STANDARD CONTRACT DOCUMENTS

AND

TECHNICAL SPECIFICATIONS

FOR

UTILITY AND STREET CONSTRUCTION

May 2016

CITY OF RAYMORE, MISSOURI

100 Municipal Circle
Raymore, Missouri 64083
816-331-1852 (Telephone)
816-331-8067 (Fax)

NOTICE TO BIDDERS

City of Raymore, Missouri

Sealed proposals will be received by the Purchasing Specialist at the City Hall, 100 Municipal Circle, Raymore, Missouri, until ____ p.m. on _____, 20__. In accordance with the Missouri Sunshine Law, RSMo 610.021, the proposals for the above project will be opened on said date and time and only the bidder name will be read aloud along with required documents checked for responsiveness. On all requests and correspondence, please reference RFP Number _____.

The work under this contract consists of the following:

- _____

The specific locations of the work to be done shall be contained in the special provisions section of the bid document. The contractor shall bid on all alternates.

All equipment, material and workmanship must be in accordance with the Specifications and other Contract Documents in the Project Manual on file with the Engineering Department, 100 Municipal Circle, Raymore, Missouri 64083.

Contractors desiring a copy of the Contract Plans & Specifications may obtain them from the City of Raymore Engineering Department, upon payment of $15.00 (non-refundable). A copy of the 2013 City of Raymore 'Standard Contract Documents and Technical Specifications & Design Criteria for Utility and Street Construction' may be obtained from the City of Raymore Engineering Department for $50.00 or may be downloaded at no cost from the City's website at www.raymore.com

A bid bond or certified check from a surety or bank, acceptable to the Purchasing Specialist, in the amount equal to, or greater than, 5% of the maximum total bid price must accompany each proposal. Prior acceptability of the proposed surety or bank furnishing the bid security, before the bid date, is recommended. An unacceptable bid security may be cause for rejection of the proposal. No bidder may withdraw his bid for a period of thirty (30) days after the date of opening of bids.

Contractor shall provide a ten (10) hour Occupational Safety and Health Administration (OSHA) construction safety program for all employees who will be on-site at the Project. The construction safety program shall include a course in construction safety and health that is approved by OSHA or a similar program approved by the Missouri Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program as required by Section 292.675, RSMo.

All wages paid for work under this contract shall comply with the requirements of the prevailing wage law of the State of Missouri, Missouri Public Law 294, Sec. 290.210 through 290.340, R.S. MO. 1969, as amended.

Pursuant to 610.021 RSMo, all documents within a request for proposal will become open record to the public upon a negotiated contract being executed. All documents within a request for bid become open record as soon as the bid is opened. Bidders and proposers should be aware that all documents within a submittal will become open records.

Documents not obtained directly from the City of Raymore are for review purposes only. Actual bidding documents must be obtained from the City of Raymore contact as stated above.

The Owner reserves the right to reject any or all proposals and to waive informalities or deficiencies therein. To negotiate with any or all bidders or others for more favorable terms or prices, and to award a contract to other than the bidder submitting the lowest cost bid proposal, with or without negotiation and to determine which is the lowest best and most responsive, to accept, at its option, any alternates and to approve the bond.

STANDARD CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS
FOR
UTILITY AND STREET CONSTRUCTION

CITY OF RAYMORE, MISSOURI

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INFORMATION FOR BIDDERS

CONTRACT DOCUMENTS

The copies of the contract documents are included in the manual.

The "Missouri Standard Specifications for Highway Construction", latest revision, the Standard Specifications & Design Criteria – Kansas City Metropolitan Chapter of the APWA, latest revision, and the "Standard Contract Documents and Technical Specifications for Utility and Street Construction - City of Raymore, Missouri" (July 2013) are an integral part of the Contract Documents and the manual. All Bidders are required to obtain and utilize the latest revision of these manuals to ensure compliance with current city codes, state statutes, policies and regulations.

Bidders must familiarize themselves with all local ordinances and statutes pertaining to the proposed construction, and examine and determine for themselves the location and nature of the proposed work, and the amount and character of the labor and materials required therefore, and the difficulties, which may be encountered.

BIDDER'S KNOWLEDGE

The Bidders shall acquaint themselves with any and all changes in specifications and changes in methods or procedures or policies as may be set forth in these Contract Documents.

If any Bidder contemplating the submission of a bid for the proposed contract in doubt as to the true meaning of any part of the plans, specifications or other proposed documents; that Bidder should submit a written request for clarification. The request to the Public Works Director for an interpretation thereof at least 2 days prior to the scheduled bid opening. The person submitting the request will be responsible for prompt delivery. Any interpretation of the proposed documents will be made only by addendum duly issued and a copy of such addendum will be mailed or delivered to each person receiving a set of such documents. The City of Raymore will not be responsible for any other explanation or interpretation.

All proposals shall be made and received with the express understanding that the Bidder accepts the terms and conditions contained in these instructions and the plans and specifications, forms of contract and bonds and any other contract documents referred to herein.

If after the bids have been delivered to the City, any difference of opinion that should arise as to the true intent or meaning of any part of the specifications decision determining clarification or true intent of the specifications by the Public Works Director and shall be final, conclusive and binding on all parties.

BIDDER'S QUALIFICATIONS

If requested, Bidders must present satisfactory evidence that they are familiar with the class of work specified and that they possess the necessary capital, tools, machinery and other equipment to conduct the work and complete the improvement within the time specified in the proposal, in a good and professional manner and to the entire satisfaction of the City.

The Bidders agree that they are fully responsible to the City for the acts and omissions of any of its proposed subcontractors and of persons either directly or indirectly employed by them, as they are for the acts and omissions of persons directly employed by them.

Before any contractor and/or subcontractor may commence work, the successful Bidder must file with the Engineer and the City, satisfactory certificates, in duplicate, from the involved insurance companies, showing insurance coverage to the same extent and the amount required of the successful Bidder.

No subcontractor will be permitted to commence work until written authorization by the City to proceed, is received in writing by the Contractor.

SUBMISSION OF BIDS

Sealed bids will be received by the City, up to the date and hour specified in the Advertisement for Bids at the City Hall offices, 100 Municipal Circle, Raymore, Missouri No bids received after the time specified will be accepted and shall be returned unopened.

All bids must be in ink upon appropriate bid form included in the specifications manual and should indicate prices for each item and the aggregate amount for the work. The bid must be signed and acknowledged by the Bidder in accordance with the directions on the bid form. In order to insure consideration, the bid shall be enclosed in a sealed envelope addressed to the City and clearly marked as to the time and date of bid opening and the nature of the project. If submitted by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to the Purchasing Specialist with notation of the project, bid date and time on its face.

Each bid must contain the full name or names and post office address of the Bidder or Bidders. Any person signing a proposal as or acting as the agent of another may be required to furnish legal evidence of his authority to do so. A corporate Bidder must name the state in which its Articles of Incorporation are held and may be requested to provide proof of current corporate standing within that jurisdiction. A partnership must give the full names and addresses of all partners and jurisdiction registered in.

Any entity or submitting a bid shall provide the individual names of all its officers and members in writing and the signatures of its principals to the contract. The signers may, if they choose, identify any subsidiary affiliations to the contract as subcontractors or describe themselves as doing business under a firm name or style.

When a corporation submits a bid, the bid must be signed in the name of, and under the seal of, the corporation by a duly authorized officer or agent of the corporation and the address given. Such officer or agent may be required to present legal evidence that he has lawful authority to sign said bid. In the event that any corporation organized and doing business under the laws of a foreign state is the successful Bidder, such corporation shall present evidence that it is authorized to do business in the State of Missouri before the contract is executed.

Any Bidder submitting a bid shall not be allowed to submit a bid under a different name or as a subcontractor to any other bid. Evidence of this occurring will be considered sufficient cause for the rejection or any and all bids so affected. This is not intended to prevent a subcontractor from quoting prices to more than one Bidder for consideration in the bid process.

Failure on the part of any Bidder to carry out previous contracts satisfactorily or its lack of experience or equipment necessary for the satisfactory completion of the project may be deemed sufficient cause for the disqualification.

Unless otherwise specifically provided in the specifications for the improvement, bids must be made upon each and every item shown on the Proposal Form, including all alternate items.

Faxed or electronic bids will not be considered. Modifications to bids already submitted will be allowed if submitted prior to the time specified for the bid opening in the Advertisement for Bids. Modifications shall be submitted as such and shall not reveal the total amount of either the original or revised bids.

BIDDERS TO INVESTIGATE SITE

Bidders are required to submit their bids upon the following express conditions, which shall apply to and become part of every bid received:

Each Bidder will determine for itself the work required to be done including materials and labor needed, and shall base its bid in sole alliance of its determination. This determination will be made from personal examination of the location of the proposed work and through any other means it deems necessary including but not limited to verifying utility locations. The investigation and research used to determine the conditions affecting the project will include the materials to be excavated. Any information or data furnished by the City or the City's representatives for the convenience of any Bidder is not guaranteed. The Bidder shall thoroughly examine and familiarize himself with the Drawings, Special Provisions, and all other Contract Documents. The Contractor by the execution of the Contract shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal instrument or to visit the site and acquaint himself with the conditions existing there. The City will be justified in rejecting any claim based on the Bidder should have known from its prebid investigation.

Regardless of what utilities are shown in the bidding documents and utility locations listed, the bidder shall contact each area utility to determine the presence and location of the utility lines. The bidder shall determine and shall assume the risk as to whether utilities that are to be relocated by the utility company have in fact been relocated and if not, when the utility company

anticipates the relocation shall be completed. The bidder shall independently determine the reliability of the information received from the utility companies and shall make the determination as to the sequence and timing of utility relocations in determining a bid.

BID GUARANTY

Each bid shall be accompanied by a Bid Guaranty in the form of a money order, certified check or bid bond, payable to the order of the City, in an amount not less than five percent (5%) of the total amount of the bid. No bid will be considered unless accompanied by a Bid Guaranty.

In case alternate bids are called for, providing for the use of several different classes of material or types of improvement for the same work, one Bid Guaranty in the amount of five percent (5%) of the total amount of the highest bid will be sufficient for all bids.

As soon as the bids have been tabulated, all Bid Guarantees shall be returned to the Bidders except those of the three lowest responsible Bidders which shall be retained until the contract has been signed by the successful Bidder and the bonds and affidavits of the Contract have been filed, approved, and accepted, which shall be within ten days of notice of award of the Contract.

If the successful Bidder fails to enter into a contract (based on in accordance with) his accepted proposal or shall fail to furnish the required performance bond and affidavits within ten days after notice of award, his Bid Guaranty shall be forfeited to the City as liquidated damages.
The next best bid shall then be considered the successful bid and that Bidder, at the discretion of the City, shall be awarded the Contract. The remaining Bid Guarantees will be returned after the agreement is executed and a performance bond and affidavits received.

WITHDRAWAL OF BIDS

Any bid may be withdrawn prior to the scheduled time for the opening of bids or authorized postponement thereof.

After the scheduled time for opening, Bidders may not withdraw or cancel for a period of sixty days, and all sums deposited or a Bid Guaranty may be held by the City for said sixty days until all of the bids submitted have been canvassed, a contract awarded and executed, and the required bonds and insurance furnished and approved. Should there be reasons why the contract cannot be awarded within the specified period; the time may be extended by mutual agreement between the City and the Bidders.

EVALUATION OF BIDS

The bids from each responsible Bidder will be considered on the basis of the total amount as shown on the bid form and awarded according to the lowest total reflecting the correct summation of all item extensions shown or as otherwise described in the Special Provisions.

The City reserves the right to reject any or all bids. Without limiting the generality of the foregoing, the City may reject any bid which is incomplete, obscure, or irregular, any bid having erasures or corrections in the price sheet, any bid which omits an amount on any one or more items in the price sheet, any bid in which unit prices are obviously unbalanced, any bid

accompanied by an insufficient or irregular bid bond, any bid which omits acknowledgment of the receipt of addendums.

The City may make such investigations as it deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the City all such information and data for this purpose as the City may request. The low Bidder must supply the names and addresses of major material suppliers and subcontractors. The City reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the City that such Bidder is properly qualified to carry out the obligation of the agreement and to complete the work contemplated therein.

EXECUTION OF CONTRACT

Prior to acceptance of the bid by the City, the City will mail to the lowest most responsive bidder prepared contract agreements for signature and return. The Contractor shall also submit with the signed agreement, affidavits or copies of insurance coverage that satisfies the requirements of the agreement. Following acceptance of the bid by the City Council, a "Notice of Award" letter will be mailed to the Contractor. The Notice of Award letter will specify that the Contractor submit their Performance Bond, Labor and Material Payment Bond along with a copy of their Occupational License with the City. The required amounts are indicated in the General Conditions. No contract will be considered by the City Council until the required affidavits or copies of insurance coverage are submitted and have been approved as to form by the City.

The Performance Bond and the Labor and Material Payment Bond shall be in the amount of 100 percent of the contract price with a corporate surety approved by the City. Attorneys-in-fact who sign Bid Bond, Performance Bond and Labor and Material Bonds must file with each bond a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to obtain a Performance Bond and Labor and Material Payment Bond within ten calendar days from the date when Notice of Award is delivered to the Bidder. In case of failure of the Bidder to execute the Agreement, the City may consider the Bidder in default, in which case the bid guaranty accompanying the proposal shall become the property of the City. The City, within ten days of receipt of an acceptable Performance Bond and Labor and Material Payment Bond, shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the City not execute the Agreement within such period, the Bidder may by written notice withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the City.

A Notice to Proceed shall be issued within ten days of the execution of the Agreement by the City. Should there be reasons why the Notice to Proceed cannot be issued within such period; the time may be extended by mutual agreement between the City and Contractor. If the Notice to Proceed has not been issued within the ten-day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

The Notice of Award letter will not be construed as an order to proceed. The Contractor will have no authority to perform work under this contract until all contract documents as indicated above are properly completed and placed on file at the City's offices.

A Notice to Proceed with the work under this project will be mailed to the Contractor upon satisfaction of the above-indicated requirements. A mandatory pre-construction conference will be scheduled thereafter.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout.

BID PROPOSAL FORM

***City Project:* _____**

Sealed Bid Proposal must include the following:

(2) SIGNED PROPOSALS

Plus one (1) unbound copy for a total of three (3) copies

MUST BE RECEIVED BY:
_____ P.M. on _____, 20__

PLEASE MARK YOUR SUBMITTAL "SEALED PROPOSAL" AND SEND IT TO:

_____
Purchasing Specialist
City of Raymore
100 Municipal Circle
Raymore, Missouri 64083
816-331-0488

Proposals to include Forms A-C and Bid Proposal Form D

BID PROPOSAL FORM

City Project: _____

BID FORM A

PROPOSAL VALIDITY AND COMMITMENT TO SIGN AGREEMENTS

I (authorized agent) _____ having authority to act on behalf of (Company name) _____ do hereby acknowledge that (Company name) _____ will be bound by all terms, costs, and conditions of this proposal for a period 90 days from the date of submission; and commit to sign the Agreements.

FIRM NAME:_____

ADDRESS:_____
Street

ADDRESS:_____
City **State** **Zip**

PHONE:_____

DATE:_____ _____
(Month-Day-Year) **Signature of Officer/Title**

DATE:_____ _____
(Month-Day-Year) **Signature of Officer/Title**

ATTEST:_____ **(Corporate Seal)**

Indicate Minority Ownership Status of Bidder (for statistical purposes only):
Check One:

_____ MBE (Minority Owned Enterprise)
_____ WBE (Women Owned Enterprise)
_____ Small Business

BID PROPOSAL FORM

City Project: _____

BID FORM B

CONTRACTOR DISCLOSURES

The Contractor submitting this RFP shall answer the following questions with regard to the past five (5) years. If any question is answered in the affirmative, the Firm shall submit an attachment, providing details concerning the matter in question, including applicable dates, locations, names of projects/project owners and circumstances.

1. Has the Firm been debarred, suspended or otherwise prohibited from doing business with any federal, state or local government agency, or private enterprise?

   Yes ___ No ___

2. Has the Firm been denied prequalification, declared non-responsible, or otherwise declared ineligible to submit bids or proposals for work by any federal, state or local government agency, or private enterprise?

   Yes ___ No ___

3. Has the Firm defaulted, been terminated for cause, or otherwise failed to complete any project that it was awarded? Yes ___ No ___

4. Has the Firm been assessed or required to pay liquidated damages in connection with work performed on any project? Yes ___ No ___

5. Has the Firm had any business or professional license, registration, certificate or certification suspended or revoked? Yes ___ No ___

6. Have any liens been filed against the Firm as a result of its failure to pay subcontractors, suppliers, or workers? Yes ___ No ___

7. Has the Firm been denied bonding or insurance coverage, or been discontinued by a surety or insurance company? Yes ___ No ___

8. Has the Firm been found in violation of any laws, including but not limited to contracting or antitrust laws, tax or licensing laws, labor or employment laws, environmental, health or safety laws?

   Yes ___ No ___

   **With respect to workplace safety laws, this statement is limited to willful federal or state safety law violations.*

9. Has the Firm or its owners, officers, directors or managers been the subject of any criminal indictment or criminal investigation concerning any aspect of the Firm's business?

   Yes ___

   No ___

10. Has the Firm been the subject to any bankruptcy proceeding?

    Yes ___ No ___

Legal Matters

1. Claims, Judgments, Lawsuits: Are there or have there been any claims, judgments, lawsuits or alternative dispute proceedings involving the Firm that involve potential damages of $10,000 or more in the past 48 months?

   ____ *Yes* ____ *No* If yes, provide details in an attachment.

2. Complaints, Charges, Investigations: Is the Firm currently or has the firm been the subject of any complaint, investigation or other legal action for alleged violations of law pending before any court or governmental agency within the past 48 months ?

   ____ Yes ____No *If yes, provide details in an attachment.*

Required Representations

In submitting this RFP, the Firm makes the following representations, which it understands are required as a condition of performing the Contract Work and receiving payment for same.

1. The Firm will possess all applicable professional and business licenses required for performing work in Raymore, Missouri.

2. The Firm satisfies all bonding and insurance requirements as stipulated in the solicitation for this project.

3. The Firm and all subcontractors that are employed or that may be employed in execution of the Contract Work shall be in full compliance with the City of Raymore's requirements for Workers' Compensation Insurance.

4. If awarded the Contract Work, the Firm represents that it will not exceed its current bonding limitations when the Contract Work is combined with the total aggregate amount of all unfinished work for which the Contractor is responsible.

5. The Firm represents that it has no conflicts of interests with the City of Raymore if awarded the Contract Work, and that any potential conflicts of interest that may arise in the future will be disclosed immediately to the City.

6. The Firm represents the prices offered and other information submitted in connection with its proposal for the Contract Work was arrived at independently without consultation, communication, or agreement with any other offeror or competitor.

7. The Firm will ensure that employees and applicants for employment are not discriminated against because of their race, color, religion, sex or national origin.

BID PROPOSAL FORM

City Project: _____

BID FORM C

EXPERIENCE / REFERENCES

Please provide a minimum of five references where your firm has performed similar work to what is being requested in the RFP and within the past 36 months. Please include ONLY the following information:

- Name
- Contact
- Title
- Mailing Address
- Telephone Number
- Project Name, Amount and Date Completed

*Please list any Municipalities that you have done work for in the past 48 months.

BID PROPOSAL FORM 'D'

Proposal of _____, organized and existing under the law
(of company or corporation)

of the State of_____, doing business as _____.
(Corporation, partnership, individual)

To the City of Raymore, Missouri: In compliance with your Advertisement for Bids, the aforementioned firm, hereby proposes and agrees to furnish all labor, tools, materials and supplies to completely construct : **City Project:**_____

This work is to be performed in strict accordance with the Plans and Specifications, including addendum number(s)_____, issued thereto, receipt of which is hereby acknowledged for the following lump sum and unit prices.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
	BASE BID				
	TBD				
			TOTAL BASE BID:		

By submission of this Bid, the aforementioned firm, and in the case of a joint bid, each party thereto certifies as to his own organization, that this id has been arrived at independently, without consultation, communication or agreement as to any matter relating to this Bid with any other Bidding firm or with any competitor.

The Bidder hereby agrees to commence work under this contract on or before the date specified in the Notice to Proceed and to fully complete the project in accordance with the completion dates specified in the Special Provisions.

BID OF : _____

_____

(Name of Firm)

CITY PROJECT TITLE: **City Project No.** _____

Total Base Bid in words: $_____

_____

FIRM NAME:_____

ADDRESS:_____
Street **City** **State** **Zip**

PHONE:_____

DATE:_____ _____
(Month-Day-Year) **Signature of Officer/Title**

DATE:_____ _____
(Month-Day-Year) **Signature of Officer/Title**

ATTEST:_____

(Corporate Seal)

STATE OF _____

County of_____

The foregoing instrument was acknowledged before me this __ day of_____,

20____.

(SEAL) **Notary Public**

_____**County,** _____.

My Commission expires on_____.

CONTRACT FOR CONSTRUCTION SERVICES

City Project No. _____

AGREEMENT FOR PROVISION OF THE FOLLOWING SERVICES

Agreement made this _____ day of_____, 20___, between _____ _____, an entity organized and existing under the laws of the State of _____ _____, with its principal office located at _____, hereafter referred to as the **Contractor**, and The City of Raymore, Missouri, a Charter City organized and existing under the laws of the State of Missouri, with its principal office located at 100 Municipal Circle, Raymore, Missouri, hereafter referred to as the **City**.

This contract and applicable attachments represent the entire understanding and agreement between the parties and no oral, implied, alterations or variations to the contract will be binding on the parties, except to the extent that they are in writing and signed by the parties hereto. This contract shall be binding upon the heirs, successors, administrators, executors and assigns of the parties hereto.

In the event there are any inconsistencies in the provisions of this contract and those contained in the proposal they will be resolved in accordance with the terms of this contract.

This contract is effective as of _____ and coincidental with the Mayor's signature and attestation by the City Clerk and shall remain in effect as described within the attachments.

ARTICLE I
THE WORK

Contractor agrees to perform all work and provide all materials as specified in the bid documents issued for **City Project _____,** the Scope of Services in Appendix A and the General Terms and Conditions in Appendix B, commonly referred to as General Terms and Conditions and according to Contract Agreement set forth here. Contractor agrees to provide all labor, materials, tools, permits, and/or professional services and perform the contracted work in accordance with all specifications, terms and conditions as set forth within the bid documents, including bonding, insurance, prevailing wage requirements, and termination clauses as needed or required. The work as specified in Appendix A, may commence upon the signing of this contract and scheduling and approval of the City.

ARTICLE II
TIME OF COMMENCEMENT AND COMPLETION

The work shall take a maximum of ____ calendar days. The date of substantial completion shall be that date when the work is completed to the extent the City can utilize the work for the use for which it is intended and fulfills the work as described in the contract and applicable attachments and addendums. The City shall be the sole determiner as to the fulfillment of the work as described.

ARTICLE III
CONTRACT SUM AND PAYMENT

The Contractor agrees to perform all work described in the Contract Documents in the amount of

$_____.

The City agrees to pay the Contractor as outlined in Appendix B of this contract and subject to deductions provided for in Articles IV and VI.

ARTICLE IV
CONTRACT PAYMENT

The City agrees to pay the Contractor for the completed work as follows: 95% of contract shall be paid within thirty (30) days of substantial completion of each section of this proposal – inspection and remediation, walk-through and acceptance by the City; a 5% retainage will be held until acceptance of the project by the Raymore City Council, at which time final payment will be made. Any monies not paid to the Contractor when due will bear interest at the rate of one and one-half percent (1 -1/2 %) per month, from the date such payment is due. However, if any portion of the work remains to be completed or corrected at the time payment is due, the City may retain sufficient funds to cover the City Engineers' estimated value of the work not completed or twenty percent (20%) of the contract amount, whichever is greater, exempt from interest, to be paid when such listed items are corrected or completed.

The City will be the sole judge as to the sufficiency of the work performed.

The Contractor agrees that the City may withhold any and all payment for damage or destruction, blatant or otherwise, incurred to the City's property caused by poor performance or defective equipment or materials or personnel employed or utilized by the Contractor. Additionally, it is agreed the Contractor shall also be liable to the City for replacement of materials or services occasioned by such breach.

Payment shall be made upon receipt of invoices presented in duplicate as outlined in Appendix B.

In the event that the Missouri Department of Labor and Industrial Relations has determined that a violation of Section 292.675, RSMo, has occurred and that a penalty as described in Section

VII shall be assessed, the City shall withhold and retain all sums and amounts due and owing when making payments to the Contractor under this Contract.

ARTICLE V
INSURANCE REQUIREMENTS

Insurance shall be provided as outline in the General Terms and Conditions Appendix B to the Contract.

ARTICLE VI
DAMAGES/DELAYS/DEFECTS

The City will not sustain monetary damage if the whole or any part of this contract is delayed through the failure of the Contractor and/or his sureties to perform any part or the whole of this contract. Thus, if at any time the Contractor refuses or neglects to supply sufficiently skilled workmen or proper materials, or fails in any respect to execute the contract, including extras, with the utmost diligence, the City may take steps deemed advisable to promptly secure the necessary labor, tools, materials, equipment, services, etc., by contract or otherwise, to complete whatever portion of the contracted work which is causing delay or is not being performed in a workmanlike manner.

Contractor and/or their sureties will be liable to the City for any cost for labor, tool, materials, equipment, services, delays, or claims incurred by the City to finish the work.

Contractor will store, contain, or remove all debris, materials, tools, equipment and vehicles at the end of each day so that no hazardous or dangerous situations are created within the work location and surrounding area.

Contractor will promptly repair all damage to public and private property caused by their agents or employees. Should damages not be promptly repaired, the City will authorize the hiring of another Contractor to do the repairs. The original Contractor agrees to promptly pay for the services of any such Contractor hired to do such repairs.

Contractor shall immediately report, to the City, or a duly authorized representative, any accident whatsoever arising out of the performance of this contract, especially those resulting in death, serious injury or property damage. Contractor must provide full details and statements from any witnesses.

If the Contractor shall fail to complete the work within the contract time, or an extension of time granted by the City, the Contractor will pay to the City the amount for liquidated damages as specified in the schedule below for each calendar day that the Contractor shall be in default after the time stipulated in this contract document. The amount specified in the schedule is agreed upon, not as a penalty, but as liquidated damages for the loss to the City of Raymore and the public of the use of the facility as designated. This amount will be deducted from any money due to the Contractor. The Contractor and Contractor’s surety will be liable for all liquidated damages.

SCHEDULE OF LIQUIDATED DAMAGES		
Original Contract Amount		Charge Per Calendar Day ($)
From More Than ($)	To and Including ($)	
0	50,000	150
50,001	100,000	250
100,001	500,000	500
500,001	1,000,000	1,000
1,000,001	2,000,000	1,500
2,000,001	5,000,000	2,000
5,000,001	10,000,000	2,500
10,000,001	And above	3,000

ARTICLE VII
RESPONSIBILITIES

The City shall provide all information or services under their control with reasonable promptness and shall designate a representative to render decisions on behalf of the City and on whose actions and approvals the Contractor may rely.

The Contractor's responsibilities and obligations under this agreement are accepted subject to strikes, outside labor troubles (including strikes or labor troubles affecting vendors or suppliers of Contractor), accidents, transportation delays, floods, fires, or other acts of God, and any other causes of like or different character beyond the control of Contractor. Impossibility of performance by reason of any legislative, executive, or judicial act of any governmental authority shall excuse performance of or delay in performance of this agreement. The City and the Contractor shall agree upon such delay or cancellation of performance and execute this agreement in writing.

Contractor agrees to provide all materials, labor, tools, and equipment necessary to perform and complete the contract as specified. All equipment will be of such type and in such condition so as not to cause any damages to City property or the community at large. All equipment used on site will meet the minimum requirements of Occupational Safety Health Administration and related federal, state, county, and city regulations, including EPA NESHAPS. All material will be of a type and quality acceptable to the City, and which will not cause injury to property or persons.

Contractor will supervise and direct the work performed, and shall be responsible for his employees. Contractor will also supervise and direct the work performed by sub-contractors and their employees and be responsible for the work performed by sub-contractors hired by the contractor.

Contractor agrees to obtain and maintain, during the term of this contract, the necessary licenses and permits required by federal, state, county and municipal governments to perform the services as required by this contract. Contractor shall bear the cost of any permits which he is obligated to secure. Contractor will also ensure any sub-contractors hired will obtain the necessary licenses and permits as required.

Contractor agrees to comply with all applicable federal, state, county and municipal laws and regulations, including, but not limited to, affirmative action, equal employment, fair labor standards and all applicable provisions of the Occupational Safety and Health Act of 1970, as amended. Contractor agrees to ensure sub-contractors and their employees comply with all applicable laws and regulations aforementioned.

Contractor also agrees to be, at all times, in full compliance with any and all applicable federal, state and local laws and regulations as they may change from time to time.

Contract is subject to the State of Missouri Prevailing Wage Law (**Cass County Annual Wage Order #___**). The Contractor shall include the provisions of this clause in all subcontracts for work to be performed by subcontractors under this contract so that provisions of this clause are binding upon subcontractors.

ARTICLE VIII
TERMINATION OF AGREEMENT

With Cause – If Contractor fail to perform his duties as specified in this contract, the City through its appointed representative, shall notify the Contractor to correct any default under the terms of this contract. Such notification may be made by telephone or in writing. If the Contractor fails to correct any default after notification of such defaults, the City shall have the right to immediately terminate this agreement by giving the Contractor ten (10) days written notice.

Without Cause – The City may terminate this agreement at any time by providing sixty (60) days written notice, by certified mail, to the Contractor at the address listed below.

In the event this agreement is terminated, the City may hold as retainer the amount needed to complete the work in accordance with bid specifications.

ARTICLE IX
ARBITRATION

In case of a dispute, the Contractor and the City shall each appoint a representative, who, together, shall select a third party to arbitrate the issue. Resolution of the issue will be binding upon both parties.

ARTICLE X
WARRANTY

Contractor warrants that all workmanship shall be of good quality, in conformance with bid specifications and guarantee all materials, equipment furnished, and work performed for a period of two (2) years from the date of substantial completion as noted in the 2013 City of Raymore "Standard Contract Documents and Technical Specifications & Design Criteria for Utility and Street Construction."

Contactor shall, within ten (10) days of written notice from the City, correct any work found to be defective, incorrect or not in accordance with bid specifications.

ARTICLE XI
SAFETY TRAINING

A. Contractor shall provide a ten (10) hour Occupational Safety and Health Administration (OSHA) construction safety program for all employees who will be on-site at the Project. The construction safety program shall include a course in construction safety and health that is approved by OSHA or a similar program approved by the Missouri Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program as required by Section 292.,675, RSMo.

B. Contractor shall require it's on site employees to complete a construction safety program within sixty (60) days after the date work on the Project commences.

C. Contractor acknowledges and agrees that any of Contractor's employees found on the Project site without documentation of the successful completion of a construction safety program shall be required to produce such documentation within twenty (20) days, or will be subject to removal from the Project.

D. Contractor shall require all of its Subcontractors to comply with the requirements of this Section and Section 292.675, RSMo.

ARTICLE XII
NOTICE OF PENALTIES FOR FAILURE TO PROVIDE SAFETY TRAINING

A. Pursuant to Section 292.675, RSMo, Contractor shall forfeit to City as a penalty ($_____), plus ($_____) for each on-site employee employed by Contractor or its Subcontractor, for each calendar day, or portion thereof, such on-site employee is employed without the construction safety training required in Section XI above.

B. The penalty described in Subsection "A" of this Section shall not begin to accrue until the time periods described in Sections XI "B" and "C" above have elapsed.

C. Violations of Section XI above and imposition of the penalty described in this Section shall be investigated and determined by the Missouri Department of Labor and Industrial Relations.

ARTICLE XIII
AFFIDAVIT of WORK AUTHORIZATION

Pursuant to 285.530 RSMo, the bidder must affirm its enrollment and participation in a federal work authorization program with respect to the employees proposed to work in connection with the services requested herein by

* submitting the attached AFFIDAVIT OF WORK AUTHORIZATION and

* providing documentation affirming the bidder's enrollment and participation in a federal work authorization program (see below) with respect to the employees proposed to work in connection with the services requested herein.

E-Verify is an example of a federal work authorization program. Acceptable enrollment and participation documentation consists of the following two pages of the E-Verify Memorandum of Understanding (MOU): 1) a valid, completed copy of the first page identifying the bidder and 2) a valid copy of the signature page completed and signed by the bidder, the Social Security Administration, and the Department of Homeland Security – Verification Division.

ARTICLE XIV
ENTIRE AGREEMENT

The parties agree that this constitutes the entire agreement and there are no further items or provisions, either oral or otherwise. Buyer agrees that it has not relied upon any representations of Contractor as to prospective performance of the goods, but has relied upon its own inspection and investigation of the subject matter.

The parties have executed this agreement at The City of Raymore the day and year first above written.

IN WITNESS WHEREOF, the parties hereunto have executed four (4) counterparts of this agreement the day and year first written above.

(SEAL)

THE CITY OF RAYMORE, MISSOURI

By: _____
Mayor

Attest:_____
City Clerk

(SEAL)

(*CONTRACTOR'S NAME*)

By:_____

Attest: _____

Appendix A

Scope of Work

CITY OF RAYMORE, MISSOURI

City Project:_____

The work under this contract consists of the following:

- TBD

Appendix B

General Terms and Conditions

A. Procedures

The extent and character of the services to be performed by the Contractor shall be subject to the general control and approval of the Finance Director in consultation with the Public Works Director or their authorized representative (s). The Contractor shall not comply with requests and/or orders issued by and other person. The Finance Director will designate her authorized representatives in writing. Both the City of Raymore and the Contractor must approve any changes to the contract in writing.

B. Contract Period

Award of this contract is anticipated prior to the end of _____, with work expected to be completed prior to the end of _____.

C. Insurance

The Bidder/Contractor shall procure, maintain, and provide proof of, insurance coverage's for injuries to persons and/or property damage as may arise from or in conjunction with, the work performed on behalf of the City of Raymore by the Bidder/Contractor, its agents, representatives, employees or subcontractors. The City of Raymore shall be named as an additional insured under such insurance contracts (except for Worker's Compensation coverage). A Certificate of Insurance will be required within ten calendar days from the date of receipt of the Notice of Award. Claims made on policies must be enforce or that coverage purchased for three (3) years after contract completion date.

1. General Liability

   Coverage shall be as broad as: Comprehensive General Liability endorsed to include Broad Form, Commercial General Liability forms including Product/Completed Operations.

   Minimum Limits
   General Liability:
   $1,000,000 Each Occurrence Limit
   $ 100,000 Damage to Rented Premises
   $ 5,000 Medical Expense Limit
   $1,000,000 Personal and Advertising Injury
   $2,000,000 General Aggregate Limit
   $1,000,000 Products & Completed Operations
   $ 50,000 Fire Damage Limit

2. Excess/Umbrella Liability

   $5,000,000 Each Occurrence
   $5,000,000 Aggregate

3. Automobile Liability

   Coverage sufficient to cover all vehicles owned, used, or hired by the Bidder/Contractor, its agents, representatives, employees or subcontractors.

   Minimum Limits
   Automobile Liability:
   $1,000,000 Combined Single Limit
   $1,000,000 Each Occurrence Limit
   $5,000 Medical Expense Limit

4. Workers' Compensation

   Limit as required by the Workers' Compensation Act of Missouri, Employers Liability, $1,000,000 from a single carrier.

5. In addition to the insurance provided above, Contractor shall at all times during the course of this building project secure and provide to the City of Raymore proof of a Builder's Risk Policy for this project and in place.

D. Hold Harmless Clause

The Bidder/Contractor shall, during the term of the contract including any warranty period, indemnify, defend, and hold harmless the City of Raymore, its officials, employees, agents, residents and representatives thereof from all suits, actions, or claims of any kind, including attorney's fees, brought on account of any personal injuries, damages, or violations of rights, sustained by any person or property in consequence of any neglect in safeguarding contract work or on account of any act or omission by the Contractor or his employees, or from any claims or amounts arising from violation of any law, bylaw, ordinance, regulation or decree. The vendor agrees that this clause shall include claims involving infringement of patent or copyright.

E. Exemption from Taxes

The City of Raymore is exempt from state sales tax and federal excise tax. Tax exemption certificates indicating this tax exempt status will be furnished on request, and therefore the City shall not be charged taxes for materials or labor.

F. Employment Discrimination by Contractors Prohibited/Wages/ Information

During the performance of a contract, the Contractor shall agree that it will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, or disabilities, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor; that it will post in conspicuous places, available to employees and applicants for employment, notices setting forth nondiscrimination practices, and that it will state, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, that it is an equal opportunity employer. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient to meet this requirement.

The Contractor will include the provisions of the foregoing paragraphs in every subcontract or purchase order so that the provisions will be binding upon each subcontractor or vendor used by the Contractor.

Contractor agrees to pay all employees involved in this contract the required wages as listed in the prevailing wage order #___ for Cass County.

G. Invoicing and Payment

The Bidder shall submit invoices, in duplicate, for services outlined above in the scope of services.

Invoices shall be based on the following schedule:

At completion of work – 95% of contract amount with 5% held for retainage – the 5% retainage will be held until acceptance of the project by the Raymore City Council, at which time final payment will be made. Payment will be based on actual services rendered and actual costs. All such invoices will be paid within thirty (30) days by the City of Raymore unless any items thereon are questioned, in which event payment will be withheld pending verification of the amount claimed and the validity of the claim. The Bidder/Contractor shall provide complete cooperation during any such investigation.

H. Cancellation

The City of Raymore reserves the right to cancel and terminate this contract in part or in whole without penalty upon 30 days written notice to the Bidder/Contractor. Any contract cancellation notice shall not relieve the Bidder/Contractor of the obligation to deliver and/or perform on all outstanding orders issued prior to the effective date of cancellation.

I. Contractual Disputes

The Contractor shall give written notice to the City of Raymore of its intent to file a claim for money or other relief at the time of the occurrence or the beginning of the work upon which the claim is to be based.

The written claim shall be submitted to the City no later than sixty (60) days after final payment. If the claim is not disposed of by agreement, the City of Raymore shall reduce their decision to writing and mail or otherwise forward a copy thereof to the Contractor within thirty (30) days of receipt of the claim.

City decision shall be final unless the Contractor appeals within thirty (30) days by submitting a written letter of appeal to the Finance Director, or his designee. The Finance Director shall render a decision within sixty (60) days of receipt of the appeal.

J. Severability

In the event that any provision shall be adjudged or decreed to be invalid, such ruling shall not invalidate the entire Agreement but shall pertain only to the provision in question and the remaining provisions shall continue to be valid, binding and in full force and effect.

K. Applicable Laws

This contract shall be governed in all respects by federal and state laws. All work performed shall be in compliance with all applicable City of Raymore codes.

L. Drug/Crime Free Work Place

The Bidder acknowledges and certifies that it understands that the following acts by the contractor, its employees, and/or agents performing services on City of Raymore property are prohibited:

1. The unlawful manufacture, distribution, dispensing, possession or use of alcohol or other drugs; and
2. Any impairment or incapacitation from the use of alcohol or other drugs (except the use of drugs for legitimate medical purposes).
3. Any crimes committed while on City property.

The Bidder further acknowledges and certifies that it understands that a violation of these prohibitions constitutes a breach of contract and may result in default action being taken by the City of Raymore in addition to any criminal penalties that may result from such conduct.

M. Inspection

At the conclusion of each job order, the Bidder shall demonstrate to the Public Works Director or his authorized representative(s) of the City that the work is fully complete and in compliance with the scope of services. Any deficiencies shall be promptly and permanently corrected by the Bidder/Contractor at the Bidder's/Contractor's sole expense prior to final acceptance of work, and normal warrantees shall be issued at point of final acceptance by the City of Raymore.

N. No Escalation of Fees

The pricing of services contained in the contract for the selected Contractor shall remain in effect for the duration of the contract. No escalation of fees will be allowed.

O. Prevailing Wage Requirement

The contract resulting from this solicitation is subject to the State of Missouri Prevailing Wage Law (Cass County Annual Wage Order #___). The Contractor shall include the provisions of this clause in all subcontracts for work to be performed by subcontractors under this contract so that provisions of this clause are binding upon subcontractors.

Not less than the prevailing wage included must be paid to all workers performing work under the contract (Section 290.250, RSMo).

The Contractor will forfeit a penalty to the contracting public body of $100 per day (or portion of a day) if a worker is paid less than the prevailing rate for any work done under the contract by the Contractor or by any Subcontractor (Section 290.250, RSMo).

P. Permits

The successful Contractor shall be responsible for obtaining all permits, and for incurring all expenses associated with those permits, prior to proceeding with the scope of work and services described in this solicitation. Included in these permits will be the "Business License" required of all contractors doing business within the City limits of Raymore. This permit can be obtained from the office of the City Clerk, 100 Municipal Circle, Raymore, Missouri, 64083.

Q. Safety Training

Bidders are informed that the Project is subject to the requirements of Section 292.675, RSMo, which requires all contractors or subcontractors doing work on the Project to provide, and require its on-site employees to complete, a ten (10) hour course in construction safety and health approved by the Occupational Safety and Health Administration ("OSHA") or a similar program approved by the Missouri Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program. The training must be completed within sixty (60) days of the date work on the Project commences. On-site employees found on the worksite without documentation of the required training shall have twenty (2) days to produce such documentation.

R. Rejection of Bids:

The City reserves the right to reject any and all bids, to waive technical defects in the bid, and to select the bid deemed most advantageous to the City.

S. Affidavit of Work Authorization and Documentation:

Pursuant to 285.530 RSMo, the bidder must affirm its enrollment and participation in a federal work authorization program with respect to the employees proposed to work in connection with the services requested herein by

* submitting the attached AFFIDAVIT OF WORK AUTHORIZATION and

* providing documentation affirming the bidder's enrollment and participation in a federal work authorization program (see below) with respect to the employees proposed to work in connection with the services requested herein.

E-Verify is an example of a federal work authorization program. Acceptable enrollment and participation documentation consists of the following two pages of the E-Verify Memorandum of Understanding (MOU): 1) a valid, completed copy of the first page identifying the bidder and 2) a valid copy of the signature page completed and signed by the bidder, the Social Security Administration, and the Department of Homeland Security – Verification Division. **NOTE: The affidavit shall be completed and returned with the RFP.**

T. Release of Information:

Pursuant to 610.021 RSMo, all documents within a request for proposal will become open record to the public upon a negotiated contract being executed. All documents within a request for bid become open record as soon as the bid is opened. Bidders and proposers should be aware that all documents within a submittal will become open records.

U. Bid Bond

A bid bond or certified check from a surety or bank, acceptable to the City Clerk, in the amount equal to, or greater than, 5% of the maximum total bid price must accompany each proposal. Prior acceptability of the proposed surety or bank furnishing the bid security, before the bid date, is recommended. An unacceptable bid security may be cause for rejection of the proposal. No bidder may withdraw his bid for a period of thirty (30) days after the date of opening of bids.

V. Performance Bond

The Contractor shall within ten (10) days after receipt of the notice of award furnish the City with a Performance Bond in penal sum equal to the amount of the contract price, conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the contract documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in prosecution of the work provided by the contract documents. Such bond shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the State in which the work is to be performed. The expense of this bond shall be borne by the Contractor. If any time a surety on any such bond is declared as bankrupt or loses its right to do business in the state in which the work is to be performed, the Contractor shall within ten (10) days after notice from the City to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the City. The premiums on such bond shall be paid by the Contractor. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the City.

W. Labor and Material Payment Bond

The Contractor shall within ten (10) days after receipt of the notice of award furnish the City with a Payment Bond in penal sum equal to the amount of the contract price, conditioned upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the work provided by the contract documents. Such bond shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the State in which the work is to be performed. The expense of this bond shall be borne by the Contractor. If any time a surety on any such bond is declared as bankrupt or loses its right to do business in the state in which the work is to be performed, the Contractor shall within ten (10) days after notice from the City to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the City. The premiums on such bond shall be paid by the Contractor. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the City.

X. Maintenance Bond

Prior to acceptance of the project by the Raymore City Council, the Contractor shall furnish the Owner with a Maintenance Bond in penal sum equal to an amount of one half (50%) of the contract price and that shall remain in full force and effect for a period of two (2) years from the date of project acceptance by the Raymore City Council. The Maintenance Bond shall guarantee all materials and equipment furnished and work performed shall be free of defects due to faulty materials or workmanship and that the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to the parts of the system resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so with all costs, including administration fees, going against the Maintenance Bond. Such bond shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the state in which the work is to be performed. The expense of this bond shall be borne by the Contractor. If any time a surety on any such bond is declared a bankrupt or loses its right to do business in the state in which the work is to be performed, the Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

AFFIDAVIT

(as required by Section 285.530, Revised Statutes of Missouri)

As used in this Affidavit, the following terms shall have the following meanings:

EMPLOYEE: Any person performing work or service of any kind or character for hire within the State of Missouri.

FEDERAL WORK AUTHORIZATION PROGRAM: Any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or an equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, under the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603.

KNOWINGLY: A person acts knowingly or with knowledge,

(a) with respect to the person's conduct or to attendant circumstances when the person is aware of the nature of the person's conduct or that those circumstances exist; or

(b) with respect to a result of the person's conduct when the person is aware that the person's conduct is practically certain to cause that result.

UNAUTHORIZED ALIEN: An alien who does not have the legal right or authorization under federal law to work in the United States, as defined in 8 U.S.C. 1324a(h)(3).

BEFORE ME, the undersigned authority, personally appeared and who, being duly sworn, states on his oath or affirmation as follows:

Name/Contractor: _____

Company: _____

Address: _____

1. I am of sound mind and capable of making this Affidavit, and am personally acquainted with the facts stated herein.
2. Contractor is enrolled in and participates in a federal work authorization program with respect to the employees working in connection with the following services contracted between Contractor and the City of Raymore: Project #_____
3. Contractor does not knowingly employ any person who is an unauthorized alien in connection with the contracted services set forth above.
4. Attached hereto is documentation affirming Contractor's enrollment and participation in a federal work authorization program with respect to the employees working in connection with the contracted services.

(Company Name)

_____
Signature

Name: _____

Title: _____

Attest: _____

STATE OF _____ COUNTY OF _____

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

Notary Public: _____

My Commission Expires:_____

PLEASE NOTE: Acceptable enrollment and participation documentation consists of the following 2 pages of the E-Verify Memorandum of Understanding:

1. A valid, completed copy of the first page identifying the Contractor; and
2. A valid copy of the signature page completed and signed by the Contractor, the Social Security Administration, and the Department of Homeland Security -Verification Division.

ACORD CERTIFICATE OF LIABILITY INSURANCE

OP ID SG RAYMO01 | DATE (MM/DD/YYYY) 02/13/09

PRODUCER

Agency Name
Address

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A: XXXXXXXXXXXXX	
INSURER B:	
INSURER C:	

INSURED

Named Insured
Address

Sample

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN IS NDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRAC ICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES JS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
X	X	GENERAL LIABILITY [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: [ ] POLICY [X] PRO-JECT [ ] LOC	XXXXXXXXXXX	XX/XX/XX	XX/XX/XX	EACH OCCURRENCE	$ 1,000,000
						DAMAGE TO RENTED PREMISES (Ea occurence)	$ 100,000
						MED EXP (Any one person)	$ 5,000
						PERSONAL & ADV INJURY	$ 1,000,000
						GENERAL AGGREGATE	$ 2,000,000
						PRODUCTS - COMP/OP AGG	$ 1,000,000
	X	AUTOMOBILE LIABILITY [X] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [ ] HIRED AUTOS [ ] NON-OWNED AUTOS	XXXXXXXXXX	XX/XX/XX	XX/XX/XX	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
						BODILY INJURY (Per person)	$
						BODILY INJURY (Per accident)	$
						PROPERTY DAMAGE (Per accident)	$
		GARAGE LIABILITY [ ] ANY AUTO				AUTO ONLY - EA ACCIDENT	$
						OTHER THAN AUTO ONLY: EA ACC	$
						AGG	$
X		EXCESS/UMBRELLA LIABILITY [X] OCCUR [ ] CLAIMS MADE [ ] DEDUCTIBLE [ ] RETENTION $	XXXXXXXXXX	XX/XX/XX	XX/XX/XX	EACH OCCURRENCE	$ 5,000,000
						AGGREGATE	$ 5,000,000
							$
							$
							$
X		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below	XXXXXXXXXX	XX/XX/XX	XX/XX/XX	[X] WC STATU-TORY LIMITS [ ] OTH-ER	
						E.L. EACH ACCIDENT	$ 1,000,000
						E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
						E.L. DISEASE - POLICY LIMIT	$ 1,000,000
		OTHER					

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

Re: Project Name and Location. City of Raymore MO is named as an additional insured including completed operations on the General Liability and an additional insured on a primary and non-contributory basis on the Automobile Liability; General Liability, Auto Liability and Workers Compensation shall include a waiver of subrogation as allowed by law.

CERTIFICATE HOLDER

City of Raymore, MO
100 Municipal Circle
Raymore MO 64083-9217

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

© ACORD CORPORATION 1988

Company ID Number: XXXXXX

The foregoing constitutes the full agreement on this subject between the SSA, DHS (Department of Homeland Security), and the Employer.

The individuals whose signatures appear below represent that they are authorized to enter into this MOU on behalf of the Employer and DHS respectively.

To be accepted as a participant in E-Verify, you should only sign the Employer's Section of the signature page. If you have any questions, contact E- Verify Operations at 888-464-4218.

Employer, Your Company Name

John Doe | _____

Name (Please type or print) | Title

Electronically Signed | **01/01/2009**

Signature | Date

Verification

Department of Homeland Security –Division

USCIS Verification Division | _____

Name (Please type or print) | Title

Electronically Signed | **01/01/2009**

Signature

Sample
E-Verify
Memo of Understanding - MOU
Electronic Signature Page

PERFORMANCE BOND

Bond Number: _____

CITY OF RAYMORE, MISSOURI

City Project No.: _____

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned

_____, here in after referred to "Contractor", and _____ Corporation organized under the laws of the State of _____ and authorized to transact business in the State of _____, as Surety, are held and firmly bound unto the City of Raymore, Missouri hereinafter referred to as "Owner" in the penal sum of _____ dollars ($ _____), lawful money of the United States of America for the payment of which sum, well and truly to be made, we bind ourselves and our heirs, executors, administrators, successors, and assigns, jointly and severally by these presents.

THE CONDITION OF THE FOREGOING OBLIGATIONS IS SUCH THAT:

WHEREAS, the above bounden Contractor has, on the _____ day of _____, 20____, entered into a written contract with the aforesaid Owner for furnishing all materials, equipment, tools, superintendence, labor and other facilities and accessories, for the construction of certain improvements as designated, defined and described in the said Contract and the Conditions thereof, and in accordance with the specifications and plans therefor; a copy of said Contract being attached hereto and made a part of:

NOW THEREFORE, if the said Contractor shall and will, in all particulars, well, duly and faithfully observe, perform and abide by each and every covenant, condition and part of the said Contract, and the Conditions, Specifications, Plans, Prevailing Wage Law and other Contract Documents, thereto attached or, by reference, made a part thereof, according to the true intent and meaning in each case, and if said Contractor shall replace all defective parts, material and workmanship for a period of two years after acceptance by the Owner, INCLUDING ANY SPECIAL REQUIREMENTS WHICH MAY BE REFERRED TO IN THE SPECIAL CONDITIONS, then this Obligation shall become null and void; otherwise is will remain in full force and effect.

PROVIDED FURTHER, that if the said Contractor fails to duly pay for any labor, materials, sustenance's, provisions, provender, gasoline, lubricating oils, fuel oils, greases, coal repairs, equipment and tools consumed or used in said work, groceries and foodstuffs, and all insurance premiums, compensation liability, and otherwise, or any other supplies or materials used or consumed by such Contractor or his, their, or its subcontractors in performance of the work contracted to be done, the Surety will pay the same in any amount not exceeding the amount of this Obligation, together with inters as provided by law.

PROVIDED FURTHER, that 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 the work to be performed thereunder, or the specifications accompanying the same, shall in any wise affect its obligation on this bond and it does hereby waive notice of any change, extension of time, alteration, or addition to the terms of the contract, or to the work, or to the specifications:

PROVIDED FURTHER, that if the said Contractor fails to pay the prevailing hourly rate of wages, as shown in the attached schedule, to any workman engaged in the construction of the improvements as designated, defined and described in the said contract, specifications and conditions thereof, the Surety will pay the deficiency and any penalty provided for by law which the Contractor incurs by reason of (his/its) act or omission in any amount not exceeding the amount of this obligation together with interest as provided by law:

IN TESTIMONY WHEREOF, the said Contractor has hereunto set his hand, and the said Surety has caused these presents to be executed in its name, and its corporate seal to hereunto affixed, by its attorney-in-fact duly authorized thereunto so to do, at _____ on this the _____ day of _____, 20_____.

_____	_____
SURETY COMPANY	CONTRACTOR
BY _____ (SEAL)	BY _____ (SEAL)

BY _____ (SEAL)

(Attorney-in-fact)

BY _____ (SEAL)

(Certified to include the date of the bond.) (State Representative)
Accompany this bond with the Attorney-in-Fact's authority form the Surety Company

MAINTENANCE BOND

City Project: _____

WHEREAS, the City Council of the City of Raymore ("City") and , (hereinafter designated as "Principal") have entered into an agreement whereby Principal agrees to install and complete certain designated public improvements, which said agreement, dated , and identified as project , is hereby referred to and made a part hereof; and,

WHEREAS, said Principal is required under the terms of said contract to furnish a maintenance bond for the correction of any defects due to defective materials or workmanship in the work performed under said agreement.

NOW, THEREFORE, we the Principal and as Surety, are held and firmly bound unto the City of Raymore 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 heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if, during a maintenance period of two (2) year from the date of acceptance of the contracted work, the Principal upon receiving written notice of a need for repairs which are directly attributable to defective materials or workmanship, shall diligently take the necessary steps to correct said defects within seven (7) days from the date of said notice, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

As part of this obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by the City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

The Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of this agreement or to the work to be performed there under or the specifications accompanying the same shall in anywise 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 of the agreement or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety above named, on _____, 20____.

PRINCIPAL	SURETY
By_____	By_____
_____	_____
Name and Title	Name and Title
	_____
	Address
	_____
	City State Zip
	_____
	Phone Number

oo0oo

NOTE: No substitution or revision to this bond form will be accepted. Be sure that all bonds submitted have a certified copy of the bonding agent's power of attorney attached. Also verify that Surety is an "Admitted Surety" (i.e., qualified to do business in Missouri), and attach proof of verification (certificate of licensing within the state, etc.).

APPROVED AS TO AMOUNT:	APPROVED AS TO FORM:
_____	_____
City Manager	City Attorney

NOTARIAL ACKNOWLEDGEMENT OF ATTORNEY-IN-FACT OF SURETY

STATE OF)
) SS.
COUNTY OF)

On _____ before me, a Notary Public, personally appeared _____, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/he r/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

_____

Notary Public
(Seal)

END OF MAINTENANCE BOND

LABOR AND MATERIAL PAYMENT BOND

Bond Number: _____

CITY OF RAYMORE, MISSOURI

PROJECT: City Project: _____

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned

_____, here in after referred to "Contractor", and _____ Corporation organized under the laws of the State of _____ and authorized to transact business in the State of _____, as Surety, are held and firmly bound unto the City of Raymore, Missouri hereinafter referred to as "Owner" in the penal sum of _____dollars ($_____),
lawful money of the United States of America for the payment of which sum, well and truly to be made, we bind ourselves and our heirs, executors, administrators, successors, and assigns, jointly and severally by these presents.

THE CONDITION OF THE FOREGOING OBLIGATIONS IS SUCH THAT:

WHEREAS, the Contractor entered into a certain contract with the Owner, dated the _____ day of _____, 20____, and entered into a written contract with the aforesaid Owner for furnishing all materials, equipment, tools, superintendence, labor and other facilities and accessories, for the construction of certain improvements as designated, defined and described in the said Contract and the Conditions thereof, and in accordance with the specifications and plans therefor; a copy of said Contract being attached hereto and made a part of:

NOW, THEREFORE, if the Contractor shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the Work provided for in such contract, and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such Work, and for all labor cost incurred in such Work including that by a Subcontractor, and to any mechanic or material man lien holder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the Subcontractors, and persons, firms, and corporations having a direct contract with the Contractor or its Subcontractors.

PROVIDED, FURTHER, that 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 the Work to be performed thereunder, or the Specifications accompanying the same shall in any way affect its obligation on this Bond, and it does hereby waive notice of any change, extension of time, alteration, or addition to the terms of the contract, or to the Work, or to the Specifications.

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the Contractor, shall have given written notice to any two of the following: The Contractor, the Owner, or the Surety above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed the Contractor, Owner, or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer; (b) After the expiration of one (1) year following the date of which Contractor ceased work on said Contract, it being understood, however, that if any limitation embodied in the Bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that is expressly agreed that his Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the Contractor and the Surety to the full and faithful performance of the Contract as so amended. The term "Amendment," wherever used in this Bond and whether referring to this Bond or the Contract, shall include any alternation, addition, extension or modification of any character whatsoever.

PROVIDED, FURTHER, that if the said Contractor fails to pay the prevailing hourly rate of wages as shown in the attached schedule, to any workman engaged in the construction of the improvements as designated, defined and described in the said contract, specifications and conditions thereof, the Surety will pay the deficiency and any penalty provided for by law which the Contractor incurs by reason of (his/its) act or omission, in any amount not exceeding the amount of this obligation together with interest as provided by law.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN TESTIMONY WHEREOF, the said Contractor has hereunto set his hand, and the said Surety has caused these presents to be executed in its name, and its corporate seal to hereunto affixed, by its attorney-in-fact duly authorized thereunto so to do, at _____ on this the _____ day of _____, 20_____.

_____

_____

SURETY COMPANY

CONTRACTOR

BY _____ (SEAL)

BY _____ (SEAL)

BY _____ (SEAL)

(Attorney-in-fact)

BY _____ (SEAL)

(State Representative)

Notice of Award

To: _____
_____
_____
_____

Project Description: _____ – Project No _____

The owner considered the bid submitted by you for the above described work in response to its advertisement for bids dated _____ and information for bidders.

You are hereby notified that your bid has been accepted for items in the amount of $_____.

You are required by the Information for Bidders to furnish the required Performance and Labor and Material Payment Bonds, Affidavits, copies of insurance coverage along with obtaining an Occupational License with the City of Raymore within ten calendar days from the date of receipt of this notice to you.

If you fail to execute said agreement and to furnish said bond and affidavits within ten days from the date of receipt of this notice, said owner will be entitled to consider all your rights arising out of the owner's acceptance of your bid as abandoned and as a forfeiture of your bid bond. The owner will be entitled to such other rights as may be granted by law.

You are required to acknowledge and return a copy of this notice of award to the owner.

Dated: _____.

City of Raymore, Missouri (Owner)

By Michael E. Krass

Title Public Works Director

ACCEPTANCE OF NOTICE: receipt of the above Notice of Award is hereby acknowledged.

By _____ this the _____ day of _____, 20___.

Title _____

NOTICE TO PROCEED

To: _____ Date: _____

_____

_____

Project: _____ – Project No. _____

You are hereby notified to commence work on or before _____ in accordance with the Agreement dated_____ and are to complete the work within _____ calendar days. The date of completion of all work therefore is _____.

CITY OF RAYMORE, MISSOURI (OWNER)

By:_____

Title: Director of Public Works

ACCEPTANCE OF NOTICE

Receipt of the above Notice to Proceed is hereby

Acknowledged by_____
Signature

Title _____
Print Name

Date: _____

Please email or mail Acceptance of Notice to Proceed to the Engineering Department.

City of Raymore, Missouri

General Conditions

Table of Contents

1.00 DEFINITIONS

Wherever used in the contract documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof.

1.01 ADDENDA

Written or graphic instruments issued prior to the execution of the agreement which modify or interpret the contract documents, drawings and specifications, by additions, deletions, clarifications or corrections.

1.02 BID

The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the work to be performed.

1.03 BIDDER

Any person, firm or corporation submitting a bid for the work.

1.04 BONDS

Bid, payment and/or performance bonds and other instruments of security, furnished by the Contractor/Developer and his surety in accordance with the contract documents.

1.05 CALENDAR DAY

Every day shown on the calendar.

1.06 CHANGE ORDER

A written order to the Contractor authorizing an addition, deletion or revision in the work within the general scope of the contract documents, or authorizing an adjustment in the contract price or contract time.

1.07 CITY

Shall mean the City of Raymore, a municipal Corporation, acting by and through its duly elected governing body and its duly appointed officials.

1.08 CONTRACT DOCUMENTS

The contract, including advertisement for bids, information for bidders, bid, bid bond, agreement, performance bond, payment bond, notice of award, notice to proceed, change order, the "Standard Contract Documents and Technical

Specifications for Utility and Street Construction, City of Raymore, Missouri", drawings, specifications and addenda.

1.09 CONTRACT PRICE

The total monies payable to the Contractor under the terms and conditions of the contract documents.

1.10 CONTRACT TIME

The number of calendar days stated in the contract documents for the completion of the work.

1.11 CONTRACTOR

The person, firm or corporation with whom the Owner has executed the agreement.

1.12 DRAWINGS

The part of the contract documents which show the characteristics and scope of the work to be performed and which have been prepared or approved by the engineer.

1.13 ENGINEER

The person, firm or corporation named as such in the contract documents.

1.14 ENGINEERING PLANS

All engineering drawings including plans, profiles and details; calculations; and/or reports prepared and sealed by a registered engineer, and meeting City standards and good engineering practices.

1.15 FIELD ORDER

A written order affecting a change in the work not involving an adjustment in the contract price or an extension of the contract time, issued by the engineer to the Contractor during construction.

1.16 HOLIDAYS

The days of each year set aside by legal authority for public commemoration of special events, and on which no public business shall be transacted except as specifically provided in cases of necessity. Unless otherwise noted, the following days shall be established as holidays:

New Years Day	January 1
Martin Luther King Day	January (3rd Monday)
President's Day	February (3rd Monday)
Memorial Day	May (last Monday)
Independence Day	July 4
Labor Day	September (1st Monday)
Veteran's Day	November 11
Thanksgiving Day	November (4th Thursday)
Day after Thanksgiving Day	November (Friday after Thanksgiving Day)
Christmas Eve Day	December 24
Christmas Day	December 25

If a holiday falls on a Saturday, the preceding Friday is taken off; if a holiday falls on a Sunday, the following Monday is taken off.

1.17 CONSTRUCTION OBSERVER

An authorized representative of the City of Raymore Public Works Department who has been assigned to monitor conformance to the requirements of the City's Standard Specifications by the Contractor/Developer.

1.18 NOTICE OF AWARD

The written notice of the acceptance of the bid from the Owner to the successful bidder.

1.19 NOTICE TO PROCEED

Written communication issued by the Owner to the Contractor authorizing the Contractor to proceed with the work and establishing the date of commencement of the work.

1.20 OWNER

A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the work is to be performed.

1.21 PROJECT

The undertaking to be performed as provided in the contract documents.

1.22 RESIDENT PROJECT REPRESENTATIVE

The authorized representative of the Owner who is assigned to the project site or any part thereof.

1.23 SHOP DRAWINGS

All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, subcontractor, manufacturer, supplier or distributor, which illustrate how specific portions of the work shall be fabricated or installed.

1.24 SPECIFICATIONS

A part of the contract documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.25 SUBCONTRACTOR

An individual, firm or corporation having a direct contract with the Contractor or with any other subcontractor for the performance of a part of the work at the site.

1.26 SUBSTANTIAL COMPLETION

That date when the project or portions of the project are officially accepted by the Owner through formal action of the City Council for utilization of the project for its intended purpose.

1.27 SUPPLEMENTAL GENERAL CONDITIONS

Modifications to general conditions required by a Federal agency for participation in the project and approved by the agency in writing prior to inclusions in the contract documents.

1.28 SUPPLIERS

Any person, supplier or organization who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.

1.29 WORK

All labor necessary to produce the construction required by the contract documents and all materials and equipment incorporated or to be incorporated in the project.

1.30 WRITTEN NOTICE

Any notice to any party to the agreement relative to any part of this agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at their last given address or delivered in person to said party or an authorized representative on the

2.00 PREVAILING WAGE RATES

The Contractor shall pay for labor at rates not less that those certified pursuant to Section 290.210 through 290.340 and 290.550 through 290.580, RSMo, as amended by the Missouri Department of Labor and Industrial Relations as indicated by the schedule attached to the project Special Provisions. The Contractor shall forfeit as a penalty to the Owner, amount set by Section 290.250, RSMo, for each worker employed for each calendar day, or portion thereof, such worker is paid less than the said stipulated rates for any work done under said contract by the Contractor or any Sub-Contractor.

Whenever there is a period of excessive unemployment in this state, every person who is charged with the duty, either by law or contract, or constructing or building any public works project or improvement for the state or any political subdivision, municipal corporation…shall employ only Missouri laborers and laborers from non restrictive states on such project or improvement (section 290.550-.580 RSMo).

3.00 OWNERSHIP OF EXISTING MATERIAL

All materials existing on the site and removed during the construction are the property of the Owner. The Contractor, at his expense, shall stockpile or dispose of all materials which the Owner does not want to retain as directed by the Engineer. All materials which the Owner wants to retain shall be delivered to a location in the City as directed by the Engineer at the expense of the Contractor.

4.00 ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

4.01

The Contractor may be furnished additional instructions and detail drawings when determined necessary by the Engineer to carry out the work required by the contract documents.

4.02

The additional drawings and instruction thus supplied will become a part of the contract documents. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions.

5.00 SCHEDULES, REPORTS AND RECORDS

5.01

The Contractor shall submit to the Owner such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed.

5.02

Seven (7) days prior to the pre-construction conference the Contractor shall submit schedules showing the order in which he proposes to carry on the work; the schedule shall comply with Section 108.4 of the Missouri Standard Specifications for Highway Construction.

5.03

The Contractor shall also submit a schedule of payments that he anticipates he will earn during the course of the work.

6.00 DRAWINGS AND SPECIFICATIONS

6.01

The intent of the drawings and specifications is that the Contractor shall furnish all labor, materials, tools, equipment and transportation necessary for the proper execution of the work in accordance with the contract documents and all incidental work necessary to complete the project in an acceptable manner, ready for use, occupancy or operation by the Owner.

6.02

In the case of a conflict of meaning between any of the terms of the Contract Documents, the provisions of the document listed first below shall take precedence over those of a document listed later:

- Contract Agreement Form
- Special Provisions
- Proposal Form
- Plans
- Specifications
- General Conditions

Special provisions and detail plans are intended to modify and prevail over standard plans and specifications. Figure dimensions on drawings shall govern over scale dimensions. Items not defined within the Contract Documents will be as defined in the APWA Standard Specifications and Design Criteria, latest addition, or the Missouri Standard Specifications for Highway Construction, latest addition.

6.03

Any discrepancies found between the drawings and specifications and site conditions or any inconsistencies or ambiguities in the drawings or specifications shall be reported in writing within five (5) to the Engineer, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after the discovery of such discrepancies, inconsistencies or ambiguities shall be done at the Contractor's risk.

7.00 SHOP DRAWINGS

7.01

Prior to performance of the work, the Contractor shall prepare and submit, to the Engineer, schedules, documents and shop drawings necessary to complete the work. The Contractor shall allow sufficient time for the Engineer to review and comment on the submittals and for the Contractor to respond to the comments, prior to performance of the work involved; normally two to three weeks. The Engineer may require additional information including permits, detail drawings, and calculations as needed to complete the review. The Contractor shall furnish as many copies of the submittals as the Engineer requires for review and subsequent inspection of the work. The Contractor shall not change the submittals without the Engineer’s written consent. Upon completion of the work, reproducible copies suitable for microfilming shall be furnished to the Engineer if

requested. The price bid for the contract items includes the cost of preparing and furnishing the submittals.

The Engineer's review of the submittals does not relieve the Contractor of responsibility for:

1. Accuracy of dimensions and details.
2. Agreement and conformity with the contract.
3. Successful completion of the work.
4. Proper and safe design done by the Contractor.
5. Proper and safe construction of the work.

7.02

The approval of any shop drawings which substantially deviates from the requirement of the contract documents shall be evidenced by a change order.

7.03

When submitting for the Engineer's review, shop drawings shall bear the Contractor certification that the Contractor has reviewed, checked, and approved the shop drawings and that they are in conformance with the requirements of the contract documents.

7.04

Portions of the work requiring a shop drawing or sample submission shall not begin until the shop drawing or submission has been approved by the Engineer. Prior to the Engineer's approval of the shop drawings or other submissions, if the Contractor chooses to proceed on work contained within the shop drawings or submissions, it will be done at the Contractor's risk. The Contractor will not receive any additional compensation to bring the completed work into compliance with the approved shop drawings or submissions. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.

8.00 MATERIALS, SERVICES AND FACILITIES

8.01

It is understood that, except as otherwise specifically stated in the contract documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature

whatsoever necessary to execute, complete and deliver the work within the specified time.

8.02

Materials and equipment shall be so stored as to insure the preservation of their quality and fitness for the work. Stored materials and equipment to be incorporated in the work shall be located so as to facilitate prompt inspection.

8.03

Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

8.04

Materials, supplies and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.

8.05

Materials, supplies or equipment to be incorporated into the work shall not be purchased by the Contractor or the subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

9.00 INSPECTION AND TESTING

9.01

All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards.

9.02

The Contractor shall provide at his expense the necessary testing and inspection services required by the contract documents, unless otherwise provided.

9.03

The Owner shall provide all other inspection and testing services not required by the contract documents.

9.04

If the contract documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any work to specifically be inspected, tested, or approved by someone other than the Contractor, the Contractor will give

the Engineer a minimum 24 hour notice of readiness. The Contractor will then furnish the Engineer the required certificates of inspection, testing or approval.

9.05

Neither observations by the Engineer or Resident Project Representative nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from his obligations to perform the work in accordance with the requirements of the contract documents.

9.06

The Engineer and any representatives will at all times have access to the work. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials and other relevant data and records. The Contractor will provide proper facilities for such access and observation of the work and also for any inspection or testing, thereof.

9.07

If any work is covered contrary to the request of the Engineer, it must, if requested by the Engineer, be uncovered for his observation and replaced at the Contractor's expense.

9.08

If any work has been covered which the Engineer has not specifically requested to observ e prior to its being covered, or if the Engineer considers it necessary or advisable that covered work be inspected or tested by others, the Contractor at the Engineer's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the work in question, furnishing all necessary labor, materials, tools and equipment. If it is found that such work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection, testing and of satisfactory reconstruction. If, however, such work is not found to be defective, an extension of the Contract time will be given and the Owner will bear all the expense directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate change order shall be issued.

9.09

All sampling and testing deemed necessary by the Engineer shall be performed by the City or by a Testing Laboratory approved by the City. The costs of all such tests, showing compliance with the Specifications, shall be paid by the Contractor.

The following is a list of tests to be performed and the frequency of each test.

TYPE	TEST REQUIRED	METHOD
COMPACTION OF EARTHWORK	SHEEPS FOOT, PROOF ROLL MATERIALS TESTING IN-PLACE DENSITY/MOISTURE	Sheeps Foot "Walks Out", Tandem Axle Dump Truck, 50000 lb Both tests conducted with Construction Inspector present At Engineer's Discretion by Certified Quality Control Laboratory
BACKFILL	VISUAL INSPECTION	Jumping Jack or Vibratory Plate Compactor
STRUCTURAL BACKFILL	IN-PLACE DENSITY/MOISTURE	At Engineer's Discretion by Certified Quality Control Laboratory
SUBGRADE MODIFICATION	VISUAL INSPECTION	Visual
COMPACTION,	PROOF ROLL	Tandem Axle Dump Truck, 50000 lb
AGGREGATE BASE	SHEEPS FOOT, PROOF ROLL	Sheeps Foot "Walks Out", Tandem Axle Dump Truck, 50000 lb Both tests conducted with Construction Inspector present
STABILIZED SHOULDERS	SHEEPS FOOT, PROOF ROLL	Sheeps Foot "Walks Out", Tandem Axle Dump Truck, 50000 lb Both tests conducted with Construction Inspector present
EMBANKMENT	VISUAL INSPECTION	
GRANULAR BASE	SHEEPS FOOT, PROOF ROLL	Sheeps Foot "Walks Out", Tandem Axle Dump Truck, 50000 lb Both tests conducted with Construction Inspector present
CRUSHED STONE FOR BACKFILL	CERTIFICATE	Visual
SURFACE OR RESURFACING AGGREGATE	CERTIFICATE	NA

TYPE	TEST REQUIRED	METHOD
FLY ASH FOR STABILIZATION AND COLD RECYCLE	MOISTURE TESTS CERTIFICATE	At Engineer's Discretion
PORTLAND CEMENT CONCRETE STRUCTURES AND MISCELLANEOUS CONSTRUCTION	MASS/YIELD SLUMP AIR CONTENT COMPRESSIVE STRENGTH SHOP DRAWINGS	At Engineer's Discretion
CONCRETE PAVEMENT	SLUMP AIR CONTENT COMPRESSIVE OR FLEXURAL STRENGTH MASS/YIELD PROFILOGRAPH	Minimum of 1 set per each day Type Inspection must equal "ACI" when recording for acceptance Type Inspection must equal "ACI" when recording for acceptance 1 set of 4 on initial pour then 1 set every 50 yards. 1 set per pour and/or mix change Testing by Testing Lab, results reviewed by City See Standard Specifications As Special Provisions Specify
CONCRETE BRICK PAVERS	CERTIFICATE	NA
JOINT FILLER	CERTIFICATE	NA
BITUMINOUS CONSTRUCTION, (PLANT MIX)	CERTIFICATE	NA
BITUMINOUS MIXTURES	DENSITY, VOIDS, STABILITY, FLOW, GRADATION, ASPHALT CONTENT, VMA, VFA	At Engineer's Discretion
SLURRY SEAL	CERTIFICATE	NA
BITUMINOUS SEAL	CERTIFICATE	NA
PAINT	CERTIFICATE	NA
REINFORCING STEEL BARS AND OTHER REINFORCING MATERIAL	DELIVERY TICKET	NA

TYPE	TEST REQUIRED	METHOD
STONE FOR RIPRAP, WASH CHECKS & OTHER MISC. USES	CERTIFICATE	NA
AGGREGATE FOR CONCRETE	CERTIFICATE	NA
MASONRY STONE	CERTIFICATE	NA
UNDERDRAIN AGGREGATE	CERTIFICATE	NA
LIQUID MEMBRANE FORMING COMPOUNDS	CERTIFICATE	NA
PORTLAND CEMENT, BLENDED HYDRAULIC CEMENT, FLY ASH FOR USE IN CONCRETE	KC METRO MATERIALS BOARD, (KCMMB)	KCMMB Requirements
INDIVIDUAL AGGREGATE	KC METRO MATERIALS BOARD, (KCMMB)	KCMMB Requirements
DRAINABLE BASE	SIEVE ANALYSIS OF AGGREGATE, (1% OF MASS)	
EPOXY	CERTIFICATE	NA
PRE-FORMED THERMO-PLASTIC	CERTIFICATE	NA
THERMOPLASTIC	CERTIFICATE	NA
THERMOPLASTIC SPRAY	CERTIFICATE	NA
GLASS BEADS	CERTIFICATE	NA
FLOWABLE FILL	CERTIFICATE	NA
HDPE OR RC PIPE, ALL USES	CERTIFICATE	NA
GUARD RAIL	CERTIFICATE	NA
FERTILIZER, HERBICIDES	CERTIFICATE	NA
BIOLOGICAL PLANTINGS	CERTIFICATE	NA
SEED, TURF GRASSES	CERTIFICATE	NA
SIGN BLANKS AND FACING	CERTIFICATE	NA
ROLLED EROSION CONTROL PRODUCTS	CERTIFICATE	NA
PARK BENCHES, PED. BRIDGES., PLAYGROUND EQUIP., OTHER PARK EQUIP.	CERTIFICATE	NA
GABIONS, BIOGABIONS	CERTIFICATE	NA
FENCING MATERIAL	CERTIFICATE	NA
IRRIGATION MATERIALS	CERTIFICATE	NA
AGGREGATES	CERTIFICATE	NA
CRACK FILLING MATERIAL	CERTIFICATE	NA
CRACK REPAIR MEMBRANE	CERTIFICATE	NA
HANDICAP RAMP MARKING PANELS	CERTIFICATE	NA
PRECAST CONCRETE BOX CULVERTS	CERTIFICATE	NA

TYPE	TEST REQUIRED	METHOD
SANITARY SEWER LINES & SERVICE LINES	CERTIFICATE	NA
LANDSCAPING PRODUCTS (INCL. BONDED FIBER MATRIX, HYDRO-SEEDING PRODUCTS, MULCHES, ETC.	CERTIFICATE	NA
MISCELLANEOUS PRODUCTS (INCL. GEOCELLULAR CONFINEMENT PRODUCTS, MODULAR WALL PRODUCTS, MONUMENT BOXES, PROJECT SIGNS, ETC. CERTIFICATE	(CERT. Hereafter)	NA
SOIL SAMPLE FOR SOIL AMENDMENTS	NITROGEN, POTASSIUM, PHOSPHORUS CONTENT—ASTM	PERTINENT ASTM/AASHTO TEST
OTHER MATERIALS NOT LISTED ABOVE	CERT., OR AS SPECIFIED BY ENGR.	NA

10.00 SUBSTITUTIONS

10.01

Whenever a material, article or piece of equipment is identified on the drawings or specifications by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function will be considered by the Engineer, if submitted by the Contractor. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the contract documents by reference to brand name or catalog number and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may approve its substitution and use by the Contractor. The Contractor shall allow sufficient time for the Engineer to review and comment on the substitution and for the Contractor to respond to the comments, prior to the performance of the work; normally two to three weeks. Any cost differential shall be deducted from the contract price and the contract documents shall be appropriately modified by change order. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the project will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the contract price or contract time.

11.00 PATENTS

11.01

The Contractor shall pay all applicable royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for any such loss when a particular process, design, or the project of a particular manufacturer or manufacturers is specified. However, if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, the Contractor shall be responsible for such loss unless he promptly gives such information to the Engineer.

12.00 SURVEYS, PERMITS, REGULATIONS

12.01

The Contractor shall set construction stakes establishing lines, slopes, elevations and grades for utility and street construction as the Engineer deems necessary for proper control of the work as shown in the contract documents. The Contractor

shall develop and establish other necessary control, detail dimensions, slope stakes and measurements required for proper layout and performance of the work. The Contractor shall assume full responsibility for all measurements made from the stakes and marks so established.

12.02

The Contractor shall carefully preserve benchmarks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

12.03

Permits and licenses of a temporary nature necessary for the prosecution of the work shall be secured and paid for by the Contractor. Within ten (10) days of receipt of the Notice of Award, the Contractor shall obtain a City of Raymore "Occupational License" the License is available from the City Clerk. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the contract documents are at variance therewith, the Contractor shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in Section 15, Changes in the Work.

13.00 PROTECTION OF WORK, PROPERTY AND PERSONS

13.01

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work as deemed necessary by the Engineer in accordance with the contract documents and Manual on Uniform Traffic Control Devices latest revision. The Contractor shall take all necessary precautions for the safety of, and will provide the necessary protection as deemed necessary by the Engineer to prevent damage, injury or loss to the traveling public, employees on the job and other persons who may be affected thereby, all the work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto. The Contractor shall be responsible for the protections of adjoining property which may include, but not be limited to mailboxes, landscaping ornaments, trees, shrubs, lawns, walks, pavements, roadways, structures and utilities, etc., not designated for removal, relocation or replacement in the course of construction. The Contractor is responsible to field verify which items within their work zone are to be removed, relocated and replaced with the Engineer

before commencing work within the area. Unless a specified bid item is provided, this work shall be considered incidental to the project.

13.02

The locations of existing utilities indicated on the drawings are based solely on available records and no responsibility is assumed by the Owner or the Engineer for the accuracy of those utilities indicated on the plans. The Contractor will assume all responsibility to the utility companies for expense incurred by them to protect or maintain their operation, including temporary relocations, during the time work is in progress.

13.03

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body jurisdiction. The Contractor will erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. The Contractor will notify Owners of adjacent utilities when prosecution of the work may affect them. The Contractor will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the contract documents or to the acts or omissions of the Owner or the Engineer or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contractor.

13.04

In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. The Contractor will promptly give the Engineer written notice of any significant changes in the work or deviations from the contract documents caused thereby, and a change order shall thereupon be issued covering the changes and deviations involved.

14.00 SUPERVISION BY CONTRACTOR

14.01

The Contractor shall supervise and direct the work. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor will employ and maintain on the work a qualified supervisor or superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site prior to commencing any work. The supervisor shall have full authority to act on behalf of the Contractor and all communications given to the supervisor shall be as binding as if given to the Contractor. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the work. At the time when the supervisor is not present on the site, the Contractor shall have a representative on the site who can act on behalf of the Contractor and to receive communications from the Engineer and Owner. No additional compensation or time will be given to the Contractor for delays or redoing of work that may be necessary that are caused by untimely communications between the Contractor and his representative.

15.00 CHANGES IN THE WORK

15.01

The Engineer, may at any time, by issuing a field order, make changes in the details of the work. The Contractor shall proceed with the performance of any changes in the work so ordered by the Engineer unless the Contractor believes that such field order entitles him to a change in contract price or time, or both, in which event he shall give the Engineer written notice thereof within fifteen (15) days after the receipt of the ordered change, and the Contractor shall not execute such changes pending the receipt of an executed change order or further instruction from the Owner. Failure by the Contractor to provide written notice of an intended change order within fifteen (15) days after the work is performed will result in denial of the change order request by the Owner for the work performed and submitted at a later date.

16.00 CHANGES IN CONTRACT PRICE

16.01

The contract price may be changed only by a change order. The value of any work covered by a change order or of any claim for increase or decrease in the contract price shall be determined by one or more of the following methods in the order of precedence listed below:

Unit prices previously approved.

An agreed unit price for each extra work item performed.

An agreed lump sum.

Force Account in accordance with Mo/DOT 109.5

17.00 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

17.01

The date of beginning and the time for completion of the work are essential conditions of the contract documents and the work embraced shall be commenced on a date specified in the notice to proceed.

17.02

The Contractor will proceed with the work at such rate of progress to insure full completion within the contract time. It is expressly understood and agreed by and between the Contractor and the Owner that the contract time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the work.

17.03

If the Contractor, or in the case of default the surety, shall fail to complete the work within the contract time, or extension of time granted by the Owner, then the Contractor will pay to the Owner the amount for liquidated damages as specified in the schedule below for each calendar day that the Contractor shall be in default after the time stipulated in the contract documents. The amount specified in the schedule is agreed upon, not as a penalty, but as liquidated damages for the loss to the City of Raymore and the public. This amount will be deducted from any money due the contractor. The Contractor and surety shall be liable for all liquidated damages.

SCHEDULE OF LIQUIDATED DAMAGES		
Original Contract Amount		Charge Per Calendar Day ($)
From More Than ($)	To and Including ($)	
0	50,000	150
50,001	100,000	250
100,001	500,000	500
500,001	1,000,000	1,000
1,000,001	2,000,000	1,500
2,000,001	5,000,000	2,000
5,000,001	10,000,000	2,500
10,000,001	And Above	3,000

17.04

The Contractor shall not be charged with liquidated damages or any excess cost if the Contractor has promptly given written notice of such delay to the Owner or Engineer and the delay in completion of the work is due to one of the following:

1. To any preference, priority or allocation order duly issued by the Owner.

2. To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God or of the public enemy, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and abnormal and unforeseeable weather; and

3. To any delays of subcontractors occasioned by any of the causes specified in paragraph 17.04A and 17.04B of this article.

18.00 CORRECTION OF WORK

18.01

The Contractor shall promptly correct all work rejected by the Engineer for failure to comply with the contract documents, whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the work in accordance with the contract documents and without expense to the Owner and shall bear the expense of making good all work of other Contractors destroyed or damaged by such removal or replacement.

18.02

The Contractor shall promptly remove from the work area all materials rejected by the Engineer for failure to comply with the contract documents, whether incorporated in the construction or not. The Contractor shall keep the materials rejected by the Engineer segregated from the acceptable materials until properly disposed of. The Contractor shall bear all expense in the removal and replacement of the rejected materials.

18.03

All removal and replacement of work and materials rejected by the Engineer shall be done at the Contractor's expense. If the contractor does not take action to remove such rejected work and/or material within ten (10) days after receipt of written notice, the Owner may cause to have such work and/or materials removed and replaced at the expense of the Contractor.

19.00 SUBSURFACE CONDITIONS

19.01

The Contractor shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the Owner by written notice of:

1. Subsurface or latent physical conditions at the site differing materially from those indicated in the contract documents; or

2. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered as provided for under the contract documents for type of work being performed.

19.02

The Owner shall promptly investigate the conditions, and if the Owner finds that such conditions materially differ and cause an increase or decrease in the cost of or in the time required for performance of the work, an equitable adjustment shall be made and the contract documents shall be modified by a change order. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he has given the required written notice, provided that the Owner may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

20.00 SUSPENSION OF WORK, TERMINATION AND DELAY

20.01

The Owner may, at any time and without cause, suspend the work or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the Contractor, by written notice to the Contractor and the Engineer which notice shall fix the date on which work shall be resumed. The Contractor will resume that work on the date so fixed. The Contractor will be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to any suspension.

20.02

If the Contractor is adjudged as bankrupt or insolvent, or if he makes a general assignment for the benefit of any creditors, or if a trustee or receiver is appointed for the Contractor or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to subcontractors for labor, materials or equipment or if he disregards laws, ordinances, rules regulations or orders of any public body having jurisdiction of the work or if he disregards the authority of the Engineer, or if he otherwise violates any provision of the contract documents, then the Owner may, without prejudice to any other right or remedy and after giving the Contractor and his surety a minimum of ten (10) days from delivery of a written notice, terminate the services of the Contractor and take possession of the project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, and finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price exceeds the direct and indirect costs of completing the project, including compensation for additional professional services, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor will pay the difference to

the Owner. Such costs incurred by the Owner will be determined by the Engineer and incorporated in a change order.

20.03

Where the Contractor's services have been so terminated by the Owner, said termination shall not affect any right of the Owner against the Contractor that existed or which may thereafter accrue. Any retention or payment of monies by the Owner due the Contractor will not release the Contractor from compliance with the contract documents.

20.04

After ten (10) days from delivery of a written notice to the Contractor and the Engineer, the Owner may, without cause and without prejudice to any other right or remedy, elect to abandon the project and terminate the contract. In such case, the Contractor shall be paid for all work executed and any expense sustained plus reasonable profit.

20.05

If, through no act or fault of the Contractor, the work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days after it is submitted, or the Owner fails to pay the Contractor substantially the sum approved by the Engineer or awarded by arbitrators within sixty (60) days after it is submitted, or the Owner fails to pay the Contractor substantially the sum approved by the Engineer or awarded by arbitrators within sixty (60) days of its approval and presentation, the Contractor may, after ten (10) days from delivery of written notice to the Owner and the Engineer, terminate the contract and recover from the Owner payment for all work executed and all expenses sustained. In addition and in lieu of terminating the contract, if the Engineer has failed to act on a request for payment or if the Owner has failed to make any payment as aforesaid, the Contractor may upon ten (10) days notice to the Owner and the Engineer stop the work until he has been paid all amounts then due. In which event and upon resumption of the work, change orders shall be issued for adjusting the contract price or extending the contract time or both to compensate for the costs and delays attributable to the stoppage of the work.

20.06

If the performance of all or any portion of the work is suspended, delayed or interrupted as a result of a failure of the Owner or Engineer to act within the time specified in the contract documents, or if no time is specified, within a reasonable time, an adjustment in the contract price or an extension of the contract time, or

both, shall be made by change order to compensate the Contractor for the costs and delays necessarily caused by the failure of the Owner or Engineer.

21.00 PAYMENTS TO CONTRACTOR

21.01

At least ten (10) days before each progress payment falls due (but not more often than once a month), the Contractor will submit to the Engineer a partial payment estimate filled out and signed by the Contractor covering the work performed during the period covered by the partial payment estimate and supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the work but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the Owner, as will establish the interest therein, including applicable insurance. The Engineer will, within thirty (30) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the Owner, or return the partial payment estimate to the Contractor indicating in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate. The Owner will, within thirty (30) days of presentation to him of an approved partial payment estimate, pay the Contractor a progress payment on the basis of the approved partial payment estimate. The Owner shall retain five percent (5%) of the amount of each payment until final completion and acceptance of all the work covered by the contract documents. On completion and acceptance of a part of the work on which the price is stated separately in the contract documents, payment may be made in full, including retained percentages, less authorized deductions.

21.02

All work covered by partial payment made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor of the sole responsibility for the care, protection and performance of the work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all terms of the contract documents.

21.03

Upon completion and acceptance of the work, the Engineer shall issue a certificate attached to the final payment request that the work has been accepted by him under the conditions of the contract documents. The entire balance found to be due the Contractor, including the retained percentages, but except such sums

as may be lawfully retained by the Owner, shall be paid to the Contractor within sixty (60) days of completion and acceptance of the work.

21.04

The Contractor will indemnify and save the Owner or the Owner's agents harmless from all claims growing out of the lawful demands of subcontractors, laborers, workers, mechanics, and furnishers of machinery and parts thereof, equipment, tools, and all suppliers, incurred in the furtherance of the performance of the work. The Contractor shall, at the Owner's request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged or waived. If the Contractor fails to do so the Owner may, after having notified the Contractor, either pay unpaid bills or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of the contract documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor, his Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the Owner shall be considered as a payment made under the contract documents by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

21.05 Final Payment

The Owner will make final payment to the Contractor after:

- Ground is adequately restored. This includes establishment of proper ground cover – as defined in Section 805.4 of the Missouri Standard Specifications for Highway Construction – 2011 Edition,
- Final acceptance of the project by the Raymore City Council, and
- The Contractor has submitted these items.
    - Affidavit for obtaining settlement of Contract with the State of Missouri and any political or government subdivision thereof.
    - Letter of Consent from surety.
    - Appropriate Lien Waiver (s).
    - Two-year maintenance bond.
    - All prevailing wage reports.

22.00 ACCEPTANCE OF FINAL PAYMENT AS RELEASE

22.01 Acceptance

The acceptance by the Contractor of final payment shall be and shall operate as a release to the Owner of all claims and all liability to the Contractor other than claims in stated amounts as may be specifically excepted by the Contractor for all things done or furnished in connection with this work and for every act and neglect of the Owner and others relating to or arising out of this work. Any payment, however, final or otherwise, shall not release the Contractor or the Contractor's Sureties from any obligations under the contract documents or the performance bond.

23.00 INSURANCE

23.01 Insurance

The Bidder/Contractor shall procure, maintain, and provide proof of, insurance coverage's for injuries to persons and/or property damage as may arise from or in conjunction with, the work performed on behalf of the City of Raymore by the Bidder/Contractor, its agents, representatives, employees or subcontractors. The City of Raymore shall be named as an additional insured under such insurance contracts (except for Worker's Compensation coverage). A Certificate of Insurance will be required of the apparent low bidder and submitted with the signed contract prior to Council consideration (1st reading) and shall be maintained by the Bidder/Contractor for the duration of the contract period. Claims made on policies must be enforce or that coverage purchased for three (3) years after contract completion date.

1. General Liability
   Coverage shall be as broad as: Comprehensive General Liability endorsed to include Broad Form, Commercial General Liability forms including Product/Completed Operations.
   Minimum Limits
   General Liability:
   $1,000,000 Each Occurrence Limit
   $ 100,000 Damage to Rented Premises
   $ 5,000 Medical Expense Limit
   $1,000,000 Personal and Advertising Injury
   $2,000,000 General Aggregate Limit
   $1,000,000 Products & Completed Operations
   $ 50,000 Fire Damage Limit

2. Excess/Umbrella Liability
   $5,000,000 Each Occurrence

$5,000,000 Aggregate

3. Automobile Liability
   Coverage sufficient to cover all vehicles owned, used, or hired by the Bidder/Contractor, its agents, representatives, employees or subcontractors.
   Minimum Limits
   Automobile Liability:
   $1,000,000 Combined Single Limit
   $1,000,000 Each Occurrence Limit
   $5,000 Medical Expense Limit

4. Workers' Compensation
   Limit as required by the Workers' Compensation Act of Missouri, Employers Liability, $1,000,000 from a single carrier.

5. In addition to the insurance provided above, Contractor shall at all times during the course of this building project secure and provide to the City of Raymore proof of a Builder's Risk Policy for this project and in place.

6. Hold Harmless Clause
   The Contractor shall, during the term of the contract including any warranty period, indemnify, defend, and hold harmless the City of Raymore, its officials, employees, agents, residents and representatives thereof from all suits, actions, or claims of any kind, including attorney's fees, brought on account of any personal injuries, damages, or violations of rights, sustained by any person or property in consequence of any neglect in safeguarding contract work or on account of any act or omission by the Contractor or his employees, or from any claims or amounts arising from violation of any law, bylaw, ordinance, regulation or decree. The vendor agrees that this clause shall include claims involving infringement of patent or copyright.

23.02

Certificates of insurance acceptable to the Owner shall be filed with Owner prior to first reading by the Raymore City Council. These certificates shall name the City of Raymore as an additional insured and shall contain a provision that coverages afforded under the policies will not be canceled unless at least fifteen (15) days prior written notice has been given to the Owner.

24.00 CONTRACT SECURITY

24.01 PERFORMANCE BOND

The Contractor shall within ten (10) days after the receipt of the notice of award furnish the Owner with a Performance Bond in penal sum equal to the amount of the contract price, conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the contract documents. Such bond shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the State in which the work is to be performed. The expense of this bond shall be borne by the Contractor. If any time a surety on any such bond is declared a bankrupt or loses its right to do business in the state in which the work is to be performed, the Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

24.02 LABOR AND MATERIAL PAYMENT BOND

The Contractor shall within ten (10) days after the receipt of the notice of award furnish the Owner with a Labor and Material Payment Bond in penal sum equal to the amount of the contract price, conditioned upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the work provided by the contract documents. Such bond shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the state in which the work is to be performed. The expense of this bond shall be borne by the Contractor. If any time a surety on any such bond is declared a bankrupt or loses its right to do business in the state in which the work is to be performed, the Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

24.03 MAINTENANCE BOND

Prior to acceptance of the project by the Raymore City Council, the Contractor shall furnish the Owner with a Maintenance Bond in penal sum equal to an amount of one half (50%) of the contract price and that shall remain in full force and effect for a period of two (2) years from the date of project acceptance by the Raymore City Council. The Maintenance Bond shall guarantee all materials and equipment furnished and work performed shall be free of defects due to faulty

materials or workmanship and that the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to the parts of the system resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so with all costs, including administration fees, going against the Maintenance Bond. Such bond shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the state in which the work is to be performed. The expense of this bond shall be borne by the Contractor. If any time a surety on any such bond is declared a bankrupt or loses its right to do business in the state in which the work is to be performed, the Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

25.00 ASSIGNMENTS

25.01

Neither the Contractor nor the Owner shall sell, transfer, assign or otherwise dispose of the contract or any portion thereof, or of his rights, title or interest therein, or their obligations thereunder, without written consent of the other party.

26.00 INDEMNIFICATION

26.01

The Contractor will indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the work, provided that any such claims, damage, loss and expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom, and is caused in whole or in part by any negligent or willful act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable.

26.02

In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employee of the Contractor, any subcontractor, anyone

directly, or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under any Worker's Compensation acts, disability benefit act or other employee benefits acts.

26.03

The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, the Engineer's agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications.

27.00 SEPARATE CONTRACTS

27.01

The Owner reserves the right to let other contracts in connection with this project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs. If the proper execution or results of any part of the Contractor's work depends upon the work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results.

27.02

The Contractor shall be responsible for this coordination of his construction schedule and work areas with other contractors (public or private) in the area of the construction. This coordination of construction with other contracts shall be done in accordance with Section 105 of Mo/DOT Standard Specifications. The coordination of construction on this contract and other contracts shall be done such that all project completion dates are met on all contracts.

27.03

The Owner may perform additional work related to the project by himself, or he may let other contracts containing provisions similar to these. The Contractor will afford the other Contractors who are parties to such contracts (or the Owner, if he is performing the additional work himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of work, and shall properly connect and coordinate his work with theirs.

28.00 SUBCONTRACTING

28.01

The Contractor may utilize the services of specialty subcontractors on those parts of the work which, under normal contracting practices, are performed by specialty subcontractors. Within 10 days of receipt of the Notice of Award, the Contractor shall provide a list of Sub-Contractors and a schedule of values of work to be performed for approval by the Owner.

28.02

The Contractor shall not award work to subcontractor(s), in excess of fifty percent (50%) of the contract price, without prior written approval of the Owner.

28.03

The Contractor shall be fully responsible to the Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

28.04

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the contract documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the contract documents.

28.05

Nothing contained in this contract shall create any contractual relation between any subcontractor and the Owner.

28.06

The Contractor shall be responsible for all communications necessary between the Owner and the Contractor's subcontractors. The Owner will only determine those claims submitted by the Contractors on behalf of their subcontractors.

29.00 ENGINEER'S AUTHORITY

29.01

The Engineer shall act as the Owner's representative during the construction period. He shall decide questions which may arise as to quality and acceptability of materials furnished and work performed. He shall interpret the intent of the contract documents in a fair and unbiased manner and in the best interests of the City. The Engineer will make visits to the site and determine if the work is proceeding in accordance with the contract documents.

29.02

The Contractor will be held strictly to the intent of the contract documents in regard to the quality of materials, workmanship and execution of the work. Inspections may be made at the factory or fabrication plant of the source of material supply.

29.03

The Engineer will not be responsible for the construction means, controls, techniques, sequences, procedures or construction safety.

29.04

The Engineer shall promptly make decisions relative to interpretation of the contract documents.

30.00 COMPENSATION FOR INCREASED OR DECREASED QUANTITIES

30.01

The Owner reserves the right to reduce or delete any bid items during contract negotiations with the successful bidder and/or after award of the contract. No adjustment will be made to the unit prices bid on the contract for any items because of reduction or deletion.

31.00 LAND AND RIGHT-OF-WAY

31.01

Prior to issuance of Notice to Proceed, the Owner shall endeavor to obtain all land and rights-of-way necessary for carrying out and for the completion of the work

to be performed pursuant to the contract documents, unless otherwise mutually agreed.

31.02

The Owner shall provide to the Contractor information which delineates and describes the lands owned and rights-of-way acquired.

31.03

The Contractor shall provide at his own expense and without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials. The Contractor, at his expense shall restore these said temporary construction facilities to the satisfaction of the property Owner. The Contractor shall provide written documentation for the use of said property.

32.00 GUARANTY

32.01

The Contractor shall guarantee all materials and equipment furnished and work performed for a period of two (2) years from the date of project acceptance by the Raymore City Council. The Contractor warrants and guarantees for a period of two (2) years that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to the parts of the system resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Maintenance Bond shall remain in full force and effect through the guarantee period.

Substantial completion referred to above is deemed by the Owner to be when the project is finally accepted by the Raymore City Council; however, in the case of a project which includes both utility and street improvements, the City will consider acceptance of the utility portion of the project upon written request by the Contractor and recommendation of the Engineer after the utility portion has been substantially completed and is capable of being put into service by the City of Raymore.

33.00 ARBITRATION

33.01

All claims, disputes and other matters in question arising out of, or relating to, the contract documents or the breach thereof, except for claims which have been waived by the making and acceptance of final payment as provided by Section 22, may be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association provided that the Owner and the Contractor mutually agree by separate instrument to arbitrate such claims, disputes and matters in question. This agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof.

33.02

Notice of the demand for arbitration shall be filed in writing with the other party to the contract documents and with the American Arbitration Association, and a copy shall be filed with the Engineer. Demand for arbitration shall in no event be made after institution of legal proceedings based on any claim, dispute or other matter in question which would be barred by the applicable statute of limitations nor prior to the complete execution of a separate instrument of agreement to arbitrate.

33.03

The Contractor will carry on the work and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

34.00 TAXES

34.01

The Owner is exempt from Missouri State Sales and Use Tax on materials and equipment to be incorporated into the work. Said taxes shall not be included in the Contract Price. The Exemption Certificate and tax exemption letter will be provided by the Owner.

35.00 AIR, WATER AND LAND POLLUTION

35.01 GENERAL

Pollution of natural resources of air, water and land by operation under this contract shall be prevented, controlled and abated in accordance with the rules, regulations and standards adopted and established by Missouri Department of Natural Resources and the City of Raymore.

The Contractor shall furnish material, labor and equipment for the temporary control measures as identified on the plans or ordered by the Engineer or City and shall provide for the acceptable maintenance therefore during the life of the contract to effectively prevent water pollution through the use of berms, rock checks, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains and other erosion control devices or methods. Construction and installation methods shall be per the latest edition of APWA.

The temporary pollution control provisions contained herein shall be coordinated with the permanent erosion control features specified elsewhere in the contract to the extent practical to assure economical, efficient and continuous erosion control throughout the construction and post construction period.

Prior to commencement of any clearing and grubbing, contractor shall:

- Submit a copy of the approved Land Disturbance Permit (LDP) issued by the Missouri Department of Natural Resources.
- Install all perimeter erosion control measures as identified on the approved erosion control plans.
- Install any additional improvements identified on the plans as being installed prior to clearing.

After submitting the state issued LDP and installing the perimeter erosion control measures, the Contactor must apply for a City issued Land Disturbance Permit. At that time, the City will:

- Review the site to verify adequate erosion control measures have been installed.
- If additional measures are deemed necessary, the permit will not be issued until the added measures are installed and verified.

No clearing and grubbing shall be started until the City issued Land Disturbance Permit is issued by the City.

35.02 MATERIALS FOR TEMPORARY CONTROL

1. Mulches may be hay, straw, fiber mats, netting, wood cellulose, corn or tobacco stalks, bark, corn cobs, wood chips or other suitable materials acceptable to the Engineer and shall be reasonably free of noxious weeds and other harmful matter.

2. Slope drains may be constructed of pipe, fiber mats, rubble, Portland cement concrete, bituminous concrete plastic sheets or other suitable material acceptable to the Engineer.

3. Grass shall be quick growing species (such as rye or cereal grasses) suitable to the area, which will provide a temporary cover which will not later compete with the grasses sown for permanent cover.

4. Fertilizers and soil conditions shall be a standard commercial grade acceptable to the Engineer.

5. Other materials as approved for use by the Engineer.

The Engineer shall have the authority to limit the surface area of erodible material exposed by clearing and grubbing, excavation, borrow and fill operations and to direct the Contractor to provide immediate, permanent or temporary control measures to prevent contamination of adjacent streams or other water courses, lakes, ponds and areas of water impoundment. Such slopes shall be seeded and mulched as the excavation proceeds to the extent considered desirable and practical.

The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practical time as outlined in his acceptable schedule. Temporary pollution control measures will be used to correct conditions that develop during the construction that were not foreseen during the design, that are needed prior to the installation of permanent control features, or that are needed temporarily to control erosion that develops during the normal construction practices but are not associated with permanent control features of the project.

The Engineer will limit the area of excavation, borrow and embankment operations in progress, commensurate with the Contractor's capability and progress of keeping the finish grading, mulching, seeding and other permanent erosion control measures current in accordance with the accepted schedules. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.

In the event of conflict between these requirements and any pollution control laws, rules or regulations of any other Federal and State or local agencies, the more restrictive requirements shall apply.

All temporary and permanent erosion and pollution control measures necessitated by the Contractor's operations outside the right of way and all temporary erosion and pollution control measures necessitated by the Contractor's negligence, carelessness or failure to properly coordinate the installation of permanent controls as part of the work scheduled within the right-of-way shall be performed as ordered by the Engineer at the Contractor's own expenses.

In the case of failure on the part of the Contractor to control erosion, pollution and siltation as ordered, the Owner reserves the right to employ outside assistance or to use its own forces to provide the necessary corrective measures. All expenses so incurred by the Owner, including its engineering costs, that are chargeable to the Contractor as his obligation and expense will be deducted from any monies due or coming to the Contractor.

Sedimentation fence, hay bales and flotation sedimentation curtain erosion control measures shall be paid as follows: sixty percent (60%) upon installation, twenty percent (20%) when project is completed, and the remaining twenty percent (20%) upon removal.

36.00 WORKING HOURS

36.01 NORMAL PERIOD FOR WORKING HOURS

The normal working hours within the City of Raymore are as follows:

Weekdays	7:00 a.m. to 7:00 p.m.
Saturdays	7:00 a.m. to 7:00 p.m. (with 48 hour notice)

Work may only be performed during the above-mentioned timeframes unless the Owner authorizes an extension.

36.02 REQUEST FOR WORKING HOURS EXTENSION

The Contractor may make a written request for an extension to the working hours in Section 36.01. The request should contain the reasons and justification for the time extension that the Contractor feels is necessary. Upon reviewing the request, the Owner will either grant or deny the time extension request. The Contractor will not be entitled to additional compensation whether the request is granted or denied.

The Owner may waive the requirement for a written request in case of extenuating circumstances.

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City of Raymore, Missouri

Sanitary Sewer Specifications

Table of Contents

1.00 GENERAL DESIGN STANDARDS

1.01 General

The design standards present in this Article are the minimum standards to be followed in the design of the City of Raymore's Public sewerage system. These standards are not intended to be used as a substitute for actual construction specifications and design computations.

1.02 Design Factors

1. Sewerage systems which provide for a complete watershed shall be designed and sized taking either of the following into consideration:

    a. The estimated tributary population for a period of 50 years hence

    b. The entire watershed shall be assumed to be completely built-up according to present or predicted land use intensities, whichever required the greater capacity.

2. Sewerage systems which provide for only a part of a complete watershed shall be sized to provide for the entire watershed. Otherwise, provision shall be made for future increased capacity. Proper modification to allow for the characteristics (i.e., domestic, commercial and industrial wastes and groundwater infiltration) of the area under consideration shall be made.

3. Trunk and subtrunk sewerage shall be designed on a basis of population density of not less than ten persons per acre. Design provisions in excess of this minimum shall be made where the City Engineer deems it necessary.

1.03 Capacities

1. In determining the required capacities of sanitary sewers, the following factors shall be considered:

    a. Maximum hourly quantity of domestic sewage;

    b. Additional maximum sewage or waste from industrial plants and commercial areas;

    c. Groundwater infiltration;

    d. New sewerage systems shall be designed on the basis of an average per capita flow of sewage from the equivalent population served of not less than 100 gallons per day.

2. The 100 gallons per capita per day figure is assumed to cover normal infiltration, but an additional allowance shall be made where conditions are especially unfavorable. This figure is likewise considered sufficient to cover the flow from basement floor drains, but is not sufficient to provide an allowance for flow from foundation drains, roof leaders or unpolluted cooling water, which are hereby prohibited from discharging into sanitary sewerage systems.

3. Unless evidence is presented to prove a different flow from industry at ultimate development, the minimum allowance for industrial flow shall be determined by providing an equivalent population of 40 persons per acre or one equivalent population per employee, whichever is the greater, in the industrial area. Area shall include the entire area zoned for industry, except public road, street and highway rights-of-way; floodplains in which construction is prohibited; and green zones separating industrial from residential areas on which construction is prohibited.

4. The minimum allowance for flow from commercial areas shall be determined by providing an equivalent population of 30 persons per acre, or one-half equivalent population per employee, whichever is the greater, in the commercial area. Area shall include the entire area zoned for commercial development, including off-street parking areas and landscaped areas, but excluding the rights-of-way of public records, streets and highways; floodplains of streams on which construction is prohibited; and green zones 100 feet or more wide separating commercial from residential areas on which construction is prohibited.

5. In cases where the above criteria are not applicable, an alternate design procedure may be submitted to the City Engineer for approval. A description of the procedure used and justification for the modifications for sewer design proposed shall be included with the design analysis and plans submitted for approval.

1.03 Minimum Size of Sewer Pipe

No public sewer shall be less than eight inches in diameter. Service lines for Industrial and Commercial development shall not be less than six inches in diameter and Residential development shall not be less than four inches in diameter.

1.04 Hydraulic Design

1. Sewers shall have a uniform slope and horizontal alignment between manholes.

2. When a smaller sewer joins a large one, the invert of the larger sewer should be lowered sufficiently to maintain the same energy gradient.

   An approximate method for securing these results in to place the 0.8 depth point of both sewers at the same elevation.

3. Sewers shall be designed to be free flowing with the hydraulic grade below the top of pipe and with hydraulic slopes sufficient to provide an average velocity when running full of not less than 2.25 feet per second. Computations of velocity of flow shall be based on the following Manning formula.

V	Velocity (FPS)
Q	Pipe flow capacity (CFS)
A	Inside area of pipe (FT^2)
R	Hydraulic Radius (FT)
S	Pipe slope (FT/FT)
n	Pipe roughness coefficient
Values for n shall be as follows:	
RCP – 0.013	
PVC – 0.010	
DIP – 0.014	

4. The maximum permissible velocity at average flow shall be 15 feet per second (FPS). Drop manholes shall be provided as shown on Standard Details San - 5 to break the steep slopes to limit the velocities to 15 FPS in the connecting sewer pipes between manholes. Where drop manholes are impracticable for reduction of velocity, the sewer shall be of ductile iron or concrete.

5. The following are minimum slopes in feet per hundred feet to be provided for pipes flowing from one-fourth of full depth to full depth:

Sewer Size (Inches)	Slope (feet Per 100 FT)
8	0.60
10	0.42
12	0.33
15	0.24
18	0.19
21	0.16
24	0.13
30	0.13
36	0.13
42	0.13

The terminal sections of sewers discharging into lift stations, sewerage treatment plants, plant effluent into streams, etc., will require a minimum slope twice that indicated in the above table. The terminal section of sewer is defined as the section of sewer from the last manhole and will be a minimum of 100 feet.

1.05 Manholes

Manholes for access to sewers shall be provided to all intersections with other sewers, at all points of change in horizontal alignment, at all changes in vertical grade and at the terminal of the line. In addition, access manholes shall be provided at intervals not exceeding 400 feet on all sewers. Manholes shall be located in the street right-of-way not under the paved area unless approved by the City Engineer.

Manholes shall be designed and constructed to conform to ASTM C478 as shown on Standard Details San-1, San-2 and San-3.

Manholes for sewers up to 24 inches in diameter shall not be less than four feet inside diameter. Manholes for sewers larger than 24 inches shall have an inside diameter of not less than five feet.

A wall thickness not less than one-twelfth (1/12) of the inside diameter or four (4) inches, whichever is greater, shall be used when the manhole depth is less than sixteen (16) feet; one-twelfth (1/12) of the inside diameter plus one (1) inch or five (5) inches, whichever is greater, shall be used when the manhole depth is sixteen (16) feet or greater.

At manholes where the invert of the inlet sewer is more than 24 inches higher than the invert of the outlet sewer, a drop connection shall be provided as shown on Standard Detail San-3.

Unless improvements such as street grades will not permit, top of manholes shall extend a minimum 1'0" above the calculated 100 year floodwater elevation, provided that such extension shall not exceed four feet above final finish grade. Where this requirement results in an exposed manhole above final finish grade, a flat top manhole shall be used, be waterproofed and equipped with watertight ring and bolted down cover assembly with neoprene gaskets.

2.00 MATERIALS

2.01 Sewer Pipes

1. Reinforced Concrete Pipe – Reinforced concrete pipe and fittings shall conform to the requirements of ASTM C76. Gaskets shall be neoprene or other synthetic rubber. Natural rubber will not be accepted.

2. Ductile Iron Pipe – Ductile iron pipe shall conform to AWWA C151, Class 50 minimum. Joints shall be mechanical or push-on joints and conform to the current specifications ANSI 21.11. Gaskets shall be neoprene or synthetic rubber material. Natural rubber gaskets will not be acceptable. Ductile iron pipe must be labeled "Sewer".

   Fittings shall conform to the current AWWA Specifications C110 and C153 and shall have a pressure rating of not less than that specified for the pipe.

3. Polyvinyl Chloride Pipe (PVC) – Polyvinyl chloride pipe shall conform to ASTM D3034, Type PSM. The minimum wall thickness shall conform to SDR 35. Service lines shall be SDR 26 (minimum).

   Flexible gasketed joints shall be compression-type with an integral bell. The integral bell shall have an elastomeric gasket ring conforming to the requirements of ASTM F477. Gaskets shall be neoprene or other material. Natural rubber gaskets will not be acceptable.

   Fittings, tee's and bends, cleanouts, reducers, or other configurations required, shall be the same material as the pipe.

   For sewer pipe with depth of cover exceeding 15 feet, the Engineer shall make earth loading analysis to determine if increased pipe strength is required in accordance with manufacturer specifications.

2.02 MANHOLES

Manholes shall be constructed complete with ring and cover, and other appurtenances, in accordance with the following criteria and standard details.

1. Concrete – 4000 PSI mix with entrained air.
2. Precast Sections – Circular precast concrete shall meet the requirements of ASTM C478. Joints shall be a bitumastic material or preformed flexible joint sealant. The exterior of all joints shall be sealed with Hamilton-Kent "Kent Seal" tape or *approved equal*.
3. Dimensions – Standard Details San-1, San-2, and San-3.
4. Flexible Joint – Hamilton-Kent "Kent Seal", Bidco Sealant, Inc. "Bidco C56" or *approved equal*. The minimum bead dimensions shall be one square inch.
5. Coal Tar Paint – Koppers "Bitumastic Super Service Black", Tnemec "46-450 Heavy Tnemecol", Porter "Tar Mastic 100" or *approved equal*.
6. Flexible Gaskets – Flexible gaskets shall be Press-wedge, PSX (Press Seal Gasket Corporation), A-Lok (A-Lok Products, Inc.) or *approved equal*.
7. Portland Cement – Portland Cement shall conform to ASTM C150, Type I or II. When high early strength is required, Type III can be used.
8. Fine Aggregate – Fine aggregate shall meet the requirements of ASTM C33.
9. Coarse Aggregate – Coarse aggregate shall meet the requirements of ASTM C33.
10. Mortar – One part Portland Cement, Type II, three parts sand, one-fourth part Hydrated lime, conforming to ASTM C207.
11. Manhole Steps – Steps are NOT permitted in manholes.
12. Reinforcing Steel – ASTM A615, Grade 40 or Grade 60.
13. External joints- All external joints shall be sealed using Cretex or an *approved equal*. Joint Seal shall be applied per manufacturer recommendations.
14. Chimney Seal- All Manhole Frame and Lids shall be sealed to the manhole with a Cretex external chimney seal or *approve equal*. Chimney Seal shall be applied per manufacturer recommendations.

2.03 CASTINGS

1. Manhole Ring and Covers (Standard Detail San-4) shall be as follows:

   a. Clay & Bailey → Model No. 2008

   b. Neenah → Model No. R-1669-A1

   c. Deeter → Model No. 1315-M

   d. EJIW → Model No. NPR11-1281A

2. Manhole Frame with Bolted Lid (Standard Detail San-5) shall be as follows:

   a. Clay & Bailey → Model No. 2014OR

   b. Neenah → Model No. R-1916E

3.00 INSTALLATION

3.01 Handling and Storage.

All pipe, fittings and accessories shall be loaded, unloaded, stored and installed in such a manner to prevent structural damage or coating damage. Any damaged material shall be replaced or restored to its original condition at the Contractor/Developer's expense.

3.02 Inspection of Materials

A Public Works Inspector will inspect pipe, fittings and accessories for damage or defect prior to installation. Damaged or defective materials shall be replaced or restored to its original condition.

3.03 Alignment

Pipe shall be laid to the lines and grades as shown on the approved Engineering drawings.

3.04 Cleaning

All pipes, fittings and accessories shall be kept clean of foreign matter while being handled or stored. During installation, foreign matter shall not enter the pipe or appurtenances. At the end of each working day, a temporary plug shall be installed at the termination of the pipeline.

3.05 Aerial Crossing

Support shall be provided at all joints in pipe utilized for aerial crossings. The supports shall be designed to prevent frost heave, overturning or settlement.

Precautions against freezing, such as insulation and increased slope, shall be provided. Expansion jointing shall be provided between above-ground and below-ground pipe.

The impact of flood waters and debris shall be considered in the design of aerial stream crossing. The bottom of the pipe shall be placed no lower than the elevation of the calculated 50 year floodwater elevation except as may be approved by the City Engineer. Joints shall be located such that a full length section of pipe is centered over the center of the streams.

Sewers crossing streams shall be ductile iron pipe encased in concrete, Standard Detail San-6, with the encasement extending into the bank a minimum of 20 feet at each end of the aerial crossing.

3.06 Sewers in Relation to Water Main – Separation of Water Mains, Sanitary Sewers and Storm Sewers.

1. Adequate Separation Factors – The following factors should be considered in providing adequate separation:

    a. materials and type of joints for water and sewer pipes

    b. soil conditions

    c. service and branch connections into the water main and sewer line

    d. compensating variations in the horizontal and vertical connections

    e. space for repair and alterations of water and sewer pipes

    f. Off-setting of pipes around manholes and other sewer structures.

2. Parallel Installation

    Water mains shall be laid at least ten feet horizontally from any existing or proposed sanitary sewer and at least 10 feet horizontally from any storm sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain this separation, the department may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer,

provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer and in either case, at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer. In cases where it is not practical to maintain either the proper horizontal or vertical separation, the department may allow deviation on a case-by-case basis, provided the sanitary sewer is designed and constructed equivalent to water pipe (i.e. DIP) and pressure tested to assure water tightness prior to backfilling.

3. Crossings

Water mains crossing sewers shall be laid to provide a minimum vertical clear distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. At crossings, a full length of water pipe shall be located such that both joints will be as far from the sewer as possible. Special structural support (i.e. encasement) for the water and sewer pipes may be required.

4. Exception

The department must specifically approve any variance from the requirements of Items 2 and 3 when it is impossible to obtain the specified separation distances.

5. Force Mains

There shall be at least a ten foot horizontal separation between water mains and sanitary sewer force mains. There shall be an 18 inch vertical separation at crossings as required in Item 3. There shall be a minimum of four foot of cover between the force main and the surface of both green and paved areas.

6. Sewer Manholes and Other Structures

No water line shall be located closer than ten feet to any part of a sewer manhole or other sanitary sewer structure. No water line will be located closer than five feet to any part of a storm sewer curb inlet, junction box, or other storm sewer structures.

3.07 Straddle Blocks

Straddle blocks shall be provided every 50 feet for sewers which exceed 15 feet per 100 feet in slope. Dimensions for straddle blocks shall be as shown on Standard Detail San-7. Straddle blocks at shorter intervals may be required under extreme conditions as determined by the City Engineer.

3.08 Service Lines and Connections

Tee's, wyes, Inserta Tee's, and saddles for service lines shall be installed at a 45 degree angle measured from the center line of the pipe for the pipe sizes eight inches through 15 inches in diameter. Service lines shall not be installed in pipe sizes 18 inches or larger.

Service lines under streets shall be installed by the Contractor/Developer extending from the main to the limits of the street right-of-way and shall be installed prior to construction of the street at a slope not less than one foot per 100 feet. Service lines for each building unit shall be connected to the mains by means of a wye or tee and shall extend at least to the street right-of-way, but never less than (10) feet from the sewer main. Individual service lines shall not connect directly into manholes unless approved by the City Engineer. Service lines shall be adequately plugged to prevent foreign matter from entering the pipe during construction. All service lines shall be constructed bell to spigot or shall have a solid glued sleeve.

Inserta Tee's shall be used to connect to existing sanitary sewer. Saddles may also be used if approved by the City Engineer. Saddles may be installed over a hole cut with a four (4) inch circular bit equal in diameter to the service line. Square cut holes are not permitted.

The Contractor/Developer shall mark the service lines and/or tees with a metal t-post at the street right-of-way so they can be detected at a depth of 24 inches during excavation.

The Contractor/Developer shall maintain an accurate record for the production of the as-built mylars of the location, size and direction of each tee and wye, and location, size and length of each building service line. Locations will be referenced to the pipeline stationing as shown on the plans, or the distance from the first downstream manhole.

3.09 Dead End Sewer Lines

All dead end sewer lines, which are to be extended in the future, shall be installed to the limits of the platted subdivision such that extensions to the lines to serve adjacent subdivision plats may be connected at the plat boundary. A stub line shall be placed into the manhole for extension in the future to serve adjacent

property; the line shall be a minimum of ten feet in length and shall include a watertight plug at the end furthest from the manhole.

3.10 Private Sewer Systems

Sewer systems not meeting the requirements of The City of Raymore Sanitary Sewer Specifications will not be considered for public dedication.

3.11 Manholes

When placing a manhole over an existing sewer line, the area shall be kept dry and clean while placing the concrete for the invert and doghouse. The concrete surface of the doghouse area shall be scarified. Six inch "Kent Seal" tape shall be placed around the pipe and the doghouse area. Non-shrink grout shall be used and shall be placed from 12 inches outside of the manhole to 4 inches inside the manhole and a minimum depth of 8 inches below the pipe.

When connecting a new sewer line to an existing manhole, a circular bit must be used to core the manhole and an A-Lok (A-Lok Products, Inc.) gasket, or approved equal, must be used.

4.00 ACCEPTANCE TESTS

4.01 General

The Public Works Inspector shall be permitted access to the construction work at any time for inspection of the work and construction methods. Work not conforming to the requirements of these standards shall be adequate basis for rejection of project until corrected to the satisfaction of the City Engineer.

4.02 Air Testing (Primary Testing Procedure) APWA 2509.2 b (2) For Gravity Sewers

1. One hundred (100) percent of the total linear footage of sewer installed on a given project shall be tested.

2. The Contractor shall furnish all facilities required including necessary piping connections, test pumping equipment, pressure gauges, bulkheads, regulator to avoid over-pressurization, and all miscellaneous items required.

    a. The pipe plug for introducing air to the sewer line shall be equipped with two taps. One tap will be used to introduce air into the line being tested, through suitable valves and fittings, so that the input air may be regulated. The second tap will be fitted with valves and fittings to accept a pressure test gauge indicating internal pressure in the sewer pipe. An additional valve and fitting

will be incorporated on the tap used to check internal pressure so that a second test gauge may be attached to the internal pressure tap. The pressure test gauge will also be used to indicate loss of air pressure due to leaks in the sewer line.

b. The pressure test gauge shall meet the following minimum specifications:

Size (diameter)	4 – ½ inches
Pressure Range	0 – 15 P.S.I
Figure Intervals	1 P.S.I. increments
Minor Subdivisions	0.05 P.S.I.
Pressure Tube	Bourdon Tube of diaphragm
Accuracy	± 0.25% of maximum scale reading
Dial and Mirror Edge	White coated aluminum with black lettering, 270 Arc
Pipe Connection	Low maile ½ " P.P.T.

Calibration data not over one year old will be supplied with all pressure test gauges. Certification of pressure test gauge will be required from the gauge manufacturer. This certification and calibration data will be available to the Public Works Inspector whenever air tests are performed.

3. Test each reach of sewer pipe between manholes after completion of the installation of pipe and appurtenances and the backfill of sewer trench.

4. Plug ends of line and cap or plug all connections to withstand internal pressure. One of the plugs provided must have two taps for connecting equipment. After connecting air control equipment to the air hose, monitor air pressure so that internal pressure does not exceed 5.0 psig. After reaching psig, throttle the air supply to maintain between 4.0 and 3.5 psig for at least two minutes in order to allow equilibrium between air temperature and pipe walls. During this time, check all plugs to detect any leakage. If plugs are found to leak, bleed off air, tighten plugs, and again begin supplying air. After temperature has stabilized, the pressure is allowed to decrease to 3.5 psig. At 3.5 psig, begin timing to determine the time required for pressure to drop to 2.5 psig. If the time, in seconds, for the air pressure to decrease from 3.5 psig to 2.5 psig is greater than that shown in the table below, the pipe shall be presumed free of defects.

Pipe Size	Required Time Per 100 LF	Maximum Required Time
8”	70 sec.	227 sec.
10”	110 sec.	283 sec.
12”	158 sec.	340 sec.
15”	248 sec.	425 sec.
18”	356 sec.	510 sec.
21”	485 sec.	595 sec.
24”	634 sec.	680 sec.
27”	765 sec.	765 sec.
30”	851 sec.	851 sec.
33”	935 sec.	935 sec.

If air test fails to meet above requirements, repeat test as necessary after all leaks and defects have been repaired.

4.03 Exfiltration and Infiltration Tests (Secondary Testing Procedure) APWA 2509.2.b (1) For Gravity Sewers for Pipe Diameters Greater Than 18” (ID)

At the option of the Contractor/Developer, sewers shall be tested for leakage by exfiltration (i.e., outward leakage trench dry) or infiltration (i.e., inward leakage, trench wet).

Leakage shall not exceed 200 gallons per inch of diameter of sewer per mile per day up to 24 inches in diameter. Leakage may be allowed up to 400 gallons per inch of diameter per mile per day for short sections of sewer lines between two adjacent manholes up to and including 12 inches in diameter. However, the average leakage on the system being tested for acceptance shall not exceed the two hundred (200) gallons per inch standard. For sewers larger than 24 inches in diameter, leakage shall not exceed 5,000 gallons per mile per day.

The leakage test shall be conducted on the first section of pipe laid by each crew before backfilling and before the crew is permitted to continue pipe installation. If, however, the contractor desires to backfill prior to testing, he may do so at his own risk, and shall be responsible for uncovering and repairing any section which does not meet the standards outlined above. The leakage test shall be conducted on all other sections of the system, as completed, in a matter acceptable to the department. All expenses connected with the test shall be borne by the contractor.

1. Leakage Test Procedures – The leakage tests shall be performed as follows:

    a. Exfiltration test – Wherever possible, in the judgment of the Public Works Department, the sewer shall be subjected to the exfiltration test. The exceptions shall be where grades are excessive

developing more than ten feet of pressure head within the pipe or where groundwater level would be higher than the internal pressure head developed by this test. All outlets and inlets shall be plugged and secured in a manner to resist the internal pressure of this test without leakage or failure. The test section shall be filled with water at the upstream manhole such that a minimum positive head of two (2) feet will be maintained during the test.

Manholes shall be included in such testing and shall be evaluated equivalent to the sewer pipe. This level of water shall be maintained as long as necessary to locate all leaks, but not less than two hours. Measurements shall be made of the rate of leakage (exfiltration) from the sewer by determining the amount of water required to maintain the initial level at the top of the pipe. Water will be furnished to the Contractor/Developer, at cost, from an approved source provided with a meter.

b. Infiltration test – Where the aforesaid exfiltration test cannot be run because of high groundwater level, the sewer shall be tested by measuring the actual infiltration during the wettest time of the year. A V-notch weir shall be installed at the lower end of the section to be tested and the maximum flow determined shall be the rate compared to the standards provided in this section and shall apply only to be submerged below the groundwater such that a continuous minimum head of two (2) feet is maintained. Manholes shall be included in such testing and shall be evaluated equivalent to the sewer pipe.

4.04 Visual Inspection-Mandrel Testing

Sewers will be inspected by physical passage of a mandrel or other approved deflection measuring device through the length of each pipe segment. The maximum allowable deflection shall not exceed five percent of the pipe's actual inside diameter as measured in the field. Mandrel testing shall be performed at least 30 days after backfill is placed. Contractor is responsible for performing the mandrel testing while a Public Works Inspector is present.

4.05 Vacuum Testing of Manholes

1. All Manholes shall be vacuum tested in the presence of a Public Works Inspector. The vacuum test shall consist of properly sealing the manhole openings, applying a vacuum equivalent to ten inches of mercury, and measuring the time the manhole will hold an acceptable level of vacuum. The Vacuum Test shall be performed in accordance with the following procedures:

    a. Each manhole shall be tested after backfilling to, at least the level of the bottom adjustment ring. The vacuum test shall include testing of the seal between the cast iron frame and the concrete cone or slab.

    b. All pipes entering the manhole shall be plugged at least eight inches into the sewer pipe. The plug shall be inflated at a location beyond the manhole/pipe gasket.

    d. All plugs shall be adequately braced to prevent the plug or pipe from being dislodged and drawn into the manhole.

    e. A vacuum of at least ten and one-half inches of mercury shall be drawn on the manhole. The valve shall be shut on the vacuum line to the manhole and the vacuum line shall be disconnected. The vacuum line valve shall be opened and the vacuum shall be adjusted to ten inches of mercury.

    f. The pressure gauge shall be liquid filled having a 3.5 inch diameter face with a reading from zero to thirty inches of memory. The pressure gauge shall be calibrated a minimum of one time per year.

    g. The time for the vacuum reading to drop from ten inches of mercury to nine inches of mercury shall be equal to or less than the following times for the manhole to be considered as passing the vacuum test:

Manhole Depth	Time (minutes)
10 feet or less	2
10.1 to 15 feet	2.5
15.1 to 25 feet	3
25.1 or greater	3.5

    h. If a manhole fails the vacuum test, the manhole shall be uncovered and the leak repaired. The manhole shall then be backfilled and retested.

4.06 Acceptance Tests for Pressure Sewage Forcemains AWWA C600 As Modified Per APWA 2509.3.

1. Perform hydrostatic pressure and leakage tests. Conform to AWWA C600 procedures as modified herein. Test shall apply to all pressure sewers. Perform after backfilling.

2. Test separately in segments between sectionalizing valves, between a sectionalizing valve and a test plug, or between test plugs. Select test segments such that adjustable seated valves are isolated for individual checking. Contractor/Developer shall furnish and install test plugs, including all anchors, braces, and other devices to withstand hydrostatic pressure on plugs. Contractor/Developer shall be responsible for any damage to public or private property caused by failure of plugs. Limit fill rate of line to available venting capacity.

3. Pressure test: Conduct at 1.5 times maximum operating pressure determined by the following formula:

   Ppt = 0.650 (OP-GE), in which
   Ppt = test pressure in psi at gauge elevation

   Op = operating pressure in feet as indicated for highest elevation of the hydraulic gradient on each section of the line.

   GE = elevation in feet at center line of gauge

   Perform satisfactorily prior to determining leakage.

4. Leakage Test: Conduct at maximum operating pressure determined by the following formula.

   Plt = 0.433 (OP-GE), in which
   Plt = test pressure in psi at gauge elevation
   OP and GE – as in Item 3 above

5.00 EXCAVATION, TRENCHING AND BACKFILLING

5.01 General

The trench shall be so dug that the pipe can be laid to the alignment and depth required and shall be excavated only so far in advance of pipe laying as the Engineer shall specify. The trench shall be so braced and drained that the workmen may work therein safely and efficiently. All trenches shall be sheeted and braced to a safe angle of repose. Such angle of repose shall be no less than

that repose required by the requirements of the Occupational Safety and Health Act (OSHA).

It is essential that the discharge of any required trench dewatering pumps be conducted to natural public drainage channels, drains or storm sewers. Discharge location(s) shall be approved by the Engineer prior to dewatering.

5.02 Bedding

Granular bedding as shown on Standard Detail San-8 shall be used unless a different class of bedding is called for elsewhere in the contract documents. PVC pipe shall be bedded in accordance with the specifications described below. Any special bedding shall be in accordance with the Special Provisions.

1. Granular Bedding:

   Granular bedding shall be achieved by bedding the pipe with ordinary care in an earth foundation formed in the trench bottom by a shaped excavation which will fit the pipe barrel with reasonable closeness for a width of at least 50% of the outside pipe diameter. The side fills and area over the pipe, to a minimum depth of six inches above the top of the pipe, shall be filled with embedment material. Embedment materials shall be granular bedding approved by the City. Embedment materials shall be compacted in six (6) inch lifts to a point six (6) inches above the pipe and to a density of at least ninety five (95) percent of standard proctor density as described by ASTM Methods D698.

2. Polyvinyl Chloride Pipe (PVC)

   All PVC pipe shall be installed and bedded in accordance with ASTM Specification D-2321, "Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe." Embedment materials shall be granular bedding approved by the City. Embedment materials shall be compacted in six (6) inch lifts to a point six (6) inches above the pipe and to a density of at least ninety five (95) percent of standard proctor density as described by ASTM Methods D698. All embedment materials shall be tested for compliance with the above specification and test results shall be supplied to the Engineer. The Contractor, with an Engineer's representative present, shall check the deflection by means of pulling a mandrel or other 'go-no-go' device (approved by the Engineer) through the pipe prior to final acceptance and at least thirty (30) days after the sanitary sewer trench has been backfilled. Deflections greater than 5% of the inside diameter of the pipe shall be considered failure of the bedding/backfilling procedure. For deflections between 5% and 7.5%, the Contractor shall have the option of:

a. Determining the extent of the deflections and accepting a reduced payment in accordance with the schedule shown below:

Deflection	Percent Reduction in Payment
5% or less	0%
5%-7.5%	25%
Greater than 7.5%	Pipe will be relaid

All deflections greater than 7.5% shall be corrected in accordance with Option 'b' stated below. The payment reduction, if exercised by the Contractor, will be applied to the entire length of the pipe between the manholes in which the deflection between 5% and 7.5% occurs.

b. The Contractor shall be required to re-excavate the trench, recompact the backfill material and restore the surface at no additional compensation with the relayed pipe meeting the 5% requirement.

5.03 Trench Width and Description

The trench width at the top of the excavation may vary depending upon the depth of the trench and the nature of material encountered. The width of the trench shall also be kept at a minimum to prevent excess destruction of the existing ground surface.

For trench width at the top of the pipe greater than specified in the paragraph above, the Engineer may direct the Contractor to provide a higher class of bedding or a higher strength pipe (or both) than that required by the contract documents; without additional compensation therefore, as the Engineer deems necessary to satisfy the design requirements.

5.04 Correcting Faulty Grade

Any part of the trench excavated below grade shall be corrected with approved material and thoroughly compacted without additional compensation to the Contractor.

5.05 Pipe Foundation in Poor Soil

When the bottom of subgrade is soft and in the opinion of the Engineer cannot adequately support the pipe, a further depth and/or width shall be excavated and refilled to pipe foundation grade with material approved by the Engineer and thoroughly compacted; or other approved means such as piling, shall be adopted to assure a firm foundation for the pipe with extra compensation allowed the Contractor as provided elsewhere in these specifications.

This provision only applies in those instances/locations when normal dewatering operations are not considered viable and/or poor soil conditions exist as determined by the Engineer. The Contractor shall furnish, drive and place piling if ordered by the Engineer. Piles shall be driven in exact position at locations determined by the Engineer. The Contractor at his own expense must replace piles not correctly positioned at the completion of driving.

5.06 Pipe Foundation in Rock

The space between the bottom of the trench in rock conditions and the required bedding of the pipe as per Section 5.02 (Bedding) as shown on Standard Detail San-8, shall be backfilled with granular material, approved by the Engineer, thoroughly tamped. No additional compensation for placing or tamping this material shall be allowed.

5.07 Solid Rock Excavation Defined

Solid rock excavation shall include such rocks as are not decomposed, weathered or shattered and which will require extraordinary construction activities as determined by the Engineer including but not limited to blasting, barring, wedging or use of air tools for removal. Under this classification shall be included the removal of any concrete or masonry structure (except concrete pavement, curb, gutter and sidewalk) exceeding one (1) cubic yard in volume that may be encountered in the work.

5.08 Blasting Procedure

The hours of blasting will be fixed by the Engineer. The Contractor's methods of procedure relative to blasting shall conform to local and state laws and municipal ordinances.

5.09 Braced and Sheeted Trenches

The Contractor shall adequately brace and sheet excavation wherever necessary to prevent caving or damage to nearby property. The cost of this temporary sheeting and bracing, unless provided for otherwise, shall be considered as part of the excavation costs without additional compensation to the Contractor. Trench sheeting shall remain in place until pipe has been laid, compacted to a depth of one foot (1') over the top of the pipe. Sheeting, bracing, etc., placed in the "pipe zone" (that part of the trench below a distance of one foot (1') above the top of the pipe) shall not be removed without the written permission or written order of the Engineer; that sheeting thereby left in place shall be paid for at the unit price bid. Sheeting ordered left in place by the Engineer in writing shall be paid for at the unit price bid. The Contractor may also leave in place, at his own expense, to be embedded in the backfill of the trench any sheeting or bracing in addition to that

ordered left in place by the Engineer for the purpose of preventing injury or damage to persons, corporations or property, whether public or private, for which the Contractor under the terms of this contract is liable.

5.10 Piling of Excavated Material

All excavated material shall be piled in a manner that will not endanger the work and damage property that is to be avoided and that will avoid obstructing sidewalks and driveways. Gutters shall be kept clear or other satisfactory provisions made for street drainage.

5.11 Barricades, Guards, and Safety Provisions

At no cost to the Owner, the Contractor shall protect persons from injury and to avoid property damage, shall place and maintain adequate barricades, construction signs, torches, flashers and guards as required in accordance with the contract documents and the Manual on Uniform Traffic Control Devices during the progress of the construction work and until the site is returned to a safe and usable manner. All material piles, trenches, excavation equipment and pipe which may serve as hazards to the public shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. The rules and regulations of the local and state authorities respecting safety provisions shall be observed.

5.12 Private Property Protection

The Contractor shall be responsible for, but not limited to, the protection of trees, fences, poles and all other private property unless their removal is authorized by the Engineer. Property damage shall be satisfactorily restored by the Contractor or adequate compensation therefore shall be the responsibility of the Contractor at no additional cost to the Owner.

5.13 Jack Steel Casing Pipe in Place

Steel casing pipe shall be jacked in place to provide a conduit for the carrier pipe.

The carrier pipe shall be installed within the casing pipe using “wooden skids” or similar devices to center the carrier pipe within the casing pipe. Upon completion of the carrier pipe installation, watertight removable end seals shall be installed for the casing conduit. Cathodic and corrosion protection are required depending on the carrier/casing pipe used.

Jacking shall be paid for at the contract unit price bid per lineal foot installed and shall include the casing pipe, jacking pits, cathodic and corrosion protection, watertight seal, dewatering and all other labor and materials necessary to complete the work.

The existing casings shall be cut or trimmed as shown on the plans. All labor and materials necessary to complete the work shall be considered incidental to the installation of the carrier pipe.

5.14 Backfill

Backfill under pavements, driveways, sidewalks, and other paved areas:

1. Flowable fill shall be used for backfill under all paved areas. Flowable fill mix design must be approved by the Engineer prior to placement. Backfill shall be placed as shown on Standard Detail St-11. (APWA p26-14)

Backfill in areas other than paved areas:

2. Backfill shall be finely divided, excavated material, free from debris, organic material, frozen material, and stones larger than six inches.

City of Raymore, Missouri

Storm Sewer Specifications

Table of Contents

1.00 GENERAL DESIGN CRITERIA

1.01 General

The design criteria presented in this article are the minimum standard to be followed in the design and construction of the Raymore Storm Sewer System. These minimum standards are not intended to be used as a substitute for actual construction specifications and design computations.

1.02 Design Requirements

1. Design Formula for Rate of Run-off:

   The Rational Method shall be used in storm sewer design within the City of Raymore.

   The Rational Method uses the basic formula Q = KCiA for estimating runoff from rainfall where:

   Q = Rate of Run-off in cubic feet per seconds.

   i = Average rainfall intensity in inches per hour for the period of maximum rainfall of a given frequency of occurrence, having a duration equal to the greatest time required for the runoff to flow from the most remote part of the drainage area to the point under design. This period of time is known as the "Time of Concentration".

   C = Runoff coefficient, which is the ratio of the amount of water draining from a given area to the total amount of rainfall within the same period of time.

   A = Drainage are in acres tributary to the point under design.

   K = Coefficient (K=1.0 for 10-yr, K=1.1 for 25-yr, K=1.25 for 100-yr)

2. Rainfall and Intensity

   The minimum storm design frequency for roadway conveyance systems in a closed conduit shall be as follows:

   a. Residential Streets: Ten (10) year event
   b. Industrial/Commercial: Twenty five (25) year event
   c. Arterial: One Hundred (100) year event

   Overland and overflow swales shall be designed to accommodate a 100 year event.

In addition to the design criteria for the roadway conveyance system, a separate drainage plan is required based on the 100 year frequency storm. The drainage from the 100 year frequency storm shall be routed using surface channeling. Routing of the 100 year storm through the project area shall be done such that no buildings are inundated with storm water. As part of the drainage plan, the elevation of the minimum building opening will be specified for each lot adjacent to the proposed 100 year storm flow. Minimum building openings shall be at an elevation such that each lot will allow runoff to flow in accordance with the drainage plan without ponding on any lot. All lots must be graded and maintained in accordance with the approved plan. The Contractor/Developer is required to include in the recorded restrictions for the development a covenant that the owner or owners of the specified lots shall not change or alter the grade for their lots and shall maintain the drainage flow lines for the 100 year storm routing. The City Engineer may also require proof that said covenants have been included in the deed restrictions for the specified lots and that they have been recorded.

All design calculations shall be arranged in a manner such that they can be easily checked. A sketch or map shall accompany the calculations showing point of intercepting storm water. These points of the interceptions shall be numbered and coincide with the numbered points of interception on the design calculation sheet.

All plans and supporting documentation for storm sewers shall be signed and sealed by a licensed professional engineer in the State of Missouri.

3. Minimum and Maximum Design Velocities

    a. The minimum system velocity when flowing full will be 3.0 feet per second.

    b. The maximum system velocity when flowing full will be 14.0 feet per second.

Deviation from the above shall be only upon the approval of the City Engineer.

4. Methods of Conveying Storm Water for a Ten Year Frequency Storm –

Storm water shall be conveyed in one of the following manners.

    a. Open Improved Channels

        (1) Grass Swales – Grass swales may be used in areas where the runoff from a ten year frequency storm does not exceed five cubic feet per second and the velocity does not exceed five feet per second.

        (2) Lined Channels – Concrete, riprap and gabions may be used to convey storm water. Channels shall be sized to carry the flow from

a ten year frequency storm entirely within the limits of the channel. All lined channels shall be constructed on dedicated easements. The width required shall be a minimum of 7.5 feet beyond the outside edge or walls of the actual lined section.

(a) Concrete Channel Slope – The paved ditch may have either vertical (railings may be required) or sloping sides. If the sides are sloped, the maximum slope shall be one and one half horizontal to one vertical.

Maximum sod slope allowed above the concrete lining shall be four feet horizontal to one foot vertical.

(b) Riprap – Maximum side slopes for riprap shall be three horizontal to one vertical. Maximum sod slope allowed above riprap shall be four horizontal to one vertical.

(c) Gabions – Gabions shall be manufactured in such a manner that their sides, ends lid and diaphragm (s) can be assembled to form rectangular units of the specified dimensions.

Gabions shall be a single unit construction. The front, base, back and lit shall be woven into a single unit. The ends and diaphragm (s) shall be factory connected to the base.

All perimeter edges of the mesh forming the gabion shall be securely selvedged (woven) so that the joints obtained have at least the same strength as the wire mesh itself.

The gabion shall be equally divided into cells, each having a length equal to the width of gabion, by diaphragm (s) of the same mesh and gage as the gabion body. Design calculations, in accordance with the manufacturer's recommendations, will be submitted for approval.

(3) Street Swale – Street swales to divert water across a street shall only be permitted on residential classification streets. Flow of runoff water across a street shall be limited to one cubic foot per second.

When street swales are utilized, water shall not be diverted across a through street. If neither street is a through street, storm water shall be diverted across the street with the least traffic, as directed by the City Engineer.

b. Underground Pipe

The minimum inside diameter shall be 15 inches. Reinforced concrete pipe shall be used for all storm sewer within rights-of-way or at locations as determined by the City Engineer, corrugated metal pipe may be used for underground storm sewer construction at other locations. NOTE: Driveway culverts, if required, may be concrete, cmp, or steel. HDPE pipe is not permitted on the ROW.

c. Open Unimproved Channels

(1) An open, unimproved channel may be used to convey storm water for a flow of 200 cubic feet per second or greater, at the upstream end of the channel crossing, the plat boundary, during the 10-year frequency storm. Such a channel is subject to approval by the City. A detailed plan showing size, type, location, and drainage calculations must be submitted with a written request. Such drainage courses will be allowed only where provisions have been established for private perpetual maintenance. The City will not maintain the channel.

Energy dissipaters shall be installed within unimproved channels where the velocity of flow exceeds five feet per second for a ten year storm. Dissipaters may be constructed of riprap or concrete as required for lined channels herein.

(2) Channels with flows less than 200 cubic feet per second at the upstream end of the channel crossing the plat boundary will be designed in accordance with Item 4a "Open Improved Channels" and 4b "Underground Pipe" except where natural site conditions would negate the effects of structural improvements. In these instances, the procedures in paragraph (1) above apply.

5. Inlet and Gutter Flow Design

Inlets shall be located to limit the width of flow in street gutters at the time of peak discharge of the design period storm to the following limits:

BACK TO BACK OF CURB STREET WIDTH IN FEET	MAXIMUM ALLOWED SPREAD IN EACH OUTSIDE CURB LANE FROM BACK OF CURB IN FEET
28 or less	10.5
Over 28 to 36	11.5
Over 36	12.0
Divided Roadways	As above for each direction roadway
Arterial and Collector Street Intersections And Pedestrian Crosswalks	6.0

Gutter spread calculations shall be provided for all inlet locations.

1.03 Manholes, Curb Inlets, Junction Boxes and Yard Inlets

1. Manholes, curb inlets, junction boxes and yard inlets shall be designed and constructed to conform to ASTM C478 and as shown as follows:

    a. Curb Inlets per Standard Detail Strm-1

    b. Yard Inlets per Standard Detail Strm-2

    c. Junction Boxes per Standard Detail Strm-3

    NOTE: A trash guard is required on all inlet openings larger than 6".

2. Minimum inside dimension shall be as follows:

    a. 4' – 0" – pipe size 24" or less

    b. 5' – 0" – pipe size 27" to 36"

    c. 6' – 0" – pipe size 42" to 48"

    NOTE: When pipe nominal diameter exceeds 48", special manhole may be required. Such manholes shall be cast-in-place and shall be detailed on the engineering plans.

3. Access for inspection and maintenance for storm sewers 36" and smaller, will be through manholes, catch basins or yard inlets located where feasible at:

    a. All changes in alignment and grade: miter joints may be accepted for pipe sizes greater than 42" at an angle of 45 degrees or less.

    b. Changes in conduit size

    c. Branch connections

    d. Probable future connections

    e. Such additional locations as required to provide access within the maximum intervals

The maximum interval between points of access into storm sewers will vary with pipe diameters as follows:

15"	400 foot maximum
18" to 36"	500 foot maximum
42" to 48"	600 foot maximum
54" and larger	700 foot maximum

1.04 Reinforced Concrete Box Culverts

Box culverts shall be constructed of reinforced concrete, and shall be designed in accordance with Missouri Department of Transportation Specifications.

1.05 Extension of Underground Pipe to Plat Boundary and Inlets and Outlets

Enclosed storm sewer systems shall extend to the plat boundary with riprap placed downstream of the end section. At the Developer's option, the end section may stop prior to the plat boundary with riprap extending to the plat boundary, in accordance with Standard Detail Strm-4. In all cases, the pipe end section shall extend to at least the property line of an individual lot. If the pipe does not extend to the plat boundary, the Developer shall provide the City of Raymore with an irrevocable letter of credit or escrow money for extension of the pipe to the plat boundary when the adjacent property is developed.

1.06 Storm Water Detention Requirements for Land Disturbances from Construction Activities

1. General

   The provisions of the section apply to all land disturbance construction activities including residential (single-family and multi-family), commercial and industrial development. Storm water detention facilities shall be constructed and in operation prior to any construction or impervious surface and so noted on the engineering drawings.

2. Methods of Storage

   There are numerous methods which may be utilized to provide the amount of storage required. In many instances one type of detention system cannot conveniently or economically provide the required or needed amount of stormwater storage. Limitations in storage capacities, site development conditions, soil limitations and other related constraints may require that more than one method be utilized. The various methods of detention including conditions, limitations, inspection, and maintenance responsibilities are defined in Chapter 450 'Stormwater Management' of the City of Raymore's Unified Development Code. A listing of the various methods follows:

   a. Rooftop Storage
   b. Parking Lots
   c. Recreations Areas
   d. Dry Reservoirs
   e. Permanent Lakes
   f. Underground Storage

3. Design

   Detention shall be designed and built according to the latest edition of the Kansas City Metropolitan A.P.W.A. and these specifications. The more restrictive applies. A complete set of the plans along with the following design data shall be submitted for the City Engineer's review for all detention facilities:

   a. Engineering drawings showing dimension of detention and details of outlet works.
   b. Area – Capacity curves for proposed detention facility plotted as datum elevation as ordinates and cumulative volume of storage as abscissas.
   c. Discharge characteristics curve of outlet works plotted in units of detention facility water – surface elevation as ordinates and discharge rate (C.F.S.) as abscissas.

   Data from the above items 'b' and 'c' may be waived at the discretion of the City Engineer.

1.07 Storm, Water Detention Requirements for Land Disturbance from Construction Activities in Excess of 25 Acres

Storm water detention requirements for watersheds in excess of 25 acres shall utilize one of the following methods for all platted land disturbance activities including residential (single-family and multi-family) commercial and industrial developments. Alternate methods may be allowed upon approval of the City Engineer.

1. SCS TR55

2. HEC - 1

3. HEC - 2

   Computer printouts and calculations shall be submitted along with submittals outlined in Section I, Paragraph F, Item 3 "Design Data Submittal" under this Article.

4. Exemptions: Storm water detention on site is not required when drainage basin/watershed modeling, considering fully developed conditions in accordance with the land use, demonstrates that no increase in peak flows at critical downstream locations for the design storm occurs following development of the site.

2.00 MATERIALS

2.01 Storm Sewer Pipe

1. Corrugated Metal Pipe - All corrugated metal pipe, coupling bands, fittings and end sections shall be fabricated from steel corrugated metal sheets and galvanized in accordance with AASHTO Designation M36.

   Gauges shall be 14 gauge for pipe diameters 15” through 54” and 12 gauge for pipe diameters 60” or greater, or, if aluminized, 16 gauge for pipe diameters less than 54” and 14 gauge for pipe diameters 60” or greater unless loading conditions dictate a higher strength pipe. Pipe joints shall be banded and gasketed as specified in the AISI Handbook of Steel Drainage and Highway Construction Products. Corrugated metal pipe shall not be used in street rights-of-way unless approved by the Engineer for a driveway culvert.

2. Reinforced Concrete Pipe - All reinforced concrete pipes shall conform to the current ASTM Specification C76, with the following exceptions:

   a. The reinforced concrete pipe shall have a wall thickness of not less than ‘B’ as defined in the C76 specifications.

b. The pipe class shall be as designated on the plans, and shall not be less than Class II except when the pipe is located under streets, in which case the pipe class shall not be less than Class III.

c. Reinforcement - Circumferential reinforcement shall be the full circle type. Elliptical or part-circle reinforcement will not be acceptable unless otherwise approved by the City Engineer.

d. Joints - Joints shall be rubber gasket or mastic joints as follows:

   (1) Rubber gasket joints - Rubber gasket joints shall conform to the current ASTM Specification C443.

   (2) Mastic joints - Mastic joints shall he a bitumastic material applied in accordance with the manufactures recommendations. A sufficient amount of material shall be applied to fill all voids in the joint.

e. Fine Aggregates - Fine aggregates shall consist of clean natural sand conforming to ASTM C33. Artificial or manufactured sand will not be acceptable.

f. Joint Separation - In laying pipe, the maximum joint separation for mastic joints shall not exceed:

Pipe Size	Maximum Separation
15" – 48"	3/8"
54" – 72"	½"
84" – 144"	¾"

g. Bends – when approved on the plans by the City Engineer, bends for concrete pipe shall be fabricated from segments of a steel cylinder with concrete or mortar lining and reinforced concrete exterior covering or from segments of concrete pipe miter cut while the pipe is still green.

   Steel cylinders shall be at least ten gage and shall be lined with concrete or mortar a minimum of three-fourths (3/4) inches thick. Bends fabricated from steel cylinders shall be designed for the same three-edge bearing loads as the adjacent pipe.

   Bends factory fabricated from miter cut segments of concrete pipe, the reinforcing steel shall be welded and each joint shall be encased in concrete after installation. Concrete encasement shall be at least eight inches thick and as shown on the approved engineering plan.

2.02 Manholes

Manholes shall be constructed complete with ring and cover, fittings, and other appurtenances, in accordance with the following criteria and standard details:

1. Concrete – 4000 PSI mix with entrained air

2. Precast Sections – Circular precast concrete shall meet the requirements of ASTM C478. Joints shall be a bitumastic material or preformed flexible joint sealant.

3. Dimensions – Standard Details Strm-1, Strm-2 and Strm-3.

4. Flexible Joint – Hamilton – Kent "Kent Seal", Bidco Sealants, Inc. "Bidco C56" or approved equal. The minimum bead dimensions shall be one square inch.

5. Coal Tar Paint – Kopper's "Bitumastic Super Service Black". Tnemec "46 – 460 Heavy Tnemecol", Porter "Tar Mastic 100" or approved equal.

6. Flexible Gaskets – Flexible gaskets shall be Press – wedge, PSX (Press Seal Gasket Corporation), A – Lok (A – Lok Products, Inc.) or approved equal.

7. Portland Cement – Portland Cement shall conform to ASTM C150, Type I of II. When high early strength is required, Type III can be used.

8. Fine Aggregate – Fine aggregate shall meet the requirements of ASTM C33.

9. Coarse Aggregate – Coarse aggregate shall meet the requirements of ASTM C33.

10. Mortar – One part Portland cement, Type II, three parts sand, one fourth parts hydrated lime, conforming to ASTM C207.

11. Manhole Steps – Steps are NOT permitted in manholes.

12. Reinforcing Steel – ASTM A615, Grade 60.

2.03 Casting

1. Manhole Ring and Covers shall be as follows:

   a. Clay & Bailey → Model No. 2020 (medium duty)

   b. Neenah → Model No. R-1669 (Heavy duty)

   c. Deeter → Model No. 1332

   d. EJIW → Model No. NPR11-1281B

2. Manhole Frame with Bolted Lid

    a. Clay & Bailey → Model No. 2014

    b. Neenah → Model No. R1916E

2.04 Curb Inlets, Junction Boxes and Yard Inlets

Curb inlets, junction boxes and yard inlets shall be constructed complete with ring and cover and other appurtenances, in accordance with the following criteria and Standard Details Strm-1 through Strm-3 and Strm-5 & 6.

1. Concrete – 4000 psi, with entrained air.

2. Portland Cement – Portland cement shall conform to ASTM C150, Type I or Type II.

3. Fine Aggregate – Fine aggregate shall meet the requirements of ASTM C33.

4. Coarse Aggregate – Coarse aggregate shall meet the requirements of ASTM C33.

5. Mortar – One part Portland cement, Type II, three parts sand, one fourth part Hydrated Lime, conforming to ASTM C207.

6. Dimensions – Standard Detail Strm-1 for Curb Inlets
   Standard Detail Strm-3 for Junction Box
   Standard Detail Strm-2 for Yard Inlet

7. Steps – NOT allowed in manholes

8. Reinforcing Steel - ASTM A615, Grade 40, Grade 60.

9. Casting - Ring and covers per Standard Detail Strm-5 shall be as follows:

    a. Clay & Bailey - Model No. 2020 or 2002

    b. Neenah - Model No. 1669

    c. Deeter - Model No. 1332

2.05 Reinforced Concrete Box Culverts

Reinforced concrete box culverts shall be designed and constructed in accordance with Missouri Department of Transportation Specifications.

2.06 Lined Channels

1. Concrete Lined Channels - All concrete lined channels shall consist of poured in place, air entrained, reinforced concrete.

   The concrete slump shall be kept as low as possible consistent with proper handling and thorough compaction. Unless otherwise authorized by the City Engineer, slump shall not exceed four (4) inches.

   The minimum 28 day acceptable compressive concrete strength as determined by ASTM C39 shall be 4,000 psi, KCMMB-4K mix.

    a. Testing - Unless otherwise stipulated or authorized by the City Engineer, a minimum of four compression test cylinders shall be made from each maximum 50 cubic yards of pour. One of these cylinders shall be tested at an age of seven days and two cylinder shall be tested at an age of 28 days. One cylinder shall be held in reserve. Concrete test cylinders shall be made, cased, and in conformity with ASTM C192 and tested in conformity with ASTM C39.

       All costs associated with the testing of concrete cylinders shall be at the expense of the Contractor/Developer performing the construction of paved ditches. One copy of the test results shall be supplied to the City Engineer.

    b. Reinforcing - The reinforcing for the concrete shall be designed to withstand all earth and water pressures imposed upon the sides. The minimum amount of reinforcing placed in any section of the concrete pavings shall be flat sheets of 6” x 6” spacing welded wire fabric, six gauge thickness. Wire fabric shall conform to ASTM A184.

2. Riprap Channels

   Riprap channels shall be constructed in accordance with Standard Detail Strm-7.

   a. Stone for riprap and gabion linings shall consist of quarried rock and be sound, durable and angular in shape. Material shall be free from cracks, seams or other defects. Shale and stone with shale seams are not acceptable.

   b. Riprap shall have a minimum thickness of 18 inches or 1.5 times as thick as the larger stones, whichever is greater. At least 60% shall be of pieces having a volume of one cubic foot or more. No more than 6 percent of the stones shall weigh less than 10 pounds.

   c. Soil stabilization blanket shall be used in conjunction with riprap at the outlet end of pipe.

   d. Riprap shall <u>not</u> be grouted.

3. Gabion Lined Channels

   Gabion Lined Channels shall be designed in accordance with "Kansas City Metropolitan Chapter of the APWA Standard Specifications and Design Criteria"

3.00 INSTALLATION

3.01 Lined Channels

1. Concrete Lined Channels

   Concrete shall be placed in accordance with APWA, Section 2208.5, beginning at the lower end of the portion of the ditch to be lined and progressing toward the upper end. Concrete shall be reinforced with the type of reinforcement and in the manner indicated on the approved Engineering Drawings. Contraction or construction joints shall be spaced and formed as indicated on the approved engineering drawings.

   A broom finish is required. Immediately after the finishing operations are completed, the concrete shall be protected and cured in conformance with the requirements specified in APWA Section 2208.4.

2. Riprap Channels

Riprap shall be placed at the locations and to the dimensions shown on the approved engineering drawings.

Riprap shall be graded as necessary to form a dense blanket. The finished surface shall present an even surface conforming to the lines, grades, and sections given. Riprap shall be placed to a minimum depth of 18 inches.

Riprap shall be placed in such a manner that voids created by larger pieces are filled in by smaller pieces and no voids extend directly through the riprap to the surface below. The riprap shall be placed in rows transversely to the center line of the ditch and in the manner indicated on the drawings.

Riprap for entrance and outlet erosion protection shall be installed in accordance with Standard Details Strm-4. The outlet erosion protection shall extend to the edge of the water when a pipe outlets to an existing body of water.

3.02 Gabion Lined Channels

1. General

Installation of gabions shall conform to the requirements of the following paragraphs, subject to additional directions of the manufacturer, as approved by the City Engineer.

2. Manufacturer's Representative

The gabion manufacturer shall send a representative, experienced in gabion construction, to the job site to monitor the Contractor/Developer's work and construction techniques.

3. Assembly

a. Each gabion shall be removed from the bundle, unfolded flat on the ground, and all kinks and bends flattened.

b. The gabion unit shall then be assembled individually, by erecting the sides (front and back), ends and diaphragm (s), ensuring that all creases are in the correct position the tops of all sides level.

c. The four corners of the gabion unit shall be laced first, followed by the edges of internal diaphragm(s) to the sides.

d. The lacing procedure shall consist of cutting a length of lacing wire approximately one and one-half times the distance to be laced - not to exceed five feet. Secure the wire terminal at the corner by looping and twisting, proceed to lace with alternating single and double loops at approximately five inch intervals. Securely fasten the other lacing wire terminal.

4. Installation

a. The assembled gabion units shall be carried to the job site and placed in their proper locations. Care shall be taken not to damage the filter cloth. For structural integrity, all adjoining empty gabions must be laced along the perimeter of their contact surfaces in order to obtain a monolithic structure.

b. The following method applied to three foot three inch high gabions; once the gabion units are laced together, they shall be stretched to effective alignment. This operation shall be carried out after several empty gabion units have been positioned. The first gabion in the line shall be partially filled to provide the necessary anchorage. Any stretching shall be carried out using a come-along or other means of at least one ton capacity.

c. While under tension, the gabion joints shall be carefully controlled against any possible unraveling.

d. Whenever gabion structures require more than one tier, the upper empty gabion tier (under tension) shall also be laced to the top of the lower one.

e. For gabions less than three feet three inches in height, the above procedures shall be modified in accordance with instructions provided by the manufacturer and approved by the City Engineer.

5. Filling

a. Gabions shall be filled with stone meeting the requirements of Section II, Paragraph G, Item 3.0 "Stone Fill for Gabions" under this Article.

b. Gabions may be filled by almost any type of earth-handling equipments such as: backhoe, gradall, crane, etc.

c. Care shall be taken when placing stone fill to assure that the sheathing on PVC coated gabions will not be broken or damaged.

d. Gabions shall be filled in layers, not to exceed one foot at a time. Two connecting wires shall be placed between each layer in all cells along all

exposed faces of the gabion. All connecting wires shall be looped around two mesh openings and the wire terminals shall be securely twisted to prevent their loosening.

e. The cells in any row shall be filled in stages so that local deformation may be avoided. That is, at no time shall any cell be filled to a depth exceeding one foot more than the adjoining cell.

f. Along all exposed gabion faces, the outer layer of stone shall be carefully placed and paced by hand, in order to ensure proper alignment and a neat, compact square appearance.

g. The last layer of stone shall be leveled with the top of the gabion to allow proper closing of the lid and provide an even surface for the next course.

h. Well packed filling without undue bulging, and secure lacing, is essential.

6. Lid Closing

a. The lids shall be stretched tight over the filling, using crowbars or lid closing tools, until the lid meets the perimeter edges of tile front and end panels.

b. The lid shall then be tightly placed along all edges, ends and diaphragm(s) in the same manner as described above for assembling.

c. Well packed filling without undue bulging, and secure lacing, is essential.

7. Cutting and Folding Mesh

a. Where shown on the Plans or otherwise directed by the City Engineer, the gabion mesh shall be cut, folded and wired together to suit existing site conditions. The mesh must be cleanly cut and the surplus mesh cut out completely, or folded back and neatly wired to an adjacent gabion face. The cut edges of the mesh shall be securely laced together with lacing wire in the manner described above for assembling.

b. The assembling, installation, filling and lid closing of the reshaped gabions shall he carried out as specified above.

8. PVC Coating

a. The PVC coating on the wire shall have continuity.

b. A coating compound material, recommended by the manufacturer of the Gabions and approved by the City Engineer, shall be on hand and applied where any PVC coating is broken because of abrasion during shipment or during construction. Excessively damaged gabions will be rejected.

3.03 Handling and Storage

All pipe, fittings and accessories shall be loaded, unloaded, stored and installed in such a manner to prevent structural damage or coating damage. Any damaged material shall be replaced or restored to its original condition at the Contractor/Developer's expense.

3.04 Inspection of Materials

A Public Works Inspector will inspect pipe, fittings and accessories for damage or defect prior to installation. Damaged or defective materials shall be replaced or restored to its original condition.

3.05 Alignment

Pipe shall be laid to the lines and grades as shown on the approved engineering drawings.

3.06 Cleaning

All pipe, fittings and accessories shall be kept clean of foreign matter while being handled or stored. During installation, foreign matter shall not enter the pipe or appurtenances. At the end of each working day, a temporary plug shall be installed at the termination of the pipe line.

3.07 Sewers in Relation to Water Main: Separation of Water Mains, Sanitary Sewers and Storm Sewers

1. Adequate Separation Factors

The following factors should be considered in providing adequate separation:

a. materials and type of joints for water and sewer pipes,

b. soil conditions,

c. service and branch connections into the water main and sewer line,

d. compensating variations in the horizontal and vertical connections,

e. space for repair and alterations of water and sewer pipes,

f. off-setting of pipes around manholes and other sewer structures.

2. Parallel Installation

Storm sewers shall be laid at least five feet horizontally from any existing or proposed sanitary sewer or water main.

The distance shall be measured edge to edge. In cases where it is not practical to maintain this separation, the department may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the storm sewer closer to the water or sanitary, provided that the storm is laid in a separate trench.

3. Crossings

Storm crossing of the water and sanitary mains shall be laid to provide a minimum vertical clear distance of 18 inches between the outside of the storm and the outside of the water and sanitary main. This vertical clearance can be either above or below the water and sewer.

4. Exception

The department must specifically approve any variance from the requirements of Items 2 and 3 when it is impossible to obtain the specified separation distances.

5. Sewer Manholes and Other Structures

No water line shall be located closer than ten feet to any part of a sanitary sewer manhole or other sanitary sewer structure. No water line shall be located closer than five feet to any part of a storm sewer curb inlet, junction box, or other storm sewer structure.

4.00 EXCAVATION, TRENCHING AND BACKFILLING

4.01 General

The trench shall be so dug that the pipe can be laid to the alignment and depth required and shall be excavated only so far in advance of pipe laying as the Engineer shall specify. The trench shall be so braced and drained that the workmen may work therein safely and efficiently. All trenches shall be sheeted and braced to a safe angle of repose. Such angle of repose shall be no less than that repose required by the requirements of the Occupational Safety and Health Act (OSHA).

It is essential that the discharge of any required trench dewatering pumps be conducted to natural public drainage channels, drains or storm sewers. Discharge location(s) shall be approved by the Engineer prior to dewatering.

4.02 Class of Bedding

Granular bedding as shown on Standard Detail Strm-7 shall be used unless a different class of bedding is called for elsewhere in the contract documents. Any special bedding shall be in accordance with the Special Provisions.

1. Granular Bedding:

   Granular bedding shall be achieved by bedding the pipe with ordinary care in an earth foundation formed in the trench bottom by a shaped excavation which will fit the pipe barrel with reasonable closeness for a width of at least 50% of the outside pipe diameter. The side fills and area over the pipe, to a minimum depth of six inches above the top of the pipe, shall be filled with embedment material. Embedment materials shall be granular bedding approved by the City. Embedment materials shall be compacted in six (6) inch lifts to a point six (6) inches above the pipe and to a density of at least ninety five (95) percent of standard proctor density as described by ASTM Methods D698.

4.03 Trench Width and Description

The trench width at the top of the excavation may vary depending upon the depth of the trench and the nature of material encountered. The width of the trench shall also be kept at a minimum to prevent excess destruction of the existing ground surface.

For trench width at the top of the pipe greater than specified in the paragraph above, the Engineer may direct the Contractor to provide a higher class of bedding or a higher strength pipe (or both) than that required by the contract documents; without additional compensation therefore, as the Engineer deems necessary to satisfy the design requirements.

4.04 Correcting Faulty Grade

Any part of the trench excavated below grade shall be corrected with approved material and thoroughly compacted without additional compensation to the Contractor.

4.05 Pipe Foundation in Poor Soil

When the bottom of subgrade is soft and in the opinion of the Engineer cannot adequately support the pipe, a further depth and/or width shall be excavated and refilled to pipe foundation grade with material approved by the Engineer and thoroughly compacted; or other approved means such as piling, shall be adopted to assure a firm foundation for the pipe with extra compensation allowed the Contractor as provided elsewhere in these specifications.

This provision only applies in those instances/locations when normal dewatering operations are not considered viable and/or poor soil conditions exist as determined by the Engineer. The Contractor shall furnish, drive and place piling if ordered by the Engineer. Piles shall be driven in exact position at locations determined by the Engineer. The Contractor at his own expense must replace piles not correctly positioned at the completion of driving.

4.06 Pipe Foundation in Rock

The space between the bottom of the trench in rock conditions and the required bedding of the pipe as per Section 4.02 (Class of Bedding) as shown on Standard Detail Strm-7 shall be backfilled with granular material, approved by the Engineer, thoroughly tamped. No additional compensation for placing or tamping this material shall be allowed.

4.07 Solid Rock Excavation Defined

Solid rock excavation shall include such rocks as are not decomposed, weathered or shattered and which will require extraordinary construction activities as determined by the Engineer including but not limited to blasting, barring, wedging or use of air tools for removal. Under this classification shall be included the removal of any concrete or masonry structure (except concrete pavement, curb, gutter and sidewalk) exceeding one (1) cubic yard in volume that may be encountered in the work.

4.08 Blasting Procedure

The hours of blasting will be fixed by the Engineer. The Contractor's methods of procedure relative to blasting shall conform to local and state laws and municipal ordinances.

4.09 Braced and Sheeted Trenches

The Contractor shall adequately brace and sheet excavation wherever necessary to prevent caving or damage to nearby property. The cost of this temporary sheeting and bracing, unless provided for otherwise, shall be considered as part of the excavation costs without additional compensation to the Contractor. Trench sheeting shall remain in place until pipe has been laid, compacted to a depth of one foot (1') over the top of the pipe. Sheeting, bracing, etc., placed in the "pipe zone" (that part of the trench below a distance of one foot (1') above the top of the pipe) shall not be removed without the written permission or written order of the Engineer; that sheeting thereby left in place shall be paid for at the unit price bid. Sheeting ordered left in place by the Engineer in writing shall be paid for at the unit price bid. The Contractor may also leave in place, at his own expense, to be embedded in the backfill of the trench any sheeting or bracing in addition to that ordered left in place by the Engineer for the purpose of preventing injury or damage to persons, corporations or property, whether public or private, for which the Contractor under the terms of this contract is liable.

4.10 Backfill

Backfill under pavements, driveways, sidewalks, and other paved areas:

1. Flowable fill shall be used for backfill under all paved areas. Flowable fill mix design must be approved by the Engineer prior to placement. Backfill shall be placed as shown on Standard Detail St-11 (APWA p26-14).

Backfill in areas other than paved areas:

2. Backfill shall be finely divided, excavated material, free from debris, organic material, frozen material, and stones larger than six inches.

City of Raymore, Missouri

Water Main Specifications

Table of Contents

1.00 GENERAL DESIGN CRITERIA

1.01 General

The design criteria presented in this Article are the minimum standards to be followed in the design and construction of the water distribution systems within Raymore. These minimum standards are not intended to be used as a substitute for actual construction specifications and design computations.

1.02 Capacity

The water distribution system and any extension thereof shall have adequate capacity to:

1. Supply the peak hour demands (estimated at 0.67 GPM/customer) of all customers, domestic, public, commercial and industrial while maintaining a pressure of not less than 35 pounds per square inch at all points of delivery, without reducing the service to any customer below these requirements.

2. For residential fire protection, the system must be capable of delivering not less than 1,000 gallons per minute for two (2) hours for fire protection on the day of maximum customer demand (estimated at 0.44 GPM/customer) with a residual pressure of not less than 20 pounds per square inch to at least one point within 300 feet of each building to be served or proposed to be served by such system and extension for residential.

3. For other than residential fire protection, the system must be capable of providing water in such quantity as to adequately protect life and adjoining properties, as determined by the City of Raymore, consistent with alternative protective measures.

1.03 Criteria for Estimating Demand

The latest version of the water model adopted by the City of Raymore shall be used for evaluating the effect of new residential/commercial development on the existing water distribution system.

The following criteria will be used in estimating the average day demand, maximum day demand, and peak hour demand incident to the determination of future water main sizes.

1. Residential population = N = number of dwelling units x 2.78 people/dwelling unit.

2. Average daily water demand of residential population in gallons per day (gpd) R = N x 100 gallons/person.

3. Average daily commercial and industrial water demand in gpd = C = number of commercial and industrial employees x 100 gallons/person.

   NOTE: Appropriate additional water demand allowance shall be made for commercial and/or industrial establishments of types having water demands in excess of 100 gpd per employee.

4. Average daily school water demand in gpd = S = number of staff employees and students x 20 gallons/person.

5. Average daily water demand (in gpd) = A = R + C + S.

6. Maximum daily water demand (in gpd) = M = A x 2.

7. Peak hours demand (in gpd) = P = M x 2.

8. Peak hour demand in gallons per minute (gpm) = P divided by 1440.

1.04 Main Designations

1. Transmission Mains - Transmission mains are classified as mains transporting water from a water source to a pumping station or reservoir. Transmission mains shall be 12 inches in diameter or larger. Materials shall be ductile iron pipe conforming to the current AWWA specification C151, Class 50 with polywrap. Transmission mains shall not be tapped unless approved by the City Engineer.

2. Major Distribution Mains - Major distribution mains shall be all other mains 12 inches in diameter or greater. Material shall be ductile iron pipe conforming to the current AWWA specification C151, Class 50 with polywrap. Fittings shall conform to the current AWWA specifications C110 and C153, and shall have a pressure rating of not less than that of the pipe.

   Major distribution mains will only be tapped by minor distribution mains. Connections to major distribution mains shall be made at intervals not less than 1,000 feet.

3. Minor Distribution Mains - Minor distribution mains are classified as water mains 6 inches to 12 inches in diameter. Material shall be ductile iron pipe conforming to the current AWWA specification C151, Class 50. Fittings shall conform to the current AWWA specifications C110 and C153 and shall have a pressure rating of not less than that of the pipe. Four inch water mains are not permitted.

1.05 Grid System

Mains shall be laid on a loop or grid system with mains cross connected not more than 1,000 feet apart. Cross mains to be installed as part of a subdivision or platted lot shall be eight inches in diameter when required by the City Engineer. The cost of the eight inch main shall be the responsibility of the Contractor/Developer and is not eligible for city upsizing reimbursement over the cost of a six inch diameter main.

1.06 Dead End Water Main

Dead end water mains shall not exceed 700 feet in length. All dead end water mains including those to be extended in the future shall have fire hydrant assemblies installed at the terminus point.

All dead end water mains, which are to be extended in the future, shall be installed to the limits of the platted subdivision such that extensions to the mains to serve adjacent subdivision plats may be connected at the plat boundary and shall be installed with a valve and a temporary fire hydrant. The valve shall be the same size as the main.

All dead end water lines which are not to be extended in the future shall be a minimum diameter of six inches and shall extend to the lot line of the last lot to be served.

1.07 Valves

Valves will be installed as follows; two valves at every tee, three valves at every cross, an in-line valve every 1,100 feet or as directed by the City Engineer.

1.08 Fire Hydrants

In water systems and extensions serving one-family and/or two family residential subdivisions, fire hydrants shall be installed at such locations that there will be at least one fire hydrant within 300 feet hose length to the nearest wall of any building, existing or future. Maximum street length between fire hydrants will not exceed 500 feet. Hydrants on adjacent streets will not be considered in meeting the above requirements.

In commercial, industrial and apartment house areas, fire hydrants shall be provided so that in no case shall more than 300 feet of fire hose be required to reach any point at the base of any exterior building wall from the nearest fire hydrant to supply the stipulated fire flow.

Not more than one fire hydrant shall be located on any six inch dead end main.

2.00 MATERIALS

2.01 Scope

This work shall consist of furnishing materials for, and installing water lines and appurtenances in conformity with the lines and grades shown on the approved plans or as directed by the City Engineer.

2.02 Water Mains and Fittings

1 Materials for Water Mains and Fittings shall be the following:

a. Ductile Iron Pipe - Ductile iron pipe shall conform to the current AWWA specification C151, Class 50. Joints shall be mechanical or push on type. Fittings shall conform to the current AWWA specifications C110 and C153 and shall have a pressure rating of not less than that of the pipe. All transmission mains shall be polyethylene encased in accordance with the current AWWA specification C105. Minimum thickness shall be eight mils.

b. Prestressed Concrete Pressure Pipe, Steel Cylinder Type Prestressed concrete pressure pipe, fittings and appurtenances shall conform to the requirements of the current AWWA specification C301. Minimum thickness of the steel cylinder shall be 16 gauge. Gaskets shall be synthetic rubber.

2.03 Valves and Appurtenances

1. Butterfly Valves - Butterfly valves shall be provided for all mains 24 inches or larger. Butterfly valves shall be rubber seated, designed to provide a tight shut off and conform to current AWWA specification C504. Valve disc shall seat 90 degrees with the pipe axis. Shaft seals shall be O-ring type. Direction to open shall be counterclockwise and be marked as such.

   Valve shafts and seat surfaces shall be constructed of 18-B Type 304 or Type 316 stainless steel.

   Valves shall be Mueller, Clow, M & H, Kennedy, Pratt or approved equal.

2. Gate Valves - The type, size and location of valves shall be as designated on the approved Engineering Drawings. Except as modified or provided herein, all gate valves shall be 200 PSI, resilient-seated, cast iron body, with non rising stems and stem seals of the O-ring type, conforming to the current AWWA specification C509. Direction to open shall be counterclockwise and be marked as such.

Valve ends shall be mechanical joint conforming to current AWWA specification C111, except where flanged ends are required by the drawings and specifications.

Valves shall be Mueller, Clow, Waterous, American Flow Control, (AFC), M & H, Kennedy, Pratt or approved equal.

3. Valve Coating - All ferrous metal surfaces of valves and accessories, both interior and exterior, shall be shop-painted with two coats epoxy conforming to current AWWA specification C550.

4. Valve Boxes - All buried valves shall be provided with ferrous metal riser and cover. Covers shall have the word "water" cast on it and painted blue.

   All parts shall be painted with an asphalt varnish in accordance with current AWWA specification C500.

2.04 Fire Hydrants

1. All fire hydrants shall be the traffic model, break-away type, and conform to the current AWWA specification C502. Such hydrants shall have two 2-1/2-inch nozzles and one 4-1/2-inch pumper nozzle with national standard fire hose coupling screw thread.

2. Nozzle caps shall be the "nut type" having the same dimensions as the operating nut. Such caps shall be securely chained to the base of the hydrant.

3. Operating nut shall include the weather shield.

4. Hydrant shall be furnished with a six-inch isolation gate valve in accordance with Section II, Par. C "Valves and Appurtenances" under this Article.

5. Direction to open shall be counterclockwise and be marked as such.

6. Hydrants shall come with an oil reservoir.

7. Hydrants shall be manufactured optic yellow. Field painting is not acceptable.

8. Hydrants shall be furnished with temporary black plastic caps or shall be covered with a black plastic bag until the hydrants are available for service.

9. Fire hydrant shall be Clow ‘Medallion’, Kennedy "Guardian", Mueller "Centurion" or approved equal.

2.04 Tapping Sleeves and Valves

Tapping sleeves and valves, when connecting to existing live mains or where required by the approved Engineering drawings, shall be 200 psi, resilient-seated, cast iron body, non-rising stem gate valves conforming with all applicable requirements of the current AWWA specification C509. Direction to open shall be counterclockwise and be marked as such.

Tapping sleeves shall be stainless steel and compatible with the tapping valve.

Tapping sleeves and valves shall be Mueller, Clow, Waterous, American Flow Control (AFC), M & H, Kennedy or approved equal.

3.00 INSTALLATION

3.01 Pipe, Hydrants, Valves, and Tapping Sleeves

1. Ductile Iron Pipe - Ductile iron pipe shall be installed in accordance with the current AWWA specification C600. All joints, fittings and other appurtenances, shall be laid at least 18 inches from any obstruction, fire hydrants shall be 36 inches from any obstruction. Fire hydrants shall be installed where shown on the Engineering Drawings and in accordance with Standard Detail Wtr-1.

2. Prestressed Concrete Pipe - Prestressed concrete pipe shall be installed in accordance with the current AWWA specification M9.

3.02 Traffic Control

Traffic Control devices shall be provided by the Contractor/Developer in accordance with the current MUTCD to regulate, warn and guide traffic at the work site.

3.03 Pipe Alignment and Grades

All pipe shall be laid and maintained to the required lines and grades, with hydrants, valves and fittings at the required locations and with joints centered and drawn "home", and with all valve and hydrant stems plumb. The developer/contractor shall furnish line and grade stakes necessary for the work. It shall be the Contractor's responsibility to preserve these stakes from loss or displacement. The Engineer may order and replace any stakes he deems necessary for the proper prosecution of the work. Any replacements shall be at the Contractor's expense. All pipes shall be laid to the depth shown on the contract drawings and/or cut sheets as supplied by the Engineer. The Contractor shall satisfactorily maintain the specified cover by a means approved by the Engineer. If additional bends are required where not shown on the drawings to maintain

alignment around curves, the Contractor shall provide the required number and be compensated at the unit price as proposed on the bid form. The following is the maximum allowable joint deflection for the ductile iron pipe:

AWWA C-600 TABLE 1 and 2 SUMMARY (20' pipe length – except as noted.)		
Pipe Size	Mechanical Joint	Push on Joint
6"	27"*	21"
8"	20"*	21"
12"	22"	21"
16"	15"	12"
18"	12"	12"
20"	12"	12"
24"	10"	12"
30"	10"	8"
36"	9"	8"
42"	8"	8"
48"	8"	8"

Note: * 18' Length

3.04 Thrust Restraints

All plugs, caps, tees, bends and hydrants shall be provided with thrust blocks in accordance with Standard Detail Wtr-2 and Wtr-3. Concrete thrust blocks shall have a minimum 28-day compressive strength of 4000 psi. Concrete shall be placed and cured for 24 hours prior to energizing the water line.

Concrete shall extend from fitting to undisturbed soil and shall be installed so that all joints are accessible. If adequate soil support cannot be obtained, a mechanical restraining assembly shall be installed as approved by the City Engineer.

3.05 Handling and Storage

All pipe, fittings, valves, hydrants and accessories shall be loaded, unloaded, stored and installed in such a manner to prevent structural damage or coating damage. Any damaged materials shall be replaced or restored to its original condition at the Contractor/Developer's expense.

3.06 Cleaning

All pipe, fittings, valves, hydrants and accessories shall be kept clean of foreign matter while being handled or stored. During installation, foreign matter shall not enter the pipe or appurtenances. At the end of each working day, a temporary plug shall be installed at the termination of the water line.

3.07 Inspection

A Public Works Inspector will inspect all pipe, fittings, valves, hydrants and accessories for damage or defect prior to installation. Damaged or defected materials shall be replaced or restored to its original condition by the Contractor/Developer.

3.08 Connection to Existing Main

The Contractor/Developer shall furnish and install all of the fittings necessary for connections between new water mains and existing water mains. Tapping sleeves and valves are required when connecting to existing live mains or where required by approved engineering drawings. The installation of tapping sleeves and valves shall be done while a Public Works Inspector is present.

Tapping into existing mains shall be done with no interruption of existing services unless otherwise approved by the City Engineer 48 hours prior to disruption of service. Valves on the existing water system or valves that separate newly constructed mains from the existing water system shall be operated by the Public Works Inspector.

Special care should be taken when making a connection to an existing main. No foreign material or contaminants will be permitted to enter the water system.

Thrust blocks shall be provided at the new connection to provide thrust restraint in accordance with Standard Detail Wtr-2 and Wtr-3.

3.09 Service Connections

The City will install a corporation connection at the main for individual, commercial, industrial and residential service lines up to one (1) inch in diameter. The Contractor/Developer shall notify the Building Inspections Department 48 hours in advance of requiring a service connection. Any tap greater than one (1) inch is the Contractor's responsibility.

Excavation for service connections shall be provided by the Contractor/Developer. Installation of meters greater than two inch diameter will be specifically approved by the City Engineer. Excavation shall be backfilled within 24 hours.

3.10 Water Lines In Relation To Sewers – Separation of Water Mains, Sanitary Sewers and Storm Sewers

1. Adequate Separation Factors - The following factors should be considered in providing adequate separation:

a. materials and type of joints for water and sewer pipes,

b. soil conditions,

c. service and branch connections into the water main and sewer line,

d. compensating variations in the horizontal and vertical connections,

e. space for repair and alterations of water and sewer pipes,

f. off-setting of pipes around manholes and other sewer structures.

2. Parallel Installation

Water mains shall be laid at least ten feet horizontally from any existing or proposed sanitary sewer and storm sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain this separation, the City Engineer may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer, and in either case, at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

3. Crossings

Water mains crossing sewers shall be laid to provide a minimum vertical clear distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. At crossings, a full length of water pipe shall be located such that both joints will be as far from the sewer as possible. Special structural support (i.e. encasement) for the water and sewer pipes may be required.

4. Force Mains

There shall be at least a ten-foot horizontal separation between water mains and sanitary sewer force mains. There shall be an 18-inch vertical separation at crossings as required in Item 3.

5. Sewer Manholes and Other Structures

No water line shall be located closer than ten feet to any part of a sanitary sewer manhole or storm sewer curb inlet, junction box, or other storm sewer structure.

6. Exceptions

The City Engineer may approve on a specific case by case basis deviations from the above requirements when the City Engineer has determined it is impossible to obtain the specified separation distance.

3.11 Straddle Blocks

Straddle blocks shall be provided every 50 feet for water mains which exceed ten percent slope and for the end of dead end water mains as shown on Standard Detail Wtr-4. Concrete shall be placed and cured for 24 hours prior to energizing the water line.

3.12 Polyethylene Encasement

Polyethylene encasement shall be installed in accordance with the current AWWA specification C105 and Standard Detail Wtr-5.

3.13 Stream Crossings

Water mains at stream crossings shall be encased as per Standard Detail San-6.

4.00 DISINFECTION

Precautions, methods, procedures and materials for disinfection shall conform to current AWWA specification C651.

Precaution shall be taken to protect the interior of pipes, fittings and valves against contamination. Pipe shall be handled in such a manner to prevent the entrance of foreign material or water. Not more than 4,000 feet of water main shall be installed without disinfecting.

The Public Works Inspector shall be notified by the contractor/Developer 24 hours prior to commencing disinfection. The disinfection shall proceed as follows:

4.01 Filling

After installation, the entire main shall be completely filled to eliminate air and be flushed to remove any material that may have entered the main.

4.02 Chlorination

Chlorination by the Contractor/Developer shall be the "continuous-feed method" or the "slug-method" as outlined in the current AWWA specification C651, or a method as approved by the City Engineer.

4.03 Operation

Prior to flushing the line free of chlorine, the Contractor/Developer shall operate all valves and hydrants in order to disinfect appurtenances. Contractor shall use extreme care so as to avoid any chlorine spikes in the existing system.

4.04 Final Flushing

Final flushing shall begin after the appropriate retention period has elapsed and the chlorine residual in the line meets regulatory requirements. The chlorinated water shall be flushed from the main until chlorine measurements show the water leaving the test main are no higher than that prevailing the system.

Test water flushed from the water main shall be disposed of in an environmentally safe manner. Discharge of test water into sanitary sewers will not be permitted. After the chlorinated water has been flushed out of the line, bacteriological test samples shall be taken by the Public Works Inspector and submitted to the Kansas City Water Department, or other laboratory at the City's discretion, to ensure the absence of coliform organisms. Test results shall be submitted to MDNR for evaluation.

If initial disinfection fails to produce satisfactory chlorine residual and bacteriological samples, the disinfection shall be repeated at the expense of the Contractor/Developer until satisfactory samples can be obtained.

5.00 HYDROSTATIC TESTING

Hydrostatic pressure and leakage testing shall be performed by the Contractor/Developer in the presence of the Public Works Inspector in accordance with current AWWA specification C600 procedures. The Contractor/Developer shall supply all pipe, tools and equipment necessary to operate the test.

The hydrostatic pressure during testing shall be at least 150 psi. Duration of the test shall be at least two hours.

The leakage test shall be conducted concurrently with the pressure test. The pipeline is acceptable if the leakage does not exceed the allowable limits as determined by the following formula:

$Q = LD (P)^{½} / 133,200$

WHERE: Q = Allowable leakage, in gallons per hour
L = Length of pipe tested, in feet
D = Nominal Diameter of pipe, in inches
P = Average test Pressure during leakage test in psi

Water lines which fail to meet the test standards shall be repaired and retested, at the expense of the Contractor/Developer, as necessary, until the test requirements are met. Not more than 4,000 feet of main shall be installed without testing.

6.00 EXCAVATION, TRENCHING AND BACKFILLING

6.01 General

The trench shall be so dug that the pipe can be laid to the alignment and depth required and shall be excavated only so far in advance of pipe laying as the Engineer shall specify. The trench shall be so braced and drained that the workmen may work therein safely and efficiently. All trenches shall be sheeted and braced to a safe angle of repose. Such angle of repose shall be no less than that repose required by the requirements of the Occupational Safety and Health Act (OSHA), whichever is more restrictive.

6.02 Trench Width and Description

The trench width, at the top of the trench may vary depending on the depth of the excavation and the nature of excavated material encountered. However, the maximum allowable width of trench shall be in strict accordance with Section 2902.1 APWA specifications. The width of the trench shall also be kept at a minimum to prevent excess destruction of the existing ground surface. The trench width at pipe grade shall be ample to permit the proper laying and jointing of the pipe and fittings and for proper backfilling and compaction. The maximum clear width of trench at the top of the pipe shall be not greater than the outside diameter of the pipe plus 2 feet.

All trenches shall be excavated so that the pipe may be laid accurately to grade with a minimum of 42 inches of earth cover over the top of the water mains, unless otherwise noted on the drawings and/or cut sheets. The trench shall have a bottom conforming to the grade to which the pipe is to be laid. The pipe shall be laid upon sound soil, cut true and even so that the barrel of the pipe will have a bearing for its full length. If the excavation is inadvertently made below the bottom conforming to grade, it shall be backfilled with well tamped pit run sand or fine gravel or other material as approved by the Engineer at no additional expense to the owner.

Bell holes shall be dug at the ends of each length of pipe to permit proper jointing. Excavations for manholes and other structures shall have a one foot minimum

clearance on all sides. The trench shall be kept free from water until the joints have been completed.

6.03 Pipe Foundation in Poor Soil

When the bottom at subgrade is soft and in the opinion of the Engineer cannot adequately support the pipe, a further depth and/or width shall be excavated and refilled to pipe foundation grade with material approved by the Engineer and thoroughly compacted; or other approved means, such as piling, shall be adopted to assure a firm foundation for the pipe with extra compensation allowed, the Contractor as provided elsewhere in these specifications. This provision only applies in those instances/locations when normal dewatering operations are not viable and/or poor soil conditions exist as determined by the Engineer.

The Contractor shall furnish, drive and place piling if ordered by the Engineer. Piles shall be driven in exact position at locations determined by the Engineer. The Contractor, at his own expense, must replace piles not correctly positioned at the completion of driving.

6.04 Pipe Clearance in Rock

Large rock boulders and large stones shall be removed to provide a clearance of at least 12 inches below outside barrel of the pipe, valves or fittings and to a clear width of 12 inches on each side of all pipe and appurtenances for pipe 16 inches or less in diameter; for pipes larger than 16 inches, a clearance of 18 inches below an clear width of 9 inches on each side of pipe shall be provided. Adequate clearance for properly jointing pipe laid in rock trenches shall be provided at bell holes.

6.05 Pipe Foundation in Rock

The space between the bottom of the trench in rock conditions and the required bedding of the pipe as per Standard Detail Wtr-6 shall be backfilled with granular material approved by the Engineer, thoroughly tamped. No additional compensation for placing or ramping this material shall be allowed.

6.06 Solid Rock Excavation Defined

Solid rock excavation shall include such rocks as are not decomposed, weathered or shattered and which will require extraordinary construction activity as determined by the Engineer including, but not limited to, blasting, barring, wedging or use of air tools for removal.

Under this classification shall be included the removal of any concrete or masonry structure (except concrete pavement, curb, gutter and sidewalk) exceeding one (1) cubic yard in volume that may be encountered in the work.

6.07 Blasting Procedure

The hours of blasting will be fixed by the Engineer. The Contractor's method of procedure relative to blasting shall conform to local and state laws and Municipal Ordinances.

6.08 Braced and Sheeted Trenches

The Contractor shall adequately brace and sheet excavations wherever necessary to prevent caving or damage to nearby property. The cost of this temporary sheeting and bracing, unless provided for otherwise, shall be considered as part of the excavation costs without additional compensation to the Contractor. Trench sheeting shall remain in place until pipe has been laid, tested for defects and repaired if necessary and the earth around it compacted to a depth of 1 foot over the top of the pipe. Sheeting, bracing, etc., placed in the "pipe zone" (that part of the trench below a distance of 1 foot above the top of the pipe) shall not be removed without the written permission or written order of the Engineer; that sheeting thereby left in place shall be paid for at the unit price bid. Sheeting ordered left in place by the Engineer in writing shall be paid for at the unit price bid. The Contractor may also leave in place, at his expense, to be embedded in the backfill of the trench, any sheeting or bracing in addition to that ordered left in place by the Engineer for the purpose of preventing injury or damage to persons, corporations or property, whether public or private, for which the Contractor under the terms of this contract is liable.

6.09 Piling of Excavated Material

All excavated material shall be piled in a manner that will not endanger the work or damage property that is to be avoided and also will avoid obstructing sidewalks and driveways. Gutters shall be kept clear or other satisfactory provisions made for street drainage.

6.10 Barricades, Guards and Safety Provisions

At no cost to the Owner, the Contractor shall protect persons from injury and to avoid property damage, shall place and maintain adequate barricades, construction signs, torches, flashers and guards as required in accordance with the contract documents and the Manual on Uniform Traffic Control Devices during the progress of the construction work and until the site is returned to a safe and usable manner. All material piles, trenches, excavations, equipment and pipe which may serve as hazards to the public shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. The rules and regulations of the local and state authorities respecting safety provisions shall be observed.

6.11 Private Property Protection

The Contractor shall be responsible for, but not limited to, the protection of trees, fences, poles and all other private property unless their removal is authorized by the Engineer. Property damage shall be satisfactorily restored by the Contractor or adequate compensation therefore shall be the responsibility of the Contractor at no additional cost to the Owner.

6.12 Jack Steel Casing Pipe in Place

Steel casing pipe shall be jacked in place to provide a conduit for the carrier pipe.

The carrier pipe shall be installed within the casing pipe using high density polyethylene spacers or similar devices to center the carrier pipe within the casing pipe. Upon completion of the carrier pipe installation, watertight removable end seals shall be installed for the casing conduit. Cathodic and corrosion protection are required depending on the carrier/casing pipe used. Typical detail per Standard Detail St-13.

Jacking shall be paid for at the contract unit price bid per lineal foot installed and shall include the casing pipe, jacking pits, cathodic and corrosion protection, watertight seal, dewatering and all other labor and materials necessary to complete the work.

The existing casings shall be cut or trimmed as shown on the plans. All labor and materials necessary to complete the work shall be considered incidental to the installation of the carrier pipe.

6.13 Backfill

Backfill under pavements, driveways, sidewalks, and other paved areas:

1. Flowable fill shall be used for backfill under all paved areas. Flowable fill mix design must be approved by the Engineer prior to placement. Backfill shall be placed as shown on Standard Detail St-11 (APWA p26-14)

Backfill in areas other than paved areas:

2. Backfill shall be finely divided, excavated material, free from debris, organic material, frozen material, and stones larger than six inches.

7.00 WATER MAINS NOT MEETING MINIMUM SPECIFICATIONS

Water lines not meeting requirements of these construction standards shall he replaced or repaired in a manner approved by the City Engineer. Defective materials shall be completely removed and replaced with acceptable materials.

8.00 PROTECTION OF EXISTING FACILITIES

All construction operations in the vicinity of existing facilities shall be performed with care to prevent damage to these facilities. If damage occurs, repairs shall be made in a manner approved by the City Engineer and any damaged facilities shall be repaired with new materials and restored to its original condition.

City of Raymore, Missouri

Street Specifications

Table of Contents

1.00 GENERAL DESIGN STANDARDS

1.01 General

The design standards presented in this article are the minimum standards to be followed in the design and construction of the City of Raymore Public Streets. These minimum standards are not intended to be used as a substitute for actual construction specifications and design computations.

1.02 Pavement Design

The pavement sections shown on the following table may vary based on actual design calculations**. Suitable material (as per APWA section 2102.2.A.3.b.) for pavement subgrade is defined as entirely imperishable material with that portion passing the No. 40 sieve having a liquid limit not exceeding 40 and a plastic index not exceeding 25 when tested in accordance with ASTM D-423 and D-424, respectively**. Contractor shall submit test results to the City prior to installing curb and pavement. Subgrade material not meeting these limits shall be stabilized as per the recommendations of a qualified geotechnical laboratory and approved by the City. Testing and stabilization will be paid for by the Contractor.

Street Classification	Major Arterial	Minor Arterial	Collector	Residential	Industrial	Commercial	Rural
Pavement Width*	52 ft.	52 ft.	36-ft.	28-32 ft.	36 ft.	36-48 ft.	24 ft.

CONCRETE

Cross Slope	3%						
Thickness	9 in.	9 in.	7 in.	6 in.	9 in.	7 in.	N/A

ASPHALT

Cross Slope	3%						
Thickness	12 in.	11 in.	9 in.	8 in.	11 in.	9 in.	11 in.
Design Axle Loading	9 Ton	9 Ton	9 Ton	7 Ton	9 Ton	9 Ton	9 Ton
Traffic Class Design ESAL	IV 1,100,000	IV 1,100,000	III 110,000	II 27,000	IV 1,100,000	IV 1,100,000	IV 1,100,000

* Back of curb to back of curb

1.03 Radius

1. Cul-De-Sac – Minimum radius for pavement on a cul-de-sac shall be thirty-nine feet to the back of the curb. When islands are constructed within the center of the cul-de-sac, the minimum radius shall be 39 feet plus the radius of the island.

2. Eyebrows – A 50-foot radius (39 feet to back of curb) eyebrow or bubble may be provided at the intersection of two streets. It is desirable that the centerline radius point be at the centerline intersection of the two streets, however, the centerline radius point may be offset a maximum of twenty-five feet toward the inside of the intersection on one of the incoming streets but not both. The said radius point may be offset toward the outside of the intersection until the eyebrow becomes a cul-de-sac and the intersection becomes a "T".

1.04 Temporary Cul-De-Sacs

When dead end streets over 300 feet are constructed or as directed by the City Engineer with plans for extensions in a future development phase and there are no provisions for a permanent turnaround, a temporary cul-de-sac shall be provided within the limits of Right –of-Way. The cul-de-sac shall consist of a 39-foot radius circle constructed of a minimum of a 4- inch asphalt base overlaid with a two- inch asphalt surface.

1.05 Grading Requirements and Geometric Design

1. Geometric Design:

Design should be based on the latest edition of AASHTO – following are the minimum design criteria**:**

Divided Arterials:

Minimum width dual roadways right-of-way	120 ft.
Maximum gradient	6%
Minimum sight distance on vertical curves (stop)	450 – 550 ft.
Minimum radii of horizontal curves	1200 ft.
Design speed	55 MPH

Arterials:

Single roadway right-of-way	80-100 ft.
Maximum gradient	6%
Minimum sight distance on vertical curves (stop)	325-400 ft.
Design speed	45 MPH
Standard Detail:	St - 1

Collectors:

Minimum width right-of-way	60 ft
Maximum gradient	8%
Minimum radii of horizontal curves	450 ft.
Minimum sight distance on vertical curves (stop)	225-250 ft.
Design speed	35 MPH
Standard Detail	St - 2

Residential Streets:

Minimum width right-of-way	50 ft.
Maximum gradient	10%
Minimum radii of horizontal curves	200 ft.
Minimum sight distance of vertical curves (stop)	150 ft.
Design speed	25 MPH
Standard Detail	St - 3

Industrial Streets:

Minimum width right-of-way	60 ft.
Maximum gradient	6%
Minimum sight distance of vertical curves (stop)	200 ft.
Minimum radii of horizontal curves	300 ft.
Design speed	30 MPH

Commercial Streets:

Minimum width right-of-way	60 ft.
Maximum gradient	6%
Minimum radii of horizontal curves	300 ft.
Minimum sight distance on vertical curves (stop)	200 ft.
Design Speed	30 MPH
Standard Detail	St - 2

Rural Roads:

Minimum width right-of-way	40 ft.
Maximum gradient	6%
Minimum radii of horizontal curves	300 ft.
Minimum sight distance on vertical curves (stop)	200 ft.
Design speed	30 MPH
Standard Detail	St - 4

2. Minimum Gradient

The minimum gradient for all streets shall be 1.0%.

3. Maximum Gradient

The maximum gradient for streets may be exceeded only upon approval of the City Engineer in writing for unusual cases.

4. Tangent Length

The minimum tangent length between reverse curves shall be 50 feet for residential streets and 100 feet for all other classifications except no tangent will be required for radii longer than 500 feet.

5. Grading

Grading for paved areas shall consist of excavating, filing, and compacting earthwork within the limits of embankment fill and the cut section in accordance with these specifications and in conformity with the lines, grades, and typical cross section shown on the drawings as approved by the City Engineer. Subgrade shall be compacted under curbs.

6. Grading Behind Curbs

The finished grade shall slope from one-quarter inch vertical to one foot horizontal minimum to one-half inch vertical to one foot horizontal maximum above the back of the curbs. The grading gradients may be varied or exceeded upon approval of the City Engineer in writing, when grading calculations are submitted and approved by the City Engineer showing that the curb water carrying capacity is adequate and will not cause flooding of yards and basements.

1.06 New Streets Abutting Existing Streets

Sight distances for the abutting streets shall meet the requirements of AASHTO's policy on Geometric Design (latest edition). If these sight distance requirements cannot be met, the existing street shall be reconstructed at the Developer's expense to meet the design standards. Developer's Engineer will provide a certification on the applicable drawings that the AASHTO requirements have been met. Curb shall be installed to match future curb at ultimate design. Centerline of the street for ultimate design shall match centerline of existing street.

1.07 Private Streets

All privately owned streets shall be constructed in accordance with the provisions in this Article, i.e., General Design Standards, grading requirements and geometric design, horizontal and vertical alignment, pavement thickness, etc.

1.08 Superelevation

The design of street curves shall consider superelevation in accordance with the current AASHTO policy on Geometric Design of streets in order to establish the proper elevation between design speed and curvature.

1.09 Street Intersections

The intersection of streets shall be designed such that street crowns match at the center of the intersection.

Street swales to divert water across a street shall only be permitted on residential classification streets with the approval of the City Engineer. Flow of run-off water across streets shall be limited to one cubic foot per second.

When street swales are utilized, water shall not be diverted across the through street or if neither street is a through street, storm water shall be diverted across the street with the least traffic, as directed by the City Engineer.

1.10 Sidewalks

Sidewalk width is defined in the Unified Development Code. The sidewalk shall be a minimum of 4-feet behind the curb and within the public right of way. If a four foot separation between back of curb and sidewalk is not possible, the sidewalk shall be increased to six feet in width and shall be constructed abutting the back of the curb. Refer to "Section 2.00 "Materials", Section 3.00 "Installation". See Standard Detail
St-5 for Handicappped Access Ramp design.

1.11 Guardrails

1. Location – At the locations required in the Roadside Design Guide published by AASHTO (latest edition).

2. Installation – Guardrail shall be installed according to the procedure outlined
in the latest edition of the Missouri Standard Specifications for Highway Construction – Section 606.

3. Material – Guardrail material shall conform to the latest edition of the Missouri Standard Specifications for Highway Construction - Section 1040.

2.00 MATERIALS

2.01 Portland Cement Concrete Pavement

1.	Concrete	KCMMB-4K
2.	Portland Cement	ASTM C150, TYPE I or II
3.	Coarse Aggregate	Per Approved Mix
4.	Fine Aggregate	Per Approved Mix
5.	Expansion Joint Material (1/2")	Flexible Foam Joint Filler with Peel Strip (or approved equal)

6.	Joint Sealing Compound	ASTM 3405
7.	Reinforcing Steel	ASTM A615
8.	Welded Wire Fabric	ASTM A185
9.	Curing Compound	ASTM C309 (or approved equal)

2.02 Asphaltic Concrete Pavement

1.	Base Material	APWA (Section 2205) Type I, 30% Maximum Recycled Type I
2.	Surface Coarse	APWA (Section 2205), Type III MSSHC (Section 403), Type B MSSHC (Section 403), Type C
3.	Coarse Aggregate	APWA (Section 2205)
4.	Fine Aggregate	APWA (Section 2205)
5.	Asphalt Cement	APWA (Section 2205)
6.	Tack Coat	RC70, or SS-1 (or approved equal)

2.03 Curb and Gutter

1.	Concrete	KCMMB-4K
2.	Portland Cement	ASTM C-150, Type I or II
3.	Coarse Aggregate	Per Approved Mix
4.	Fine Aggregate	Per Approved Mix
5.	Dimension	Standard Details St-6 thru St-8
6.	Expansion Joint Material (1/2”)	ASTM D1753
7.	Joint Sealing Compound	ASTM 3405
8.	Curing Compound	ASTM C309
9.	Dowels	#5 Smooth Bars

2.04 Driveway Entrances and Sidewalks

1.	Concrete	KCMMB-4K
2.	Portland Cement	ASTM C150, Type I or II
3.	Coarse Aggregate	Per Approved Mix
4.	Fine Aggregate	Per Approved Mix
5.	Welded Wire Fabric	ASTM A185
6.	Dimension	Standard Details St-9 & St-10

Copies of specifications listed above are available for review at the Public Works Department.

3.00 INSTALLATION

3.01 Portland Cement Concrete Pavement

Construction of Portland Cement Concrete Pavement shall conform to the requirements of APWA specifications Section 2208, Portland Cement Concrete Pavement, with the following modifications.

1. Forms – Horizontal and vertical alignment for all form work shall not vary more than one eighth inch in ten feet.

2. Reinforcing Steel – Reinforcing steel shall be for the shape and size shown on the accepted detail plans and when placed in the work shall be free from dirt, mill and rust scale, paint, oil, (except dowel bars), or other foreign substances. The arrangement and spacing of the bars shall be as shown on the approved drawings; all reinforcing steel shall be positively secured against displacement due to the placing of the concrete. Bars shall be bound firmly together with wire ties or metal clips where they cross or lap and shall be supported by metal supports, spacers, or metal hangers. Spliced bars shall lap not less than 40 times the nominal diameters of the bars spliced.

3. Reinforced Placement – Longitudinal joints shall be constructed with one half-inch diameter bars, 24”centers. Dowel bars shall be placed in expansion joints and in construction joints marking the end of the day’s construction. Welded wire fabric reinforcement shall be placed two inches from the finished surface of the pavement.

4. Dowel bars- Dowel bars shall be smooth round bars placed as shown on the accepted drawings and shall be held in position exactly parallel to the surface and centerline of the slab by a metal device that is left in the pavement. This device shall hold each dowel in exactly the correct position so firmly that the dowels cannot be altered by concreting operations. The use of stones, brick or other bulk materials for supporting dowels or sleeves will not be permitted. One half of each bar shall be coated with basic sulphate blue lead or red lead paint with a heavy oil (not grease) to prevent bond. The painted and oiled end of the bar shall also be furnished with an approved paper or metal sleeve so designed as to provide a one-inch space at the end of the bar.

3.02 Asphaltic Concrete Pavement

Construction of Asphaltic Concrete Pavement shall be constructed in accordance with the requirements of APWA, Section 2200 "Paving" with the following modifications.

1. Base course shall be placed in lifts of three inches minimum and four inches maximum.

2. Tack coat between lifts shall consist of five hundredths to one-tenth gallons per square of RC-70 or SS-1 (or approved equal). A tack coat shall not be required between successive layers of base placed in the same working day.

3. Surface course shall be placed in two-inch maximum thickness lifts. Tack coat, if required in Item 2 above, shall consist of five hundredths to one-tenth gallon per square yard of RC-70 or SS-1 (or approved equal).

3.03 Curb and Gutter

1. Description – This work shall consist of air-entrained Portland Cement Concrete combined curb and gutter, constructed to the lines, grades, dimensions, and cross sections shown on the accepted drawings and in accordance with these specifications.

2. Curb Types:

    a. Curb and gutter for residential and collector streets shall be constructed in accordance with Standard Detail St-6, "Roll back curb and gutter", Type CG-2.
    b. Curb and Gutter for Collectors, Divided Arterials, Arterials, Industrial, Commercial, Limited Access Collectors, and Frontage streets shall be constructed in accordance with Standard Detail St-7, "Straight back curb and gutter", Type CG-1.

3. Subgrade – The subgrade for combined curb and gutter shall be excavated to the grades and sections shown on the accepted drawings. The subgrade shall be of compacted density stipulated in this Article. Paving underneath curb (to 1' behind curb and gutter) is acceptable.

4. Forms – All forms shall be sufficiently strong and rigid and securely staked and braced to obtain a finished project correct to the dimensions, lines and grades required. Forms may be of steel or wood at the option of the contractor. All forms must be cleaned and oiled before each use.

5. Joints – Expansion, contraction, and construction joints shall be constructed at the intervals and places shown on the accepted drawings. Contraction joints shall be tooled or sawed. Sawed joints shall begin as soon as the concrete hardens sufficiently to prevent excessive raveling along the saw cut and shall finish before conditions induce uncontrolled cracks, regardless of the time or weather. All joints shall be of the type and materials shown on the accepted drawings. Minimum depth of contraction joints shall be one quarter (25%) of the overall concrete thickness.

6. Placing Concrete – Concrete for curb and gutter shall be placed upon the previously prepared, compacted and moistened subgrade. The concrete shall be compacted with an approved internal type vibrator, or by hand spudding and tamping. The surface shall be shaped by use of a steel tool to produce the section shown on the accepted drawings. The edges shall be rounded with edgers to form the radii indicated on the approved drawings. Curb placed with a curb machine shall produce the section shown on the accepted drawings.

7. Finish – The surface of curb and gutter shall be finished with a wooden or steel float and brushed. Excessive water used to bring 'mud' to the surface to ease finishing will be cause for rejection of the curb.

8. Curbing and Protection – Immediately after the finishing operation have been completed and as soon as marring of the concrete will not occur, the entire surface of the newly placed concrete shall be covered and cured in accordance with the following method. The concrete shall not be left exposed for more than one half hour between stages of curing or during the curing period.

    a. White Pigmented Membrane – After the free water has left the pavement surface, the entire surface shall be sealed by hand or machine spraying with a uniform application of white pigmented membrane curing material. The contractor shall use equipment to ensure uniform coverage of curing material, without loss, on the pavement at the rate of one gallon for each 150 square feet. If rain falls on the newly coated pavement before the film has dried sufficiently to resist damage, or if the film is damaged in any other way, the Contractor/Develop will be required to apply additional

curing material to the affected portions. All areas cut by finishing tools subsequent to the application of the curing material shall immediately be given new applications at the rate specified above. If hair-checking develops before the membrane can be applied, the concrete shall be initially cured with wet burlap as specified in APWA, Section 2200 "Paving".

b. Cold & Hot Weather Concrete – 'Cold' weather concrete shall conform to the requirements of MCIB Section 10 and 'hot' weather concrete shall conform to the requirements of MCIB Section 11.

3.04 Driveway Entrance and Sidewalks

Driveway entrances and sidewalks shall be constructed in accordance with APWA Specifications, Section 2208, with the following modifications.

1. All sidewalks shall be a minimum of four inches in depth and include two #4 reinforcing bars which shall be placed six inches off the edge longitudinally or 6 inches in depth without reinforcing. At locations where sidewalks stop at undeveloped property, the Contractor shall place two reinforcing steel bars two feet beyond the end of the sidewalk.

2. All residential driveway approaches shall be constructed using:

   a. Six (6)-inch thick concrete with #4 reinforcing steel bars at 24" center, or flat sheets of '6x6 W2.9/2.9' WWF (previous designation was 6x6xW6/W6), or
   b. eight-inch thick concrete with no reinforcing steel required.

3. All commercial/industrial driveway approaches shall be constructed using:

   a. six (6)-inch thick concrete with #4 reinforcing steel bars at 12" centers,
   b. seven-inch thick concrete with flat sheets of '6X6 W2.9/2.9' WWF (6X6XW6/W6), or
   c. eight-inch thick concrete with no reinforcing steel required.

   Curbing shall be poured separate of the flatwork with no monolithic pours permitted.

4. Four inches of one half inch to three fourths inch clean crushed rock shall be placed as base material for all driveway approaches.

5. In areas where commercial drives intersect with integral curbs, the curb shall be lowered to driveway elevations to provide for handicapped access.

6. Driveways shall be constructed in accordance with Standard Details St-9 and St-10.

7. 'Cold' weather concrete shall conform to the requirements of MCIB Section 10 and 'hot' weather concrete shall conform to the requirements of MCIB Section 11.

8. The top six inches of subgrade shall be compacted to 95 percent of maximum proctor density at optimum moisture content as determined by ASTM D698. Any unstable subgrade material, such as topsoil, shall be removed and replaced with suitable material and compacted as indicated above.

   Any over-excavated subgrade shall be completely filled with concrete, backfilled with ½", ¾" clean rock or AB3, or backfilled with suitable material and compacted as indicated above.

3.05 Cleaning Operations

All catch basins, manholes, inlets and outlets and roadway surfaces shall be thoroughly cleaned of any accumulations of silt, debris, or foreign matter of any kind, and shall be free from such accumulations at the time of final inspection.

4.00 MATERIAL TESTS AND CERTIFICATIONS OF COMPLIANCE

4.01 Material Tests

When requested by the City Engineer, the contractor shall furnish testing and supply all test results at the contractor's expense and from an approved testing laboratory. Tests may be required for any of the following:

1. Standard Proctor tests for subgrade material.

2. Liquid Limit and Plastic Limit tests to determine the Plasticity Index of the Subgrade material.

3. Subgrade compaction on any section of the street and compaction around culverts, bridges, retaining walls, manholes, catch basins, and other locations inaccessible.

4. Aggregate for Portland Cement Concrete, Asphaltic Concrete Base and Asphaltic Concrete Surface.

5. A complete set of Test Property Curves for hot-mix design by Marshall Method for determining the optimum asphalt content for asphaltic concrete surface course and base for the current year. The curves shall have actual test

valves plotted and the number of test valves determined shall be sufficient to establish a meaningful curve. Mix designs and Marshall test results shall be submitted and approved by the City Engineer prior to construction.

5. Concrete compressive tests (cylinders), air entrainment, and slump.

5.00 CONSTRUCTION METHODS FOR GRADING

5.01 Finish Grading

Areas to be graded shall be cut or filled to within four hundredths of a foot of the approved subgrade elevations.

5.02 Excavating

All stable and suitable materials from excavation shall be used as far as practicable for fills as shown on the acceptable drawings. All unstable and unsuitable materials such as organic substances, soft clay, etc., shall be removed from the limits of the work. All tree stumps, masonry, and other obstructions shall be removed to a depth of four feet below the subgrade elevation. Where solid rock, shale, or similar material is found, the excavation shall be carried six inches below the subgrade for full width of the paved areas, plus an additional width for form work for curbs, catch basins, curb inlets, etc. The excavated area shall be backfilled to the subgrade and shoulder elevation with suitable earth or granular material and compacted.

5.03 Clearing and Grubbing

All sod shrubs, trees, and all vegetation and other deleterious material shall be removed from within the grading limits in cut or fill sections.

5.04 Fill

The embankment fill area shall be cleared and graded prior to placing of the fill layers. In no case shall boulders with a dimension greater than eight inches in any direction, or rock layers be deposited within two feet of subgrade elevation. Fill layer shall not exceed eight inches of compacted thickness.

5.05 Moisture Content

The moisture content of the soil at the time of compaction shall be uniform and shall be such that the soil can be compacted as specified. The moisture content shall not exceed minus one percent to plus three percent of the specified content.

5.06 Compaction in Fill Sections

After each fill layer has been spread as outlined in Paragraph 5.04, and brought to proper moisture content (5.05), the entire area shall be compacted as follows:

1. Compacted density of soil in each fill layer shall be equal to or greater than 95 percent of Standard Proctor Density within the moisture limits.

2. Sand and gravel which cannot be compacted satisfactorily with a sheepsfoot roll shall be rolled until no further consolidation is evident.

5.07 Compaction in Cut Sections

The soil six inches below the finish subgrade line in cut sections shall be scarified, broken up, adjusted to the proper moisture content and then compacted as specified above for fill sections. The depth of compaction in cut sections shall be six inches.

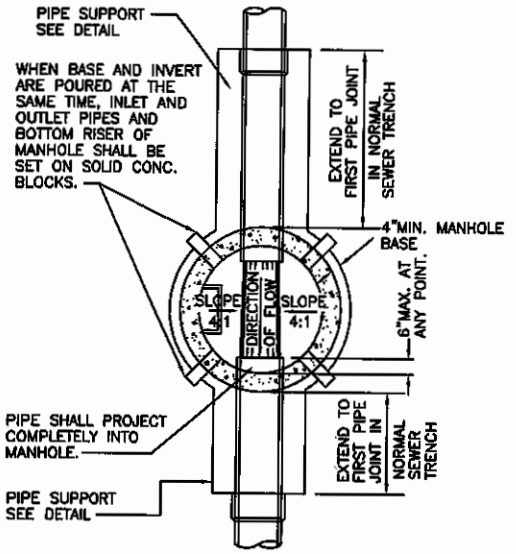
5.08 Utility Backfill

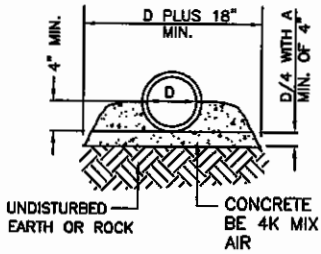
Backfill under pavements, driveways, sidewalks, and other paved areas shall be as follows:

1. Flowable fill shall be used for backfill in utility trenches, areas around culverts, bridges and retaining walls, curbs, manholes, and other sections that are inaccessible to the roller. Flowable fill mix design must be approved by the Engineer prior to placement. Backfill shall be placed as shown on Standard Detail St-11 (APWA p26-14)

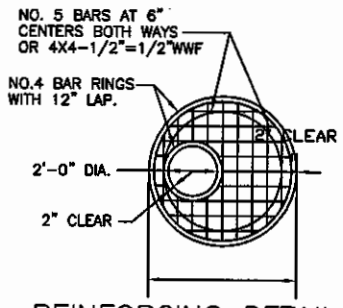
Backfill in areas other than paved areas:

2. Backfill shall be finely divided, excavated material, free from debris, organic material, frozen material, and stones larger than six inches.

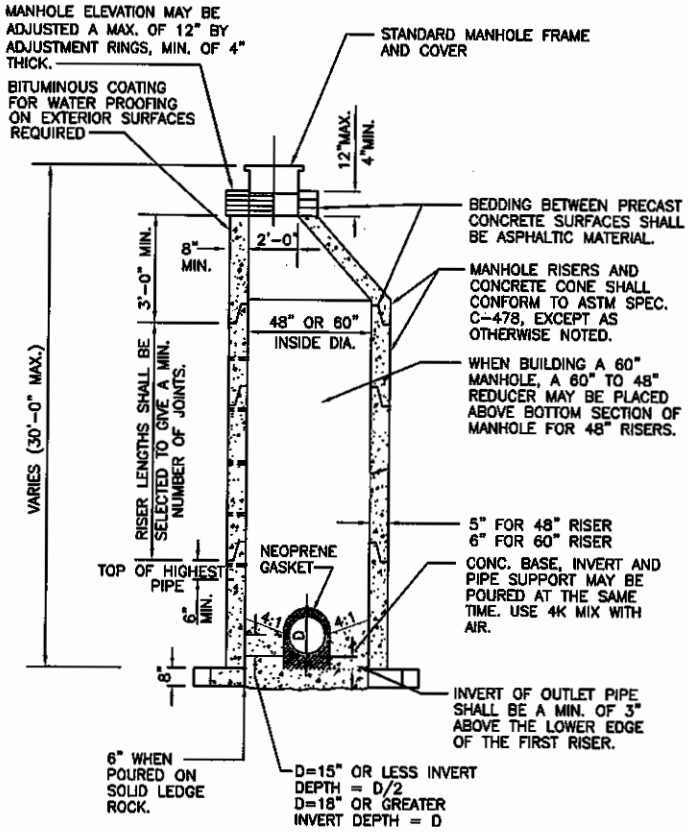


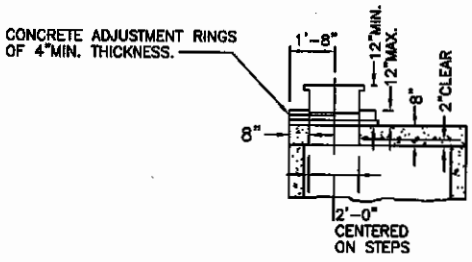


PIPE SUPPORT DETAIL



REINFORCING DETAIL OF COVER SLAB





SLAB TOP ALTERNATE AND SHALLOW MANHOLE DETAIL

GENERAL NOTES:

1. Clearance tolerance of pipe openings.
   The maximum allowable pipe opening on a horizontal axis shall be the outside diameter of the pipe plus 12".
   The maximum allowable pipe opening on a vertical axis shall be the outside diameter plus 8".
   The minimum clearance between the outside surface of an installed pipe and the concrete of the manhole shall be 2".
   The maximum openings allowable for the drop manhole entry in the barrel shall be the outside diameter of the pipe plus 12".
2. Installation of pipe openings.
   All required pipe openings shall be plant cast in manhole units. Field alterations of openings will be permitted only with Engineer's approval.
3. Minimum distance between any two adjacent pipes shall be 4".
4. Joint Wrap or Chimney Seal Material around each joint.

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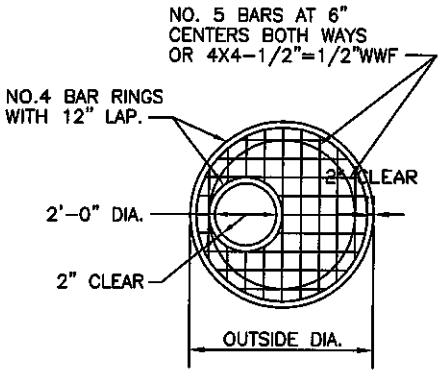
CITY OF RAYMORE

MANHOLE– PRECAST CONCRETE 4'–0" OR 5'–0" DIA

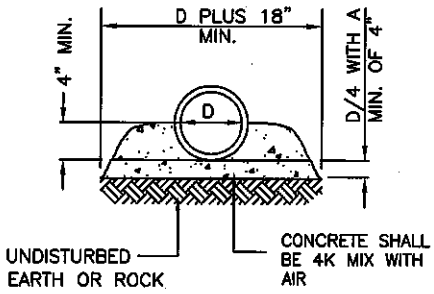
SIZE	FSCM NO.	DWG NO.	REV
A		San – 1	

SCALE NONE

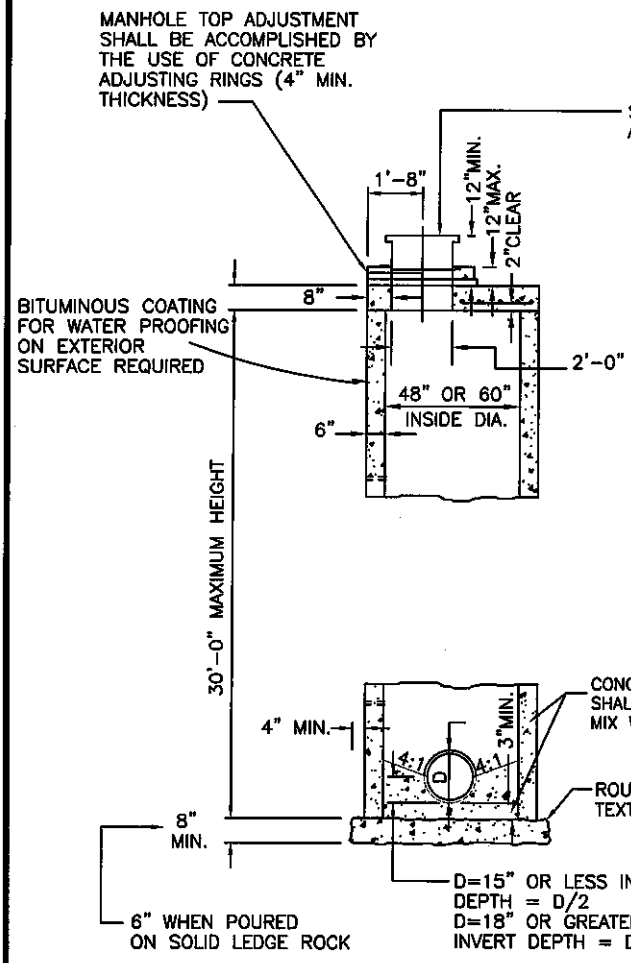
SHEET 1 OF 1



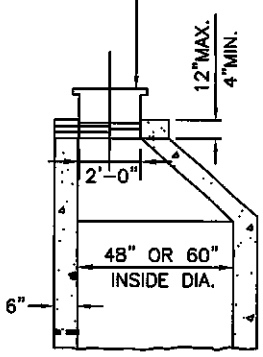
REINFORCING DETAIL OF COVER SLAB



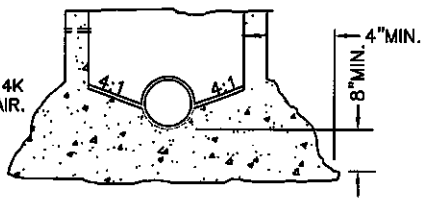
PIPE SUPPORT DETAIL



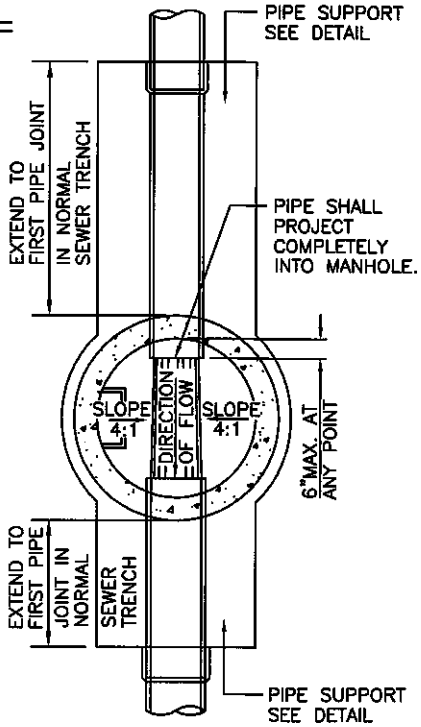
STAGE CONSTRUCTION



USING CONICAL SECTION



MONOLITHIC CONSTRUCTION



NOTES:

ALL JOINTS AND ADJUSTMENT RINGS SHALL BE WRAPPED.

MINIMUM DISTANCE BETWEEN ANY TWO ADJACENT PIPES SHALL BE 4".

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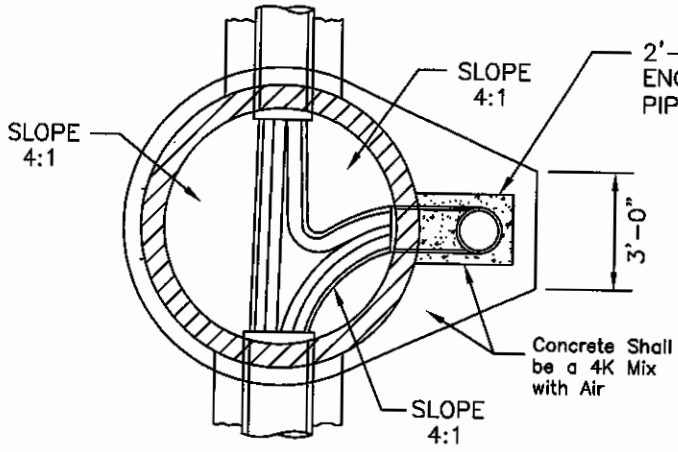
CITY OF RAYMORE

MANHOLE– CAST IN PLACE 4'–0" OR 5'–0" DIA.

DRAWN	CHECKED	APPROVED
Modified 2013		

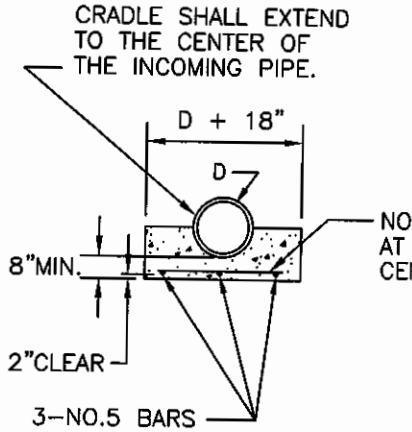
SIZE	FSCM NO.	DWG NO.	REV
A		San – 2	

SCALE NONE SHEET 1 OF 1

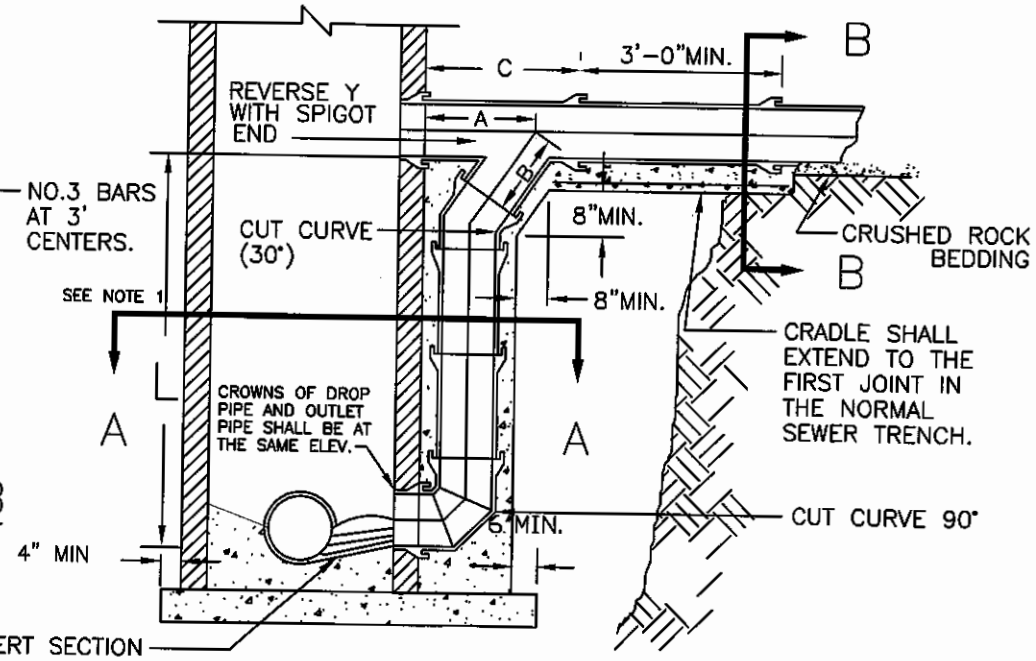


SECTION A-A

SIZE	C	A	B
8" ON 8"	3'-0"	2'-4"	1'-3"
10" ON 10"	3'-0"	2'-3"	1'-5"
12" ON 12"	3'-0"	2'-1"	1'-5"



SECTION B-B



SECTION VIEW

NOTE 1:
L > 2' DROP REQUIRES DROP MANHOLE.

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CITY OF RAYMORE

MANHOLE- OUTSIDE DROP
USE WITH ANY STANDARD MANHOLE

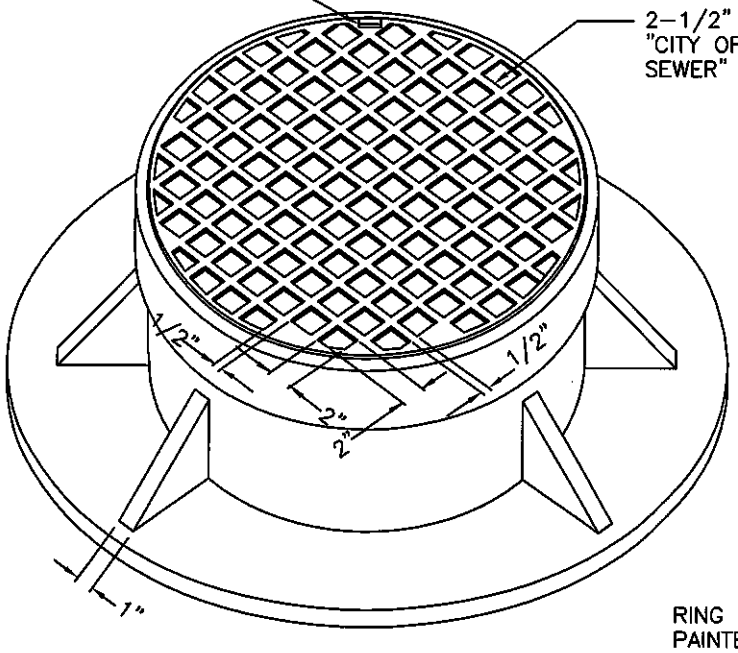
DRAWN	CHECKED	APPROVED
Modified 2013		

SIZE	FSCM NO.	DWG NO.	REV
A		San - 3	

SCALE NONE SHEET 1 OF 1

PICK HOLES SHALL BE PROVIDED IN EACH COVER.

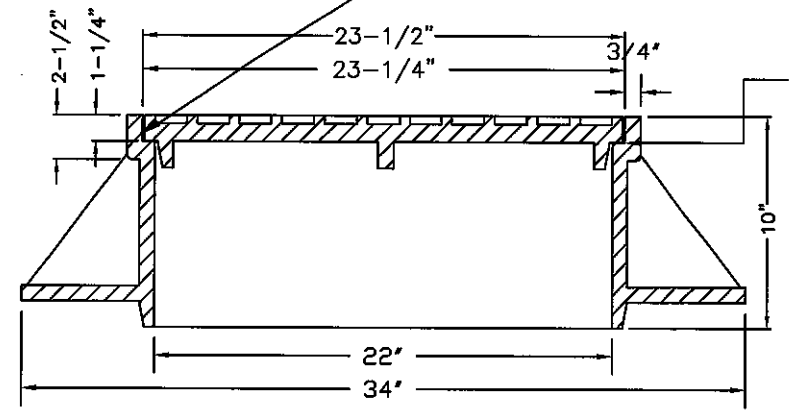
2–1/2" BLOCK LETTERING "CITY OF RAYMORE SEWER" This is the only lettering allowed.



MATERIAL TO MEET SPECIFICATIONS FOR GRAY IRON CASTINGS ASTM DESIGNATION A–48, CLASS 25 AS A MINIMUM REQUIREMENT.

RING AND COVER SHALL BE PAINTED WITH A MINIMUM OF ONE COAT OF ASPHALT BASE PAINT.

1/8" NEOPRENE GASKET



SURFACES BETWEEN RING AND COVER SHALL BE MACHINED TO PROVIDE A TRUE PLANE AROUND THE ENTIRE BEARING AREA OF THE COVER.

MINIMUM WEIGHT COVER– 160 LBS.
MINIMUM WEIGHT RING– 240 LBS.
See specs for approved castings.

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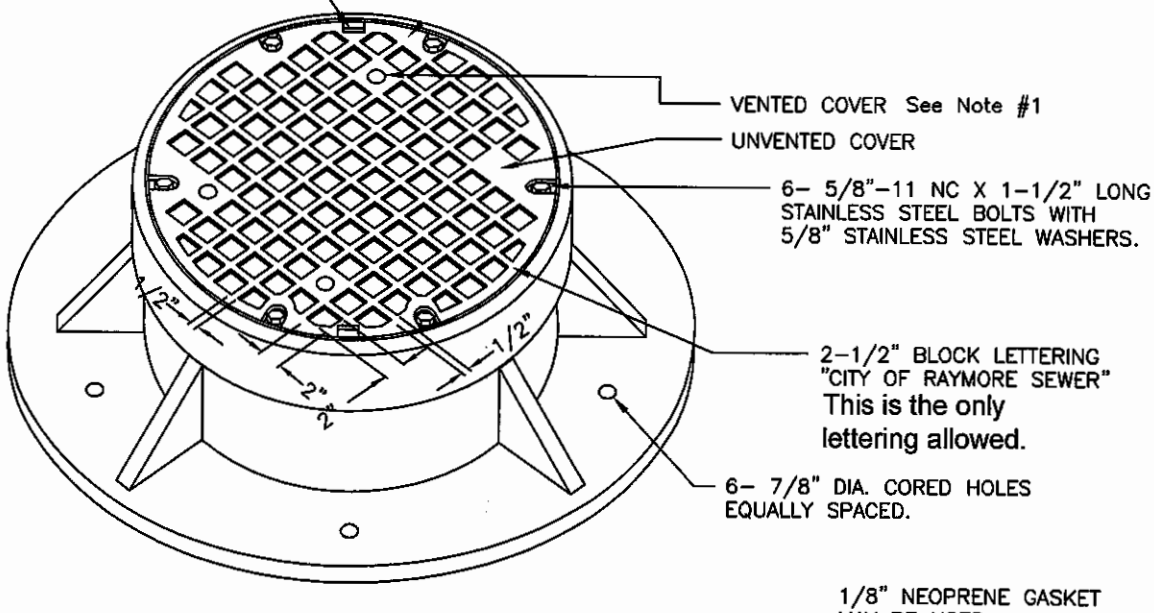
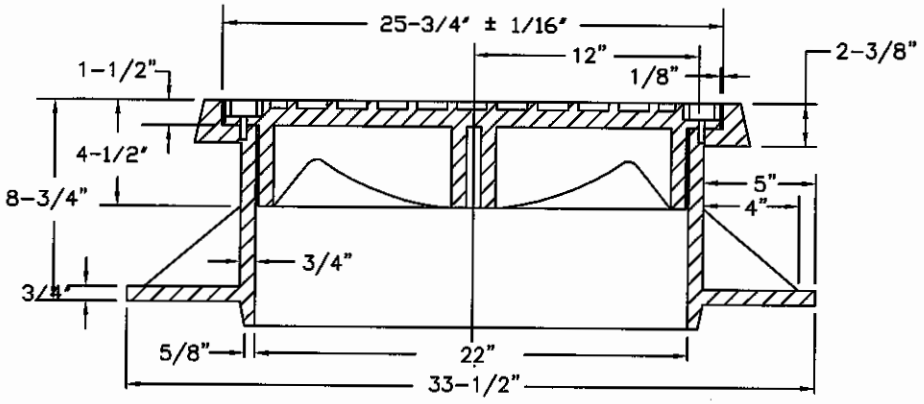
CITY OF RAYMORE

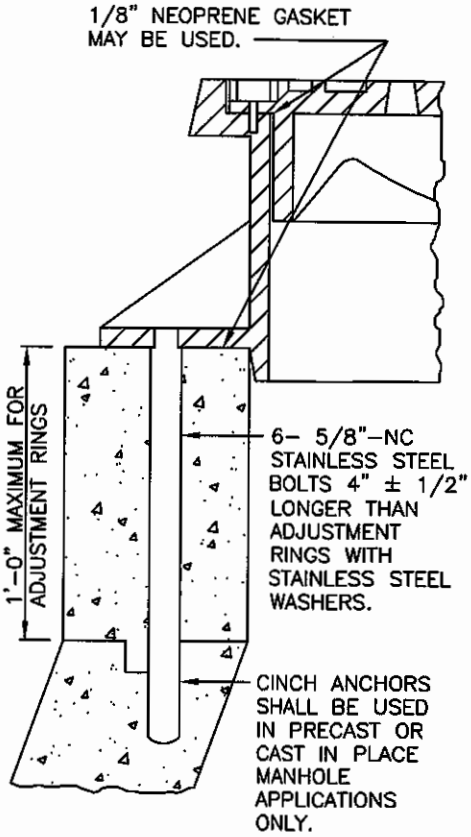
MANHOLE RING & COVER (CASTING)

SIZE	FSCM NO.	DWG NO.	REV
A		San - 4	

SCALE NONE | SHEET 1 OF 1







NOTES:
1. VENTED COVER SHALL HAVE FOUR VENT HOLES AS INDICATED.
2. FOR PRESSURE APPLICATIONS CONSULT THE ENGINEER.
3. MATERIAL TO MEET SPECIFICATIONS FOR GREY IRON CASTINGS ASTM DESIGNATION A–48, CLASS 25 AS A MINIMUM REQUIREMENT. DESIGNATION A–48, CLASS 25 AS A
4. SURFACES BETWEEN RING AND COVER SHALL BE MACHINED TO PROVIDE A TRUE PLANE AROUND THE ENTIRE BEARING AREA OF THE COVER.
5. RING AND COVER SHALL BE PAINTED WITH AN ASPHALT BASE PAINT.

MINIMUM WEIGHT COVER– 190 LBS.
MINIMUM WEIGHT RING– 250 LBS.
See specs for approved castings.

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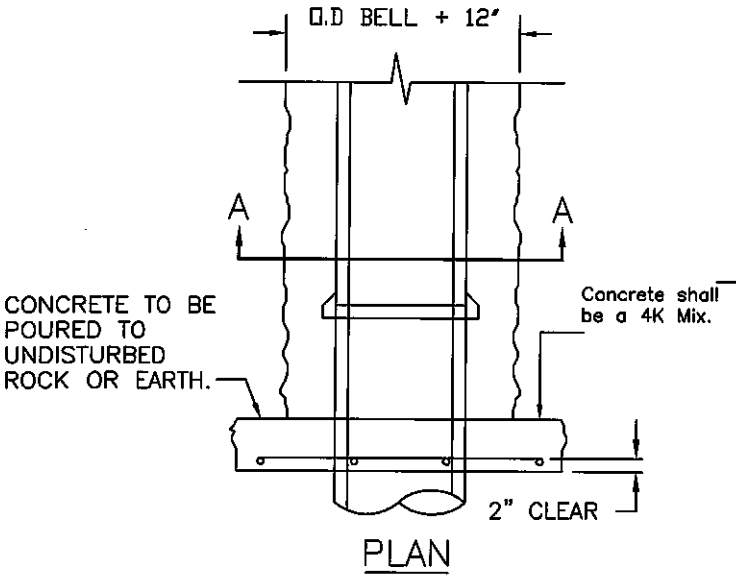
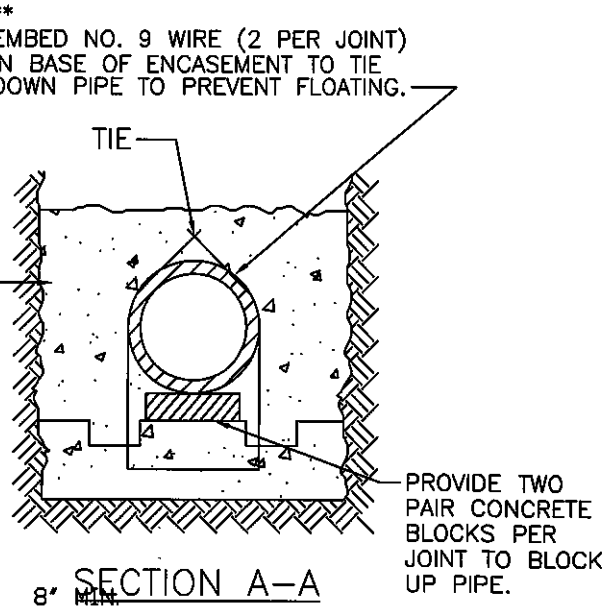
BOLTED MANHOLE RING & COVER SOLID & VENTED

SIZE	FSCM NO.	DWG NO.	REV
A		San – 5	

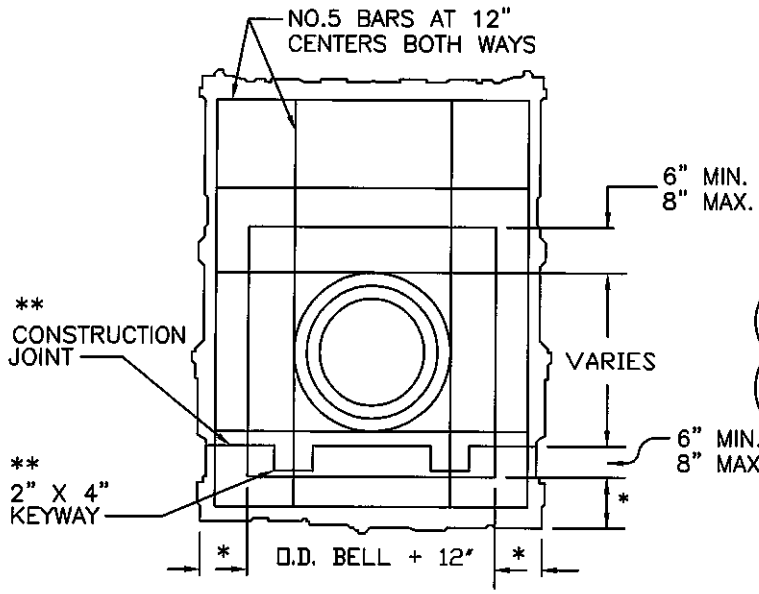
SCALE NONE SHEET 1 OF 1



PLAN

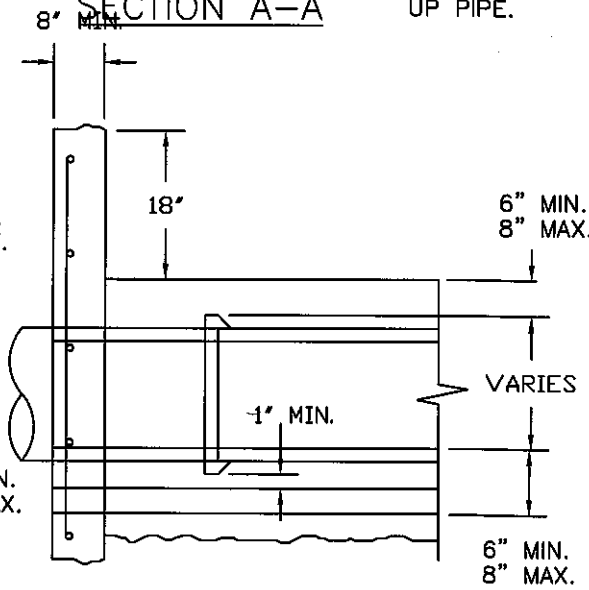


SECTION A–A



* 6" FOR TRENCH IN ROCK
12" FOR TRENCH IN EARTH

ELEVATION



SIDE ELEVATION

** APPLIES IF POUR IS NOT MADE MONOLITHICALLY.

NOTE:
ALL CONCRETE ENCASEMENT IN ROCK SHALL BE POURED AGAINST THE FACE OF ROCK ON BOTH SIDES AND BOTTOM OF TRENCH WHEN USING MONOLITHIC POUR. PIPE SHALL BE ANCHORED TO PREVENT FLOATING OR DISPLACEMENT OF THE PIPE.

Estimated concrete quantities. Concrete to be poured full width of trench.

PIPE SIZE	CU.YDS/LIN.FT.	PIPE SIZE	CU.YDS./LIN.FT.
8"	.1173	15"	.2063
10"	.1397	18"	.2533
12"	.1647	21"	.3056

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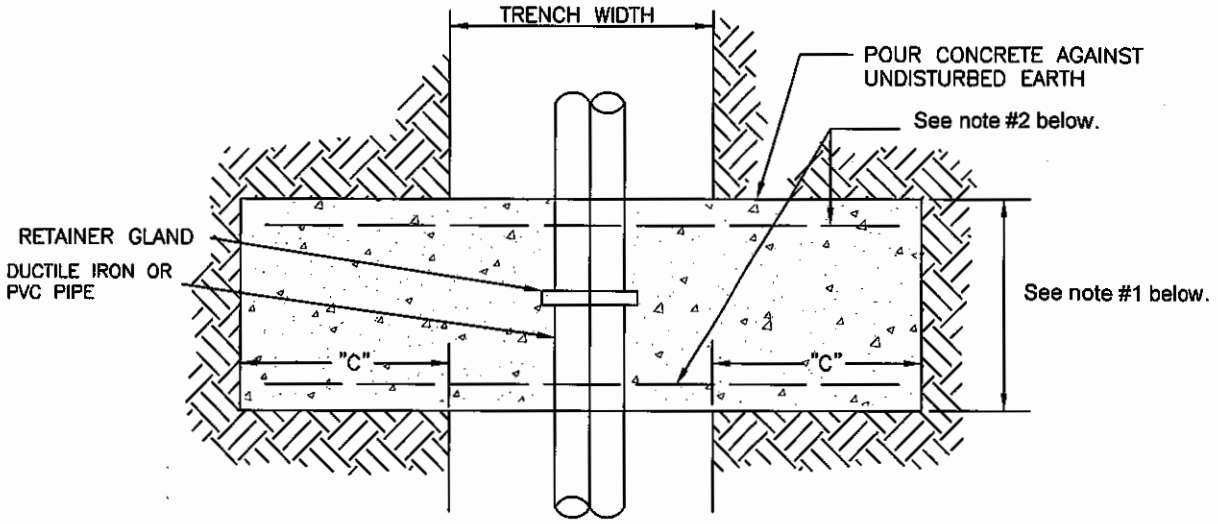
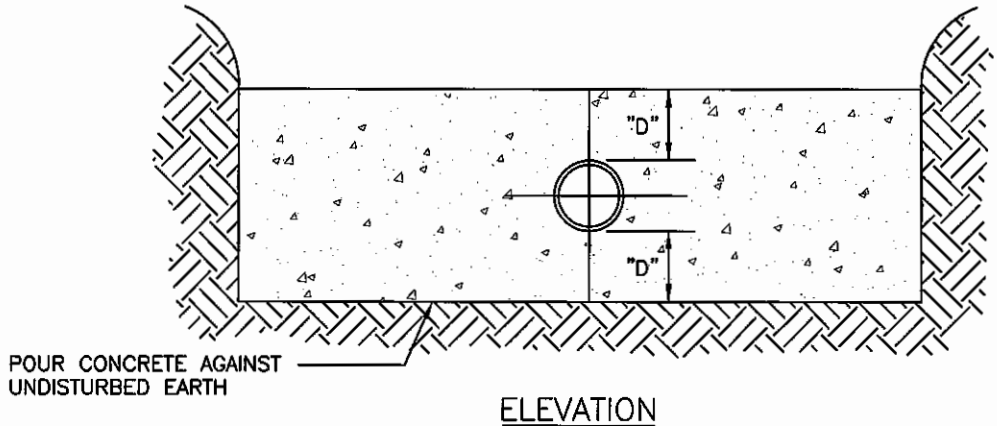
PIPE ENCASEMENT AND COLLAR

SIZE A | FSCM NO. | DWG NO. San – 6 | REV
SCALE NONE | SHEET 1 OF 1



PLAN



ELEVATION

PIPE SIZE	"D" MIN.	CU. FT.	"C"
2"	4"	12	24
6"	4"	18	24
8"	7"	30	24
12"	15"	61	24
16"	18"	–	30
20"	20"	–	42
24"	24"	–	48

1. For 2 through 12 inch pipe, 24 inch minimum or equal to trench width. For 16 through 24 inch pipe, 18 inch minimum or equal to trench width.
2. #5 rebars at 12 inch centers in each direction for 16 through 24 inch pipes.
3. Concrete shall have a minimum strength of 4000 PSI.

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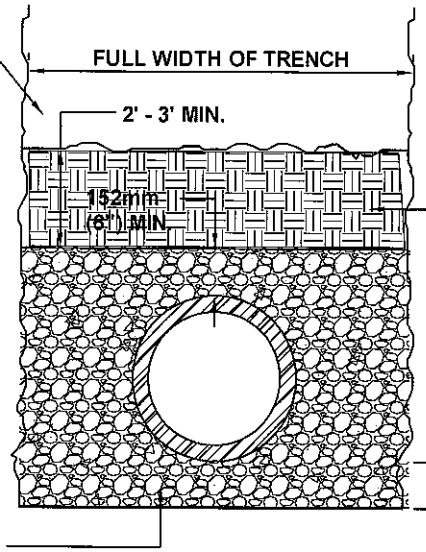
TYPICAL STRADDLE BLOCK

SIZE	FSCM NO.	DWG NO.	REV
A		San – 7	

SCALE NONE SHEET 1 OF 1

EARTH OR EARTH AND ROCK OR OTHER SUITABLE MATERIAL. ROCK SHALL NOT EXCEED 305mm(12") IN ITS LONGEST DIMENSION.

Clean stone bedding/backfill shall extend 6" above the pipe, full width of trench.

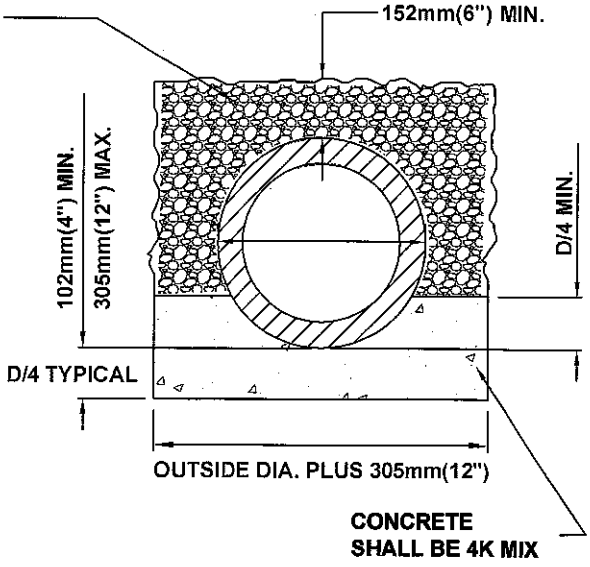


PIPE BEDDING

CONCRETE CRADLE QUANTITY

Pipe Size	Cu. Yds./Ft
8"	.032
10"	.038
12"	.043
15"	.057
18"	.076
21"	.097
24"	.120

COMPLETE BEDDING OF CRADLED PIPE AS SHOWN ABOVE IN "PIPE BEDDING".



CONCRETE CRADLE

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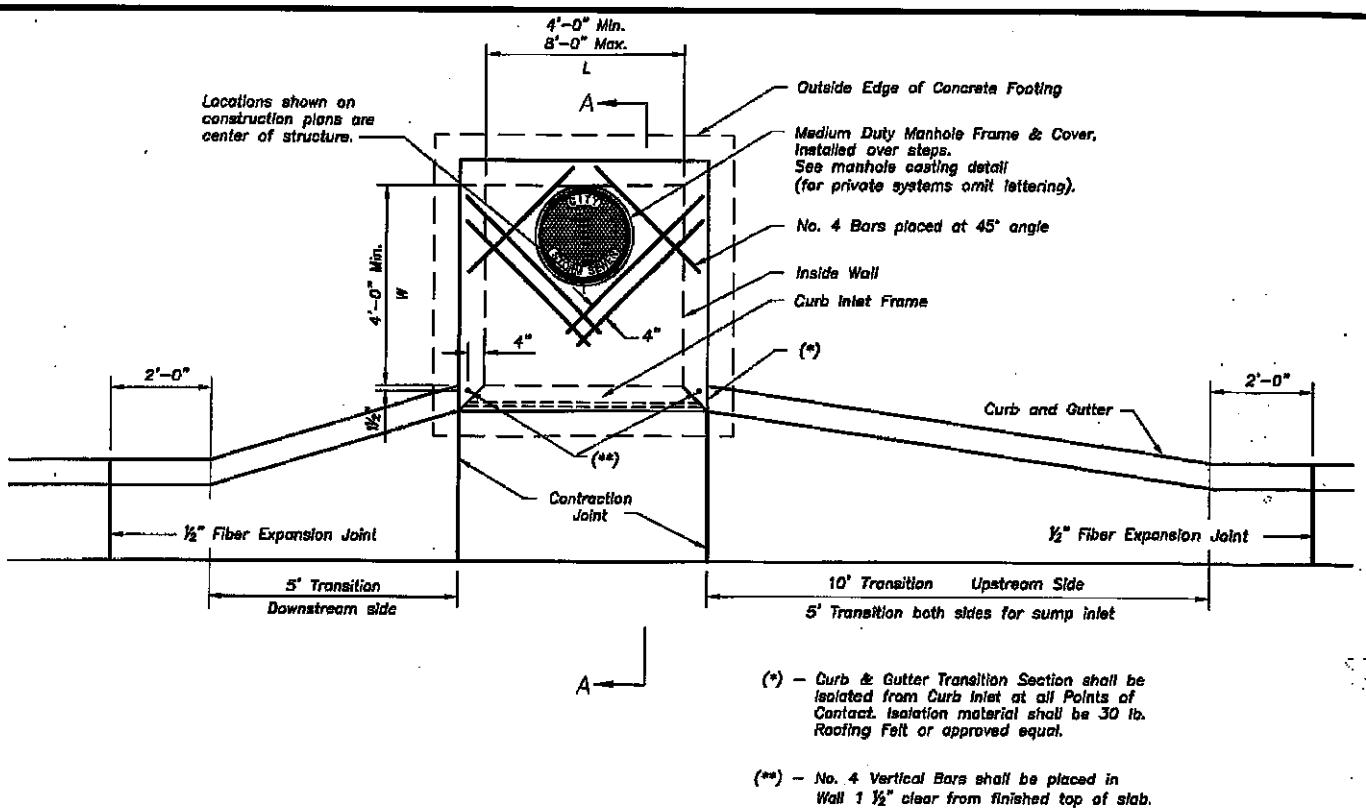
CITY OF RAYMORE

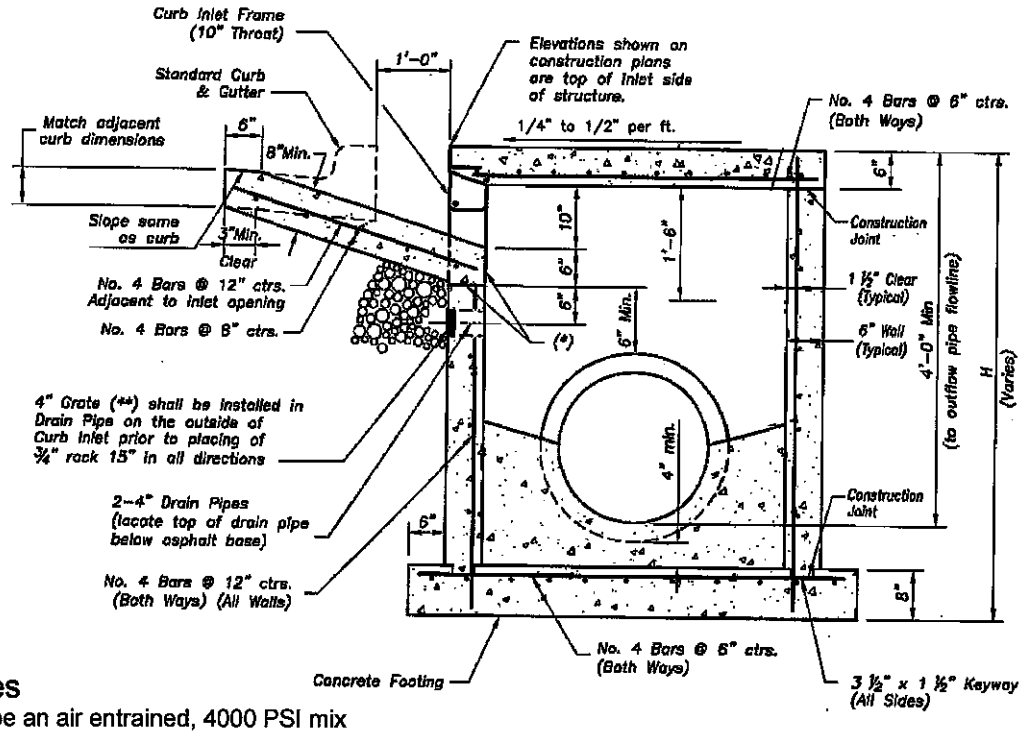
PIPE BEDDING & CRADLE FOR SANITARY SEWER PIPE

DRAWN	DATE
Modified 2013	
CHECKED	
APPROVED	

SIZE	FSCM NO.	DWG NO.	REV
A		San – 8	

SCALE **NONE** SHEET 1 OF 1





Curb Inlet Notes

1. All concrete is to be an air entrained, 4000 PSI mix design.Transitions/curb to be 4K KCMMB mix.
2. Boxouts shall not pass through structure corners.
3. Steps are not to be installed in structures.
4. Use 3/4" chamfer strip on all exposed corners.
5. Manhole cover shall read, "City of Raymore Storm Sewer"

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Modified 2013

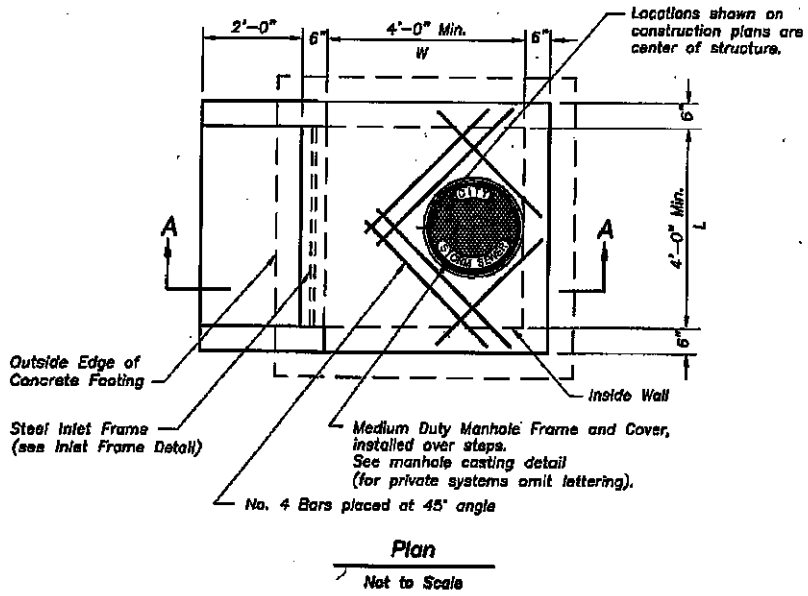
CITY OF RAYMORE

Curb Inlet For CG-1 & CG-2 Curb

SIZE	FSCM NO.	DWG NO.	REV
A		Strm – 1	

SCALE NONE

SHEET 1 OF 1

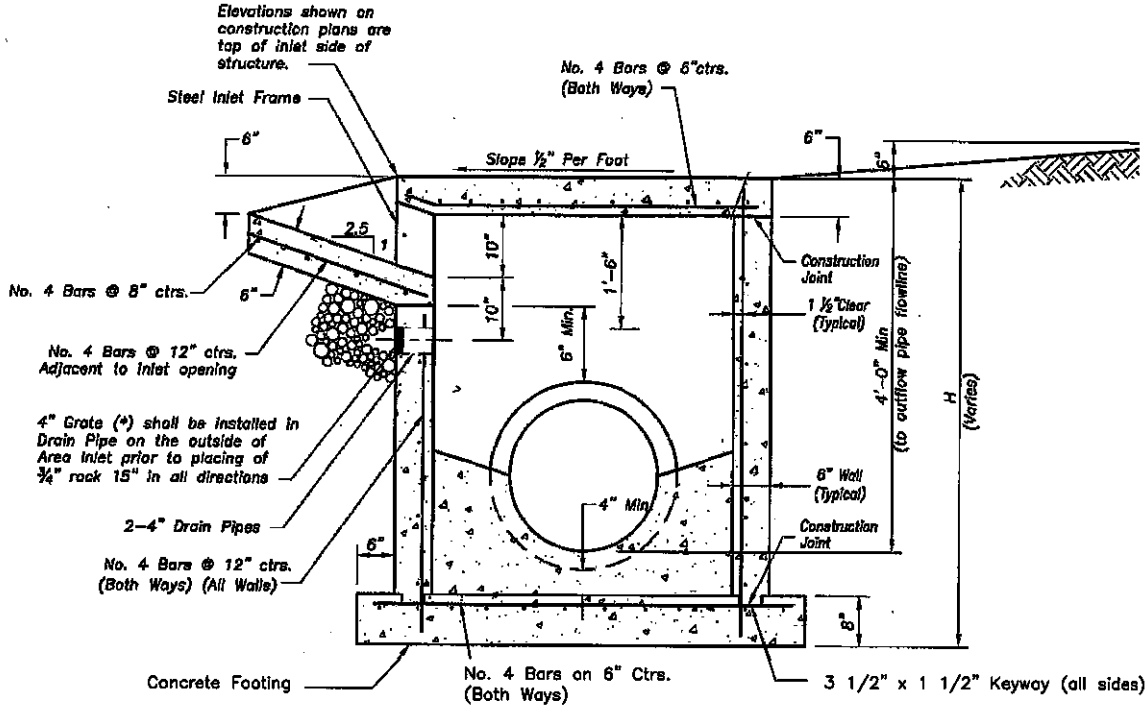


Plan

Not to Scale

Area Inlet General Notes:

1. All concrete is to be an air entrained, 4000 PSI mix design.
2. Boxouts shall not pass through structure corners.
3. Steps are NOT to be installed in structures.
4. Show inlet orientation, number and size of openings on plans.
5. Use 3/4" chamfer strip on all exposed corners.
6. Manhole cover shall be labeled "City of Raymore Storm Sewer".

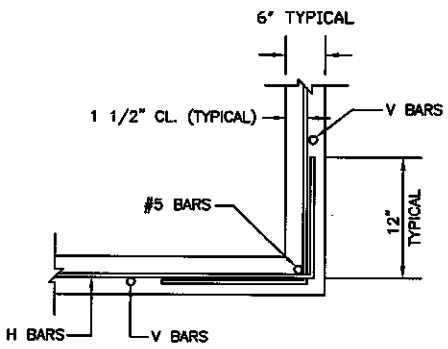


Section A – A

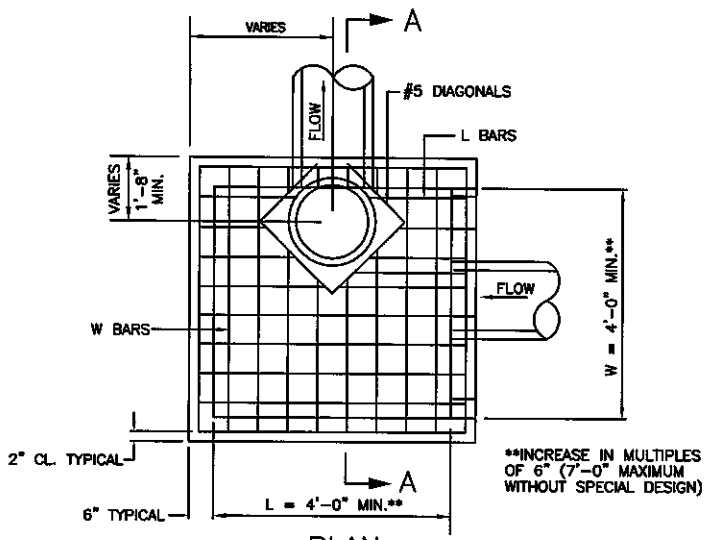
Engineering Department City of Raymore 100 Municipal Circle Raymore, MO 64083 816-331-1852 Fax 816-331-8067		CITY OF RAYMORE		
DRAWN Modified 2013	DATE	Area/Yard Inlet		
CHECKED		SIZE A	FSCM NO.	DWG NO. Strm – 2 REV
APPROVED		SCALE NONE		SHEET 1 OF 1

REINFORCING

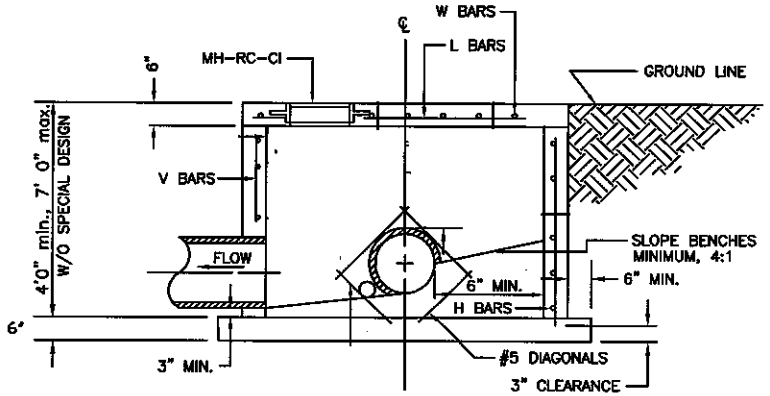
BARS	SIZE	SPACING (IN.)
H	4	12
V	4	12
L	5	6
W	5	6



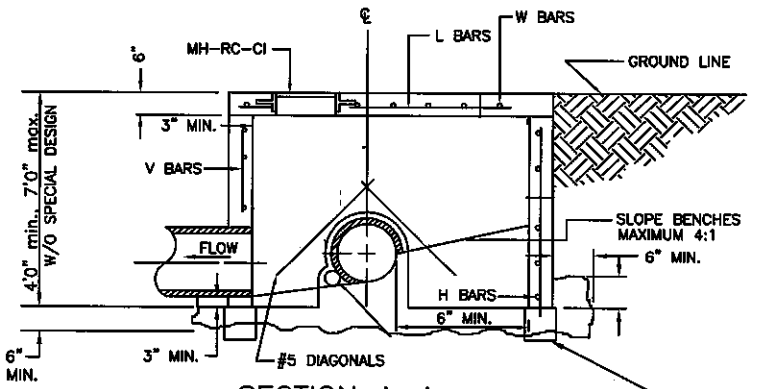
CORNER DETAIL



PLAN



SECTION A–A
CAST IN PLACE



SECTION A–A
PRECAST

SET ON SOLID PRECAST CONC. BLOCKS. FOUNDATION AND INVERT SHALL BE POURED MONOLITHIC, UNLESS SOIL CONDITIONS REQUIRE POURING BASE SLAB BEFORE SETTING STRUCTURE.

GENERAL NOTES:

1. Locate ring and cover over outlet.
2. Concrete shall be 4000 PSI mix.
3. Use 3/4" chamfer strip on all exposed corners.
4. Boxouts shall not project through the corners of the structure.
5. The minimum reinforcing shall be 1 H–bar over a cast–in place pipe and 2 H–bars over a precast boxout.
6. O.R. = one half outside pipe diameter (O.D.)
7. Steps are NOT to be installed in structure.

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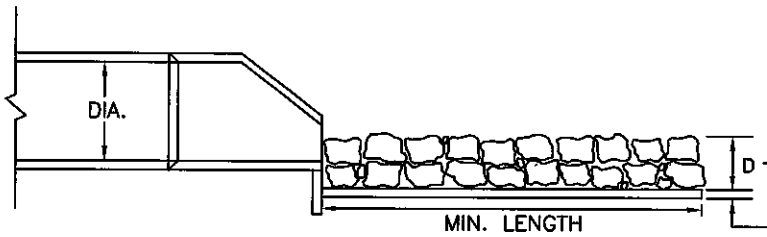
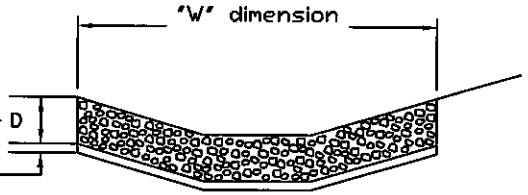
JUNCTION BOX

SIZE	FSCM NO.	DWG NO.	REV
A		Strm – 3	

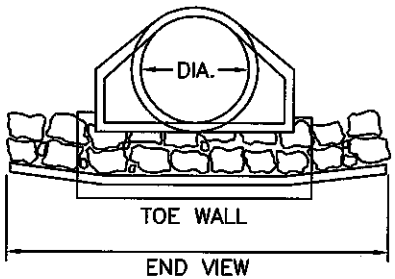
SCALE NONE SHEET 1 OF 1



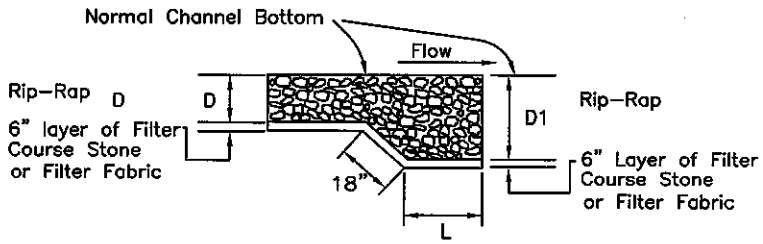
SIDE VIEW



TYPICAL SECTION



END VIEW



SECTION THROUGH DOWNSTREAM END OF RIP-RAP

ROCK LINING FOR CULVERT OUTLETS

CULVERT SIZE. DIA INCH	MINIMUM D X W FEET	MINIMUM LENGTH FEET	END RIP-RAP L X D1 FEET	EQUIVALENT PIPE ARCH CULVERT (APPROX.)	EQUIVALENT CONC. BOX CULV. (APPROX.)
18	1.5 X 8	12	3 X 2		
24	1.5 X 8	14	3 X 2		2' X 1-1/2'
30	1.5 X 8	16	3 X 2	8-5	2' X 2'
36	1.5 X 10	18	3 X 2	8-6	3' X 2'
42	2 X 10	20	4 X 2.75	8-7	3' X 3'
48	2 X 12	20	4 X 2.75	8-8	4' X 3'
54	2 X 13.5	22	4 X 2.75	8-9	4' X 4'
60	2 X 15	26	4 X 2.75	8-10	5' X 4'
66	2 X 18	26	4 X 2.75	8-11	5' X 6'
72	2 X 20	30	4 X 2.75	8-12	5' X 8'
84	2.5 X 25	36	5 X 3.3		6' X 6'
96	2.5 X 30	40	5 X 3.3		7' X 7'
108	3 X 32	40	6 X 4		8' X 8'

THE DIMENSIONS SHOWN IN THE TABLE CAN BE APPLIED TO BOX OR ARCH CULVERTS OF EQUIVALENT WATERWAY AREA.

NOTE:
ALL MATERIALS NEED TO CONFORM TO APWA SECTION 2605.

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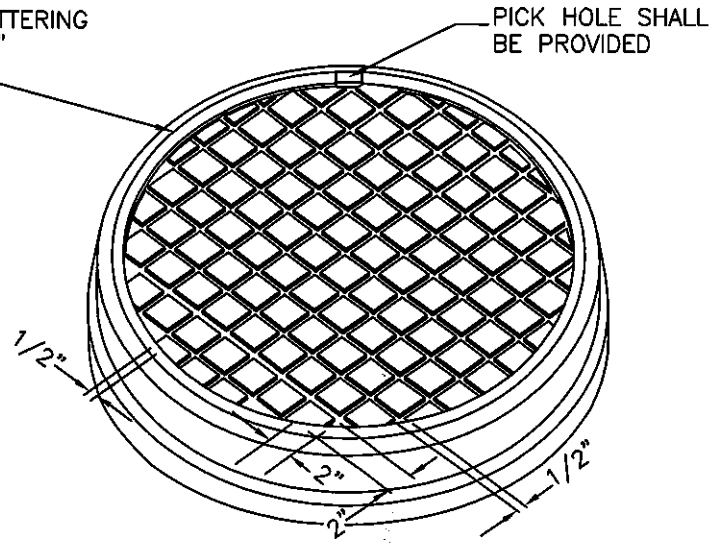
ROCK LINING FOR CULVERT OUTLETS & RIP RAP DITCH

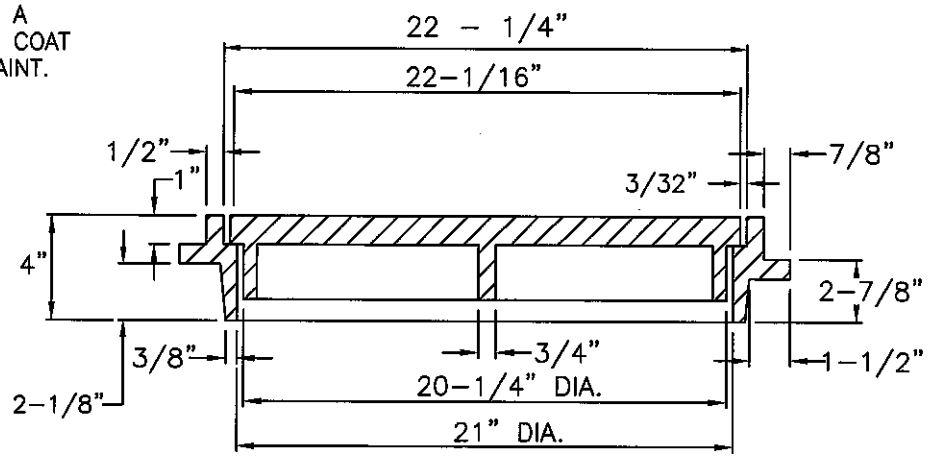
SIZE A | FSCM NO. | DWG NO. Strm - 4 | REV

SCALE NONE | SHEET 1 OF 1



NOTE:

1. MATERIAL TO MEET SPECIFICATIONS FOR GRAY IRON CASTINGS ASTM DESIGNATION A-48, CLASS 25 AS A MINIMUM REQUIREMENT.
2. SURFACES BETWEEN RING AND COVER SHALL BE MACHINED TO PROVIDE A TRUE PLANE AROUND THE ENTIRE BEARING AREA OF THE COVER.
3. RING AND COVER SHALL BE PAINTED WITH A MINIMUM OF ONE COAT ASPHALT BASE PAINT.



MINIMUM WEIGHT COVER- 135 LBS.
MINIMUM WEIGHT RING- 50 LBS.
CLAY & BAILEY 2020 shown, see specifications for approved equals

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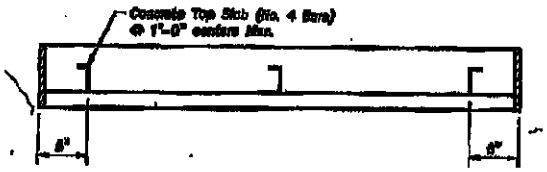
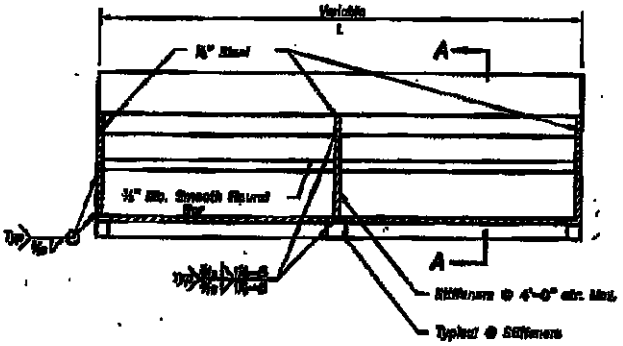
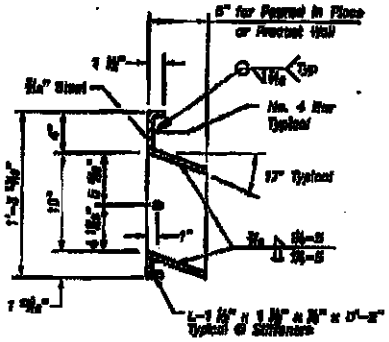
DRAWN Modified 2013	DATE	MANHOLE CURB INLET RING & COVER
CHECKED		SIZE A / FSCM NO. / DWG NO. Strm - 5 / REV
APPROVED		SCALE NONE / SHEET 1 OF 1



Top View
Not to Scale



Front View
Not to Scale



Section A-A
Not to Scale

Inlet frame to installed on all curb and area inlets.

Notes:

1. All welds shall be performed in accordance with appropriate AWS Specifications and Procedures.
2. All welds on exposed surfaces shall be dressed so as to provide a pleasing finished apprerance.
3. All flat steel shall be 7 Gage or 3/8" thick.
4. The entire frame shall be hot dip zinc coated in accordance with ASTM A -123

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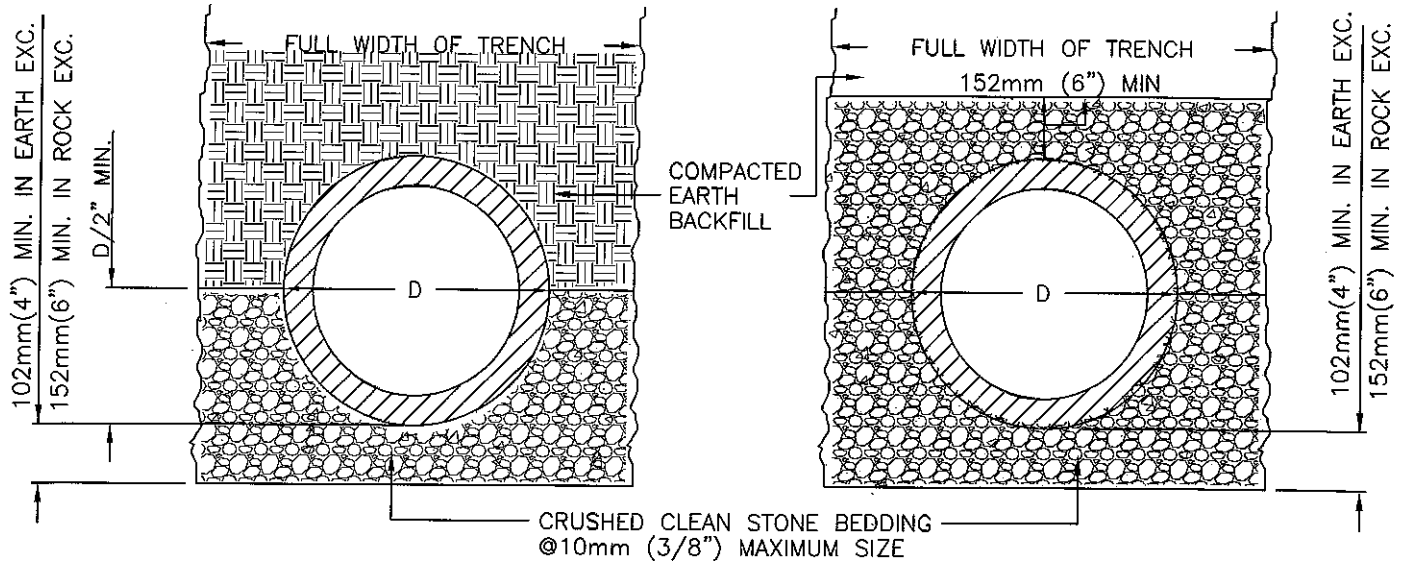
Inlet Frame for Curb and Area Inlets

SIZE	FSCM NO.	DWG NO.	REV
A		Strm - 6	

SCALE NONE SHEET 1 OF 1

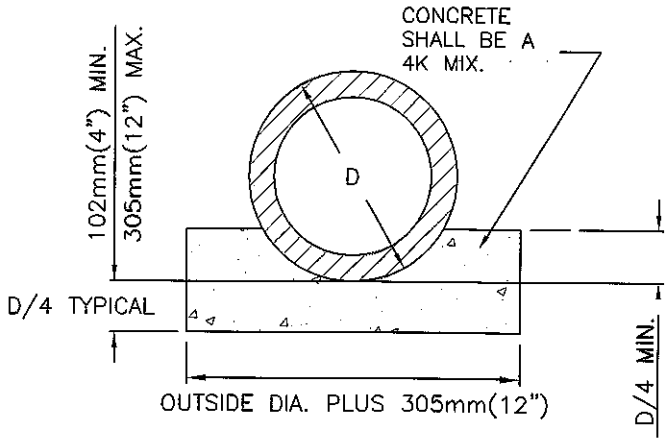


RIGID PIPE

FLEXIBLE PIPE

CONCRETE CRADLE

PIPE SIZE	CU M/M	CU.YDS/FT
381mm(15")	.143	(.057)
457mm(18")	.191	(.076)
533mm(21")	.243	(.097)
610mm(24")	.301	(.120)
686mm(27")	.381	(.152)
762mm(30")	.449	(.179)
914mm(36")	.602	(.240)
1067mm(42")	.748	(.298)
1219mm(48")	.863	(.344)
1372mm(54")	.986	(.393)
1524mm(60")	1.111	(.443)



CONCRETE CRADLE

GENERAL NOTES:
1. STONE BEDDING REQUIRED FOR ALL SEWER PIPE WITHOUT CONCRETE CRADLE.

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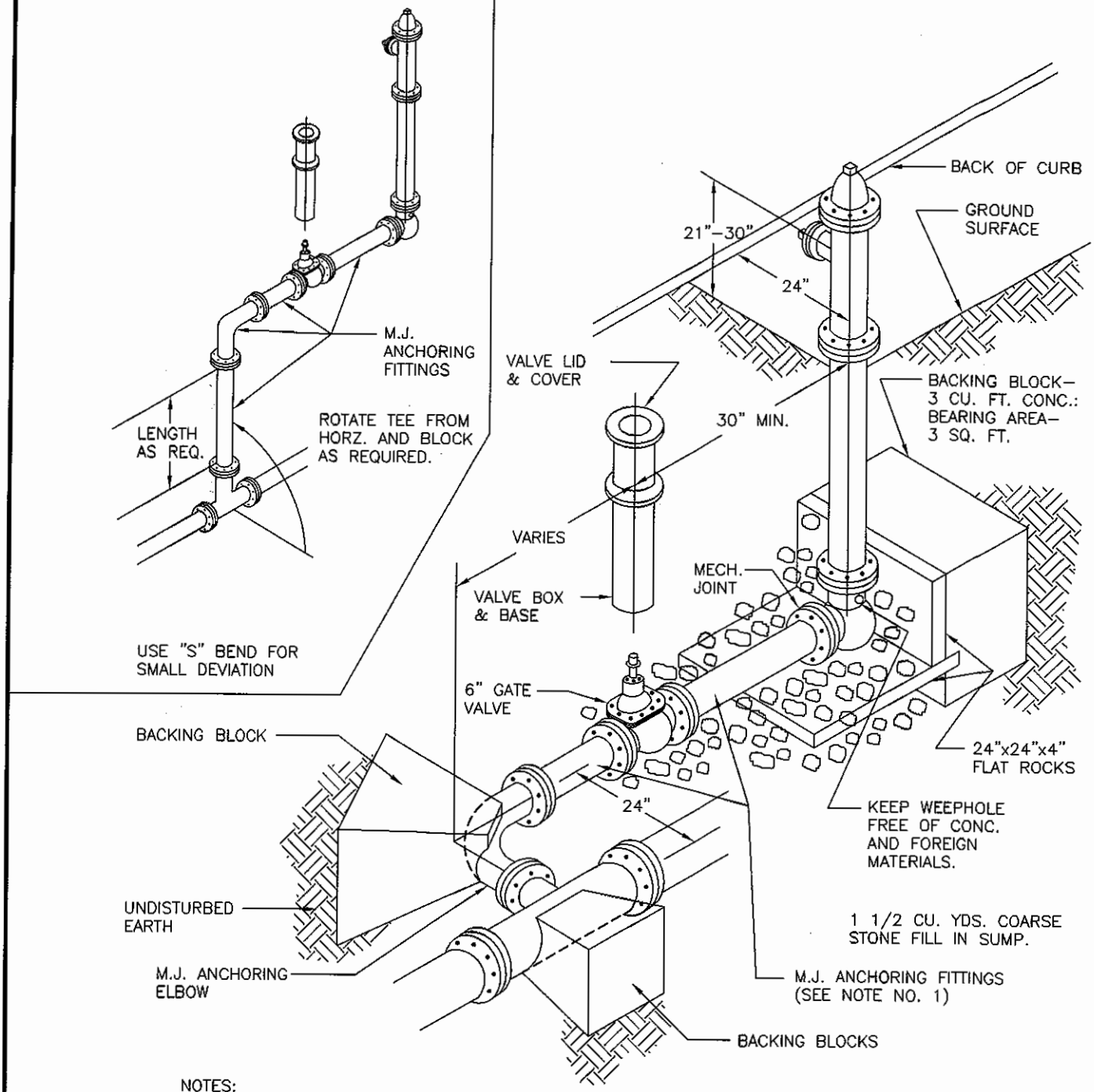
PIPE BEDDING & CRADLE FOR STORM SEWER PIPE

SIZE	FSCM NO.	DWG NO.	REV
A		Strm – 7	

SCALE NONE | SHEET 1 OF 1



NOTES:
1. ALL FIRE HYDRANTS SHALL BE INSTALLED USING MEGALUG STYLE FITTINGS.
2. VALVE BOX AND BASE ARE TO BE DUCTILE IRON.
3. ALL HYDRANTS SHALL BE CLOW MEDALLION, KENNEDY "GUARDIAN" or MUELLER "CENTURION".
4. ALL HYDRANTS SHALL BE DELIVERED PAINTED SAFETY YELLOW. FIELD PAINTING IS NOT ACCEPTABLE.

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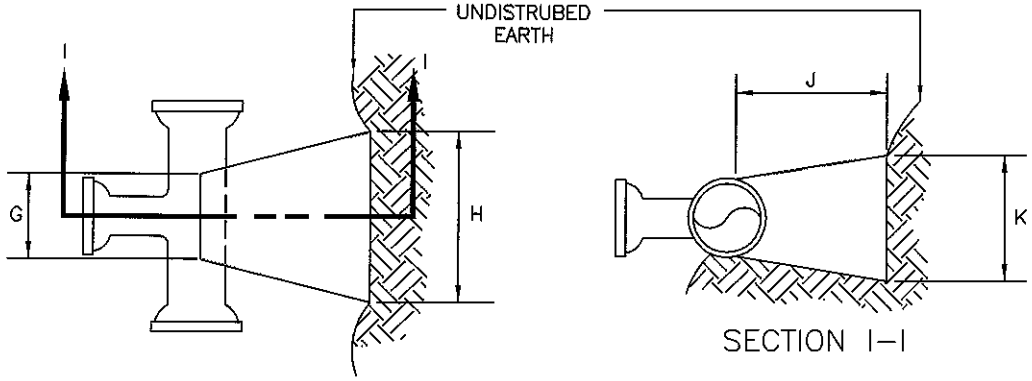
TYPICAL HYDRANT INSTALLATION WITH 90° BEND (TYPE "A")

SIZE	FSCM NO.	DWG NO.	REV
A		Wtr– 1	

SCALE NONE SHEET 1 OF 1



SECTION I–I

NOTES:
1. WHEN USING A PLUG OR TEE WITH A BRANCH SIZE NOT COVERED IN THESE CHARTS, A BACKING BLOCK FOR THE NEXT LARGER PLUG OR BRANCH SHALL BE USED.
2. BACKING BLOCKS FOR PIPING SIZES UP THROUGH 12–INCH ARE BASED ON WORKING PRESSURE OF 225 P.S.I. INCLUDING SURGE.
3. BACKING BLOCKS FOR PIPING SIZES 16–INCH THROUGH 24–INCH ARE BASED ON A WORKING PRESSURE OF 200 P.S.I. INCLUDING SURGE.

BRANCH SIZE	G	H	J	K
6"	8"	30"	24"	18"
8"	8"	40"	24"	24"
12"	12"	54"	30"	40"
16"	12"	65"	36"	50"
20"	16"	85"	40"	60"
24"	18"	102"	54"	72"

CUBIC FEET OF CONCRETE REQUIRED								
PLUG		TEE						
		RUN	BRANCH					
SIZE	CU. FT.		6	8	12	16	20	24
6	5	6	5	–	–	–	–	–
8	8	8	5	8	–	–	–	–
12	21	12	5	8	21	–	–	–
16	37	16	5	8	21	37	–	–
20	64	20	5	8	21	37	64	–
24	123	24	5	8	21	37	64	123

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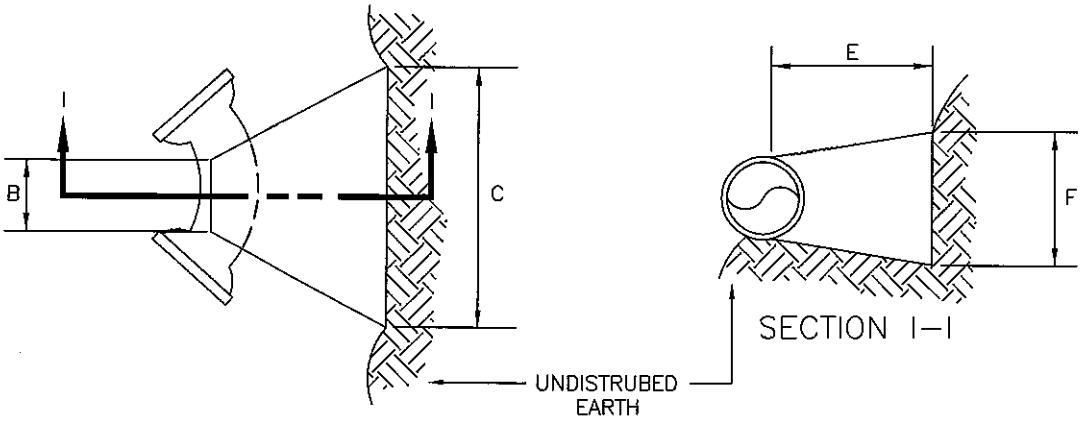
TYPICAL BACKING BLOCKS FOR TEES AND PLUGS

SIZE A | FSCM NO. | DWG NO. Wtr – 2 | REV
SCALE NONE | SHEET 1 OF 1



NOTES:
1. WHEN USING A BEND WITH A DIAMETER NOT COVERED IN THESE CHARTS, A BACKING BLOCK FOR THE NEXT LARGER DIAMETER PIPE WITH THE SAME DEGREE OF BEND SHALL BE USED.
2. BACKING BLOCKS FOR PIPING SIZES UP THROUGH 12–INCH ARE BASED ON WORKING PRESSURE OF 225 P.S.I. INCLUDING SURGE.
3. BACKING BLOCKS FOR PIPING SIZES 16–INCH THROUGH 24–INCH ARE BASED ON A WORKING PRESSURE OF 200 P.S.I. INCLUDING SURGE.

BENDS	B	C	D	E	F
6" 11 1/4° & 22 1/2°	8"	12"	8"	24"	9"
6" 45°	8"	17"	8"	24"	12"
6" 90°	8"	27"	8"	24"	14"
8" 11 1/4° & 22 1/2°	8"	16"	10"	24"	12"
8" 45°	8"	23"	10"	24"	16"
8" 90°	8"	34"	10"	24"	20"
12" 11 1/4° & 22 1/2°	8"	26"	12"	24"	16"
12" 45°	8"	34"	12"	24"	24"
12" 90°	8"	50"	12"	24"	30"
16" 11 1/4°	8"	20"	16"	24"	16"
16" 22 1/2°	8"	32"	16"	24"	20"
16" 45°	8"	42"	16"	30"	30"
16" 90°	8"	58"	16"	36"	40"
20" 11 1/4°	12"	24"	20"	24"	20"
20" 22 1/2°	12"	42"	20"	30"	24"
20" 45°	12"	54"	20"	36"	36"
20" 90°	12"	75"	20"	42"	48"
24" 11 1/4°	12"	30"	24"	24"	24"
24" 22 1/2°	12"	44"	24"	30"	33"
24" 45°	12"	59"	24"	42"	48"
24" 90°	.12"	87"	24"	54"	60"

CUBIC FEET OF CONCRETE REQUIRED				
BEND	11 1/4°	22 1/2°	45°	90°
6"	1.4	1.4	2.9	3.3
8"	2.1	2.1	3.3	5.5
12"	3.8	3.8	6.5	11.3
16"	3.8	5.6	12.4	25.9
20"	5.4	11.2	23.2	47.2
24"	7.4	15.5	38.4	86.6

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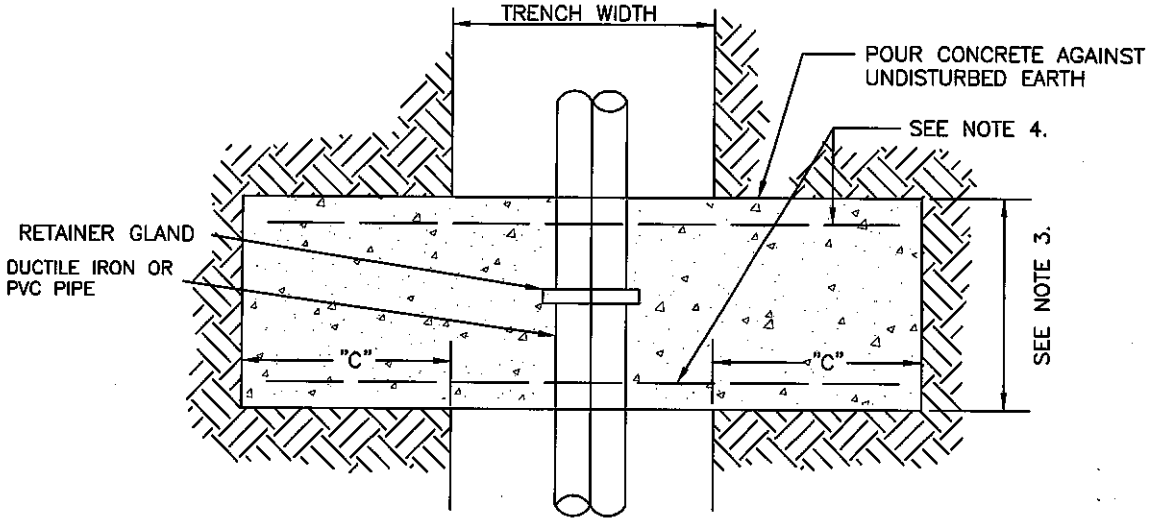
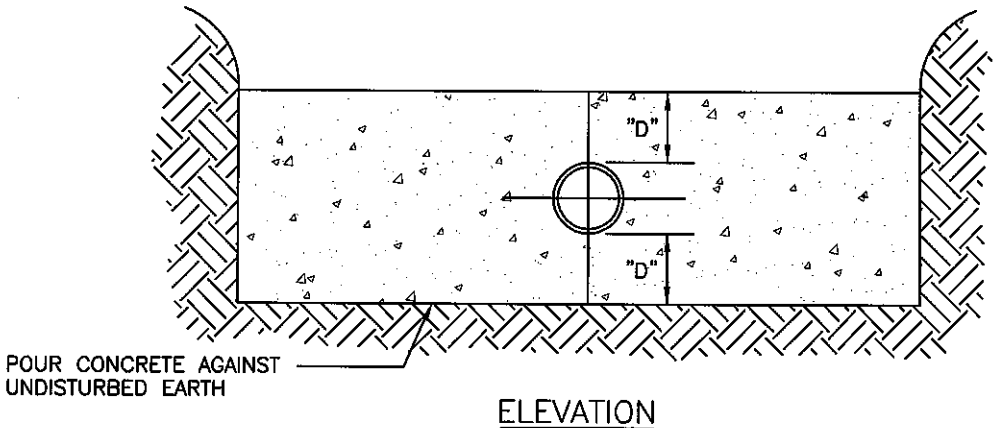
TYPICAL BACKING BLOCKS FOR BENDS

SIZE A | FSCM NO. | DWG NO. Wtr - 3 | REV

SCALE NONE | SHEET 1 OF 1



PLAN



ELEVATION

PIPE SIZE	"D" MIN.	CU. FT.	"C"
2"	4"	12	24
6"	4"	18	24
8"	7"	30	24
12"	15"	61	24
16"	18"	–	30
20"	20"	–	42
24"	24"	–	48

NOTES:
1. FOR 2 THROUGH 12 INCH PIPE, STRADDLE BLOCKS ARE SIZED FOR 225 P.S.I. LINE PRESSURE INCLUDING SURGE.
2. FOR 16 THROUGH 24 INCH PIPE, STRADDLE BLOCKS ARE SIZED FOR 200 P.S.I. LINE PRESSURE INCLUDING SURGE.
3. FOR 2 THROUGH 12 INCH PIPE, 24 INCH MINIMUM OR EQUAL TO TRENCH WIDTH.
   FOR 16 THROUGH 24 INCH PIPE, 18 INCH MINIMUM OR EQUAL TO TRENCH WIDTH.
4. #5 BARS AT 12" CENTERS IN EACH DIRECTION FOR 16 THROUGH 24 INCH PIPES.
5. CONCRETE SHALL HAVE A MINIMUM STRENGTH OF 4000 PSI.

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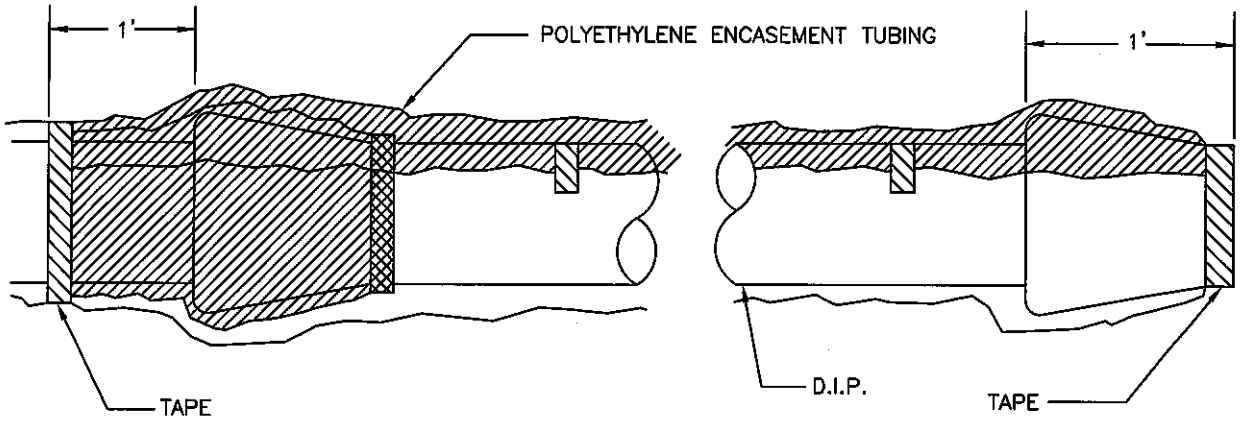
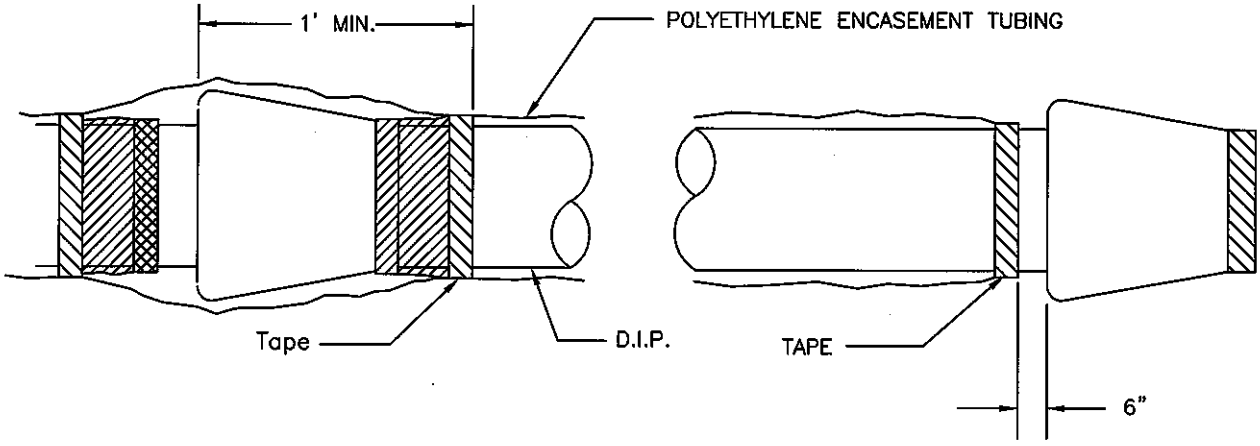
TYPICAL STRADDLE BLOCK

SIZE	FSCM NO.	DWG NO.	REV
A		Wtr – 4	

SCALE NONE SHEET 1 OF 1



METHOD A



METHOD B

NOTES:
Polywrap shall be installed on all ductile iron pipes 12" and larger.

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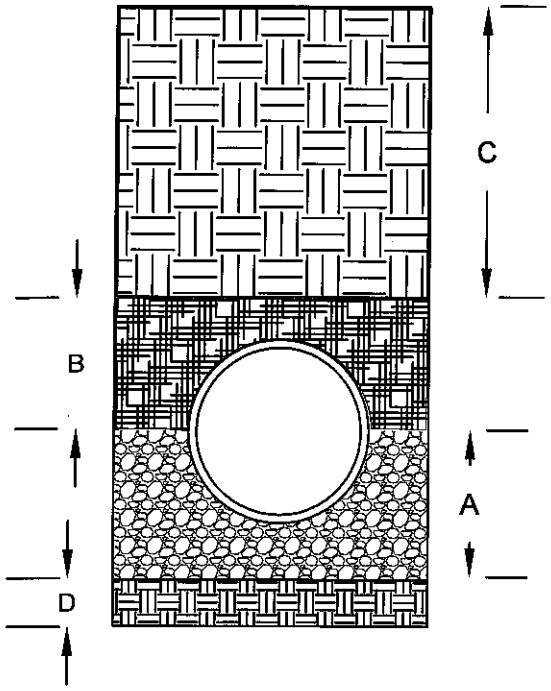
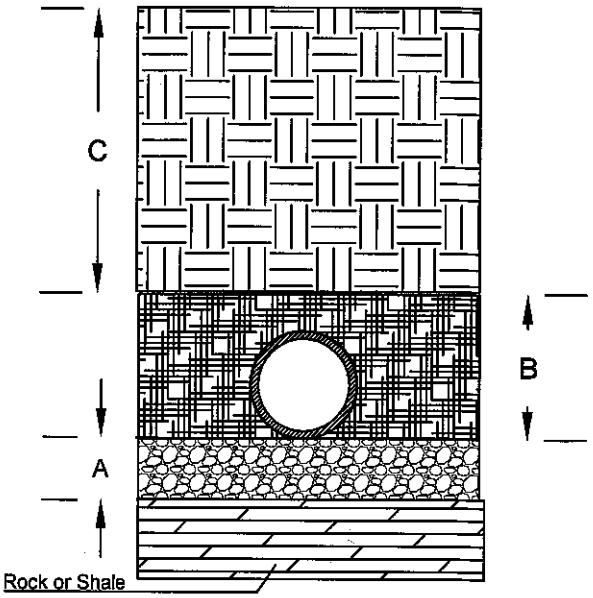
POLYETHYLENE ENCASEMENT FOR DUCTILE IRON PIPE

SIZE	FSCM NO.	DWG NO.	REV
A		Wtr – 5	

SCALE NONE SHEET 1 OF 1



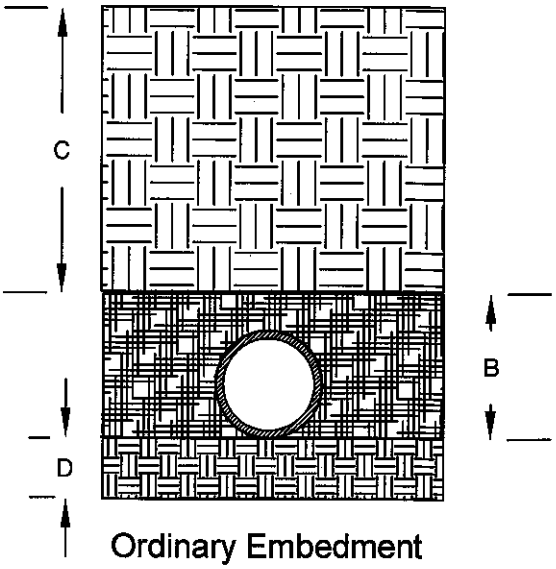
Embedment for Pipe 24" and Larger



Embedment for Pipe in Rock or Shale

Legend

"A" - 3/8" to 1/2" clean gravel placed to a minimum depth of 4" below bell.
"B" - Loosely compacted backfill, free of rock or shale, placed to a depth covering the pipe by 6".
"C" - Compacted backfill.
"D" - Undisturbed earth



Ordinary Embedment

Notes:

1. Ductile iron pipe 12" in diameter and larger shall be polywraped and taped as per spec.
2. Rock and shale shall be over-excavated to a depth where gravel can be placed to a depth of 4" below the bell.

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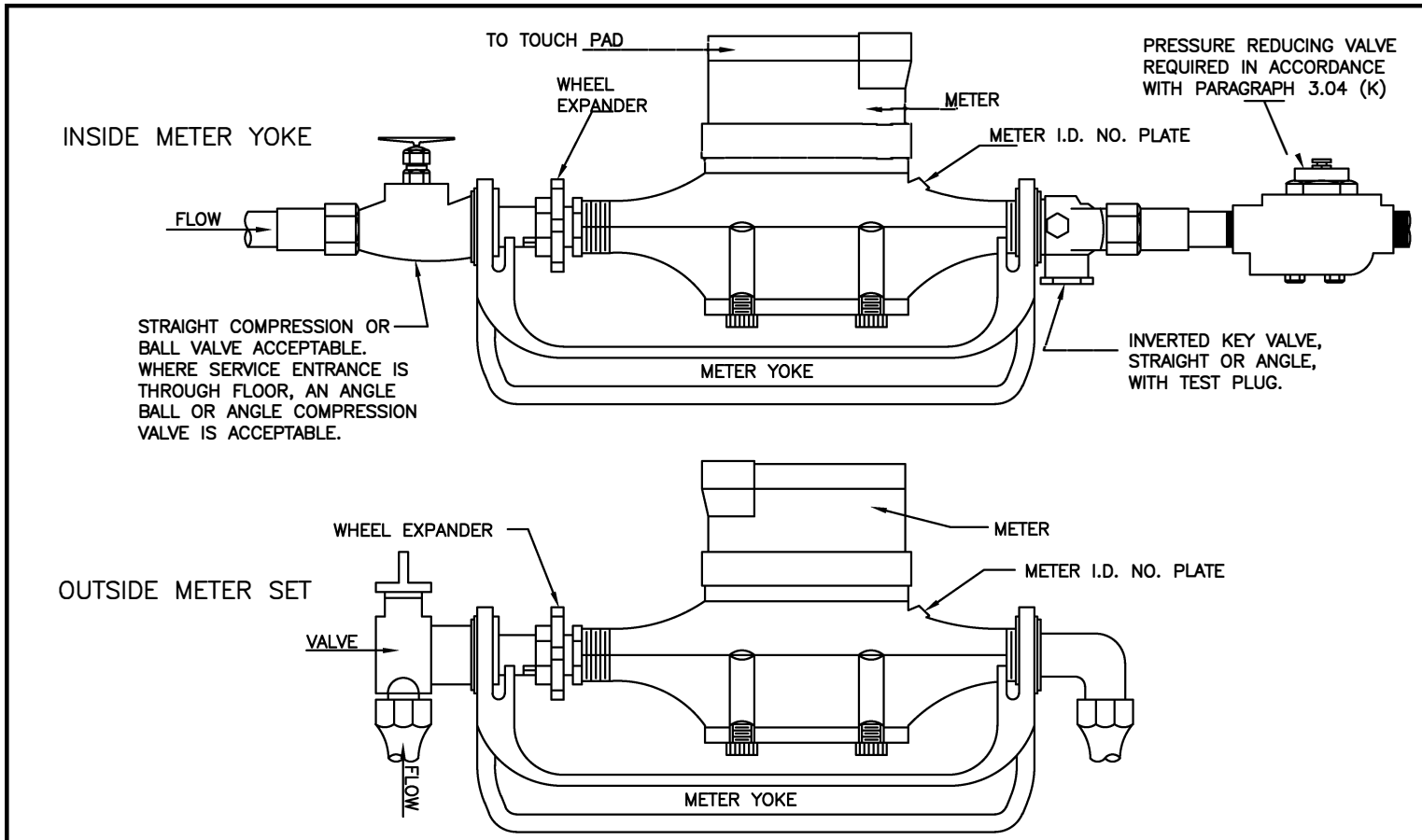
EMBEDMENTS FOR WATER MAINS

SIZE A | FSCM NO. | DWG NO. Wtr – 6 | REV
SCALE NONE | SHEET 1 OF 1



100 Series for straight connections
200 Series for angle connections

Copper Service Pipe Size Type K	Meter Yoke Ford Straight Line Yoke		Meter Size	Copper Service Pipe Size Type K	Meter Yoke McDonald Straight Line Yoke		Meter Size
	Inside Set	Outside Set			Inside Set	Outside Set	
3/4"	121 & 221	513	5/8"	5/8"	14–1––BKCE33	14–1––BJCC33	5/8"
3/4"	123 & 223	515	3/4"	3/4"	14–3––BKCE33	14–3––BJCC33	3/4"
1"	124 & 224	516	1"	1"			1"

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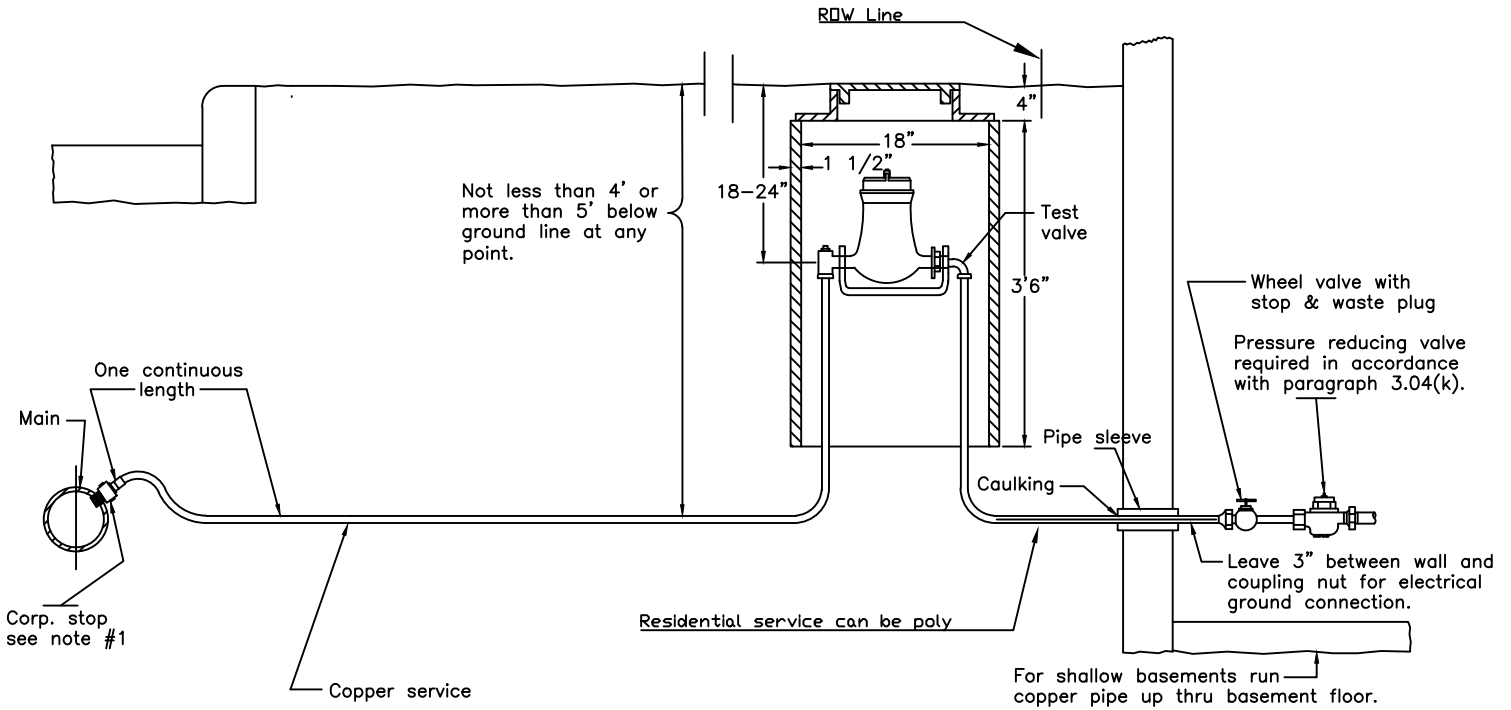
METER SETTINGS

SIZE A | FSCM NO. | DWG NO. WTR – 7 | REV
SCALE | SHEET OF

NOTES:

1. Corp stops installed by Water Dept.
2. All service piping to be copper type K.
3. Remote register required on all inside meter installations per paragraph 5.04(g).

SERVICE LINE REQUIREMENTS			
Service Size 1	Corp. Size See Note #1	Curb Stop Size See Note #2	Meter Size
3/4"	3/4"	3/4"	5/8" or 3/4"
1"	1"	1"	1"



PLANNING & ENGINEERING
100 MUNICIPAL CIRCLE
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FAX (816)331-8067

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JPB	2016
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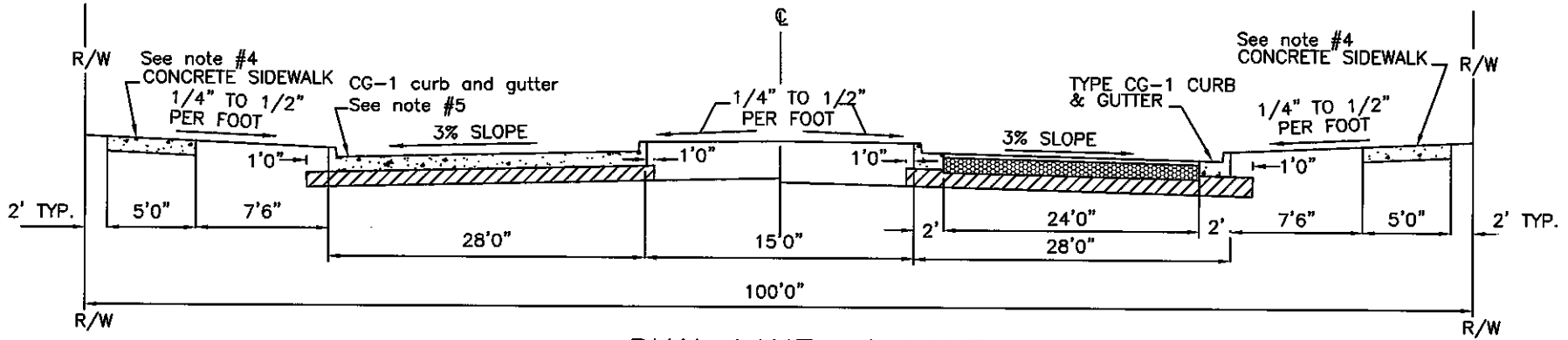
CITY OF RAYMORE

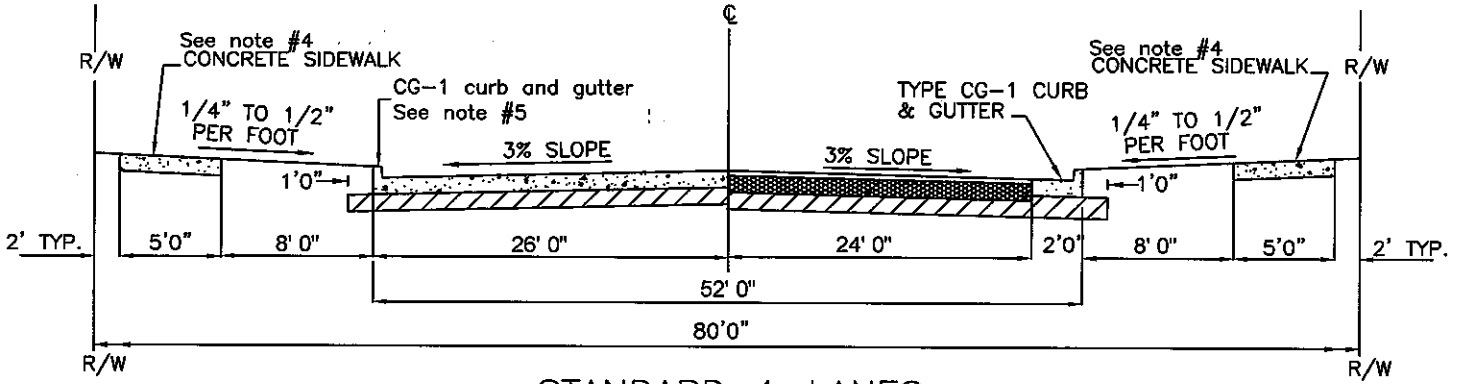
Outside Installation for 3/4" & 1" Services

SIZE	FSCM NO.	DWG NO.	REV
A		WTR – 8	

SCALE | SHEET OF



DUAL LANE 4-LANE



STANDARD 4-LANES

TYPE A CONSTRUCTION (Minimum Thickness)

- 9" Portland Cement Concrete Pavement
- 6" Subgrade Compacted to 95% of Standard Maximum Density

TYPE B CONSTRUCTION (Minimum Thickness)

- 2" Type 3 Asphaltic Concrete Surface
- 9" Type 1 Asphaltic Concrete Base (Minor Arterial)
  10" Type 1 Asphaltic Concrete Base (Major Arterial)
- 6" Subgrade Compacted to 95% of Standard Maximum Density

Notes:

1. All curb, sidewalk and Portland Cement pavement shall be KCMMB 4K concrete.
2. Type 2 Asphaltic Concrete is not allowed in any lift of Type B construction.
3. Engineer shall submit pavement designs if deviating from standard profiles shown above.
4. Cross-slope on sidewalk shall not exceed 2%.
5. Curb & gutter shall NOT be poured monolithic with pavement.

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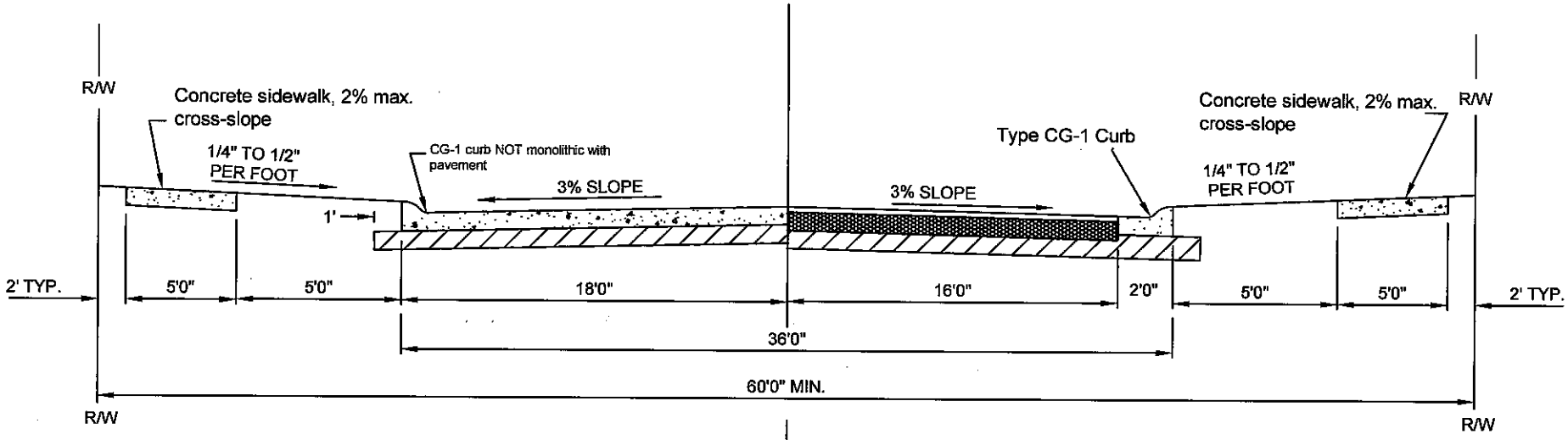
CITY OF RAYMORE

Major & Minor Arterial Streets

SIZE	FSCM NO.	DWG NO.	REV
A		St - 1	

SCALE NONE | SHEET OF



TYPE A CONSTRUCTION (Minimum Thickness)

7" Portland Cement Concrete Pavement

6" Subgrade Compacted to 95% of Standard Maximum Density

TYPE B CONSTRUCTION (Minimum Thickness)

2" Type 3 Asphaltic Concrete Surface

7" Type 1 Asphaltic Concrete Base

6" Subgrade Compacted to 95% of Standard Maximum Density

Notes:

1. All curb, sidewalk and Portland Cement pavement shall be KCMMB 4K concrete.
2. Type 2 Asphaltic Concrete is not allowed in any lift of Type B construction.
3. Engineer shall submit pavement designs if deviating from standard profiles shown above.

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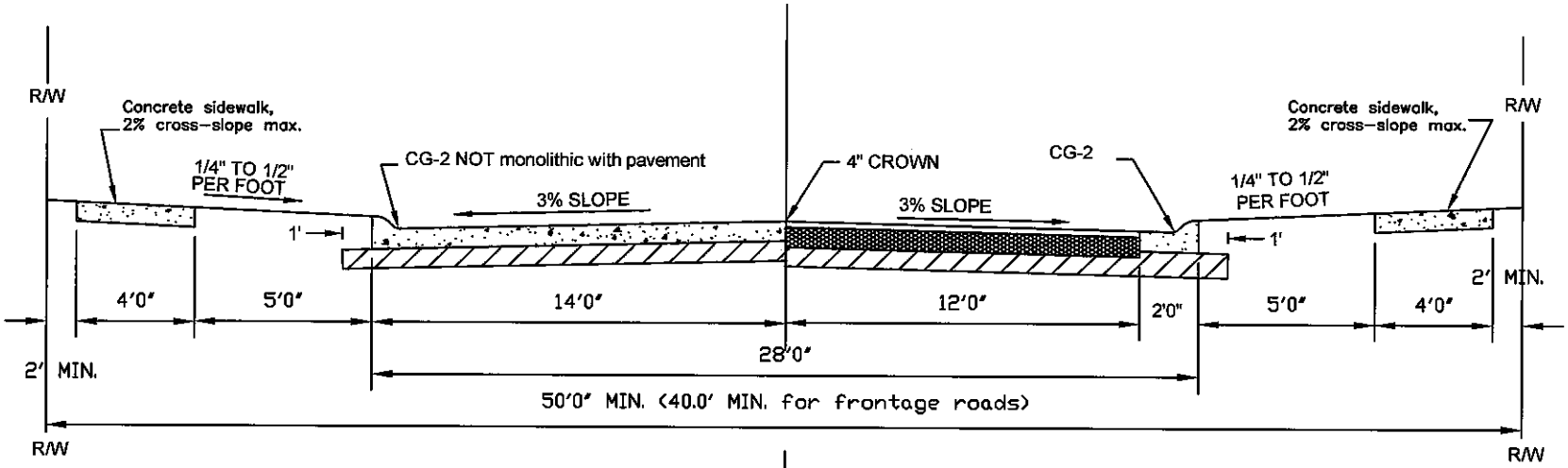
Collector/ Commercial Street

SIZE	FSCM NO.	DWG NO.	REV
A		St – 2	

SCALE NONE

SHEET 1 of



TYPE D CONSTRUCTION (Minimum Thickness)

6" Portland Cement Concrete

6" SUBGRADE COMPACTED TO 95% OF STANDARD MAXIMUM DENSITY

TYPE E CONSTRUCTION (Minimum Thickness)

2" Type 3 Asphaltic Concrete Surface

6" Type 1 Asphaltic Concrete Base

6" Subgrade Compacted to 95% of Standard Maximum Density

1. All curb, sidewalk and Portland cement pavement shall be KCMMB 4K concrete.
2. Type 2 Asphaltic Concrete is not allowed in any lift of Type E construction.
3. Engineer shall submit pavement designs if deviating from standard profiles shown.

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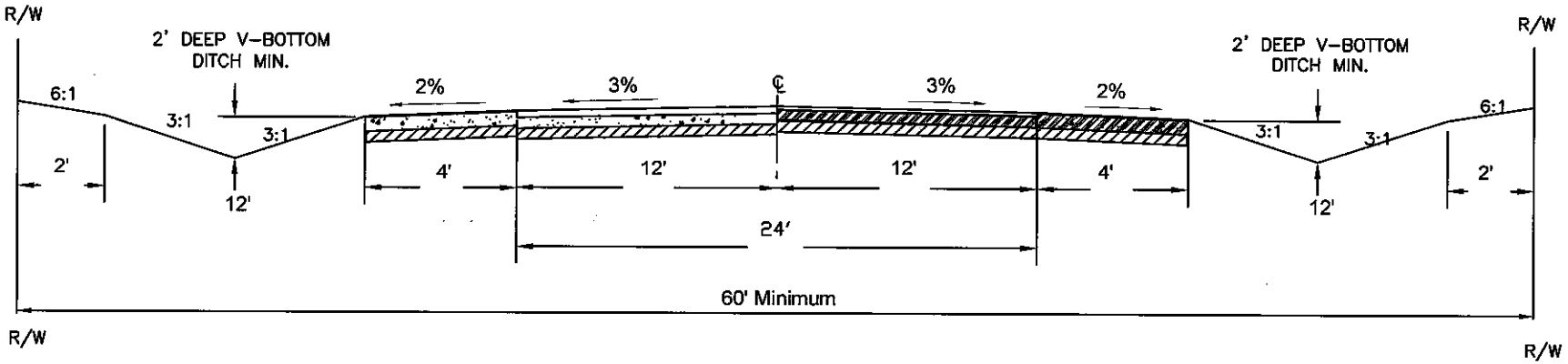
RESIDENTIAL STREET

SIZE A | FSCM NO. | DWG NO. St -3 | REV

SCALE NONE | SHEET 1 OF 1



TYPE F CONSTRUCTION (Minimum Thickness)

- TYPE 3 ASPHALTIC CONCRETE
- STABILIZED AGGREGATE BASE
- 6" Subgrade Compacted to 95% of Standard Maximum Density.

Type G Construction (Minimum Thickness)

- 2" Type 3 Asphaltic Concrete Surface
- 9" Type 1 Asphaltic Concrete Base
- 6" Subgrade Compacted to 95% of Standard Maximum Density.

SHOULDER

- 2" Type 3 Asphaltic Concrete Surface
- 4" Type 1 Asphaltic Concrete Base
- 6" Subgrade Compacted to 95% of Standard Maximum Density.

Notes:

1. Type F Construction profile must be submitted by Engineer for approval by City.
2. Engineer shall submit pavement designs if deviating from the standard profiles shown for Type G Construction and the Shoulder.
3. Utilities may not be placed under the shoulder or the ditch.
4. Type 2 Asphaltic Concrete is not allowed in any lift of Type G or Shoulder construction.

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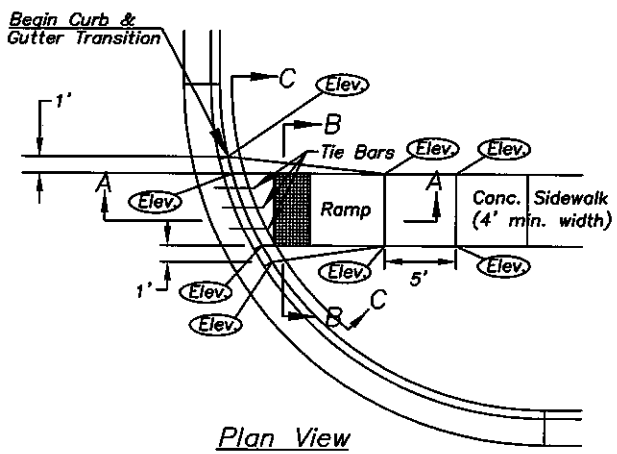
Rural Street

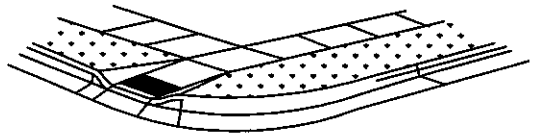
SIZE	FSCM NO.	DWG NO.	REV
A		St – 4	

SCALE NONE

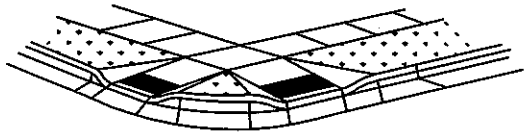
SHEET 1 OF 1



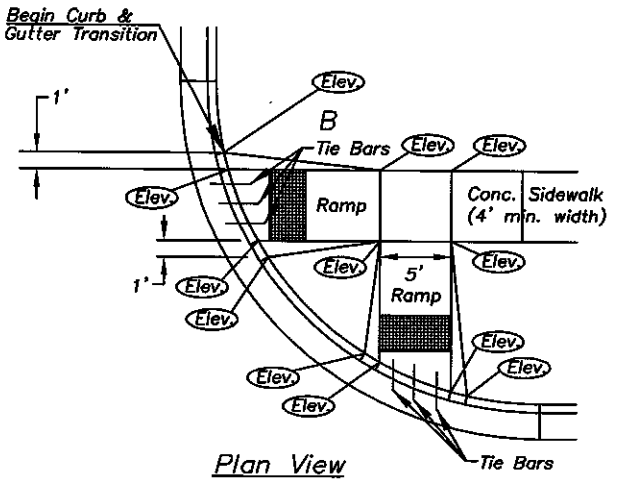
Plan View
Type A Sidewalk Ramp



3-D View Type A
Sidewalk Ramp



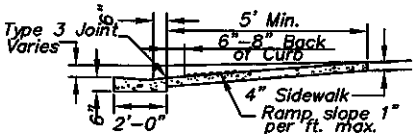
3-D View Type A-1
Sidewalk Ramp



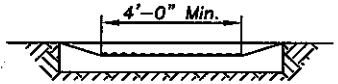
Plan View
Type A-1 Sidewalk Ramp

NOTES

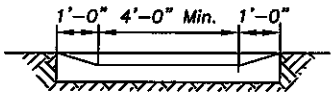
1. Sidewalk ramp location determined from the intersection of the extension of back of sidewalk and back of curb and gutter.
2. Plan drawings shall include a table of elevations for all points labelled as (Elev.).
3. Key all construction joints or use tie bars #4 epoxy coated @ 12" o.c.
4. Longitudinal joint spacing to match width of sidewalk.
5. Isolation joints shall be placed where walk abuts driveways and similar structures, and 250' centers max.
6. Sidewalk Ramp shall be lengthened to provide ADA compliance slope but need not exceed 15'.
7. ADA maximum ramp slope = 1"/Ft.
   ADA maximum cross slope = 2%.
8. Detectable warnings to comply with ADA requirements. ArmourCast panels or approved equal, brick pavers are not acceptable.



Section A-A



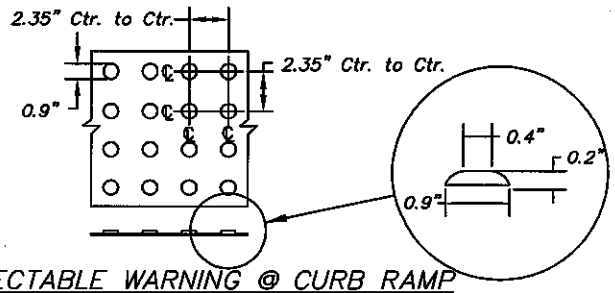
Section B-B



Section C-C

Note: Curb may vary with the type of curb required.

** Contractor shall Transition Curb and Gutter to Match Proposed Sidewalk Using Stringline, Straight Edge, etc. Projected from the R/W line. (Typical both Sides).



DETECTABLE WARNING @ CURB RAMP

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100 Municipal Circle
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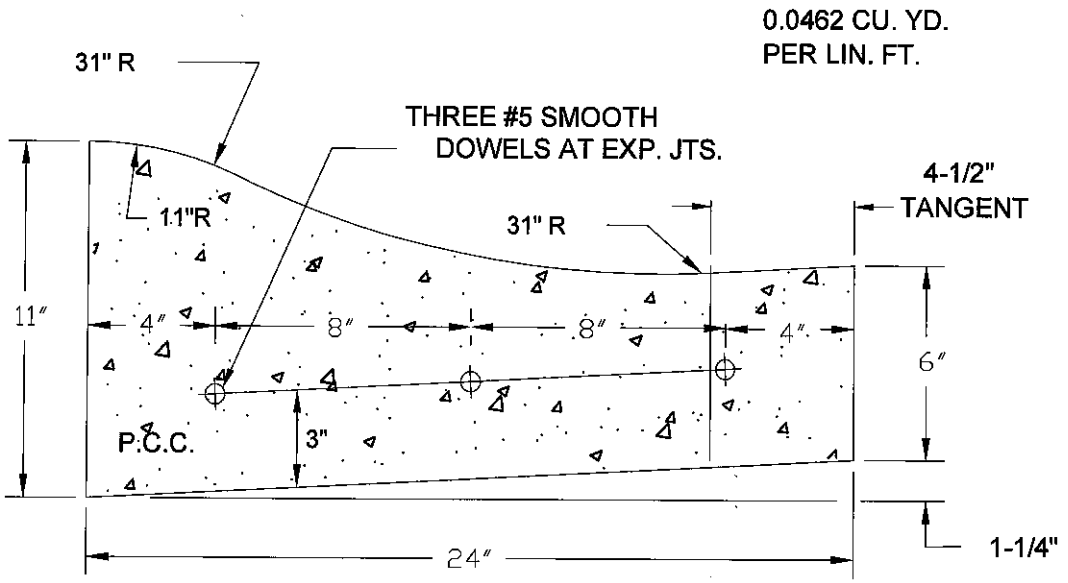
TYPE A AND A-1 HANDICAPPED ACCESS RAMPS

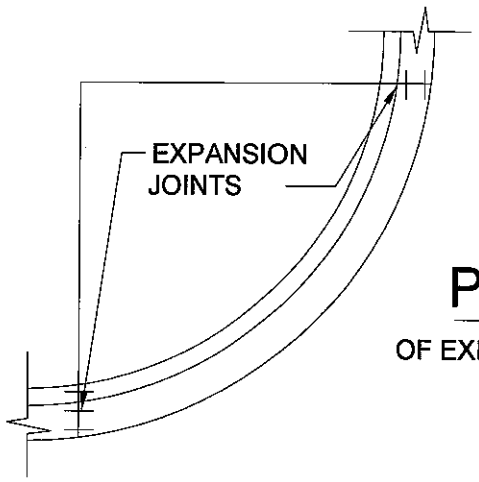
SIZE A | FSCM NO. | DWG NO. St - 5 | REV

SCALE NONE | SHEET 1 OF 1

TYPEA-BHANDICAPPEDRAMP09



CROSS SECTION



PLAN VIEW

OF EXPANSION JOINTS LOCATIONS

Notes:

1. 3/4" pre-molded, expansion joints with 2 foot steel dowels to be placed at radius points, vertical points of curvature, curb inlets and intermediate points not to exceed 300 feet. Dowels shall be smooth, greased and capped on one end.
2. Contraction joints, 2 inches deep and spaced every 10 feet, shall be sawn as soon as curing permits.
3. All exposed concrete shall be sprayed with cure as soon as finishing permits. Plastic sheeting is not an acceptable curing method.
4. KCMMB 4K concrete shall be used throughout.

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CITY OF RAYMORE

ROLL BACK
CURB & GUTTER (CG - 2)

DRAWN	DATE
Modified 2013	
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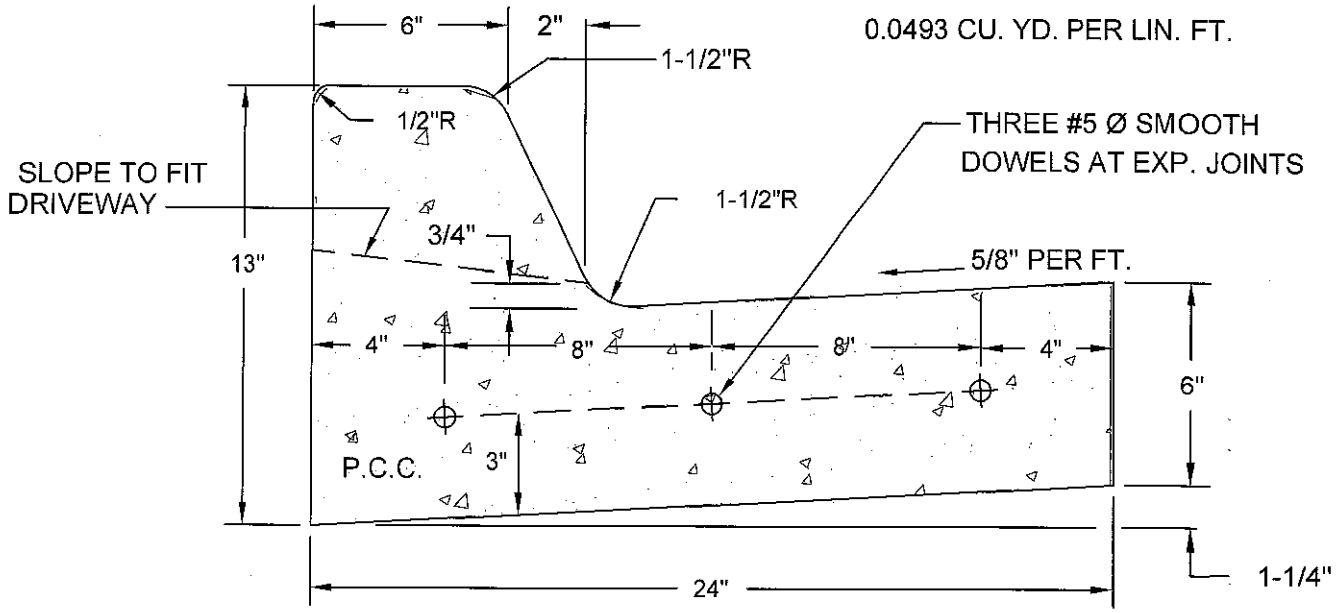
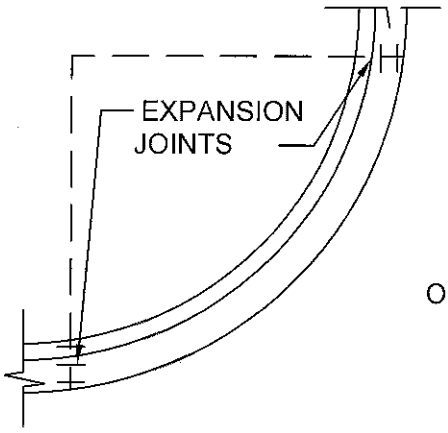
APPROVED	

SIZE	FSCM NO.	DWG NO.	REV
A		St – 6	

SCALE NONE SHEET 1 OF 1



CROSS SECTION



PLAN VIEW

OF EXPANSION JOINTS LOCATIONS

Notes:

1. 3/4" pre-molded, expansion joints with 2 foot steel dowels to be placed at radius points, vertical points of curvature, curb inlets and intermediate points not to exceed 300 feet. Dowels shall be smooth, greased and capped on one end.
2. Contraction joints, 2 inches deep and spaced every 10 feet, shall be sawn as soon as curing permits.
3. All exposed concrete shall be sprayed with cure as soon as finishing permits. Plastic sheeting is not an acceptable curing method.
4. KCMMB 4K concrete shall be used throughout.

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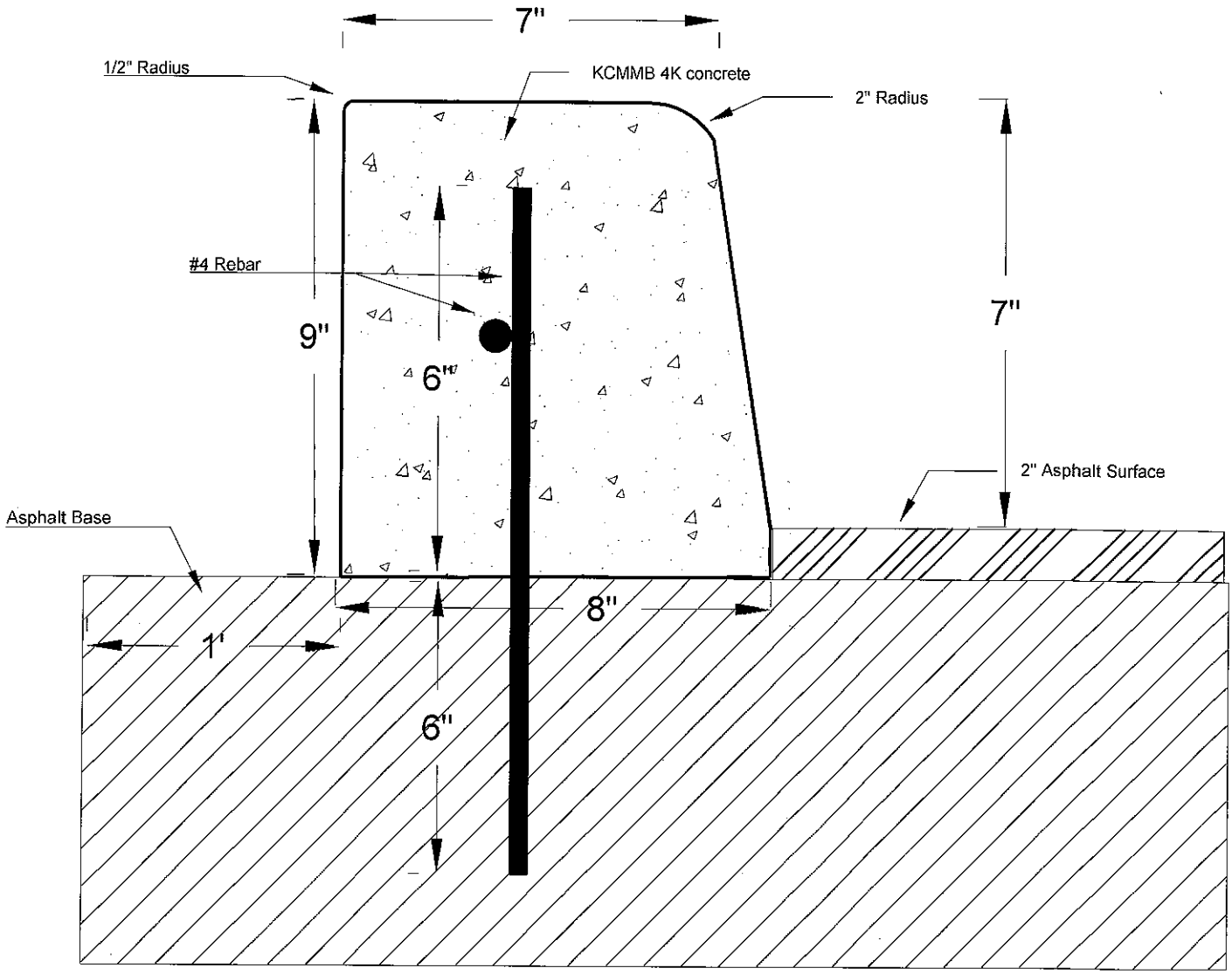
CITY OF RAYMORE

STRAIGHT BACK
CURB & GUTTER (CG - 1)

DRAWN	DATE
Modified 2013	
CHECKED	
APPROVED	

SIZE	FSCM NO.	DWG NO.	REV
A		St - 7	

SCALE NONE SHEET 1 OF 1



Notes:

1. Concrete for curb shall be a KCMMB 4K mix design.
2. All exposed conrete shall be sprayed with cure as soon as finishing permits.
3. Contraction joints, 2" deep, shall be sawn as soon as curing permits.
4. 1/2" pre-molded expansion joints to be placed at radius points, curb inlets and intermediate points not to exceed 250 feet.
5. Vertical rebar to be drilled into asphalt base at 10 foot intervals. Horizontal rebar is not to extend through expansion joints.

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CITY OF RAYMORE

STRAIGHT 7" CURB

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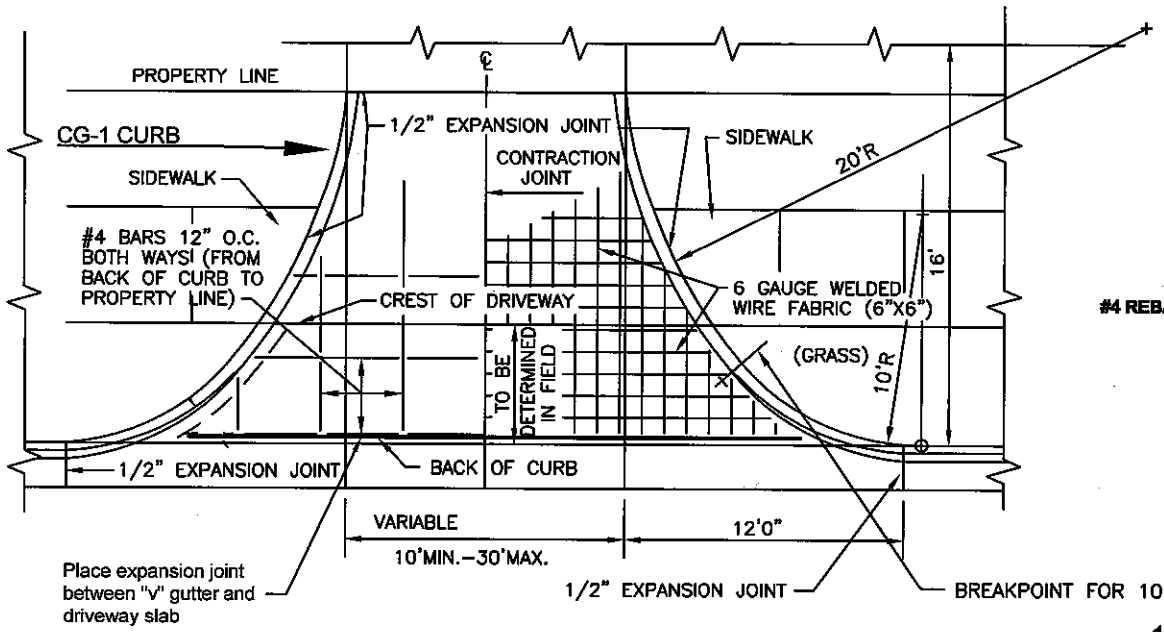
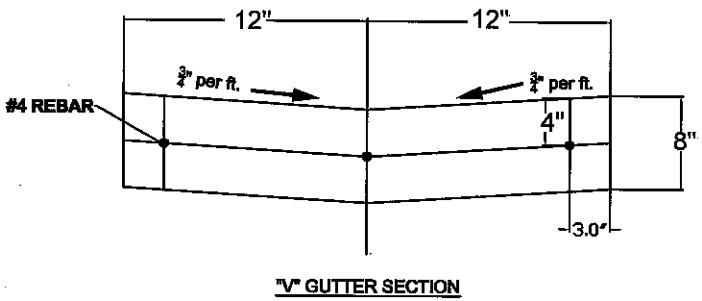
Modified 2013	
CHECKED	
APPROVED	

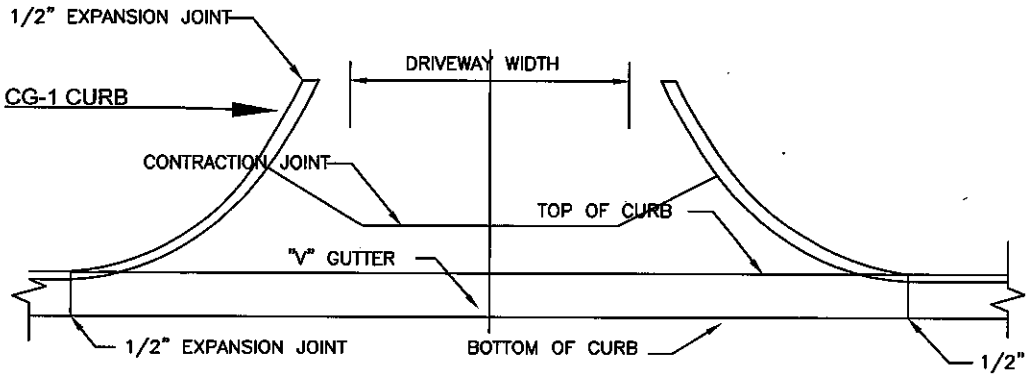
SIZE	FSCM NO.	DWG NO.	REV
A		St - 8	

SCALE NONE SHEET 1 OF 1





"V" GUTTER SECTION



Notes:

1. All concrete shall be a KCMMB 4K mix design.
2. Place expansion joint between CG-1 curb and driveway slab (not shown for clarity) in addition to locations shown in detail. No monolithic pours.
3. Slab can either be 8" thick with no reinforcing, 7" thick with 6 gauge welded wire fabric, or 6" thick with #4 rebar on 12 " centers.
4. Contraction joints shall be located so as to form no panel larger than 12' by 12'. Joints are to be sawn 2" deep.
5. CG-1 curb can be eliminated for residential drives.
6. Drive shall slope towards the curb at 1/4" to 1/2" per foot, except thru the sidewalk area where the slope shall not exceed 1/4" per foot.
7. Driveway slab shall be placed on 4" of clean gravel.

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Modified 2013	
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DESIGN	

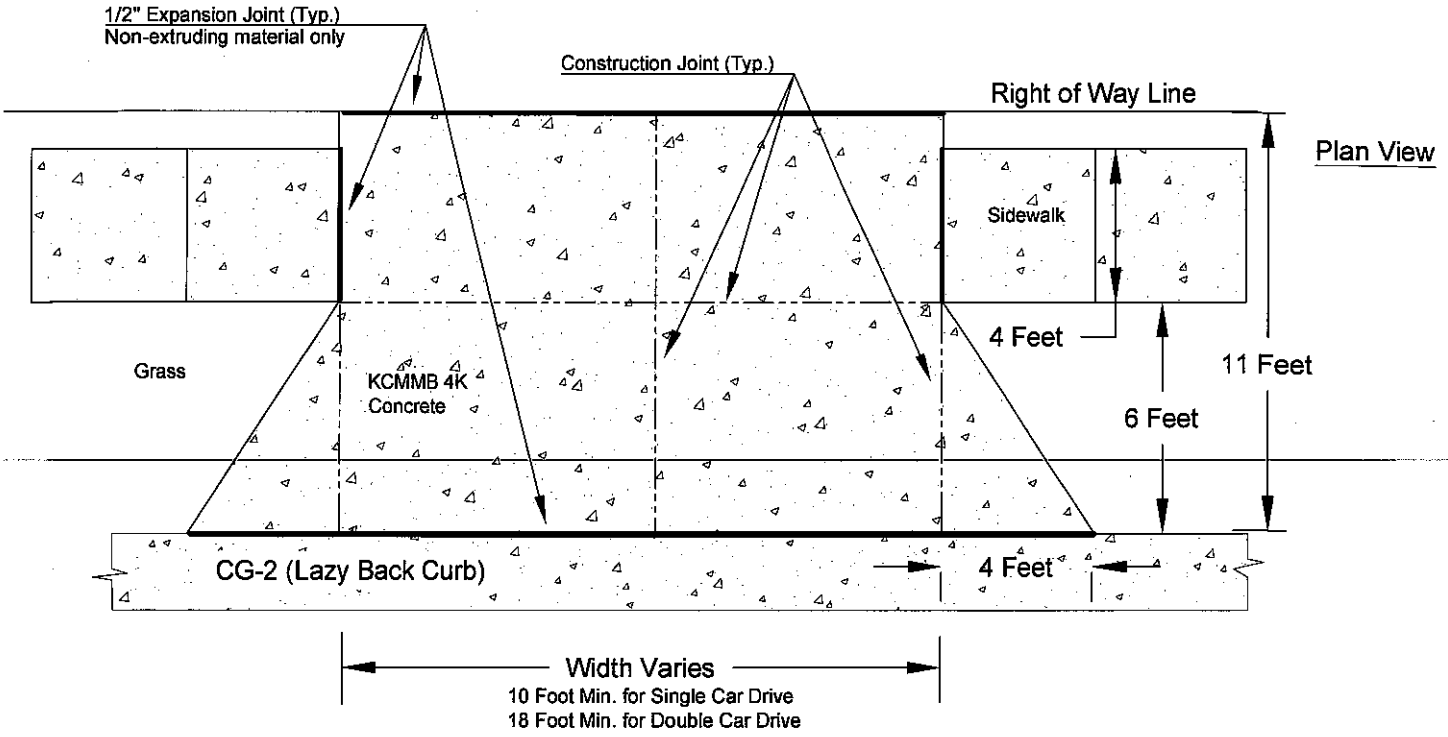
CITY OF RAYMORE

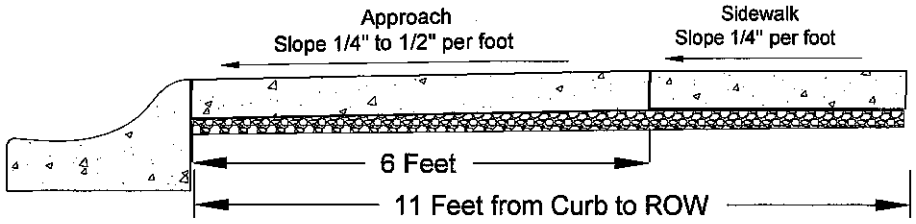
DRIVEWAYS (CONCRETE) COMMERCIAL & CG-1 RESIDENTAL

SIZE	FSCM NO.	DWG NO.	REV
		St - 9	

SCALE NONE SHEET 1 OF 1

Typical Plan of Residential Driveway





Elevation View
Not to Scale

Notes:

1. All concrete is to be KCMMB 4K. This includes flatwork behind the ROW line.
2. Thickness and Reinforcing
   a. Four inch thick slab requires #4 rebar on 24" centers, both ways.
   b. Five inch thick slab requires 6 gauge, 6"x6", flat, welded wire fabric.
   c. Six inch thick slab can be unreinforced.
3. Driveway replacement in ROW requires a ROW permit.
4. Four inches of 1/2" to 3/4" gravel shall be placed as base material for all slabs in the ROW.
5. Non-extruding expansion material only.

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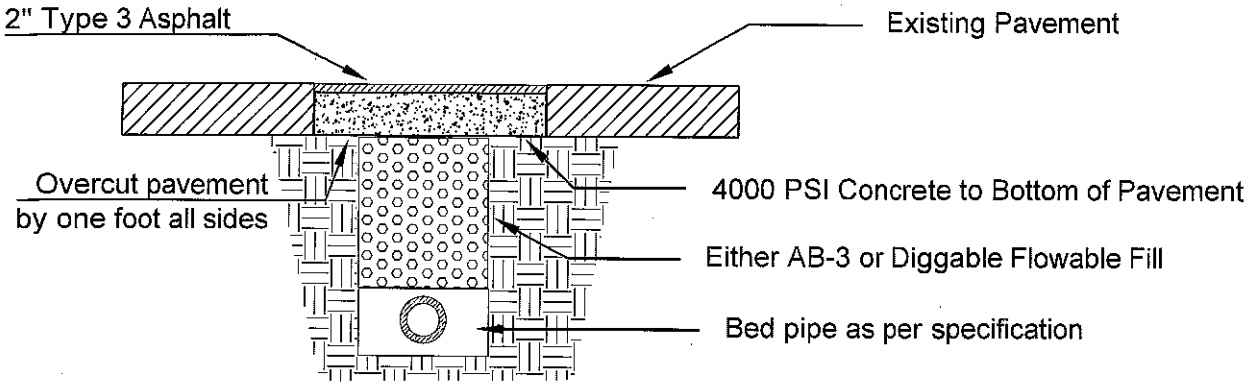
CITY OF RAYMORE

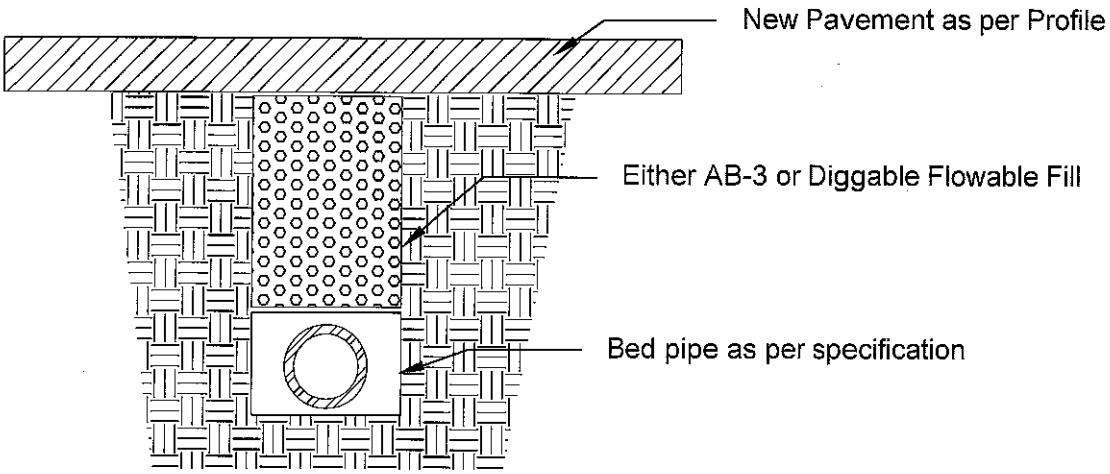
DRIVEWAYS–RESIDENTIAL
(FOR CG–2 CURB ONLY)

SIZE	FSCM NO.	DWG NO.	REV
A		St - 10	

SCALE NONE | SHEET 1 OF 1



Utility Installation In Existing Pavement (See note #5 below.)



Utility Installation Under New Pavement Construction

Notes:

1. AB-3 must be compacted in lifts to 95% maximum standard density and tested by an independent laboratory.
2. Bedding material shall extend above pipe a maximum of 12".
3. AB-3 or flowable fill shall extend 4 feet behind back of curb.
4. This detail covers all public and private utility construction in the Right of Way.
5. A pavement cut is to be done only to access existing utilities. New utilities/pipes shall be installed by horizontal drilling and encasement as per Standard Detail St - 13.

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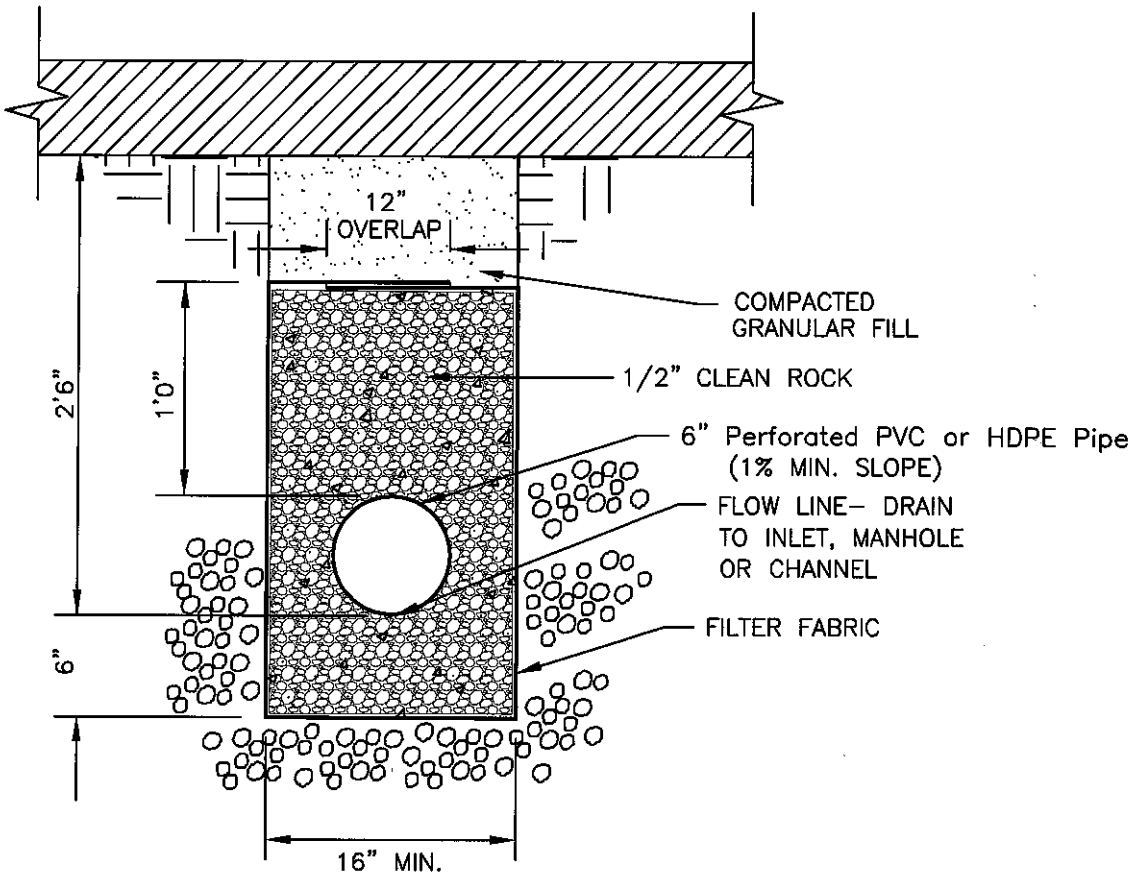
DRAWN Modified 2013	DATE	Utility Trench Construction in Right of Way
CHECKED		SIZE A / FSCM NO. / DWG NO. St - 11 / REV
APPROVED		SCALE NONE / SHEET 1 of



UNDERDRAIN DETAIL

SHOWN UNDER PAVEMENT

NOTE:

1. GRANULAR FILL TO BE CRUSHED STONE OR PEA GRAVEL WITH NO LESS THAN 95% PASSING 1/2" AND NOT LESS THAN 95% TO BE RETAINED ON A #4 SIEVE. FILL TO PLACED IN NOT MORE THAN 6" LAYERS AND COMPACTED.

2. FILTER FABRIC TO MEET AASHTO DESIGNATION M 288–90 CLASS A.

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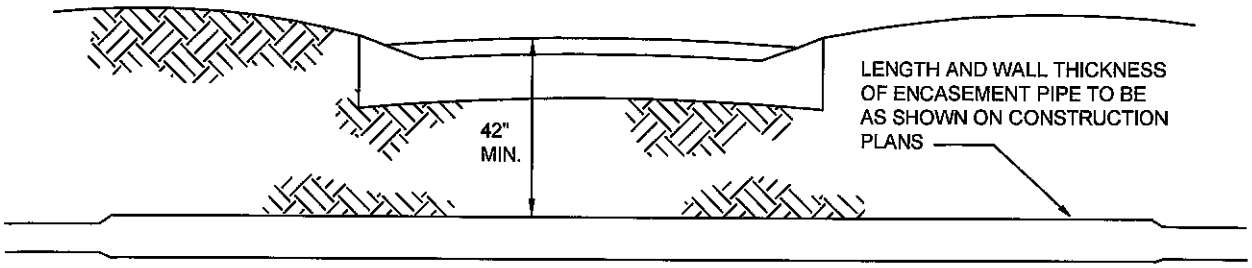
UNDERDRAIN DETAIL

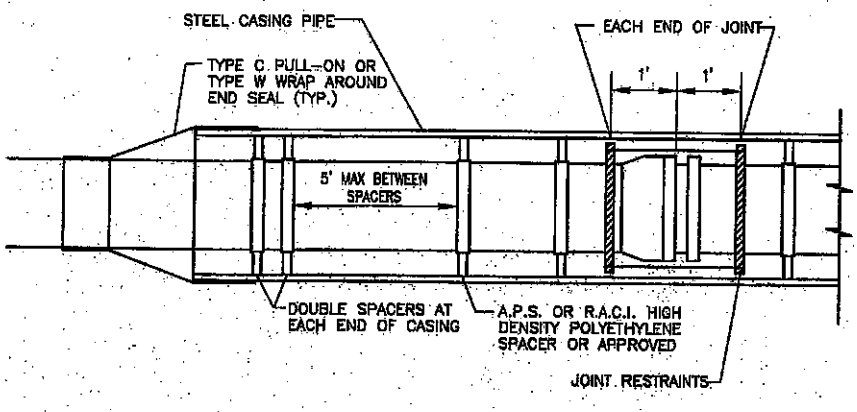
SIZE	FSCM NO.	DWG NO.	REV
A		St – 12	

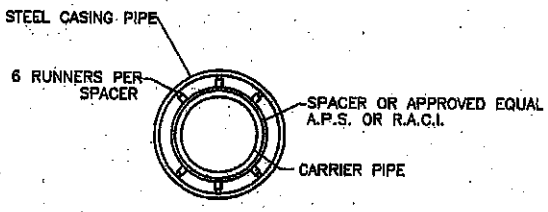
SCALE NONE SHEET 1 OF 1



Notes:

1. Engineer to determine required casing pipe thickness.
2. Polywrap required if the casing pipe is ductile iron.





SECTION VIEW

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City of Raymore
100 Municipal Circle
Raymore, MO 64083
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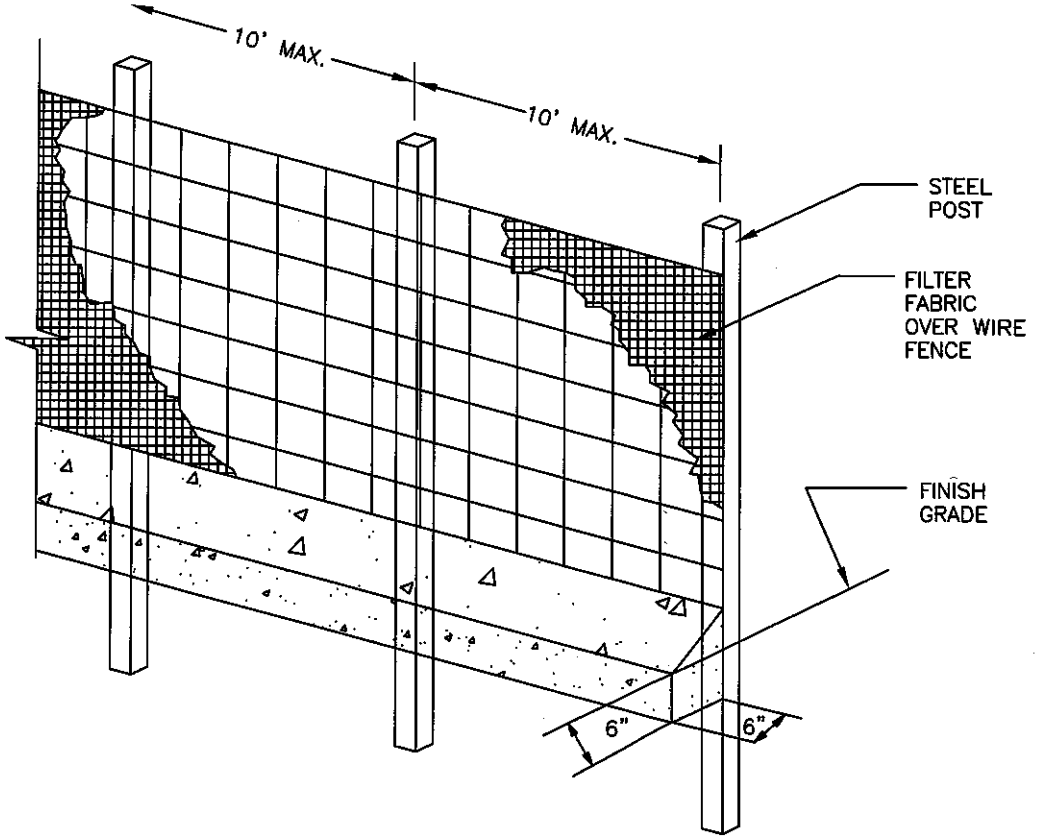
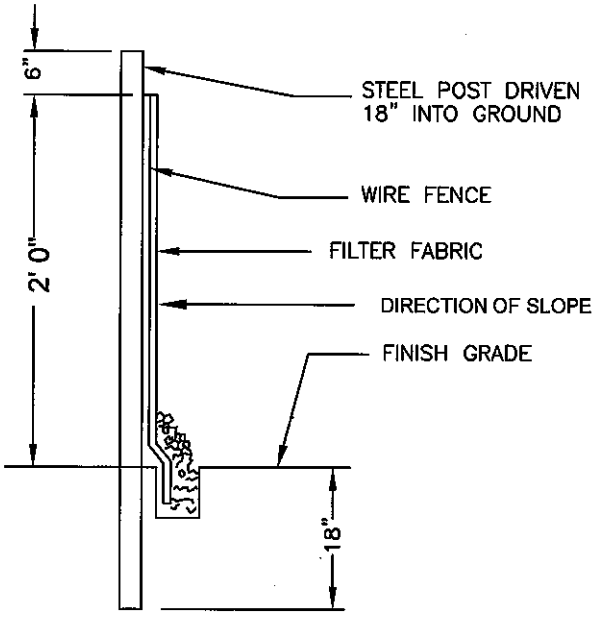
City of Raymore

Pipe Encasement Under Road

DRAWN Modified 2013	DATE			
CHECKED		SIZE A	FSCM NO.	DWG NO. St – 13 REV
APPROVED		SCALE NONE		SHEET 1 OF 1



ELEVATION



CROSS-SECTION

Notes:

1. Bottom of fence and filter fabric shall be trenched 6 inches into the subgrade.
2. Regular silt fence does not require the wire fence and wood stakes can be substituted for the steel posts.
3. Silt deposits must be removed before exceeding one third the height of the fence.

SILT FENCE

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City of Raymore
100 Municipal Circle
Raymore, MO 64083
816-331-1852 Fax 816-331-8067

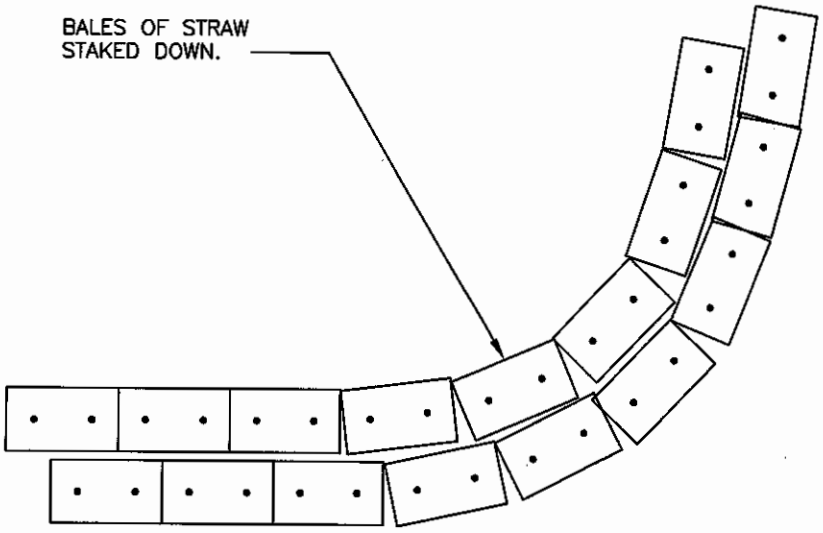
CITY OF RAYMORE

Regular & Reinforced Silt Fence

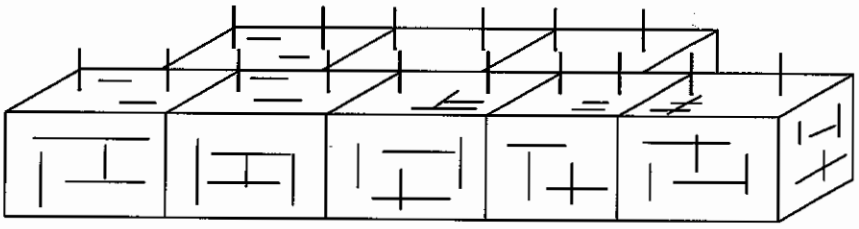
DRAWN	DATE
Modified 2013	
CHECKED	
APPROVED	

SIZE	FSCM NO.	DWG NO.	REV
A		St - 14	

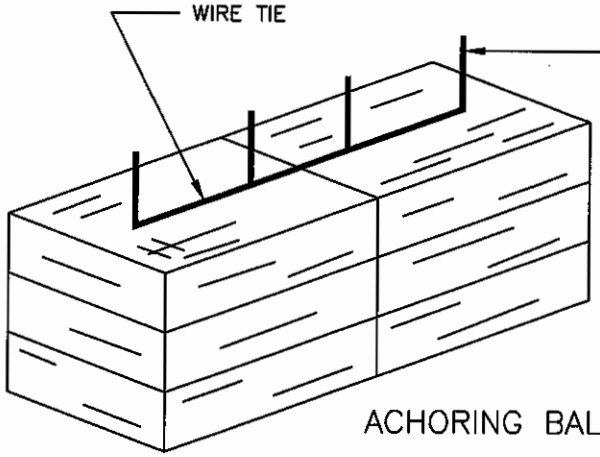
SCALE NONE SHEET OF



DOUBLE ROW OF BALES OF STRAW TO BE PLACED PRIOR TO THE START OF ROUGH GRADING. BALES ARE TO BE PLACED AS CLOSELY TOGETHER AS POSSIBLE IN ORDER TO PROVIDE MAXIMUM PROTECTION.



FRONT VIEW



ACHORING BALES

Notes:

1. Straw bales may NOT be used in inlet throats.
2. A single row of straw bales may be used in combination with un-reinforced silt fence.

STRAW BALE BARRIER

Engineering Department City of Raymore 100 Municipal Circle Raymore, MO 64083 816-331-1852 Fax 816-331-8067		*CITY OF RAYMORE*		
DRAWN Modified 2013	DATE	STRAW BALE BARRIER		
CHECKED		SIZE A	FSCM NO.	DWG NO. St - 15 REV
APPROVED		SCALE NONE		SHEET 1 OF 1