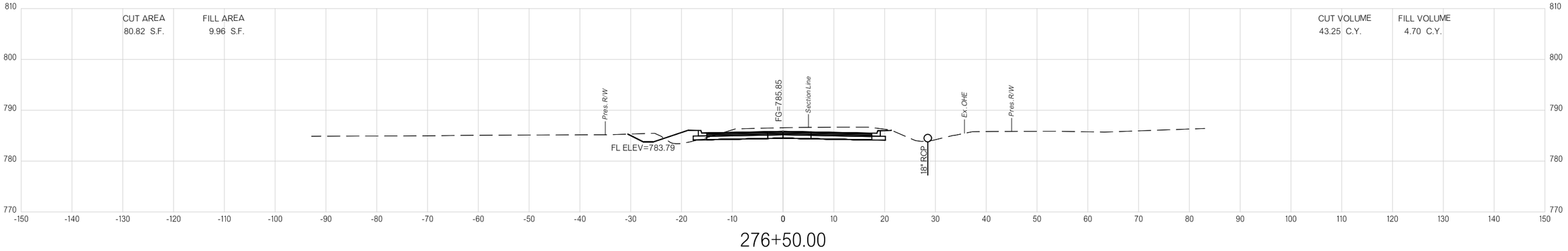

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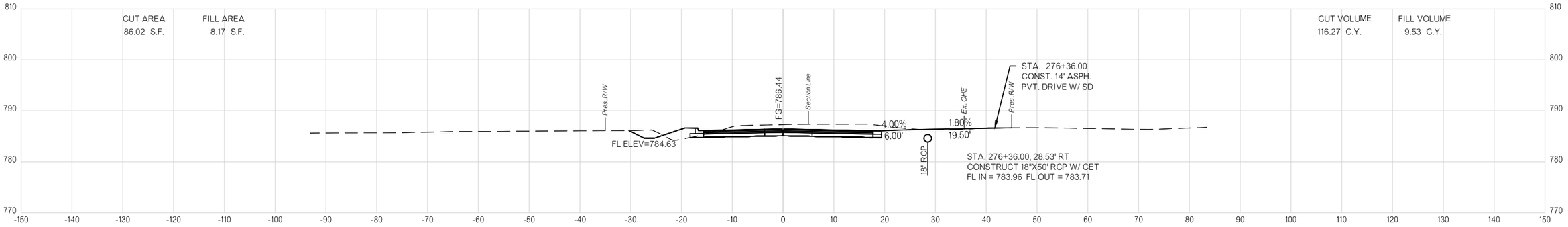

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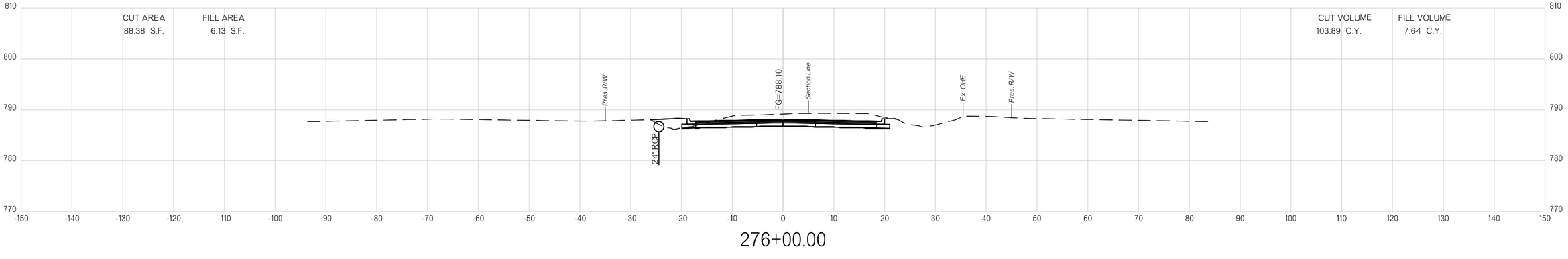

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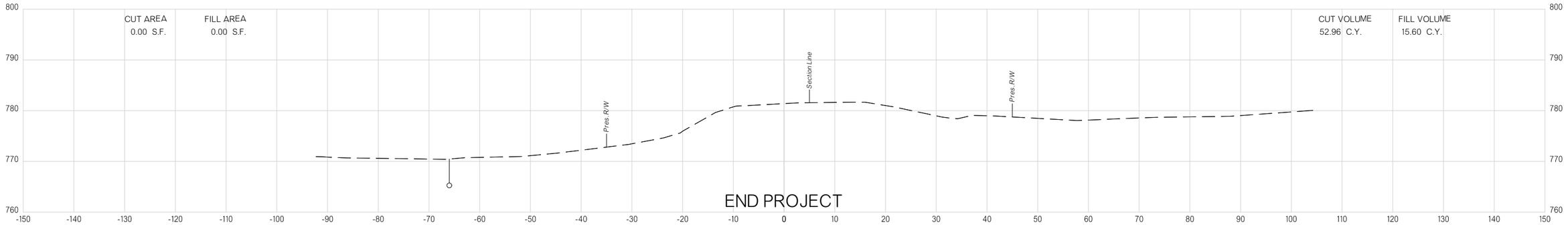

END PROJECT

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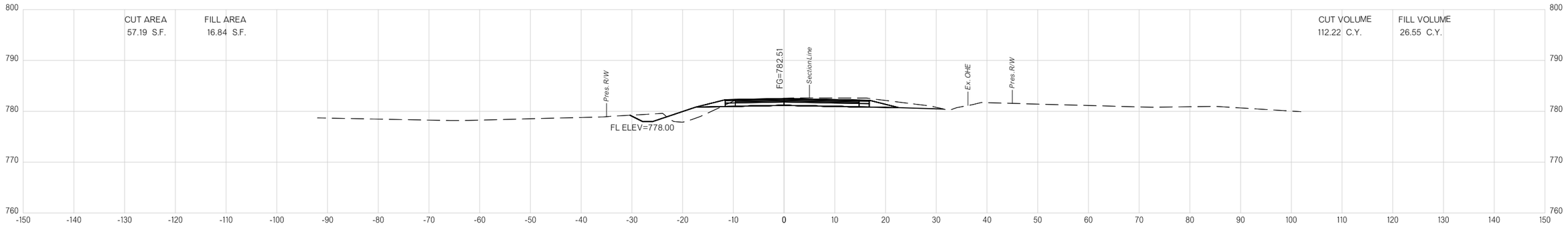

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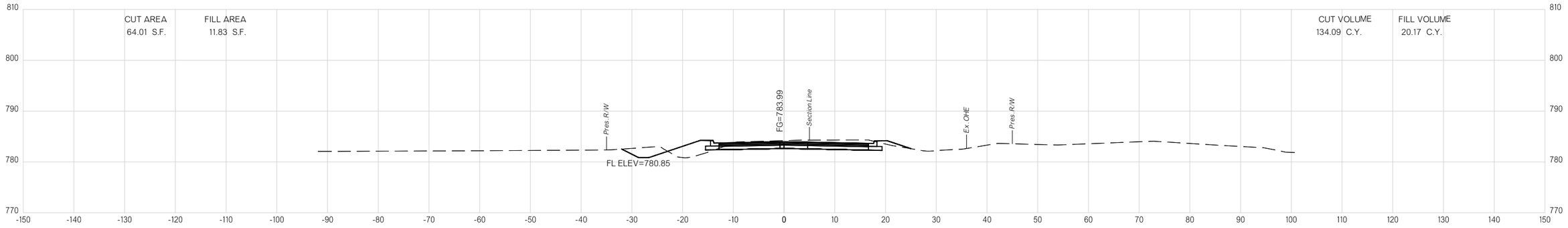

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Friday, September 23, 2022 8:56:10 AM
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COUNTY CREEK HIGHWAY/ROAD 49TH W. AVE. STATE JOB NO. _____ SHEET NO. X17

CREEK COUNTY
RURAL WATER DISTRICT NO. 2
49th W. AVE. AND SH-117
WATERLINE RELOCATION
JULY 2022

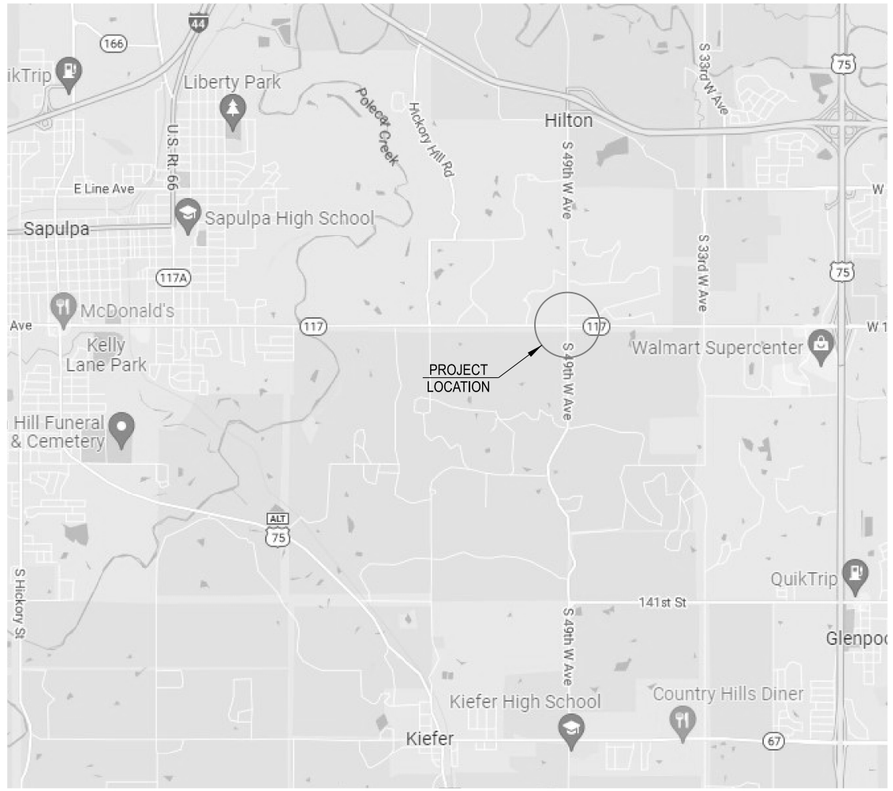
LEGEND

- PROPOSED WATERLINE
- GATE VALVE
- REDUCER
- ARV — COMBINATION VACUUM & AIR RELEASE VALVE
- FLUSHING POST HYDRANT ASSEMBLY
- CREEK CROSSING SAMPLER
- EXISTING WATER VALVE
- EXISTING WATER METER
- EXISTING GAS METER
- W — EXISTING WATERLINE
- O — EXISTING OIL PIPELINE
- ELECTRIC POWER LINE
- ELECTRIC POWER POLE w/GUY WIRE & ANCHOR
- G — EXISTING GAS PIPELINE
- TUG — UNDERGROUND TELEPHONE LINE
- T — TELEPHONE PEDESTAL
- X — X — FENCE
- EXISTING EASEMENT
- PRES. R/W
- REALIGNMENT R/W
- PROPOSED EASEMENT
- PROPERTY LINE
- GUARDRAIL
- C/L CREEK

CONVENTIONAL SIGNS & SYMBOLS

- PROPOSED ROAD
- RANGE & TOWNSHIP LINES
- SECTION LINES
- QUARTER SECTION LINES
- 1/16th SEC. LINES
- 1/64th SEC. LINES
- X — FENCES
- GROUND LINE
- EXISTING ROADS
- BASE LINE
- +2% -2% — GRADE LINES
- TELEPHONE & TELEGRAPH
- POWER LINES
- DRAINAGE STRUCTURES-IN-PLACE
- DRAINAGE STRUCTURES-NEW
- PRES.R/W — R/W — RIGHT-OF-WAY LINES-EXISTING
- RIGHT-OF-WAY LINES-NEW
- RIGHT-OF-WAY MARKERS-IN PLACE
- RIGHT-OF-WAY MARKERS-REMOVE & RESET
- RIGHT-OF-WAY MARKERS-NEW
- CONTROLLED ACCESS
- SS — EXISTING SANITARY SEWERS
- G — EXISTING GAS LINES
- W — EXISTING WATER LINES
- TUG — EXISTING TELEPHONE CABLES UNDERGROUND

- RAILROADS
- INTERSTATE HWY
- U.S. HIGHWAY
- STATE HIGHWAY
- OIL WELLS
- BUILDINGS



LOCATION MAP
N.T.S.

INDEX OF SHEETS

BOARD OF DIRECTORS

HARVEY MORRIS	PRESIDENT
BILL MARTIN	VICE-PRESIDENT
LARRY BAYOUTH	SECRETARY
CHARLES VOLTURO	TREASURER
PAT SCOTT	MEMBER
JIM PILKINGTON	MEMBER
ROY KIRBY	MEMBER
CINDY HUBBLE	MANAGER

PREPARED AND SUBMITTED BY:

POE & ASSOCIATES, INC.
4606 S. GARNETT RD., SUITE 600
TULSA, OKLAHOMA 74146-5200
(918) 665-8800
CONSULTING ENGINEERS

CERTIFICATE OF AUTHORIZATION NO. CA 541 P.E., L.S. RENEWAL DATE 06-30-23

LICENSED PROFESSIONAL ENGINEER — Ryan W. Smith — 24015 — OKLAHOMA — 9/19/22

SUMMARY OF WATER QUANTITIES

WATER LINE BASE BID (LIKE IN KIND)

ITEM	SPEC. NO.	ITEM DESCRIPTION	PAY ITEM NOTES	UNIT	QUANTITY
1	301	RIGHT-OF-WAY CLEARING AND RESTORING, COMPLETE IN PLACE	4,5,6,7,22	LF	295
2	302	EXCAVATION AND BACKFILL, UNCLASSIFIED	14	CY	148
3	306	6" SDR-21 CLASS 200 PVC	1,2,3,9,10,16	LF	114
4	306	6" SDR-21 CLASS 200 PVC (RJ)	1,2,3,8,9,10,16	LF	583
5	308	3/4" SHORT METER RESET	15	EA	1
6	309	6" X 6" D.I. TEE (RJ)	2,8,11,13	EA	2
7	309	12" 45° D.I. BEND (RJ)	2,8,11,13	EA	2
8	309	6" 45° D.I. BEND (RJ)	2,8,11,13	EA	16
9	309	6" D.I. SLEEVE (RJ)	2,8,11,13	EA	6
10	309	8" D.I. SLEEVE (RJ)	2,8,11,13	EA	1
11	309	12" D.I. SLEEVE (RJ)	2,8,11,13	EA	1
12	309	12" X 6" D.I. REDUCER (RJ)	2,8,11,13	EA	1
13	309	8" X 6" D.I. REDUCER (RJ)	2,8,11,13	EA	1
14	312	CONNECT TO EXISTING 12" WATERLINE	12	EA	1
15	312	CONNECT TO EXISTING 8" WATERLINE	12	EA	1
16	312	CONNECT TO EXISTING 6" WATERLINE	12	EA	6
17	314	6" GATE VALVE (RJ)	2,8,17	EA	2
18	314	12" GATE VALVE (RJ)	2,8,17	EA	1
19	315	VALVE BOX	21	EA	3
20	315	VALVE BOX EXTENSION	21	EA	3
21	319	12" STEEL CASING (BORED)		EA	322
22	322	SOLID SLAB SODDING	23	LF	295
23	324	TRAFFIC CONTROL DEVICES		LSUM	1
24	325	DRIVEWAY CROSSING BY BORING W/O CASING		LF	80
25	SPECIAL	CONSTRUCTION AS-BUILT	24	EA	1

WATER LINE BASE BID (BETTERMENT)

ITEM	SPEC. NO.	ITEM DESCRIPTION	PAY ITEM NOTES	UNIT	QUANTITY
1	301	RIGHT-OF-WAY CLEARING AND RESTORING, COMPLETE IN PLACE	4,5,6,7,22	LF	295
2	302	EXCAVATION AND BACKFILL, UNCLASSIFIED	14	CY	162
3	306	12" SDR-21 CLASS 200 PVC	1,2,3,9,10,16	LF	114
4	306	12" SDR 21 CLASS 200 PVC (RJ)	1,2,3,8,9,10,16	LF	476
5	306	6" SDR-21 CLASS 200 PVC (RJ)	1,2,3,8,9,10,16	LF	107
6	308	3/4" SHORT METER RESET	15	EA	1
7	309	12" X 12" D.I. TEE (RJ)	2,8,11,13	EA	2
8	309	12" 45° D.I. BEND (RJ)	2,8,11,13	EA	14
9	309	6" 45° D.I. BEND (RJ)	2,8,11,13	EA	4
10	309	6" D.I. SLEEVE (RJ)	2,8,11,13	EA	6
11	309	8" D.I. SLEEVE (RJ)	2,8,11,13	EA	1
12	309	12" D.I. SLEEVE (RJ)	2,8,11,13	EA	1
13	309	12" X 6" D.I. REDUCER (RJ)	2,8,11,13	EA	3
14	309	12" X 8" D.I. REDUCER (RJ)	2,8,11,13	EA	1
15	312	CONNECT TO EXISTING 12" WATERLINE	12	EA	1
16	312	CONNECT TO EXISTING 8" WATERLINE	12	EA	1
17	312	CONNECT TO EXISTING 6" WATERLINE	12	EA	6
18	314	12" GATE VALVE (RJ)	2,8,17	EA	3
19	315	VALVE BOX	21	EA	3
20	315	VALVE BOX EXTENSION	21	EA	3
21	319	12" STEEL CASING (BORED)		EA	60
22	319	24" STEEL CASING (BORED)		EA	262
23	322	SOLID SLAB SODDING	23	LF	295
24	324	TRAFFIC CONTROL DEVICES		LSUM	1
25	325	DRIVEWAY CROSSING BY BORING W/O CASING		LF	80
26	SPECIAL	CONSTRUCTION AS-BUILT	24	EA	1

PAY ITEM NOTES - WATER LINES

1. TESTING AND CHLORINATION OF WATER MAINS SHALL BE PERFORMED BY THE CONTRACTOR ON MAINS WHICH ARE PHYSICALLY DISCONNECTED FROM THE EXISTING WATER SYSTEM. TESTING, CHLORINATION, AND FLUSHING OF NEW WATER MAINS SHALL NOT BE PERFORMED AGAINST VALVES WHICH ARE PHYSICALLY CONNECTED TO EXISTING SYSTEM. CONTRACTOR/DEVELOPER IS RESPONSIBLE FOR OBTAINING TWO PASSING BACTERIOLOGICAL SAMPLES. DISTRICT WILL PROVIDE FLUSHING WATER IN THE QUANTITY OF THREE TIMES THE VOLUME OF THE INSTALLED WATERLINES, ANY ADDITIONAL WATER REQUIRED TO OBTAIN PASSING SAMPLES WILL BE BILLED TO THE CONTRACTOR/DEVELOPER AT THE COST OF THE WATER TO THE DISTRICT. AFTER THE CONTRACTOR/DEVELOPER HAS PROVIDED TWO SAMPLES, WHICH WERE TAKEN UNDER DISTRICT SUPERVISION, THE SEALED SAMPLE SHALL BE DELIVERED TO DISTRICT APPROVED LABS AND UPON PASSING, THE LINE WILL BE PLACED INTO SERVICE. TESTING, CHLORINATION, AND FLUSHING SHALL BE DONE IN ACCORDANCE WITH AWWA STANDARD C651-05 "DISINFECTING WATER MAINS." NO ADDITIONAL PAYMENT WILL BE MADE.

   IN ACCORDANCE WITH OAC 252:626-19-2(e), TEST THE INSTALLED PIPE FOR LEAKAGE IN ACCORDANCE WITH AWWA STANDARD SPECIFICATIONS. LEAKAGE MUST NOT EXCEED 10 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT 150 PSI TESTING PRESSURE.

2. BURIED BOLTS, HARNESS LUGS, AND COUPLINGS SHALL BE STAINLESS STEEL. COST TO BE INCLUDED IN UNIT PRICE BID FOR PIPE AND FITTINGS.

3. CONTRACTOR TO EXCAVATE ALL UTILITY CROSSINGS AHEAD OF PIPE LAYING SO THAT THE GRADES CAN BE ADJUSTED ON THE PROPOSED WATER MAIN TO AVOID UTILITY CONFLICTS. FAILURE TO DO SO SHALL NOT ENTITLE THE CONTRACTOR TO CLAIM EXTRA COMPENSATION FOR ADJUSTMENTS TO THE PROPOSED WATER MAIN. COST FOR EXCAVATING UTILITY CROSSINGS SHALL BE INCLUDED IN UNIT PRICE BID FOR PIPE.

4. CONTRACTOR SHALL INSURE ALL POLES WHICH ARE AFFECTED BY TRENCHING CONDITIONS ARE BRACED BY OWNERS. PAYMENT SHALL BE INCLUDED IN "RIGHT-OF-WAY CLEARING AND RESTORING". NO ADDITIONAL PAYMENT SHALL BE MADE.

5. ALL HYDRANTS, VALVES AND OTHER FITTINGS FROM ABANDONED WATER MAINS SHALL BE SALVAGED AND DELIVERED TO THE RWD WATER TREATMENT PLANT. PAYMENT TO BE MADE UNDER RIGHT OF WAY CLEARING AND RESTORING. NO ADDITIONAL PAYMENT SHALL BE MADE.

6. CONTRACTOR SHALL REPAIR ANY IRRIGATION SYSTEMS, ROOF DRAINS, AND FENCING DAMAGED IN THE ZONE OF CONSTRUCTION DURING THE COURSE OF CONSTRUCTION TO SATISFACTION OF THE PROPERTY OWNER. PAYMENT SHALL BE INCLUDED IN RIGHT-OF-WAY CLEARING AND RESTORING. NO ADDITIONAL PAYMENT SHALL BE MADE.

7. COST OF ANY TEMPORARY LIVESTOCK FENCING AND POLES SHALL BE INCLUDED IN COST OF RIGHT OF WAY CLEARING AND RESTORING. NO ADDITIONAL PAYMENT SHALL BE MADE.

8. ALL COSTS FOR COMPONENTS NECESSARY TO RESTRAIN JOINTS FOR PIPE AND FITTINGS DESIGNATED RESTRAINED JOINT ("RJ") SHALL BE INCLUDED IN UNIT PRICE BID FOR PIPE OR FITTINGS.

   A. POLYVINYL CHLORIDE (PVC) RESTRAINED JOINT SYSTEMS: EBAA MEGALUG OR STAR STARGRIP SHALL BE USED ON THIS PROJECT FOR PIPE SIZES 12" AND LARGER. MIDCO PERMAGRIP SHALL BE USED FOR PIPE SIZES 6" AND SMALLER. LOCKING GASKETS NOT PERMITTED; SHOULD RJ PIPE BE SPECIFIED ON BORE CASING IS REQUIRED.

   NO ADDITIONAL PAYMENT SHALL BE MADE.

9. ALL CUT ENDS AND WHERE SALVAGED FITTINGS HAVE BEEN REMOVED FROM ABANDONED WATER LINES LEFT IN PLACE, SHALL BE PLUGGED WITH 24-IN OF CONCRETE INSIDE THE PIPE. COST OF CONCRETE PLUGGING TO BE INCLUDED IN UNIT PRICE BID FOR PIPE. NO ADDITIONAL PAYMENT SHALL BE MADE.

10. TRACER WIRE AND DETECTABLE MYLAR MARKING TAPE SHALL BE INSTALLED ABOVE ALL PVC AND HDPE PIPE, TERMINATING ONLY ONTO HYDRANTS JUST ABOVE GROUND LEVEL. COST OF TRACER WIRE AND DETECTABLE MYLAR TAPE SHALL BE INCLUDED IN UNIT PRICE BID FOR PVC AND HDPE PIPE. TRACER WIRE SHALL BE #12 COATED COPPER.

11. CONCRETE THRUST BLOCKING SHALL BE BUILT ACCORDING TO THE DETAILS.

12. ALL LABOR, MATERIALS, AND EQUIPMENT TO CONNECT PROPOSED WATER MAINS TO EXISTING WATER MAINS ARE INCLUDED IN PAY ITEM 312. CONTRACTOR TO EXCAVATE ALL EXISTING WATER MAINS AHEAD OF PIPE LAYING SO THAT THE GRADES CAN BE ADJUSTED ACCORDINGLY. FAILURE TO DO SO SHALL NOT ENTITLE THE CONTRACTOR TO CLAIM EXTRA COMPENSATION FOR ADJUSTMENTS TO THE PROPOSED WATER MAIN. COST FOR EXCAVATING EXISTING WATER MAINS SHALL BE INCLUDED IN UNIT PRICE BID FOR CONNECTION. NO ADDITIONAL PAYMENT SHALL BE MADE.

13. ALL FITTINGS SHALL BE POLYETHYLENE WRAPPED.

14. CONTRACTOR IS REMINDED TO BACKFILL ALL TRENCHES EXCAVATED ACROSS ANY EXISTING OR PROPOSED DRIVING OR PARKING SURFACE WITH 1½-IN TYPE A AGGREGATE BASE, PLACED IN 8-INCH MAXIMUM LIFTS AND COMPACTED TO 98% MODIFIED PROCTOR DENSITY. COST TO BE INCLUDED IN COST OF EXCAVATION AND BACKFILL. NO ADDITIONAL PAYMENT SHALL BE MADE.

15. WATER SERVICE CONNECTIONS SHALL INCLUDE COST OF MATERIAL, LABOR AND EQUIPMENT TO REMOVE AND INSTALL SADDLES, SERVICE CLAMPS, CORPORATION STOPS, BENDS, 3-PART UNIONS, COUPLINGS, SETTERS AND ANY OTHER INCIDENTALS REQUIRED FOR A COMPLETE WATER SERVICE CONNECTION. NO ADDITIONAL PAYMENT SHALL BE MADE.

   A. "METER RECONNECTION" ARE METERS THAT HAVE BEEN IDENTIFIED AS NOT REQUIRING A NEW METER, METER CAN, OR METER SETTER. THESE RECONNECTIONS WILL UTILIZE THE EXISTING INFRASTRUCTURE BUT MAY REQUIRE A NEW CURB STOP AND SPLICE INTO EXISTING SERVICE LINE.

   B. "METER RESET" ARE METERS THAT HAVE EITHER BEEN IDENTIFIED AS NEEDING TO BE REPLACED OR ARE METERS IN NEW LOCATIONS THAT REQUIRE A FULL INSTALLATION INCLUDING BUT NOT LIMITED TO: METER CAN, RIM AND LID, SERVICE LINE AND METER SETTER. PLUMBING FROM THE METER TO THE EXISTING SERVICE CONNECTION IS NOT INCLUDED AND WILL BE PERFORMED BY OTHERS.

   C. "BORED METER RESET" ARE METERS IDENTIFIED IN SECTION B ABOVE BUT ALSO REQUIRE A ROAD BORE TO COMPLETE.

PAY ITEM NOTES - WATER LINES

16. ALL PIPE SHALL BE BEDDED IN SAND, PER THE DETAILS. NO ADDITIONAL PAYMENT WILL BE MADE FOR BEDDING MATERIALS.

17. ALL VALVES LOCATED ADJACENT TO A FITTING SHALL BE HARD TIED VIA SWIVEL CONNECTOR, EITHER UTILIZING A SWIVEL ADAPTER OR SWIVEL TEE. NO BURIED FLANGED FITTINGS WILL BE ALLOWED.

18. NOT USED.

19. NOT USED.

20. NOT USED.

21. TOP OF VALVE BOX SHALL BE FLUSH WITH FINISHED GRADE AND INSTALLED WITH A PRECAST CONCRETE VALVE RING.

22. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE EXISTING IMPROVEMENTS. LIMITS OF DISTURBANCE SHALL NOT EXCEED 9-FEET CENTERED ON THE WATERLINE. ANY DISTURBANCE OUTSIDE OF THIS AREA SHALL BE RESTORED AT THE CONTRACTORS EXPENSE. STREETS, DRIVEWAYS AND ASSOCIATED ITEMS SHALL BE PAID FOR UNDER OTHER ITEMS OF WORK.

23. THE CONTRACTOR SHALL RESTORE ALL DISTURBED GRASS AREAS TO A CONDITION EQUAL TO OR BETTER THAN THE EXISTING CONDITION. THE CONTRACTOR SHALL REPLACE THE SOD TO MATCH IN-KIND AND QUALITY. LIMITS OF DISTURBANCE SHALL NOT EXCEED 9-FEET CENTERED ON THE WATERLINE. ANY DISTURBANCE OUTSIDE OF THIS AREA SHALL BE RESTORED AT THE CONTRACTORS EXPENSE.

24. SPOT ELEVATIONS ON THE MAIN WATER LINE RELATIVE TO FINISHED GRADE SHALL BE PROVIDED AT EACH 500-FT INTERVAL, COMPLETE WITH STATION AND OFFSET. IN ADDITION, ALL VALVES, FITTINGS, FIRE HYDRANTS (TOP OF NUT) AND OTHER MAJOR APPURTENANT ITEMS SHALL BE SHOWN WITH THE PROPER DESCRIPTION, STATION, OFFSET AND ELEVATION.

WATER LINE CONSTRUCTION NOTES

1. RURAL WATER DISTRICT NO. 2 AND THE RESIDENT PROJECT INSPECTOR SHALL INSPECT ALL TRENCHING, BEDDING, PIPE INSTALLATION, BACKFILL AND COMPACTION.

2. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT STANDARD SPECIFICATIONS AND STANDARD DETAILS FOR RWD #2.

3. EXISTING SERVICE CONNECTIONS ARE TO BE KEPT IN SERVICE UNTIL CONNECTIONS TO NEW MAIN ARE MADE. ALL SERVICE LINE RECONNECTIONS SHALL BE MADE BY THE CONTRACTOR. SERVICE RECONNECTIONS SHALL BE INSTALLED AS PER RWD #2 STANDARD SPECIFICATIONS AND STANDARD DETAILS.

4. MINIMUM COVER OVER WATER LINES SHALL BE AS NOTED ON PLANS.

5. CONTRACTOR SHALL REPLACE EXISTING GRASS WITH SEED/SOD OF SAME TYPE AND VARIETY OR AS NOTED ON PLANS.

6. CONTRACTOR SHALL BORE EXISTING TREES UNDER DRIP LINE, UNLESS DIRECTED OTHERWISE BY ENGINEER.

7. CONTRACTOR SHALL BORE EXISTING DRIVEWAYS, UNLESS DIRECTED OTHERWISE BY ENGINEER.

8. ALL VALVE OPERATIONS ON THE EXISTING DISTRIBUTION SYSTEM SHALL BE UNDER SUPERVISION OF DISTRICT PERSONNEL.

9. CONTRACTOR SHALL PROVIDE AT LEAST 48 HOUR NOTICE TO ALL RESIDENTS OR BUSINESSES AFFECTED BEFORE TURNING OFF ANY WATER. CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING DOOR HANGERS ON AFFECTED HOMES AND BUSINESSES.

10. CONTRACTOR SHALL GIVE THE NOTIFICATION CENTER OF THE OKLAHOMA ONE-CALL SYSTEM, INC, NOTICE OF ANY EXCAVATION NO SOONER THAN 48 HOURS OR LATER THAN 10 DAYS, EXCLUDING SATURDAYS, SUNDAYS, LEGAL HOLIDAYS PRIOR TO COMMENCEMENT OF WORK, PHONE 1-800-522-6543.

11. LOCAL AND THROUGH TRAFFIC SHALL BE MAINTAINED THROUGH PROJECT AT ALL TIMES. OPEN CUT STREET CROSSINGS REQUIRE AN APPROVED TRAFFIC CONTROL PLAN WITH TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH CURRENT MUTCD REQUIREMENTS.

12. ANY DAMAGE CAUSED BY CONTRACTOR TO ADJACENT TRAFFIC SIGNAL INFRASTRUCTURE SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE TRAFFIC ENGINEER.

13. CONSTRUCTION FOR ALL FACILITIES SHALL BE IN COMPLIANCE WITH THE LATEST EDITION OF TITLE 252, DEPARTMENT OF ENVIRONMENTAL QUALITY, CHAPTER 626, PUBLIC WATER SUPPLY CONSTRUCTION STANDARDS, OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ).

14. ALL EXCAVATED MATERIAL NOT REQUIRED IN OTHER AREAS OF THE PROJECT SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF BY THE CONTRACTOR IN A MANNER ACCEPTABLE TO THE ENGINEER WITHOUT COST TO THE DISTRICT.

15. ANY CHANGES FROM APPROVED PLANS SHALL BE SUBMITTED TO THE DISTRICT FOR WRITTEN APPROVAL PRIOR TO INSTALLATION.

16. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN TEMPORARY SANITARY FACILITIES (PORTA-JOHNS) ON-SITE FOR WORKERS. COSTS FOR PROVIDING AND MAINTAINING THESE FACILITIES SHALL BE CONSIDERED INCIDENTAL TO THE CONSTRUCTION OF THE PROJECT AND WILL NOT BE PAID FOR SEPARATELY.

17. WORK DAYS SHALL BE LIMITED TO MONDAY THROUGH FRIDAY UNLESS PRIOR APPROVAL IS OBTAINED FROM THE OWNER AND ENGINEER.

18. ESTIMATES OF QUANTITIES ARE APPROXIMATE. CONTRACTOR WILL BE PAID FOR ACTUAL QUANTITIES INSTALLED AND ACCEPTED.

19. THE OWNER MEETS THE 2ND TUESDAY OF EACH MONTH. PAY REQUESTS MUST BE SUBMITTED BY THE 25TH OF EACH MONTH AND MUST BE VERIFIED BY THE INSPECTOR PRIOR TO SUBMISSION TO THE ENGINEER.

20. OAC 252:626-19-2(H) - SEPARATION OF WATER MAINS AND SEWERS FROM CONTAMINATION SOURCES
   (1) HORIZONTAL SEPARATION
      (A) MEASURE THE SEPARATION DISTANCE EDGE TO EDGE.
      (B) LOCATE WATER MAINS AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED SEWER LINES.
      (C) LOCATE WATER MAINS AT LEAST 5 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED STORM SEWERS, RAW WATER LINES, PETROLEUM PRODUCT LINES, NATURAL GAS LINES, AND OTHER BURIED UTILITY LINES.
      (D) LOCATE CAST IRON WATERLINES AT LEAST 10 FEET FROM ANY GASOLINE STORAGE TANK AND LINES AND PVC WATER LINES AT LEAST 50 FEET HORIZONTALLY FROM ANY GASOLINE STORAGE TANK AND LINES.
      (E) LOCATE WATERLINES AT LEAST 15 FEET FROM ALL PARTS OF SEPTIC TANKS AND ABSORPTION FIELDS, OR OTHER SEWAGE TREATMENT AND DISPOSAL SYSTEMS.
   (2) VERTICAL SEPARATION
      (A) MEASURE THE SEPARATION DISTANCE FROM EDGE TO EDGE.
      (B) LAY WATERLINES CROSSING SEWER LINES TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 24 INCHES BETWEEN THE WATER MAIN AND THE SEWER LINE. ARRANGE THE PIPING SO THAT JOINTS IN A 20-FOOT LENGTH OF PVC OR 18-FOOT LENGTH OF CAST IRON SEWER PIPE WILL BE EQUIDISTANT FROM THE WATER MAIN. WHERE A WATER MAIN CROSSES UNDER A SEWER, PROVIDE ADEQUATE STRUCTURAL SUPPORT FOR THE SEWER TO PREVENT DAMAGE TO THE WATER MAIN.
      (C) MAINTAIN A 2-FOOT VERTICAL SEPARATION BETWEEN WATERLINES AND ANY EXISTING OR PROPOSED STORM SEWERS, RAW WATER LINES, PETROLEUM PRODUCT LINES, NATURAL GAS LINES, AND OTHER BURIED UTILITY LINES.
   (3) SPECIAL CONDITIONS WHEN IT IS IMPOSSIBLE TO OBTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS STIPULATED IN (1) AND (2) OF THIS SUBSECTION, DESIGN AND CONSTRUCT THE OTHER LINE EQUAL TO WATER PIPE, AND PRESSURE TEST IT TO ASSURE WATER TIGHTNESS OF JOINTS ADJACENT TO THE WATER LINE PRIOR TO BACKFILLING.

21. OAC 252:626-19-2(f) -DISINFECT ALL WATERLINES ACCORDING TO AWWA STANDARD SPECIFICATIONS. OBTAIN SAFE BACTERIOLOGICAL SAMPLES ON TWO CONSECUTIVE DAYS BEFORE PLACING THE WATERLINE INTO SERVICE.

POE & ASSOCIATES INC.
4606 S. GARNETT RD., STE. 600 TULSA, OK 74146-5200

REVISION	BY	DATE

DESIGNED BY: RWS
DRN. BY: RM | CHKD. BY: GC
DATE: APRIL 2022
SHEET 2 OF 9

QUANTITIES AND PAY ITEM NOTES
CREEK COUNTY RWD #2
49th W. AVE. & SH-117

I:\3220\I28 - 49th W Ave at SH 117\Plan Sheets\3220I -Notes.dgn
9/19/2022

12" WATERLINE "A"
SHEET 4

6" WATERLINE "B"
SHEET 5

12" WATERLINE "C"
SHEET 6

6" WATERLINE "D"
SHEET 7

S. 49th W. AVE.

SH-117

KWRD Properties, LLC
Warranty Deed
Book: 1201, Page: 319

Derek E. Wachob, Trustee of the
Wachob Irrevocable Trust dated July 21, 2011
Warranty Deed
Book: 1153, Page: 598

Vernon L. Brummett and Pamela D. Brummett
JTWD
Book: 365, Page: 1614

John Murphy and Carolyn Murphy
JTWD
6
Book: 1204, Page: 367

Jonathan Dale Scott and Nicole Weithass Scott
JTWD
5
Book: 942, Page: 790

Rural Water District #2
Right-of-Way Easement
Book: 249, Page: 1793

State of Oklahoma
Dedication Deed
Book: 886, Page: 18

Oklahoma Gas and Electric Company
Easement
Book: 241, Page: 2043

Transok Pipe Line Company
Right of Way Contract
Book: 753, Page: 225

Partial Release of Right Of Way Grant
Book: 448, Page: 1577

Oklahoma Natural Gas Company
ROW
Book: [illegible] Page: 516

Creek County Rural Water District No. 2
ROW Easement
Book: 259, Page: 2091

Oklahoma Natural Gas Company
ROW
Book: 250, Page: 1520

OneOk Transmission Assets, LLC
Assignment of Easements
(W/2, N 21.61 Ac., NW/4, NW/4)
Book: 402, Page: 205

Creek County Rural Water District No. 2
Easement
981, Page: 541

Oklahoma Electric Company
Easement
Book: 3, Page: 1130

State of Oklahoma
Dedication Deed
Book: 1032, Page: 636

BM #29
BM #1
BM #2

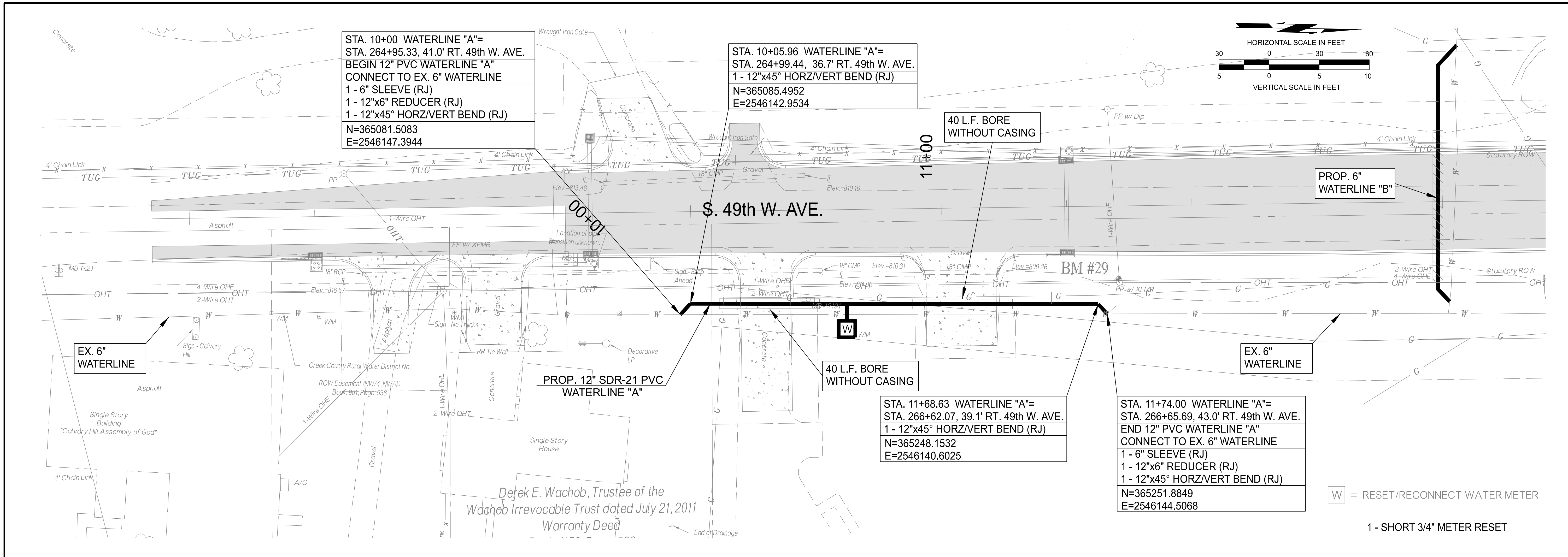
9/19/22

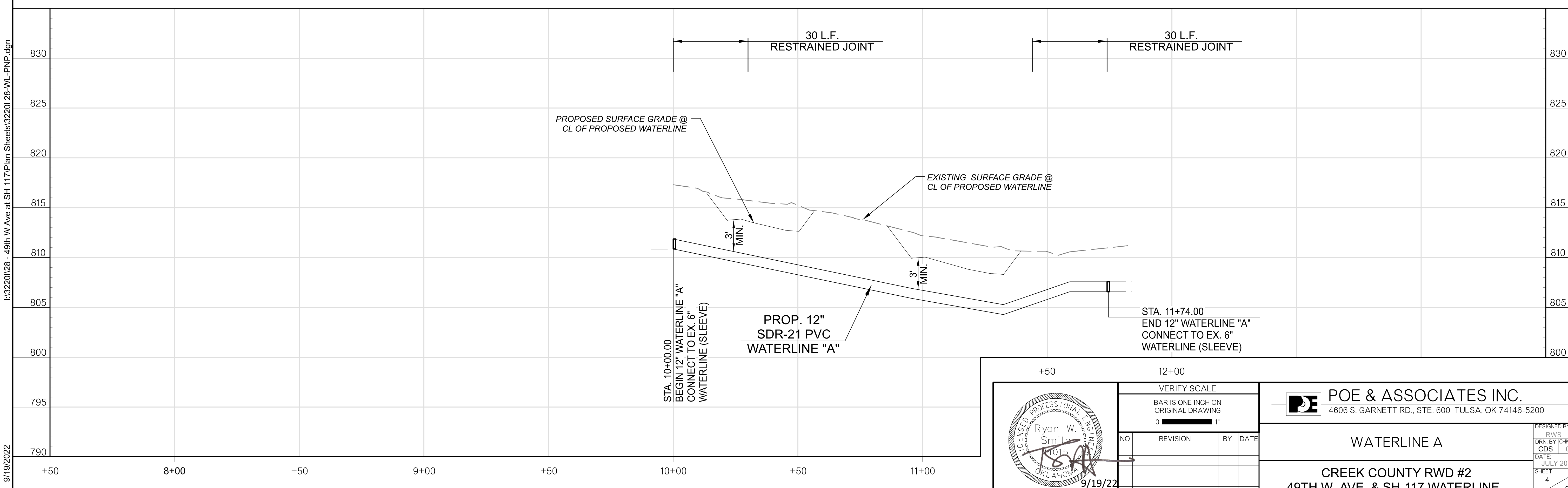
POE & ASSOCIATES INC.
4606 S. GARNETT RD., STE. 600 TULSA, OK 74146-5200

REVISION	BY	DATE

DESIGNED BY: RWS
DRN. BY: CS
CHKD. BY: GC
DATE: JULY 2022
SHEET 3 OF 9

KEY MAP
CREEK COUNTY RWD #2
49th W. AVE. & SH-117


STA. 10+00 WATERLINE "A"=
STA. 264+95.33, 41.0' RT. 49th W. AVE.
BEGIN 12" PVC WATERLINE "A"
CONNECT TO EX. 6" WATERLINE
1 - 6" SLEEVE (RJ)
1 - 12"x6" REDUCER (RJ)
1 - 12"x45° HORZ/VERT BEND (RJ)
N=365081.5083
E=2546147.3944
STA. 10+05.96 WATERLINE "A"=
STA. 264+99.44, 36.7' RT. 49th W. AVE.
1 - 12"x45° HORZ/VERT BEND (RJ)
N=365085.4952
E=2546142.9534
40 L.F. BORE
WITHOUT CASING
HORIZONTAL SCALE IN FEET
30 0 30 60
5 0 5 10
VERTICAL SCALE IN FEET
11+00
10+00
S. 49th W. AVE.
PROP. 6"
WATERLINE "B"
BM #29
EX. 6"
WATERLINE
PROP. 12" SDR-21 PVC
WATERLINE "A"
40 L.F. BORE
WITHOUT CASING
EX. 6"
WATERLINE
STA. 11+68.63 WATERLINE "A"=
STA. 266+62.07, 39.1' RT. 49th W. AVE.
1 - 12"x45° HORZ/VERT BEND (RJ)
N=365248.1532
E=2546140.6025
STA. 11+74.00 WATERLINE "A"=
STA. 266+65.69, 43.0' RT. 49th W. AVE.
END 12" PVC WATERLINE "A"
CONNECT TO EX. 6" WATERLINE
1 - 6" SLEEVE (RJ)
1 - 12"x6" REDUCER (RJ)
1 - 12"x45° HORZ/VERT BEND (RJ)
N=365251.8849
E=2546144.5068
W = RESET/RECONNECT WATER METER
1 - SHORT 3/4" METER RESET
Single Story
Building
"Calvary Hill Assembly of God"
Single Story
House
Derek E. Wachob, Trustee of the
Wachob Irrevocable Trust dated July 21, 2011
Warranty Deed


30 L.F.
RESTRAINED JOINT
30 L.F.
RESTRAINED JOINT
PROPOSED SURFACE GRADE @
CL OF PROPOSED WATERLINE
EXISTING SURFACE GRADE @
CL OF PROPOSED WATERLINE
3' MIN.
3' MIN.
PROP. 12"
SDR-21 PVC
WATERLINE "A"
STA. 10+00.00
BEGIN 12" WATERLINE "A"
CONNECT TO EX. 6"
WATERLINE (SLEEVE)
STA. 11+74.00
END 12" WATERLINE "A"
CONNECT TO EX. 6"
WATERLINE (SLEEVE)
830
825
820
815
810
805
800
795
790
+50
8+00
+50
9+00
+50
10+00
+50
11+00
+50
12+00

I:\3220I28 - 49th W Ave at SH 117\Plan Sheets\3220I 28-WL-PNP.dgn

9/19/2022

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

NO	REVISION	BY	DATE

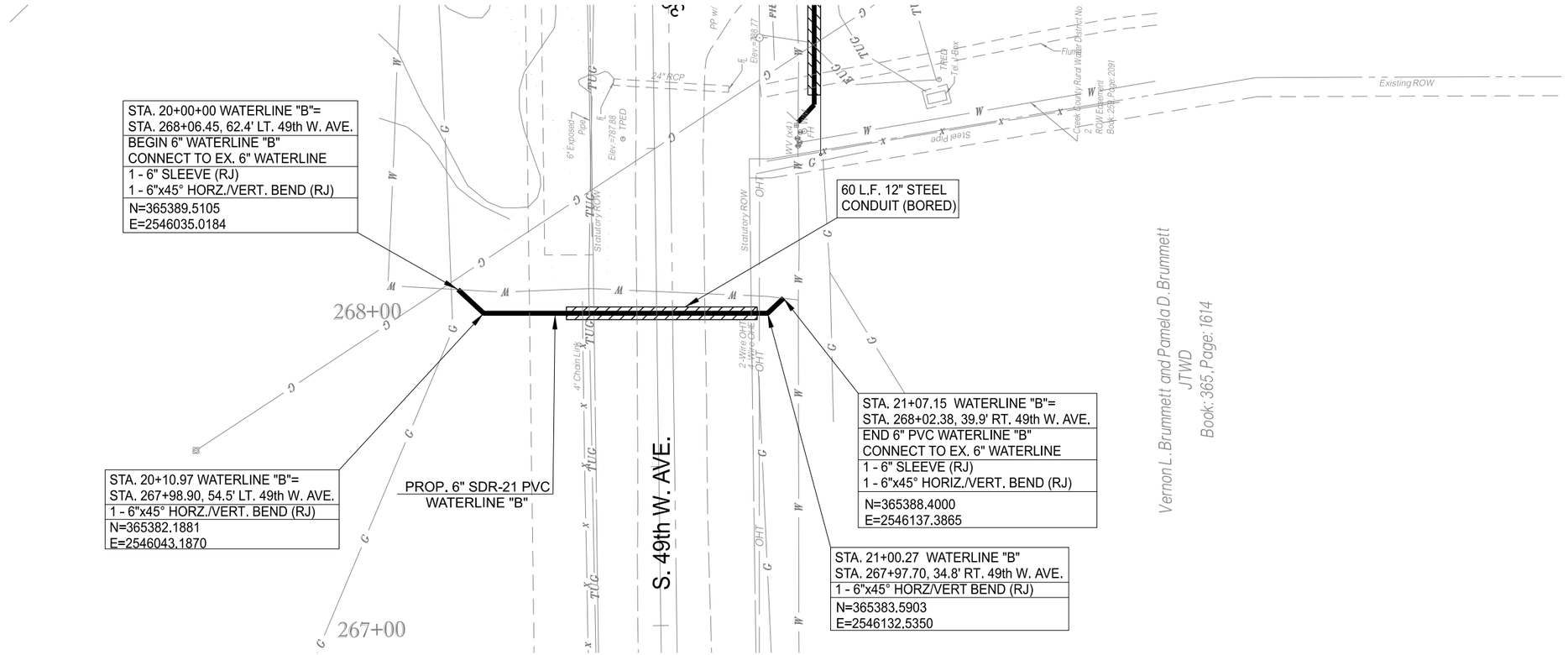
Ryan W. Smith 24015 — LICENSED PROFESSIONAL ENGINEER — OKLAHOMA
9/19/22

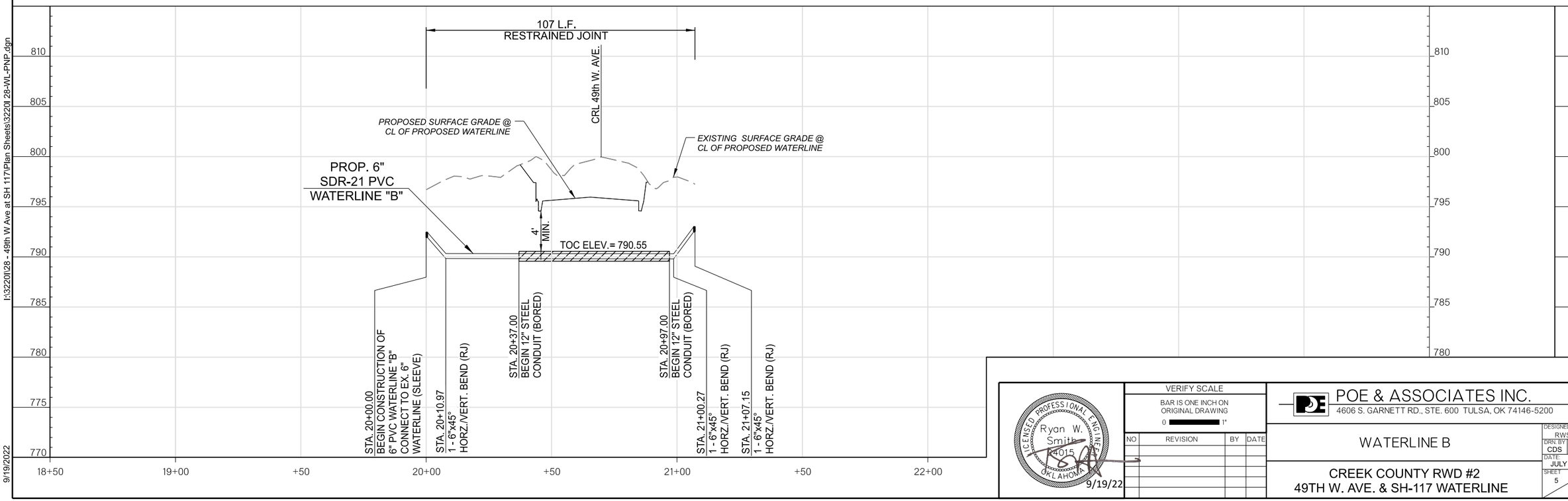
POE & ASSOCIATES INC.
4606 S. GARNETT RD., STE. 600 TULSA, OK 74146-5200

WATERLINE A

CREEK COUNTY RWD #2
49TH W. AVE. & SH-117 WATERLINE

DESIGNED BY: RWS
DRN. BY: CDS
CHKD. BY: GC
DATE: JULY 2022
SHEET 4 OF 9





I:\3220\I28 - 49th W Ave at SH 117\Plan Sheets\3220I 28-WL-PNP.dgn

9/19/2022

LICENSED PROFESSIONAL ENGINEER
Ryan W. Smith
14015
OKLAHOMA
9/19/22

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

NO	REVISION	BY	DATE

POE & ASSOCIATES INC.
4606 S. GARNETT RD., STE. 600 TULSA, OK 74146-5200

WATERLINE B

CREEK COUNTY RWD #2
49TH W. AVE. & SH-117 WATERLINE

DESIGNED BY: RWS
DRN. BY: CDS
CHK'D. BY: GC
DATE: JULY 2022
SHEET 5 OF 9

HORIZONTAL SCALE IN FEET
30 0 30 60
VERTICAL SCALE IN FEET
5 0 5 10

PROPOSED 6" WATERLINE "B"

PROPOSED 6" WATERLINE "D"

S. 49th W. AVE.

30+00

31+00

32+00

41+00

41+66

202 L.F. 24" STEEL CONDUIT (BORED)

BM #1

VENT PIPE

VENT PIPE

PROP. 12" SDR-21 PVC WATERLINE "C"

S.H. - 117

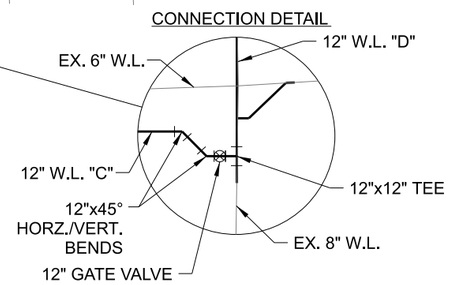
STA. 30+00 WATERLINE "C"= STA. 268+57.66, 45.2' RT. 49th W. AVE.
BEGIN PROP. 12" PVC WATERLINE "C" CONNECT TO EX. 6" WATERLINE
1 - 6" SLEEVE (RJ)
1 - 12"x6" REDUCER (RJ)
1 - 12"x45° BEND (RJ)
N=365443.8056
E=2546141.1500

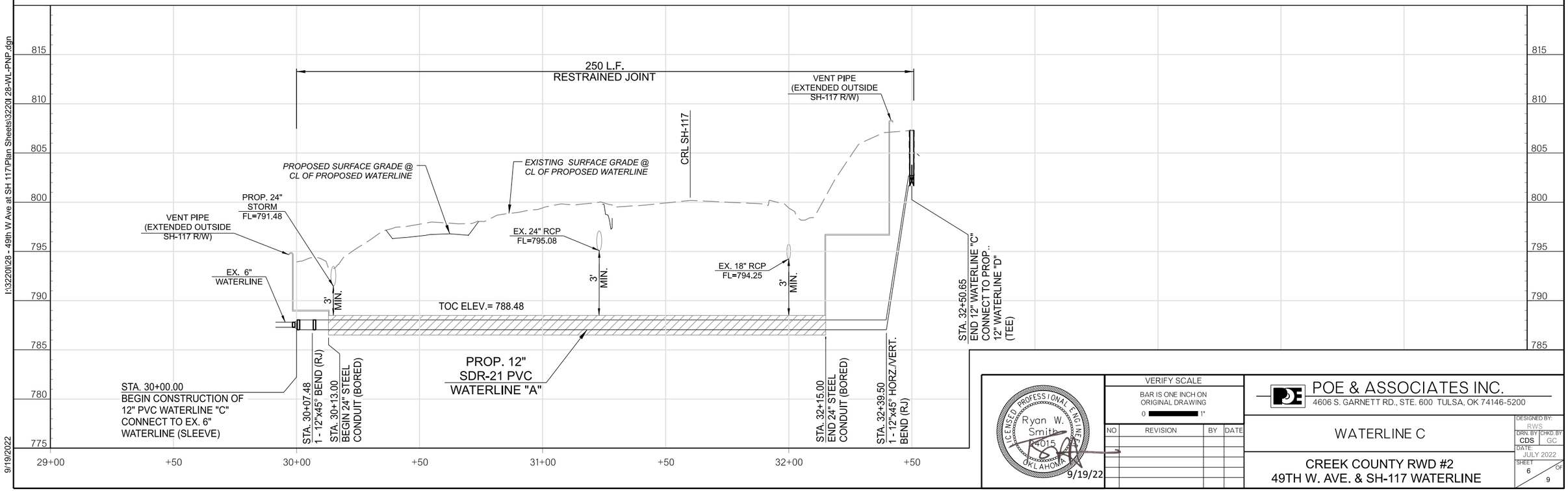
STA. 30+07.48 WATERLINE "C"= STA. 268+63.06, 50.4' RT. 49th W. AVE.
1 - 12"x45° BEND (RJ)
N=365449.3699
E=2546146.1421

STA. 32+39.50 WATERLINE "C"= STA. 270+95.56, 52.7' RT 49th W. AVE.
1 - 12"x45° HORZ./VERT. BEND (RJ)
N=365681.3463
E=2546142.5353

STA. 32+50.65 WATERLINE "C"= STA. 41+60.00 WATERLINE "D"= STA. 261+04.00, 59.3' RT. 49th W. AVE.
CONNECT TO PROP. 12" W.L. "D" (TEE)
1 - 12"x45° HORZ./VERT. BEND (RJ)
1 - 12" GATE VALVE (RJ)
1 - VALVE BOX
N=365689.8994
E=2546148.8969

CONNECTION DETAIL





I:\3220\I28 - 49th W Ave at SH 117\Plan Sheets\3220I 28-WL-PNP.dgn

9/19/2022

LICENSED PROFESSIONAL ENGINEER Ryan W. Smith 24015 OKLAHOMA 9/19/22

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

NO	REVISION	BY	DATE

POE & ASSOCIATES INC.
4606 S. GARNETT RD., STE. 600 TULSA, OK 74146-5200

WATERLINE C

CREEK COUNTY RWD #2
49TH W. AVE. & SH-117 WATERLINE

DESIGNED BY: RWS
DRN. BY: CDS | CHKD. BY: GC
DATE: JULY 2022
SHEET 6 OF 9

HORIZONTAL SCALE IN FEET
30 0 30 60
5 0 5 10
VERTICAL SCALE IN FEET

STA. 40+00 WATERLINE "D"= STA. 271+04.60, 100.7' LT 49th W. AVE.
BEGIN 12" WATERLINE "D" CONNECT TO EX. 6" WATERLINE
1 - 6" SLEEVE (RJ) 1 - 12"x6" REDUCER (RJ)
N=365687.4196 E=2545988.9196

STA. 41+50.00 WATERLINE "D"= STA. 261+04.00, 49.3' RT. 49th W. AVE.
CONNECT TO EX. 12" W.L.
1 - 12"x12" TEE (RJ) 2 - 12" GATE VALVES (RJ) 2 - VALVE BOXES 1 - 12" SLEEVE (RJ) 2 - 12"x45° HORZ/VERT BENDS (RJ)
N=365689.7339 E=2546138.9159

STA. 41+60.00 WATERLINE "D"= STA. 32+50.65 WATERLINE "C"= STA. 261+04.00, 59.3' RT. 49th W. AVE.
CONNECT TO PROP. 12" W.L. "C"
1 - 12"x12" TEE (RJ) 1 - 12" GATE VALVE (RJ) 1 - VALVE BOX
N=365689.8994 E=2546148.8969

STA. 41+65.00 WATERLINE "D"= STA. 261+04.00, 64.9' RT. 49th W. AVE.
END 12" PVC WATERLINE "D" CONNECT TO EX. 8" W.L.
1 - 12"x8" REDUCER (RJ) 1 - 8" SLEEVE (RJ)
N=365690.0235 E=2546154.5230

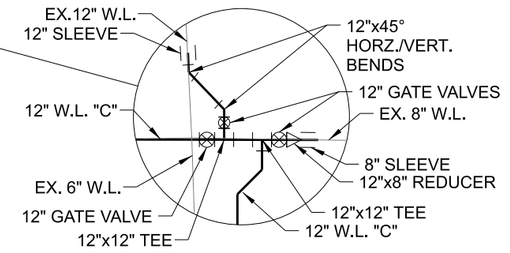
60 L.F. 24" STEEL CONDUIT (BORED)

PROP. 12" SDR-21 PVC WATERLINE "D"

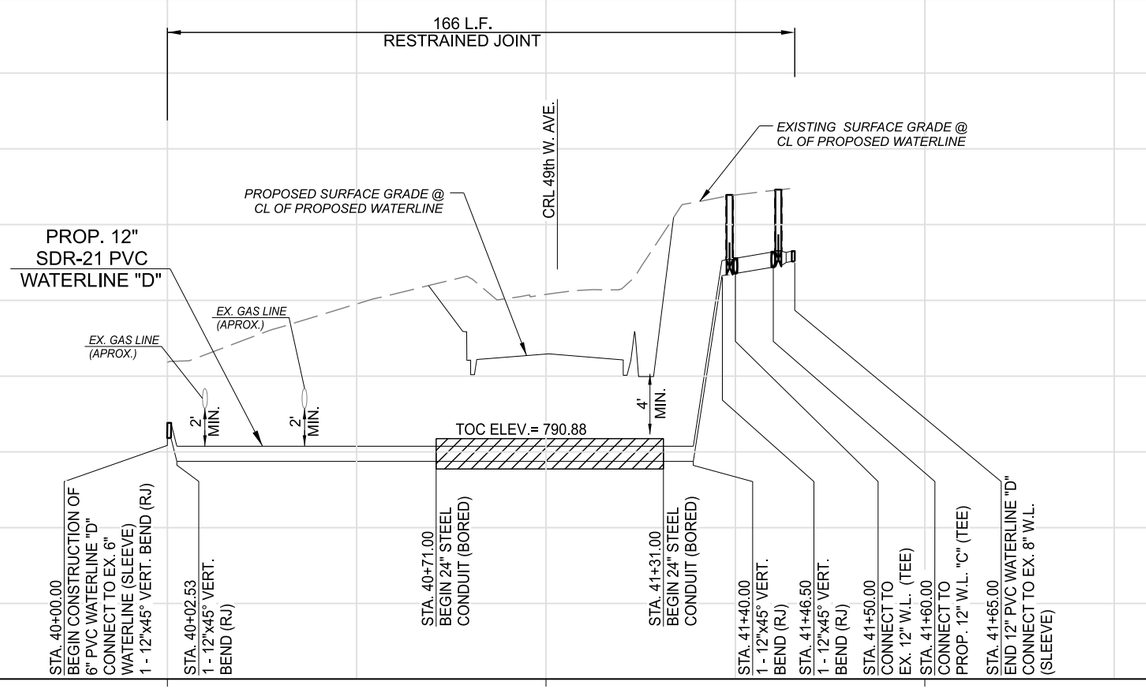
S. 49th W. AVE.

S.H. - 117

CONNECTION DETAIL



166 L.F. RESTRAINED JOINT



I:\3220\I28 - 49th W Ave at SH 117\Plan Sheets\3220I 28-WL-PNP.dgn

9/19/2022

LICENSED PROFESSIONAL ENGINEER Ryan W. Smith 24015 OKLAHOMA 9/19/22

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"

NO	REVISION	BY	DATE

POE & ASSOCIATES INC.
4606 S. GARNETT RD., STE. 600 TULSA, OK 74146-5200

WATERLINE D

CREEK COUNTY RWD #2
49TH W. AVE. & SH-117 WATERLINE

DESIGNED BY: RWS
DRN. BY: CDS CHK'D BY: GC
DATE: JULY 2022
SHEET 7 OF 9

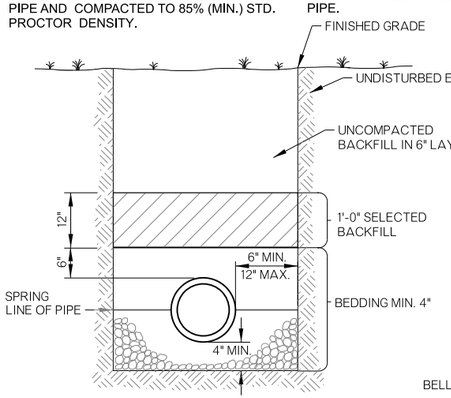
SELECTED BACKFILL SHALL BE COMPACTED TO 95% STD. DENSITY AT OPTIMUM MOISTURE CONTENT. LIFTS SHALL BE UNIFORM AND SHALL NOT EXCEED 6".

BEDDING SHALL BE SELECT NATIVE MATERIAL, PLACED IN THE TRENCH SIMULTANEOUSLY ON BOTH SIDES OF THE PIPE AND COMPACTED TO 85% (MIN.) STD. PROCTOR DENSITY.

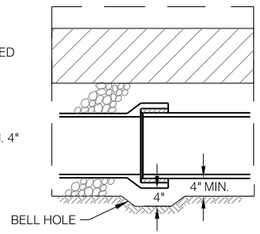
REMOVE ALL STONES FOUND IN THE TRENCH TO A DEPTH OF AT LEAST 6 INCHES BELOW THE BOTTOM OF THE PIPE.

A #12 SOLID CORE COPPER TRACER WIRE AND MAGNETIC DETECTABLE TAPE MUST BE INSTALLED WITH THE PIPE.

PIPE DIAMETER	MIN. TRENCH WIDTH CENTER OF PIPE	MAX. WIDTH OR TRENCH 12" ABOVE TOP OF PIPE
1"-6"	18"	24"
8"	20"	24"
12"	25"	29"
15"	28"	32"
18"	35"	46"
24"	44"	52"
30"	54"	62"
36"	64"	72"
42"	73"	82"
48"	80"	92"

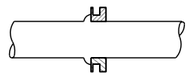


TRENCH CROSS-SECTION FOR ALL DEPTHS



TRENCH LONGITUDINAL SECTION

BEDDING DETAIL

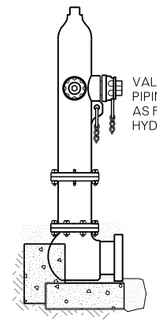


TYPICAL RESTRAINED JOINT

N.T.S.

WHERE RESTRAINED JOINTS ARE SPECIFIED EBAA MEGALUG SERIES 2800 OR EQUAL SHALL BE INSTALLED AND THE COST INCLUDED IN THE PRICE FOR WATER LINE WITH RESTRAINED JOINTS. THE COST FOR MECHANICAL JOINTS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PIPE AND FITTINGS. INTERCONNECT NIPPLES SHALL BE DUCTILE IRON.

RESTRAINED JOINT DETAILS

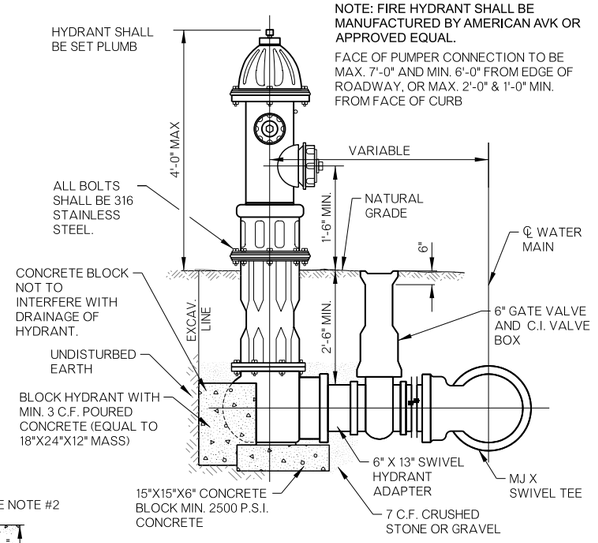


2-1/8" POST TYPE FIRE HYDRANT

N.T.S.

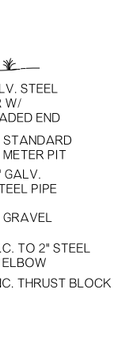
NOTE: FIRE HYDRANT SHALL BE MANUFACTURED BY AMERICAN AVK OR APPROVED EQUAL.

FACE OF PUMPER CONNECTION TO BE MAX. 7'-0" AND MIN. 6'-0" FROM EDGE OF ROADWAY, OR MAX. 2'-0" & 1'-0" MIN. FROM FACE OF CURB



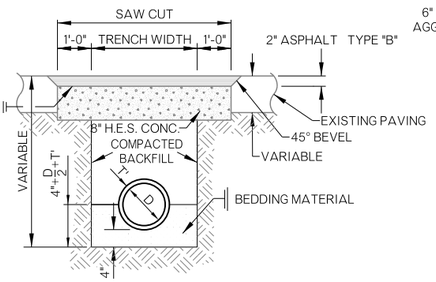
TYPICAL FIRE HYDRANT

N.T.S.



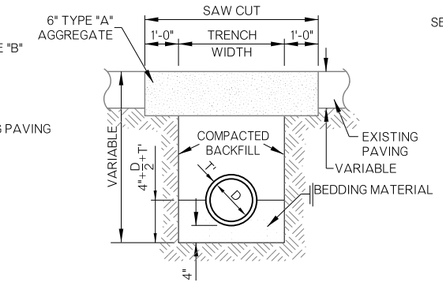
PIPELINE BLOW-OFF

N.T.S.



ASPHALT PAVING REMOVED AND REPLACED

N.T.S.

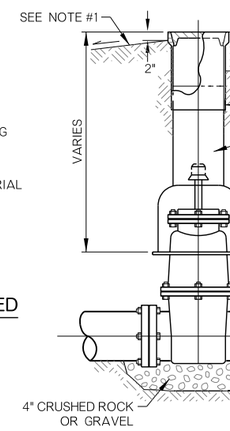


GRAVEL PAVING REMOVED AND REPLACED

N.T.S.

GENERAL NOTES:

1. BEDDING AND BACKFILL SHALL BE 1-1/2" CRUSHER RUN COMPACTED TO 95% STD. PROCTOR, PLACED IN HORIZONTAL LAYERS NOT TO EXCEED 8" AND COMPACTED, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. NO PAYMENT WILL BE MADE FOR REPLACEMENT OF PAVEMENT OUTSIDE OF STANDARD PAY WIDTH DUE TO TRENCH EXCAVATION WIDER THAN STANDARD TRENCH WIDTH.
3. PAY QUANTITY WILL INCLUDE REPLACEMENT OF PAVEMENT DUE TO SQUARING OF DIAGONAL CUTS.
4. FOR SERVICE LINES 2" AND SMALLER, THE STD. PAY WIDTH SHALL BE 3 FEET.
5. SAW CUTS SHALL BE A MIN. DEPTH OF 2-IN.
6. COST FOR REMOVAL AND REPLACEMENT OF GRAVEL SHALL BE INCLUDED IN OTHER ITEMS OF WORK. NO ADDITIONAL PAYMENT WILL BE MADE.

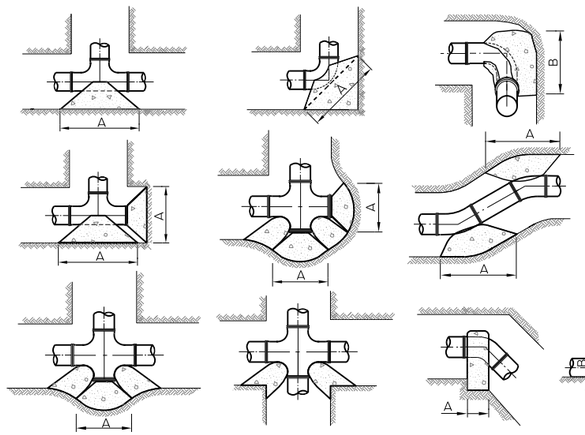


VALVE AND VALVE BOX SETTING DETAIL

N.T.S.

VALVE & BOX NOTES

1. TOP OF VALVE BOX TO BE 2" ABOVE GRADE IN NON- TRAFFIC AREAS.
2. TOP OF VALVE BOX TO BE FLUSH WITH GRADE IN TRAFFIC AREAS.
3. VALVE BOXES LOCATED OUTSIDE OF PAVEMENT MUST BE PLACED WITH A 24-INCH CONCRETE RING MATCHING THE SURROUNDING FINISHED GRADE LINE.
4. VALVES MUST HAVE AN IDENTIFICATION MARKER CONTAINING OWNER, ADDRESS, TELEPHONE NUMBER & SIZE OF PIPE.
5. ACROSS STREET SERVICE TO BE 2" PVC LINE WITH 3/4" CORPORATION VALVE AND PLUG.



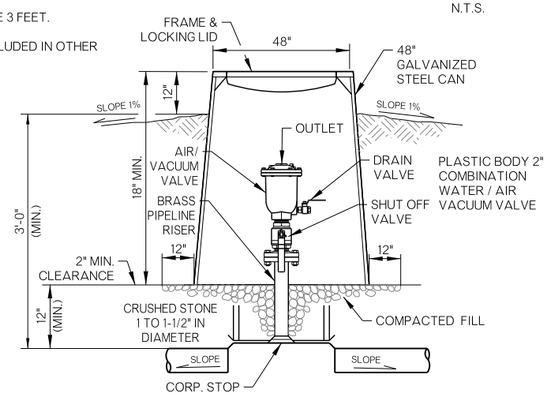
TYPICAL THRUST BLOCK DETAILS

N.T.S.

PIPE SIZE	TEES		BENDS							
			90°		45°		22½°		VERT.	
	A	B	A	B	A	B	A	B	A	B
2"-6"	24"	21"	24"	24"	18"	12"	12"	12"	18"	21"
8"	39"	24"	24"	26"	21"	15"	15"	15"	18"	24"
10"	48"	30"	30"	32"	26"	24"	18"	18"	18"	24"
12"	48"	30"	32"	34"	28"	30"	18"	18"	20"	28"
14"	54"	36"	36"	39"	30"	30"	21"	21"	20"	28"
16"	54"	38"	38"	41"	32"	32"	24"	24"	21"	30"

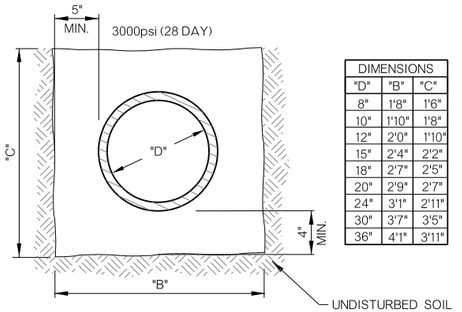
NOTE:

"B" DIMENSION IS THE VERTICAL HEIGHT OF THRUST BLOCK



COMBINATION AIR RELEASE VALVE & AIR VACUUM VALVE

N.T.S.



DIMENSIONS		
"D"	"B"	"C"
8"	1'8"	1'6"
10"	1'10"	1'8"
12"	2'0"	1'10"
15"	2'4"	2'2"
18"	2'7"	2'5"
20"	2'9"	2'7"
24"	3'1"	2'11"
30"	3'7"	3'5"
36"	4'1"	3'11"

CONCRETE ENCASEMENT

N.T.S.

LICENSED PROFESSIONAL ENGINEER
Ryan W. Smith
19015
OKLAHOMA
9/19/22

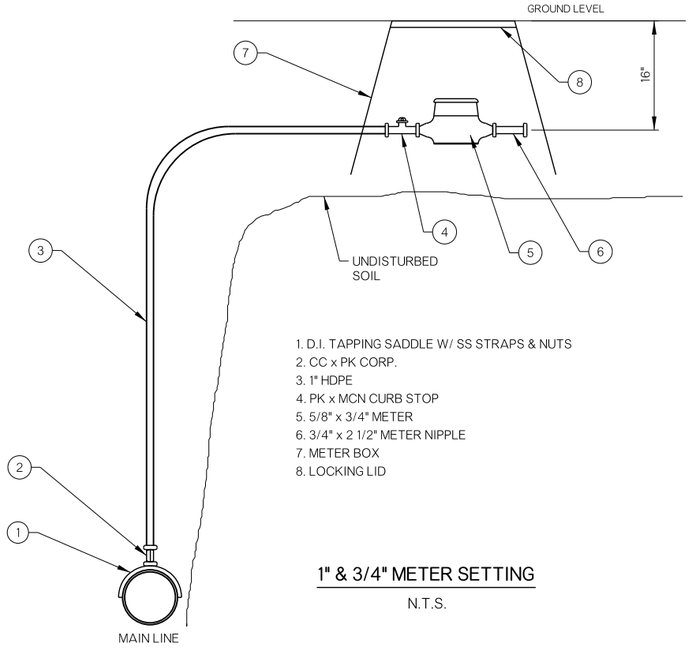
POE & ASSOCIATES INC.
4606 S. GARNETT RD., STE. 600 TULSA, OK 74146-5200

REVISION	BY	DATE

DESIGNED BY: RWS
DRN. BY: CS
CHKD. BY: RM
DATE: AUG 2022
SHEET 8 OF 9

WATERLINE DETAILS (1)
CREEK COUNTY RWD #3

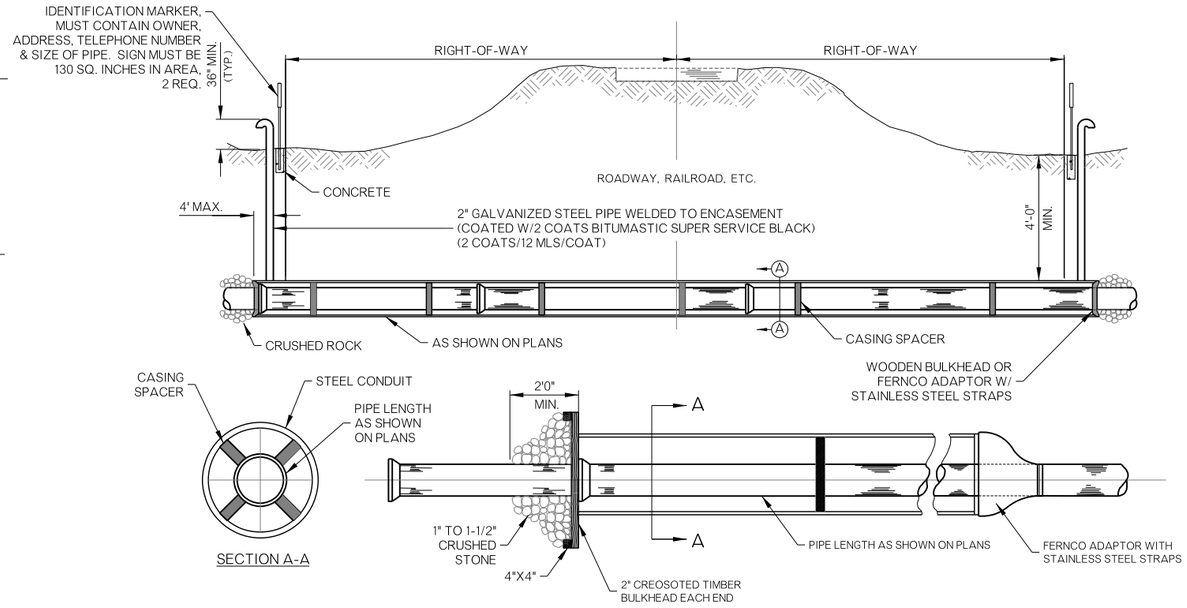
I:\22-4008 Creek 3 Pump Station Waterline\Plan Sheets\22-4008-Water Details.dgn



1. D.I. TAPPING SADDLE W/ SS STRAPS & NUTS
2. CC x PK CORP.
3. 1" HDPE
4. PK x MCN CURB STOP
5. 5/8" x 3/4" METER
6. 3/4" x 2 1/2" METER NIPPLE
7. METER BOX
8. LOCKING LID

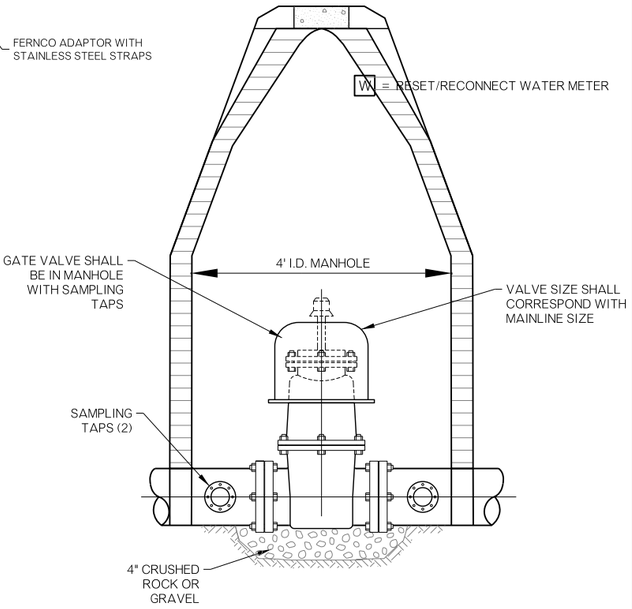
1" & 3/4" METER SETTING

N.T.S.



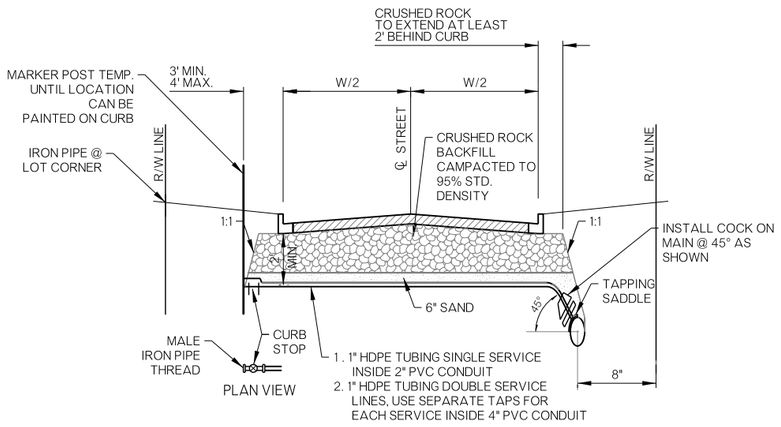
CROSSING & CONDUIT DETAILS

N.T.S.



CREEK CROSSING SAMPLING STATION

N.T.S.

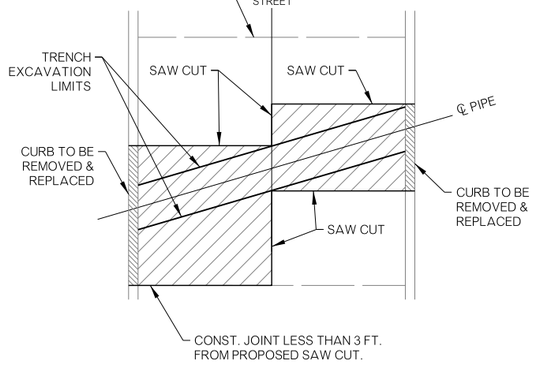


NOTES:

1. LOT CORNERS SHALL BE STAKED PRIOR TO CONSTRUCTION OF SERVICE LINES, DUAL CROSSINGS TO BE ON LOT LINE.
2. DETECTABLE MYLAR MARKING TAPE TO BE INSTALLED OVER SERVICE LINES AS SHOWN.
3. PIPE SHALL NOT BE SPLICED.
4. CROSSING TO BE INSPECTED BEFORE TRENCH IS BACKFILLED.
5. PIPE SHALL BE PLACED IN 2" OR 4" SCHEDULE 40 PVC SLEEVE.
6. #12 COATED COPPER TRACER WIRE REQUIRED ON ALL SERVICE CROSSINGS.

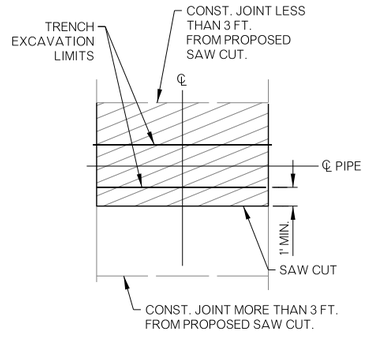
WATER SERVICE STREET CROSSING DETAIL

N.T.S.



TYPICAL STREET WITH DIAGONAL CROSSING

N.T.S.



TYPICAL STREET, DRIVEWAY, OR SIDEWALK WITH RIGHT ANGLE CROSSING

N.T.S.

NOTES:

1. REMOVE AND REPLACE PAVEMENT WITHIN SHADED AREAS BOUNDED BY SAW CUTS AND/OR CONST. JOINTS.
2. FOR DIAGONAL CROSSING, REPLACE PAVEMENT USING SQUARED CUTS, AS SHOWN. PAY QUANTITY WILL INCLUDE SQUARED AREA.
3. REMOVE AND REPLACE PAVEMENT TO CONST. JOINT IF LESS THAN 3 FT. FROM PROPOSED SAW CUT. EXTRA AREA WILL BE INCLUDED IN PAY QUANTITY.
4. FOR LONGITUDINAL INSTALLATIONS: REMOVE AND REPLACE PAVEMENT AND CURB TO EDGE OF STREET, IF THE SAW CUT IS LESS THAN 3 FT. FROM THE OUTSIDE EDGE OF THE PAVEMENT OR CURB. AVOID SAW CUTS IN THE EXISTING WHEEL LINES. TRENCHES EXCEEDING 300 L.F. SHALL BE BACKFILLED AND MADE DRIVABLE.

POE & ASSOCIATES INC.
4606 S. GARNETT RD., STE. 600 TULSA, OK 74146-5200

REVISION	BY	DATE

DESIGNED BY: RWS
DRN. BY: CS | CHKD. BY: RM
DATE: AUG 2022
SHEET 9 OF 9

WATERLINE DETAILS (2)
CREEK COUNTY RWD #3

I:\22-4008 Creek 3 Pump Station Waterline\Plan Sheets\22-4008-Water Details.dgn

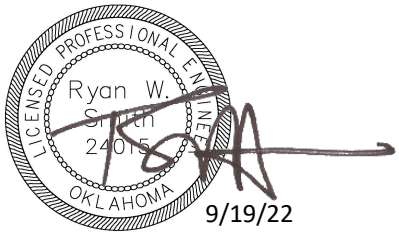
TECHNICAL SPECIFICATIONS

FOR

49th W. AVE. AND SH-117 WATERLINE RELOCATION

CREEK COUNTY
RURAL WATER DISTRICT NO. 2

September 2022



PREPARED BY:

Poe & Associates, Inc.
Consulting Engineers
Tulsa ◆ Oklahoma City
Certificate of Authorization No. 541 P.E., L.S., Renewal Date 06/30/23

TABLE OF CONTENTS (TECHNICAL SPECIFICATIONS)

49TH W. AVE. AND SH-117 WATERLINE RELOCATION
CREEK COUNTY RURAL WATER DISTRICT NO. 2

DIVISION I – GENERAL SPECIFICATIONS

DIVISION II - MATERIAL SPECIFICATIONS

DIVISION III – CONSTRUCTION SPECIFICATIONS

DIVISION I
GENERAL SPECIFICATIONS

101. SCOPE AND LOCATION

101.1. The location of the project is in or near the Creek County RWD #2, Oklahoma. The character and exact location of the project are shown on the Drawings on file in the office of the District Manager. Said Drawings clearly show the general work involved, but are not intended to show all details of the work.

101.2. The site and/or rights-of-way upon which the work is to be performed is shown on the Drawings. The Contractor agrees that the site or rights-of-way provided is adequate for the performance of the work. If any additional working area is required, the Contractor shall, at his expense, make arrangements for such working area. The RWD #2 will not be liable for additional compensation as a result of any delay in obtaining rights-of-way.

102. SCOPE, NATURE. AND INTENT OF SPECIFICATIONS AND DRAWINGS

102.1. The Specifications and Drawings are intended to supplement, but not necessarily duplicate each other; and together constitute one complete set of Specifications and Drawings, so that any work exhibited in the one and not in the other shall be executed just as if it had been set forth in both, in order that the work shall be completed according to the complete design or designs as decided and determined by the Engineer.

102.2. The Drawings are not intended to be scaled for dimensions, and if dimensions not shown on the Drawings are required, the Contractor shall request them from the Engineer. Where existing utility lines or other sub-surface obstructions are shown on the Drawings, the same have been located as nearly as practicable from information furnished by owners of such, and from such surface indications as may exist at the work site. Such obstructions are shown for the purpose of advising the Contractor that they may interfere with the work to be done hereunder, but not for the purpose of indicating that the work can be performed without such interference.

102.3. Where exploratory drilling is indicated to have been performed on the plans, boring logs will be available for review at the office of the Engineer. The logs will be furnished for information purposes only, and are not to be construed as a true representation of actual subsurface conditions.

102.4. Should anything be omitted from the Specifications and Drawings which is necessary to a clear understanding of the work, or should it appear various instructions are in conflict, the Contractor shall request written instructions from the Engineer before proceeding with the construction affected by such omissions or discrepancies.

102.5. The Contractor's responsibility for construction covered by conflicting requirements, not provided for by addendum's prior to the time of opening bids for the work represented thereby, shall not extend beyond the construction in conformity with the cheaper of the said conflicting requirements. Any increase in cost of work requested to be done in excess of the cheaper of the conflicting requirements may be paid for as Extra Work as provided for herein.

103. LINES AND GRADES

103.1. All work done under this Contract shall be done to the lines, grades, and elevations shown on the Drawings. The contractor shall furnish all lines and grades required for construction.

104. SATURDAY, SUNDAY, HOLIDAY AND NIGHT WORK

104.1. No work shall be done between the hours of 6:00 p.m. and 8:00 am. nor on Saturday, Sunday, or legal holidays without the written approval or permission of the Engineer in each case, except such work as may be necessary for the proper care, maintenance, and protection of work already done, or of equipment, or in the case of an emergency.

105. PROTECTION OF PROPERTY

105.1. The protection of District, City, State and Government monuments, street signs, and other District property is of prime importance, and if the same be damaged, destroyed or removed, they shall be repaired, replaced or paid for by the Contractor. Disturbance to this property must first be approved by the agency that controls it.

105.2. No valve or other control on any utility main or building service line shall be operated for any purpose by the Contractor.

105.5. The location of utility service lines serving individual properties may or may not be shown on the Drawings, but the Contractor shall assume that such service lines exist whether or not they are shown on the Drawings, and it shall be the responsibility of the Contractor to make any necessary changes in the line and/or grade of such services, or to secure the necessary changes therein to be made by the particular utility company involved or other owner thereof, or by an agent or individual contractor approved by such utility company or other owner. Contractor shall pay the cost of all such revisions whether performed by contractor, the utility company, or other owner, or an approved contractor. In the event of interruption of a utility service as a result of accidental breakage, Contractor shall promptly notify the Engineer and the owner of the utility, and shall repair or cause the same to be repaired, in the same manner as necessary changes above provided for, and the Contractor shall do all things necessary to see to the restoration of services as promptly as may be reasonably done. All sanitary sewer service lines damaged shall be replaced with cast iron pipe, regardless of type or kind damaged.

106. CONNECTIONS

106.1 All connections to existing water mains shall be made by the Contractor, unless noted otherwise. The Contractor shall perform his work so that these connections may be readily made. All transfer of building service line connections from the existing to the new main shall be made by the Contractor after the main has been backfilled, tested, and chlorinated, but before any sidewalks, driveways, curbs, and/or paved roadways, are replaced.

106.2. The Contractor shall not make any unauthorized connections to a sewer, nor shall he permit any such connections to be made. If the Contractor is properly authorized by the Engineer to make connections by installing wyes in the sewer under construction, such installation shall conform to the regulations of the RWD#2.

107. REFERENCES TO OTHER SPECIFICATIONS

107.1. Where a standard American Society for Testing Materials, American Concrete Institute, American Standards Association, American Water Works Association, or other agency designation is specified for a material, that designation shall be the current revision, either tentative or adopted. If a referenced specification is in disagreement with these specifications, the RWD #2 specifications shall govern. When within Broken Arrow city limits, Broken Arrow specifications will supercede these specifications.

108. PROTECTION OF MATER1ALS

108.1. All materials delivered to the site of the work shall be adequately housed and protected against deterioration according to the standard accepted procedures. The Contractor shall keep his storage yards in good order, pile his materials neatly, and protect them from damage.

109. TESTING

109.1 Materials: All materials required to be tested shall be tested by a laboratory of good reputation, previously approved by the RWD #2. No material shall be accepted for construction unless it bears the approval of the laboratory. Reports of tests shall be forwarded to the RWD #2. Before final acceptance of the project, all materials shall be tested and shall be found in good and proper condition, or shall be placed in such condition. The cost of all testing shall be paid by the contractor.

109.2 Testing and Chlorinating Water Mains: Testing and chlorinating water mains will be performed by the Contractor. Water mains shall be testing in accordance with the Standard Specifications for "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 48 In., for Water Transmission and Distribution," AWWA Designation C-900/905. The pressure test of 150 psi shall be for thirty minutes' duration. If the line passes the test without significant pressure drop, a leakage test shall be made at the normal operating pressures under which the line is to operate for two hours' duration.

After the pipe is laid, and the trench backfilled, the newly laid piping or any valved section of piping shall be tested and disinfected in the following manner.

Leakage shall not exceed 10 gallons-per-inch of pipe diameter per mile of pipe per 24 hours at a testing pressure of 150 psi. Provide for system testing as follows:

1. Fill pipe with water until all air is exhausted. Where temporary plugs are required for pressure testing, the contractor shall furnish and install the plug and temporary blocking, and remove after testing is complete. The cost shall be included in the unit price bid for pipe. No additional payment will be made.
2. Raise pressure to rated working strength of pipe by means of pumping from a container.
3. Refill container and maintain pressure for four (4) hours.
4. Measure water required to refill container to pre-test level.
5. Disinfect and test water samples in strict accordance with Oklahoma Department of Environmental Quality requirements and AWWA Standard for Disinfecting Water Mains, AWWA Designation C-651

In addition to the allowable leakage as required in pipeline testing, the Contractor must pay for water losses which occur during the period that service is available to all users and prior to final acceptance of the system. If any customers are using water, the amount of water used by them, as shown by their meter readings, will be deducted from the amount to be paid by the Contractor.

110. "OR EQUAL" CLAUSE

110.1. When a material is specified or shown on the Drawings by brand or manufacturer's name, any other material that will adequately perform the same function, must be submitted to the Engineer for approval before use.

111. DEWATERING

111.1. The Contractor shall provide all necessary pumps, drains, dams, well points, and other means for removing water from or preventing water from entering the trench or other excavation until the project is completed. Sufficient pumps or other works shall be made available at all times to hold the water at a safe level. Water from the excavation shall be properly disposed of so that no damage or interference results to public health, public or private property, completed or uncompleted work, other projects, or streets.

112. SAFETY

112.1. Excavations: The Contractor shall adequately shore, or sheet, and brace the excavation, or shall slope the sides of the trench in accordance with the OSHA standards.

112.2 Explosives: Explosives will not be allowed without prior approval from the Engineer. Handling explosives used during the construction of the project, the Contractor shall adhere to all Federal and State Laws and District Ordinances regulating the purchase, transportation, storage, handling, and use of such explosives. No blasting shall be done without the presence of the

Inspector. All equipment, tools, and materials used shall be of the correct type and in good conditions for the operation. The Contractor shall take all necessary precautions to avoid damage to property resulting from the transportation, storage, handling and use of explosives. Before blasting, the Contractor shall cover the area to be blasted with steel mesh mat or other suitable material, reinforced with timbers of sufficient weight so that rock and debris will be confined to the excavation. Any blasting within ten feet of a water, sewer, gas, or pipe line shall be done with very light charges, and utmost care should be taken to avoid disturbance to these lines. Blasting insurance shall be provided to the owner for their protection, prior to the use of explosives.

112.3. Danger Signals and Protection: When the Contractor is performing any type of construction or excavation work, or is stockpiling or storing any materials or equipment upon or adjacent to any street, alley, sidewalk, residence, public ground, or other location that is likely to be subject to pedestrian or vehicular traffic, he shall furnish, erect, and maintain substantial guard rails, safety fencing, lights, and traffic control devices around the project to protect pedestrians, animals, and vehicles from injury or damage. All traffic control shall be in accordance with the ODOT Traffic Engineering Division's Standards and Procedures for Street Use and Temporary Traffic Control. A Safety and traffic control plan shall be presented to the Engineer upon request.

112.4. Power Lines: No person, materials, or equipment shall come within six feet of any power line carrying more than 440 volts unless the electric power services has been first discontinued.

112.5. Fire Prevention and Protection: The Contractor shall take all necessary measures to prevent fire, and shall provide satisfactory fire fighting means at the location of work.

112.6. Interference with Traffic: The Contractor shall construct and maintain adequate and safe bridges or crosswalks over excavations, where required. When a roadway or sidewalk is not closed, the Contractor shall provide a safe substitute route for any portion obstructed by his operations. If a roadway or sidewalk is closed to traffic, the Contractor shall provide and mark detours. Unless otherwise shown on drawings, construction across roadways or sidewalks may be done by open excavation.

112.7. Condition of Equipment and Materials: All equipment, tools, appliances, and materials used in connection with the project shall be handled and operated only when they are in safe operating condition and in accordance with a standard safety procedure. All responsibility for the safe use of equipment shall fall to the contractor.

113. REMOVAL OF CONDEMNED MATERIALS AND STRUCTURES

113.1. The Contractor shall remove from the site of the work, without delay, all rejected and condemned materials or structures of any kind brought to or incorporated in the work, and upon his failure to do so, or to make satisfactory progress in so doing, within forty-eight (48) hours after the service of a written notice from the Engineer ordering such removal, the condemned material or structure may be removed by the RWD #2 and the cost of such removal to be taken out of the money that may be due or may become due the Contractor on account of or by virtue

of this Contract. No such rejected or condemned material shall again be offered for use by the Contractor under this or any other Contract with the District.

114. CLEAN-UP

114.1. Immediately upon installation of any portion of the work, the Contractor shall restore all fills, topsoil, and utilities to their location and condition prior to construction.

114.2. Immediately upon installation of any defined segment of work, the Contractor shall remove all materials, tools, debris, excess excavated material, and equipment; and restore the site in a manner satisfactory to the Inspector.

114.3. Clean up and restoration of service line transfers shall be made immediately following each transfer installation.

115. PLACING WORK IN SERVICE

115.1. If desired by the RWD #2, portions of the work may be placed in service when completed and the Contractor shall give prior access to the work for this purpose, but such use and operation shall not constitute an acceptance of the work. Acceptance of work occurs only after completion of a final inspection.

116 UTILITIES

116.1 Before construction the Contractor shall contact all utility companies which were specified in the project area by Oklahoma One-Call. Contractor shall give the Notification Center of Oklahoma One-Call System, Inc., notice of any excavation no sooner than ten (10) days nor later than 48 hours excluding Saturday, Sunday, and legal holidays, prior to commencement of work. Phone 1-800-522-6543.

116.2 Known utilities and structures adjacent to or expected to be encountered in the work are shown on the drawings. The locations shown are taken from existing records; however, it is expected there may be some discrepancies and omissions in the locations and quantities of utilities and structures shown. Those shown are for the convenience of the Contractor only, and no responsibility is assumed by either the Owner or the Engineer for their accuracy or completeness. No attempt has been made to show utility service lines on the drawings. The Contractor shall field locate and verify the presence, type, size, location and depth of all existing utilities and structures prior to construction.

116.3 Contractor is responsible for the relocation adjustment and bracing of all utility lines. Actual relocation work is to be done by utility companies and paid for by the Contractor. Contractor shall coordinate this work with the utility companies for proper timing with own construction schedule. Cost of utility relocation is to be included in price bid for Right-of-Way Clearing and Restoring.

116.4 No payment will be made for the removal of abandoned utility pipe lines that interfere with construction. Cost shall be included in price bid for other items of work.

116.5 In the event of interruption of a utility service as a result of accidental breakage, Contractor shall promptly notify the Engineer and the owner of the utility, and shall repair or cause the same to be repaired, in the same manner as necessary changes above provided for, and the Contractor shall do all things necessary to see to the restoration of services as promptly as may be reasonably done. All sanitary sewer service lines damaged shall be replaced with cast iron pipe, regardless of type or kind damaged. All water lines damaged shall be replaced with cast iron pipe unless otherwise authorized by the District Engineer.

116.6 All efforts should be made to keep utilities in service during construction. If it is not possible, the District shall be notified immediately, and the Contractor shall notify any affected area residents or businesses at least 24 hours prior to a planned interruption of utility service. In the event of unplanned interruption, the Contractor shall immediately notify the utility company and affected residences or businesses. Any charges for utility service breakage shall be the responsibility of the Contractor.

116.7 The Contractor shall excavate all utility crossings ahead of pipe laying so grades can be adjusted on the proposed water line to avoid utility conflicts. Failure to do so shall not entitle the Contractor to claim extra compensation for the adjustments to the proposed water line. The cost for excavating the utility crossings shall be included in the price bid for other items of work. The Contractor shall notify all utility owners when working near their facilities.

116.8 Storm sewers and culverts may be removed at the time of crossing or may be adequately braced and held in position while the pipe is placed beneath them. If the storm sewer or culvert is removed, it shall be replaced with pipe of the same type and size as that removed, and it shall be re-joined to the undisturbed line with a joint satisfactory to the Engineer. Backfill over the main, up to and around the storm sewer, shall be thoroughly compacted in order that no settlement will occur. The revision and crossing shown on the Drawing shall be at the expense of the Contractor. In the event utility lines, other than those shown on the Drawings, are encountered and fall within the standard trench limit and, in the opinion of the Engineer, revision of the line is necessary for the construction of the project, the Contractor will be reimbursed for the extra cost of the crossing or revision under the “Extra Work” clause of the Contract.

116.9 In the event the Contractor in any way fails to comply with the requirements of protecting, repairing, and restoring of any utility or utility service, the Engineer may, upon forty-eight (48) hours’ notice, proceed to protect, repair, rebuild or otherwise restore such utility or utility service as may be deemed necessary. The cost thereof will be deducted from any money due or which may become due the Contractor pursuant to the terms of his contract.

117. PERMIITS

117.1 All required permits are the responsibility of the Contractor. The Contractor shall coordinate with the District to determine which permits have been obtained prior to construction.

117.2 All street crossings, open cut or bored, in Tulsa & Creek County must be approved by during a scheduled Commissioner meeting. Items to be placed on the Monday meeting agenda must be turned in by Thursday to the county clerk. The Creek County Clerk can be reached at (918) 224-4084 and the Tulsa County Clerk can be reached at (918) 596-5801. When requesting

a street crossing, include the date of crossing, the location, and the responsible party (including contact phone number).

DIVISION II
MATERIAL SPECIFICATIONS

200. SUBMITTALS

200.1. The Contractor shall submit to the District, with such promptness as to cause no delay in his own work or in that of any other contractor, three (3) copies of all shop drawings, material submittals for all material he proposes to use, project data and schedules required for the work of various trades. If the Contractor requires more than one (1) copy be returned, the additional copies shall be submitted to the District. The District shall pass upon them with reasonable promptness, making necessary corrections; however, the Contractor shall estimate a two week review period for the District. Construction shall not begin until the submittals have been approved by the District.

200.1.2 All shop drawings submitted must bear the stamp of approved by the Contractor prior to being transmitted to the Engineer for review. All shop drawings submitted without the stamp of approval of the Contractor will not be considered and will be returned to the Contractor for proper resubmission. If the shop drawings indicate variances from the requirements of the contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise, the Contractor shall not be relieved of the responsibility of execution of the work in compliance with the contract even though shop drawings have been reviewed.

200.1.3 Submittals for pipe shall consist of notarized certifications, from the manufacturer, that the pipe was manufactured and tested in accordance with the applicable specifications. The certifications shall indicate the pipe diameter, the pressure rating, and the batch number from which the pipe was manufactured. For restrained joint pipe, a detailed laying schedule prepared by the manufacturer shall be submitted, along with the detail design calculations.

200.1.4 Submittals for material other than pipe shall consist of manufacturer's product literature or shop drawings, indicating dimensions and material specifications. Submittals shall include reference to compliance with AWWA, ASTM, NSF, and other applicable standards.

200.1.5 Form of Drawings: The drawings shall be numbered consecutively and shall accurately and distinctly present the following:

1. All work and erection dimensions;
2. Arrangement and section views;
3. Connections between functional parts;
4. Kinds of materials and finishes; and
5. Parts list and description thereof.

Each drawing shall be dated and shall bear the name of the project, names of the equipment or materials, and the location at which the equipment or materials are to be installed in the work. The Engineer may decline to consider any shop drawings that do not contain complete data on the work and full information on related matters.

200.1.6 Approved by the Engineer shall not be construed to relieve the Contractor of his responsibility for errors, omissions or use of materials not conforming with the requirements of the Contract Documents, nor shall the Engineer be responsible for dimension and measurements given on such shop drawings.

200.1.7 Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data shall have each copy clearly marked to identify pertinent materials, products or models. Where applicable, the data will include:

1. Dimensions and clearances;
2. Shop performance characteristics and capacities; and
3. Wiring diagrams and controls.

All submittals must bear the stamp of approval by the Contractor as evidence that the data has been checked by the Contractor.

200.1.8 The Contractor shall submit for approval of the Engineer samples of materials, appliances, accessories, finishes or other items that may be required. They shall be submitted in ample time before the work is required to permit the Engineer's consideration. Each sample shall be labeled to give a complete description of material, where it is to be used, and the name of the party submitting it. The work provided shall be in accordance with the approved samples.

200.1.9 The procedure for review of drawings shall be as follows:

A. The Contractor shall submit three (3) prints of drawings to the District for his approval. The submission of drawings shall be accompanied by a letter of transmittal (3 copies) containing the name of the project, the name of the Contractor, the number of drawings, titles and other requirements.

B. When a drawing is satisfactory to the District, three (3) prints will be stamped or marked "Approved . . ." or "Approved as Noted . . .", be dated and one copy will be returned to the Contractor by letter. The remaining copies are for the Owner and the Engineer.

C. Should a drawing be unsatisfactory to the District, he will stamp thereon "Revise and Resubmit" and will return two (2) or more copies thereof to the Contractor with the necessary corrections and changes indicated. The Contractor must make such corrections and changes and again submit at least three (3) prints of the drawings for approval. The Contractor shall revise and resubmit the working drawings as required by the District, until acceptance thereof is obtained.

D. The Contractor shall allow sufficient time for preliminary review, corrections and resubmission, and final review for all working (shop) drawings. The Contractor should allow not less than fourteen (14) days for each review. Drawings of items critical to job progress, when requested in writing by the Contractor, will be given priority review.

200.1.10 An Operation and Maintenance Manual shall be furnished by the Contractor for each equipment item and system at the time of shipment of the equipment. No payment will be made for equipment unless the O&M manuals are supplied to the Owner.

A. Organization: The Operation and Maintenance Manual shall contain the following information:
   1. Equipment and/or system layout.
   2. Equipment function, normal operating characteristics and limiting conditions.
   3. Assembly, installation, alignment, adjustment and checking instructions.
   4. Operation instructions for start-up, routine and normal operation, regulation and control, shut-down and emergency conditions.
   5. Lubrication and Maintenance instructions describing daily, weekly, monthly and yearly requirements.
   6. Guide to "troubleshooting".
   7. Parts list and predicted life of parts subject to wear.
   8. Outline, cross sections and assembly drawings, engineering data, and wiring diagrams.
   9. Certified Test Data and performance curves, where applicable.

B. Identification, Binding and Size:
   1. Each manual shall be bound with the following information printed on the cover:
      a. Operation and Maintenance Manual
      b. Name of Equipment
      c. Name of Contractor/Supplier
      d. Name of Owner
      e. Name of Facility
      f. Job Identification (Supplier's)
      g. Equipment Tag No.

   2. The instruction sheets shall be 8-1/2 x 11 inches. Drawings and diagrams shall be reduced to 8-1/2 inches or 11 x 17 inches.
   3. Appropriate manuals for components shall include parts lists, wiring diagrams and schematics for all electrical equipment and lubrication schedules for all bearings, wearing rings and other non-friction devices. It shall be the responsibility of the Contractor to secure all pertinent data, operating instructions, purchase orders and furnish the sets collected and bound.

200.1.11 It is anticipated the Contractor shall make submittals for the following items (if applicable):

1. Pipe Laying Schedule
2. Ready Mixed Concrete Supplier w/Plant Certification
3. Concrete Mix Designs
4. Subcontractors
5. Ductile Iron Pipe Certifications
6. Steel Pipe Certifications
7. Cast Iron Pipe Fittings
8. Gate, Check, and Altitude Control Valves and Related Structures
9. Retaining Wall Design
10. Foundation Details and Design Computations
11. Fence and Gate
12. Paint & Lettering
13. Standpipe and Appurtenances
14. Specials

200.1.12 The Contractor shall provide the Owner with construction record drawings reflecting items as constructed before final payment will be approved.

201. CONCRETE

201.1. CEMENT - All cement used in the work shall be a well-known brand of true Portland Cement and shall conform to the Standard Specifications for Portland Cement, ANSI/A.S.T.M. Designation Cl50. Unless otherwise permitted, the Contractor shall use only one brand of cement in the work and under no condition shall he use more than one brand of cement in the same structure. Cement that for any reason has become partially set or contains lumps or cakes will be rejected and shall be removed from the site of the work.

201.1.2. The acceptance or rejection of cement shall be with the Inspector and any cement failing to meet the requirements specified herein may be rejected at his direction. All rejected cement shall be plainly marked for identification, shall be immediately removed from the work, and shall not again be offered for inspection. Cement kept in storage for several months may be subject to repeated tests, if required.

201.1.3. The cement shall be delivered in strong cloth or paper bags. No cement shall be used and no cement shall be inspected unless delivered in the original package with the brand and name of the manufacturer plainly marked thereon. Each bag of cement shall contain approximately ninety-four pounds of cement, net weight, and four bags shall be the equivalent of one barrel. Packages received in broken or damaged condition will be rejected or accepted only as fractional packages.

201.1.4. The Contractor shall provide, at the site of the work, a suitable weather tight building, or buildings, having a floor properly blocked or raised from the ground, for the storage of cement. The building shall be large enough to supply of cement in quantity sufficient to prevent delays or interruptions to the work, which might be due to the lack of cement. The cement shall be stored in such manner to permit easy access for the proper inspection and identification of each shipment. Cement in bags shall not be piled to a height in excess of seven feet. Suitable accurate scales shall be provided by the Contractor for weighing the cement. After it has been delivered to the job, the Contractor will not be permitted to remove any of the cement to any other job or dispose of any of this cement in any way without the consent of the Engineer.

201.1.5. At the beginning of operations and at all other times while cement is required, the Contractor shall have, at the site of the work, an ample supply of acceptable cement and shall carefully guard against possible shortage on account of rejection, irregular deliveries, or any other cause.

201.2. WATER

201.2.1. All water used in mixing mortar or concrete shall be free from acid, alkali, oil, salt, vegetable, or other matter in sufficient quantity to be injurious to the finished product, and shall be from an approved source.

201.3. AGGREGATE

201.3.1. Fine aggregate for concrete shall be clean, hard, durable, uncoated grains of Arkansas River sand or other sand acceptable to the Engineer. It shall be free from injurious amounts of dust, clay balls, soft or flaky particles, shale, alkali, organic matter, loam, or other deleterious substances. It shall not contain more than three per cent, by weight, of material, which can be removed by standard decantation tests. If the color of the supernatant liquid is darker than that of the reference standard color solution when subjected to the Standard Test For Organic Impurities in Sands for Concrete ANSI/ASTM C40, the fine aggregate shall be rejected unless it passes the Standard Test for Effect of Organic impurities in Fine Aggregate on Strength of Mortar ANSI/ASTM C87.

201.3.2. Fine aggregate shall be graded approximately within the limits shown in the following table. If not enough fines are available in the natural sands, limestone dust, or other approved fines shall be added:

Per Cent Passing Standard Square Mesh Screens

No.4	No. 20	No. 50	No. 100
95-100	45-80	10-30	5-10

201.3.3. Coarse aggregate shall consist of the best available crushed limestone or other approved material. River gravel or other material with smooth surfaces shall not be used without specific written approval of the Engineer. Coarse aggregate shall be clean, tough,

sound, durable rock and shall not contain harmful quantities of foreign materials and must be satisfactory to the Engineer.

201.3.4. Coarse aggregate shall be graded within the limits shown in the following table:

Per Cent Passing Standard Square Mesh Screens

Aggregate Max Size	2-1/2"	2"	1-1/2"	1"	¾"	½"	3/8"	No.4
2"	100	95-100	60-95	50-83	40-70	20-40		0-5
1 ½"		100	95-100		40-70		10-30	0-5
¾"				100	95-100		40-75	0-5

201.3.5. Coarse aggregate shall conform to Standard Specifications for Concrete Aggregates, ANSI/ASTM C33, except as to graduation. The maximum size aggregate to be used in structures six inches thick and under shall be three-quarters inch; in structures from six inches to ten inches thick, the maximum size of aggregate shall be one and one-half inches. If required, the Contractor shall furnish test certificates showing the aggregates meet the above requirements.

201.3.6. In case the concrete resulting from the mixture of the aggregates is not of a workable character or does not make the proper finished surface, the Engineer may require a different grading in order to secure the desired results, or they may allow the use of inert admixtures to correct deficiencies, upon proper showing that such use will not materially lower the strength or increase the permeability of the concrete.

201.4. STEEL REINFORCEMENT

201.4.1. All reinforcing steel shall be deformed bars and shall conform to the requirements of the Standard Specifications for Deformed and Plain Billet Steel Bars for Concrete Reinforcement, ANSI/ASTM A615, for grade 40 or grade 60. All steel shall be manufactured in the United States.

201.4.2. The Engineer reserves the right to require a test of three specimens of each size of bar from each carload received. A laboratory shall make these tests or testing firm approved by the Engineer and the cost of such testing shall be included in the price bid for steel reinforcement.

201.5. STRENGTH AND PROPORTION

201.5.1. The concrete shall have a compressive strength of not less than three thousand pounds per square inch, unless otherwise specified in the plans, as determined from test cylinders at twenty-eight days, made, cured, and broken, as hereinafter specified.

201.5.2. The concrete shall be mixed in the approximate proportion of 1:2-1/2:4-1/4 and shall contain not less than 5 sacks of cement per cubic yard of finished concrete. With the approval of the Engineer, admixtures may be added in order to increase workability.

201.6. TESTING OF CONCRETE

201.6.1. During the progress of the work, a reasonable number of compression tests shall be made when and if required by the Engineer. Each test shall consist of not less than three test cylinders. At least one test shall be made for each one hundred cubic yards of concrete placed. The test cylinders shall be made and stored in accordance with the Standard Method of Making and Curing Concrete Test Specimens in the Field, ANSI/ASTM C31, and shall be tested in accordance with the requirements relating to making compression tests on concrete test specimens as given in the Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens, ANSI/ASTM C39.

201.6.2. The Contractor shall furnish the Engineer certified reports on these tests and shall pay all the expense of taking the tests and of furnishing the concrete for preparing and testing the cylinders.

201.7. RESPONSIBILITY OF CONTRACTOR FOR STRENGTH

201.7.1. It is the intent of these specifications that the Contractor shall guarantee that concrete of the specified compressive strength is incorporated in the structures and that the responsibility for producing the required grades of concrete is assumed by the Contractor.

201.7.2. If the tests disclose that the strength of the concrete is insufficient for the structure as built, the Engineer may condemn the part of any structure in which concrete of insufficient strength has been placed and the Contractor, at his cost, shall remove and replace such concrete with concrete meeting these specifications.

201.8. EXPERIMENTAL CONCRETE MIXES

201.8.1. The Contractor shall make experimental mixes prior to the placing of the concrete and at any time during the progress of the work when necessary to demonstrate that the concrete will meet these specifications. Materials for making experimental mixes shall be furnished by the Contractor and these materials shall be identical with those intended for use in the work. The cost of the materials, as well as the costs of crushing test specimens made from the experimental mix, shall be borne by the Contractor and shall be included in the price bid for concrete.

201.9. MIXING

201.9.1. The concrete shall be mixed in an approved batch machine or mixer. The ingredients shall be accurately measured by weight, unless the Engineer permits measurement by volume, before being placed in the mixer. Measuring boxes or other approved measuring apparatus shall be such that the proportions can be accurately determined. The quantity of water to be added, which will vary with the degree of dryness of the material and with the weather conditions, shall be accurately measured for each batch of concrete. Means shall be provided by which a measured quantity of water

can be introduced at any stage of the process. The mixing shall be done in a thorough and satisfactory manner and shall continue until every particle of aggregate is completely covered with mortar. The mixing time for each batch shall not be less than one minute after the materials are in the mixer. The entire contents of the drum shall be discharged before recharging. Retempering of concrete which has partly hardened will not be permitted.

201.10. CONSISTENCY

201.10.1. All reinforced concrete which is required to be spaded or puddled in forms or around reinforcing steel shall be of such consistency that: all aggregate will float uniformly throughout the mass without settling or segregation; when dropped directly from the discharge chute of the mixer, it will flatten out at the center of the pile but will stand up at the edges, the pile spreading from internal expansion and not by flowing; it will flow sluggishly when tamped or spaded; it can be readily puddled into corners and angles of forms and around reinforcing steel, it can be readily spaded to the bottom of the pour or to a depth of several feet any time within thirty minutes after placing.

201.10.2 A desirable consistency is one which results in a very slight accumulation of water at the top of a layer several feet in thickness, but not with segregation or accumulation of laitance.

201.10.3. If, through accident, intention, or error in mixing, any concrete shall, in the opinion of the Engineer, vary materially from the consistency specified, such concrete shall not be incorporated in the work but shall be discharged as waste material.

201.11. PLACING CONCRETE

201.11.1. Before beginning a run of concrete, surfaces of the forms, reinforcing steel, and concrete previously placed, shall be thoroughly cleaned of hardened concrete or foreign materials. Forms shall be thoroughly wetted or oiled.

201.11.2. Concrete shall be placed in the forms immediately after mixing. It shall be so deposited that the aggregates are not separated. Dropping the concrete any considerable distance, generally in excess of five feet, depositing large quantities at any point and running or working it along the forms, or any other practice tending to cause segregation of the ingredients, will not be allowed. It shall be compacted by vibration or continuous tamping, spading, or slicing. Care shall be taken to fill every part of the forms, to work the coarser aggregate back from the face, and to force the concrete under and around the reinforcement without displacing it. All concrete shall be thoroughly vibrated, except where specifically accepted in the specifications. The concrete shall be deposited in continuous horizontal layers and, whenever practicable, concrete in structures shall be deposited continuously for each monolithic section of the work. Chutes and tremies used for conveying concrete shall be mortar-tight.

201.11.3. Work shall be arranged in order that each part of the work shall be poured as a

unit, if this is possible. Where necessary to stop pouring concrete, the work shall be brought up in level courses and against a vertical stop board.

201.11.4. The placing of concrete under water, where permitted, must be done by special approved methods.

201.12. PLACING IN COLD WEATHER

201.12.1. No concrete shall be placed without the specific permission of the Engineer when the air temperature is at or below thirty-five degrees Fahrenheit.

201.12.2. If concreting in freezing weather is permitted by the Engineer, care shall be taken to prevent the use of any frozen material. In addition to adequate provision for protecting the concrete against chilling or freezing, the Contractor shall be required to heat the water and aggregate in order that when deposited in the forms, the concrete will have a temperature of not less than fifty degrees Fahrenheit, nor more than eighty degrees Fahrenheit. The concrete shall be adequately protected in order to maintain this temperature for a minimum of seventy-two hours after it has been placed and a temperature above thirty-two degrees Fahrenheit for a period of two additional days. The work shall be done entirely at the Contractor's risk.

201.12.3. No chemicals or other foreign matter shall be added to the concrete for the purpose of preventing freezing.

201.13. READY-MIXED CONCRETE

201.13.1. Ready-mixed concrete may be used on the work, with the approval of the Engineer, when the Contractor can demonstrate that the concrete can be furnished in accordance with the specifications hereinabove and that delivery can be made at such rate as will insure the continuity of any pour. Standard Specifications for Ready-Mix Concrete, ANSI/ASTM C94, when not in conflict with the specifications herein, shall control the furnishing of ready-mix concrete.

201.13.2. All mixer trucks shall be equipped with water meters. Additional water shall be added at the job site only with the specific approval of the Engineer.

201.14.1. Construction joints shall be located as shown on the drawings and at other points as may be necessary during the construction, provided that the location and nature of additional joints shall be approved by the Engineer, in general, joints shall be located at points of minimum shear, shall be perpendicular to the principal lines of stress, and shall have suitable keys having areas of approximately one-third of the area of the joints.

201.14.2. In resuming work, the surface of the concrete previously placed shall be thoroughly cleaned of dirt, scum, laitance, or other soft material, and shall be roughened. The surface shall then be thoroughly washed with clean water and covered with at least one-half inch of cement mortar, after which concreting may proceed. Mortar shall be

placed in a manner in order not to splatter forms and reinforcing steel.

201.15. FINISH OF CONCRETE SURFACES

201.15.1. All surfaces exposed to view shall be free from conspicuous lines, affects, or other irregularities caused by defects in the forms. If for any reason this requirement is not met, or if there are any conspicuous honeycombs, the Engineer may require the correction of the defects by rubbing with carborundum bricks and water until a satisfactory finish is obtained.

201.15.2. Immediately after removing the forms, all wires or other exposed metal shall be cut back of the concrete surface, and the depressions thus made and all honeycombs and other defects shall be pointed with mortar and then rubbed smooth. If the Engineer deems any honeycomb or other defect to require such treatment, the defective concrete shall be cut out to a depth sufficient to expose the reinforcement and to afford a key for the concrete replacing that cut out.

201.16. CURING CONCRETE

201.16.1. Exposed surfaces of concrete shall be protected by approved methods from premature drying for a period of at least seven days. Curing compounds, when approved by the Engineer, shall be applied according to the manufacturer's recommendations. In dry, hot weather, forms shall be removed as early as practicable and curing started immediately. The Engineer may require the frequent wetting of the concrete and the use of means to protect it from the direct rays of the sun.

201.17. PLACING REINFORCEMENT

201.17.1. All reinforcement, when placed, shall be free from mill scale, loose or thick rust, dirt, paint, oil or grease, and shall present a clean surface. Bends and splices shall be accurately and neatly done and shall conform to American Concrete Institute Manual of Standard Practice for Detailing Reinforced Concrete Structures.

201.17.2. All reinforcing shall be placed in the exact position shown on the drawings and shall be held firmly in position by means of approved metal spacers and supports, by wiring to the forms, and by wiring the bars together at intersections with approved wire ties in order that the reinforcement will not be displaced during the depositing and compacting of the concrete. The placing and fastening of reinforcement in each section of the work shall be approved by the Engineers before any concrete is deposited in the section. Care shall be taken not to disturb the reinforcement after the concrete has taken its initial set.

201.18.1. Forms shall be so designed and constructed that they may be removed without injuring the concrete. The material to be used in the form for exposed surfaces shall be sized and dressed lumber or metal in which all bolt and rivet heads are countersunk. In either case, a plain, smooth surface of the desired contour must be obtained. Undressed lumber may be used for backing or other unexposed surfaces, except inside faces of

conduit.

201.18.2. The forms shall be built true to line and braced in a substantial and unyielding manner. They shall be mortar-tight, and if necessary to close cracks due to shrinkage, shall be thoroughly soaked in water. Forms for re-entrant angles shall be filleted, and for corners shall be chamfered. Dimensions affecting the construction of subsequent portions of the work shall be carefully checked after the forms are erected and before any concrete is placed. The interior surfaces of the forms shall be adequately oiled with a non-staining mineral oil to insure the non-adhesion of mortar.

201.18.3. Form lumber which is to be used a second time shall be free from bulge or warp and shall be thoroughly cleaned. The forms shall be inspected immediately preceding the placing of concrete. Any bulging or warping shall be remedied, and all dirt, sawdust, shavings, or other debris within the forms shall be removed. No wood device of any kind used to separate forms will be permitted to remain in the finished work.

201.18.4. Temporary openings shall be placed at the bottom of the column and wall forms and at other points where necessary to facilitate cleaning and inspection immediately before depositing concrete.

201.19. REMOVAL OF FORMS

201.19.1. Forms shall be removed in such manner as to insure the complete safety of the structure. No forms shall be removed except with the express approval of the Engineer. In general, this approval will be based on the following:

201.19.2. Forms on ornamental work, railings, parapets, and vertical surfaces which do not carry loads and which will be exposed in the finished work shall be removed within twenty-four to forty-eight hours after placing, depending upon weather conditions.

201.19.3. Girder, beam, and joist sides only, column, pier, abutment, and wall forms may be removed within twenty-four to forty-eight hours after placing, depending upon weather conditions. No backfill shall be placed against walls, piers, or abutments, unless they are adequately supported or have reached the required strength.

201.19.4. Girder, beam, and joist soffit forms shall remain in place with adequate shoring underneath, and no construction load shall be supported upon, nor any shoring removed from any part of the structure under construction until that portion of the structure has attained sufficient strength to support safely its weight and the loads placed thereon.

202. DUCTILE IRON PIPE. DUCTILE AND CAST IRON FITTINGS. AND VALVES

202.1. PIPE AND FITTINGS

202.1.1. Where ductile iron pipe (DIP) three (3) inches in diameter and larger is specified or required, it shall conform to, and be tested in accordance with, the current

American National Standard for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids, ANSI/AWWA C151/A21.51. Ductile iron pipe less than three (3) inches in diameter shall conform to the manufacturer's standards, either centrifugally or statically cast with a minimum thickness of 0.25 inches. The ductile iron (nodular cast iron) shall conform to the Standard Specification for Ductile Iron Castings, ANSI/ASTM A536, with physical properties of Grade 60 - 42 - 10.

Length of joints shall be either eighteen or twenty feet. The minimum standard thickness class of each size pipe shall be as follows:

PIPE S1ZE	THICKNESS CLASS
4" thru 8"	51
10" and Larger	50

For 16-inch and larger Ductile Iron Pipe, all bell and spigot joints shall be electrically bonded, using a #12 AWG coated copper wire of adequate length to braze, using a #15 cadweld cartridge, the copper wire to the bare metal at the bell and spigot. Cost shall be included in the unit price bid per lineal foot of Ductile iron Pipe.

For 16-inch and larger Ductile Iron Pipe, junction box test stations shall be furnished and installed, EXCEPT, no magnesium anode banks shall be furnished or installed. Junction box test stations shall be installed in accordance with the stationing shown on the Schedule of Anode Spacing. Cost shall be included in the unit price bid per lineal foot of Ductile Iron Pipe.

202.1.2. Fittings for ductile iron pipe shall be cast or ductile iron. Cast iron and ductile iron fittings shall conform to the American National Standard for Ductile-Iron and Gary-Iron Fittings, 3-inch through 48-inch, ANSI/AWWA C110; or the American National Standard for Ductile-Iron Compact Fittings, 3-inch through 12-inch, ANSI/AWWA C153. The length of all solid sleeves (both AWWA C110 and C153) shall be the longest length listed in the AWWA C110 specification (12-inch length for 3-inch through 12-inch sleeves, 15-inch length for 14-inch through 24-inch sleeves, and 24-inch length for 30-inch through 48-inch sleeves).

Fittings manufactured by: Tyler, US, Sigma, American Darling, or equal are permitted.

202.2. JOINTS

202.2.1. Cast iron and ductile iron pipe and fittings shall be jointed with any of the end types as specified below, unless a particular end type is specified. Fittings shall have mechanical joints, unless otherwise specified. Flanged ends shall be used only where specifically noted on the Drawings except that the valve connection end of all tapping sleeves shall be flanged.

202.2.2. Mechanical joints and push-on joints shall conform to, and be tested in accordance with, the American National Standard for Rubber Gasket Joints for Ductile-

Iron and Gray-Iron Pressure Pipe and Fittings, ANSI/AWWA C111/A21.11.

202.2.3. Flange joints shall conform to the American National Standard for Cast Iron Pipe Flanges and Flanged Fittings, ANSI B16.1. All flanged joints shall utilize 316 stainless steel bolts.

202.2.4. Where ductile iron pipe is to be tapped, a split cast iron tapping sleeve of 150 psi working pressure shall be used. The sleeve body shall be cast iron conforming to ANSI/AWWA C110. The sleeve shall have mechanical joints conforming to ANSI/AWWA C111 on the run and a flange branch conforming to ANSI B16.1, Class 125. The end gaskets shall be natural rubber or neoprene material conforming to ANSI/AWWA C111.

202.2.5. Tapping sleeves manufactured by Smith Blair are permitted.

202.2.6. Openings of the sizes shown on the drawings shall be furnished with steel blind flanges of proper strength to withstand the working pressure of the line where no other provision is made for closing the openings. Blind flanges shall be fabricated from material as specified under ANSI/AWWA C200. All bolts shall be carbon steel ANSI/ASTM A307, Grade A only, in accordance with ANSI/AWWA C207.

202.2.7 Where restrained joints are specified or required, they shall be a wedge action type mechanical restrained joint assembly equal to the MEGALUG design for the specific type of pipe being used. Set screw type retainer glands will not be permitted.

202.3. COATING. LINING AND POLYETHYLENE WRAP

202.3.1. Ductile iron pipe and fittings shall be bituminous coated outside and cement-mortar lined inside with seal coat in accordance with American National Standard for Cement Mortar Lining for Ductile-Iron Fittings for Water, ANSI/AWWA C104/A21.4.

202.3.2. All ductile iron and cast iron pipe and fittings shall be encased with polyethylene tube in accordance with AWWA C105, American National Standard for Polyethylene Encasement for Ductile Iron Piping for water and other liquids. Polyethylene film shall be manufactured of virgin polyethylene material conforming to ASTM D-1248, Type 1, Class A or C, Grade E. Thickness shall be not less than 8 mils (0.008 in.). Tensile strength shall be 1200 psi, minimum. Elongation shall be 300 percent, minimum. Tube length shall provide at least one (1) foot of overlap at each joint of pipe. Tape shall be a 2” width, plastic backed adhesive tape, Polykan #900, Scotch #50, or equal. Tube width for each pipe diameter shall be as follows:

NOMINAL PIPE DIAMETER (inches)	FLAT TUBE WIDTH (inches)
3	14
4	16
6	20
8	24
10	27
12	30
14	34
16	37
18	41
20	45
24	54
30	67
36	81
42	95
48	108
54	121

202.4. GATE VALVES

202.4.1. Where gate valves are specified or required, they shall conform to, and be tested in accordance with, the AWWA Standard for Gate Valves, 3-inch through 48-inch, Nominal Pipe Size, for Water and Sewage Systems, ANSI/AWWA C500. Gate valves shall have double disc parallel seats, non-rising stem, vertical mounting "O" ring stem seal, counter-clockwise opening, and ends to fit the pipe or fitting to which attached (push-on, mechanical, or flanged).

202.4.2. Only the following makes of gate valves will be permitted: Mueller or AVK.

202.4.3. Where resilient seated gate valves are specified or required for waterworks distribution service, they shall conform to and be tested in accordance with the AWWA Standard for Resilient Seated Gate Valves, 3" through 12" nominal pipe size, Water and Sewer Systems, ANSI/AWWA C509. The valve shall be bubble tight from either direction at a rated design working pressure of 200 psi. The valve shall have a single disc gate with synthetic rubber seat bonded or mechanically attached to the disc; non-rising stem with 2" AWWA operating nut; counter clockwise opening, "O" ring stem seals, corrosion resistant interior coating acceptable for potable water; and end to fit the pipe or fitting to which is attached (mechanical or flanged).

202.4.4. Only the following makes of resilient seated gate valves will be permitted: Mueller or AVK.

202.4.5. Where flanges are specified they shall be ANSI B16.1, Class 125.

202.5.1. Ball valves shall conform to and be tested in accordance with the AWWA Standard for Ball Valves, ANSI/AWWA C507. Where ball valves are specified or

required, they shall be: double-seated with natural or synthetic rubber, bronze, or monel metal seats; designed for 150 psi working pressure; flanged end; "O" ring rotor bearing seals; constructed of ductile or cast iron; counter-clockwise opening; equipped with totally enclosed manual operators, and torque limiting control device. Valves shall be tested by, and shall withstand without leak, a hydrostatic pressure of: (1) 250 psi on the valve body with rotor in the open position; and (2) 150 psi on the side of the valve with the opposite side open to atmosphere. Five (5) copies of the test results and manufacturer's drawings shall be submitted for approval prior to delivery of the valve.

202.5.2. Where flanges are specified they shall be ANSI B1 6.1, Class 125, cast iron flanges.

202.5.3. Only the following makes will be permitted: Henry Pratt, or Williamette Iron and Steele.

202.6. BUTTERFLY VALVES

202.6.1 Butterfly valves shall be of the tight closing, rubber-seat type, shall have a rated pressure of 150 psig, and shall be bubble-tight at this pressure with flow in either direction. Valve opening shall be counter-clockwise. The valves shall conform to and be tested in accordance with the AWWA Standard for Rubber-Seated Butterfly Valves, ANSI/AWWA C504, Class 150B. The valve body shall be of the short-body flange type, constructed of cast iron conforming to ASTM Al 26, Class B, or ANSI/ASTM A48, Class 40 or ductile iron ANSI/ASTM A536, Grade 65-45-12. Flanges shall be ANSI B 16.1, Class 125, cast iron flanges. Valve Discs shall be constructed of alloy cast iron conforming to ANSI/ASTM A436, Type 1, or cast iron conforming to ANSI/ASTM A48, Class 40, or ductile iron ANSI/ASTM A536, Grade 65-45-12. Valve shafts shall be constructed of 18-8, Type 304 or 316 stainless steel, ANSI/ASTM A296, Grade CF8, or monel. Valve seats shall be body or disc mounted and shall be of natural or synthetic rubber compound with mating seat surfaces of 18-8, Type 304 or 316 stainless steel, or alloy cast iron conforming to ANSI/ASTM A436, Type 1, or bronze Grade A, D, or E. Valve bearings shall be corrosion resistant and self lubricating.

202.6.2. Interior surfaces of the valve, except seating surfaces, shall be epoxy coated in accordance with AWWA Standard for Protective Interior Coatings for Valves and Hydrants, AWWA C550. Exterior surface of the valve shall be painted with two (2) coats of asphalt varnish conforming to Federal Specifications IT-V-51C. For non-buried service, exterior surface shall be coated with two (2) coats of zinc chromate.

202.6.3. Performance, hydrostatic and leakage tests shall be conducted in strict accordance with ANSI/AWWA C504. Five (5) certified copies of the manufacturers detail drawings and test results, signed by a registered professional engineer, shall be submitted for approval prior to delivery of the valve.

202.7. MANUAL OPERATORS FOR BALL VALVES AND BUTTERFLY VALVES

202.7.1. Manual Operators for Ball and Butterfly valves shall be totally enclosed permanently lubricated, counter-clockwise opening, and designed for buried or submerged service. Manual Operators shall be equipped with a 2" square AWWA operating nut with a removable handwheel complete with spinner and an open-closed indicator, suitable for one-man operation at 150 psi unbalanced across the valve. Manual Operators shall be either worm gear or traveling-nut type, and shall conform to AWWA C507 for Ball Valves or AWWA C504 for Butterfly Valves.

202.7.2. Manual Operators for Ball and Butterfly Valves 16" and larger shall be equipped with a Torque Limiting Control Device. The device shall be mounted directly on the operating nut for valves in vaults and on top of the extension shaft for buried valves. The device shall be secured to the operating nut with two set screws. The device shall declutch at 200 ft. lbs. of input torque in either direction of rotation. The device shall be designed for permanent buried or submerged service. Declutch and reset shall be automatic. Repeatability shall be within 5 percent of original rating for a minimum of 1000 cycles. Certified proof-of-design test reports shall be furnished for the device.

202.8. AIR RELIEF VALVES AND COMBINATION VALVES

202.8.1. Where air relief valves are specified or required, the valve shall be heavy-duty combination air release and vacuum type for 150 psi working pressure, tested to 300 psi, size shown on plans. Body, cover, and baffle shall be cast or ductile iron. All internal parts to be either highest quality stainless steel or bronze, and the inside of valve coated with rust inhibitor.

202.8.2 Combination air and vacuum valves shall be designed to allow large quantities of air to escape out of the orifice when filling a pipeline and to close watertight when the liquid enters the valve. The air and vacuum valve shall also permit large quantities of air to enter through the orifice when the pipeline is being drained to break the vacuum. An automatic air release valve shall be mounted on the combination valve body to allow air to escape under pressure. The discharge orifice area shall be equal or greater than the inlet of the valve. The valve shall consist of a body, cover, baffle, float and seat. The baffle will be designed to protect the float from direct contact of the rushing air and water to prevent the float from closing prematurely in the valve. The seat shall be fastened into the valve cover without distortion and shall be easily removed if necessary. The float shall be stainless steel designed to withstand 1000 psi or more. The float shall be center guided for positive seating. The body and cover shall be cast iron with a stainless steel float and a buna-N seat.

202.8.2. Only the following makes will be permitted: 2" Plastic A.R.I., 3" Val-Matic.

202.9. CHECK VALVES

202.9.1. Where check valves are specified or required, they shall conform to, and be tested in accordance with the AWWA Standard for Swing-Check Valves for Ordinary

Water Works Service, AWWA C508. They shall be horizontally mounted, single disc, swing type with a full diameter passage providing minimum pressure loss. Valves shall be of the non-slamming type designed for the future installation of outside lever and weight. Unless otherwise specified, all check valves installed in pump or lift stations shall be equipped with an outside lever and spring. Disc faces and seat rings shall be bronze. Ends shall fit the pipe or fitting to which attached (push-on, mechanical, or flanged).

202.9 .2. Only the following makes will be permitted: OCV or Clow.

202.10. FIRE HYDRANTS

202.10.1. Where fire hydrants are specified, they shall conform to, and be tested in accordance with the AWWA Standard for Dry-Barrel Fire Hydrants, ANSI/AWWA C502. All hydrants shall have: breakable connection features and a breakable coupling on the stem immediately above the bury line which has a lower breaking point than the rest of the unit; 5¼-inch compression main valve; 6-inch inlet connection; standard bell or mechanical joint hub; four-foot six-inch bury length, or as specified on drawings; two 2½-inch hose nozzles with National Standard threads; one 5-1/4 inch pumper nozzle: "O" ring seal; drain valve; left (counter-clockwise) opening; and National Standard pentagon operating nut. All bolts contained in the assembly shall be 316 stainless steel.

202.10.2. Where fire hydrant extensions are specified or required, they shall be of proper design to accommodate the make of fire hydrant installed.

202.10.3. Only the following makes will be permitted: Mueller Centurion or AVK, in accordance with certified detailed drawings which have been approved by, and are on file with, the Rural Water District #2.

202.10.4 All fire hydrants are to be painted red.

202.11. FIVE-WAY FIRE HYDRANT

202.11.1. Where five-way fire hydrants are specified or required, they shall conform to, and be tested in accordance with the AWWA Standard for Dry-Barrel Fire Hydrants, ANSI/AWWA C502. All hydrants shall have: breakable connection features and a breakable coupling on the stem immediately above the bury line which has a lower breaking point than the rest of the unit; 61/4"- inch compression main valve; 8-inch inlet connection; flange, or mechanical joint inlet; four-foot six-inch bury length; three 21/2" inch hose nozzles with National Standard threads; two 5-1/4 inch pumper nozzles; "O" ring seal; drain valve; left (counter-clockwise) opening; and National Standard pentagon operating nut. All bolts contained in the assembly shall be 316 stainless steel.

202.11.2. Where fire hydrant extensions are specified or required, they shall be of the proper design to accommodate the make of fire hydrant installed.

202.11.3 Only the following makes will be permitted: Mueller Improved or AVK.

202.11.4 All fire hydrants are to be painted red.

202.12. BLOW OFF HYDRANT

202.12.1. Where blow off hydrants are specified or required, they shall be an Eclipse Model 85 TU or equal. Blow off hydrants shall have; $2^{1/2}$-inch main valve; one $2^{½}$-inch brass hose nozzle with National Standard Threads; cast iron yoke and base; drain valve; left (counter-clockwise) opening: and 7/8-inch brass pentagon operating nut.

202.12.2. Where blow off hydrant extensions are specified or required, they shall be of proper design to accommodate the make of hydrant installed.

202.13. AUTOMATIC FLUSHING HYDRANT

202.13.1 All dead end lines proposed shall include an automatic flushing hydrant. Automatic flushing hydrant shall be Eclipse Model #9400A as manufactured by Kupferle, Saint Louis, Missouri.

202.13.2 Automatic flushing hydrants shall have a 2" stainless steel MIP inlet that will lead vertically to the bottom into a 2" automatic flushing valve. The flushing valve shall control the flow of water through the hydrant and its diaphragm with the extension and retraction of a DC latching solenoid and have a 220 PSI rating. Each unit shall be furnished with a stand-alone valve controller. Valve controller will not require a second hand-held device for programming. Controller must have minimum of 12 possible flushing cycles per day. Shall be submersible to 12 feet, operate with a 9 volt battery and have resin-seated electrical components. Solenoid shall have no loose parts when removed from valve. Removal of 2" solenoid valve shall be possible via an o-ring connector located under the valve after removal of stainless steel access plate. Valve assembly shall be contained within a UV-resistant locking cover.

203. STEEL PIPE AND FITTINGS

203.1. GENERAL

203.1.1. Where steel pipe is specified or required, it shall conform to the AWWA Standard for Steel Water Pipe, 6-Inches and Larger, AWWA C200. No steel less than 33,000 psi. specified minimum yield strength shall be permitted. All pipe shall be hydrostatically tested in accordance with AWWA C200. Mill Test Reports shall be furnished and the hydrostatic test pressure shown on shop fabrication drawings. Pipe length shall be not less than 35 feet per joint, except for specials, unless otherwise noted. There shall be no more than one longitudinal or girth seam per section. Nominal pipe diameter and steel thickness shall be as specified on the drawings. The diameter shown is the required inside diameter of cement-mortar lining. All pipe shall be manufactured by an established manufacturer who has had at least three (3) years experience in successfully building this type of pipe. Openings for air valves, main connections, and

blow-off connections shall be provided with suitable reinforcements around the opening, welded to the body of the pipe in accordance with AWWA Manual MII. Openings of the sizes shown on the drawings shall be furnished with steel blind flanges of proper strength to withstand the working pressure of the line where no other provision is made for closing the openings. Blind flanges shall be fabricated from material listed above as specified under AWWA C200. All bolts shall be carbon steel ANS1/ASTM A307, Grade A only, in accordance with ANSI/AWWA C207. For corrosion monitoring of steel pipe, junction box test stations shall be furnished and installed. Magnesium anode banks shall be furnished and installed where specified in the plans. Junction box test stations and anode banks shall be installed in accordance with the stationing as shown on the Schedule of Anode Spacing.

203.1.3. Where steel fittings or specials are specified or required, they shall conform to all of the steel pipe specification requirements and to the AWWA Standard for Dimensions for Steel Water Pipe Fittings AWWA C208. Where fittings and specials are fabricated from mill pipe, they shall be fabricated from pipe hydrostatically tested in accordance with AWWA C200 with mitered joints dye checked for welding flaws. Changes in line and grade shall be made by steel specials or in the joints. Joint deflection shall not exceed that as recommended by the manufacturer. Inside diameter of steel specials and fittings shall be the required inside diameter of cement-mortar lining.

203.1.4. Where field cutting of steel pipe is permitted, pipe shall be cut by sawing. The inside lining shall be removed for a minimum of six inches each side of the cut and the pipe surface shall be cleaned and brushed to bright metal. After welding, the inside lining shall be replaced in accordance with AWWA C600.

203.1.5. The minimum thickness standard in inches for each size pipe shall be as follows:

MINIMUM THICKNESS - INCHES FOR GRADE OF STEEL

NOMINAL PIPE DIAMETER	A-283 Gr. D A-570 Gr. 33	A-53 Gr. B A-135 Gr. B A-139 Gr. B A-36	A-139 Gr. C A-572 Gr. 42
36”	0.313	0.250	0.250
42”	0.313	0.281	0.250
48”	0.375	0.313	0.281
54’	0.438	0.375	0.313
60”	0.500	0.406	0.344
66”	0.500	0.438	0.375
72”	0.563	0.500	0.406

The design criterion for steel pipe thickness is based on 150 psi working pressure plus a 75 psi allowance for water hammer. Maximum depth of cover shall be 12 feet. Depth of cover In excess of 12 feet shall require special design.

203.2. JOINTS

203.2.1. Steel Pipe and fittings shall have one of the following type joints: slip joint ends for field lap welding, single beveled ends for field butt welding, double beveled ends for field butt welding, “O” ring bell and spigot joints, or plain ends for mechanically coupled field joints. Flange ends shall be used only when noted on the drawings.

203.2.2. Welded joints shall conform to, and be tested in accordance with the AWWA Standard for Field Welding of Steel Water Pipe Joints, AWWA C206. Slip joints for held lap welding shall be sized to provide a tolerance of not less than 0.09 inches and not more than 0.41 inches difference in measurement between the outside circumference of the spigot end and the inside circumference of the bell end.

203.2.3. Other joints to conform to the AWWA Standard for Steel Water Pipe 6-Inches and Larger, AWWA C200 and the AWWA Steel Pipe Manual, Mll. The gasket shall be a continuous “O” ring design of natural rubber or neoprene and shall be of suitable cross-section and size to assure a watertight joint. Acceptable bell and spigot joints for all steel pipe diameters and thicknesses shall be the “O” Ring-Bar Type, or the “O” Ring-Carnegie Section, or rolled groove type joint. Bell and spigot ends shall be properly sized by forcing over a sizing die or by expanding to stretch the steel beyond its elastic limit so that the difference in diameter between outside of spigot and inside of bell at normal engagement is not less than .03” and not more than 0.10K as measured on circumference with a diameter tape. Shop applied interior lining on the bell end of the pipe shall be held back a minimum distance of the spigot engagement + 1-1/8” for the Bar and Carnegie Type Joints. Hold back for the rolled groove joint shall be the spigot engagement + ½”. Interior lining for the spigot, shall be continuous to the end. Field replacement of the interior joint linings shall be in accordance with Section 203.4. of these specification for cement-mortar linings. All “O” Ring joints shall be electrically bonded using a #12 coated copper wire, 6” length #15 cadweld cartridge brazed to bare metal at the belt and spigot or equal. Shop applied exterior coatings shall be held back in accordance with manufacturer’s specifications. Field replacement of exterior coatings at the joints shall be in accordance with the AWWA Standard for Cold-Applied Tape Coatings for Special Sections, Connections, and Fittings, for Steel Water Pipelines, AWWA C209, or AWWA C203 Coal-Tar Protective Coatings and Linings for Steel Water Pipelines, Enamel and Tape, Hot Applied, or AWWA C205. Cement-Mortar Protective Lining and Coating for Steel Water Pipe, 4” and Larger, Shop Applied.

203.2.4. Where steel pipe is to be tapped, a split tapping saddle of 150 psi working pressure shall be used. The saddle body shall be heavy welded ANSI/ASTM A36, or ANSI/ASTM A285, Gr. C steel with flange conforming to ANSI/AWWA C207, Class D. The gasket shall be natural rubber or neoprene design in a continuous ring of suitable cross-section, and sized to assure a watertight joint. The interior and exterior surfaces of the saddle body shall be shop coated with a fusion bonded epoxy. The exterior coating or wrap on steel pipe shall be removed to bare metal beneath the entire area to be covered by the sleeve. The following makes of saddles will be permitted: Superior Style 822, Baker Series 428, Rockwell 622, or equal.

203.3. EXTERIOR COATING

203.3.1. The exterior coating on steel pipe and fittings shall be in accordance with Coal Tar Protective Coatings and Linings for Steel Water Pipelines, Enamel and Tape, Hot Applied, AWWA C203; or Tape Coating Systems for the Exterior of Water Pipelines, AWWA C214 or cement-mortar coatings in accordance with AWWA C205, Cement-Mortar Protective Lining and Coating For Steel Water Pipe, 4" and Larger, Shop Applied. Where tape coatings are used, the total thickness shall be no less than 80 mils. Where cement-mortar coating is used, the thickness shall be not less than ¾" and reinforced with spiral-wire, wire-fabric, or ribbon mesh reinforcement in accordance with AWWA C205, Sec. 2.1. All above ground piping shall be cleaned, primed, and painted with enamel, as shown in the plans. The total dry film thickness shall be 6 mils.

203.3.2. If field welding is used, the pipe joints shall be furnished with the outside coating held back, in accordance with standard joint detailed drawings. The coating and any touch up work shall be done under the direction of the coating manufacturer, and as approved by the Engineer.

203.4. INTERIOR LINING

203.4.1. The interior lining shall be installed in the field in accordance with AWWA C602, Cement-Mortar Lining of Water Pipelines, 4-Inch and Larger, In Place; or shop applied in accordance with AWWA C205, Cement Mortar Protective Lining and Coating for Steel Water Pipe, 4" and Larger, Shop Applied. The lining shall be 3/8" thick for diameters through 36", and ½" thick for 42" and larger, whether shop or in place lined. Tolerances shall be in accordance with the applicable AWWA standards.

203.4.2. Where in place cement-mortar lining is used, the contractor shall furnish all materials, labor, and equipment, prepare the interior surface, and machine place the mortar lining in the pipe. The lining at valves, specials, and bends may be hand sprayed or troweled, or hand applied as required. The lining shall be maintained in a moist condition while curing. The contractor shall be responsible for any extended curing time until acceptance by the Engineer. No additional payment shall be made for any extended curing period.

203.5. STRUTTING AND BRACING

203.5.1. Strutting and bracing shall be provided on all specials, fittings, and straight pipe, where shop lined or coated with cement mortar, so as to limit the pipe deflection to 2% maximum of inside diameter. A minimum of three strutting braces shall be installed in each standard pipe joint. For pipe 54" and larger in diameter, the strutting shoes at each bearing point shall be minimum 4 feet long, parallel to the longitudinal pipe axis. The strutting shall remain in place until all compacting and backfilling has been completed. Where In Place cement mortar lining is to be installed, sufficient strutting braces subject to the approval of the engineer shall be installed at the shop to insure against pipe

deformation.

204. REINFORCED CONCRETE PIPE AND FITTINGS

204.1. REINFORCED CONCRETE PIPE AND FITTINGS FOR WATER LINES

204.1.1. Where reinforced concrete pipe (RCP) and fittings are specified or required for water lines, they shall be designed, manufactured, and tested in accordance with the AWWA Standard for Pre-stressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids, AWWA C301, or Reinforced Concrete Pressure Pipe, Steel Cylinder Type, Pre-stressed, for Water and other Liquids, AWWA C303. All pipe shall be manufactured by an established manufacturer who has had at least three years' experience in successfully building this type of pipe. All specials and fittings shall be built to the details furnished by the manufacturer and approved by the Engineer. Each special and each length of straight pipe shall be plainly marked to indicate the head for which the pipe is designed and to indicate where the pipe will be used by reference to the layout drawings. All closure fittings shall be furnished with an 18-inch flanged access manway with an 18-inch steel blind flange. 6-inch screw type hand hole fittings will not be permitted.

204.1.2. RCP and fittings for water lines shall be designed for the following conditions (minimum): Normal operating pressure equal to 150 psi. plus 50% for surge pressure plus earth load resulting from actual backfill depth, but not less than 8 feet plus external live load equal to AASHTO HS 20 loading. The thickness of the mortar coating shall provide a minimum cover of 1 inch over the reinforcing steel.

204.1.3. Reinforced concrete pipe and fittings for water lines shall be jointed according to AWWA Standard for Pre-stressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids, ANSI/AWWA C301, or Reinforced Concrete Pressure Pipe, Steel Cylinder Type, Pre-stressed, for Water and Other Liquids, AWWA C 303.

204.1.4. Where concrete pressure pipe ANSI/AWWA C301, Steel Cylinder Pre-stressed Concrete or Pre-stressed Concrete Pressure Pipe, AWWA C303 is to be tapped, the Tapping saddle shall be fabricated in accordance with the American Water Works Association Manual M-9, and as recommended by manufacturers of Concrete Pressure Pipe. Saddle shall provide grout gaskets and grout opening to enable filling the wall space between saddle and pipe wall with grout, to assure complete protection of the steel pipe wall. The saddle shall also provide gland assembly, including gasket and flange, to insure a tight seal.

204.1.6. Openings of the sizes shown on the drawings shall be furnished with steel blind flanges of proper strength to withstand the working pressure of the line where no other provisions is made for closing the openings. Blind flanges shall be fabricated from material as specified under AWWA C200. All bolts shall be carbon steel ASTM A307, Grade A only, in accordance with ANSI/AWWA C207.

204.2. REINFORCED CONCRETE PIPE AND FITTINGS FOR SANITARY SEWERS

204.2.1. Where reinforced concrete pipe (RCP) and fittings are specified or required for sanitary sewers, except as herein modified, they shall be designed, manufactured, and tested in accordance with ASTM C76, Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe. Pipe shall be a minimum Class III. Pipe length shall be no less than 6'-0" except for shorts and specials. Pipe sections connected to a manhole or structure shall be no more than 4' - 0" in length, as measured from the inside face of the structure to the point of flexure of the joint. Elliptical reinforcement is not allowed. At least three circumferential reinforcing bars shall be provided in each pipe bell equal in area to an equivalent length of outside cage in the pipe barrel. Concrete shall have a minimum 28 day compressive strength of 6,000 psi, and an absorption not to exceed six percent.

204.2.2. Testing shall be observed and reported by an independent testing laboratory approved by the Engineer. One (I) Three-Edge Bearing Test in accordance with ASTM C497 shall be performed on a representative sample of each diameter and class of pipe to be furnished. One (I) absorption test in accordance with ASTM C497 shall be performed for each 300 tons of pipe manufactured, not less than one (I) test per day's production. Four (4) concrete cylinders or core samples shall be tested for compressive strength from each days production, two at 7 days and two at 28 days. An in-plant hydrostatic test in accordance with ASTM C361 shall be performed on each section of pipe and each pipe joint at an internal hydrostatic head of 25 feet. The joints shall be tested for a minimum period of one (I) hour under constant pressure as specified. Each pipe unit that satisfactorily passes all hydrostatic testing shall bear the seal of the testing laboratory. This seal does not constitute acceptance of the pipe installation which will be subjected to further testing and inspection in the field.

204.2.3. In lieu of the in-plant hydrostatic testing of each joint, the Contractor may substitute the following procedure: (1) Perform one in-plant hydrostatic test per days production, in accordance with the previously specified criteria; and (2) Perform an air test on each joint in the field after assembly, in accordance with the Creek County RWD #2 Water Standard Air Test Procedure. The Contractor shall furnish all air test equipment. Testing and test conclusions shall be verified by the Engineer. The Engineer reserves the right to require additional in-plant hydrostatic testing.

204.2.5. Reinforced concrete pipe and fittings for sanitary sewer shall be jointed in accordance with ASTM 0361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe. Joints shall be concrete bell and spigot, employing a rubber gasket and cement mortar formed by a diaper. Rubber gaskets shall be either a standard o-ring gasket or a Forsheda pre-lubricated gasket, or equal. For the O-ring gasket, the spigot end shall contain a groove to confine and compress the gasket on four surfaces when the joint is in final position. The Forsheda joint shall be designed and installed in accordance with the manufacturer's recommendations.

205. POLYETHYLENE PROFILE WALL PIPE FOR SANITARY SEWERS

205.1 Where Polyethylene Profile Wall Sewer Pipe, 18 inches in diameter through 36 inches in diameter, is specified or required, it shall conform to the Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe, ASTM F894.

205.2 The Ring Stiffness classes RSC classifications shall be RSC through 36" diameters. Maximum (RSC) shall be as directed by the Engineer. Minimum 100 for 18" through 24" diameters, and RSC 160 for 27" depths for each class and diameter shall be as follows:

DIAMETER	RSC 100	RSC 160	RSC 250
18 inch	24 ft.	32 ft.	------
21 inch	22 ft.	31ft.	------
24 inch	20 ft.	28 ft.	------
27 inch	------	26 ft.	33 ft.
30 inch	------	25 ft.	32 ft.
33 inch	------	24 ft.	31 ft.
36 inch	------	23 ft.	31 ft.

205.3 Pipe joints shall be a slip type gasketed joint. The bell and spigot ends shall be integrally formed and shall when assembled form a water tight seal by radial compression of the gasket. The gasket shall be contained within a machined groove on the spigot end. The joint shall be designed to avoid displacement of the gasket when it is assembled in accordance with the manufacturer's recommendations. Gaskets shall comply with the physical requirements of ASTM F-477. The lubricant shall have no detrimental effect on the gasket or the pipe. Laying lengths shall be 20 feet except for specials.

205.4 The manufacturer shall maintain quality control through regularly scheduled testing in accordance with all referenced ASTM standards. Testing for flattening and the Ring Stiffness Constant shall be performed on one test specimen for each size and class of pipe produced for the project. Certifications shall be furnished that the material was manufactured, sampled, tested, and inspected in accordance with all applicable specifications. The certifications shall indicate the manufacturer's production code, from which the plant location, machine, and date of manufacture can be identified.

206. POLYVINYL CHLORIDE (PVC) PIPE. WATER SERVICE

206.1. Polyvinyl chloride (PVC) pipe shall conform to the provisions of AWWA C900 AWWA Standard for PVC Pressure pipe 4" through 12" for water and shall conform to requirements set forth herein. The size, OD base, pressure class, and type of joint shall be as shown on the plans. Where not shown otherwise, the pipe shall have cast iron pipe equivalent OD, elastomeric gasket bell joints, and dimension ratio (DR) of 14. PVC pipe shall be marked to show that it has been approved by Underwriters Lab., Inc. The contractor shall furnish an affidavit from the pipe manufacturer that all delivered

materials comply with Standard for PVC Pressure Pipe 4" through 12" for Water and shall conform to requirements set forth herein.

206.2 Polyvinyl chloride (PVC) pipe shall conform to the provisions of AWWA C905 AWWA Standard for PVC Pressure pipe greater than 12" for water and shall conform to requirements set forth herein. The size, OD base, pressure class, and type of joint shall be as shown on the plans. Where not shown otherwise, the pipe shall have cast iron pipe equivalent OD, elastomeric gasket bell joints, and dimension ratio (DR) of 14. PVC pipe shall be marked to show that it has been approved by Underwriters Lab., Inc. The contractor shall furnish an affidavit from the pipe manufacturer that all delivered materials comply with Standard for PVC Pressure greater than 12" for Water and shall conform to requirements set forth herein.

206.3. PVC pipe shall have integral wall-thickened bell ends and shall be jointed using one piece elastomeric gaskets. Solvent cement jointing shall not be permitted.

206.4. Fittings for PVC pipe shall be polyethylene wrapped ductile or cast iron conforming to Section 202 of these specifications. The use of PVC fittings shall not be permitted.

206.5. Contractor shall submit certifications from the manufacturer that PVC pipe has been manufactured in accordance with AWWA C900/C905, and that it meets the approval of the "NSF".

206.6 Where restrained joints are specified or required, they shall be MIDCO Permagrip (6" or smaller), or EBAA Iron MegaLug or Star Pipe Products StarGrip (8" or greater). All bolts in restraints must be coated to prevent corrosion.

207. POLYVINYL CHLORIDE (PVC) PIPE. SEWER SERVICE

207.1 Where polyvinyl chloride (PVC) pipe eight (8) inches in diameter through fifteen (15) inches in diameter, fittings and inline tees are specified or required for sewer service, it shall conform to an be tested in accordance with ASTM D3034 "Type PSM Polyvinyl Chloride Sewer Pipe and Fittings" for standard dimensional ration (SDR) of 35 unless otherwise specified in the Plans.

207.3 The PVC sewer pipe shall be supplied in 12.5 foot, or 20 foot laying lengths as specified.

207.4 Where it is necessary to connect PVC sewer pipe to ductile iron pipe and AWWA C1100 long body solid sleeve shall be used with a special gasket for the PVC pipe.

207.5 Where PVC sewer pipe is being installed, the fittings for the service line and the in-line tees for future service connections shall be manufactured and specifically designed for Schedule 35 PVC service lines.

207.6 The manufacturer shall maintain quality control through regularly scheduled testing in accordance with all referenced ASTM standards. Testing for flattening and the pipe stiffness shall be performed on one test specimen for each size and class of pipe produced for the project. Certifications shall be furnished that the material was manufactured, sampled, tested, and inspected in accordance with all applicable specifications. The certifications shall indicate the manufacturer's production code, from which the plant location, machine, and date of manufacture.

207.7 Test Procedure for Lamping: The contractor will provide the necessary personnel to assist the Utility Inspector in lamping the line. Lamping will consist of shining a light source from one end of the line while the Utility Inspector observes from the other end. A clear circle of light with no dips or obstructions is required.

207.8 Mandrel test (required on PVC lines only): The contractor will have personnel pull the required size mandrel thorough the line while the Utility Inspector observes. The Madrel must pass through the line, or the contractor must correct the line at his expense. The test will be conducted 30 days or longer after the line has been installed unless otherwise coordinated with the Utility Inspector.

207.9 Pressure Test: The Contractor will plug both ends of the line and pressure the line to 4 psi. When the line is at pressure the Utility Inspector will observe 4 psi on the pressure gage for 7 minutes. If the line does not meet test requirements, the contractor will make necessary repairs and retest. When the test is completed, the contractor will remove all plugs and ensure the line is clear.

207.10 Alternative Inspections: In special circumstances and with the prior approval of the District Engineer, the following alternative tests may be substituted for the pressure test detailed above.

1. Joint testing: on 24 inch and larger diameter lines,
2. Exfiltration test: conducted in accordance with standard industry practices.
3. Infiltration test: conducted in accordance with standard industry practices.
4. The contractor may substitute having the line inspected with a TV camera for laming and mandrel testing. The contractor will provide the inspector with a copy of the TV tape (in VHS format) of the line.

208. CASTINGS

208.1. Gray iron castings shall conform to and be tested in accordance with the Standard Specification for Gray Iron Castings ASTM A48. Castings for manhole steps, lamphole covers, valve boxes, and water meter lids shall be Class 30A or 30B iron. Castings for frames and lids for valve vaults, meter vaults, and manholes shall be Class 35B iron.

208.2. Dimensions shall vary by not more than ± 1/16 inch per foot. Frames and lids for all manholes and valve vaults, and for meter vaults and other castings located within dedicated public right-of-way or other locations subject to vehicular traffic shall be rated for H-20 loading and shall have all bearings surfaces machined to prevent rocking and rattling.

208.3. Frames and lids for manholes, valve vaults, and traffic location meter vaults shall be certified by the manufacturer for H-20 loading. Only those makes which have been certified by the manufacturer and approved by the Department will be permitted. Certification shall consist of submittal of shop drawings, design calculations, laboratory test reports, and a written statement certifying the casting for H-20 loading. All submittal items shall be signed and sealed by a registered professional engineer.

209. CONDUIT

209.1. Where conduit (also known as tunnel liner or pipe sleeve) is specified or required, it shall conform to, and be tested in accordance with one of the following:

TYPE OF CONDUIT	SPECIFICATION
Reinforced Concrete Culvert, Storm and Sewer Pipe	ANSI/ASTM C76; Class IV
Steel Pipe, 6-inches and larger thickness	AWWA C200; 3/8-inch wall

209.2 Factory made casing spacers of the following description shall be installed on any carrier pipe passing through a pipe casing. Wooden skids are not acceptable as an alternative.

209.3 Casing Spacers shall be Model A8G-1 for carrier pipes up to 18-inch diameters (A8G-2 for 20"-24", A12G-1 for 24"-30") and Model A12G-2 for larger pipe sizes as manufactured by Pipeline Seal and Insulator, Inc. Houston, TX., or equal. Casing Spacers shall have a minimum 14 gauge steel band and 10 gauge risers. The band, risers and connecting studs shall be welded, and cleaned at the factory before the application of a synthetic enamel coating. The spacer shall have a flexible PVC liner of 0.09-inch thickness with a Durometer "A" 85-90 hardness. The runners shall be of a high pressure molded Glass Reinforced Polyester with a minimum compressive strength of 18,000 psi, 1 or 2 inches in width and a minimum 7 inches long (11" for A12 Model). Polyethylene runners are not an acceptable alternative. The runners shall be attached to the band or riser by 3/8-inch welded steel studs and lock nuts which shall be recessed in the runner for the 2-inch wide runners whereas the 1-inch runners shall be spot welded to the band or riser. The band section shall be bolted together with cadmium plated studs, nuts and washers.

209.4 Casing Spacers shall be spaced approximately 3 per joint of pipe or 1 spacer per every 6-7 feet. Placement of the casing spacer at the insertion mark of a plastic bell and spigot pipe may reduce the tendency for over insertion.

209.5 Each end of the casing shall be sealed with the standard Pull-on (Model S) end seal as manufactured by Pipeline Seal Insulator, Inc., Houston, TX., or equal.

210. VAULT, PITS AND MANHOLES

210.1. Concrete masonry units shall conform to, and be tested in accordance with the specifications for Concrete Masonry, Hollow Load Bearing Concrete Masonry Units, ANSI/ASTM C90, or Concrete Building Brick C55, Grade A.

210.2. Manhole units shall conform to, and be tested in accordance with, one of the following: Sewer Brick (made from Clay or Shale), ANSI/ASTM C32 Grade SM; Concrete Building Brick, ANSI/ASTM C55, Grade N; or Concrete Masonry Units for Construction of Catch Basins and Manholes, ANS1/ASTM C139.

210.3. Precast manholes shall conform to, and be tested in accordance with, the specifications for ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections

210.4. All manholes which have been coated with an epoxy system will be tested in accordance to ASTM D4787-93 “Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates.”

210.5 The Inspector will visually inspect all manholes for compliance with specifications. For suspect manholes, the Inspector may request additional testing. A Vacuum test can be requested where the contactor will plug the lines in the manhole and induce a vacuum of 4 psi in the manhole. The manhole must hold the vacuum for 7 minutes. If the manhole does not meet test requirements, the contractor will make necessary repairs and retest. When the manhole passes the test, the contractor will remove all plugs and ensure the manhole is clear. Additionally, the Inspector can request a dye test. The dye will be injected at 4 equally spaced locations around the manhole until the area is saturated. The Utility Inspector will observe the manhole for 30 minutes and if dye appears on the walls of the manhole, the manhole has failed the test. If the manhole fails the test, the contractor will make necessary repairs and retest.

211. SAND FOR CUSHION OR BACKFILL

211.1. Sand shall be a SW or SP classification according to ASTM, free from objectionable material. One hundred per cent shall pass a three-quarter inch screen, and ninety-five per cent shall pass a number four screen.

212. CRUSHED STONE FOR SURFACING. BASE COURSE. AND STABILIZATION

212.1. Crushed stone shall consist of clean, tough, durable fragments, free from an excess of soft or disintegrated particles. Sampling shall be in accordance with the Standard Method of Sampling Aggregates, ANSI/ASTM D 75.

212.2. Sieve analysis shall be performed in accordance with the method of Sieve Analysis; ANSI/ASTM Cl36. Gradation to be used at each location will be specified by the Engineer.

212.3. Crushed stone for aggregate base and surface course shall conform to the Oklahoma Department of Transportation Specifications for Highway Construction, and shall conform to the following gradations:

PER CENT PASSING

SIEVE SIZE		TYPEA	TYPE B
3”		- - -	100
1-1/2”	100	40-100	
3/4U		40-100	30-75
3/8”		30-75	25-60
No. 4		25-60	20-50
No. 10		20-43	15-35
No. 40		8-26	7-22
No. 200		4-12	3-10

212.4. Crushed stone aggregate for stabilization and bedding shall conform to the following ASTM 0448 and C33 gradations:

PERCENT PASSING

Sieve Size	Size #1 3-1/2” to 1-1/2”	Size #467 1-1/2 to No. 4	Size #57 1” to No. 4
4”	100	- - -	- - -
3-1/2”	50-100	- - -	- - -
2-1/2”	25-60	- - -	- - -
2”	- - -	100	- - -
1-1/2”	0-15	95-100	- - -
1”	- - -	- - -	95-100
¾”	0-5	35-70	- - -
½”	- - -	- - -	25-60
3/8”	- - -	10-30	- - -
No. 4	- - -	0-5	0-10
No.8	- - -	- - -	0-5

Sieve Size	Size #67 ¾" to No. 4	Size #7 ½" to No. 4
4"	- - -	- - -
3-1/2"	- - -	- - -
2-1/2"	- - -	- - -
2"	- - -	- - -
1-1/2"	- - -	- - -
1"	100	- - -
¾"	90-100	100
½"	- - -	90-100
3/8"	20-55	40-70
No. 4	0-10	0-15
No. 8	0-5	0-5

213. RIP RAP

213.1. QUALITY OF MATERIALS: All stone for Rip Rap shall be either sandstone, limestone, or other hard stone of good quality that will not materially disintegrate under action of air or water. It shall weigh not less than 140 pounds per cubic foot as determined from the bulk specific gravity (saturated surface dry) of the sample in accordance with procedure in ANSI/ASTM Specifications C127-68, "Test for Specific Gravity and Absorption of Coarse Aggregate". Slabs or slivers shall not be used. Rocks shall be of angular shape. Gypsum, anhydrite, chert, shale, soft or weathered rock shall not be used. All stone material furnished shall be such that will yield hard, massive, heavy, durable stone, and shall be free from cracks, seams and other defects that would tend to unduly increase its destruction by natural causes. The contractor shall furnish for the work, an approved stone of good quality. The successful bidder shall, within fifteen (15) days after receipt of notice to proceed, submit to the District for approval, three (3) samples weighing not less than 150 pounds each, of the stone he proposes to furnish. The samples shall be fairly representative of the whole quarry. If it is proposed to furnish stone for more than one quarry, samples as stated above shall be furnished from each quarry. The District will notify the contractor of acceptance or rejection of the stone samples within ten (10) days after their submittal for approval. The submission of samples will not be required if the material is to be obtained from a source previously approved by the District from test and service records.

213.2. TYPE "B": Type "B" rip rap material shall be quarry-run rock free from overburden spoil, and no piece shall weigh more than 500 pounds. At least forty percent (40%) of any shipment shall consist of rocks weighing 100 pounds or more. Rock shall be graded so as to produce a reasonably well-graded mass with the minimum practicable percentage of voids. Rock carrying dirt and fines less that ½-inch in maximum cross section, accumulated from interledge layers or from blasting or loading operations, will be accepted if such material does not exceed ten percent (10%) by weight.

213.3. TYPE "Cs: Type "C" rip rap material shall be quarry-run rock free from overburden spoil, and no piece shall weigh more than 1,000 pounds. At least forty percent (40%) of any shipment shall consist of rocks weighing 200 pounds or more. Rock shall be graded so as to produce a reasonably well-graded mass with the minimum practicable percentage of voids.

214. HIGH DENSITY POLYETHYLENE (HDPE) PIPE FOR POTABLE WATER SERVICE

214.1. GENERAL: This specification covers the requirements of high density polyethylene water transmission and distribution pipe in sizes 4" to 54" joined by means of thermal heat-fusion, or electro-fusion, and approved mechanical joints, meeting the specifications and requirements of American Water Works Association Standard C901. All materials shall be installed in accordance with manufacturer's recommendations and procedures.

214.2. MATERIALS: The polyethylene pipe and fittings shall be made from virgin resins exhibiting a cell classification of PE 345434C as defined in ASTM D3350 with an established hydrostatic-design-basis of 1600 psi for water at 73°F. The resin shall be listed by the PPI (Plastic Pipe Institute) in its pipe-grade registry Technical Report (TR) 4, "Listing of Plastic Pipe Compounds".

214.3. PIPE & FITTINGS (FOR C900, C901, C905 & C906): Pipe OD Sizes 3" to 24" shall be available both in steel pipe sizes (IPS) and ductile iron pipe sizes (DIPS). Pipe OD sizes 26" to 54" shall be available in steel pipe sizes only. All pipes shall be suitable for use as a fluid pressure conduit. Peak flow water velocity of 5 ft/sec shall be used in the hydraulics engineering design. Pipe and fittings material shall be fatigue (surge) tolerant to at least 3,000,000 cycles of stresses at 50% over-pressurization above WPR. The net pressure capability shall be the working pressure rating (WPR) as follows:

DR	WPR (psi)	WPR + SURGE (psi)	HYDROTEST (psi)	NOMINAL BURST (psi)
32.5	50.8	76.2	76.2	203.2
26.0	64.0	96.0	96.0	256.0
21.0	80.0	120.0	120.0	320.0
17.0	100.0	150.0	150.0	400.0
15.5	110.3	165.5	165.5	441.4
13.5	128.0	192.0	192.0	512.0
11.0	160.0	240.0	240.0	640.0
9.0	200.0	300.0	300.0	800.0
7.0	266.7	400.0	400.0	1066.7

The wall thickness shall follow the Dimension Ratio (DR) system prescribed in AWWA C906. Laying lengths are 40 ft standard. The pipe is to be joined by heat fusion, flanges or other mechanical joint systems proven for HDPE pipes. Both pipe and fittings must be NSF listed by the manufacturer and bear the "NSF" logo or mark.

214.4. MARKING: Pipe and fittings must be marked as prescribed by AWWA C906 and NSF. Pipe markings will include nominal size, OD base (ie: 12" steel pipe size, IPS), dimension ratio, pressure class, WPR, AWWA-C906, manufacturer's name, manufacturer's production code including day, month, year extruded, and manufacturer's plant and extrusion line; and optional NSF logo.

215. HYDROSTATIC TESTING OF PRESSURE PIPELINES

215.1 This section describes the requirements and procedures for pressure and leakage testing of all pressure mains.

215.2 All piping, valves, fire hydrants, services, and related appurtenances shall be installed prior to testing.

The pipe trench shall have trench zone backfill placed and compacted with a minimum of 3 feet of material over the pipe.

All concrete anchor blocks shall be allowed to cure a sufficient time to develop a minimum strength of 2,000 psi before testing.

Pressure tests on exposed and aboveground piping shall be conducted only after the entire piping system has been installed and attached to pipe supports, hangers or anchors as shown on the Approved Plans.

215.3 Hydrostatic testing shall be performed prior to connections to existing mains. District authorization for connection to the existing system shall be given only on the basis of acceptable hydrostatic, disinfection and bacteriological test results.

215.4 Potable water shall be used for hydrostatic testing of potable water mains when such testing is performed separately from disinfection operations.

Potable water shall be supplied by a District approved source. Make-up water for testing shall also be potable water.

Well water shall not be used for hydrostatic testing or any other purposes in new or existing pipelines.

215.5 Testing water shall be supplied through a metered connection equipped with a backflow prevention device at the point of connection to the potable water source used.

The Contractor shall provide any temporary piping needed to deliver potable water to the piping that is to be tested.

215.6 The Contractor shall provide the District Engineer with a minimum of five (5) working days notice prior to the requested date and time for hydrostatic tests.

The Contractor shall furnish all labor, materials, tools, and equipment for testing.

Temporary blocking during the tests will be permitted only at temporary plugs, caps or where otherwise directed by the District Engineer.

All valves and appurtenances shall be operated during the test period. The test shall be conducted with valves in the open position.

At the onset of testing, all valves, air vacuum assemblies, blowoffs, and services shall be monitored for possible leakage and repairs made, if necessary, before the test proceeds. The appurtenances shall be monitored for the duration of testing.

215.7 Before applying the specified test pressure, care shall be taken to release all air within the pipe and appurtenances to be tested. Air shall be released through services, fire hydrants, air release valves, or other approved locations.

A five (5) hour hydrostatic pressure test shall be performed after the pipe and all appurtenances have been installed and after any trench backfill compaction with heavy-duty compaction equipment has been completed. The hydrostatic test pressure shall be 50 psi above the class rating of the pipe at the lowest point in the section being tested and shall be at least equal to the design class of the pipe at the highest point in the line.

The test pressure shall be applied and continuously maintained by pumping for a period of four (4) hours. During the pumping phase of the test, the test pressure shall be maintained within 5 psig of the specified test pressure at all times.

At the end of the fourth (4th) hour, the pressure shall meet the requirements stated above. Pumping shall then be discontinued for one (1) hour and the drop in pressure shall be recorded. Pumping shall then be resumed to restore the initial test pressure, and the quantity of water pumped into the line shall be accurately measured. This measured quantity shall not exceed that which would result from leakage at the following rates:

1. The allowable leakage for steel (flanged or welded) and ductile iron (flanged) pipe shall be zero.

2. The leakage for polyvinyl chloride (PVC) pipe and for steel or ductile-iron pipes with rubber joints shall be considered as the total amount of water pumped into the pipe system after the fifth (5th) hour of testing. Allowable leakage during the fifth (5th) hour shall be in accordance with AWWA C600-99 and calculated using the following formula:

$$\frac{L = S * D * (P)^{0.5}}{133{,}200}$$

L = testing allowance (gallons / hour) S = length of pipe tested (feet)
D = nominal diameter of pipe (inches)
P = average test pressure during test (pounds / sq. inch (gage))

If leakage exceeds the allowable loss, the leak points shall be located and repaired as required by the District Engineer. All defective pipe, fittings, valves, and other appurtenances discovered shall be removed and replaced with reliable material. Additional disinfection shall be performed as necessary. The hydrostatic test shall be repeated until the leakage does not exceed the rate specified above. All visible leaks shall be similarly repaired.

DIVISION III
CONSTRUCTION SPECIFICATIONS

301. RIGHT-OF-WAY CLEARING AND RESTORING

301.1. Work under this item shall include the removal and reconstruction or replacement of all obstructions affected by the construction of the project, including, but not limited to fences, retaining walls, patios, trash burners, signs, mail boxes, out-buildings, landscaping, etc. Any such obstructions that are not to be reconstructed are so designated on the drawings. Such shall be removed and disposed of by the contractor. All obstructions to be replaced or reconstructed shall be restored to substantially the same condition as existed prior to the construction except as otherwise noted. The Contractor shall remove and dispose of all debris, restore the grade of the surface of the earth as reasonably as may be done to the grade existing prior to construction, and upon completion of the work shall leave the site in as neat, clean and orderly condition as nearly as it was prior to construction as may be reasonably done. Contractor shall video tape the right of way prior to the beginning of construction. The video tape shall be given to the engineer for reference should any questions or disputes arise. Tapes shall be in the VHS format. All costs of photography shall be included in Bid Item 301, Right-of-way clearing and restoring.

301.2. Passable surfaces across or along the construction vicinity shall be maintained at all times with gravel, steel mat or plate, or temporary bituminous surfacing material where a sidewalk, driveway, parking lot, street or alley previously existed. Pavement damaged by the Contractor's equipment movement shall be replaced to original condition. Gravel surfaces shall be replaced with the same.

301.3. lf an obstruction is of public ownership, the Contractor shall notify the appropriate agency, and obtain any necessary permit or license forty-eight hours before beginning any operations affecting the obstruction. All work shall conform to the current standards and specifications of that agency, and shall be approved by the agency before completion of the project. At the Contractor's request, the Engineer will furnish information as to what licenses or permits are required.

301.4. PAYMENT: Payment for this item shall be made at the unit price bid per linear foot. Total footage shall be the total length of pipe, not including bores, fittings, or specials, as included in other items. No additional payment shall be made for alterations of utility mains, service lines, or appurtenances, unless specifically provided for elsewhere in the Contract Documents.

302. EXCAVATION AND BACKFILL

302.1. The work under this item shall include all earth, shale, gravel, loose rock, solid rock, debris, junk and/or other material excavated or otherwise removed in the preparation of the trench; all work in connection with the excavation, removal and subsequent handling and disposal of such material, regardless of its type, character, or

condition; subgrade preparation, all sheeting, piling, shoring, bracing, and dewatering of trenches; protection of adjacent property; backfilling; sand cushion; grade base stabilization; all specified backfill consolidation; and other work necessary or required.

302.2. The trench shall be excavated so that the pipe can be laid to the alignment and grades shown on the drawings, or as directed by the Inspector. In dense or built-up areas or where unstable soils exist, the trench shall be excavated a maximum of one hundred (100) feet in advance of pipe laying. In open areas or where soil conditions permit, the trench excavation may be unlimited in advance of pipe laying, as approved by the Engineer. Opening of trenches in excess of the maximum requires specific approval of the Engineer. Trenches shall be dry when the trench bottom is prepared. The trench bottom shall be shaped so that even bearing is obtained for the barrel of the pipe with the bells unsupported. The standard trench width as shown on the attached Standard Detail shall not be exceeded at any elevation below a point twelve inches above the top of the pipe. If for any reason this portion of the trench exceeds the permitted width and if the Inspector shall determine that cradling or encasement then is required, said concrete cradle or encasement shall be installed. Any part of the bottom of the trench excavated more than four inches below the specified grade shall be corrected with approved material thoroughly compacted as directed by the Inspector. In the event suitable material is not available, sand shall be used. When rock is encountered and concrete cradle is required, it shall be excavated four inches below the bottom of the pipe and the trench refilled to grade with sand. When quicksand or other unstable earth is encountered, the Contractor shall excavate to sufficient depth to permit backfilling with crushed stone in order to provide a stable base for the pipe.

302.3. Bedding of pipe shall be as shown on the attached Standard Details. Sand shall be placed in the trench simultaneously on both sides of the pipe to an elevation of six inches above the top of the pipe, being carefully worked and hand-tamped around the pipe in order to consolidate the sand and assure excellent bedding. Backfill material shall not be placed in the trench covering the sand cushion without prior approval of the Inspector.

302.4 For large diameter (18” and above) flexible pipe, bedding shall be in accordance with the Bedding Detail for Large Diameter Flexible Pipe. The pipe shall be bedded in soil-cement, installed over a 6-inch sand cushion. The bedding shall be installed to the top of the pipe for the full width of the excavated trench. The soil-cement shall consist of a mixture of sand, Portland cement, and water. Each cubic yard of soil cement shall contain 1 ½ sacks of cement and approximately 70 gallons of water. Precautions shall be taken to prevent flotation. Movable trench supports shall not extend lower than the top of the pipe. The contractor may use crushed rock if approved by engineer.

302.5. When the type of backfill material is not indicated on the Drawings or specified, the backfill may be made with the excavated material, provided that such material, in the opinion of the Engineer is suitable for backfilling. In the event that excavated material is not suitable, sand or other approved material shall be used. From six inches above the pipe to eighteen inches above the pipe, the trench shall be backfilled by hand or by mechanical methods approved by the Inspector. Special care shall be used in placing this

portion of the backfill to avoid damaging or moving the pipe. The remainder of the trench may be backfilled by mechanical methods. Backfilling operation shall be completed within one hundred (100) feet or less of the finished line at all times, as directed by the Inspector.

302.6. Unless otherwise directed by the Engineer, all trenches excavated across any sidewalk, driveway, parking lot or other paved area, across any traveled portion of unpaved streets or alleys, across any proposed roadways or proposed roadway fills, and as shown on the drawings shall be bedded and backfilled with Type A Crushed Stone (1-1/2" crusher run), placed in 8-inch maximum lifts and compacted to 95% Standard Proctor Density, as measured by the Nuclear Density Method. Compaction shall be done by a vibratory hand tamper. Trenches excavated across existing street or alley paving shall be backfilled in accordance with the standard detail for Pavement Removal and Replacement. For excavations where there is more than 6 feet of cover over the top of the pipe and where the trench width is sufficient for use of heavy compaction equipment, an engineered fill using a suitable compactable material may be used in lieu of crusher run, if approved in writing by the District Engineer. If the backfilling has been completed and the backfill material does not meet the requirements for compaction, all the material shall be removed and hauled from the job site and the trenches refilled with material as specified above. Failure of backfill shall be corrected immediately, as directed by the Engineer.

302.7. PAYMENTS: Payment for this item shall be made at the unit price bid per cubic yard. Volume will be computed as follows: standard trench width as shown in the Plans; length of line, as the actual horizontal measurement along the centerline of the ditch; depth of excavation as the actual depth of ditch from the original ground surface to the flow fine of the pipe as shown in the construction notes. Average end-area method of computing volume will be used. No payment for excavation will be made for material excavated outside the neat lines of the standard trench width as given in the attached Standard Detail. No additional payment will be made for: sand cushion; backfilling; compaction of backfill; crushed stone used for backfill under existing and/or proposed roadways, roadway fills, streets, alleys, driveways, sidewalks, parking lots or as shown on the Drawings; removing and replacing topsoil and obstruction, tunneling of trees, storm sewers or other obstructions; blasting; bracing and shoring; dewatering; pumping and draining; grade base stabilization; removal of excess excavated material; or restoration of the site. It is mutually understood that subterranean water, quicksand, or other unstable earth may be encountered and the Contractor has taken such into consideration in making this bid. Where such is encountered, Contractor will be required to excavate to sufficient depth to permit backfilling with crushed stone in order to provide a stable base for the pipe. Extra payment will not be made because of such additional excavation or because it is necessary to excavate wider than the trench width as shown in the Plan's Standard Details; or for crushed stone.

303. PIPE - REINFORCED CONCRETE

303.1. The work under this item shall include furnishing, hauling, placing and jointing of reinforced concrete pipe (RCP) in the trench in specific conformity with the lines and levels given.

303.2. For water lines, the method of bedding shall be as shown on the Standard Bedding Detail. The Drawings show the plan and grade for the pipeline. The Contractor shall submit detailed drawings to the Engineer for approval, showing the proposed method of laying the pipe to these grades. All pipelines to be crossed shall be located before these drawings are prepared. The ends of the pipes to be jointed shall be cleaned immediately prior to jointing and the rubber gasket thoroughly lubricated with vegetable soap before it is placed in position on the spigot end. Extreme care shall be taken in moving the spigot end of the pipe into the bell end of previously laid pipe. If the gasket is damaged or moved out of place, the new pipe shall be removed and a new gasket applied before rejoining. Any soap remaining on the exposed concrete surfaces inside or outside the pipe shall be completely removed. Fittings or specials included as pipe shall be blocked in accordance with the attached Standard Detail.

303.3. For sanitary sewers, the methods of laying pipe, foundation, and grade area as specified. The pipe shall be laid on a firm trench bottom, true to the lines and grades shown on the drawings and/or as given in the field by the Inspector. Pipe shall be protected during handling against impact shocks and free fall. The laying of pipe in finished trenches shall be commenced at the lowest point, with the spigot ends pointing in the direction of flow. Pipe shall be laid continuously through new manholes if both inlet and outlet pipes are of the same size and in line. Upon completion of the manhole the invert shall be shaped. The pipe grade shall be obtained by using a laser level or other standard method such as batterboards. All pipe shall be installed with the mark “C-76” visible on the top of the pipe. The ends of the pipes to be jointed shall be cleaned immediately prior to joining and the rubber gasket thoroughly lubricated before it is placed in position on the spigot end, and all manufacturers instructions are to be followed. Extreme care shall be taken in moving the spigot end of the pipe into the bell end of previously laid pipe. If the gasket is damaged or moved out of place, the new pipe shall be removed and a new gasket applied before rejoining.

303.4. For all lines, after the pipe has been jointed, a band at least five-and-one-half inches wide shall be placed around the outside of the pipe at the joint. This band shall serve as a form for placing 1:1 cement mortar grout in the external recess formed by the face of the groove and the shoulder of the tongue. If a reinforced paper joint band is used, it shall be drawn up tight around the pipe and the backfill tamped against it up to the spring line before pouring the grout. If a cloth band is used, it shall be wired around the outside of the pipe, and the grout poured before backfilling. On all pipes, the joint space remaining on the inside of the pipe shall be filled with a stiff mixture of 1:1 cement mortar which shall be troweled in place to produce a continuous, smooth, flush surface across the joint.

303.5. PAYMENT: Payment for this item shall be made at the unit price bid per lineal foot of pipe of the type specified in the Proposal, and placed as shown on the Drawings. Total footage shall be the actual horizontal measurement along the centerline of the pipe. No additional payment shall be made for vertical pipe or fittings used with drop manholes, for fittings or special included as pipe, or for concrete blocking.

304. PIPE - DUCTILE IRON

304.1. The work under this Item shall include furnishing, hauling, placing, and jointing of Ductile Iron pipe in the trench in specific conformity with the lines and levels given. All Ductile Iron pipe shall be wrapped with a loose fitting, slip-on polyethylene film. The polyethylene film shall be slipped over the end of the pipe length that has been raised above the ground at the trench side. After the joint on the pipe is made up, the one-foot length shall be slipped over the joint to form an over-or-under lap of the adjacent polyethylene tube at this point. The loosely fitting film shall then be neatly folded over the top of the joint and held in place with tape. The loosely fitting tube extending along the pipe shall be drawn up snugly and folded along the top and held in place by using short pieces of plastic tape at intervals not to exceed four (4) feet. Fittings, valves and corporation stops shall be wrapped with a section of polyethylene material split to form a flat sheet, using plastic tape to hold the material around the appurtenance. For all pipe, the American National Standard for Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances, AWWA C-600 shall govern the installation as applicable. The method of bedding shall be as shown in the Standard Details.

304.1.1 Pipe and appurtenances shall be protected during handling against impact shocks and free-fall. Under no circumstances shall pipe or appurtenances be dropped or dumped into the trench or onto the ground.

304.1.2 All pipe and appurtenances shall be unloaded as near to their point of installation as possible. Locate pipe and fittings on the opposite side of excavated material. If trench has not been excavated, locate pipe and fittings in such position that they will not interfere with the operation of trenching equipment.

304.1.3 Do not string out pipe or fittings in advance of installation in areas where damage to them may result due to construction equipment or activities.

304.1.4 All pipe and fittings shall be carefully examined for cracks and other defects while suspended above the trench immediately before installation in final position. Damaged or defective pipe or fittings shall be laid aside for inspection by the Owner's representative, who will decide if corrective repair is possible, or if replacement is necessary. Any corrective repair work shall be subject to the Owner's representative's approval. No pipe or fitting which the Owner's representative has rejected or is known to be defective shall be laid. Any rejected or defective item shall be removed and replaced at the contractor's expense.

304.1.5 Prior to lowering pipe and fittings into the trench, the interior portions shall be cleared of all dirt and superfluous materials. All lumps, blisters, and excess coating shall be removed from the joint end of each pipe and fitting. Jointing portions of each pipe shall be thoroughly cleaned to remove oil, grit and other foreign matter.

304.1.6 Rock: Ledge rock, boulders and large stones shall be removed to provide a clearance of at least six (6) inches below and on all sides of pipe, fittings and appurtenances.

304.1.7 Every precaution shall be taken to prevent foreign material from entering the pipe and fittings while being placed in the line. If the pipe laying crew cannot put the pipe or fittings into the trench and in place without getting earth into it, the Contractor shall, before lowering into the trench, place a heavy, tightly woven canvas bag of suitable size over each end. During laying operation, no materials shall be placed in the pipe. At times when work is not in progress, open ends of pipe fittings shall be securely closed.

304.1.8 Pipe and fittings shall be carefully lowered into the trench, piece by piece, by means of mechanical equipment or the necessary manpower in such a manner as to prevent any damage. If damage occurs, the Owner's representative will decide if corrective repair is possible or if replacement is necessary. Any corrective repair work shall be subject to the Owner's representative's approval.

304.1.9 Maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets, shall be five (5) degrees unless a lesser amount is recommended by the manufacturer.

304.1.10 As soon as possible after the joint is made, sufficient backfill material shall be placed along each side of the pipe to offset conditions that might tend to move the pipe off line and grade. No pipe shall be brought into position until the preceding length has been secured in place.

304.1.11 The full length of each section of pipe shall rest solidly on the prepared foundation, with recesses excavated for bells, couplings, and joints. If the foundation is disturbed, the pipe shall be removed and relayed.

304.1.12 Underground pipe shall have a minimum of 36-inch ground cover unless shown otherwise. No metal piping for any services shall be installed in or below cinders or in locations that are conducive to rapid corrosive action.

304.1.13 If any defective pipe or fittings are discovered after installation, they shall be removed and replaced with sound pipe and fittings or shall be repaired by the Contractor in an approved manner and at his own expense.

304.2. For water lines, all fittings or specials included as pipe shall be blocked in accordance with the attached Standard Detail, the size to be determined by the Engineer.

304.3. PAYMENT: Payment for this item shall be made at the unit price bid per linear

foot of pipe of the type specified in the Proposal, and placed as shown on the Drawings. Total footage shall be the actual horizontal measurement along the centerline of the pipe. No additional payment shall be made for vertical pipe or fittings used with drop manholes, for fittings or specials included as pipe, or for concrete blocking.

305. PIPE. STEEL

305.1. The work under this item shall include furnishing, hauling, placing, and jointing of steel pipe in the trench in specific conformity with the lines and levels given. For all lines, American National Standard for Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances, AWWA C-600 shall govern the installation, as applicable. The method of bedding shall be as shown on the Standard Bedding Detail. The Drawings show the plan and grade for the pipeline. The Contractor shall submit detailed drawings to the Engineer for approval, showing his proposed method of laying the pipe to these grades. All pipelines to be crossed shall be located before these drawings are prepared. Fittings or specials included as pipe shall be blocked in accordance with the attached Standard Detail for Thrust Blocks and Trench Conditions.

305.2. If joints are field-welded, they shall develop the full strength of the pipe. The Contractor shall file with the Engineer a description of the method of welding which he proposes to use, the name of the individual or company who will do the welding, and a statement regarding the previous experience of such individual or company in this particular line of work. Testing shall be in accordance with Section 3.3 of AWWA C206. If requested, coupons shall be cut across the field welds and tested by a testing company approved by the Engineer and at the contractors expense. The line may be welded continuously with provisions for slack in the line, or in sections to be lowered in the trench and connected by a position weld.

305.3. If joints are to be mechanically coupled, sections up to 240 feet may be coupled and lowered carefully into the ditch. Electrical continuity shall be provided at all joints. Preparation for, protection of, and repair of pipe coating and lining, and coating of mechanical couplings shall conform to the applicable section of these specifications.

305.4. Field replacement of the cement-mortar interior lining shall be in accordance with the AWWA Standard for Cement-Mortar Lining of Water Pipelines, 4-Inch and Larger, In Place, AWWA C602.

305.5. PAYMENT: Payment for this item shall be made at the unit price bid per linear foot of pipe of the type specified in the Proposal, and placed as shown on the drawings. Total footage shall be the actual horizontal measurement along the centerline of the pipe. No additional payment shall be made for vertical pipe or fittings used with drop manholes, for fittings or specials included as pipe, or for concrete blocking.

306. POLYVINYL CHLORIDE (PVC) PIPE - WATER SERVICE

306.1. When PVC pipe is delivered to the jobsite it shall not be exposed to sunlight for

more than three (3) weeks. PVC pipe exposed to sunlight for more than three (3) weeks shall be covered with an opaque protective covering. The pipe shall be left stacked and no more pipe than can be installed in one day shall be strung along the jobsite.

306.2. When a length of PVC pipe is cut, the plain end shall be beveled to the same configuration as the factory beveled end. The end shall be beveled using a pipe beveling tool, portable sander, or abrasive disc. After beveling, stop marks shall be applied to the plain end at a distance from the end corresponding to the original stop marks.

306.3. Both Bell End and Plain End of PVC pipe shall be thoroughly cleaned before connecting pipes.

306.4. Elastomeric Gaskets shall be placed into bell with colored side of the gasket to the outside.

306.5. Before connecting PVC pipes, the plain end shall be lubricated with an approved lubricant.

306.6. When connecting, the plain end pipe shall be inserted into the bell end pipe and then pushed until stop marks on plain end are flush with end of bell.

306.7 All gasketed joints shall conform to ASTM D-3139 when measured in accordance with ASTM D-2122. The gaskets shall be manufactured to conform to the requirements of ASTM F-477.

306.7. PAYMENT: Payment for this item shall be made at the unit price bid per linear foot of pipe of the type specified in the Proposal, and placed as shown on the Drawings. Total footage shall be the actual horizontal measurement along the centerline of the pipe. No additional payment shall be made for vertical pipe or fittings or specials included as pipe, or for concrete blocking.

307. LOCATOR WIRE AND DETECTABLE MARKING TAPE

307.1. A Number 12 coated copper conductor wire for the purpose of locating PVC pipe shall be buried along the top of the pipe, and connected at each end to a fire hydrant by Cadweld Brazing just above the ground.

307.2. Detectable Mylar marking tape for location of PVC water pipe shall be required. Detectable Mylar marking tape shall be 2-inches wide, Blue in color with a continuous black lettered imprint stating “Caution: Water Line Below”. Tape shall be equal to Lineguard Tape III as manufactured by Lineguard, Inc. of Wheaton, Illinois.

307.3. Detectable Mylar Tape shall be buried above PVC water lines at a depth of 10-inches below the surface.

307.4 Payment for tape shall be included with unit price payment for PVC pipe.

308. SERVICE CONNECTIONS

308.1. The work under this item shall include furnishing, hauling, placing, jointing all material and labor required to complete a service connection transfer as shown on the plans. After new water mains have been tested and chlorinated, the Contractor shall excavate around the new main for the service transfer. The existing mains and new mains shall remain in service during the transfer of services. The Contractor shall tap the new main and install a new 1" corporation stop, reducer, service clamp, bend, copper tubing, and required fittings. The new service shall be connected to the existing or new meter after the service has been tested for leakage. The excavated area shall be backfilled and restored to original condition. Where galvanized service lines are encountered, they shall be replaced with copper. Where long services are replaced, they shall be bored under existing pavement. Open cutting will not be permitted unless approved by Engineer. Copper tubing shall be Type K soft annealed conforming to ASTM B88.

308.2 Known service connections adjacent to or expected to be encountered in the work are shown on the drawings. The locations shown are estimated from the District's records and discrepancies and omissions in the locations and quantities of service connections are expected. Those shown are for the convenience of the Contractor only, and no responsibility is assumed by either the Owner or the Engineer for their accuracy. The Contractor shall field locate and verify the presence, type, size, location and depth of all existing service connections prior to construction. The location of the proposed meter shall be approved by the District prior to setting the meter.

308.3 The plans show "Water Meter Reset" at locations where service connections are expected. All salvaged meters and materials are property of the District and shall be delivered to the District's office. Prior to delivery the District shall inspect material to determine its condition is suitable for salvaging.

308.4 Payment for this item shall include resetting the existing water meter including tapping the new main, installing a new 1" corporation stop, reducer, service clamp, bend, copper tubing, box and required fittings, and shall be paid per each. Also, all service lines which need replacement and/or any service line required to connect to the existing service line shall be included. The quantity shown in the Proposal is an estimated quantity only, for use as directed by the District. The District will inspect the condition of the existing meter and service line to determine if they are acceptable.

309. FITTINGS

309.1. The work under this item shall include all of the requirements specified under the item of pipe, in that "pipe" is understood to also mean "bends, tees, crosses, sleeves, outlet assemblies and other specified fittings." Unless otherwise specified, outlet assemblies shall consist of a flanged outlet constructed into the wall of steel or concrete pipe. If cast iron or ductile iron pipe is used, the outlet shall consist of a tee with the outlet flanged. If a gate valve is shown on the Drawings to be attached to the outlet, the

line side end shall be flanged and the opposite end shall be bell or mechanical joint according to the item for valves. All bends, tees, crosses, outlet assemblies, and plugs shall be blocked with concrete as shown on the attached Standard Detail, except where the fittings have flanged, welded, or harnessed joints, the inspector may, under certain conditions, delete the blocking. Concrete blocking shall be placed so that joints are accessible for repair.

309.2. PAYMENT: Payment for this item shall be made at the unit price bid per fitting, of the type specified in the Proposal, and placed as shown on the drawings. Only fittings specifically noted in the Proposal are included in this item. No additional payment shall be made for excavation, backfilling, or concrete blocking.

310. POLYVINYL CHLORIDE (PVC) PIPE SEWER SERVICE

310.1 The work under this item shall include furnishing, hauling, placing, and jointing PVC sewer pipe in the trench in specific conformity with the line and levels given. Installation shall be in accordance with ASTM D2321, Underground Installation of Flexible Thermoplastic Sewer Pipe, except as modified by these specifications.

310.2 Pipe shall be protected during unloading and installation against impact shocks and free fall. After unloading and before installation, pipe shall be stored on flat level ground with no rocks or other objects under the pipe.

310.3 The pipe shall be laid on a firm trench bottom true to the lines and grades shown on the drawings and/or as given in the field by the Inspector. Pipe shall be protected during handling against impact shocks and free fall. The laying of pipe in finished trenches shall be commenced at the lowest point, with the spigot ends pointing in the direction of flow. Pipe shall be laid continuously through new manholes if both inlet and outlet pipes are of the same size and in line. Upon completion of the manhole, the invert shall be shaped. The ends of adjoining pipes shall butt against each other for their entire circumference in such manner that there are no shoulders of unevenness of any kind. The pipe grade shall be shaped obtained by using batterboards and a “top line”. A laser beam may be used as long as the beam is inside of the pipe.

310.4 Prior to making pipe joints, all surfaces of the portion of the pipe to be jointed shall be cleaned and dried. Jointing shall be done in strict accordance with the manufacturer’s recommended procedure.

310.5 At connections to manholes or other concrete structures, where the pipe is to be grouted or cast into the wall, a tight fitting rubber water stop gasket shall be installed around the pipe. The outer sealing surface of the pipe shall be planed smooth. The pipe section with the gasket shall be grouted or cast into the manhole wall. Only pipe with a smooth outer wall or concentric ribs shall be used for cast or grouted in place connections. Where A-Lock type gaskets are used, only smooth outer wall pipe shall be used.

310.6 Approximately 30 days after backfilling the contractor shall measure vertical ring deflection for all pipe. The deflection testing shall be performed in the presence of the Engineer or his designated representative. Maximum ring deflection of the installed pipe shall be limited to 5 percent of the base inside diameter. All pipe which exceeds the allowable deflection shall be replaced or corrected by the contractor at no additional cost. The Contractor shall provide all mandrels and necessary equipment to perform the tests. Deflection shall be tested using a Go/No/Go Deflection Test Gauge conforming to the standard detail or as manufactured by Cherne industries, inc., or equal in accordance with the manufacturer's instructions.

310.7 Flushing of PVC sewer line trenches will be performed by the Contractor. Any infiltration of flushing water or other leaks into the sewer shall not be acceptable, and the contractor shall immediately correct the cause of the leak in a manner acceptable to the Engineer.

310.8 Air testing of PVC pipe is required, it shall be air tested in accordance with the RWD #2 standard air test procedure. The air testing will be performed by the Contractor. Manholes shall be vacuum tested by plugging all lines entering and exiting the manholes. The Contractor will perform this test.

310.9 All valves adjacent to a fitting shall be hard tied via swivel connector, either utilizing a swivel adapter or a swivel tee. No buried flanged fittings will be permitted.

310.10 PAYMENT: Payment for this item shall be made at the unit price bid per linear foot of the pipe specified in the Proposal, and placed as shown on the Drawings. Total footage shall be the actual horizontal measurement along the centerline of the pipe. No additional payment shall be made for vertical pipe or fittings used with drop manholes.

311. MANHOLE

311.1. The work under this item shall include all excavation, furnishing all materials required, construction, pipe connection thereto, finishing and backfilling of new standard or drop manholes. Construction of manholes shall progress as rapidly as installation of the line permits, and as directed by the Inspector.

311.2. Excavation for manholes shall be minimized, but shall conform to OSHA standards. Manholes are to be built to an elevation not less than that of the existing ground surface, or as shown on the drawings.

311.3. New manholes shall be constructed around existing lines without disturbance to the line. When the manhole is completed, the existing pipe shall be removed from the invert of the manhole. Care shall be taken in removing the pipe to prevent any stoppage. Immediately upon completion of the manhole, all waste mortar and debris shall be removed from the bottom and invert. When the walls are completed, a standard manhole frame and cover shall be set in place. Above the base, manhole inverts shall be carefully constructed of solid concrete to maintain proper velocities. Changes in pipe grade,

alignment or size shall be made by transition sections of the invert, determined by the lower half of the inlet and outlet pipes, but not greater than that of the outlet pipe. All inverts shall be plastered, troweled, and brushed to a smooth, clean surface. Inlet and outlet pipes shall not project beyond the interior wall of the manhole and shall be free from all sharp masonry.

311.4. During the construction of each manhole, steps shall be set in place on the inside of the manhole, beginning eighteen inches above the bottom and placed not more than fifteen inches apart. No steps shall be placed closer than eighteen inches to the manhole top. If concrete masonry units are used for the walls, special cut step blocks shall be installed to receive the steps. Steps shall be built firmly into the wall, allowing the steps to project five inches inside the manhole. If five-inch concrete masonry units are used, the ends of the steps projecting beyond the outside wall shall be cut off flush with the wall, and plastered over. The centerline of the steps shall be as shown on the attached Standard Detail for Manholes. Twelve-inch steps shall be used for precast manholes.

311.5. All drop manholes and all manholes downstream of a drop manhole must be coated with Warren Environmental CTS-301-NSF Epoxy Spray system or pre-approved equal. Manhole coating must achieve 125-mil thickness or better.

311.7. PRE-CAST MANHOLES

311.7.1. Pre-cast manholes with cast-in-place base slabs will be permitted for all standard and drop manhole installations.

311.7.2. Pre-cast manholes with integral pre-cast floors will be permitted only for standard manhole installations with depths of 12 feet or less.

311.7.3. Pre-cast manholes with integral pre-cast floors will not be permitted for drop manhole installations. Pre-cast floors shall be placed on a minimum of 18-inches of compacted Class A crushed stone. (maximum of 6” lifts)

311.7.4. Pre-cast manholes shall conform to the specifications for Pre-Cast Reinforced Concrete Manhole Sections, ASTM C478. Joint construction shall be in accordance with the standard specification for Reinforced Concrete Pipe except that no exterior grout band is required. No more than eight (8) inches of concentric rings shall be used to bring the manhole to finished grade. Each concentric ring shall have a full mortar joint, not exceeding three-eighths (3/8) inch in thickness. Inside joints shall be rubbed full and struck.

311.7.5. All drop manholes and all manholes downstream of a drop manhole must be coated with Warren Environmental CTS-301-NSF Epoxy Spray system or pre-approved equal. Manhole coating must achieve 125-mil thickness or better.

311.8. PAYMENT: Payment for this item shall be made at the unit price bid per manhole of the type specified in the Proposal, and placed as shown on the drawings. If

the manhole depth, measured from the invert to the top of the cover, exceeds six feet, the additional depth shall be paid for at the unit price bid per linear foot of manhole depth over six feet. No additional payment will be made for excavation, backfilling, pipe or concrete bottoms.

312. CONNECTION

312.1. The work under this item shall include all excavation, furnishing all materials required, construction, finishing, and backfilling of connections to existing mains, valves, manholes, special connections, service line re-connections, plugs, or in-line tees for future connections, as indicated on the Drawings or as directed by the Inspector.

312.2. The drawing shows details of the various connections and they shall be made in accordance with the details or as directed by the Engineer. On water mains, Contractor shall make the pressure and wet connections to existing mains, as shown on the drawing, unless specifically noted otherwise.

312.3. Connections to existing manholes shall be made by cutting into the manhole at the specified grade, inserting the pipe, and encasing the joint with concrete. Contractor shall not break into any existing sewer unless the Inspector is present and the work done shall be under the direction of the Inspector. Inlet and outlet pipes at the invert shall not project beyond the interior walls of the manholes. The manhole base shall be cut and reconstructed in such a manner that a proper invert section is maintained. All waste mortar, debris, and sharp edges shall be removed from the joints, bottom, and invert. Contractor shall remove and replace the manhole steps in the proper location and in accordance with the attached Standard Details if they are not properly located after the connection is made. Any and all diversion or pumping of water or sewerage in a wet connection is included in this Item. Methods of construction for house line reconnections shall minimize interruption of service. New pipe used shall be of the same diameter as the existing line. Plugs shall be constructed of manhole brick and mortar, extending at least one foot into the line plugged from the manhole. The plug shall be watertight and troweled to a smooth finish on the interior of the manhole.

312.4. Sanitary sewer in-line tee fittings shall be installed for future service connections, as shown on the plans, in accordance with the Standard Detail for in-line tees. The tee shall be capped with a screw plug of either bronze, brass or a detectable plastic, marked by a non-magnetic, mylar tape, and stapled to both sides of a nominal 2” x 4” marker, 8’ long, 4’ buried, and 4’ exposed, directly above fitting plug. The mylar tape shall be minimum 2-1/2” width, green in color, marked “Caution, Sanitary Sewer Below,” as manufactured by Terra Tape or Line Guard.

312.5. After new water mains have been leak tested and tested for chlorination, the Contractor shall connect to the existing mains as designated in the Plans. The existing mains and new mains shall remain in service during the transfer of service lines.

312.8. PAYMENT: Payment for this item shall be made at the unit price bid for each type of connection constructed, or in-line tee for future connection, as specified on the Proposal, or as directed by the Engineer. Payment for the first drop connection to a new manhole is included in the Manhole Item. No additional payment will be made for excavation, backfilling, furnishing and placing of concrete, removing and replacing of manhole steps, if necessary, or for the diversion or pumping of water or sewerage necessary to make the connection.

313. LAMPHOLE

313.1. The work under this Item shall include all excavation, furnishing all materials required, construction, pipe connection thereto, finishing and backfilling of new lampholes. Lampholes shall be located and constructed as shown on the Drawings, or as directed by the Inspector. When the concrete lamphole frame base is completed, a standard lamphole frame is to be set in place and closed with a lamphole cover.

313.2. PAYMENT: Payment for this item shall be made at the unit price bid per lamphole constructed as specified on the Proposal. No additional payment will be made for excavation, backfilling, or pipe.

314. VALVE

314.1. The work under this item shall include furnishing, hauling, and installation of valves at the locations shown on the Drawings, and in accordance with the attached Standard Details. The American National Standard for Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances, AWWA C-600 shall govern the installation, as applicable. If the paint is damaged, the valve shall be cleaned by wire-brushing and given two coats of black asphalt paint.

314.2. Gate valves shall be set with the stems plumb. Ball valves shall be set with the handwheels horizontal. Air relief valves shall be set so that the square operating nut on the two-inch valve can be operated from the top. Check valves shall be set horizontally. Construction standards for air relief and check valve vaults shall be the same as for manholes.

314.3. Fire hydrants shall be set so that the bottom of the steamer nozzle is not less than twelve inches nor more than twenty-one inches above the finish grade of the ground. Breakable bolts damaged in the installation shall be replaced in kind. If the Mueller hydrant is used, the oil reservoirs shall be filled before the hydrant is set. Concrete blocking shall be placed so that the drain and joints are accessible. Fire hydrant and stem extensions shall be provided and installed as necessary, in accordance with the manufacturer's recommendations.

314.4. Automatic flushing hydrants shall be placed in an area that promotes safe drainage away from structures and sidewalks. Hydrants shall be set flush to the ground per manufacturers recommendations.

314.4. PAYMENT: Payment for this item shall be made at the unit price bid per valve, of the type specified on the Proposal, and placed as shown on the Drawings. If fire hydrant and stem extension are required, they shall be paid for at the unit price bid for each different length of extension used. The unit price bid for air relief, gate, and check valves shall include the valve vault. No additional payment shall be made for: excavation; backfilling; restrained joints; concrete blocking; the pipe length between the line and the fire hydrant, except where the pipe is shown on the Drawings in a separate profile; crushed rock for drains; or air relief valve piping vaults.

315. VALVE BOX

315.1. The work under this item shall include furnishing, hauling, and installation of valve boxes, other than check, gate, and air relief valve boxes, at the locations shown on the Drawings. The American National Standard for Installation of Gray and Ductile Cast-Iron Water Mains and Appurtenances, AWWA C-600, shall govern the installation, as applicable. Exposed parts of valve boxes shall be primed and then painted with two coats of Tnemec or approved paint. Valve boxes located outside of pavement must be placed within a 24-inch concrete ring. The top elevation of the concrete ring shall match the finished grade line surrounding the valve box. Signs must be placed at all valve boxes identifying the District as the owner of the valve.

316. ENCASEMENT, CONCRETE

316.1. The work under this item shall include the installation of concrete encasement as shown on the Drawings or as directed by the Inspector, in accordance with the Standard Details. Care shall be taken to assure that placing of encasement does not deflect the pipe from the proper grade and alignment.

316.2. Sanitary sewers shall be encased when the depth of cut from the original ground elevation to the flow line of the pipe is four feet (4') or less. Concrete encasement necessitated by trench widths more than the maximum as shown on the attached Standard Detail for Thrust Blocks and Trench Conditions shall be placed as directed by the Inspector.

316.3. PAYMENT: Payment for this item shall be made at the unit price bid per cubic yard of concrete placed as encasement. All concrete encasement required because of excessive trench width shall be placed at the expense of the Contractor. No payment will be made for concrete used as fill or in excess of the theoretical quantity computation based on the attached Standard Detail for Thrust Blocks and Trench Conditions.

317. CRADLE, CONCRETE

317.1. The work under this item shall include the installation of concrete cradle as shown on the Drawings or as directed by the Inspector, in accordance with the attached Standard Detail for Thrust Blocks and Trench Conditions. Care shall be taken to assure that placing of cradle does not deflect the pipe from the proper grade and alignment.

317.2. For sanitary sewers, standard concrete cradle is required at any location where the depth of cut to the flow line of the pipe is sixteen feet (16') or more. Concrete cradle necessitated by trench widths more than the maximum as shown on the Standard Details shall be placed as directed by the Inspector.

317.3. PAYMENT: Payment for this item shall be made at the unit price bid per cubic yard of concrete placed as cradle. All concrete cradle required because of excessive trench width shall be placed at the expense of the Contractor. No payment will be made for concrete used as fill or in excess of the theoretical quantity computation based on the attached Standard Detail for Thrust Blocks and Trench Conditions.

318. PIERS. REINFORCED CONCRETE

318.1. The work under this item shall include all materials, forming, construction and finishing of reinforced concrete piers, and necessary pipe anchorage. Piers shall be located and constructed as shown on the Drawings and attached Standard Details. Forms shall be made to conform to the shape of the pier and securely braced. Reinforcing steel shall be bent as detailed and securely tied in place. Bearing area for the pipe shall be made to fit the outside diameter of the pipe and shall support the pipe at the proper grade. Steel strapping and bolts shall be installed and painted with one heavy coat of coal tar or asphalt paint after bolting in place. Any honeycomb or other unevenness in the concrete shall be patched with cement mortar immediately after form removal.

318.2. PAYMENT: Payment for this item shall be made at the unit price bid per cubic yard of concrete placed as reinforced concrete piers in accordance with the attached Standard Details, at the location shown on the Drawings, or as directed by the Engineer. No additional payment will be made for excavation, forming, bracing, dewatering, backfilling, or pipe anchorage.

319. CONDUIT

319.1. The work under this item shall include the installation of railroad, street, or other crossings by boring or tunneling as shown on the Drawings. The conduit pipe shall be installed to the line and grades given with the required spacers. Voids between the outside of the conduit and the surrounding earth shall be filled with cement grout or other material approved by the Engineer. The Engineer shall approve the following options: tunneling or boring; conduit material; construction method details, carrier supports.

319.2. PAYMENT: Payment for this item shall be made at the unit price bid per lineal foot of conduit, of the size specified in the Proposal, and placed as shown on the Drawings. All carrier pipe shall be paid for under other items. No additional payment shall be made for excavation, backfilling, boring, tunneling, dewatering, spacers, or sand fill.

320. STRUCTURE, SPECIAL

320.1. The work under this item shall include the furnishing of all materials and

performing all work necessary to complete any special structures shown on the Drawings.

320.2. PAYMENT: Payment for this item shall be made at the unit price bid for each structure as specified in the Proposal, and constructed as shown on the Drawings. Unless specified with special construction limit boundaries, pipe, fittings, valves and other appurtenances will be paid for under other items. No additional payment will be made for excavation, backfill, foundations, or any particular element of construction.

321. MATERIALS FURNISHED BY CONTRACTOR AND INSTALLED BY RWD #2

321.1. The work under this item shall include furnishing and hauling of materials to the site of work. All necessary clearing, excavation, other site preparation, backfill and restoration, shall be performed by the contractor so that the RWD #2 may install the materials in place with a minimum amount of delay. The Contractor shall furnish assistance to the RWD #2 in preparing the materials so that they may be readily installed. The RWD #2 responsibility shall be only for the actual installation of the materials. All other work shall be performed by the Contractor.

321.3. PAYMENT: Payment for this item shall be made at the unit price bid per material item of the type specified in the Proposal and actually installed per Drawings. Only materials specifically noted in the Proposal are included in this item. All necessary clearing, excavation, other site preparation, backfill and restoration will be paid for under other bid items.

322. SODDING AND SEEDING

322.1. Where the installation of water or sanitary sewer mains traverse developed areas, residential or commercial, the Contractor shall restore all damaged sod turf. The restoration of sod turf shall be by either Sod Replacement or Hydromulch Seeding, as directed by the Engineer.

Only that turf in one residential block may be removed at any time. Where residential blocks are not involved, only that turf in approximately 1,000 linear feet of trench excavation may be removed at any time. The Contractor shall restore all turf damaged by the construction. Payment for turf restoration will be per linear foot, based on the length of main installed through an area. The Contractor shall consider, when preparing his bid, the width of turf restoration required.

322.2. Sod Replacement: Remove the sod turf with approved cutting equipment. Store the turf in an area where construction operations will not damage it and apply sufficient water to preserve the root system. Replace the sod turf after the trench has been backfilled and compacted. As an alternate to this method, the Contractor may furnish and install new solid slab grass sod of the same type as that which was removed. The new sod shall be moist when excavated from the source and kept moist until planted. Sod shall consist of vegetative parts (rhizomes, stolons, and roots) with an appreciable quantity of

adhering soil. Sod which becomes dry shall be discarded. Sodded areas shall be thoroughly watered after placement.

322.3. Hydromulch Seeding: Remove, store, and replace top soil. Apply seed, fertilizer, and mulch together in homogeneously mixed slurry. Fertilizer shall be 10-20-10 and shall be applied at a rate of 10 lbs. per 1,000 sq. ft. Mulch shall be wood fiber and applied at a rate of 46 lbs. per 1,000 sq. ft. Grass seed shall be either hulled Bermuda applied at a rate of 2 lbs. per 1,000 sq. ft. or K-31 fescue applied at a rate of 8 lbs. per 1,000 sq. ft. as directed. Mulch shall be kept moist for a minimum of 10 days or until seeds have germinated and rooted. Watering shall be provided as required to maintain the grass.

322.4. The Contractor shall obtain a construction meter from the District and pay all required fees for any watering. The Contractor shall maintain all sodded or seeded areas until acceptance of the contract or until the turf has a 3" height.

322.5. PAYMENT: Payment for Sod Replacement or Hydromulch Seeding will be made at the unit price bid per linear foot and shall include all necessary top soil replacement, fertilizing, watering, and maintenance. The linear foot pay quantity will be measured parallel to the pipe through the area being restored. The Contractor shall consider the width of turf restoration required for each area. No additional payment will be made for extra sodding or seeding required due to valve vaults, fire hydrants, tie-ins, service transfers, leak repairs, plugging, manholes, lampholes, or other appurtenances.

323. STREET WASH DOWN

323.1. The Contractor shall, at the written direction of the engineer, wash down streets to control dust and clean the streets in the area of construction. Contractor shall obtain a construction meter from the Connection Control Division of the Water and Sewer Department and shall pay all required fees for obtaining and using the meter.

323.2. PAYMENT: No payment will be made for street washing, cost shall be included in the price bid for section 301 – Right of Way Clearing and Restoring.

324. TRAFFIC CONTROL DEVICES

322.1. The Contractor shall furnish and install traffic control devices when construction is performed upon or adjacent to any street, alley, sidewalk, residence, public ground, or other location that is subject to pedestrian or vehicular traffic. Traffic control devices shall include safety fencing, barricades, signs, barrels, warning lights, arrow panels, flagmen, high level devices, etc.

324.2. Traffic Control Devices shall conform to the Manual on Uniform Traffic Control Devices.

324.3. Safety fence shall be an open mesh type, high density plastic material, 48-inches in height, and colored international Safety Orange. Fence shall be supported by fence posts

spaced at no more than 10 feet.

324.4. PAYMENT: cost of traffic control devices shall be lump sum and include deliver, installation, maintenance, and removal of all devices.

325. DRIVEWAY CROSSING BY BORING

325.1. Waterline installed under existing concrete or asphalt driveways shall be bored. The diameter of the bore shall be a maximum of 4-inches larger than the outside diameter of the pipe bell. The annular space between the carrier pipe and the surrounding undisturbed earth shall be filled with sand. If the carrier pipe is ductile iron it shall be polyethylene wrapped and taped at one (1) foot intervals through the entire length of the bore. If the Engineer determines that boring is not possible, the driveway shall be open cut and the pavement replaced as directed by the Engineer.

325.2. PAYMENT: Payment for driveway crossings by boring shall be at the unit price bid per linear foot as measured from edge to edge of the driveway. Removal and replacement of driveway pavement will be paid for under other items. No payment will be made for additional bore required due to obstructions on either side of the driveway.

326. PAVEMENT REMOVAL AND REPLACEMENT

326.1. Work under this item includes removal and replacement of concrete or asphalt for sidewalks, driveways, parking lots, curbs, streets, alleys, and the like. Pavement crossed at right angles shall be saw cut, removed, and replaced as shown on the standard drawings or as directed by the Engineer for the type of pavement indicated on the proposal. Pavement crossed diagonally shall be squared by saw cutting at right angles to the paved area. If a construction joint is within three (3) feet of a proposed saw line, the pavement shall be replaced to the joint as directed by the Inspector. New concrete pavement shall bridge the top of the trench by a minimum of one (1) foot on each side. All paving shall conform to the standards and specifications of the Rural Water District #2 and ODOT. The County or City Engineer shall approve all street cuts and a Permit shall be obtained before work may begin.

326.2. All concrete pavement removal shall be a minimum of 3 feet by 3 feet. Concrete shall be High Early Strength Class P5 as per ODOT Section 701A with a minimum 28 day compressive strength of 5,000 psi, which contains the following:

Cement	705 lbs/Cu. Yd.
Flyash	0
Air	4-6%
W/C Ratio	.44 lbs./lb.

Concrete shall meet the existing concrete depth with a minimum depth of 8” for streets, 6” for commercial Driveways, 5” for residential driveways, and 4” for sidewalks. Cuts

shall be a minimum depth of 2'. No traffic shall be allowed on the street replacement for 24 hours after placing of concrete. Twenty-four hours after placing of concrete, all butt joints must be sawed a minimum of 2", cleaned and sealed with joint sealer, ODOT Section 701A.08 (e). If curb and gutter are removed, they shall be replaced to the standards and specifications of the typical existing curb and gutter. When one or more longitudinal construction joints are removed, the joints shall be re-established in accordance with the RWD #2 standards for concrete pavement. When a pavement section is removed along an existing longitudinal construction joint, the pavement shall be dowelled to the adjacent pavement.

326.3. All asphalt shall be Type B as per ODOT Section 708. The asphalt shall be, compacted to a 92-97% maximum density as determined by AASHTO T-209 method. Spreading and finishing of asphalt shall meet ODOT Section 411.04. Edges of cut shall be saw cut to a minimum depth of 2". Prior to placement of asphalt in cut, a tack coat shall be uniformly applied. Tack coat shall be an asphalt rubber, meeting the specifications of ASTM D1190. Optional tack coat - SS-IH meeting ODOT 708 Table 3a. All surface edge joints of cut/overlay shall be sealed with an asphalt rubber meeting minimum specifications of ASTM D1190. Asphalt rubber shall be squeegeed into edge joints. SS-IH emulsion shall be squeegeed into edge joint and blotted with dry concrete screenings. If curb and gutter are removed, they shall be replaced to the standards and specifications of the typical existing curb and gutter. Macadamized or oiled surfaces shall be replaced with asphalt.

326.4. Materials for asphalt shall meet the requirements for a Type B asphalt concrete as specified in ODOT, Section 708.04

326.5. PAYMENT: Payment for removal and replacement of concrete or asphalt pavement shall be at the unit price bid per square yard. The pay quantity of square yards will be computed using the standard pay width for the type of pavement replaced and the length of the pavement cut along the centerline of the pipe. The pay quantity will include pavement replaced due to the proximity of a construction joint if the specified criteria is meet. For diagonal crossings, the pay quantity will include the areas replaced due to squaring. Payment for saw cut shall be at the unit price bid per linear foot. Payment for curb and gutter shall be at the unit price bid per linear foot. Payment for dowels shall be at the unit price bid per each. No payment will be made for disposal of broken pavement, temporary surfaces, excavation, and preparation of subgrade, forms, or reinforcing. No payment will be made for removal or replacement of gravel. No payment will be made for the replacement of pavement damaged by the Contractor's equipment movement. No payment will be made for joint sealer, tack coats, or edge sealing.

327. EROSION CONTROL MEASURES

327.1. The Contractor is responsible to ensure measures are taken to minimize erosion and sedimentation problems, including but not limited to the following:

A. Place straw bale dikes in bar ditches at 500 ft. intervals on relatively flat grades and 200 ft. intervals on grades over 5%.

B. Place sediment sumps upstream of straw bales. Remove sediment on a regular basis.
C. Keep excavation and silt off of streets.
D. In areas where water lines are being constructed adjacent to improved streets, measures shall be taken which will minimize siltation and excavation accumulating in existing storm sewers. Straw bales should be placed around inlets. Precautions should be taken during heavy rains to assure that a flooding condition is not created.
E. Straw mulch can be used as an effective means of erosion control.
F. Erosion control measures shall be placed at the toe of slope of all cut and fill areas.

327.2. Straw bales shall be standard rectangular size, approximately 18" x 20" x 36", and shall be securely bound with wire. Bales shall be firmly anchored with wood or metal stakes approximately 3 feet long. A sediment sump shall be placed immediately upstream of each bale. Contractor shall clean and maintain sediment sumps throughout the maintenance period.

327.3. The contractor shall furnish and install straw mulch as directed. Mulch shall be applied at a rate of 1½ tons per acre. Mulch shall be securely anchored in place.

327.4. PAYMENT: Cost of erosion control shall be included in other bid items.

328. WATER TABLE CRADLE

328.1 The work under this item shall include furnishing and installing Water Table Cradle as shown on the drawings or as directed by the Engineer and in accordance with the Standard Detail for Water Table Cradle.

328.2 The trench excavation shall be completely dewatered to provide a dry and stable trench bottom. The trench shall be excavated to a minimum of 18" below the bottom of the pipe. If additional base stabilization is required crushed stone, 3 ½" to 1 ½" (Gradation No. 1), shall be installed on the trench bottom, prior to the installation of water table cradle. Minimum trench widths for flexible pipe installations shall be as shown in the standard detail.

328.3 Geotextile filter fabric shall be installed on the trench bottom and walls. Crushed stone shall be installed in the trench directly on the filter fabric to a height of 12 inches above the top of the pipe. The crushed stone bedding material shall be carefully worked and compacted around the pipe. The filter fabric shall be placed over the top of the crushed stone with a minimum 18" lap. All fabric joints shall be lapped a minimum of 18". Water Table Cradle shall be installed for the fully excavated width of the trench.

328.4. Crushed stone for Water Table Cradle shall be Gradation No. 57, 1" to No. 4. The Geotextile Filter Fabric shall be a nonwoven needle punch constructed fabric composed of petrochemical based polymers which are chemically and biologically inert. The fabric unit weight shall be not less than 13 ounces per square yard with a Mullen

Burst Strength (ASTM D-3786) of not less than 600 psi.

328.5 PAYMENT: Payment for Water Table Cradle will be made at the unit price bid per linear foot for the specified diameter of pipe. The unit price shall include the cost of all labor, equipment, and materials required. No additional payment will be made for dewatering or crushed stone required for additional base stabilization.

329. CONSTRUCTION STAKING

329.1 PAYMENT: The Contractor shall be responsible for construction staking. No additional payment will be made.

330. BACKFLOW PREVENTER

330.1 The work under this item shall include furnishing a 4-inch PVC/ABS Backflow preventer to Creek County Rural Water District No. 2. The backflow preventer shall be manufactured by MULTI FITTINGS or equal.

330.2 PAYMENT: payment for Backflow Preventer will be made at the unit price bid per each. The price shall include all materials and delivery to Creek County Rural Water District No. 2 maintenance yard.

331. HIGH DENSITY POLYETHYLENE PIPE (HDPE) FOR POTABLE WATER SERVICE

331.1. GENERAL: This specification covers the requirements of high density polyethylene water transmission and distribution pipe in sizes 4" to 54" joined by means of thermal heat-fusion, or electro-fusion, and approved mechanical joints, meeting the specifications and requirements of American Water Works Association Standard C901. All materials shall be installed in accordance with manufacturer's recommendations and procedures.

331.2. MANUFACTURER'S TESTING: Each manufacturer shall have an approved in-house QA/QC program providing compliance to the testing specifications and requirements of AWWA Standard C906 for both pipe and fittings, and shall be ISO 9001 certified.

331.3. STORAGE AND INSTALLATION: The storage and installation of the polyethylene pipe and fittings shall be in strict accordance with the manufacturer's procedures and recommendations.

331.4. FIELD TESTING OF PIPE: The installed pipe shall be air tested after fusion assembly and prior to installation. The complete facility shall be tested to the manufacturer's working pressure (WPR) for the DR rating of the specified pipe. The test shall be for a period of 4 hours. The Owner and/or Engineer may require a hydrostatic test of the material upon installation and prior to the pipe being placed in service.

331.5. PAYMENT: Payment for the polyethylene pipe, fittings and accessories shall be by unit cost as indicated by the Bid Proposal, Scope of Work or as indicated on the plans. Total footage shall be the actual horizontal measurement along the centerline of the pipe. No additional payment shall be made for vertical pipe or fittings or specials included as pipe, or for concrete blocking.

Creek County Rural Water District No. 2
2425 W. 121st Street South
Jenks, Oklahoma 74037
(TDD) 711
Phone (918) 299-4448
Fax (918) 299-5712
www.ccrwd2.com

Gentlemen,

Creek County Rural Water District #2 has established a preferred parts material list with these brands being accepted. **NO OTHER BRAND NAME WILL BE ACCEPTED.**

Tapping Sleeves: Smith-Blair, Ford, Mueller, or Rockwell

Gate Valves: AVK, AVK must be used unless that brand cannot be delivered in a reasonable time frame then the contractor may use Mueller

M/J Fittings: Tyler, US Pipe, Sigma, or United

Check Valves: OCV, Clow, Kennedy, or Golden Anderson

Pressure Reducing Valves: OCV, Val-Matic, or Golden Anderson

Air-Relief Valves: A.R.I., APCO, or Val-Matic

Restrained Joints: Midco Permagrip ONLY on all PVC Pipe 4" or smaller
For pipe 6" or larger: Midco, Meg-A-Lug, Star, EBBA, or Sigma

Fire Hydrants: AVK, Mueller, or American-Darling, Preferred AVK or Mueller

2" Post Hydrants: AVK or Mueller

Tracer wire must be solid core insulated 12 or 14 ga.

PVC Pipe shall conform to pressure class 200 and be "O-Ring" SDR21 rated.

Poly-Pipe shall conform to DR9.

No Glue Joint Pipe of any size will be accepted.

All brass must comply with the Lead Free Drinking Act of Jan. 4, 2011

Brass nipples and collars must be Domestic Brands ONLY. No Foreign brand will be accepted.

Only brass water fittings made by A.Y. McDonald, Ford, or Mueller will be accepted.

All material will need to be inspected before use.

Buried line must have 30" of cover or 36" through ditches and creeks.

No exposed trench can be back filled before approved inspection.

Please feel free to call Matt Foreman @ 918-830-1488 with any questions.