CALL NO. 200

CONTRACT ID. 221055

JEFFERSON - OLDHAM COUNTIES

FED/STATE PROJECT NUMBER 121GR22D055

DESCRIPTION OLD HENRY ROAD(KY-3084)

WORK TYPE GRADE, DRAIN & SURFACE WITH BRIDGE

PRIMARY COMPLETION DATE 10/31/2024

LETTING DATE: October 20,2022

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN DAYLIGHT TIME October 20,2022. Bids will be publicly announced at 10:00 AM EASTERN DAYLIGHT TIME.

PLANS AVAILABLE FOR THIS PROJECT.

DBE CERTIFICATION REQUIRED - 9%

REQUIRED BID PROPOSAL GUARANTY: Not less than 5% of the total bid.

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SCOPE OF WORK

ADMINISTRATIVE DISTRICT - 05

CONTRACT ID - 221055

121GR22D055

COUNTY - JEFFERSON

PCN - DE05630842255
STP 6000(205)

OLD HENRY ROAD(KY-3084) (MP 1.6) CONSTRUCT 5-LANE ROADWAY FROM KY-3084 MP 1.6 TO MP 1.8 AND 3-LANE ROADWAY FROM MP 1.8 TO MP 3.15 AT OLDHAM COUNTY LINE (MP 3.15), A DISTANCE OF 01.53 MILES.GRADE, DRAIN & SURFACE WITH BRIDGE SYP NO. 05-00367.20.

GEOGRAPHIC COORDINATES LATITUDE 38:16:55.00 LONGITUDE 85:29:07.00

ADT

COUNTY - OLDHAM

PCN - DE09330842255
STP 6000(205)

OLD HENRY ROAD(KY-3084) (MP 0.00) CONSTRUCT 3-LANE ROADWAY FROM KY-3084 MP 0.00 TO MP 0.32 TO ASH AVENUE (MP 0.32), A DISTANCE OF 02.27 MILES.GRADE, DRAIN & SURFACE WITH BRIDGE SYP NO. 05-00367.20.

GEOGRAPHIC COORDINATES LATITUDE 38:16:55.00 LONGITUDE 85:29:07.00

ADT

COMPLETION DATE(S):

COMPLETED BY 10/31/2024 APPLIES TO ENTIRE CONTRACT

CONTRACT NOTES

PROPOSAL ADDENDA

All addenda to this proposal must be applied when calculating bid and certified in the bid packet submitted to the Kentucky Department of Highways. Failure to use the correct and most recent addenda may result in the bid being rejected.

BID SUBMITTAL

Bidder must use the Department's electronic bidding software. The Bidder must download the bid file located on the Bid Express website (www.bidx.com) to prepare a bid packet for submission to the Department. The bidder must submit electronically using Bid Express.

JOINT VENTURE BIDDING

Joint venture bidding is permissible. All companies in the joint venture must be prequalified in one of the work types in the Qualifications for Bidders for the project. The bidders must get a vendor ID for the joint venture from the Division of Construction Procurement and register the joint venture as a bidder on the project. Also, the joint venture must obtain a digital ID from Bid Express to submit a bid. A joint bid bond of 5% may be submitted for both companies or each company may submit a separate bond of 5%.

UNDERGROUND FACILITY DAMAGE PROTECTION

The contractor shall make every effort to protect underground facilities from damage as prescribed in the Underground Facility Damage Protection Act of 1994, Kentucky Revised Statute KRS 367.4901 to 367.4917. It is the contractor's responsibility to determine and take steps necessary to be in compliance with federal and state damage prevention directives. When prescribed in said directives, the contractor shall submit Excavation Locate Requests to the Kentucky Contact Center (KY811) via web ticket entry. The submission of this request does not relieve the contractor from the responsibility of contacting non-member facility owners, whom shall be contacted through their individual Protection Notification Center. Non-compliance with these directives can result in the enforcement of penalties.

REGISTRATION WITH THE SECRETARY OF STATE BY A FOREIGN ENTITY

Pursuant to KRS 176.085(1)(b), an agency, department, office, or political subdivision of the Commonwealth of Kentucky shall not award a state contract to a person that is a foreign entity required by KRS 14A.9-010 to obtain a certificate of authority to transact business in the Commonwealth ("certificate") from the Secretary of State under KRS 14A.9-030 unless the person produces the certificate within fourteen (14) days of the bid or proposal opening. If the foreign entity is not required to obtain a certificate as provided in KRS 14A.9-010, the foreign entity should identify the applicable exception. Foreign entity is defined within KRS 14A.1-070.

For all foreign entities required to obtain a certificate of authority to transact business in the Commonwealth, if a copy of the certificate is not received by the contracting agency within the time frame identified above, the foreign entity's solicitation response shall be deemed non-responsive or the awarded contract shall be cancelled.

Businesses can register with the Secretary of State at https://secure.kentucky.gov/sos/ftbr/welcome.aspx .

SPECIAL NOTE FOR PROJECT QUESTIONS DURING ADVERTISEMENT

Questions about projects during the advertisement should be submitted in writing to the Division of Construction Procurement. This may be done by fax (502) 564-7299 or email to kytc.projectquestions@ky.gov. The Department will attempt to answer all submitted questions. The Department reserves the right not to answer if the question is not pertinent or does not aid in clarifying the project intent.

The deadline for posting answers will be 3:00 pm Eastern Daylight Time, the day preceding the Letting. Questions may be submitted until this deadline with the understanding that the later a question is submitted, the less likely an answer will be able to be provided.

The questions and answers will be posted for each Letting under the heading "Questions & Answers" on the Construction Procurement website (www.transportation.ky.gov/contract). The answers provided shall be considered part of this Special Note and, in case of a discrepancy, will govern over all other bidding documents.

HARDWOOD REMOVAL RESTRICTIONS

The US Department of Agriculture has imposed a quarantine in Kentucky and several surrounding states, to prevent the spread of an invasive insect, the emerald ash borer. Hardwood cut in conjunction with the project may not be removed from the state. Chipping or burning on site is the preferred method of disposal.

INSTRUCTIONS FOR EXCESS MATERIAL SITES AND BORROW SITES

Identification of excess material sites and borrow sites shall be the responsibility of the Contractor. The Contractor shall be responsible for compliance with all applicable state and federal laws and may wish to consult with the US Fish and Wildlife Service to seek protection under Section 10 of the Endangered Species Act for these activities.

ACCESS TO RECORDS

The contractor, as defined in KRS 45A.030 (9) agrees that the contracting agency, the Finance and Administration Cabinet, the Auditor of Public Accounts, and the Legislative Research Commission, or their duly authorized representatives, shall have access to any books, documents, papers, records, or other evidence, which are directly pertinent to this contract for the purpose of financial audit or program review. Records and other prequalification information confidentially

disclosed as part of the bid process shall not be deemed as directly pertinent to the contract and shall be exempt from disclosure as provided in KRS 61.878(1)(c). The contractor also recognizes that any books, documents, papers, records, or other evidence, received during a financial audit or program review shall be subject to the Kentucky Open Records Act, KRS 61.870 to 61.884.

In the event of a dispute between the contractor and the contracting agency, Attorney General, or the Auditor of Public Accounts over documents that are eligible for production and review, the Finance and Administration Cabinet shall review the dispute and issue a determination, in accordance with Secretary's Order 11-004.

April 30, 2018

FEDERAL CONTRACT NOTES

The Kentucky Department of Highways, in accordance with the Regulations of the United States Department of Transportation 23 CFR 635.112 (h), hereby notifies all bidders that failure by a bidder to comply with all applicable sections of the current Kentucky Standard Specifications, including, but not limited to the following, may result in a bid not being considered responsive and thus not eligible to be considered for award:

102.02 Current Rating
102.13 Irregular Bid Proposals
102.09 Proposal Guaranty
102.08 Preparation and Delivery of Proposals
102.14 Disqualification of Bidders

CIVIL RIGHTS ACT OF 1964

The Kentucky Transportation Cabinet, Department of Highways, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, national origin, sex, age (over 40), religion, sexual orientation, gender identity, veteran status, disability, income- level, or Limited English Proficiency (LEP)in consideration for an award.

NOTICE TO ALL BIDDERS

To report bid rigging activities call: 1-800-424-9071.

The U.S. Department of Transportation (DOT) operates the above toll-free “hotline” Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the “hotline” to report such activities.

The “hotline” is part of the DOT’s continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

SECOND TIER SUBCONTRACTS

Second tier subcontracts are acceptable per Section 108.01 of the Standard Specifications for Road and Bridge Construction. Sub-Contractors fulfilling a disadvantaged business enterprise goal on a project may enter into a 2nd tier subcontract with a Non-DBE Subcontractor. However, in this instance, none of the work subcontracted to the Non-DBE Contractor will count toward fulfilling the established Disadvantaged Goal for the project.

DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

It is the policy of the Kentucky Transportation Cabinet ("the Cabinet") that Disadvantaged Business Enterprises ("DBE") shall have the opportunity to participate in the performance of highway construction projects financed in whole or in part by Federal Funds in order to create a level playing field for all businesses who wish to contract with the Cabinet. To that end, the Cabinet will comply with the regulations found in 49 CFR Part 26, and the definitions and requirements contained therein shall be adopted as if set out verbatim herein.

The Cabinet, contractors, subcontractors, and sub-recipients shall not discriminate on the basis of race, color, national origin, or sex in the performance of work performed pursuant to Cabinet contracts. The contractor shall carry out applicable requirements of 49 CFR 26 in the award and administration of federally assisted highway construction projects. The contractor will include this provision in all its subcontracts and supply agreements pertaining to contracts with the Cabinet.

Failure by the contractor to carry out these requirements is a material breach of its contract with the Cabinet, which may result in the termination of the contract or such other remedy as the Cabinet deems necessary.

DBE GOAL

The Disadvantaged Business Enterprise (DBE) goal established for this contract, as listed on the front page of the proposal, is the percentage of the total value of the contract.

The contractor shall exercise all necessary and reasonable steps to ensure that Disadvantaged Business Enterprises participate in a least the percent of the contract as set forth above as goals for this contract.

OBLIGATION OF CONTRACTORS

Each contractor prequalified to perform work on Cabinet projects shall designate and make known to the Cabinet a liaison officer who is assigned the responsibility of effectively administering and promoting an active program for utilization of DBEs.

If a formal goal has not been designated for the contract, all contractors are encouraged to consider DBEs for subcontract work as well as for the supply of material and services needed to perform this work.

Contractors are encouraged to use the services of banks owned and controlled by minorities and women.

CERTIFICATION OF CONTRACT GOAL

Contractors shall include the following certification in bids for projects for which a DBE goal has been established. BIDS SUBMITTED WHICH DO NOT INCLUDE CERTIFICATION OF DBE PARTICIPATION WILL NOT BE ACCEPTED. These bids will not be considered for award by the Cabinet and they will be returned to the bidder.

"The bidder certifies that it has secured participation by Disadvantaged Business Enterprises ("DBE") in the amount of _____ percent of the total value of this contract and that the DBE participation is in compliance with the requirements of 49 CFR 26 and the policies of the Kentucky Transportation Cabinet pertaining to the DBE Program."

The certification statement is located in the electronic bid file. All contractors must certify their DBE participation on that page. DBEs utilized in achieving the DBE goal must be certified and prequalified for the work items at the time the bid is submitted.

DBE PARTICIPATION PLAN

Lowest responsive bidders must submit the *DBE Plan/ Subcontractor Request*, form TC 14-35 DBE, within 5 days of the letting. This is necessary before the Awards Committee will review and make a recommendation. **The project will not be considered for award prior to submission and approval of the apparent low bidder's DBE Plan/Subcontractor Request.**

The DBE Participation Plan shall include the following:

1. Name and address of DBE Subcontractor(s) and/or supplier(s) intended to be used in the proposed project;
2. Description of the work each is to perform including the work item, unit, quantity, unit price and total amount of the work to be performed by the individual DBE. The Proposal Line Number, Category Number, and the Project Line Number can be found in the "material listing" on the Construction Procurement website under the specific letting;
3. The dollar value of each proposed DBE subcontract and the percentage of total project contract value this represents. DBE participation may be counted as follows;
   a. If DBE suppliers and manufactures assume actual and contractual responsibility, the dollar value of materials to be furnished will be counted toward the goal as follows:
      - The entire expenditure paid to a DBE manufacturer;
      - 60 percent of expenditures to DBE suppliers that are not manufacturers provided the supplier is a regular dealer in the product involved. A regular dealer must be engaged in, as its principal business and in its own name, the sale of products to the public, maintain an inventory and own and operate distribution equipment; and
      - The amount of fees or commissions charged by the DBE firms for a bona fide service, such as professional, technical, consultant, or managerial services and assistance in the procurement of essential personnel, facilities, equipment, materials, supplies, delivery of materials and supplies or for furnishing bonds, or insurance, providing such fees or commissions are determined to be reasonable and customary.

b) The dollar value of services provided by DBEs such as quality control testing, equipment repair and maintenance, engineering, staking, etc.;
c) The dollar value of joint ventures. DBE credit for joint ventures will be limited to the dollar amount of the work actually performed by the DBE in the joint venture;

4. Written and signed documentation of the bidder's commitment to use a DBE contractor whose participation is being utilized to meet the DBE goal; and
5. Written and signed confirmation from the DBE that it is participating in the contract as provided in the prime contractor's commitment.

UPON AWARD AND BEFORE A WORK ORDER WILL BE ISSUED

Contractors must submit the signed subcontract between the contractor and the DBE contractor, along with the DBE's certificate of insurance. If the DBE is a supplier of materials for the project, a signed purchase order must be submitted to the Division of Construction Procurement.

Changes to DBE Participation Plans must be approved by the Cabinet. The Cabinet may consider extenuating circumstances including, but not limited to, changes in the nature or scope of the project, the inability or unwillingness of a DBE to perform the work in accordance with the bid, and/or other circumstances beyond the control of the prime contractor.

CONSIDERATION OF GOOD FAITH EFFORTS REQUESTS

If the DBE participation submitted in the bid by the apparent lowest responsive bidder does not meet or exceed the DBE contract goal, the apparent lowest responsive bidder must submit a Good Faith Effort Package to satisfy the Cabinet that sufficient good faith efforts were made to meet the contract goals prior to submission of the bid. Efforts to increase the goal after bid submission will not be considered in justifying the good faith effort, unless the contractor can show that the proposed DBE was solicited prior to the letting date. DBEs utilized in achieving the DBE goal must be certified and prequalified for the work items at the time the bid is submitted. One complete set (hard copy along with an electronic copy) of this information must be received in the Division of Contract Procurement no later than 12:00 noon of the tenth calendar day after receipt of notification that they are the apparent low bidder.

Where the information submitted includes repetitious solicitation letters it will be acceptable to submit a sample representative letter along with a distribution list of the firms solicited. Documentation of DBE quotations shall be a part of the good faith effort submittal as necessary to demonstrate compliance with the factors listed below which the Cabinet considers in judging good faith efforts. This documentation may include written subcontractors' quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

The Good Faith Effort Package shall include, but may not be limited to information showing evidence of the following:

1. Whether the bidder attended any pre-bid meetings that were scheduled by the Cabinet to inform DBEs of subcontracting opportunities;
2. Whether the bidder provided solicitations through all reasonable and available means;
3. Whether the bidder provided written notice to all DBEs listed in the DBE directory at the time of the letting who are prequalified in the areas of work that the bidder will be subcontracting;
4. Whether the bidder followed up initial solicitations of interest by contacting DBEs to determine with certainly whether they were interested. If a reasonable amount of DBEs within the targeted districts do not provide an intent to quote or no DBEs are prequalified in the subcontracted areas, the bidder must notify the Disadvantaged Enterprise Business Liaison Officer (DEBLO) in the Office for Civil Rights and Small Business Development to give notification of the bidder's inability to get DBE quotes;
5. Whether the bidder selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the contract goals. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise perform these work items with its own forces;
6. Whether the bidder provided interested DBEs with adequate and timely information about the plans, specifications, and requirements of the contract;
7. Whether the bidder negotiated in good faith with interested DBEs not rejecting them as unqualified without sound reasons based on a thorough investigation of their capabilities. Any rejection should be so noted in writing with a description as to why an agreement could not be reached;
8. Whether quotations were received from interested DBE firms but were rejected as unacceptable without sound reasons why the quotations were considered unacceptable. The fact that the DBE firm's quotation for the work is not the lowest quotation received will not in itself be considered as a sound reason for rejecting the quotation as unacceptable. The fact that the bidder has the ability and/or desire to perform the contract work with its own forces will not be considered a sound reason for rejecting a DBE quote. Nothing in this provision shall be construed to require the bidder to accept unreasonable quotes in order to satisfy DBE goals;
9. Whether the bidder specifically negotiated with subcontractors to assume part of the responsibility to meet the contract DBE goal when the work to be subcontracted includes potential DBE participation;
10. Whether the bidder made any efforts and/or offered assistance to interested DBEs in obtaining the necessary equipment, supplies, materials, insurance and/or bonding to satisfy the work requirements of the bid proposal; and
11. Any other evidence that the bidder submits which may show that the bidder has made reasonable good faith efforts to include DBE participation.

FAILURE TO MEET GOOD FAITH REQUIREMENT

Where the apparent lowest responsive bidder fails to submit sufficient participation by DBE firms to meet the contract goal and upon a determination by the Good Faith Committee based upon the information submitted that the apparent lowest responsive bidder failed to make sufficient reasonable efforts to meet the contract goal, the bidder will be offered the opportunity to meet in person for administrative reconsideration. The bidder will be notified of the Committee's decision within 24 hours of its decision. The bidder will have 24 hours to request reconsideration of the Committee's decision. The reconsideration meeting will be held within two days of the receipt of a request by the bidder for reconsideration.

The request for reconsideration will be heard by the Office of the Secretary. The bidder will have the opportunity to present written documentation or argument concerning the issue of whether it met the goal or made an adequate good faith effort. The bidder will receive a written decision on the reconsideration explaining the basis for the finding that the bidder did or did not meet the goal or made adequate Good Faith efforts to do so.

The result of the reconsideration process is not administratively appealable to the Cabinet or to the United States Department of Transportation.

The Cabinet reserves the right to award the contract to the next lowest responsive bidder or to rebid the contract in the event that the contract is not awarded to the low bidder as the result of a failure to meet the good faith requirement.

SANCTIONS FOR FAILURE TO MEET DBE REQUIREMENTS OF THE PROJECT

Failure by the prime contractor to fulfill the DBE requirements of a project under contract or to demonstrate good faith efforts to meet the goal constitutes a breach of contract. When this occurs, the Cabinet will hold the prime contractor accountable, as would be the case with all other contract provisions. Therefore, the contractor's failure to carry out the DBE contract requirements shall constitute a breach of contract and as such the Cabinet reserves the right to exercise all administrative remedies at its disposal including, but not limited to the following:

- Suspension of Prequalification;
- Disallow credit toward the DBE goal;
- Withholding progress payments;
- Withholding payment to the prime in an amount equal to the unmet portion of the contract goal; and/or
- Termination of the contract.

PROMPT PAYMENT

The prime contractor will be required to pay the DBE and Non-DBE Subcontractors within seven (7) working days after he or she has received payment from the Kentucky Transportation Cabinet for work performed or materials furnished.

CONTRACTOR REPORTING

All contractors must keep detailed records and provide reports to the Cabinet on their progress in meeting the DBE requirement on any highway contract. These records may include, but shall not be limited to payroll, lease agreements, cancelled payroll checks, executed subcontracting agreements, etc. Prime contractors will be required to complete and submit a ***signed and notarized*** Affidavit of Subcontractor Payment (TC 18-7) and copies of checks for any monies paid to each DBE subcontractor or supplier utilized to meet a DBE goal. These documents must be completed and signed within 7 days of being paid by the Cabinet.

Payment information that needs to be reported includes date the payment is sent to the DBE, check number, Contract ID, amount of payment and the check date. Before Final Payment is made on this contract, the Prime Contractor will certify that all payments were made to the DBE subcontractor and/or DBE suppliers.

******* IMPORTANT *******

Please mail the original, signed and completed TC (18-7) Affidavit of Subcontractor Payment form and all copies of checks for payments listed above to the following address:

Office for Civil Rights and Small Business Development
6th Floor West 200 Mero Street
Frankfort, KY 40622

The prime contractor should notify the KYTC Office for Civil Rights and Small Business Development seven (7) days prior to DBE contractors commencing work on the project. The contact in this office is Mr. Melvin Bynes. Mr. Bynes' current contact information is email address – melvin.bynes2@ky.gov and the telephone number is (502) 564-3601.

DEFAULT OR DECERTIFICATION OF THE DBE

If the DBE subcontractor or supplier is decertified or defaults in the performance of its work, and the overall goal cannot be credited for the uncompleted work, the prime contractor may utilize a substitute DBE or elect to fulfill the DBE goal with another DBE on a different work item. If after exerting good faith effort in accordance with the Cabinet's Good Faith Effort policies and procedures, the prime contractor is unable to replace the DBE, then the unmet portion of the goal may be waived at the discretion of the Cabinet.

PROHIBITION ON TELECOMMUNICATIONS EQUIPMENT OR SERVICES

In accordance with the FY 2019 National Defense Authorization Act (NDAA), 2 CFR 200.216, and 2 CFR 200.471, Federal agencies are prohibited, after August 13, 2020, from obligating or expending financial assistance to obtain certain telecommunications and video surveillance services and equipment from specific producers. As a result of these regulations, contractors and subcontractors are prohibited, on projects with federal funding participation, from providing telecommunication or video surveillance equipment, services, or systems produced by:

- Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities)
- Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities)

LEGAL REQUIREMENTS AND RESPONSIBILITY TO THE PUBLIC – CARGO PREFERENCE ACT (CPA).

(REV 12-17-15) (1-16)

SECTION 7 is expanded by the following new Article:

102.10 **Cargo Preference Act – Use of United States-flag vessels.**

Pursuant to Title 46CFR Part 381, the Contractor agrees

- To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.
- To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph 1 of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.
- To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

ASPHALT MIXTURE

Unless otherwise noted, the Department estimates the rate of application for all asphalt mixtures to be 110 lbs/sy per inch of depth.

INCIDENTAL SURFACING

The Department has included in the quantities of asphalt mixtures established in the proposal estimated quantities required for resurfacing or surfacing mailbox turnouts, farm field entrances, residential and commercial entrances, curve widening, ramp gores and tapers, and road and street approaches, as applicable. Pave these areas to the limits as shown on Standard Drawing RPM-110-06 or as directed by the Engineer. In the event signal detectors are present in the intersecting streets or roads, pave the crossroads to the right of way limit or back of the signal detector, whichever is the farthest back of the mainline. Surface or resurface these areas as directed by the Engineer. The Department will not measure placing and compacting for separate payment but shall be incidental to the Contract unit price for the asphalt mixtures.

ASPHALT PAVEMENT RIDE QUALITY CATEGORY B

The Department will apply Pavement Rideability Requirements on this project in accordance with Section 410, Category B.

FUEL AND ASPHALT PAY ADJUSTMENT

The Department has included the Contract items Asphalt Adjustment and Fuel Adjustment for possible future payments at an established Contract unit price of $1.00. The Department will calculate actual adjustment quantities after work is completed. If existing Contract amount is insufficient to pay all items on the contract with the adjustments, the Department will establish additional monies with a change order.

ASPHALT PAVEMENT RIDE QUALITY CATEGORY A

The Department will apply Pavement Rideability Requirements on this project in accordance with Section 410, Category A.

OPTION A

Be advised that the Department will accept compaction of asphalt mixtures furnished for driving lanes and ramps, at 1 inch (25mm) or greater, on this project according to OPTION A in accordance with Section 402 and Section 403 of the current Standard Specifications. The Department will require joint cores as described in Section 402.03.02 for surface mixtures only. The Department will accept compaction of all other asphalt mixtures according to OPTION B.

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

12/2010
Page 1 of 6

County: Jefferson/Oldham Item No.: 5-367.20

Federal Project No.: JL04 056 3084 001-002

Project Description:

EXTENSION OF OLD HENRY ROAD EAST TO ASH AVENUE (KY362). (12CCR)(18CCN) (2020CCR)

Roadway Classification: ☒ Urban ☐ Rural

☐ Local ☒ Collector ☐ Arterial ☐ Interstate

ADT (current) 5700 AM Peak Current N/A PM Peak Current N/A % Trucks 8%

Project Designation: ☒ Significant ☐ Other: _____

Traffic Control Plan Design:

Taper and Diversion Design Speeds 35

Minimum Lane Width 10-11’ Minimum Shoulder Width N/A

Minimum Bridge Width N/A

Minimum Radius N/A Maximum Grade N/A

Minimum Taper Length N/A Minimum Intersection Level of Service N/A

Existing Traffic Queue Lengths N/A Projected Traffic Queue Lengths N/A

Comments:

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-367.20

Discussion:

1) Public Information Plan

a) Prepare with assistance from ☐ KYTC or ☒ Consultant

b) Identify Trip Generators	Referenced	f) Railroad Involvement	N/A
c) Identify Types of Road Users	Referenced	g) Address Pedestrians, Bikes Mass Transit	Referenced
d) Public Information Message	Referenced	h) Address Timing, Frequency, Updates, Effectiveness of Plan	Referenced
e) Public Information Strategies to be used	Referenced	i) Police & Other Emergency Services	Referenced

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-367.20

2) Temporary Traffic Control Plan (For Each Phase of Construction) Phase 1

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	N/A	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A	**Uniformed Law Enforcement Officers**	N/A
f) Evaluation of Queue Lengths	N/A	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	N/A	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No 5-367.20

2) Temporary Traffic Control Plan (For Each Phase of Construction) Phase 2

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	Referenced	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	Referenced	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A	**Uniformed Law Enforcement Officers**	N/A
f) Evaluation of Queue Lengths	N/A	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	N/A	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

Please see TMP plans for road closure/detour from Arnold Palmer Road/Hamilton Springs Drive to Old Henry Trail. Closure will be limited to 30 calendar days to construct the 12'x5' RCBC extension plus improve the current deficient vertical curve east of Arnold Palmer Road/Hamilton Springs Drive.

Please see TMP plans for road closure/detour from just west of Factory Lane to Twin Creek Drive. Closure will be limited to 45 calendar days to construct the 13'x7' RCBC.

Please see TMP plans for road closure/detour from just east of Factory Lane and west of Reamers Lane. Closure will be limited to 60 calendar days to construct the bridge.

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-367.20

2) Temporary Traffic Control Plan (For Each Phase of Construction) Phase 3

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	N/A	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A	**Uniformed Law Enforcement Officers**	N/A
f) Evaluation of Queue Lengths	N/A	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	N/A	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-367.20

2) Temporary Traffic Control Plan (For Each Phase of Construction) Phase 4

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	N/A	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A	**Uniformed Law Enforcement Officers**	N/A
f) Evaluation of Queue Lengths	N/A	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	N/A	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

2) Temporary Traffic Control Plan (For Each Phase of Construction)
Phase 5

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	N/A	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A	**Uniformed Law Enforcement Officers**	N/A
f) Evaluation of Queue Lengths	N/A	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	N/A	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

2) Temporary Traffic Control Plan (For Each Phase of Construction)
Phase 6

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	N/A	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A	**Uniformed Law Enforcement Officers**	N/A
f) Evaluation of Queue Lengths	N/A	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	N/A	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

2) Temporary Traffic Control Plan (For Each Phase of Construction)
Phase 7

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	N/A	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A	**Uniformed Law Enforcement Officers**	N/A
f) Evaluation of Queue Lengths	N/A	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	N/A	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-367.20

2) Temporary Traffic Control Plan (For Each Phase of Construction) Phase 8

Exposure Control Measures		**Positive Protection Measures**	
a) Is Road Closure Allowed Type:	N/A	a) Address Drop Off Protection Criteria	Referenced
b) Detour Conditions	N/A	b) Temporary Barrier Requirements	Referenced
c) Working Hour Restrictions	Referenced	c) Evaluation of Existing Guardrail Conditions	Referenced
d) Holiday or Special Event Work Restrictions	Referenced	d) Address Temporary Drainage	Referenced
e) Evaluation of Intersection LOS	N/A	**Uniformed Law Enforcement Officers**	N/A
f) Evaluation of Queue Lengths	N/A	**Payment for Traffic Control***	
g) Evaluation of User Costs and Incentives/Disincentives	N/A	a) Method of Project Bidding	Referenced
h) Address Pedestrians, Bikes, Mass Transit	Referenced	b) Special Notes	Referenced
Work Vehicles and Equipment	Referenced	*Payment for traffic control items shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction	

Comments:

Kentucky Transportation Cabinet
Division of Highway Design
TRAFFIC MANAGEMENT PLAN

Item No. 5-367.20

APPROVAL:

Charles S. Berg — 7-29-2022
Project Manager — Date

Stan Hall — 8/11/2022
Project Delivery and Preservation Manager — Date

Ken Bailey — 08/11/22
Engineering Support Manager — Date

FHWA Representative — Date

Revisions to the TMP require review/approval by the signatories.

KY 3084 (OLD HENRY ROAD)
ITEM No. 5-367.20
PUBLIC INFORMATION PLAN

The primary goal of the Public Information Plan (PIP) is to inform the motoring public and area stakeholders of project information including Maintenance of Traffic (MOT) which includes shoulder, lane and ramp closures. The KYTC District 5 Public Information Officer (PIO) will coordinate and disseminate to stakeholders and the media appropriate information regarding the construction plans.

LOCAL STAKEHOLDERS

- Elected Officials
  - State Senator Julie Raque Adams – (502) 564-8100; julie.adams@lrc.ky.gov
  - State Representative Jerry T. Miller – (502) 564-8100; jerry.miller@lrc.ky.gov
  - State Representative-Elect John Hodgson – to take office January 1, 2023
  - Mayor Greg Fischer – (502) 574-2003; greg.fischer@louisvilleky.gov
  - Metro Councilman (19) Anthony Piagentini – (502) 574-1119; anthony.piagentini@louisvilleky.gov
  - Metro Councilman (17) Markus Winkler – (502) 574-1117; markus.winkler@louisvilleky.gov
  -

- Local Agencies
  - Donald Robinson, Director of Transportation for Jefferson County Public Schools
  - Carrie Butler, Transit Authority of the River City (TARC) – (502) 561-5100;
  - Lt. Joe Seelye, Louisville Metro Police Department Traffic Division – (502) 817-9958; joe.seelye@louisvilleky.gov
  - Anchorage Fire and EMS Station 3 – (502) 586-2049
  - Pewee Valley Fire Protection District – (502) 241-0025

- Utility Companies
  - Local utility companies are kept apprised of this project at the monthly utility coordination meetings hosted by District 5

- Neighborhoods and their Mayors

TRUCKING FIRMS AND OUT OF STATE STAKEHOLDERS

Information will be distributed electronically to trucking firms via Rick Taylor at the Department of Vehicle Regulation (502-564-4540; rick.taylor@ky.gov). Information will also be posted on the 511 website (www.511.ky.gov) and on the 511 telephone information system.

PRESENTATIONS

A project description including anticipated schedule will be provided to the media, stakeholders and other emergency service agencies via e-mail prior to construction. Information will be provided to these groups via traffic advisories, press releases, the District 5 website and the weekly District 5 Road Show of Construction and Maintenance Activities.

MEDIA RELATIONS

The District PIO will prepare an initial news release regarding the contract award for the project. The PIO will conduct interviews with the media throughout the project duration to keep the public informed of construction progress. Traffic advisories will be submitted to the media when a change in the MOT occurs. The contractor must provide to the PIO via the Resident Engineer notification of any change in the MOT at least five (5) days prior to the change.

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GENERAL NOTES

1. TRAFFIC SHALL BE MAINTAINED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND THE STANDARD DRAWINGS, CURRENT EDITIONS.

2. EXCEPT FOR THE ROADWAY AND TRAFFIC CONTROL BID ITEMS LISTED, ALL ITEMS OF WORK NECESSARY TO MAINTAIN AND CONTROL TRAFFIC WILL BE PAID AT THE LUMP SUM BID PRICE TO "MAINTAIN AND CONTROL TRAFFIC" AS SET FORTH IN THE CURRENT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION UNLESS OTHERWISE PROVIDED FOR IN THESE NOTES. THE LUMP SUM BID TO "MAINTAIN AND CONTROL TRAFFIC" SHALL ALSO INCLUDE, BUT IS NOT LIMITED TO, THE FOLLOWING ITEMS AND OPERATIONS:

   A. ALL GRADING AND NECESSARY DRAINAGE (UNLESS A BID ITEM FOR DETOUR CONSTRUCTION IS INCLUDED) FOR THE TEMPORARY ROADWAY AND REMOVAL THEREOF, WHEN IT IS NO LONGER NEEDED. IF A BID ITEM FOR DETOUR CONSTRUCTION IS INCLUDED, GRADING AND DRAINAGE WILL BE PAID FOR IN THE BID ITEM "DETOUR CONSTRUCTION".

   B. ALL LABOR AND MATERIALS NECESSARY FOR CONSTRUCTION AND MAINTENANCE OF TRAFFIC CONTROL DEVICES AND MARKINGS.

   C. ALL FLAG PERSONS AND TRAFFIC CONTROL DEVICES SUCH AS, BUT NOT LIMITED TO, FLASHERS, SIGNS, BARRICADES AND VERTICAL PANELS, PLASTIC DRUMS (STEEL DRUMS WILL NOT BE PERMITTED) AND CONES NECESSARY FOR THE CONTROL AND PROTECTION OF VEHICULAR AND PEDESTRIAN TRAFFIC AS SPECIFIED IN THESE NOTES, THE PLANS, THE MUTCD OR THE ENGINEER.

3. ANY TEMPORARY TRAFFIC CONTROL ITEMS, DEVICES, MATERIALS AND INCIDENTALS SHALL REMAIN THE PROPERTY OF THE CONTRACTOR WHEN NO LONGER NEEDED.

4. THE CONTRACTOR SHALL MAINTAIN INGRESS AND EGRESS TO ALL PROPERTIES WITHIN THE PROJECT LIMITS AT ALL TIMES.

5. THE CONTRACTOR SHALL COMPLETELY COVER ANY SIGNS, EITHER EXISTING, PERMANENT OR TEMPORARY, WHICH DO NOT PROPERLY APPLY TO THE CURRENT TRAFFIC PHASING, AND SHALL MAINTAIN THE COVERING UNTIL THE SIGNS ARE APPLICABLE OR ARE REMOVED. ALL TEMPORARY SIGNS SHALL BE MAINTAINED DURING CONSTRUCTION.

6. IN GENERAL, ALL TRAFFIC CONTROL DEVICES SHALL BE PLACED STARTING AND PROCEEDING IN THE DIRECTION OF THE FLOW OF TRAFFIC AND REMOVED STARTING AND PROCEEDING IN THE DIRECTION OPPOSITE THE FLOW OF TRAFFIC.

7. THE ENGINEER AND THE CONTRACTOR, OR THEIR AUTHORIZED REPRESENTATIVES, SHALL REVIEW THE SIGNING BEFORE TRAFFIC IS ALLOWED TO USE ANY LANE CLOSURES, CROSSOVERS OR DETOURS. ALL SIGNING SHALL BE APPROVED BY THE ENGINEER BEFORE WORK CAN BE STARTED BY THE CONTRACTOR.

8. IF THE CONTRACTOR DESIRES TO DEVIATE FROM THE TRAFFIC CONTROL SCHEME AND CONSTRUCTION SCHEDULE OUTLINED IN THESE PLANS AND THIS PROPOSAL, HE SHALL PREPARE AN ALTERNATE PLAN AND PRESENT IT IN WRITING TO THE ENGINEER. THIS ALTERNATE PLAN CAN BE USED ONLY AFTER REVIEW AND APPROVAL OF THE DIVISIONS OF TRAFFIC, DESIGN AND CONSTRUCTION, AND THE FEDERAL HIGHWAY ADMINISTRATION, WHERE APPLICABLE.

9. IF TRAFFIC SHOULD BE STOPPED DUE TO CONSTRUCTION OPERATIONS AND AN EMERGENCY VEHICLE ON AN OFFICIAL EMERGENCY RUN ARRIVES AT THE SCENE, THE CONTRACTOR SHALL MAKE THE PROVISIONS NECESSARY FOR THE SAFE PASSAGE OF THAT VEHICLE AS QUICKLY AS POSSIBLE.

10. ALL SIGNS NECESSARY FOR A MARKED DETOUR WILL BE PROVIDED BY THE CONTRACTOR AS REQUIRED BY THE STANDARD DRAWINGS AND THE MUTCD. SIGNS OUTSIDE THE PROJECT LIMITS SHALL BE PAID FOR BY THE SQUARE FOOT. THIS QUANTITY SHALL INCLUDE SIGN MOUNTING HARDWARE AND POSTS.

11. THE RELOCATION OF SIGNS FOR MAINTENANCE OF TRAFFIC DURING CONSTRUCTION, INCLUDING MOUNTING HARDWARE AND POSTS, SHALL BE INCIDENTAL TO OTHER ITEMS OF WORK. CHANGES IN THE TRAFFIC CONTROL PLAN WILL REQUIRE APPROVAL OF THE ENGINEER.

12. ALL BARRELS/DRUMS ARE TO BE SPACED NO MORE THAN 50 FEET APART DURING ALL PHASES OF CONSTRUCTION AS SHOWN ON THE PLANS AND/OR AS DIRECTED BY THE ENGINEER.

13. APPLICATION OF ANY NECESSARY TRAFFIC CONTROL APPURTENANCES, SUCH AS BUT NOT LIMITED TO, SIGNAGE AND CHANNELIZING DEVICES (CONES, DRUMS, BARRICADES, AND, TUBULAR MARKERS) ARE TO BE PLACED IN ACCORDANCE WITH THE CURRENT STANDARD DRAWINGS AND SPECS, OR AS DIRECTED BY THE ENGINEER.

14. WORK WILL BE PERMITTED EACH DAY DURING THE WEEK.

15. THE POSTED SPEED LIMIT ON KY 3084 (OLD HENRY ROAD) DURING CONSTRUCTION WILL BE 35 MPH.

PUBLIC INFORMATION PLAN (PIP)

KYTC DISTRICT 5 PUBLIC INFORMATION OFFICER (PIO) WILL INFORM THE MOTORING PUBLIC AND AREA STAKEHOLDERS OF PROJECT INFORMATION INCLUDING MAINTENANCE OF TRAFFIC. THE DISTRICT PUBLIC INFORMATION OFFICER WILL COORDINATE AND DISSEMINATE TO STAKEHOLDERS AND THE MEDIA APPROPRIATE INFORMATION REGARDING THE CONSTRUCTION PLANS. PRIOR TO CONSTRUCTION, SIGNS SHALL BE IN PLACE PER APPLICABLE STANDARD DRAWING(S) AND/OR AS DIRECTED BY THE ENGINEER.

SPECIAL NOTES

FAILURE TO COMPLETE WORK ON TIME

FOR EACH CALENDAR DAY BEYOND THE FIXED COMPLETION DATE OR SPECIFIED WORKING DAYS, THE DEPARTMENT WILL ASSESS LIQUIDATED DAMAGES PER CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

LANE CLOSURE

NO DIRECT PAYMENT WILL BE MADE FOR ANY LANE CLOSURE.
TEMPORARY LANE CLOSURES WILL NOT BE PERMITTED DURING PEAK TRAFFIC HOURS BETWEEN THE HOURS OF 7:00 A.M. AND 9:00 A.M. AND 2:00 P.M. AND 4:00 P.M. MONDAY THROUGH FRIDAY.
PRIOR TO INSTALLING ANY TEMPORARY LANE CLOSURE, THE CONTRACTOR SHALL GIVE A MINIMUM OF 2 DAYS NOTICE IN WRITING AND APPROVAL MUST BE OBTAINED FROM THE ENGINEER.

TEMPORARY DRAINAGE

THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL TEMPORARY DRAINAGE DURING CONSTRUCTION

PAVEMENT DROP-OFFS

A MINIMUM WIDTH OF 10 FEET WITH A MINIMUM WEDGE OF 3:1 WILL BE MAINTAINED TO ANY EXCAVATED DROP OFF AREA AT THE END OF ANY WORK PERIOD WHILE LEAVING BARRELS IN PLACE IN THE RESPECTIVE AREA. ANY OTHER PAVEMENT EDGE THAT TRAFFIC IS NOT EXPECTED TO CROSS, EXCEPT ACCIDENTALLY, SHOULD BE TREATED AS FOLLOWS:

- LESS THAN TWO INCHES - NO PROTECTION REQUIRED, WARNING SIGNS SHOULD BE PLACED IN ADVANCE AND THROUGHOUT THE DROP- OFF AREA.
- TWO TO FOUR INCHES - PLASTIC DRUMS, VERTICAL PANELS OR BARRICADES EVERY 100 FEET ON TANGENT SECTIONS FOR SPEEDS OF 50 MPH OR GREATER. CONES MAY BE USED IN PLACE OF PLASTIC DRUMS, PANELS AND BARRICADES DURING DAYLIGHT HOURS. FOR TANGENT SECTIONS WITH SPEED LESS THAN 50 MPH AND FOR CURVES, DEVICES SHOULD BE PLACED EVERY 50 FEET. SPACING OF DEVICES ON TAPERED SECTIONS SHOULD BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), CURRENT EDITION.
- GREATER THAN FOUR INCHES - POSITIVE SEPARATION OR WEDGE WITH 3:1 OR FLATTER SLOPE NEEDED. IF THERE IS EIGHT FEET OR MORE DISTANCE BETWEEN THE EDGE OF THE PAVEMENT AND DROP-OFFS THEN DRUMS, PANEL, OR BARRICADES MAY BE USED. IF THE DROP-OFF IS GREATER THAN 12 INCHES, POSITIVE SEPARATION IS STRONGLY ENCOURAGED. IF CONCRETE BARRIERS ARE USED SPECIAL REFLECTIVE DEVICES OR STEADY BURN LIGHTS SHOULD BE USED FOR OVERNIGHT INSTALLATIONS.

FOR TEMPORARY CONDITIONS, DROP-OFFS GREATER THAN FOUR INCHES MAY BE PROTECTED WITH PLASTIC DRUMS, VERTICAL PANELS OR BARRICADES FOR SHORT DISTANCES DURING DAYLIGHT HOURS WHILE WORK IS BEING DONE IN THE DROP- OFF AREA. LESSER TREATMENTS THAN THOSE DESCRIBED ABOVE MAY BE CONSIDERED FOR LOW -VOLUME LOCAL STREETS.

PAYMENT FOR TEMPORARY WEDGING AND MAINTAINING ACCESS (IF NECESSARY) IS INCLUDED IN CRUSHED STONE BASE-SEE PAVEMENT SUMMARY SHEET.

BLASTING OPERATIONS

DURING BLASTING OPERATION, TRAFFIC MAY BE HALTED A MAXIMUM OF 15 MINUTES PER HOUR TO ALLOW THE EXECUTION OF THE "SHOT" AND TO REMOVE ALL ROCK FRAGMENTS AND DEBRIS FROM THE TRAVELED WAY. THE CONTRACTOR, WHEN USING EXPLOSIVES OF ANY KIND, FOR THE PURPOSE OF EXCAVATING AND REMOVAL SHALL HALT THE TRAFFIC A SAFE DISTANCE FROM THE IMPENDING EXPLOSION. THE CONTRACTOR SHALL IMMEDIATELY INSPECT THE PAVEMENTS FOR ANY DEBRIS THAT MAY BE A HAZARD TO TRAFFIC BEFORE ALLOWING THE TRAFFIC TO PROCEED. LISTED BELOW ARE THE PERIODS OF TIME EACH DAY THAT TRAFFIC MAY BE HALTED FOR BLASTING:

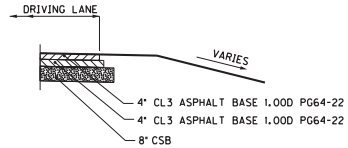
MONDAY - SUNDAY 9:00 AM TO 3:00 PM

TRAFFIC SHALL BE MAINTAINED IN ACCORDANCE WITH THE PLANS, THESE NOTES, AND THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR THE ROAD AND BRIDGE CONSTRUCTION, CURRENT EDITION. THE CONTRACTOR SHALL MAINTAIN A MINIMUM LANE WIDTH OF TEN FEET UNLESS OTHERWISE NOTED.

PRIOR TO ANY CLEARING, GRUBBING AND EXCAVATION, CONSTRUCT PERIMETER CONTROLS SUCH AS BUT NOT LIMITED TO TEMPORARY SILT FENCE, SILT TRAPS, SILT CHECKS, ETC. TO ENSURE THAT DISTURBED SEDIMENT DOES NOT LEAVE THE PROJECT SITE AND/OR TO CONTROL SEDIMENT PER THE PLANS. INSTALL CONSTRUCTION SIGNS THROUGHOUT THE ENTIRE CONSTRUCTION AREA PER APPLICABLE STANDARD DRAWING(S) AND/OR AS DIRECTED BY THE ENGINEER.



TYPE III BARRICADE ROAD CLOSURE WITH TYPE A WARNING LIGHTS



TEMPORARY PAVEMENT DETAIL (SEE TMP CROSS SECTIONS)

FOR MAINTENANCE OF TRAFFIC ONLY

CONSTRUCTION SEQUENCE
SEE NEXT SHEET

TEMPORARY TRAFFIC CONTROL PLAN NOTES
SHEET 1 OF 2

FILE NAME: C:\PWWORKING\AECOM_DS2\NA_2020\DMS26093\R07900MT.DGN
USER: mitch.thomas
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R07900MT
MicroStation v8.11.9.921

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CONSTRUCTION SEQUENCING

OLD HENRY ROAD TRAFFIC CONTROL

PHASE 1
Note: Earthwork for this construction will provide the rock required for the rock roadbed.
Maintain traffic on existing Old Henry Road and approach roads.
Place all Advanced Warning Signs and place drums to close the shoulder on KY 362.
Close entrance Right Sta. 1088+75 (property to be accessed at Right Sta. 1087+00±).
Close Meadow Bluff Way, entrance to "The Reserve at Fox Run" (Right Sta. 1090+79).
Construct proposed road, up to final base course, from Sta. 1089+50 to Sta. 1101+45 along with part-width construction on the right to Sta. 1088+75 including proposed entrance.

PHASE 2
Note: Phase 2 involves closure of portions of existing Old Henry Road. It is KYTC's intent that this work is to be done during Jefferson County Public Schools' summer break.

ROAD CLOSURE A
Close Road east of Arnold Palmer Boulevard/Hamilton Springs Drive and west of Old Henry Trail.
Detour traffic to Old Henry Trail.
Construct proposed road, up to final base course, from Sta. 1019+50 to Sta. 1036+24.
This closure is limited to 30 calendar days.

ROAD CLOSURE B
Note: Same detour as Road Closure C.

- Close Road just west of Factory Lane (approx. Sta. 1046+00 Rt.) and on Factory Lane, just north of Old Henry Road for culvert and road construction to Twin Creek Drive. Old Henry Road will be open to Local Traffic Only between Twin Creek Drive and Reamers Lane.
- Detour traffic using Factory Lane, KY 146 and Reamers Lane.
- Construct proposed road, up to final base course, from Sta. 1044+50 to Sta. 1051+80, including Factory Lane intersection and the west sides of approaches to Twin Creek Road and Ridge Brook Circle.
- Construct temporary tie to existing pavement between Sta. 1051+80 and Sta. 1052+50.
- Construct Temporary Widening of Existing Pavement at the following location (traffic can be reduced to 1 lane between 9am and 4pm to construct widening):
  Sta. 1036+24 and Sta. 1044+50 Left
- This construction is limited to 45 calendar days.

ROAD CLOSURE C
Note: Same detour as Road Closure B. Different portion of Old Henry open to Local Traffic.

- Close Road just east of Factory Lane and just west of Reamers Lane for Bridge construction at Sta. 1072+50. Old Henry Road will be open to Local Traffic Only between Factory Lane and the entrance left Sta. 1071+30. Old Henry Road will be open to Local Traffic Only between the entrance right Sta. 1073+25 and Reamers Lane.
- Detour traffic using Factory Lane, KY 146 and Reamers Lane.
  Construct proposed road, up to final base course, from Sta. 1070+00 to Sta. 1076+40 including bridge and west sides of approaches to Woodmont Park Lane.
- This construction is limited to 60 calendar days.

PHASE 3
Note: Phase 3 and 4 construction can occur simultaneously.
Step 1

- Maintain traffic on existing roads.
- Woodmont Park Lane to Reamers Lane. Construct Widening left and right using Lane Closure during Low Volume Hours.
- Construct Temporary Road (20 feet wide) to the left (north) of existing road between Reamers Lane and Woodmont Ridge Drive. Use pavement of parking lot water blast existing markings and place temporary paint.
- Construct Temporary Road (10 feet wide) to the left (north) of existing road between Woodmont Ridge Drive and the entrance left Station 1087+75.

Step 2

- Maintain traffic on temporary roads and entrances.
- Entrances at Stations 1088+50 Rt. and 1090+30 Lt. Access to the east only to KY 362 (Ash Avenue).
- Construct part width of proposed road (eastbound thru and turn lane) between Station 1080+17 and Station 1084+40.
- Construct full width of proposed road between Station 1085+30 and Station 1089+00.

Construct temporary entrance to Apple Hill (right Station 1085+20).
Construct part width (east side) of proposed connector to Woodmont Ridge Drive.

Step 3
Maintain traffic on proposed roads constructed in previous steps.
Roads and Entrances west of Woodmont Ridge Drive Access to the west only (Old Henry Road).

Roads and Entrances east of Woodmont Ridge Drive, including Apple Hill Access and Meadow Bluff Way to the east only to KY 362 (Ash Avenue).

Construct proposed Woodmont Ridge Drive/Apple Hill intersection and remainder of proposed Old Henry Road.

PHASE 4
Note: Phase 4 and 3 construction can occur simultaneously.
Maintain traffic on existing Old Henry Road and segments of proposed roadway and temporary roadway built in Phase 2. Access to Old Henry Road from the entrance left of Sta. 1013+00 (opposite Bush Farm Road) is closed. Traffic to use Old Henry Trail (signed detour is not required).

Construct Temporary Widening of Existing Pavement at the following locations (traffic can be reduced to 1 lane between 9am and 4pm to construct widening):
Sta. 1056+50 and Sta. 1058+50 Right
Construct proposed road, up to final base course, at the following locations:
Sta. 1010+00 to Sta. 1012+60 (part width left of centerline)
Sta. 1012+60 to Sta. 1016+00
Sta. 1016+00 to Sta. 1017+00 (part-width left two lanes)
Sta. 1052+50 to Sta. 1056+50 (part-width, right lane, using lane closure during low volume hours
Sta. 1058+50 to Sta. 1060+00 (part-width, right lane and turn lane)
Sta. 1060+00 to Sta. 1070+00

PHASE 5
Maintain traffic on existing Old Henry Road, temporary pavement constructed in Phase 4 and proposed segments between Sta. 1019+50 and Sta. 1036+24; and Sta. 1058+50 and Sta. 1101+45 (end).

Construct proposed road, up to final base course, at the following locations:
Sta. 1036+24 to Sta. 1044+50 (part-width, left lane and turn lane)
Sta. 1051+85 to Sta. 1058+50 (part-width, left lane and turn lane)
Sta. 1058+50 to Sta. 1070+00 (part-width, left lane)

PHASE 6
Remove 648 feet of existing raised median from Terra Crossing Boulevard to Sta. 1003+00 for crossover (pave over removed median).

Maintain traffic in eastbound left-turn lane of existing Old Henry Road to entrance ramp of I-265 northbound.
Maintain traffic on eastbound thru-lanes of existing Old Henry Road by dropping inside eastbound lane with a 540' taper beginning at entrance ramp to southbound I-265 and continuing to Arnold Palmer Boulevard, while re-directing westbound traffic to inside eastbound lane at Arnold Palmer Boulevard.
Maintain Old Henry Road traffic on new construction from previous phases.

Construct proposed westbound lanes between Sta. 1003+00 and Sta. 1010+00 while maintaining access to north High Wickham Place by leaving one side open while completing tie-in and then completing other side. Construct proposed part-width westbound pavement between Sta. 1016+00 to Sta. 1019+50 including approach road tie-ins at Hamilton Springs Drive and Arnold Palmer Boulevard.

Construct proposed westbound lanes between Sta. 1036+24 and Sta. 1043+00.
Construct proposed westbound lanes between Sta. 1052+10 and Sta. 1058+50.

PHASE 7
Crossover eastbound traffic to westbound lanes.

Maintain traffic on westbound lanes constructed in Phase 6 between Sta. 1003+00 and Sta. 1020+00. Maintain traffic on completed Old Henry Road from Sta. 1020+00 to Sta. 1101+45.
Construct proposed eastbound lanes between Sta. 1003+00 and Sta. 1010+00 while maintaining access to south High Wickham Place by leaving one side open while completing tie-in and then completing other side. Construct remaining part-width between Sta. 1016+50 and Sta. 1019+50 while maintaining access to Arnold Palmer Boulevard.

PHASE 8
Maintain two (2) lanes of traffic on proposed Old Henry Road for the entire length of the project.

Construct final surface lift for each lane while maintaining traffic on other two lanes.
Place final pavement markings and complete sidewalk and curb work as necessary.
Remove existing pavements per construction plans.

APPROACH ROAD TRAFFIC CONTROL

High Wickham Place (Left & Right)
See Phases 6 and 7 entrance/exit roads to be constructed using split phasing (shift two-way traffic to one-way side temporarily). Type III barricade and two (2) "Two-Way Traffic" (W6-3) signs are required. Contractor is to maintain smooth transition between travel way and proposed construction.

Bush Farm
Left is constructed in Phase 4. Bush Farm Road is closed and traffic is to use Old Henry Trail.
Phase 6 relocate the signal heads for new traffic pattern.
Right is constructed in Phase 7 using split phasing (shift two-way traffic to one-way side temporarily). Type III barricade and two (2) "Two-Way Traffic" (W6-3) signs are required.
Contractor is to maintain existing south Bush Farm Road traffic using drums.

Hamilton Springs Drive (Left) / Arnold Palmer Boulevard (Right)
See Phase 2 (Road Closure A) entrance/exit roads to be constructed using split phasing (shift two-way traffic to one-way side temporarily). Type III barricade and two (2)"Two-Way Traffic"(W6-3) signs are required.

Old Henry Trail (Left)
See Phase 5 Tie-in to be constructed with temporary road closure. Use Type III Barricade for duration of construction (no detour required). Once tie-in is complete place drums so that Old Henry Road can be accessed.

Sycamore Falls Drive (Right)
See Phase 6 Tie-in to be constructed using part width construction. Contractor must maintain one lane of traffic at all times. "One-lane Road Ahead"sign (W20-4) is required.

Factory Lane (Left)
See Phase 6 Close Factory Lane at Old Henry to complete intersection construction. Construction is to be limited to a weekend closure. Date and time restrictions to be approved by the engineer 2 weeks prior to closure.

Twin Creek Drive (Left) / Ridge Brook Circle (Right)
See Phase 2 (Road Closure B) entrance/exit roads to be constructed using split phasing (shift two-way traffic to one-way side temporarily). Type III barricade and two (2)"Two-Way Traffic"(W6-3) signs are required.

Woodmont Park Lane (Left & Right)
See Phase 2 (Road Closure C) entrance/exit roads to be constructed using split phasing (shift two-way traffic to one-way side temporarily). Type III barricade and two (2)"Two-Way Traffic"(W6-3) signs are required.

Reamers Road (Left)
See Phase 3 construct using split phasing in low volume hours

Apple Hill Road (Right)
See Phase 3 construct temporary entrance before completing proposed connection.

Meadow Bluff Way (Right)
See Phase 1 Close entrance and construct both sides to tie-in Old Henry Road.

TEMPORARY TRAFFIC CONTROL PLAN NOTES
SHEET 2 OF 2

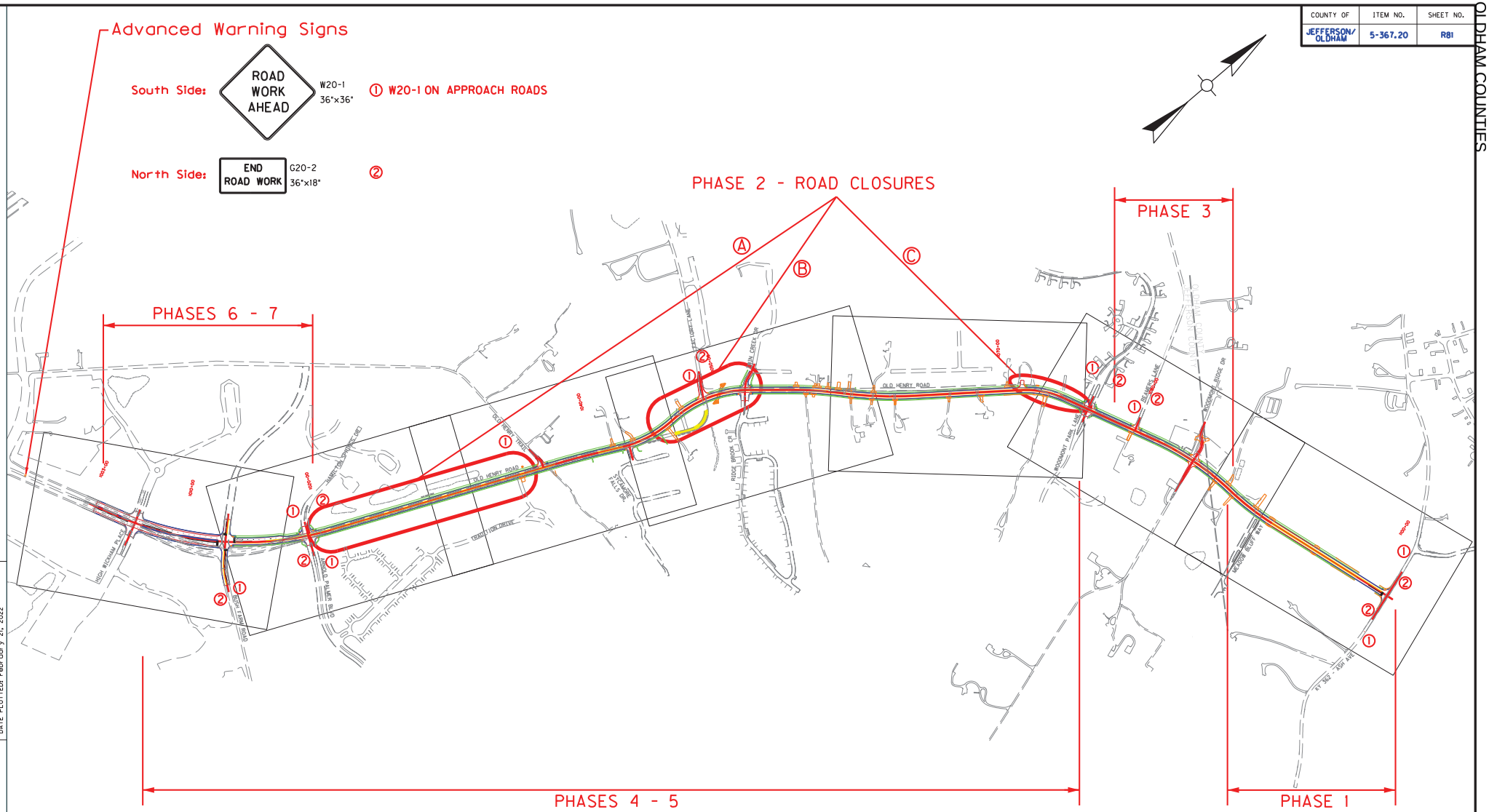
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COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R81

Advanced Warning Signs

South Side: ROAD WORK AHEAD — W20-1 36"x36" — ① W20-1 ON APPROACH ROADS

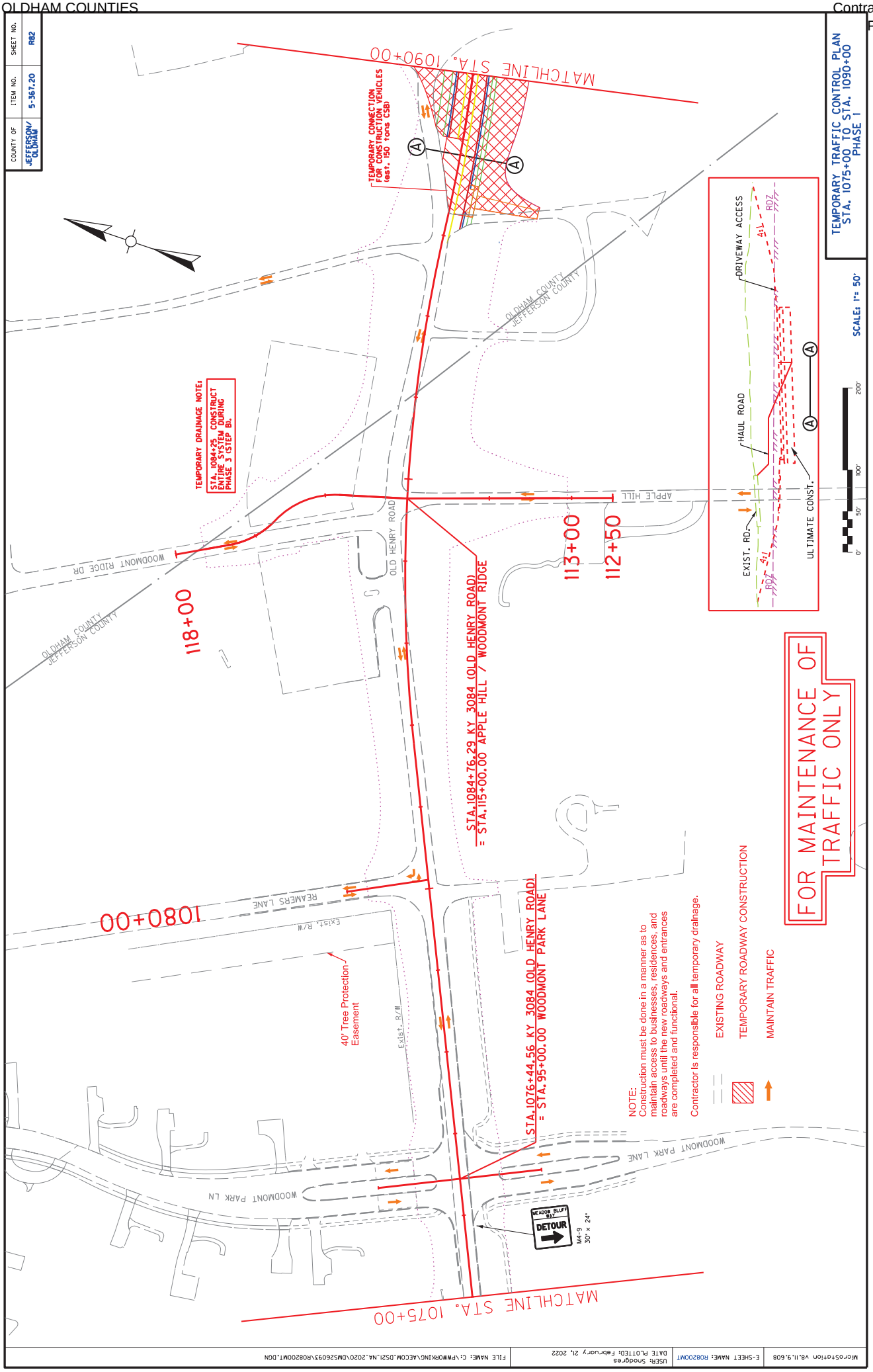
North Side: END ROAD WORK — G20-2 36"x18" — ②

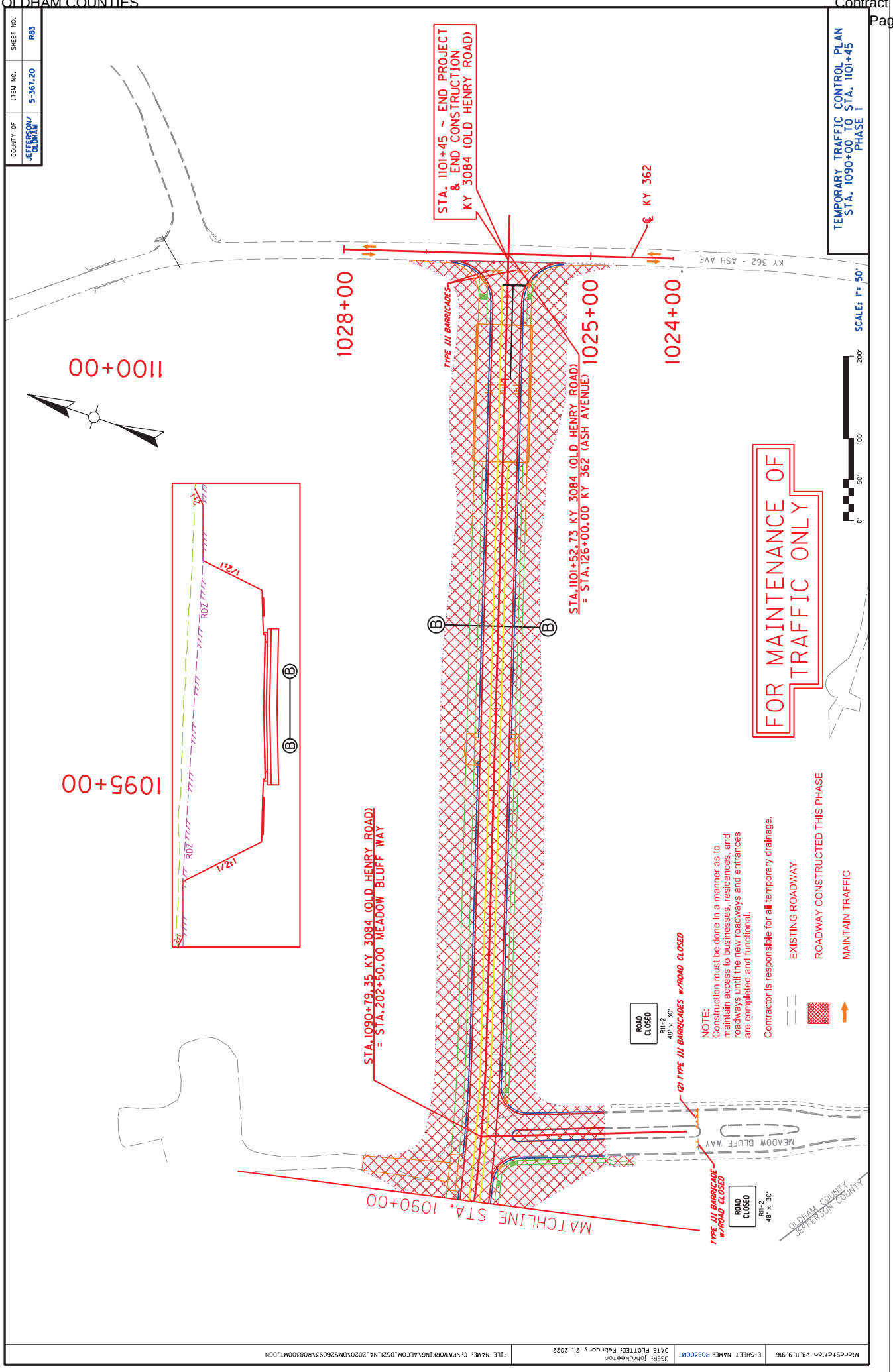


NOT TO SCALE

TEMPORARY TRAFFIC CONTROL PLAN
OVERALL PHASING

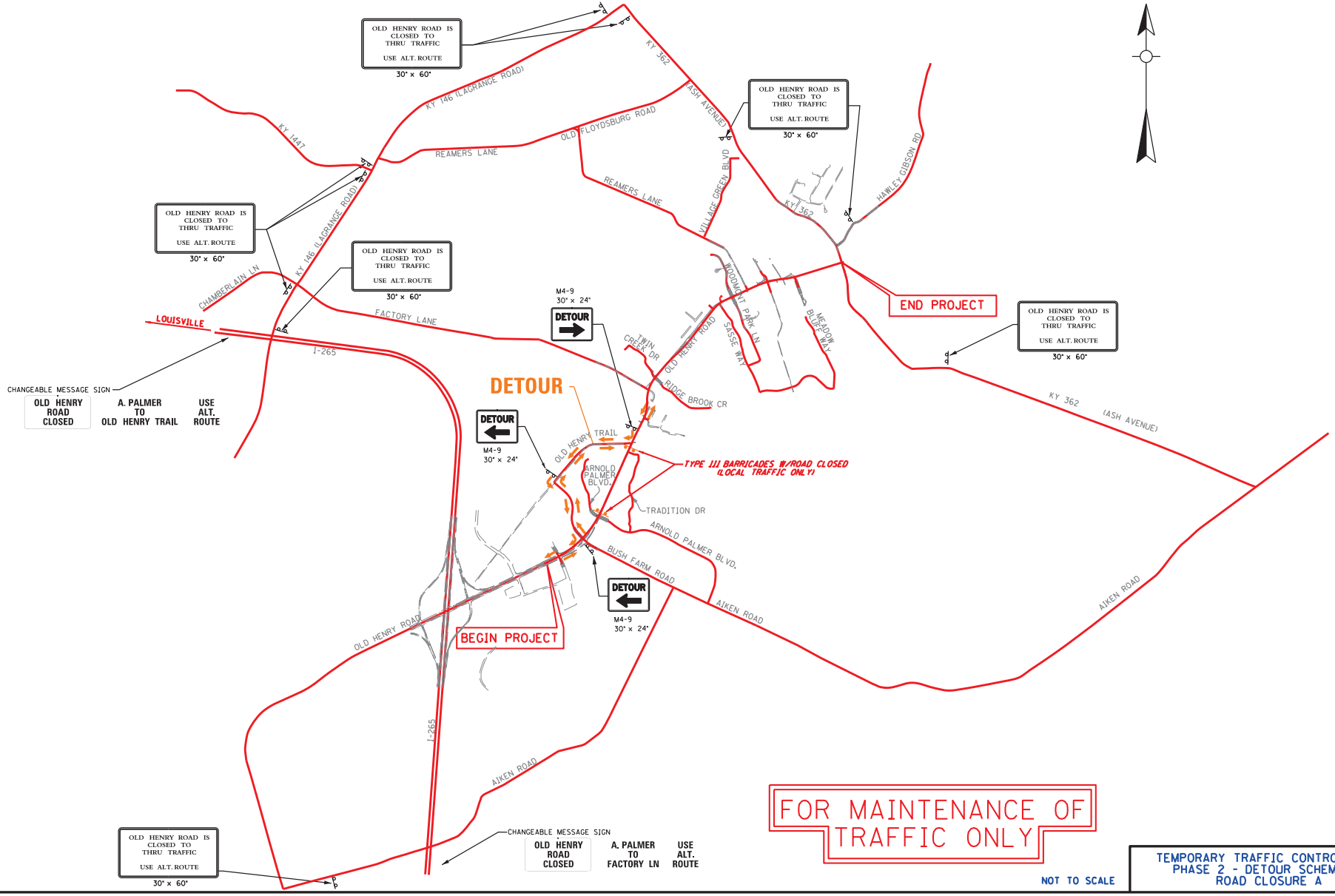
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COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R82
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1075+00 TO STA. 1090+00
PHASE 1
SCALE: 1"= 50'
MATCHLINE STA. 1090+00
MATCHLINE STA. 1075+00
TEMPORARY CONNECTION FOR CONSTRUCTION VEHICLES (est. 150 tons CSB)
TEMPORARY DRAINAGE NOTE:
STA. 1084+25 CONSTRUCT ENTIRE SYSTEM DURING PHASE 3 (STEP 8).
OLDHAM COUNTY
JEFFERSON COUNTY
APPLE HILL
OLD HENRY ROAD
WOODMONT RIDGE DR
REAMERS LANE
WOODMONT PARK LN
WOODMONT PARK LANE
118+00
113+00
112+50
1080+00
STA.1084+76.29 KY 3084 (OLD HENRY ROAD)
= STA.115+00.00 APPLE HILL / WOODMONT RIDGE
STA.1076+44.56 KY 3084 (OLD HENRY ROAD)
= STA.95+00.00 WOODMONT PARK LANE
40' Tree Protection Easement
Exist. R/W
DRIVEWAY ACCESS
HAUL ROAD
EXIST. RD.
ULTIMATE CONST.
4:1
RDZ
0'
50'
100'
200'
MEADOW BLUFF WAY
DETOUR
M4-9
30" x 24"
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor Is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
Microstation V8.11.9.608
E-SHEET NAME: R082OOMT
USER: Snodgras
DATE PLOTTED: February 21, 2022
FILE NAME: C:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R082OOMT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R83
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1090+00 TO STA. 1101+45
PHASE I
STA. 1101+45 ~ END PROJECT
& END CONSTRUCTION
KY 3084 (OLD HENRY ROAD)
℄ KY 362
KY 362 - ASH AVE
1028+00
1025+00
1024+00
1100+00
1095+00
TYPE III BARRICADES
STA.1101+52.73 KY 3084 (OLD HENRY ROAD)
= STA.126+00.00 KY 362 (ASH AVENUE)
SCALE: 1"= 50'
0'
50'
100'
200'
FOR MAINTENANCE OF
TRAFFIC ONLY
STA.1090+79.35 KY 3084 (OLD HENRY ROAD)
= STA.202+50.00 MEADOW BLUFF WAY
ROAD CLOSED
R11-2
48" x 30"
(2) TYPE III BARRICADES w/ROAD CLOSED
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY CONSTRUCTED THIS PHASE
MAINTAIN TRAFFIC
MEADOW BLUFF WAY
TYPE III BARRICADE w/ROAD CLOSED
MATCHLINE STA. 1090+00
OLDHAM COUNTY
JEFFERSON COUNTY
MicroStation V8.11.9.916
E-SHEET NAME: R083OOMT
USER: Donn.keeton
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R083OOMT.DGN

MAINTENANCE OF TRAFFIC
DETOUR SCHEMATIC

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R84

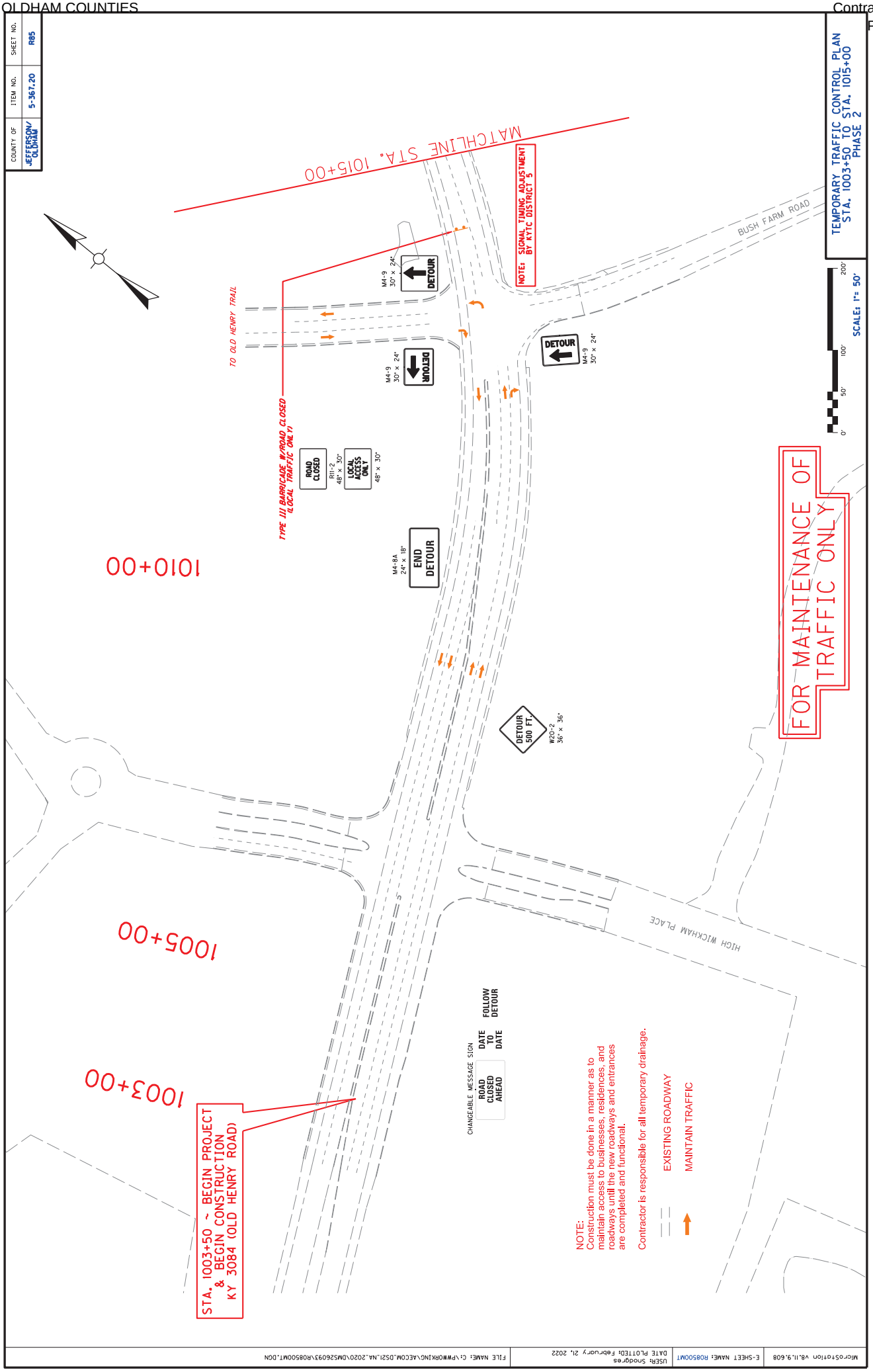


FOR MAINTENANCE OF TRAFFIC ONLY

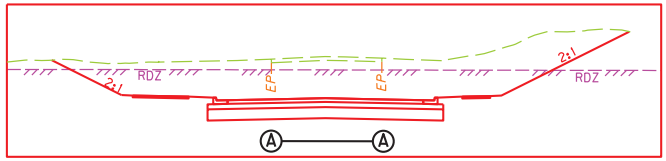
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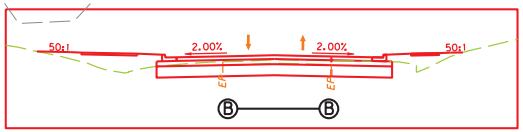
TEMPORARY TRAFFIC CONTROL PLAN
PHASE 2 - DETOUR SCHEMATIC
ROAD CLOSURE A

MicroStation v8.11.9.608 | E-SHEET NAME: R0840OMT | USER: Snodgres | DATE PLOTTED: February 21, 2022 | FILE NAME: C:\PWWORKING\AECOM_DS2I_NA_2020\DMS26093\R0840OMT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R85
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1003+50 TO STA. 1015+00
PHASE 2
SCALE: 1" = 50'
0'
50'
100'
200'
MATCHLINE STA. 1015+00
NOTE: SIGNAL TIMING ADJUSTMENT BY KYTC DISTRICT 5
BUSH FARM ROAD
TO OLD HENRY TRAIL
M4-9
30" x 24"
DETOUR
TYPE III BARRICADE W/ROAD CLOSED
(LOCAL TRAFFIC ONLY)
R11-2
48" x 30"
ROAD CLOSED
LOCAL ACCESS ONLY
48" x 30"
M4-8A
24" x 18"
END DETOUR
DETOUR
500 FT.
W20-2
36" x 36"
FOR MAINTENANCE OF TRAFFIC ONLY
1010+00
1005+00
1003+50
HIGH WICKHAM PLACE
CHANGEABLE MESSAGE SIGN
ROAD CLOSED AHEAD
DATE TO DATE
FOLLOW DETOUR
STA. 1003+50 ~ BEGIN PROJECT
& BEGIN CONSTRUCTION
KY 3084 (OLD HENRY ROAD)
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
MAINTAIN TRAFFIC
FILE NAME: G:\PWWORKING\AECOM_DS2\NA_2020\DMS26093\R085OOMT.DGN
USER: Snodgrae
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R085OOMT
Microstation v8.11.9.608

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R86





MATCHLINE STA. 1015+00

1020+00

HAMILTON SPRINGS DR

1025+00

MATCHLINE STA. 1030+00

STA.1019+02.42 KY 3084 (OLD HENRY ROAD) =
STA.32+00.00 ARNOLD PALMER BLVD/HAMILTON SPRINGS DRIVE

(3) TYPE III BARRICADES W/ROAD CLOSED

ROAD CLOSED
R11-2
48" x 30"

32+70

31+33

A

A

B

B

TYPE III BARRICADE W/ROAD CLOSED (LOCAL TRAFFIC ONLY)

ROAD CLOSED
R11-2
48" x 30"

LOCAL ACCESS ONLY
48" x 30"

ARNOLD PALMER BLVD

NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.

Contractor is responsible for all temporary drainage.

EXISTING ROADWAY

ROADWAY CONSTRUCTED THIS PHASE

MAINTAIN TRAFFIC

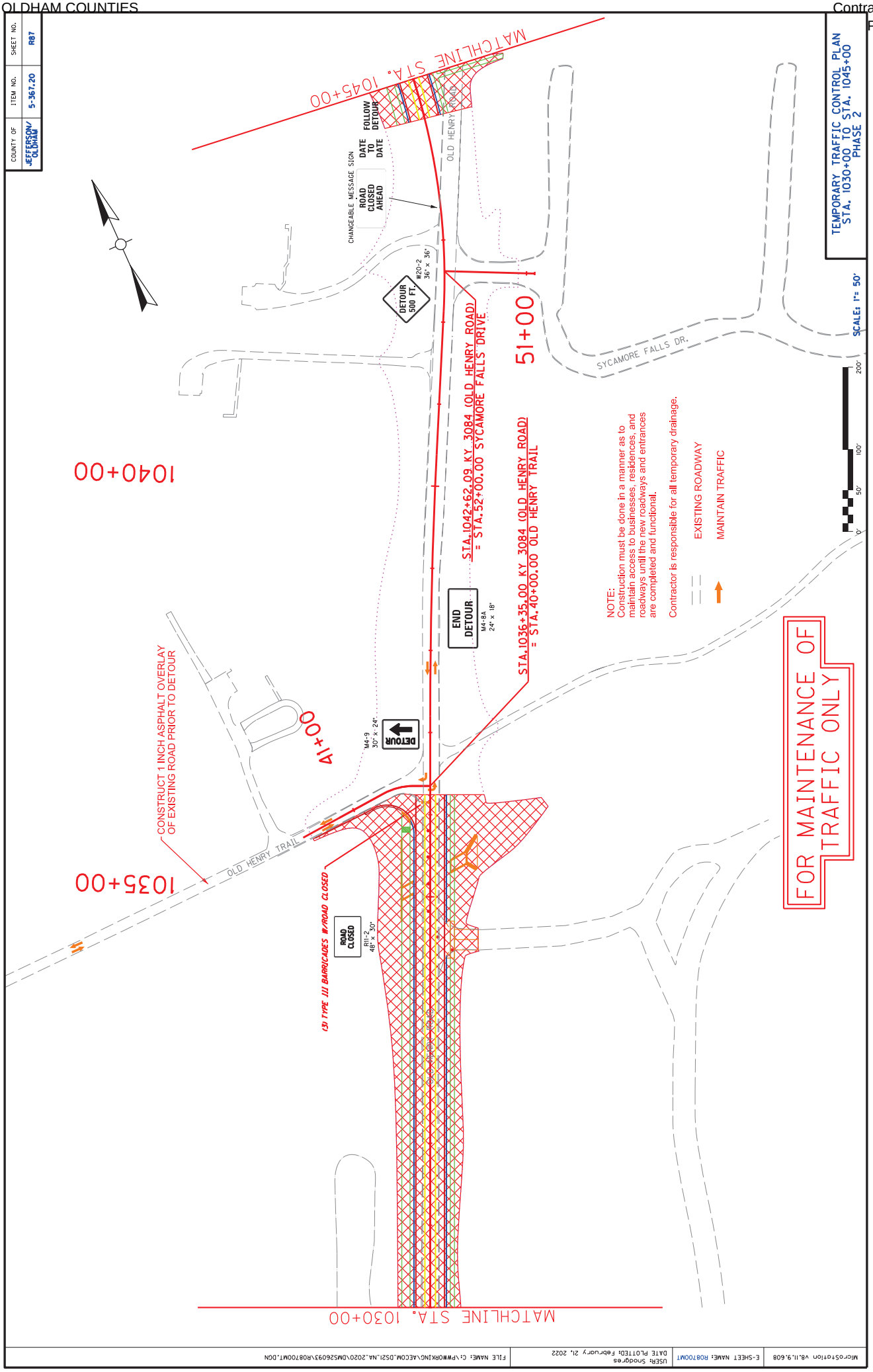
FOR MAINTENANCE OF TRAFFIC ONLY

0' 50' 100' 200'

SCALE: 1"= 50'

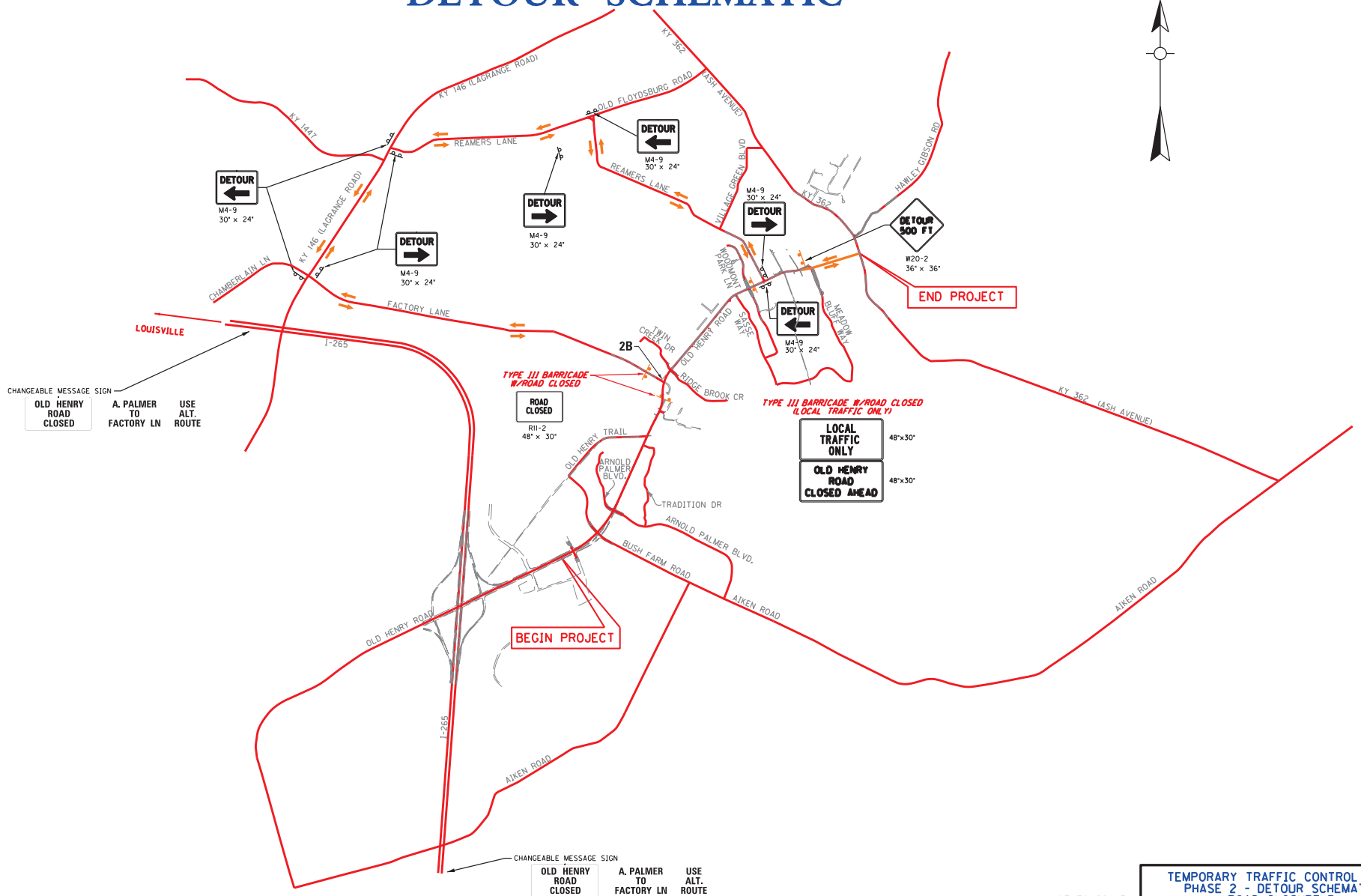
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1015+00 TO STA. 1030+00
PHASE 2 (ROAD CLOSURE A)

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USER: Snodgres
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R0860OMT
MicroStation v8.11.9.608


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R87
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1030+00 TO STA. 1045+00
PHASE 2
SCALE: 1" = 50'
MATCHLINE STA. 1045+00
MATCHLINE STA. 1030+00
OLD HENRY ROAD
SYCAMORE FALLS DR.
FOLLOW DETOUR
DATE TO DATE
CHANGEABLE MESSAGE SIGN
ROAD CLOSED AHEAD
DETOUR 500 FT.
W20-2
36" x 36"
51+00
1040+00
41+00
1035+00
STA. 1042+62.09 KY 3084 (OLD HENRY ROAD)
= STA. 52+00.00 SYCAMORE FALLS DRIVE
STA. 1036+35.00 KY 3084 (OLD HENRY ROAD)
= STA. 40+00.00 OLD HENRY TRAIL
END DETOUR
M4-8A
24" x 18"
DETOUR
M4-9
30" x 24"
ROAD CLOSED
R11-2
48" x 30"
(3) TYPE III BARRICADES W/ROAD CLOSED
CONSTRUCT 1 INCH ASPHALT OVERLAY
OF EXISTING ROAD PRIOR TO DETOUR
OLD HENRY TRAIL
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
0'
50'
100'
200'
Microstation V8.11.9.608
E-SHEET NAME: R087OOMT
USER: Snodgras
DATE PLOTTED: February 21, 2022
FILE NAME: G:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R087OOMT.DGN

MAINTENANCE OF TRAFFIC
DETOUR SCHEMATIC

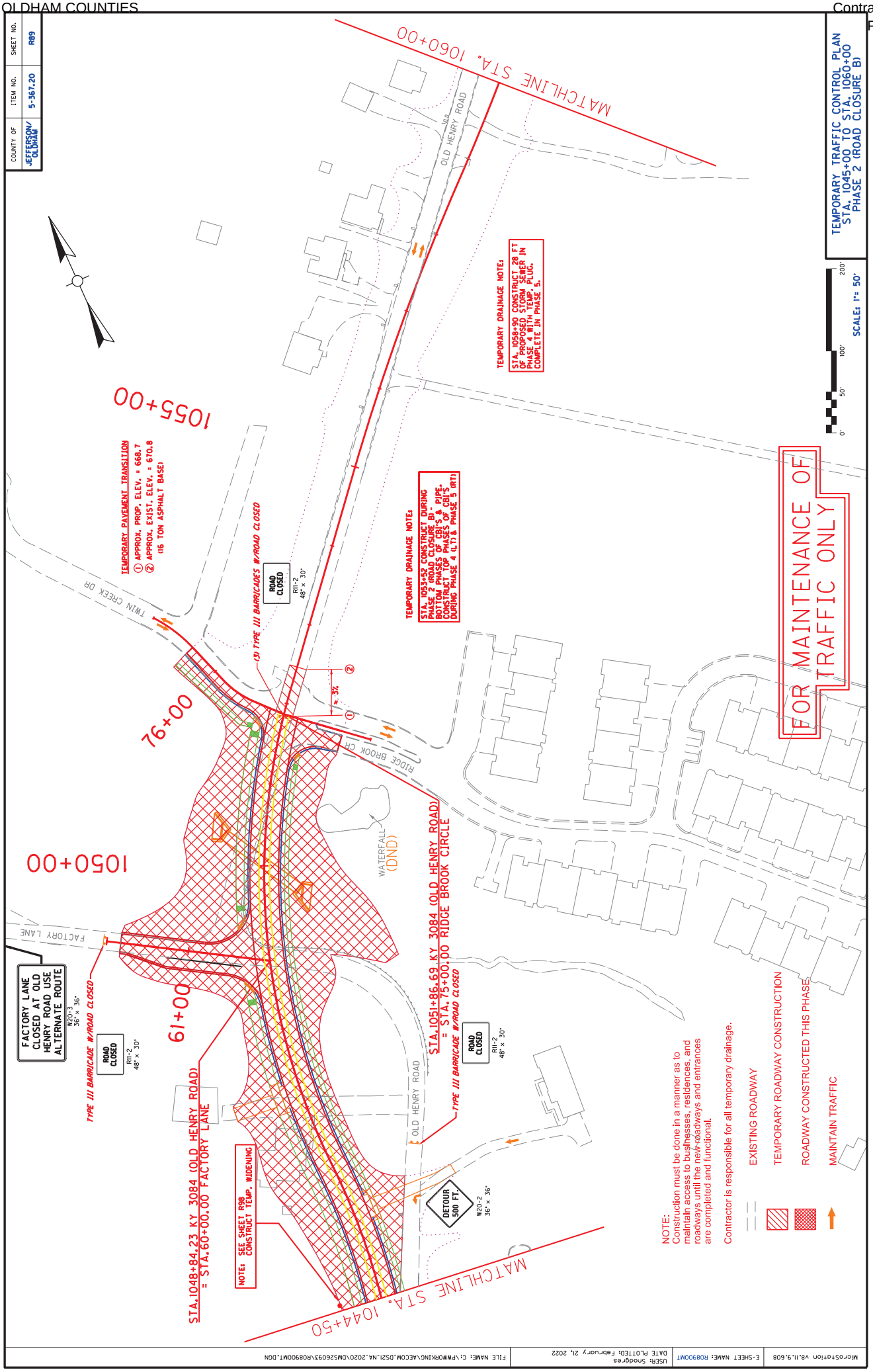
COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R88



NOT TO SCALE

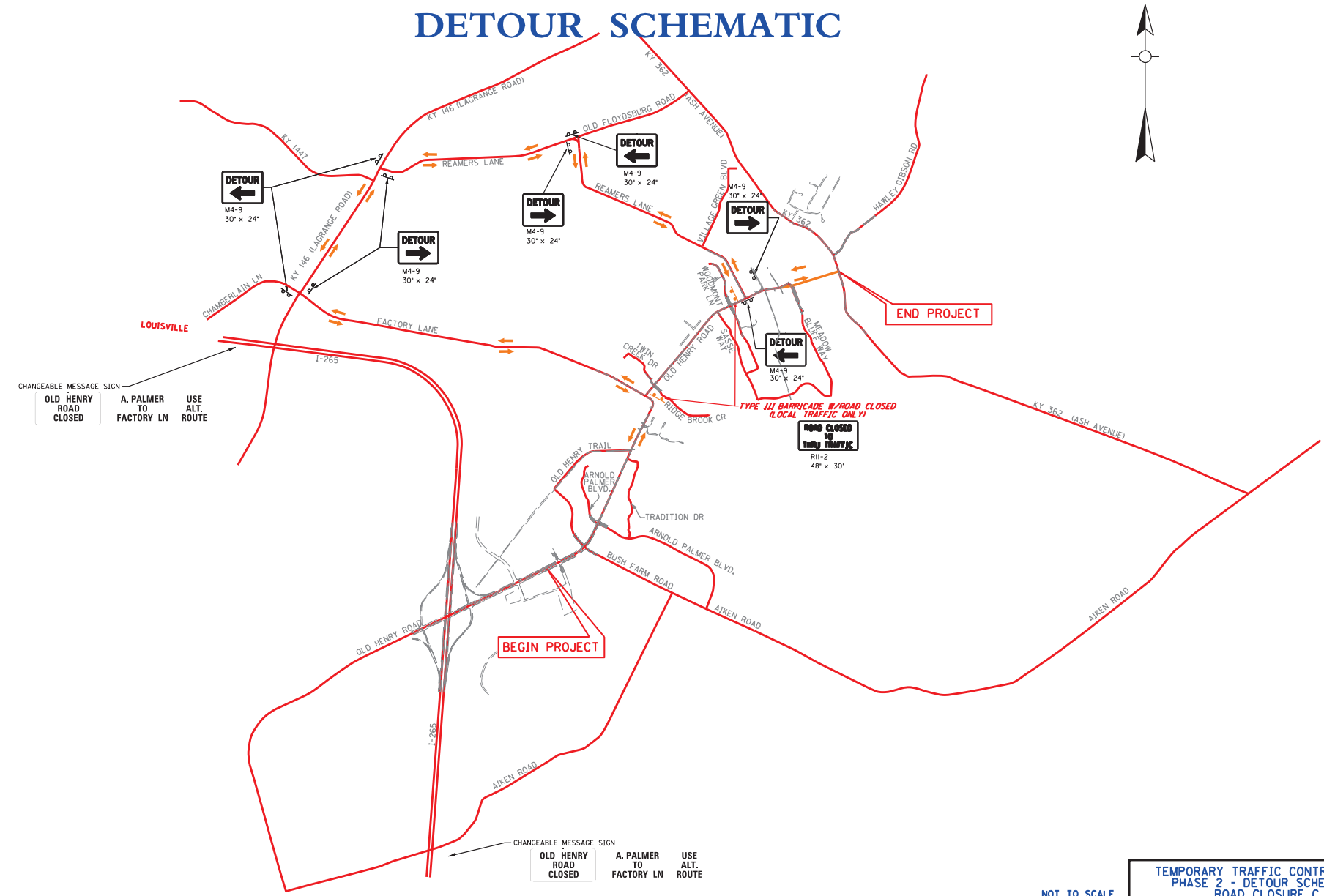
TEMPORARY TRAFFIC CONTROL PLAN
PHASE 2 - DETOUR SCHEMATIC
ROAD CLOSURE B

MicroStation v8.11.9.608
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USER: Snodgres
DATE PLOTTED: February 21, 2022
FILE NAME: C:\PWWORKING\AECOM_DS2\NA_2020\DMS26093\R0880MT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R89
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1045+00 TO STA. 1060+00
PHASE 2 (ROAD CLOSURE B)
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1060+00
MATCHLINE STA. 1044+50
1055+00
1050+00
76+00
61+00
OLD HENRY ROAD
TWIN CREEK DR
RIDGE BROOK CR
FACTORY LANE
WATERFALL (DND)
TEMPORARY DRAINAGE NOTE:
STA. 1058+90 CONSTRUCT 28 FT OF PROPOSED STORM SEWER IN PHASE 4 WITH TEMP. PLUG. COMPLETE IN PHASE 5.
TEMPORARY DRAINAGE NOTE:
STA. 1053+52 CONSTRUCT DURING PHASE 2 (ROAD CLOSURE B)- BOTTOM PHASES OF CB1'S & PIPE. CONSTRUCT TOP PHASES OF CB1'S DURING PHASE 4 (LT) & PHASE 5 (RT)
TEMPORARY PAVEMENT TRANSITION
① APPROX. PROP. ELEV. = 668.7
② APPROX. EXIST. ELEV. = 670.8
(16 TON ASPHALT BASE)
(3) TYPE III BARRICADES W/ROAD CLOSED
ROAD CLOSED
R11-2
48" x 30"
≈ 32'
FOR MAINTENANCE OF TRAFFIC ONLY
FACTORY LANE CLOSED AT OLD HENRY ROAD USE ALTERNATE ROUTE
W20-3
36" x 36"
TYPE III BARRICADE W/ROAD CLOSED
STA.1048+84.23 KY 3084 (OLD HENRY ROAD)
= STA.60+00.00 FACTORY LANE
NOTE: SEE SHEET R98 CONSTRUCT TEMP. WIDENING
STA.1051+86.69 KY 3084 (OLD HENRY ROAD)
= STA.75+00.00 RIDGE BROOK CIRCLE
TYPE III BARRICADE W/ROAD CLOSED
DETOUR 500 FT.
W20-2
36" x 36"
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
ROADWAY CONSTRUCTED THIS PHASE
MAINTAIN TRAFFIC
MicroStation V8.11.9.608
E-SHEET NAME: R089OOMT
DATE PLOTTED: February 21, 2022
USER: Snodgras
FILE NAME: c:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R089OOMT.DGN

MAINTENANCE OF TRAFFIC
DETOUR SCHEMATIC

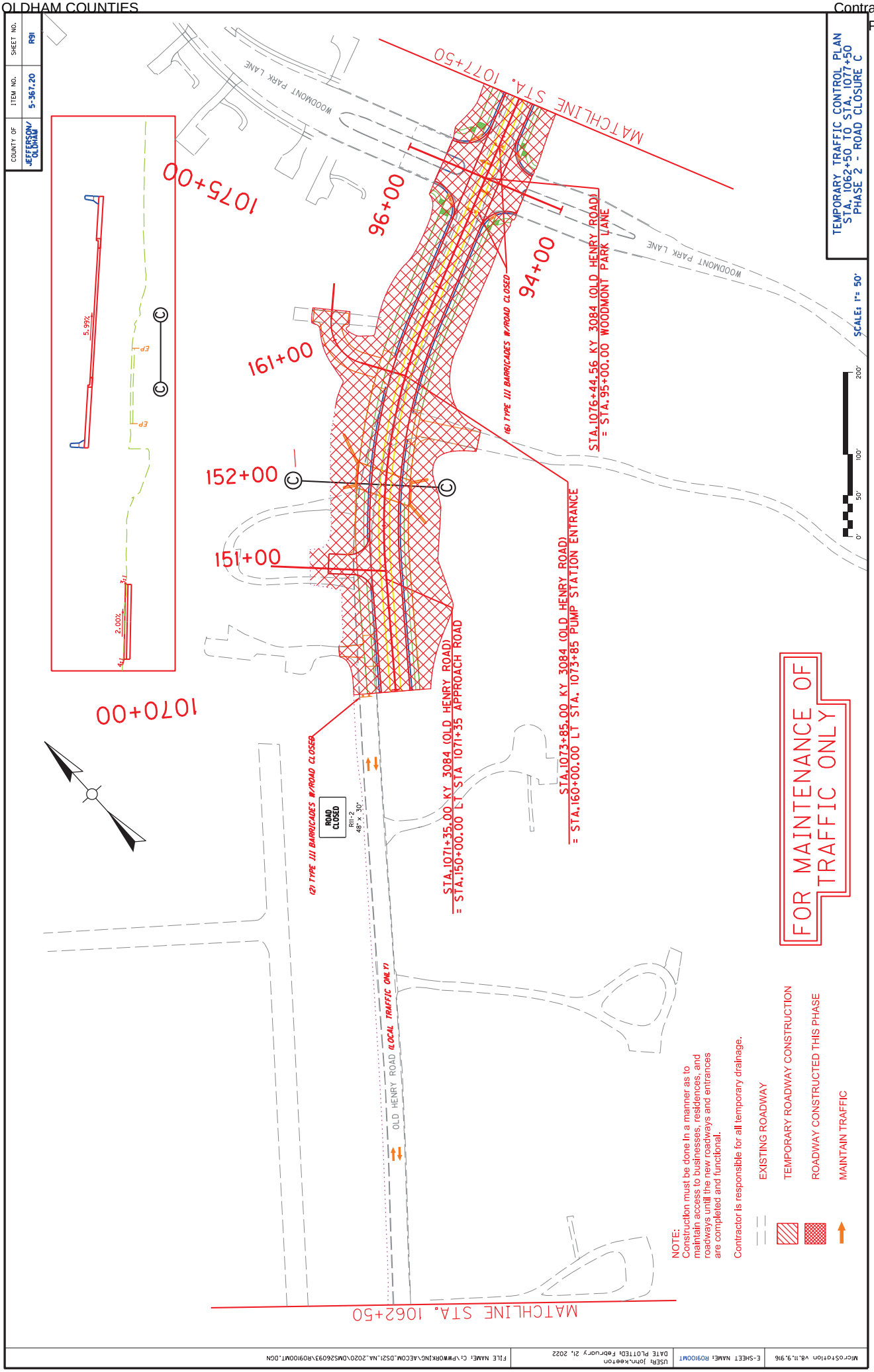
COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R90

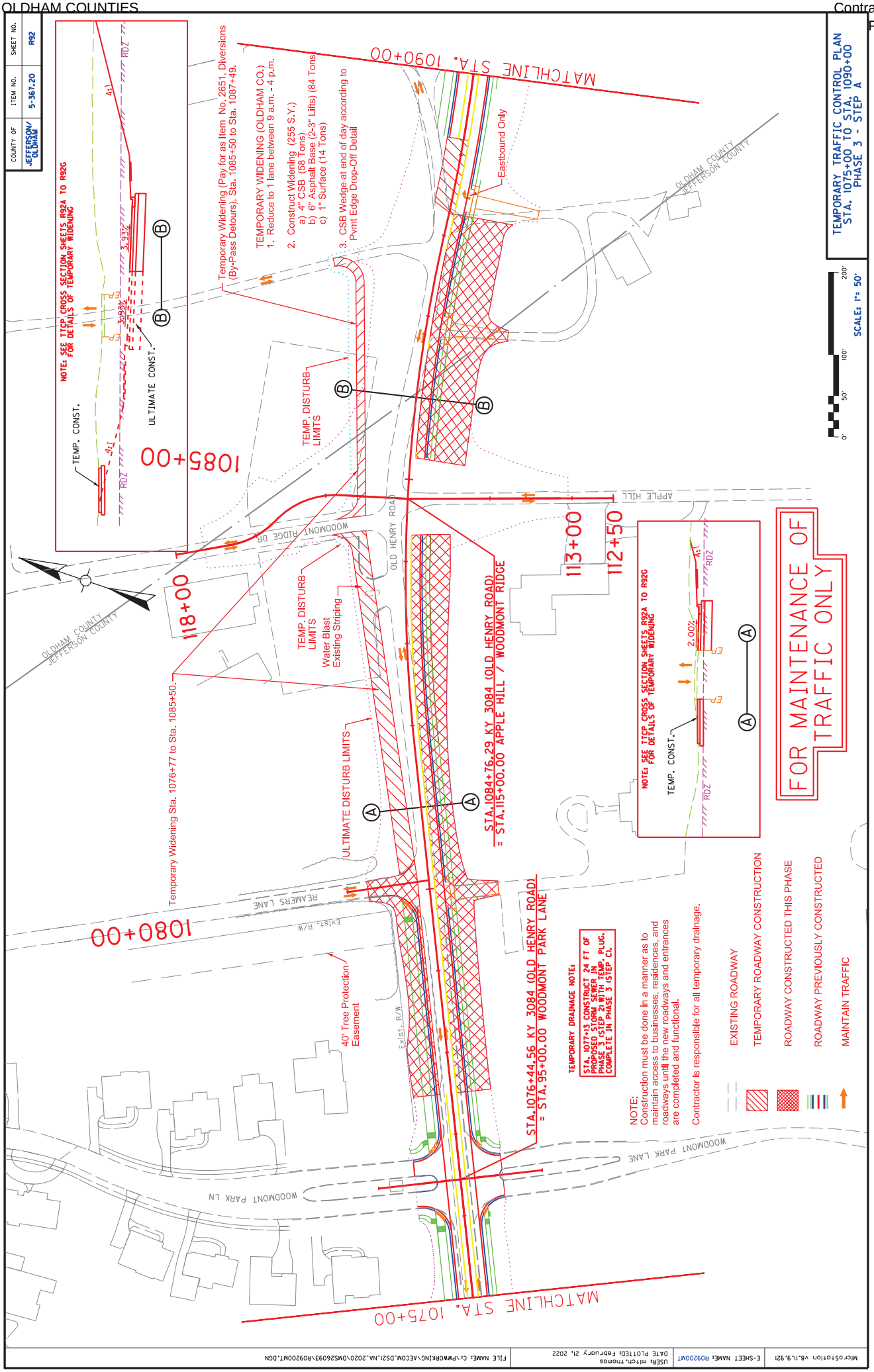


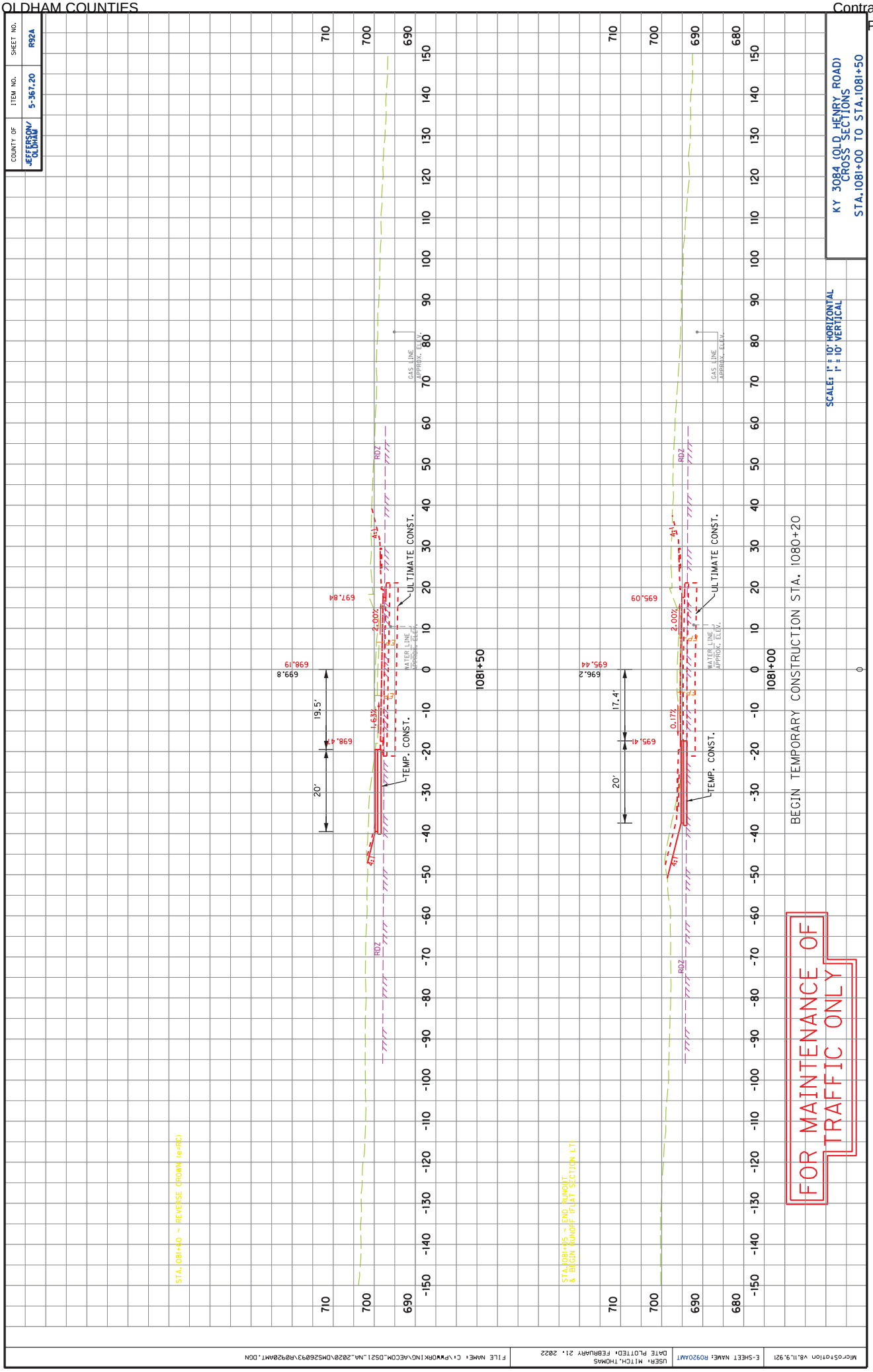
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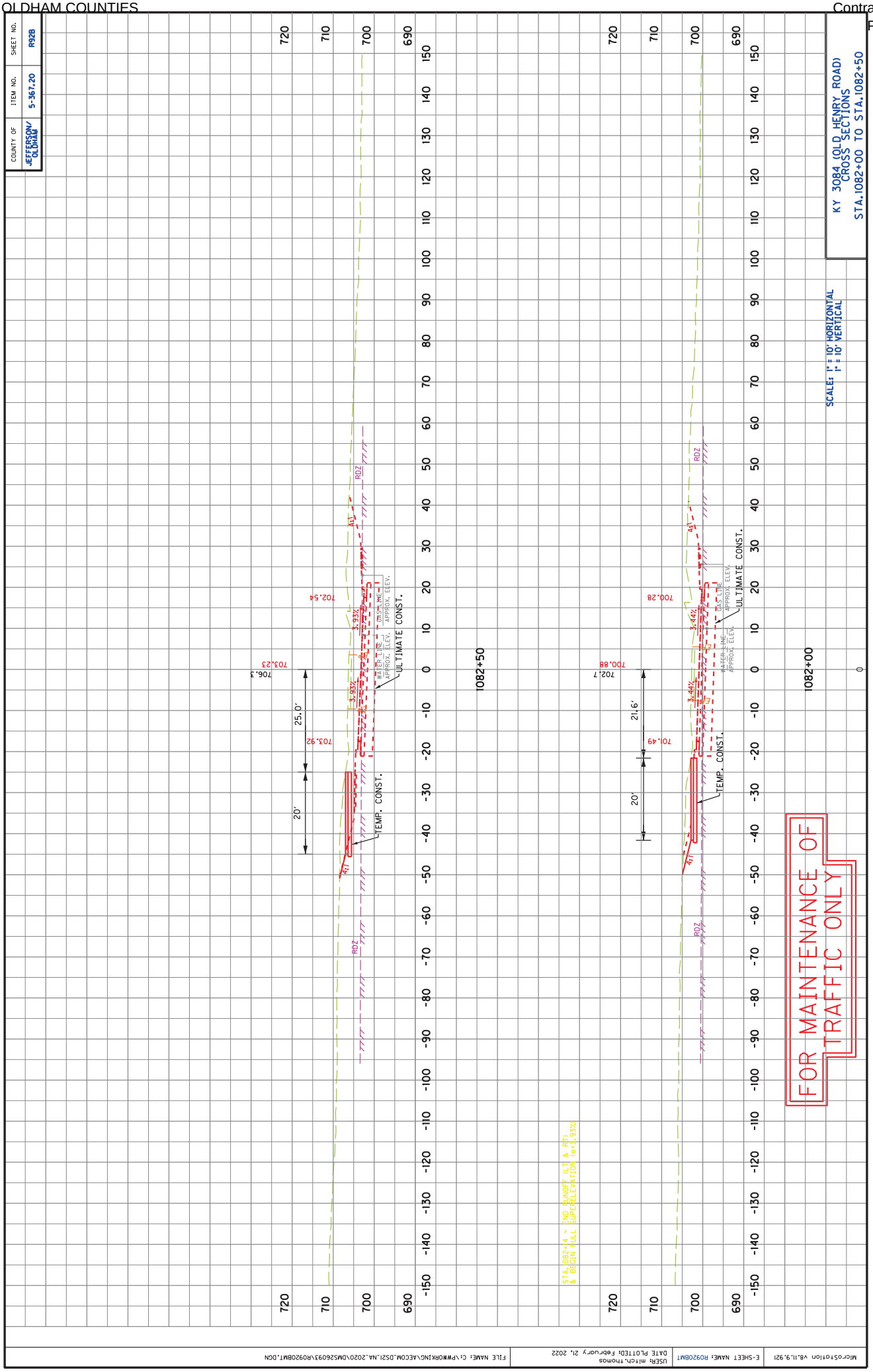
TEMPORARY TRAFFIC CONTROL PLAN
PHASE 2 - DETOUR SCHEMATIC
ROAD CLOSURE C

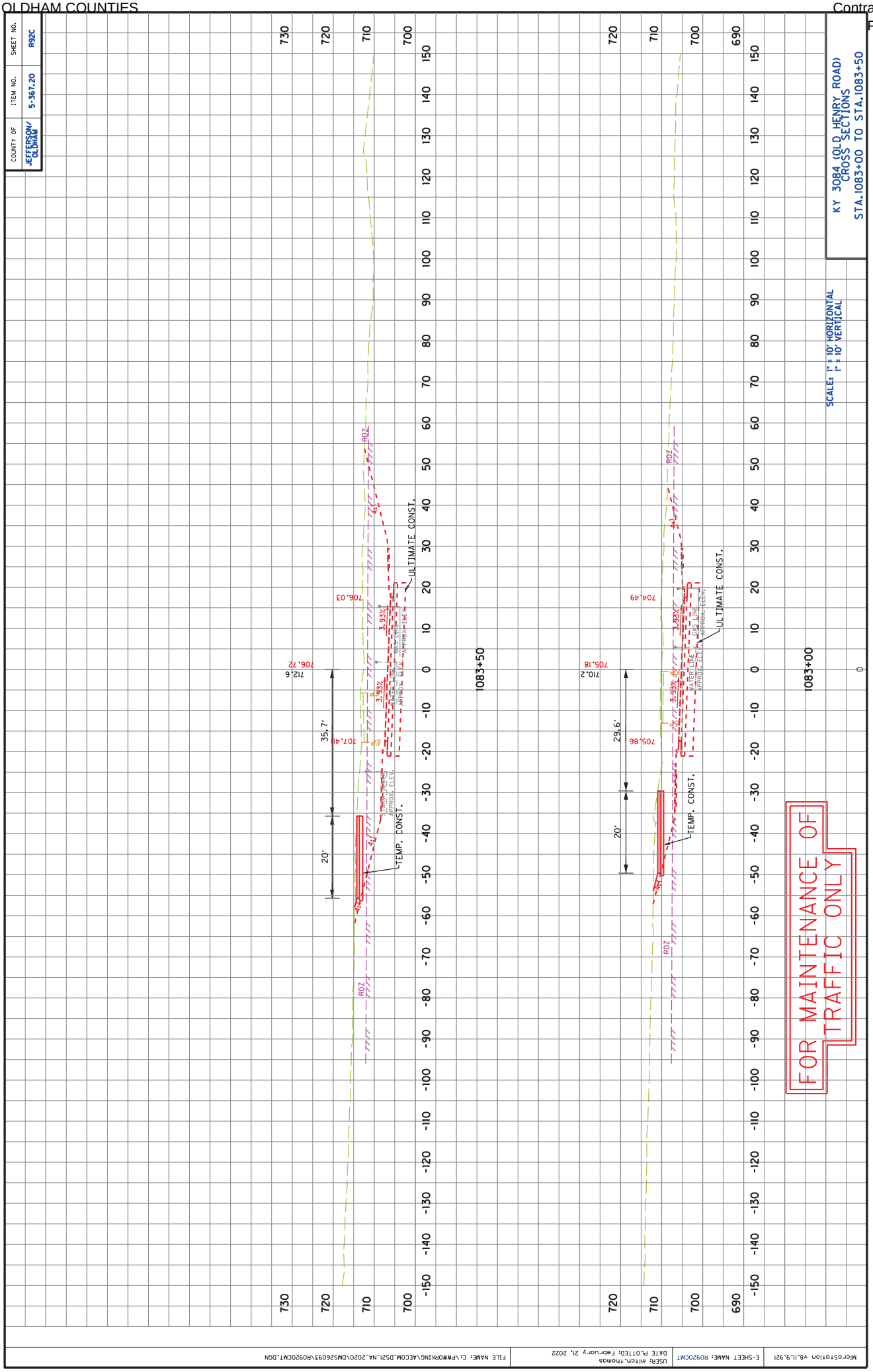
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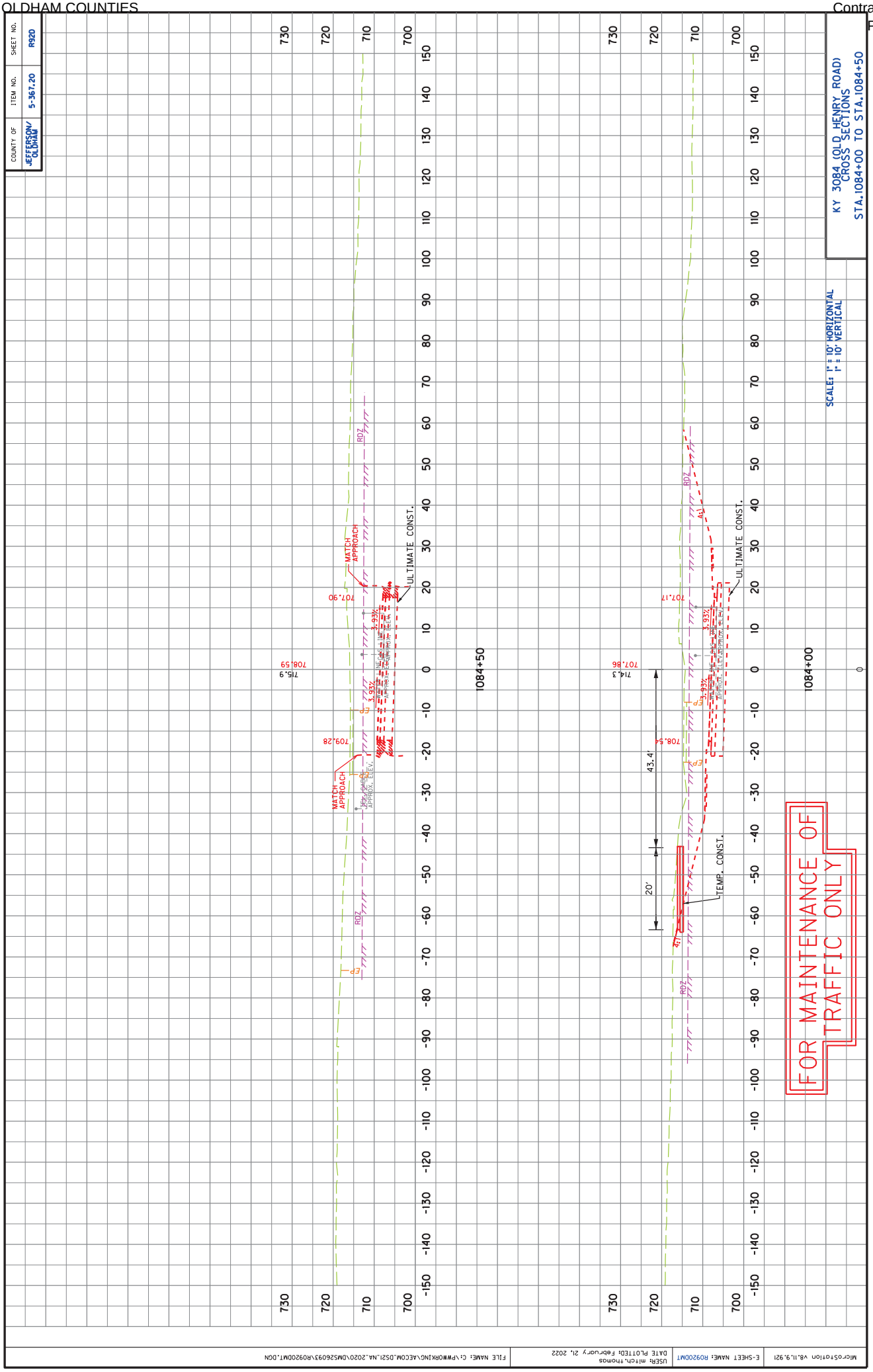

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R91
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1062+50 TO STA. 1077+50
PHASE 2 - ROAD CLOSURE C
SCALE: 1"= 50'
0' 50' 100' 200'
MATCHLINE STA. 1077+50
MATCHLINE STA. 1062+50
WOODMONT PARK LANE
OLD HENRY ROAD
1075+00
1070+00
96+00
94+00
161+00
152+00
151+00
5.99%
2.00%
EP
EP
(6) TYPE III BARRICADES W/ROAD CLOSED
STA.1076+44.56 KY 3084 (OLD HENRY ROAD)
= STA.95+00.00 WOODMONT PARK LANE
(2) TYPE III BARRICADES W/ROAD CLOSED
ROAD CLOSED
R11-2
48" x 30"
STA.1071+35.00 KY 3084 (OLD HENRY ROAD)
= STA.150+00.00 LT STA 1071+35 APPROACH ROAD
STA.1073+85.00 KY 3084 (OLD HENRY ROAD)
= STA.160+00.00 LT STA. 1073+85 PUMP STATION ENTRANCE
LOCAL TRAFFIC ONLY
FOR MAINTENANCE OF TRAFFIC ONLY
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
ROADWAY CONSTRUCTED THIS PHASE
MAINTAIN TRAFFIC
MicroStation V8.11.9.916
E-SHEET NAME: R09100MT
USER: Jonn.keeton
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R09100MT.DGN

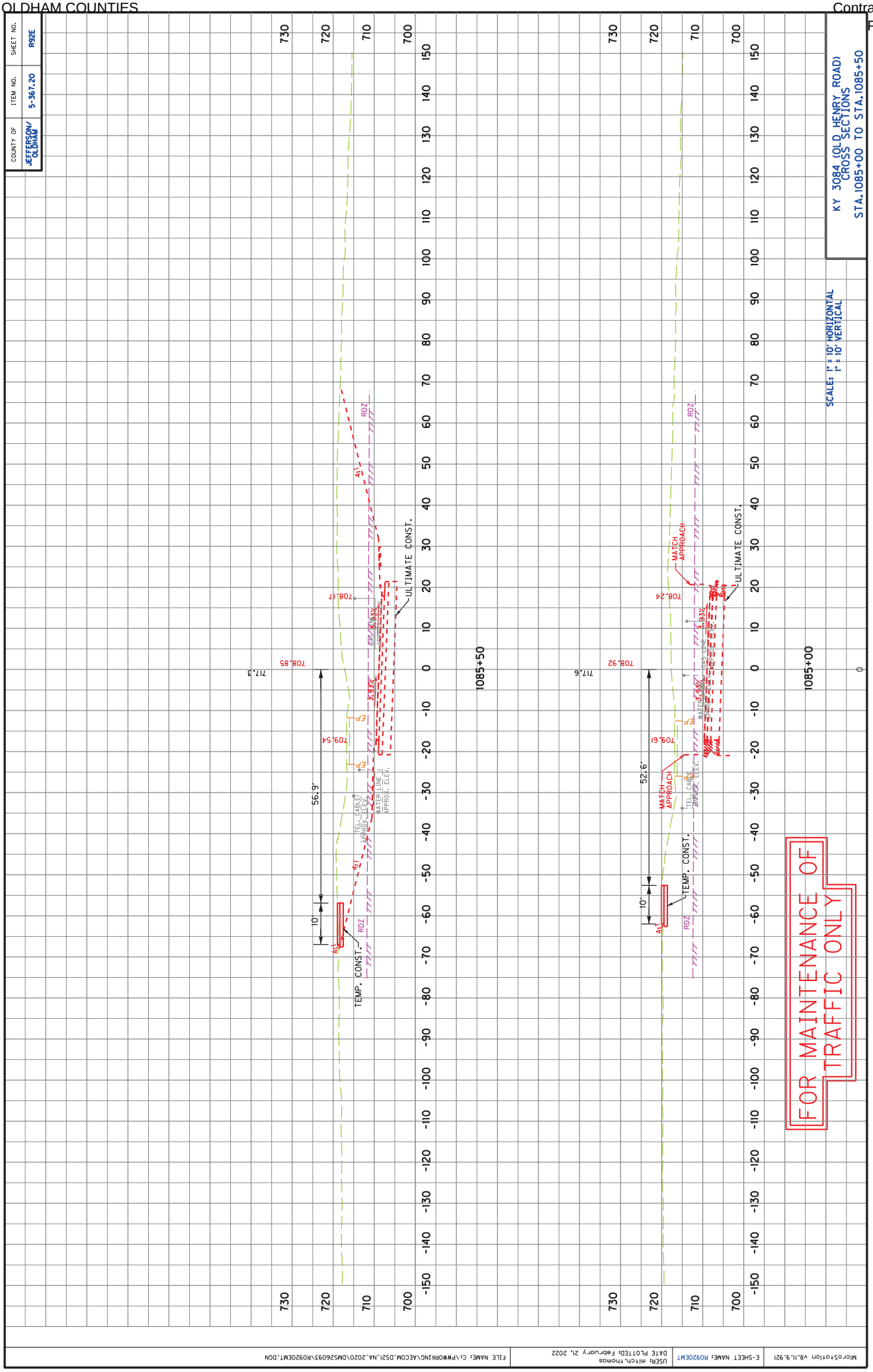

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R92
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1075+00 TO STA. 1090+00
PHASE 3 - STEP A
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1090+00
MATCHLINE STA. 1075+00
1085+00
1080+00
118+00
113+00
112+50
NOTE: SEE TCP CROSS SECTION SHEETS R92A TO R92G FOR DETAILS OF TEMPORARY WIDENING
TEMP. CONST.
ULTIMATE CONST.
4:1
RDZ
EP
3.93%
2.00%
Temporary Widening (Pay for as Item No. 2651, Diversions (By-Pass Detours), Sta. 1085+50 to Sta. 1087+49.
TEMPORARY WIDENING (OLDHAM CO.)
1. Reduce to 1 lane between 9 a.m. - 4 p.m.
2. Construct Widening (255 S.Y.)
a) 4" CSB (58 Tons)
b) 6" Asphalt Base (2-3" Lifts) (84 Tons)
c) 1" Surface (14 Tons)
3. CSB Wedge at end of day according to Pvmt Edge Drop-Off Detail
Eastbound Only
OLDHAM COUNTY
JEFFERSON COUNTY
TEMP. DISTURB LIMITS
OLD HENRY ROAD
APPLE HILL
WOODMONT RIDGE DR
TEMP. DISTURB LIMITS
Water Blast
Existing Striping
STA.1084+76.29 KY 3084 (OLD HENRY ROAD)
= STA.115+00.00 APPLE HILL / WOODMONT RIDGE
ULTIMATE DISTURB LIMITS
Temporary Widening Sta. 1076+77 to Sta. 1085+50.
REAMERS LANE
Exist. R/W
40' Tree Protection Easement
STA.1076+44.56 KY 3084 (OLD HENRY ROAD)
= STA.95+00.00 WOODMONT PARK LANE
TEMPORARY DRAINAGE NOTE:
STA. 1077+13 CONSTRUCT 24 FT OF PROPOSED STORM SEWER IN PHASE 3 (STEP 2) WITH TEMP. PLUG. COMPLETE IN PHASE 3 (STEP C).
WOODMONT PARK LN
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor Is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
MicroStation V8.11.9.921
E-SHEET NAME: R09200MT
USER: mtech.thomas
DATE PLOTTED: February 21, 2022
FILE NAME: C:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R09200MT.DGN

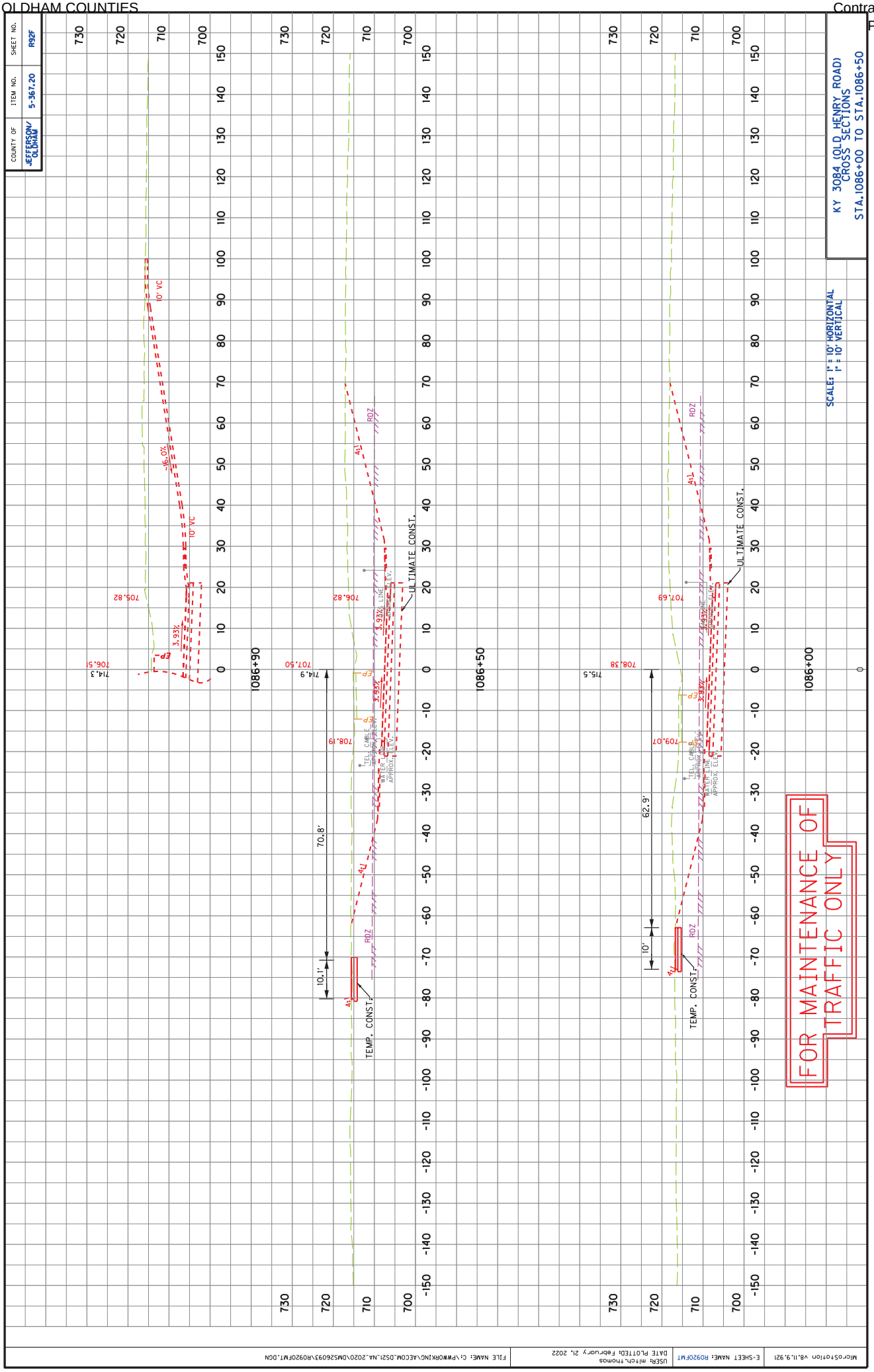

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R92A
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1081+00 TO STA.1081+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
BEGIN TEMPORARY CONSTRUCTION STA. 1080+20
1081+00
1081+50
ULTIMATE CONST.
TEMP. CONST.
WATER LINE APPROX. ELEV.
GAS LINE APPROX. ELEV.
695.09
697.84
699.8
698.19
698.47
696.2
695.44
695.41
19.5'
20'
17.4'
20'
2.00%
1.63%
0.17%
4:1
RDZ
STA.1081+40 ~ REVERSE CROWN (e=RC)
STA.1081+15 ~ END RUNOFF
& BEGIN RUNOFF (FLAT SECTION LT.
FOR MAINTENANCE OF TRAFFIC ONLY
FILE NAME: C:\PWORKING\AECOM_DS21_NA_2020\DMS2609293\R0920AMT.DGN
USER: MITCH.THOMAS
DATE PLOTTED: FEBRUARY 21, 2022
E-SHEET NAME: R0920AMT
MicroStation V8.11.9.921

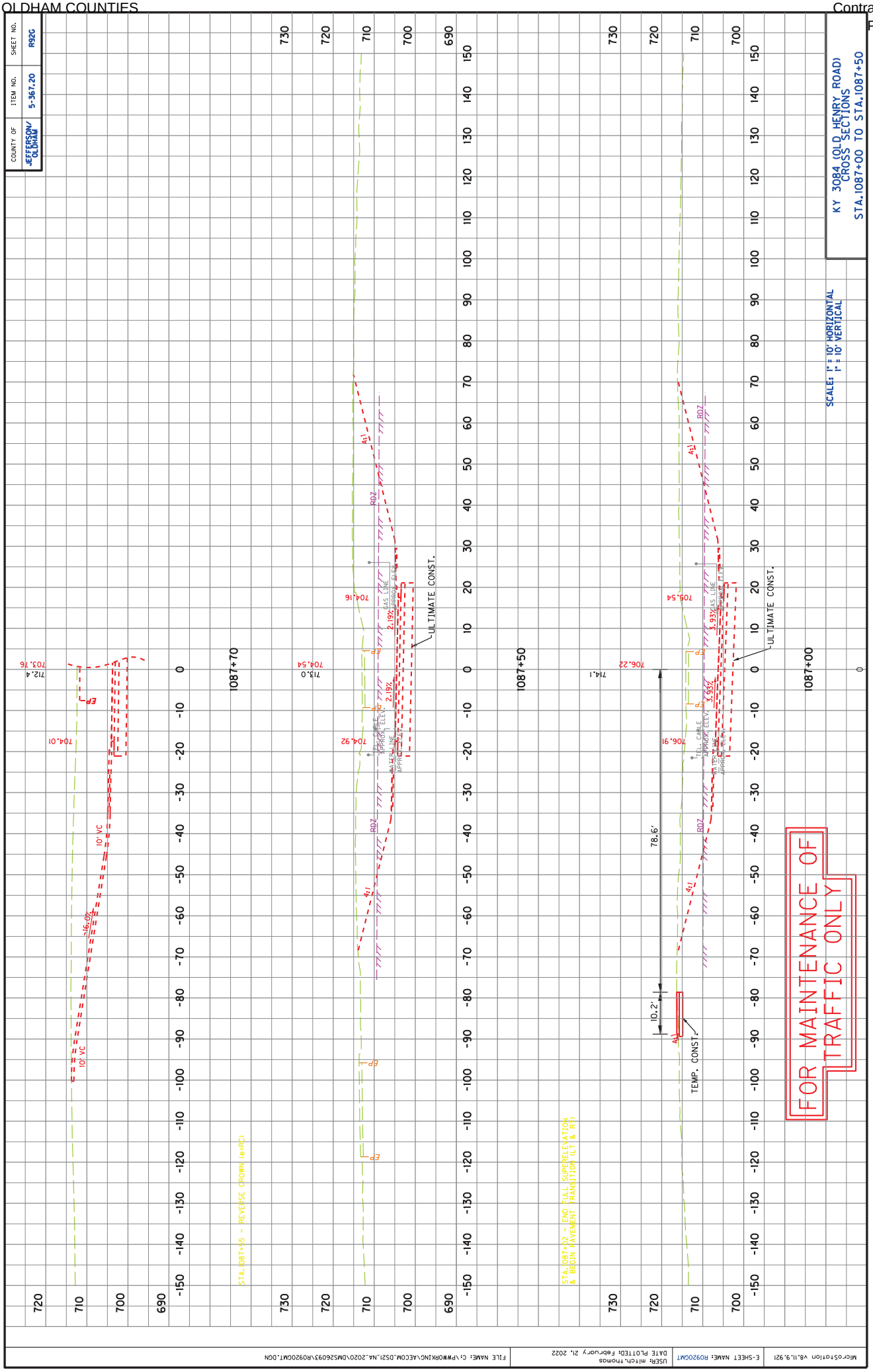

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R928
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1082+00 TO STA.1082+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
FOR MAINTENANCE OF TRAFFIC ONLY
1082+50
1082+00
TEMP. CONST.
ULTIMATE CONST.
WATER LINE
APPROX. ELEV.
RDZ
4:1
20'
25.0'
21.6'
3.93%
3.44%
STA.1082+4 ~ END RUNOFF (LT & RT)
& BEGIN FULL SUPERELEVATION @ e=3.93%
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R920BMT.DGN
USER: mfoch.thomas
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R920BMT
MicroStation V8.11.9.921

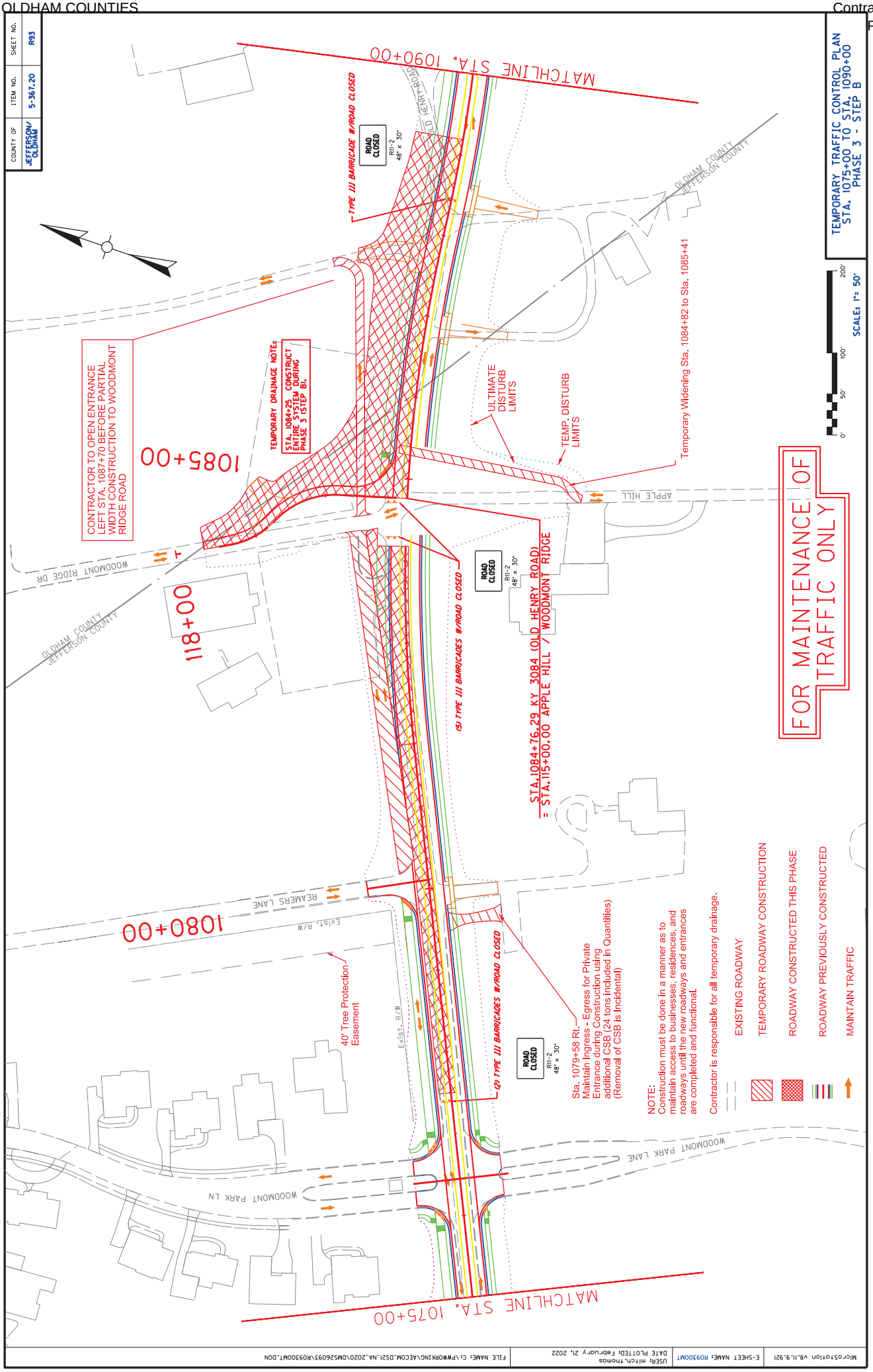

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R92C
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1083+00 TO STA.1083+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1083+50
1083+00
ULTIMATE CONST.
TEMP. CONST.
FOR MAINTENANCE OF TRAFFIC ONLY
E-SHEET NAME: R092CMT
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R092CMT.DGN

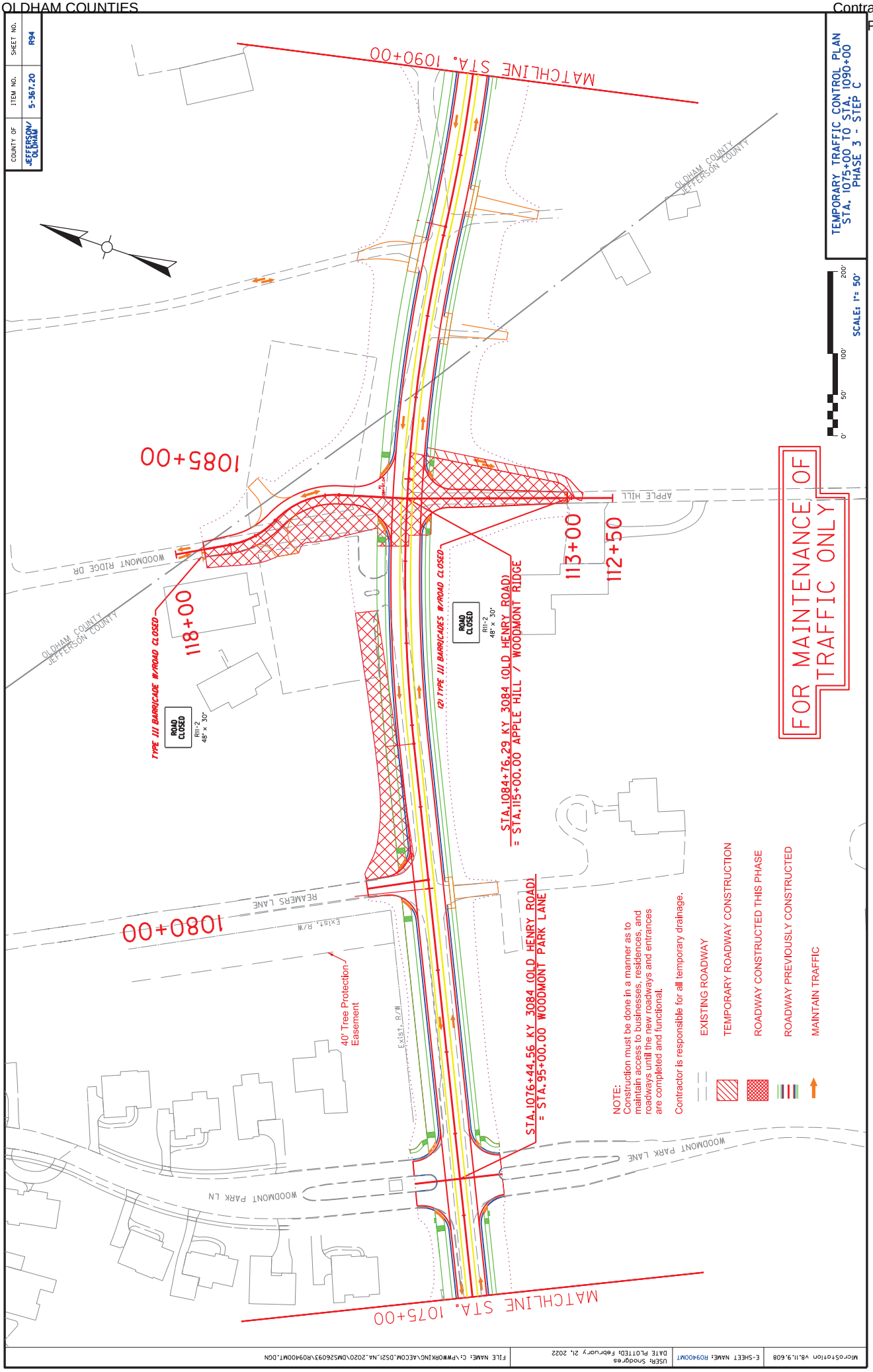

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R920
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1084+00 TO STA.1084+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1084+50
1084+00
ULTIMATE CONST.
TEMP. CONST.
MATCH APPROACH
709.28
707.90
708.59
707.17
707.86
708.54
43.4'
20'
3.93%
RDZ
EP
FOR MAINTENANCE OF TRAFFIC ONLY
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R9200MT.DGN
USER: mfoch.thomas
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R9200MT
MicroStation V8.11.9.921

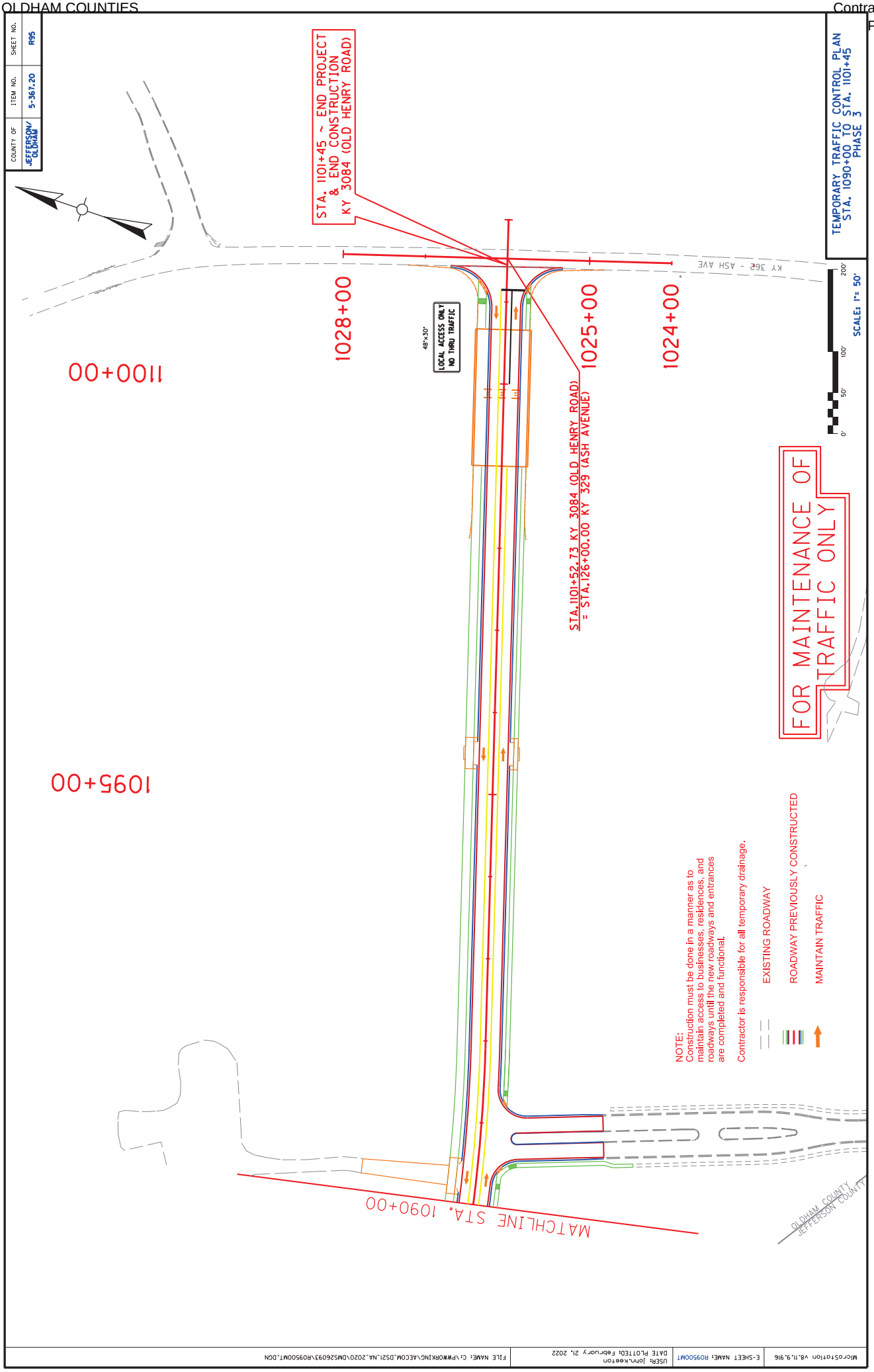

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R92E
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1085+00 TO STA.1085+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1085+50
1085+00
TEMP. CONST.
ULTIMATE CONST.
MATCH APPROACH
FOR MAINTENANCE OF TRAFFIC ONLY
RDZ
EP
TEL. CABLE APPROX. ELEV.
WATER LINE APPROX. ELEV.
56.9'
52.6'
10'
4:1
3.93%
708.85
709.54
708.17
708.92
709.61
708.24
717.5
717.6
700
710
720
730
MicroStation V8.11.9.921
E-SHEET NAME: R092CEMT
USER: mfoch.thomas
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R092CEMT.DGN

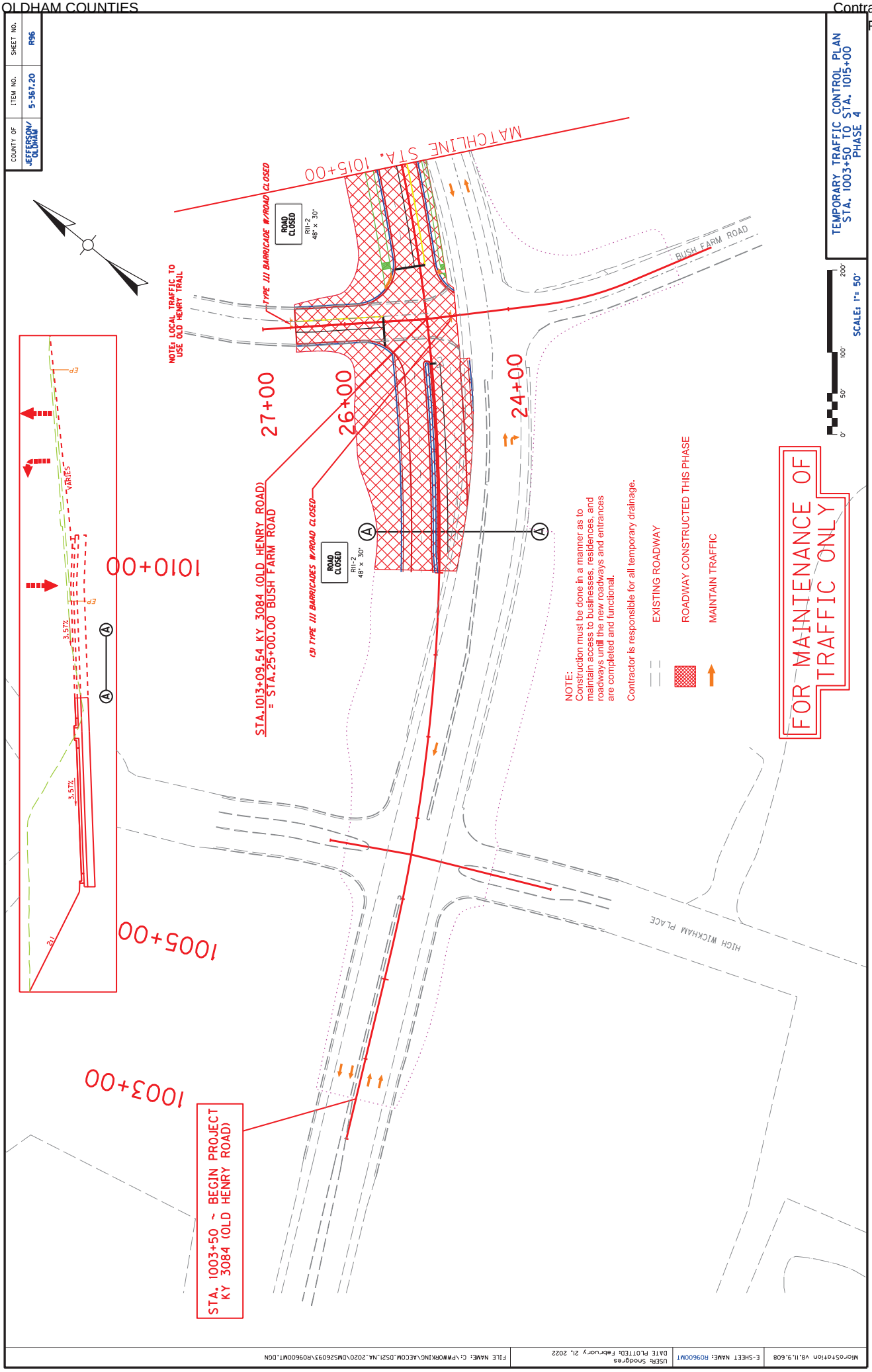

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R92F
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1086+00 TO STA.1086+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1086+90
1086+50
1086+00
TEMP. CONST.
ULTIMATE CONST.
RDZ
4:1
10'
70.8'
62.9'
10.1'
FOR MAINTENANCE OF TRAFFIC ONLY
E-SHEET NAME: R092OFMT
USER: mfoch.thomas
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21.NA.2020\DMS26093\R092OFMT.DGN
MicroStation V8.11.9.921

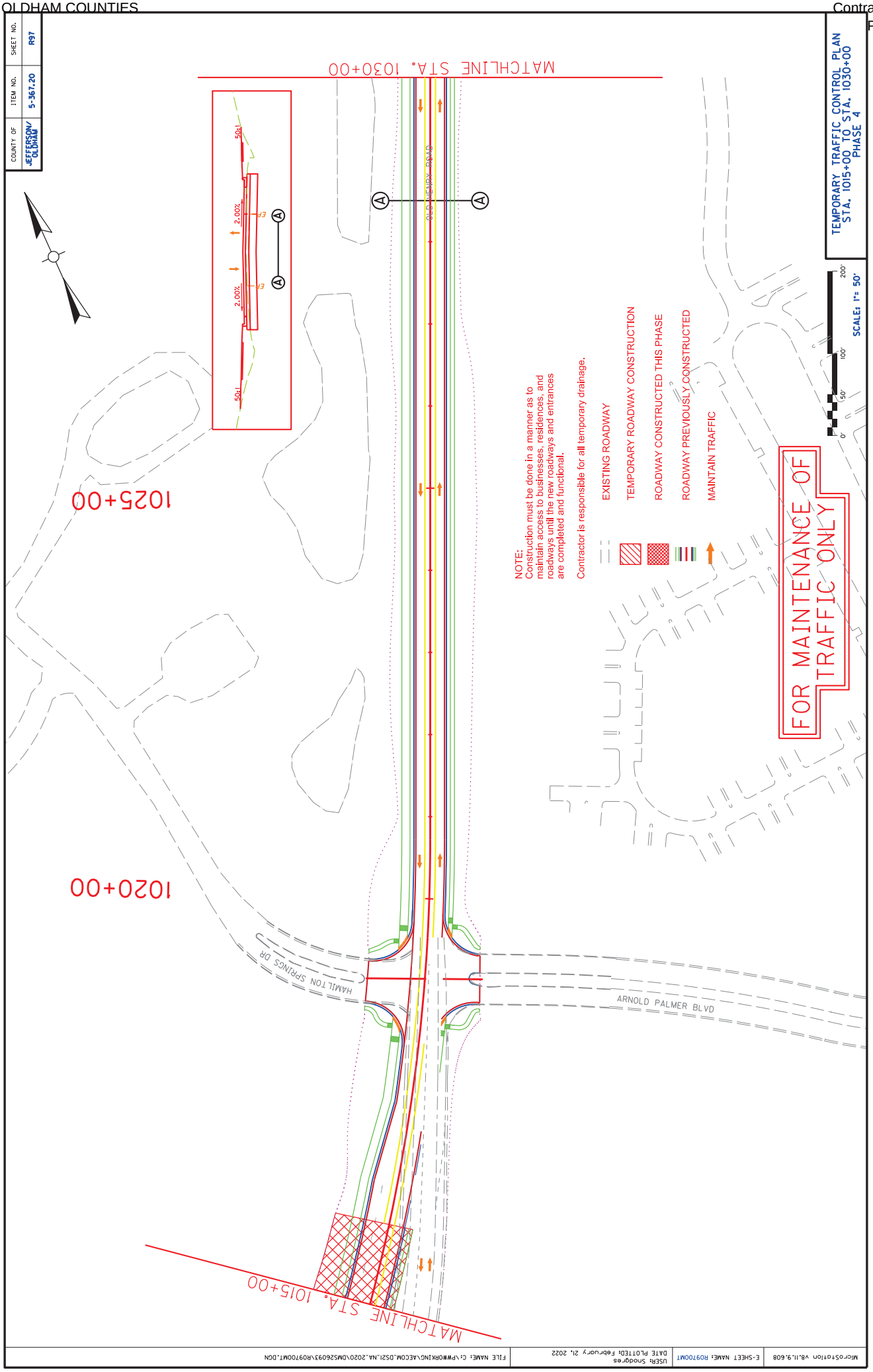

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R92G
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1087+00 TO STA.1087+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
FOR MAINTENANCE OF TRAFFIC ONLY
ULTIMATE CONST.
TEMP. CONST.
78.6'
10.2'
STA.1087+35 ~ REVERSE CROWN (e=RC)
STA.1087+42 ~ END FULL SUPERELEVATION & BEGIN PAVEMENT TRANSITION (LT & RT)
1087+70
1087+50
1087+00
10' VC
16.0'
4:1
RBZ
RDZ
EP
GAS LINE
TEL. CABLE
WATER LINE
APPROX. ELEV.
2.19%
3.93%
712.4
703.76
704.01
713.0
704.54
704.16
704.92
714.1
706.22
705.54
706.91
MicroStation V8.11.9.921
E-SHEET NAME: R092GGMT
USER: mfoch.thomas
DATE PLOTTED: February 21, 2022
FILE NAME: C:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R092GGMT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R93
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1075+00 TO STA. 1090+00
PHASE 3 - STEP B
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1090+00
MATCHLINE STA. 1075+00
TYPE III BARRICADE W/ROAD CLOSED
ROAD CLOSED
R11-2
48" x 30"
OLD HENRY ROAD
OLDHAM COUNTY
JEFFERSON COUNTY
CONTRACTOR TO OPEN ENTRANCE LEFT STA. 1087+70 BEFORE PARTIAL WIDTH CONSTRUCTION TO WOODMONT RIDGE ROAD
1085+00
TEMPORARY DRAINAGE NOTE:
STA. 1084+25 CONSTRUCT ENTIRE SYSTEM DURING PHASE 3 (STEP B).
ULTIMATE DISTURB LIMITS
TEMP. DISTURB LIMITS
Temporary Widening Sta. 1084+82 to Sta. 1085+41
APPLE HILL
WOODMONT RIDGE DR
1180+00
(5) TYPE III BARRICADES W/ROAD CLOSED
STA.1084+76.29 KY 3084 (OLD HENRY ROAD)
= STA.115+00.00 APPLE HILL / WOODMONT RIDGE
FOR MAINTENANCE OF TRAFFIC ONLY
REAMERS LANE
1080+00
Exist. R/W
40' Tree Protection Easement
(2) TYPE III BARRICADES W/ROAD CLOSED
Sta. 1079+58 Rt.
Maintain Ingress - Egress for Private Entrance during Construction using additional CSB (24 tons included in Quantities) (Removal of CSB is Incidental)
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
WOODMONT PARK LN
WOODMONT PARK LANE
MicroStation V8.11.9.921
E-SHEET NAME: R93000MT
USER: mfoch.thomas
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R93000MT.DGN

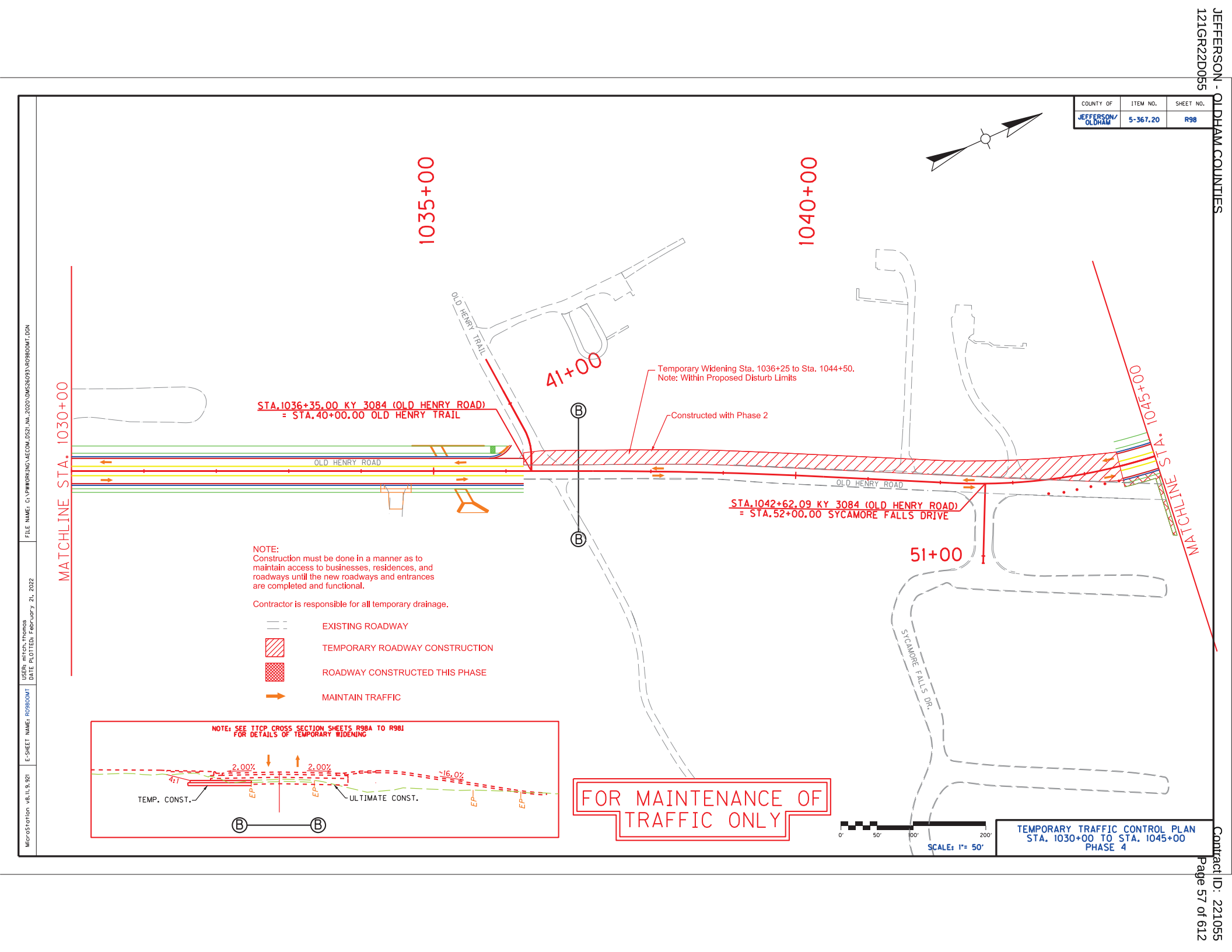

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R94
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1075+00 TO STA. 1090+00
PHASE 3 - STEP C
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1090+00
MATCHLINE STA. 1075+00
1085+00
1080+00
118+00
113+00
112+50
APPLE HILL
WOODMONT RIDGE DR
REAMERS LANE
WOODMONT PARK LN
WOODMONT PARK LANE
OLDHAM COUNTY
JEFFERSON COUNTY
TYPE III BARRICADE W/ROAD CLOSED
ROAD CLOSED
R11-2
48" x 30"
(2) TYPE III BARRICADES W/ROAD CLOSED
STA.1084+76.29 KY 3084 (OLD HENRY ROAD)
= STA.115+00.00 APPLE HILL / WOODMONT RIDGE
STA.1076+44.56 KY 3084 (OLD HENRY ROAD)
= STA.95+00.00 WOODMONT PARK LANE
Exist. R/W
40' Tree Protection Easement
FOR MAINTENANCE OF TRAFFIC ONLY
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
Microstation V8.11.9.608
E-SHEET NAME: R9400MT
USER: Snodgrae
DATE PLOTTED: February 21, 2022
FILE NAME: C:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R9400MT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R95
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1090+00 TO STA. 1101+45
PHASE 3
STA. 1101+45 ~ END PROJECT
& END CONSTRUCTION
KY 3084 (OLD HENRY ROAD)
KY 362 - ASH AVE
1028+00
1025+00
1024+00
1100+00
1095+00
48"x30"
LOCAL ACCESS ONLY
NO THRU TRAFFIC
STA.1101+52.73 KY 3084 (OLD HENRY ROAD)
= STA.126+00.00 KY 329 (ASH AVENUE)
FOR MAINTENANCE OF
TRAFFIC ONLY
SCALE: 1"= 50'
0'
50'
100'
200'
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
MATCHLINE STA. 1090+00
OLDHAM COUNTY
JEFFERSON COUNTY
MicroStation V8.11.9.916
E-SHEET NAME: R095OOMT
USER: Jonn.keeton
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R095OOMT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R96
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1003+50 TO STA. 1015+00
PHASE 4
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1015+00
BUSH FARM ROAD
HIGH WICKHAM PLACE
NOTE: LOCAL TRAFFIC TO USE OLD HENRY TRAIL
TYPE III BARRICADE W/ROAD CLOSED
ROAD CLOSED
R11-2
48" x 30"
27+00
26+00
24+00
STA.1013+09.54 KY 3084 (OLD HENRY ROAD) = STA.25+00.00 BUSH FARM ROAD
(3) TYPE III BARRICADES W/ROAD CLOSED
1010+00
1005+00
1003+00
3.57%
VARIES
EP
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY CONSTRUCTED THIS PHASE
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
STA. 1003+50 ~ BEGIN PROJECT
KY 3084 (OLD HENRY ROAD)
FILE NAME: C:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R96000MT.DGN
USER: Snodgrass
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R96000MT
Microstation V8.11.9.608

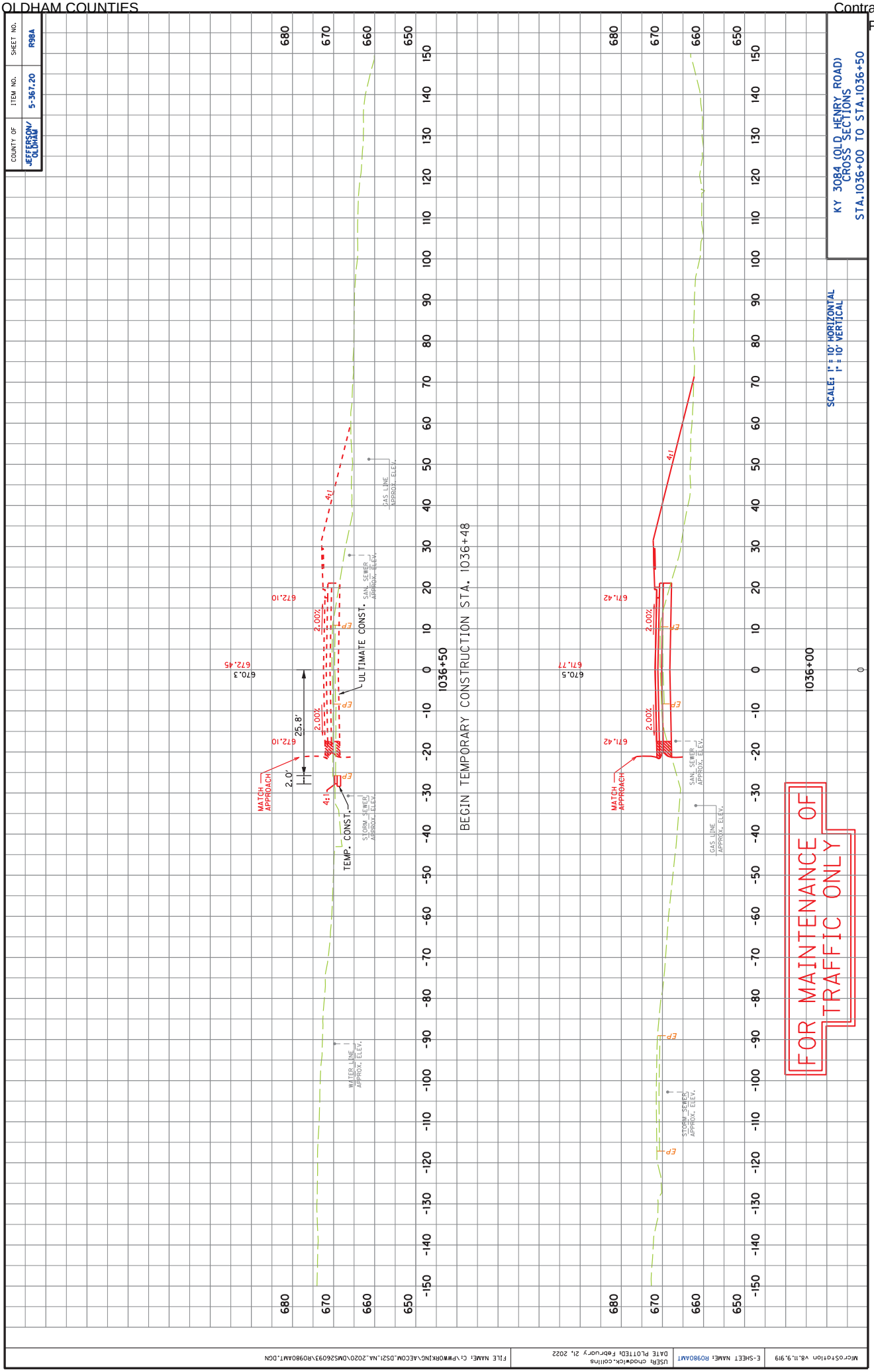

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R97
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1015+00 TO STA. 1030+00
PHASE 4
MATCHLINE STA. 1030+00
MATCHLINE STA. 1015+00
1025+00
1020+00
OLD HENRY ROAD
HAMILTON SPRINGS DR
ARNOLD PALMER BLVD
2.00%
2.00%
50ft
50ft
EP
EP
A
A
A
A
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
SCALE: 1"= 50'
0'
50'
100'
200'
Microstation V8.11.9.608
E-SHEET NAME: R097OOMT
USER: Snodgras
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21.NA.2020\DMS26093\R097OOMT.DGN

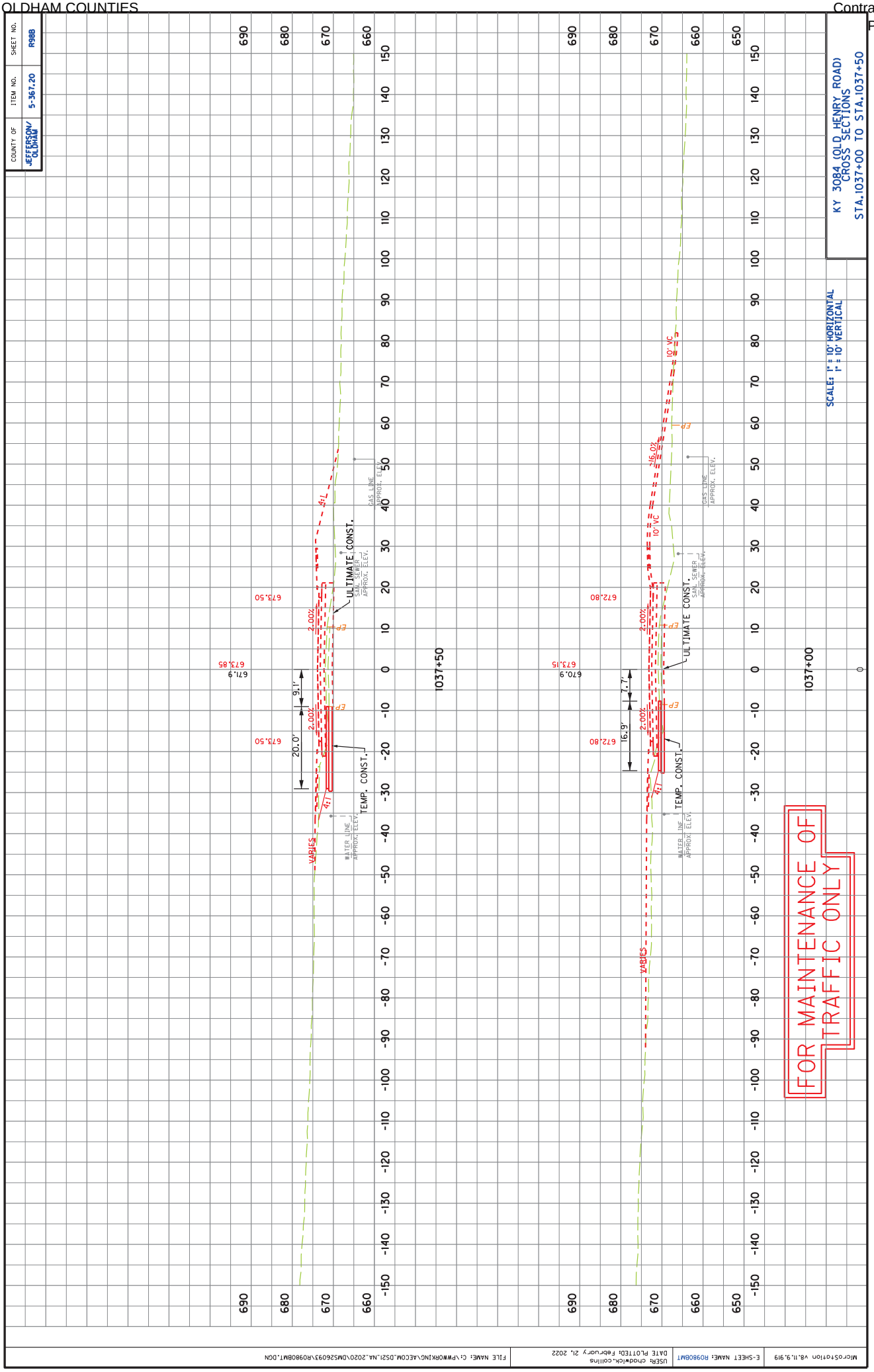
COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R98

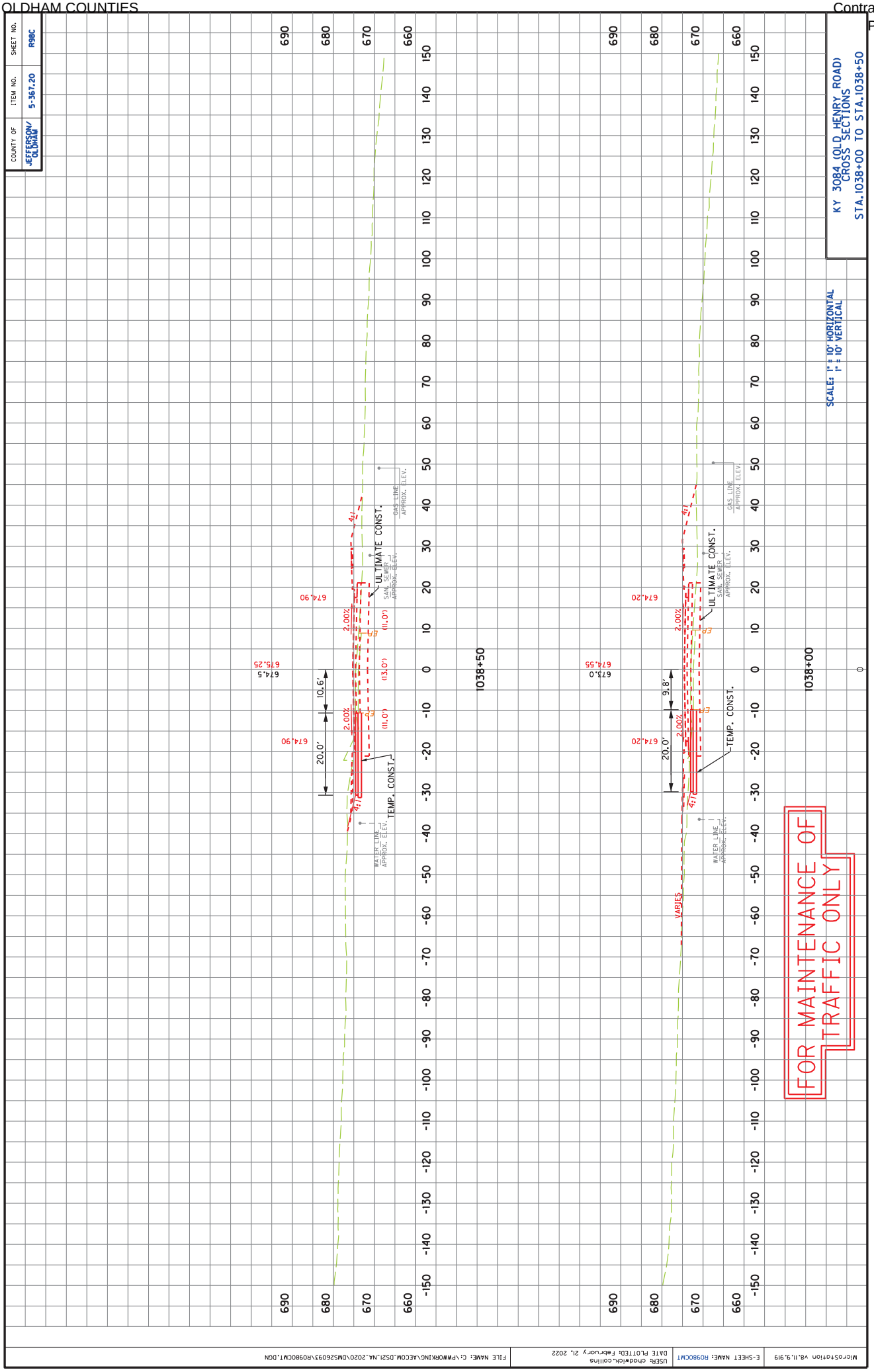


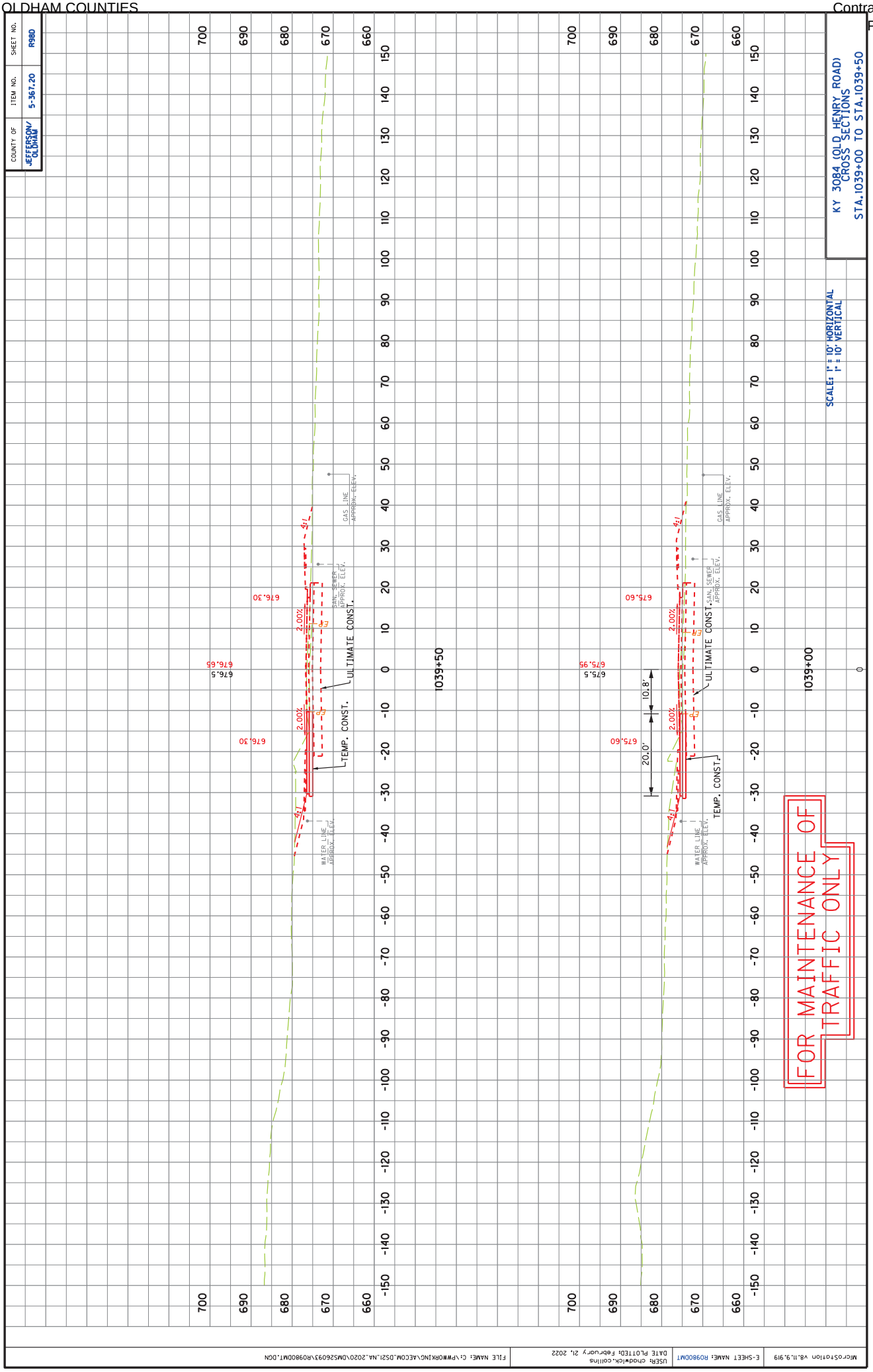
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1030+00 TO STA. 1045+00
PHASE 4

MicroStation v8.11.9.921 | E-SHEET NAME: R09800MT | USER: mitch.thomas | DATE PLOTTED: February 21, 2022 | FILE NAME: C:\PWWORKING\AECOM_DS2\NA_2020\DMS26093\R09800MT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R98A
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1036+00 TO STA.1036+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1036+50
1036+00
BEGIN TEMPORARY CONSTRUCTION STA. 1036+48
ULTIMATE CONST.
TEMP. CONST.
MATCH APPROACH
672.10
672.45
670.3
671.42
671.77
670.5
2.00%
4:1
25.8'
2.0'
EP
SAN. SEWER APPROX. ELEV.
STORM SEWER APPROX. ELEV.
GAS LINE APPROX. ELEV.
WATER LINE APPROX. ELEV.
FOR MAINTENANCE OF TRAFFIC ONLY
FILE NAME: G:\PWWORKING\AECOM\DS21_NA_2020\DMS26093\R0980AMT.DGN
USER: Chaddwick.Collins
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R0980AMT
MicroStation V8.11.9.919

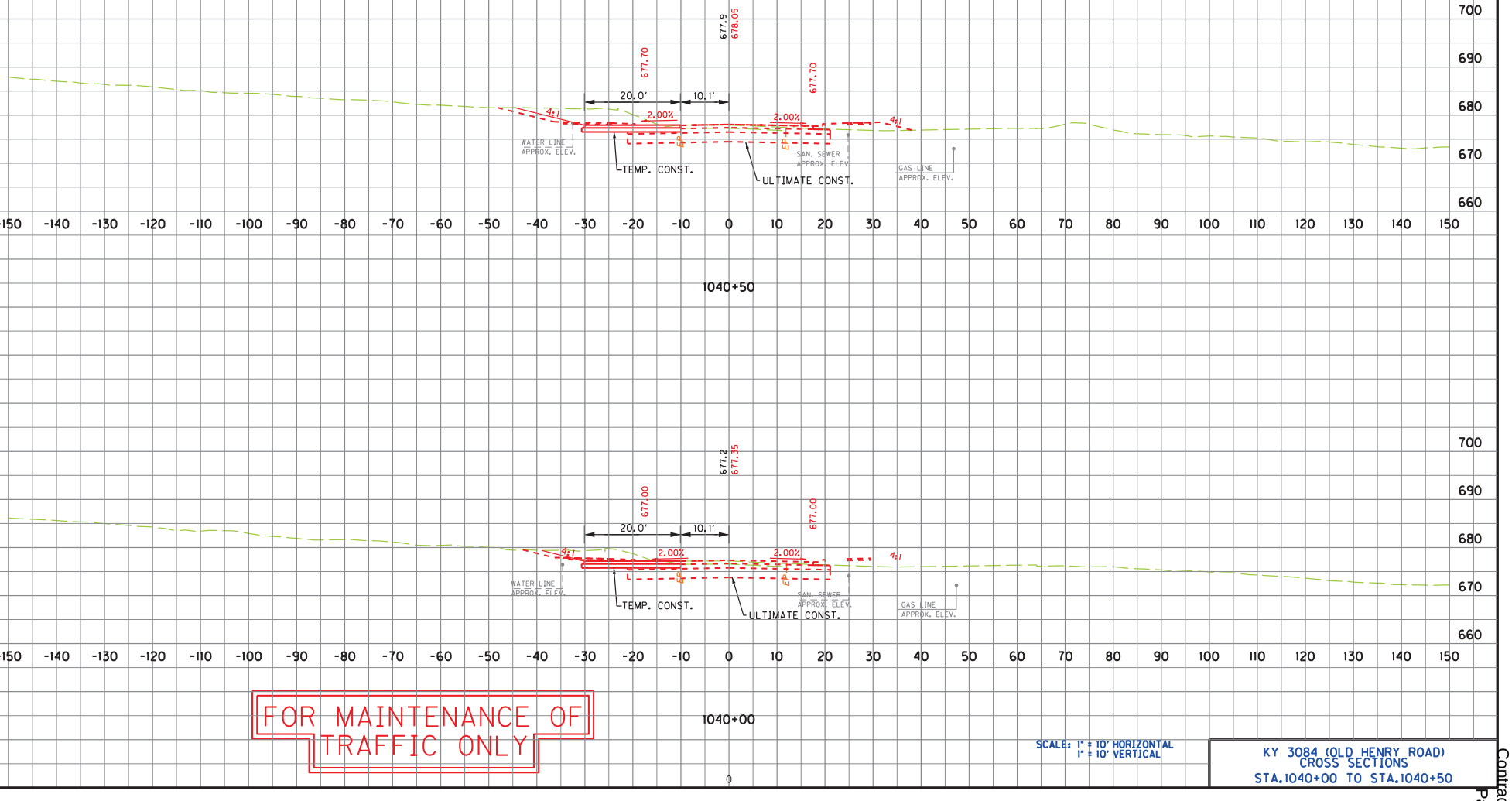

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R98B
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1037+00 TO STA.1037+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1037+50
1037+00
ULTIMATE CONST.
TEMP. CONST.
10' VC
16.0%
2.00%
4:1
VARIES
20.0'
9.1'
16.9'
7.7'
673.50
673.85
671.9
672.80
673.15
670.9
GAS LINE APPROX. ELEV.
SAN. SEWER APPROX. ELEV.
WATER LINE APPROX. ELEV.
FOR MAINTENANCE OF TRAFFIC ONLY
FILE NAME: c:\PWWORKING\AECOM.DS21_NA.2020\DMS26093\R9808MT.DGN
USER: Chaddwick.Collins
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R9808MT
MicroStation V8.11.9.919


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R98C
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1038+00 TO STA.1038+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1038+50
1038+00
ULTIMATE CONST.
TEMP. CONST.
674.90
674.20
674.5
675.25
673.0
674.55
10.6'
9.8'
20.0'
2.00%
4:1
(11.0')
(13.0')
VARIES
WATER LINE APPROX. ELEV.
GAS LINE APPROX. ELEV.
SANITARY SEWER APPROX. ELEV.
FOR MAINTENANCE OF TRAFFIC ONLY
MicroStation V8.11.9.919
E-SHEET NAME: R098CMT
USER: chaddwick.collins
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R098CMT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R980
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1039+00 TO STA.1039+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1039+50
1039+00
TEMP. CONST.
ULTIMATE CONST.
20.0'
10.8'
2.00%
676.30
676.65
675.60
675.95
GAS LINE APPROX. ELEV.
SAN. SEWER APPROX. ELEV.
WATER LINE APPROX. ELEV.
FOR MAINTENANCE OF TRAFFIC ONLY
MicroStation V8.11.9.919
E-SHEET NAME: R980DMT
USER: Chadwick.collins
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM\DS21-NA-2020\DMS26093\R980DMT.DGN

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R98E

STA.1040+51 ~ END NORMAL CROWN
& BEGIN RUNOUT

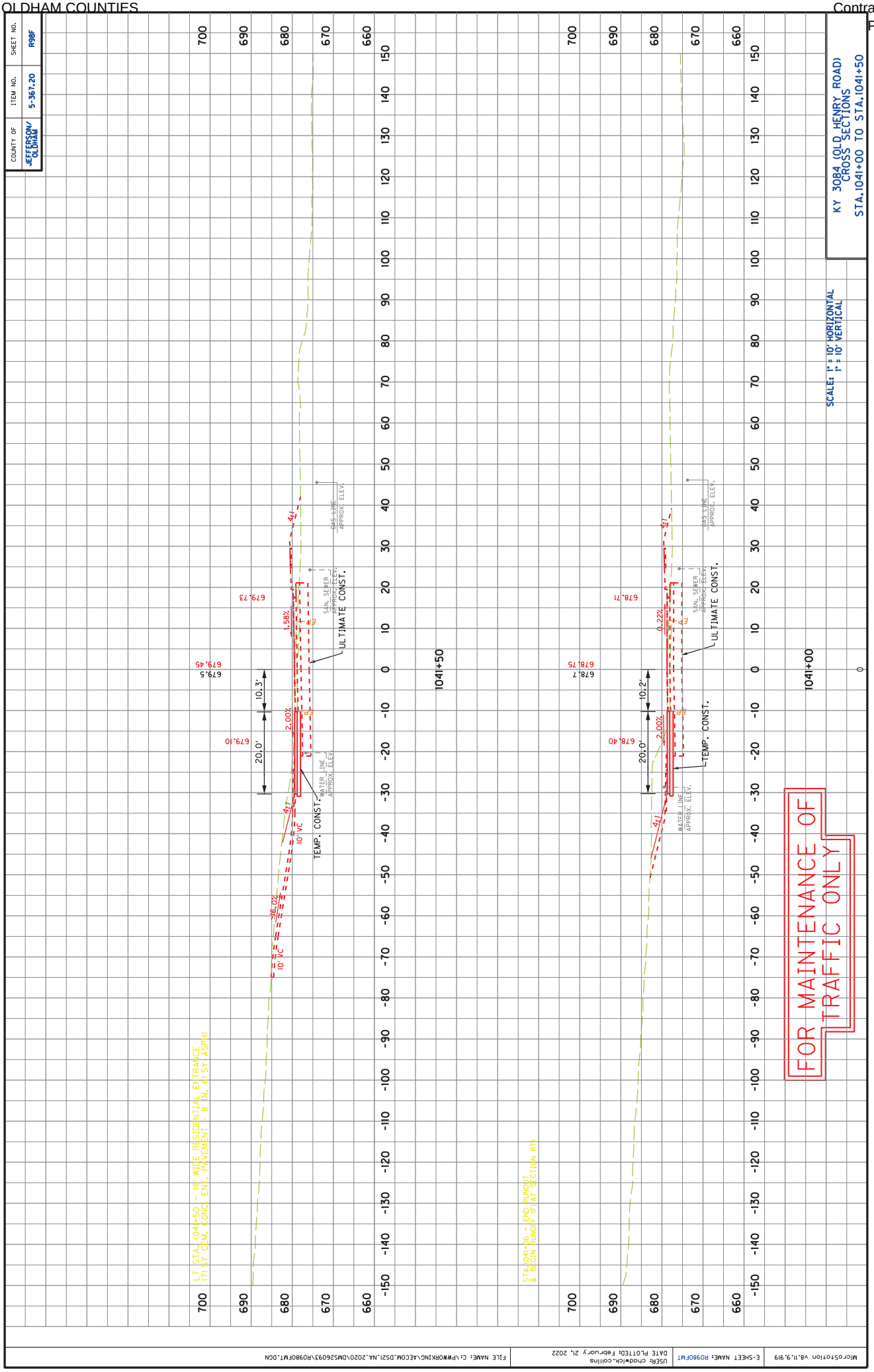


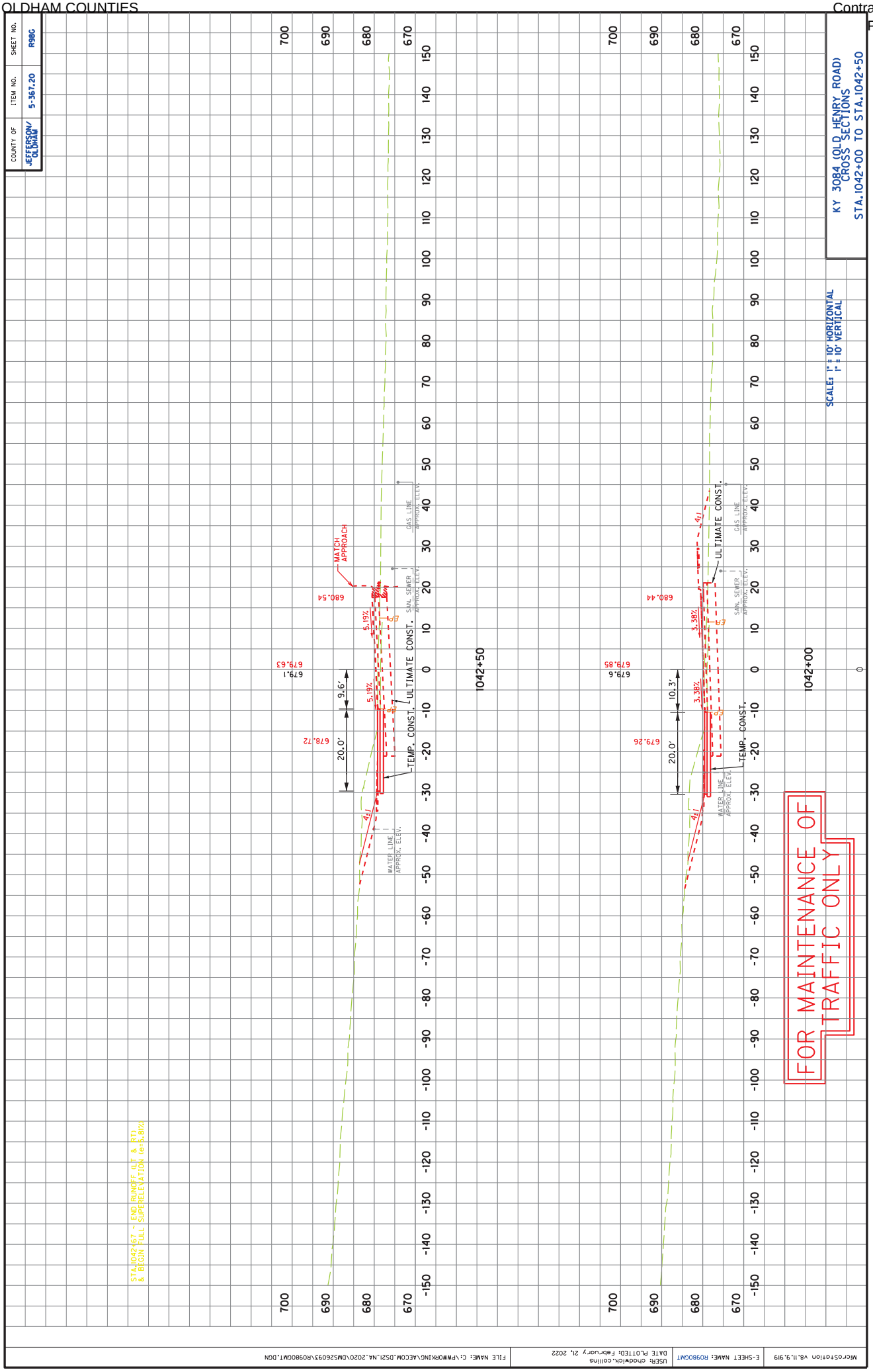
FOR MAINTENANCE OF TRAFFIC ONLY

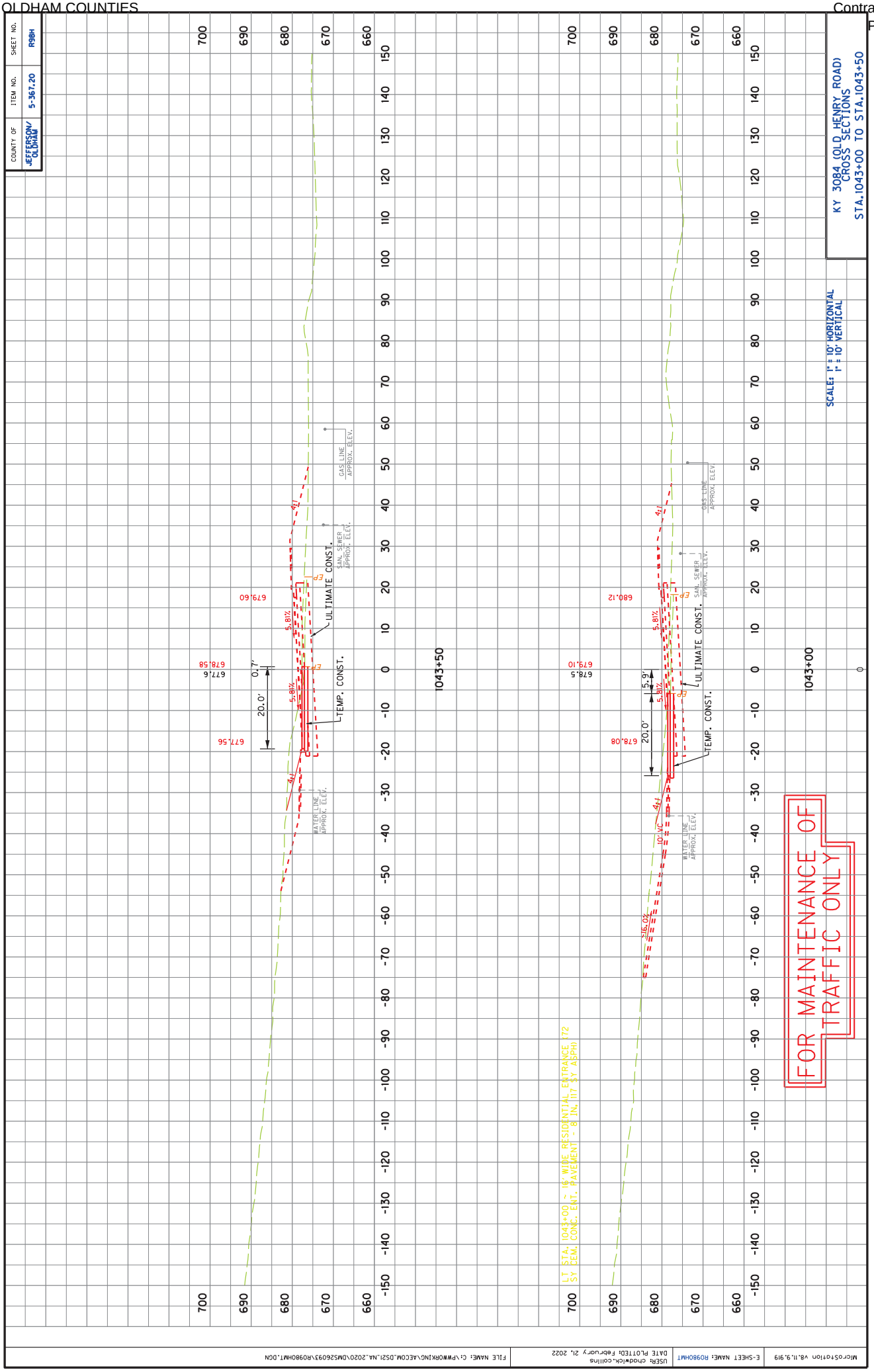
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL

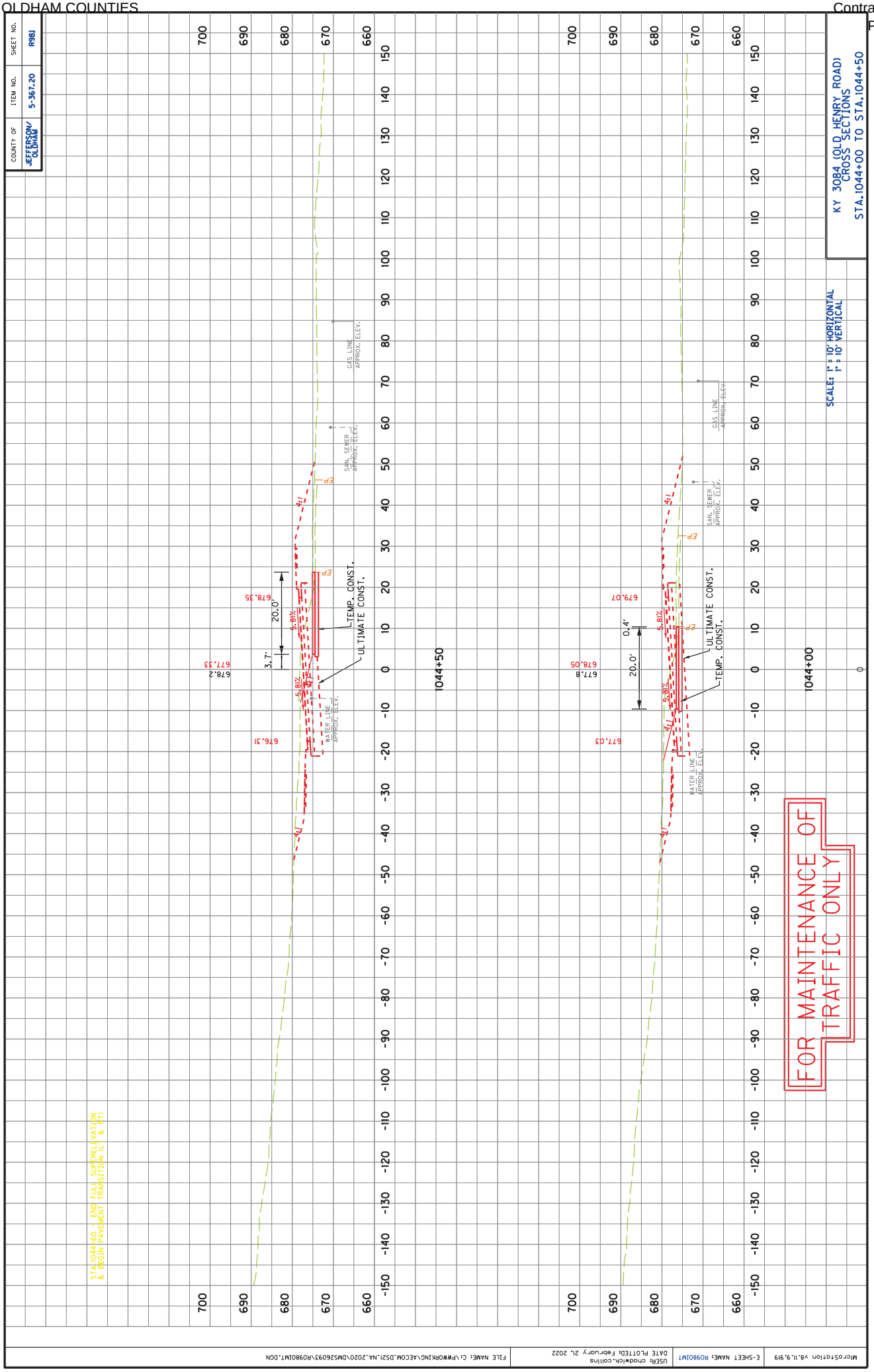
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1040+00 TO STA.1040+50

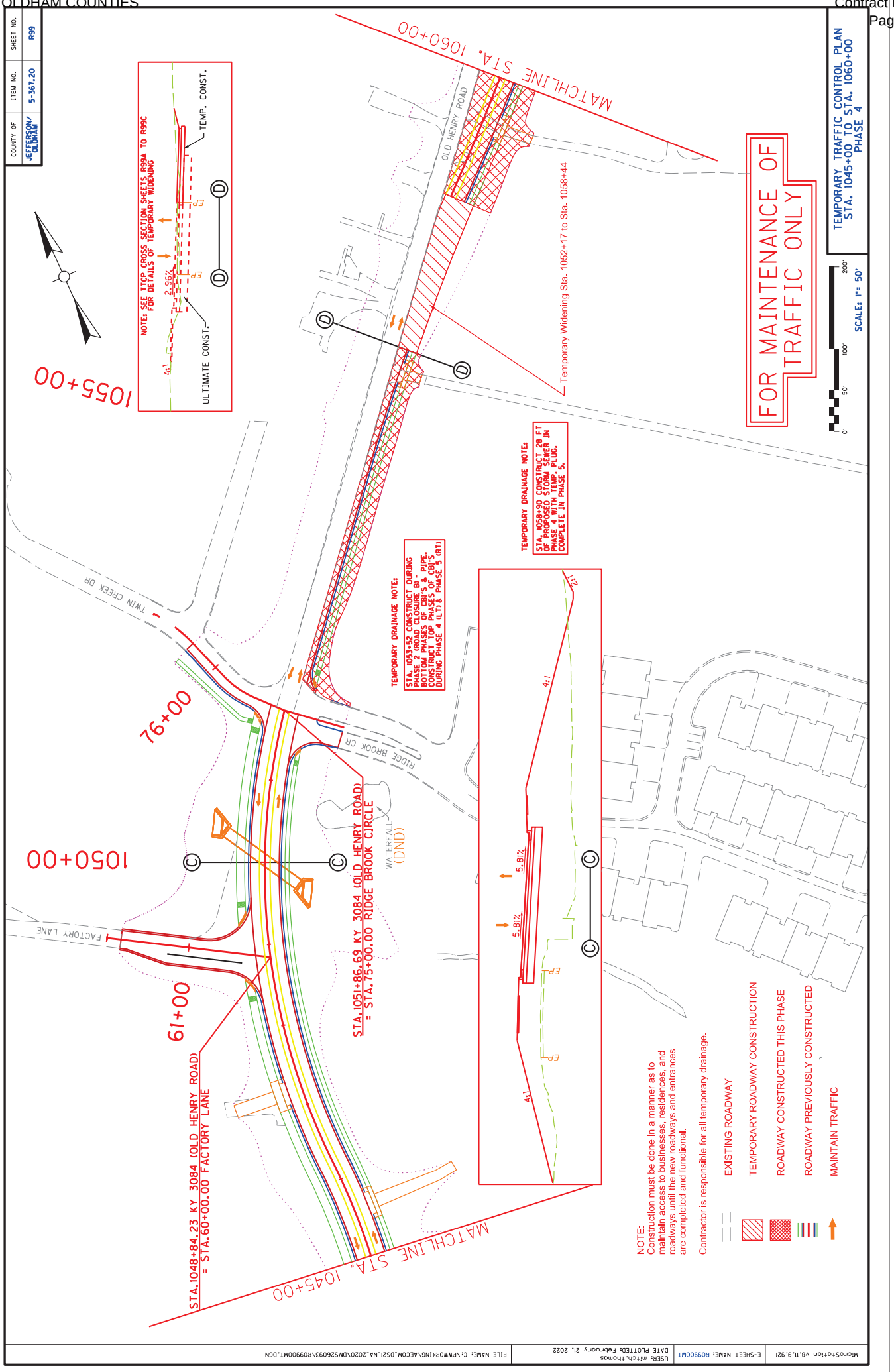
MicroStation v8.11.9.919
E-SHEET NAME: R098DEMT
USER: chadwick.collins
DATE PLOTTED: February 21, 2022
FILE NAME: C:\PWWORKING\AECOM_DS2_NA_2020\DMS26093\R098DEMT.DGN

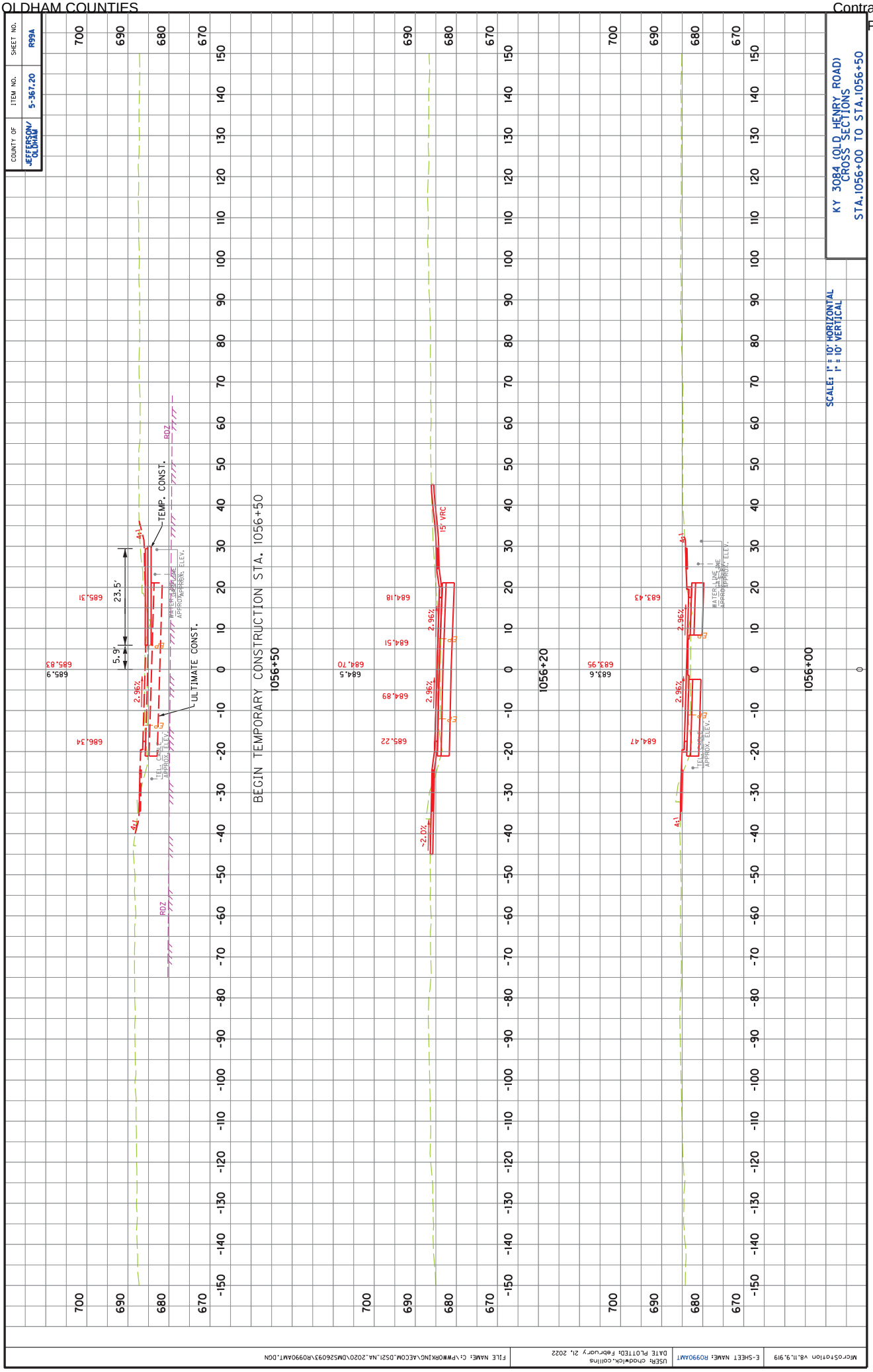

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R98F
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1041+00 TO STA.1041+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
FOR MAINTENANCE OF TRAFFIC ONLY
LT STA.1041+50 - 16' WIDE RESIDENTIAL ENTRANCE
(71 SY CEM. CONC. ENT. PAVEMENT - 8 IN. OR SY ASPH)
STA.1041+26 - END RUNOUT
& BEGIN RUNOUT FOR LT SECTION RT
ULTIMATE CONST.
TEMP. CONST.
SAN. SEWER APPROX. ELEV.
GAS LINE APPROX. ELEV.
WATER LINE APPROX. ELEV.
679.73
679.45
679.10
678.71
678.75
678.40
1.58%
2.00%
0.22%
4:1
10' VC
16.0%
10.3'
20.0'
10.2'
1041+50
1041+00
FILE NAME: G:\PWWORKING\AECOM.DS21.NA.2020\DMS26093\R0980FMT.DGN
USER: Chaddwick.Collins
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R0980FMT
MicroStation V8.11.9.919

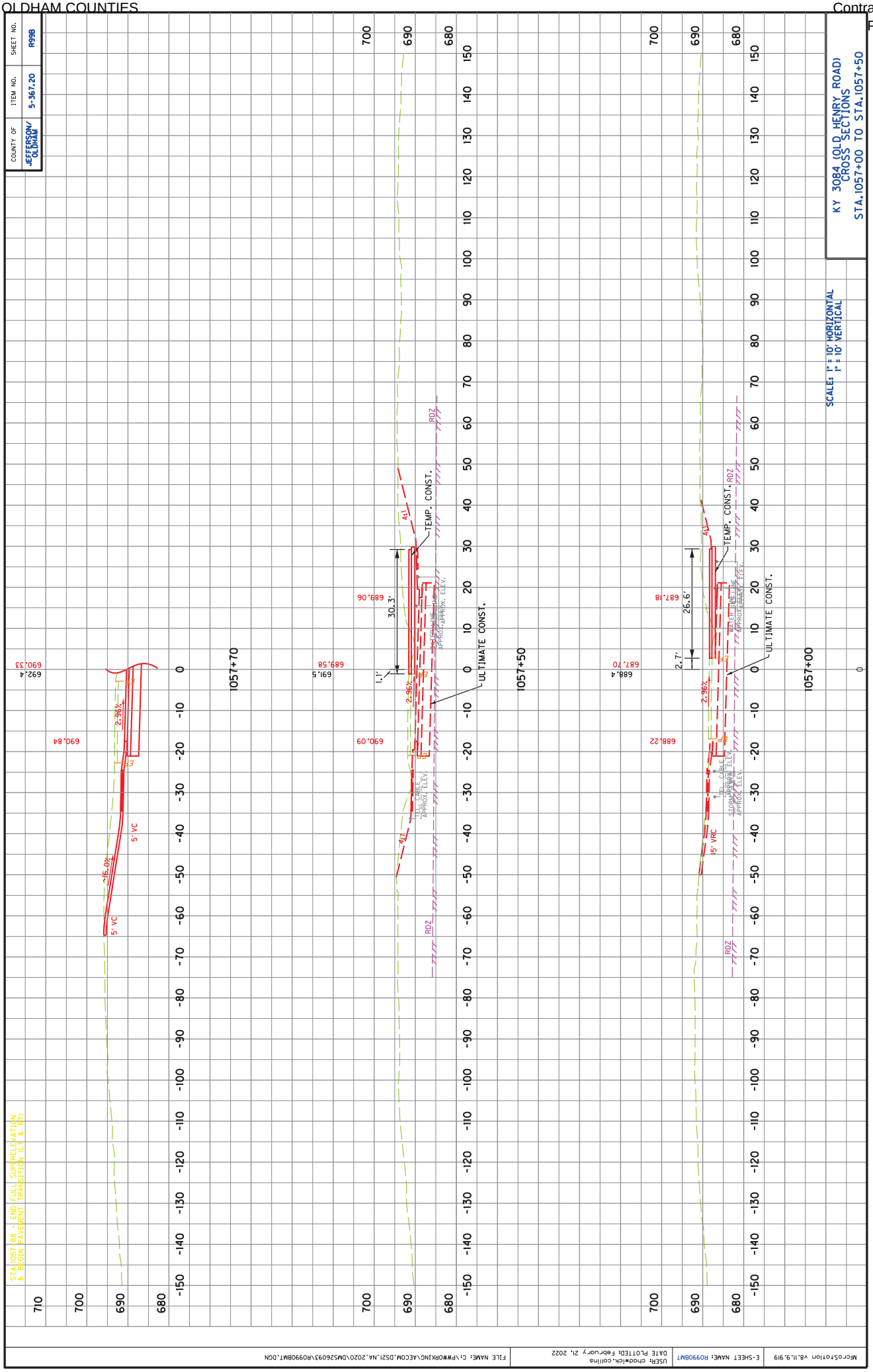

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R98G
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1042+00 TO STA.1042+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1042+50
1042+00
TEMP. CONST.
ULTIMATE CONST.
MATCH APPROACH
680.54
679.1
679.63
678.72
679.6
679.85
679.26
680.44
5.19%
3.38%
4:1
9.6'
10.3'
20.0'
WATER LINE APPROX. ELEV.
SAN. SEWER APPROX. ELEV.
GAS LINE APPROX. ELEV.
STA.1042+67 ~ END RUNOFF (LT & RT)
& BEGIN FULL SUPERELEVATION (e=5.8%)
FOR MAINTENANCE OF TRAFFIC ONLY
FILE NAME: G:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R98GCMT.DGN
USER: CraddaTch.Collins
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R98GCMT
MicroStation V8.11.9.919

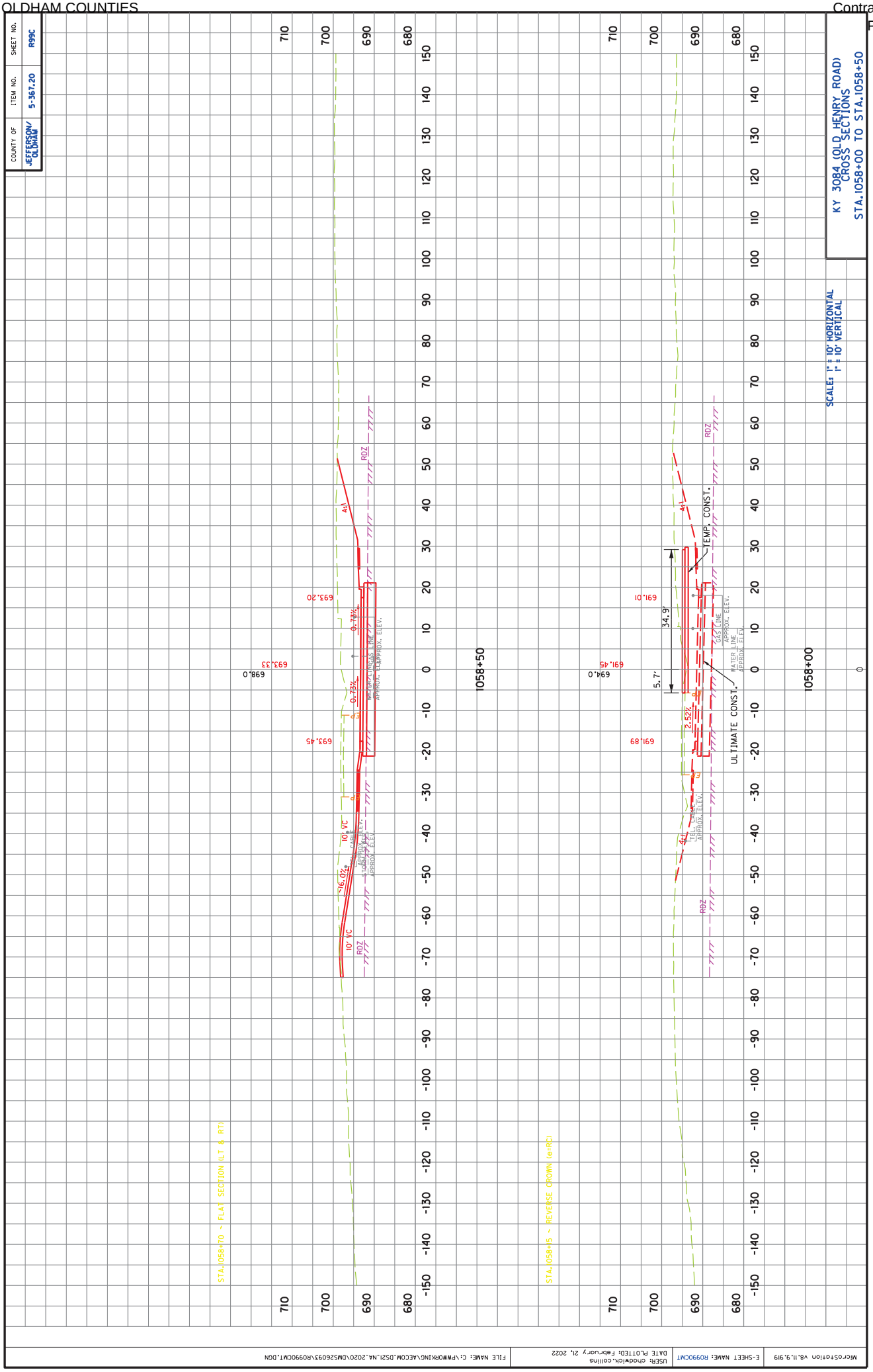

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R98H
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1043+00 TO STA.1043+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
1043+50
1043+00
ULTIMATE CONST.
TEMP. CONST.
20.0'
0.7'
5.9'
5.81%
4:1
679.60
678.58
677.56
678.5
679.10
680.12
678.08
GAS LINE APPROX. ELEV.
SAN. SEWER APPROX. ELEV.
WATER LINE APPROX. ELEV.
LT STA. 1043+00 - 16' WIDE RESIDENTIAL ENTRANCE
SY CEM. CONC. ENT. PAVEMENT - 8" IN. (17 SY ASPH)
FOR MAINTENANCE OF TRAFFIC ONLY
MicroStation V8.11.9.919
E-SHEET NAME: R098OHMT
USER: CraigTick.collins
DATE PLOTTED: February 21, 2022
FILE NAME: C:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R098OHMT.DGN

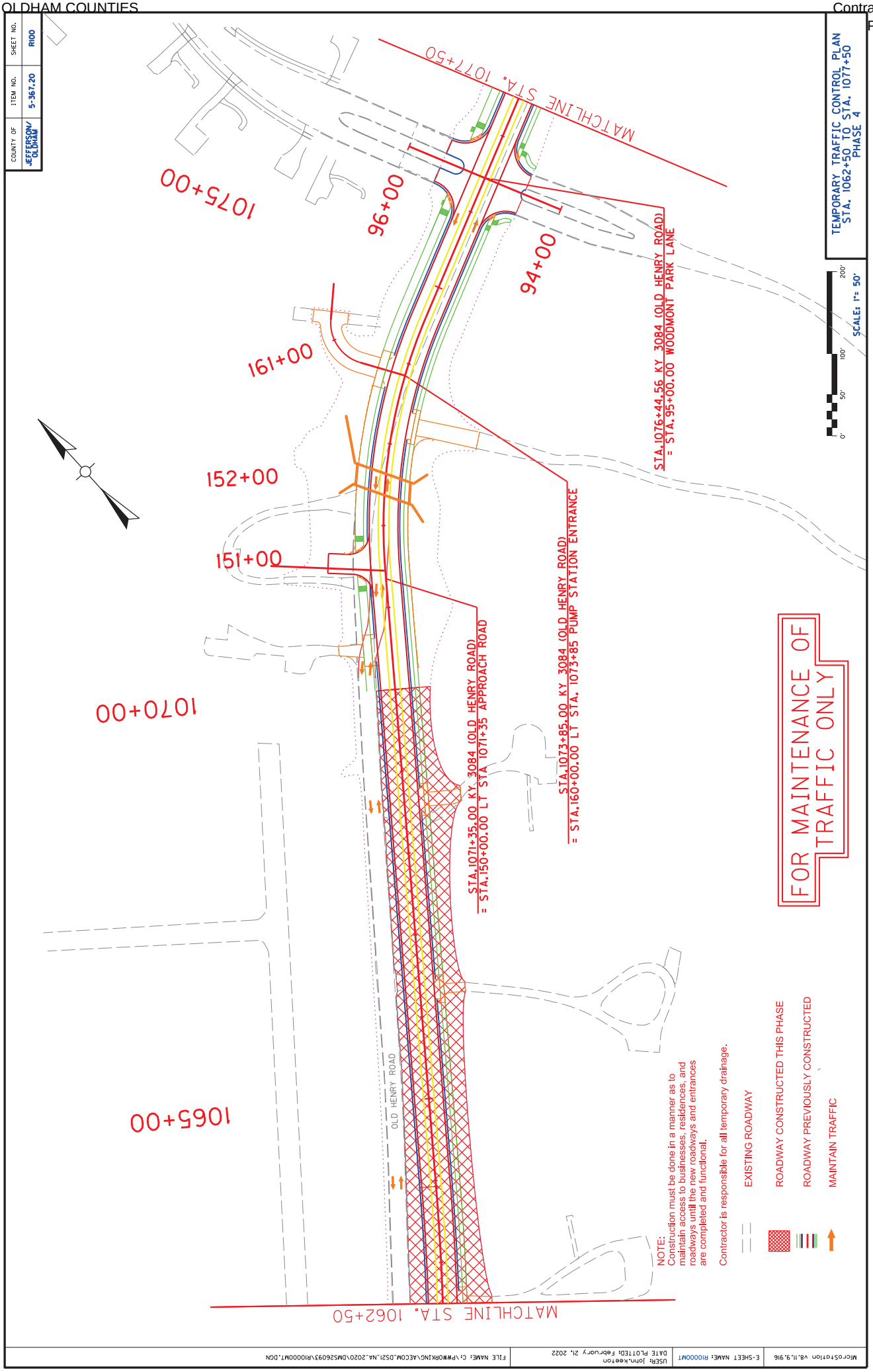

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R98I
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1044+00 TO STA.1044+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
STA.1044+50 - END FULL SUPERELEVATION
& BEGIN PAVEMENT TRANSITION (L & R)
1044+50
1044+00
TEMP. CONST.
ULTIMATE CONST.
20.0'
3.7'
0.4'
678.35
676.31
678.2
677.33
679.07
677.03
678.8
677.8
678.05
6%R
4%R
EP
GAS LINE
APPROX. ELEV.
SAN. SEWER
APPROX. ELEV.
WATER LINE
APPROX. ELEV.
FOR MAINTENANCE OF
TRAFFIC ONLY
MicroStation V8.11.9.919
E-SHEET NAME: R0980IMT
USER: Chaddwick.collins
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R0980IMT.DGN

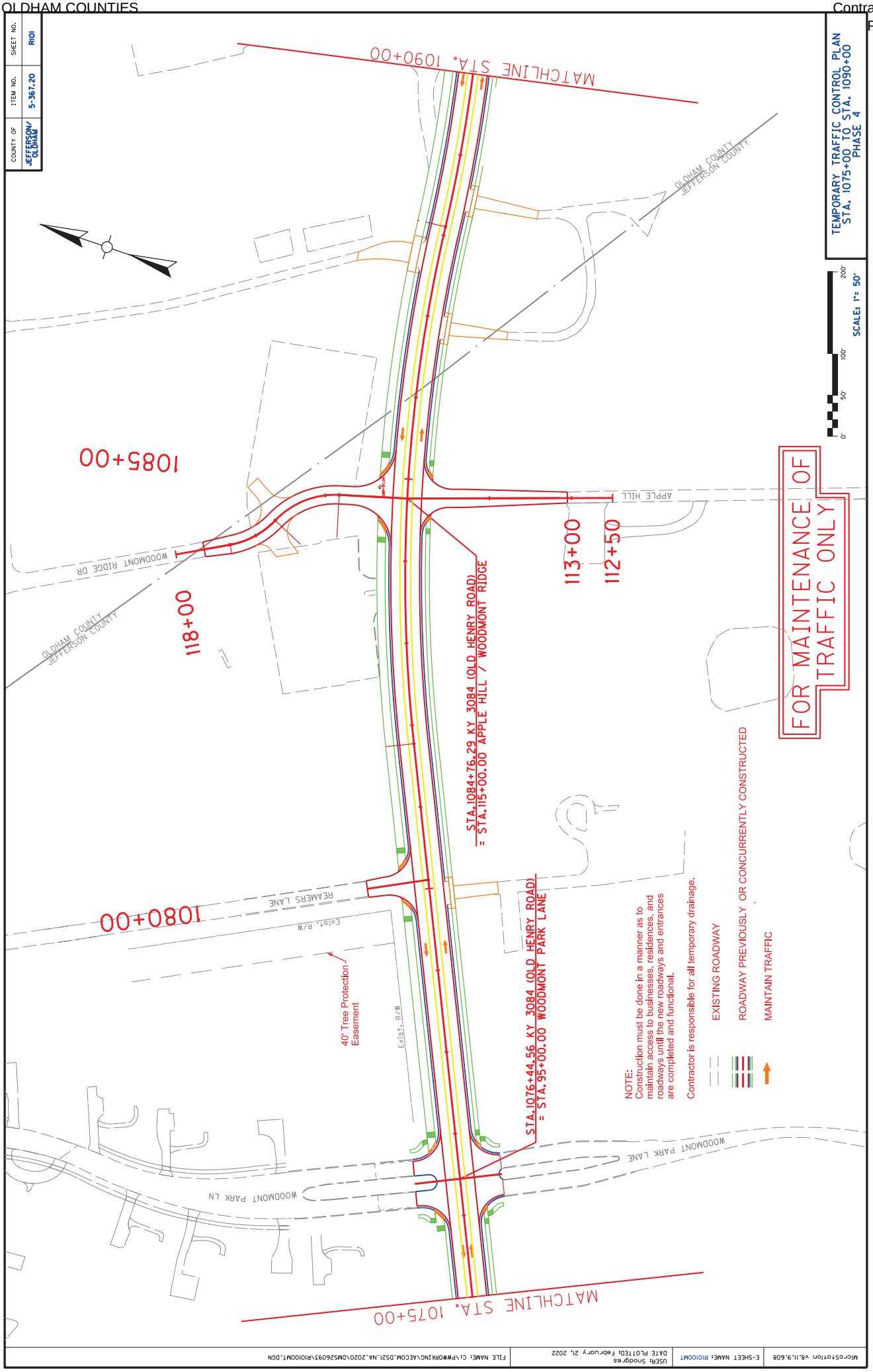

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R99
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1045+00 TO STA. 1060+00
PHASE 4
FOR MAINTENANCE OF TRAFFIC ONLY
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1060+00
MATCHLINE STA. 1045+00
OLD HENRY ROAD
TWIN CREEK DR
RIDGE BROOK CR
FACTORY LANE
Temporary Widening Sta. 1052+17 to Sta. 1058+44
1055+00
1050+00
76+00
61+00
NOTE: SEE TICP CROSS SECTION SHEETS R99A TO R99C FOR DETAILS OF TEMPORARY WIDENING
TEMP. CONST.
ULTIMATE CONST.
EP
2.96%
4:1
TEMPORARY DRAINAGE NOTE:
STA. 1053+52 CONSTRUCT DURING PHASE 2 ROAD CLOSURE 84' PIPE. POSITION PRIOR TO PHASE 3 & CONSTRUCT TOP PHASES OF CBU'S DURING PHASE 4 (LT1 & PHASE 5 (RT)
TEMPORARY DRAINAGE NOTE:
STA. 1058+90 CONSTRUCT 20 FT OF 4 PROPOSED STORM SEWER IN PHASE 4 WITH FLARE END SECTION. COMPLETE IN PHASE 5.
STA.1051+86.69 KY 3084 (OLD HENRY ROAD) = STA.75+00.00 RIDGE BROOK CIRCLE
STA.1048+84.23 KY 3084 (OLD HENRY ROAD) = STA.60+00.00 FACTORY LANE
WATERFALL (DND)
5.81%
12'
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
MicroStation V8.11.9.921
E-SHEET NAME: R99900MT
USER: mtech.thomas
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21-NA-2020\DMS26093\R99900MT.DGN

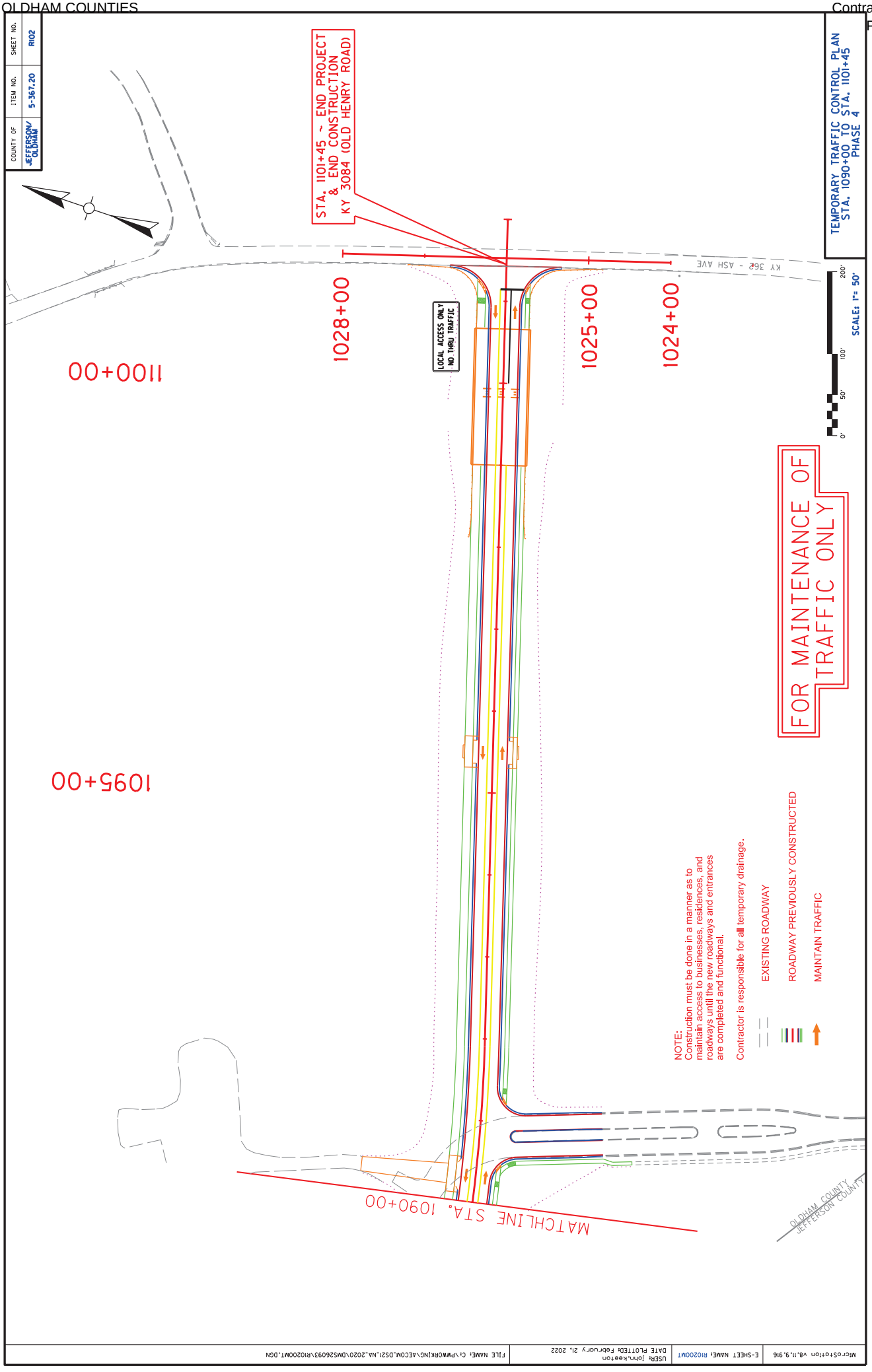

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R99A
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1056+00 TO STA.1056+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
BEGIN TEMPORARY CONSTRUCTION STA. 1056+50
1056+50
1056+20
1056+00
TEMP. CONST.
ULTIMATE CONST.
23.5'
5.9'
2.96%
4:1
15' VAC
-2.00%
BDZ
EP
685.31
685.9
685.83
686.34
684.5
684.70
684.18
684.51
684.89
685.22
683.6
683.95
683.43
684.47
WATER LINE
APPROX. ELEV.
TELEPHONE
APPROX. ELEV.
0
Microstation v8.11.9.919
E-SHEET NAME: R0990AMT
USER: Chadwick.collins
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R0990AMT.DGN


COUNTY OF
JEFFERSON/
OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R998
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1057+00 TO STA.1057+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
STA.1057+88 ~ END FULL SUPERELEVATION
& BEGIN PAVEMENT TRANSITION (LT & RT)
1057+70
1057+50
1057+00
TEMP. CONST.
ULTIMATE CONST.
RDZ
30.3'
26.6'
2.7'
1.1'
4:1
2.96%
5' VC
5' VRC
692.4
690.33
690.84
691.5
689.58
690.09
688.4
687.70
688.22
687.18
TELE CABLE
APPROX. ELEV.
WATER LINE
APPROX. ELEV.
SIGNAL CABLE
APPROX. ELEV.
FILE NAME: c:\pwworking\aecom_ds21_na_2020\dms2609315\r998obmt.dgn
USER: Chaddwick.Collins
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R998OBMT
MicroStation V8.11.9.919

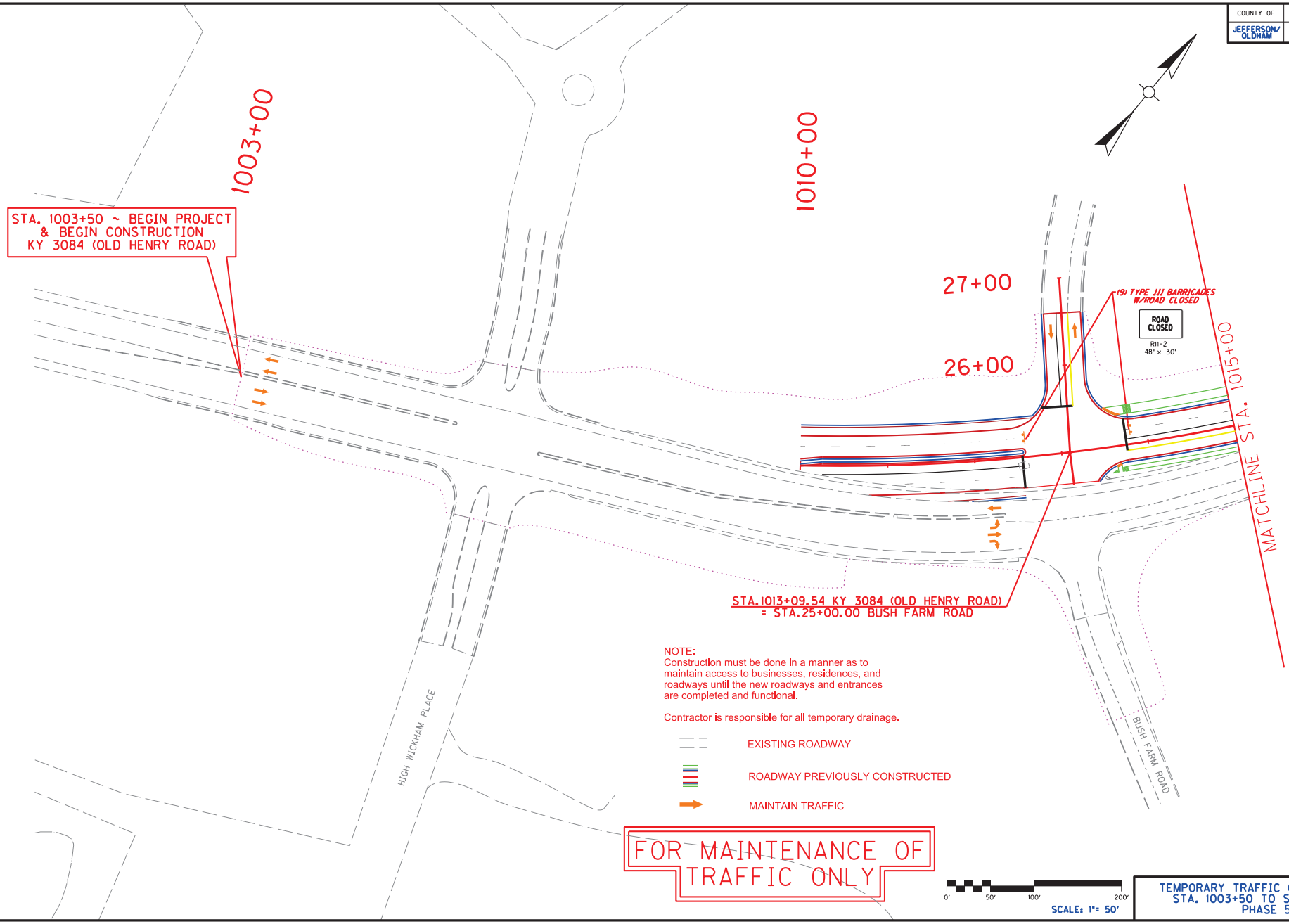

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R99C
KY 3084 (OLD HENRY ROAD)
CROSS SECTIONS
STA.1058+00 TO STA.1058+50
SCALE: 1" = 10' HORIZONTAL
1" = 10' VERTICAL
STA.1058+50
STA.1058+00
STA.1058+70 ~ FLAT SECTION (LT & RT)
STA.1058+15 ~ REVERSE CROWN (e=RE)
TEMP. CONST.
ULTIMATE CONST.
34.9'
5.7'
693.20
693.33
693.45
691.01
691.45
691.89
698.0
694.0
0.78%
2.52%
4:1
RDZ
10' VC
WATER LINE
APPROX. ELEV.
GAS LINE
APPROX. ELEV.
FILE NAME: G:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R990CMT.DGN
USER: Chaddwick.Collins
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R990CMT
MicroStation V8.11.9.919


COUNTY OF
JEFFERSON/
OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R100
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1062+50 TO STA. 1077+50
PHASE 4
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1077+50
MATCHLINE STA. 1062+50
1075+00
00+96
94+00
161+00
152+00
151+00
1070+00
1065+00
STA.1076+44.56 KY 3084 (OLD HENRY ROAD)
= STA.95+00.00 WOODMONT PARK LANE
STA.1073+85.00 KY 3084 (OLD HENRY ROAD)
= STA.160+00.00 LT STA. 1073+85 PUMP STATION ENTRANCE
STA.1071+35.00 KY 3084 (OLD HENRY ROAD)
= STA.150+00.00 LT STA 1071+35 APPROACH ROAD
OLD HENRY ROAD
FOR MAINTENANCE OF
TRAFFIC ONLY
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
MicroStation V8.11.9.916
E-SHEET NAME: R100OMT
USER: Jonn.keeton
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS2609321\R100OMT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R101
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1075+00 TO STA. 1090+00
PHASE 4
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1090+00
MATCHLINE STA. 1075+00
1085+00
1080+00
118+00
113+00
112+50
APPLE HILL
WOODMONT RIDGE DR
REAMERS LANE
WOODMONT PARK LN
WOODMONT PARK LANE
OLDHAM COUNTY
JEFFERSON COUNTY
Exist. R/W
40' Tree Protection Easement
STA.1084+76.29 KY 3084 (OLD HENRY ROAD)
= STA.115+00.00 APPLE HILL / WOODMONT RIDGE
STA.1076+44.56 KY 3084 (OLD HENRY ROAD)
= STA.95+00.00 WOODMONT PARK LANE
FOR MAINTENANCE OF TRAFFIC ONLY
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY PREVIOUSLY OR CONCURRENTLY CONSTRUCTED
MAINTAIN TRAFFIC
FILE NAME: C:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R101OOMT.DGN
USER: Snodgras
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R101OOMT
Microstation V8.11.9.608


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R102
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1090+00 TO STA. 1101+45
PHASE 4
STA. 1101+45 ~ END PROJECT
& END CONSTRUCTION
KY 3084 (OLD HENRY ROAD)
KY 362 - ASH AVE
1100+00
1028+00
LOCAL ACCESS ONLY
NO THRU TRAFFIC
1025+00
1024+00
1095+00
SCALE: 1"= 50'
0'
50'
100'
200'
FOR MAINTENANCE OF
TRAFFIC ONLY
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
MATCHLINE STA. 1090+00
OLDHAM COUNTY
JEFFERSON COUNTY
MicroStation V8.11.9.916
E-SHEET NAME: R102OMT
USER: jonn.keeton
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM_DS21_NA_2020\DMS26093\R102OMT.DGN

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R103



NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.

Contractor is responsible for all temporary drainage.

EXISTING ROADWAY

ROADWAY PREVIOUSLY CONSTRUCTED

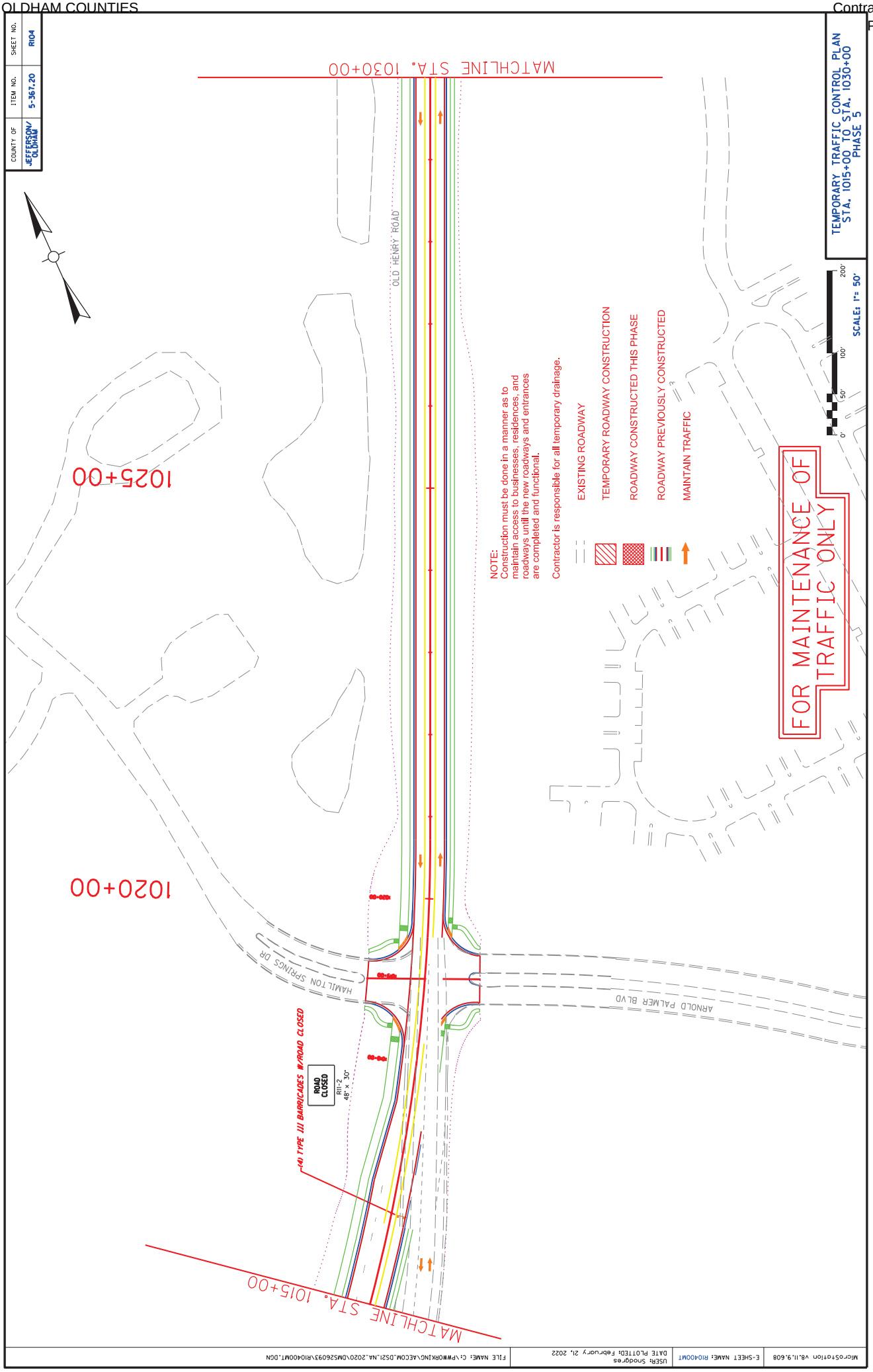
MAINTAIN TRAFFIC

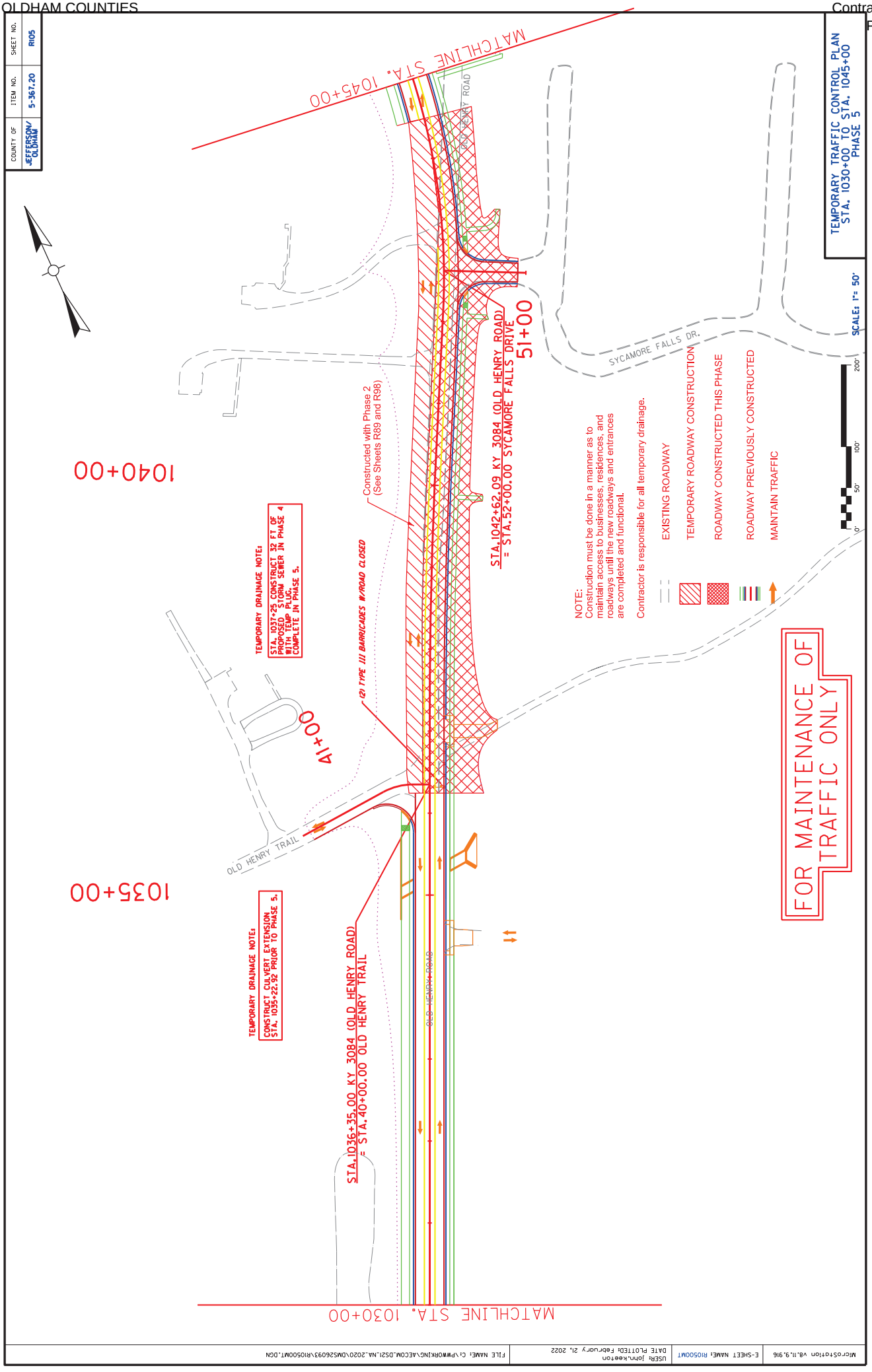
FOR MAINTENANCE OF TRAFFIC ONLY

0' 50' 100' 200'
SCALE: 1"= 50'

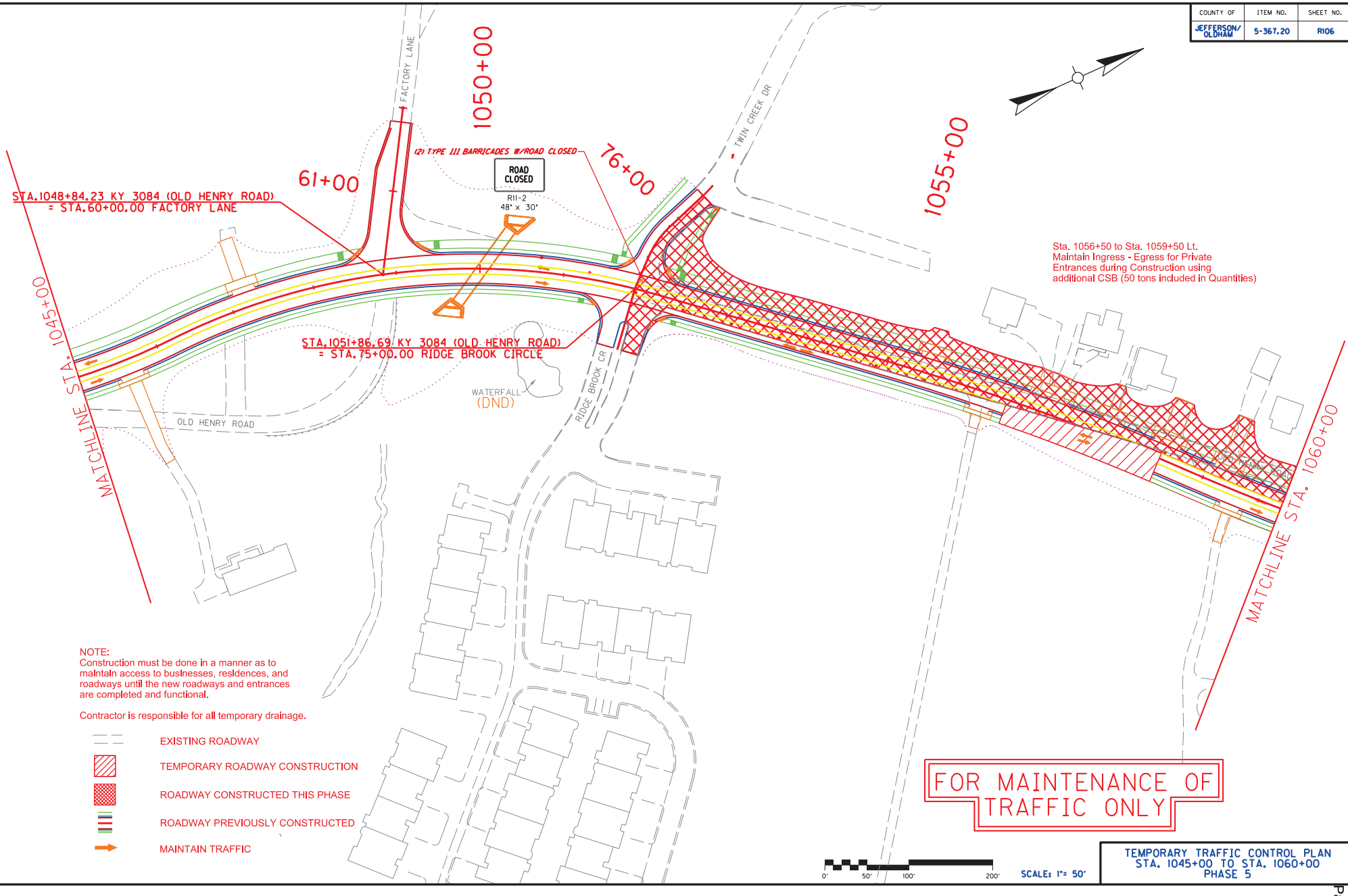
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1003+50 TO STA. 1015+00
PHASE 5

FILE NAME: C:\PWWORKING\AECOM_DS2\NA_2020\DMS26093\R103OMT.DGN
USER: Snodgres
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R103OMT
MicroStation v8.11.9.608


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R104
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1015+00 TO STA. 1030+00
PHASE 5
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1030+00
MATCHLINE STA. 1015+00
1025+00
1020+00
OLD HENRY ROAD
HAMILTON SPRINGS DR
ARNOLD PALMER BLVD
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
ROAD CLOSED
R11-2
48" x 30"
(4) TYPE III BARRICADES W/ROAD CLOSED
FILE NAME: C:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R104OMT.DGN
USER: Snodgras
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R104OMT
Microstation V8.11.9.608

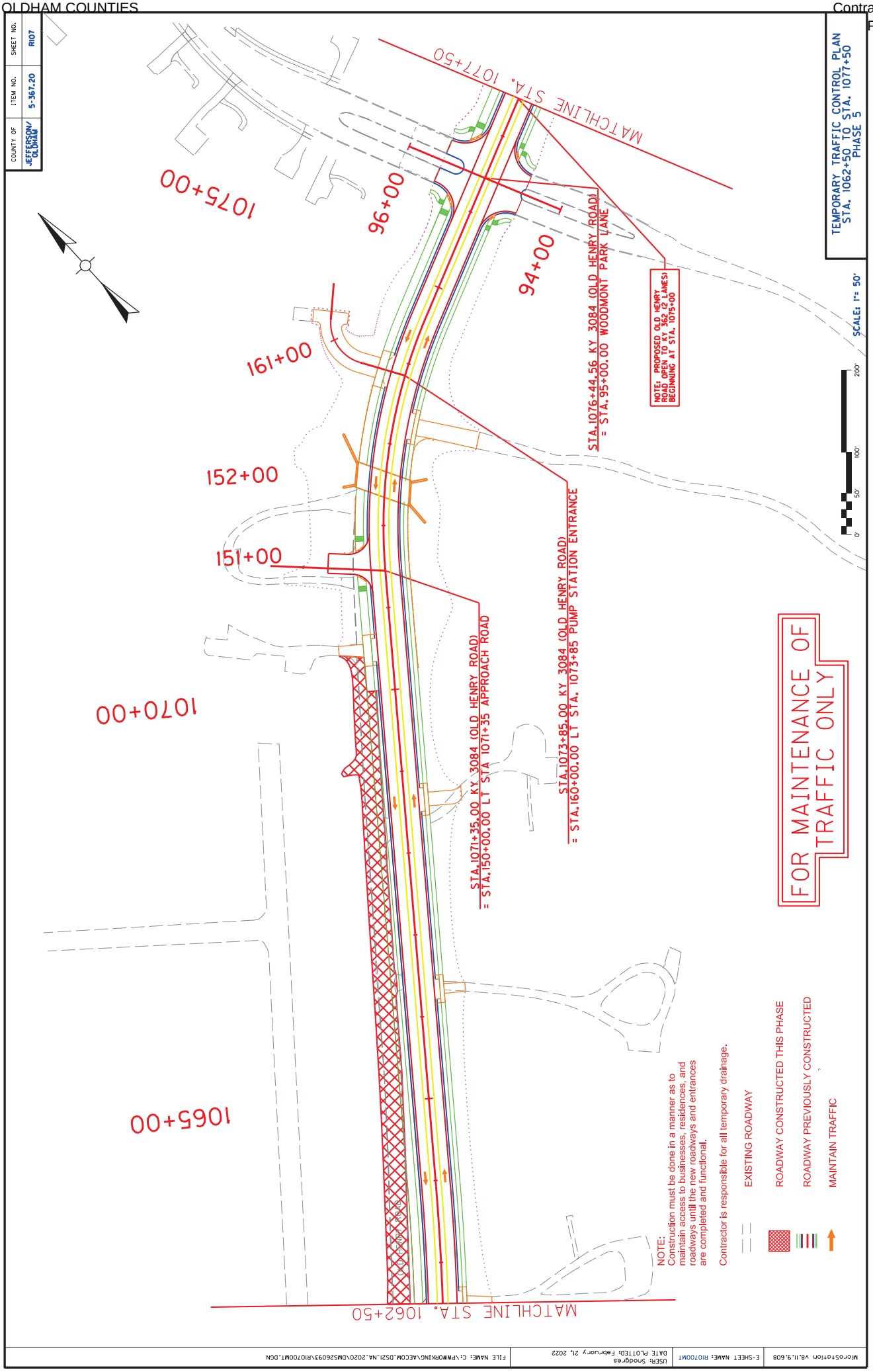

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R105
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1030+00 TO STA. 1045+00
PHASE 5
SCALE: 1"= 50'
MATCHLINE STA. 1045+00
MATCHLINE STA. 1030+00
OLD HENRY ROAD
SYCAMORE FALLS DR.
OLD HENRY TRAIL
1040+00
1035+00
41+00
51+00
Constructed with Phase 2
(See Sheets R89 and R98)
STA.1042+62.09 KY 3084 (OLD HENRY ROAD)
= STA.52+00.00 SYCAMORE FALLS DRIVE
STA.1036+35.00 KY 3084 (OLD HENRY ROAD)
= STA.40+00.00 OLD HENRY TRAIL
(2) TYPE III BARRICADES W/ROAD CLOSED
TEMPORARY DRAINAGE NOTE:
STA. 1037+25 CONSTRUCT 32 FT OF PROPOSED STORM SEWER IN PHASE 4 WITH TEMP PLUG. COMPLETE IN PHASE 5.
TEMPORARY DRAINAGE NOTE:
CONSTRUCT CULVERT EXTENSION STA. 1035+22.32 PRIOR TO PHASE 5.
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
TEMPORARY ROADWAY CONSTRUCTION
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
MicroStation V8.11.9.916
E-SHEET NAME: R105OOMT
USER: Jonn.keeton
DATE PLOTTED: February 21, 2022
FILE NAME: G:\PWWORKING\AECOM.DS21-NA-2020\DMS26093\R105OOMT.DGN

COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R106

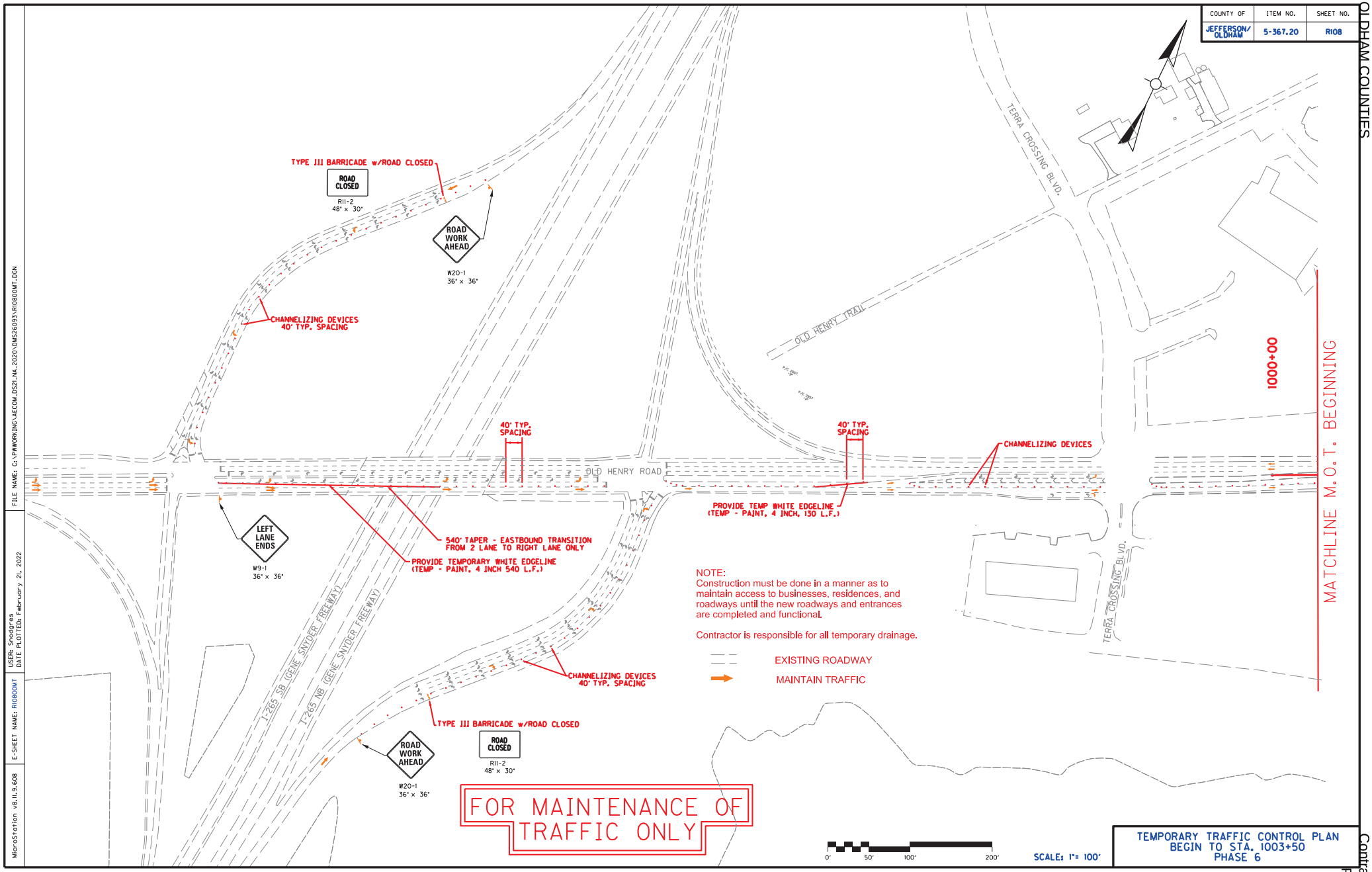


TEMPORARY TRAFFIC CONTROL PLAN
STA. 1045+00 TO STA. 1060+00
PHASE 5

MicroStation v8.11.9.608 | E-SHEET NAME: R1060MT | USER: Snodgres | DATE PLOTTED: February 21, 2022 | FILE NAME: C:\PWWORKING\AECOM_DS2\NA_2020\DMS26093\R1060MT.DGN

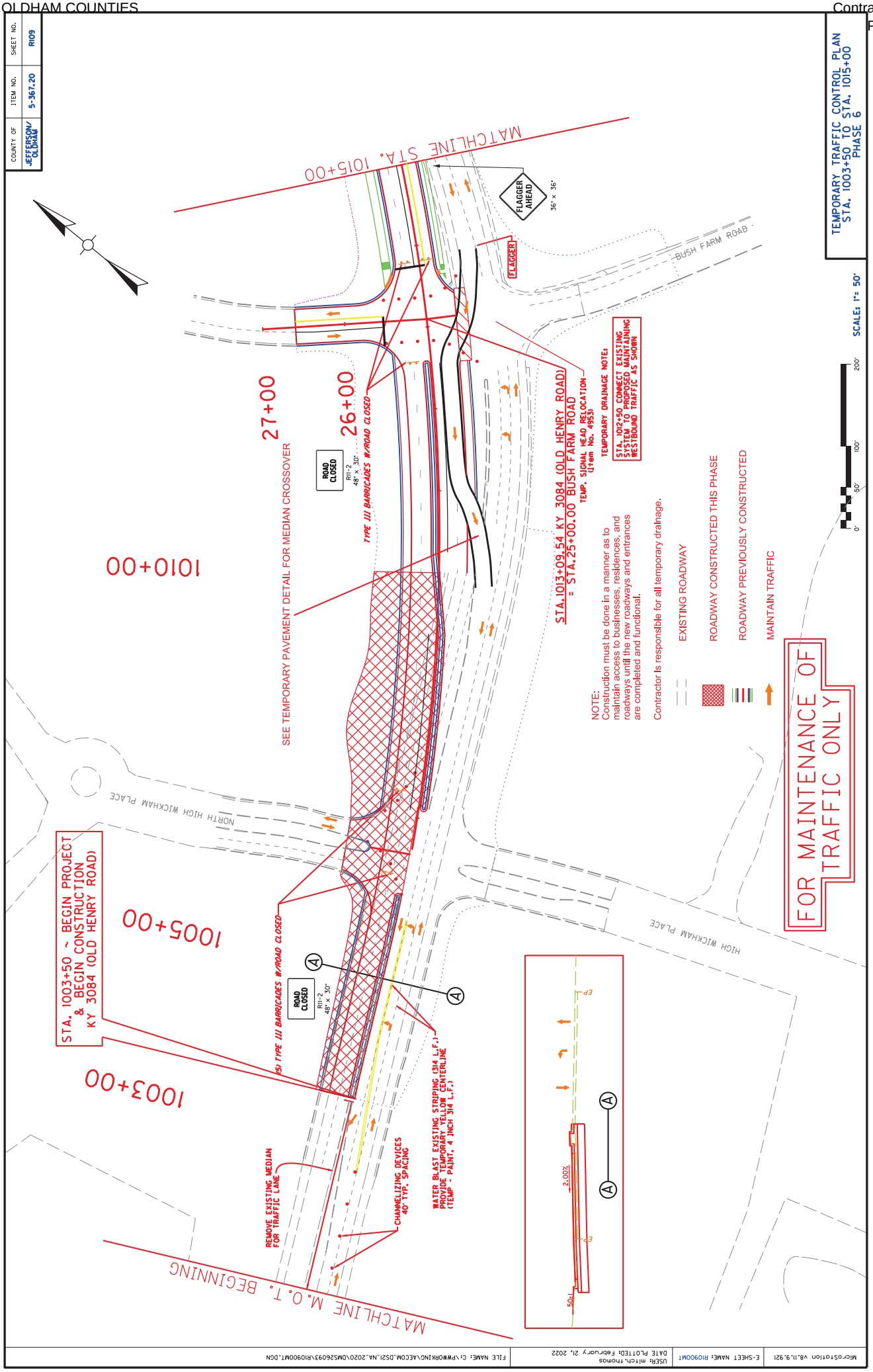

COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R107
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1062+50 TO STA. 1077+50
PHASE 5
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1077+50
1075+00
96+00
94+00
161+00
152+00
151+00
1070+00
1065+00
MATCHLINE STA. 1062+50
STA.1076+44.56 KY 3084 (OLD HENRY ROAD)
= STA.95+00.00 WOODMONT PARK LANE
NOTE: PROPOSED OLD HENRY ROAD OPEN TO KY 362 (CHAMES) BEGINNING AT STA. 1075+00
STA.1071+35.00 KY 3084 (OLD HENRY ROAD)
= STA.150+00.00 LT STA 1071+35 APPROACH ROAD
STA.1073+85.00 KY 3084 (OLD HENRY ROAD)
= STA.160+00.00 LT STA. 1073+85 PUMP STATION ENTRANCE
FOR MAINTENANCE OF TRAFFIC ONLY
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
Microstation v8.11.9.608
E-SHEET NAME: R107OMT
USER: Snodgras
DATE PLOTTED: February 21, 2022
FILE NAME: G:\PWWORKING\AECOM.DS21_NA_2020\DMS2609\R107OMT.DGN

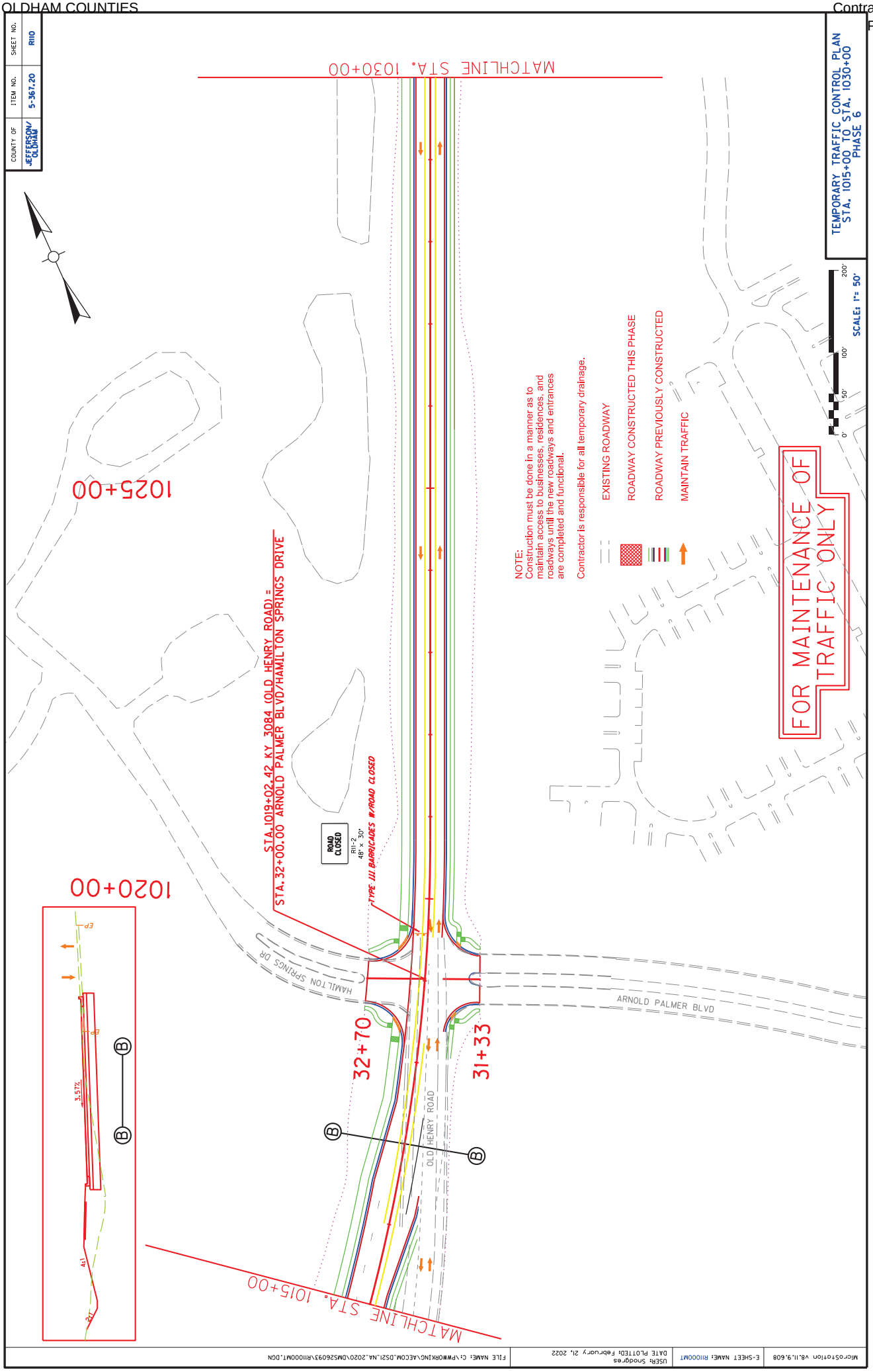
COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R108

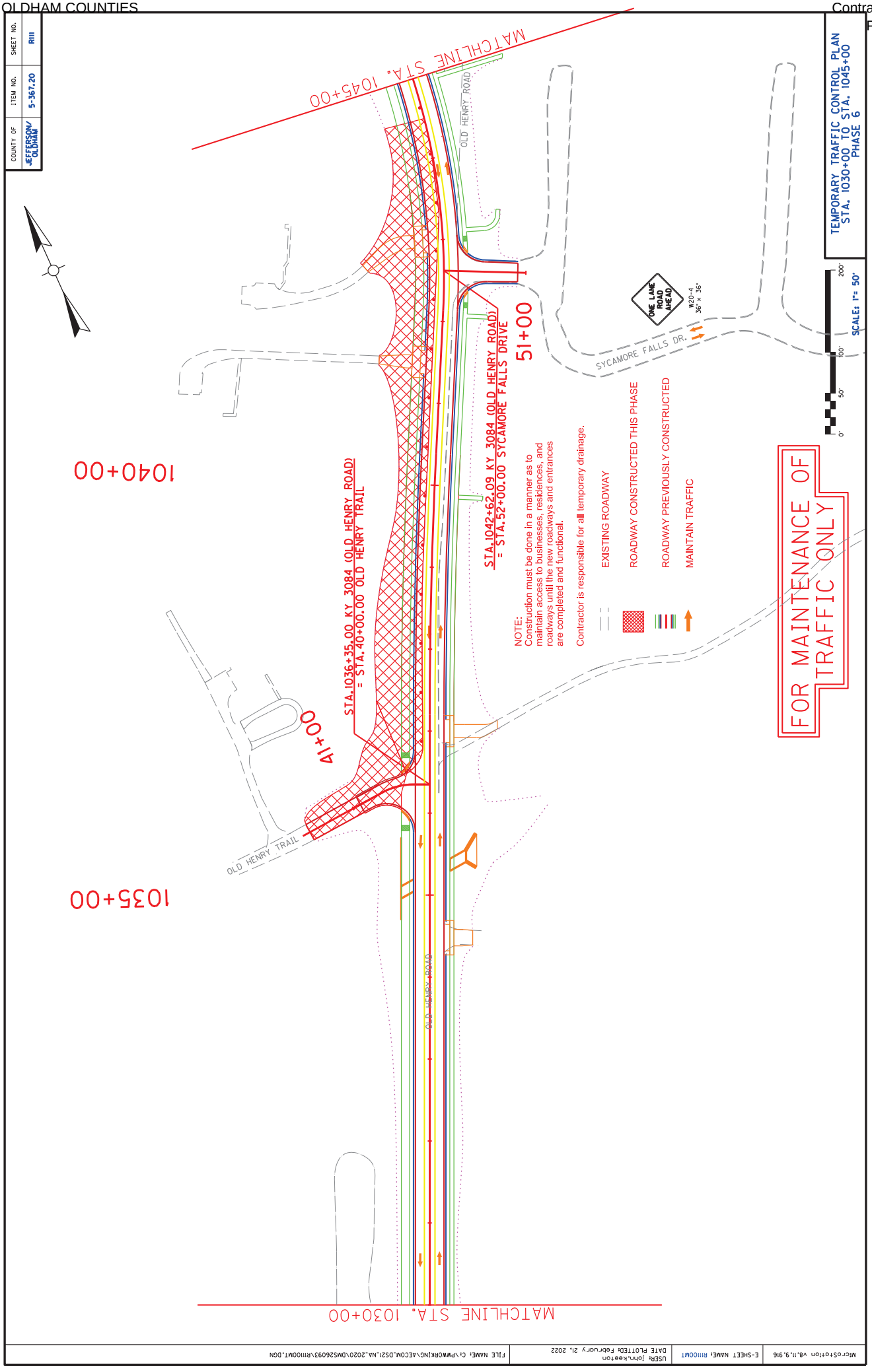


TEMPORARY TRAFFIC CONTROL PLAN
BEGIN TO STA. 1003+50
PHASE 6

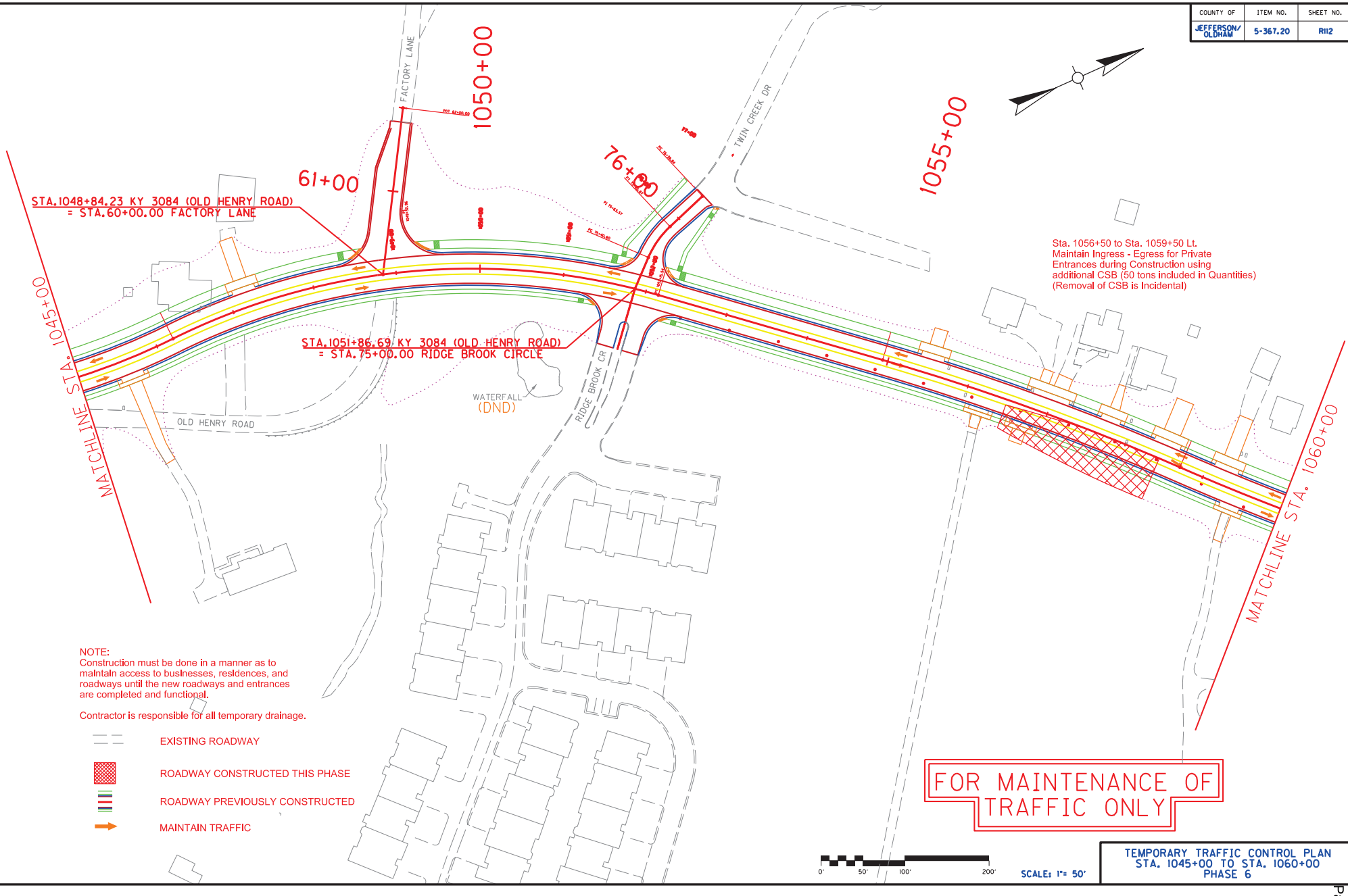
FILE NAME: C:\PWWORKING\AECOM_DS2\.NA_2020\DMS26093\R108OMT.DGN
USER: Snodgres
DATE PLOTTED: February 21, 2022
E-SHEET NAME: R108OMT
MicroStation v8.11.9.608


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R109
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1003+50 TO STA. 1015+00
PHASE 6
SCALE: 1" = 50'
0'
50'
100'
200'
MATCHLINE STA. 1015+00
FLAGGER AHEAD
36" x 36"
FLAGGER
BUSH FARM ROAD
27+00
26+00
1010+00
1005+00
1003+50
ROAD CLOSED
R11-2
48" x 30"
TYPE III BARRICADES W/ROAD CLOSED
SEE TEMPORARY PAVEMENT DETAIL FOR MEDIAN CROSSOVER
STA. 1013+09.54 KY 3084 (OLD HENRY ROAD)
= STA.25+00.00 BUSH FARM ROAD
TEMP. SIGNAL HEAD RELOCATION
(14em No. 4953)
TEMPORARY DRAINAGE NOTE:
STA. 1012+50 CONNECT EXISTING SYSTEM TO PROPOSED MAINTAINING WESTBOUND TRAFFIC AS SHOWN
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
NORTH HIGH WICKHAM PLACE
HIGH WICKHAM PLACE
STA. 1003+50 ~ BEGIN PROJECT
& BEGIN CONSTRUCTION
KY 3084 (OLD HENRY ROAD)
MATCHLINE M.O.T. BEGINNING
REMOVE EXISTING MEDIAN FOR TRAFFIC LANE
CHANNELIZING DEVICES 40' TYP. SPACING
WATER BLAST EXISTING STRIPING (314 L.F.)
PROVIDE TEMPORARY YELLOW CENTERLINE (TEMP - PAINT, 4 INCH 314 L.F.)
EP
EP
A
A
A
2.00'
50'
MicroStation V8.11.9.921
E-SHEET NAME: R109OMT
USER: mfoch.thomas
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21.NA.2020\DMS26093\R109OMT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
R110
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1015+00 TO STA. 1030+00
PHASE 6
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1030+00
1025+00
1020+00
MATCHLINE STA. 1015+00
STA.1019+02.42 KY 3084 (OLD HENRY ROAD) =
STA.32+00.00 ARNOLD PALMER BLVD/HAMILTON SPRINGS DRIVE
TYPE III BARRICADES W/ROAD CLOSED
ROAD CLOSED
R11-2
48" x 30"
HAMILTON SPRINGS DR
ARNOLD PALMER BLVD
OLD HENRY ROAD
32+70
31+33
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
EP
3.57%
4:1
3:1
B
B
B
B
Microstation V8.11.9.608
E-SHEET NAME: R1100MT
USER: Snodgras
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\R1100MT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
RIII
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1030+00 TO STA. 1045+00
PHASE 6
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1045+00
MATCHLINE STA. 1030+00
1040+00
1035+00
OLD HENRY ROAD
OLD HENRY TRAIL
SYCAMORE FALLS DR.
ONE LANE ROAD AHEAD
W20-4
36" x 36"
STA.1042+62.09 KY 3084 (OLD HENRY ROAD)
= STA.52+00.00 SYCAMORE FALLS DRIVE
51+00
STA.1036+35.00 KY 3084 (OLD HENRY ROAD)
= STA.40+00.00 OLD HENRY TRAIL
41+00
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
MicroStation V8.11.9.916
E-SHEET NAME: RIIIOOM1
USER: Jonn.keeton
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\RIIIOOM1.DGN

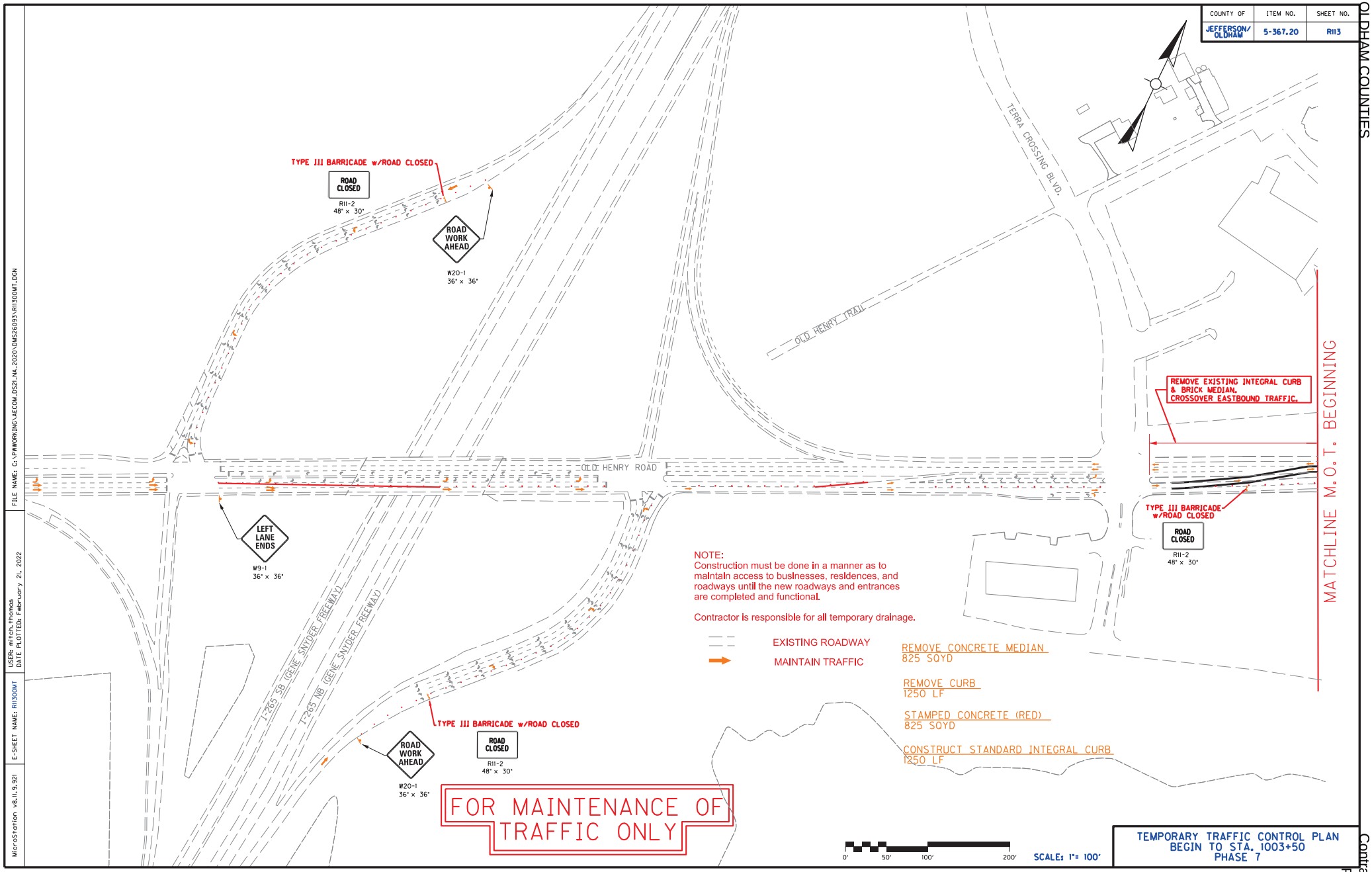
COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R112



TEMPORARY TRAFFIC CONTROL PLAN
STA. 1045+00 TO STA. 1060+00
PHASE 6

MicroStation v8.11.9.608
E-SHEET NAME: RI120MT
USER: Snodgres
DATE PLOTTED: February 21, 2022
FILE NAME: C:\PWWORKING\AECOM_DS2\NA_2020\DMS26093\RI120MT.DGN

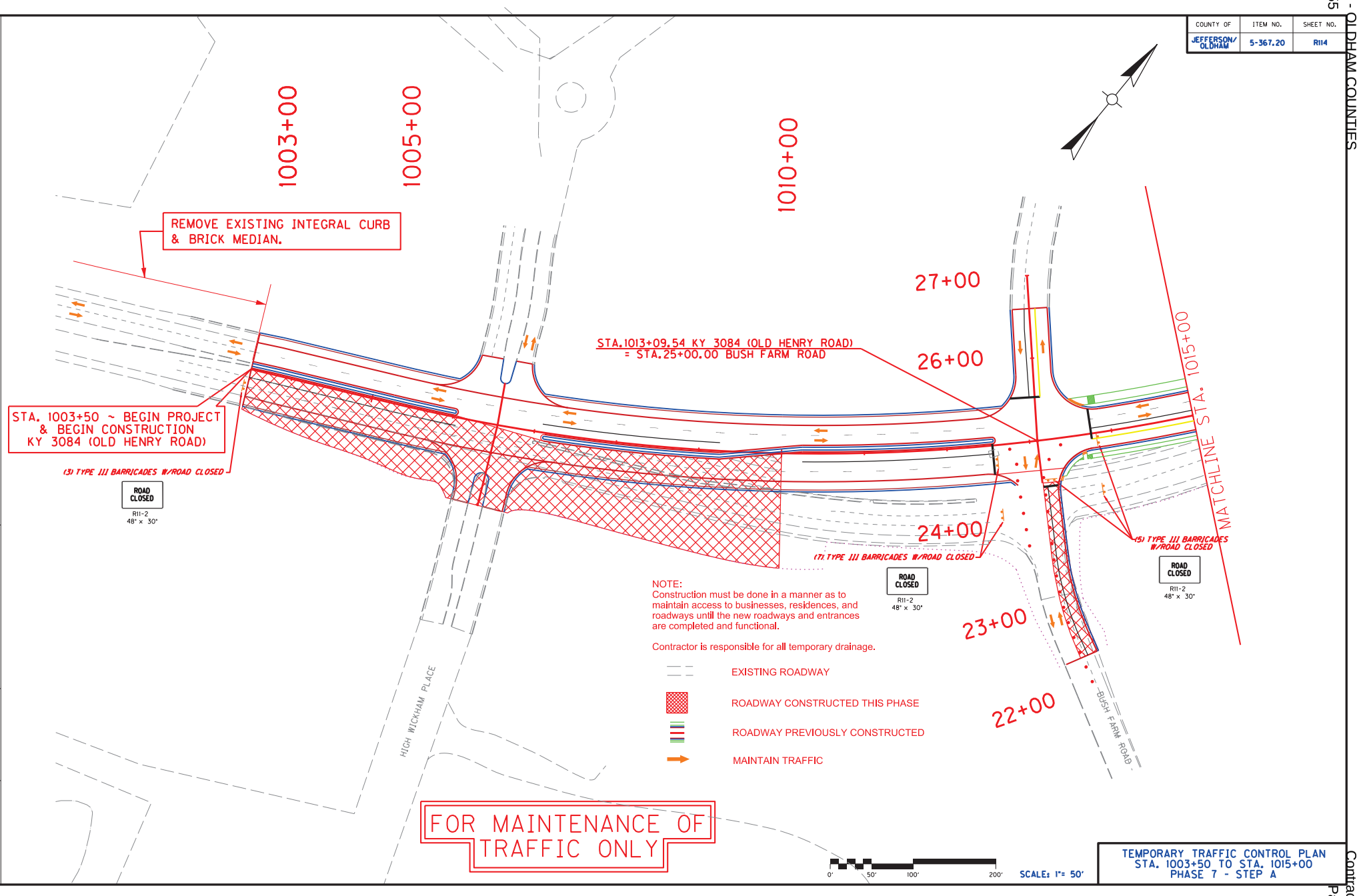
COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	RI13



TEMPORARY TRAFFIC CONTROL PLAN
BEGIN TO STA. 1003+50
PHASE 7

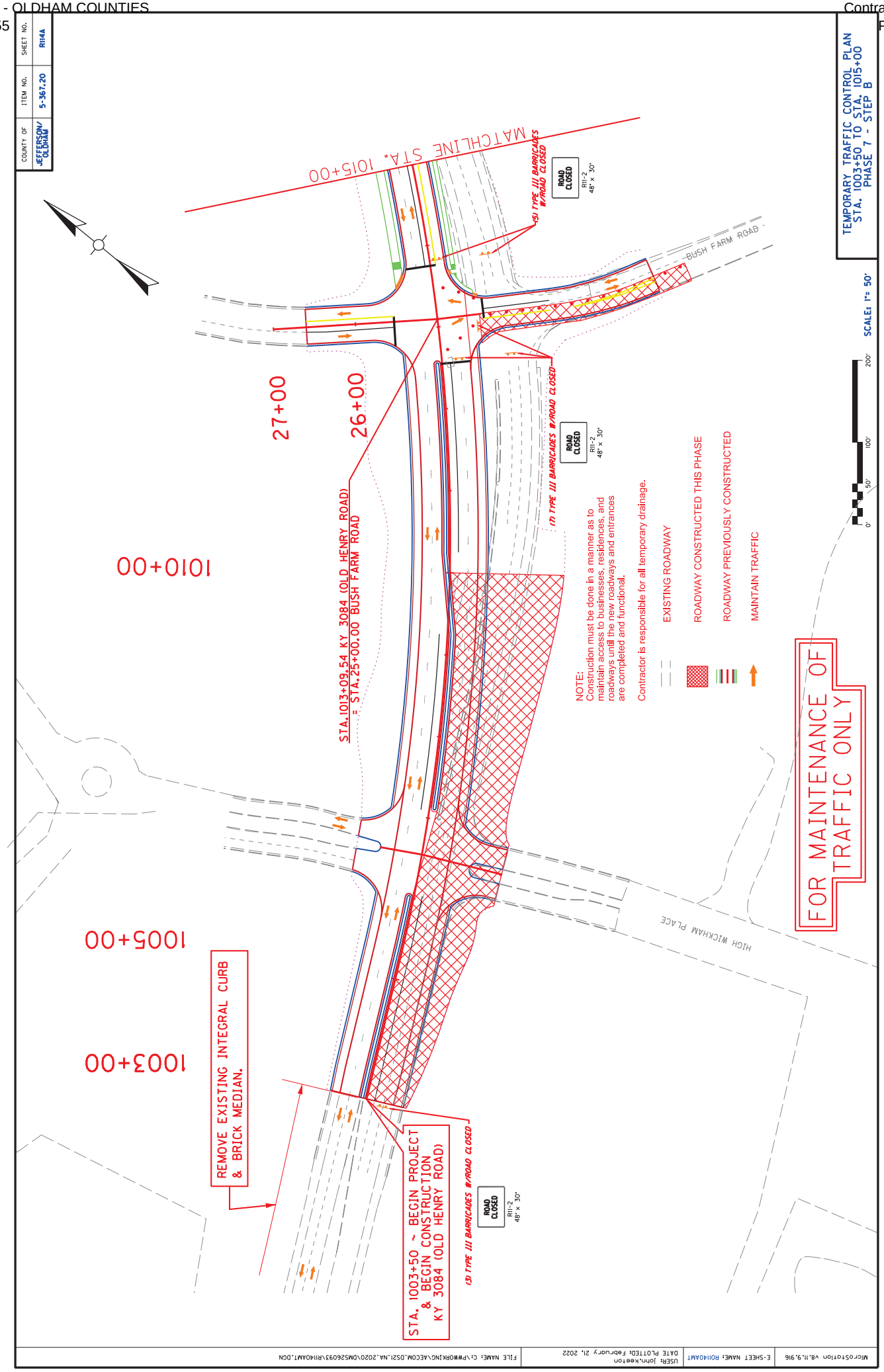
FILE NAME: C:\PWWORKING\AECOM_DS2\.NA.2020\DMS26093\RI130OMT.DGN
USER: mitch.thomas
DATE PLOTTED: February 21, 2022
E-SHEET NAME: RI130OMT
MicroStation v8.11.9.921

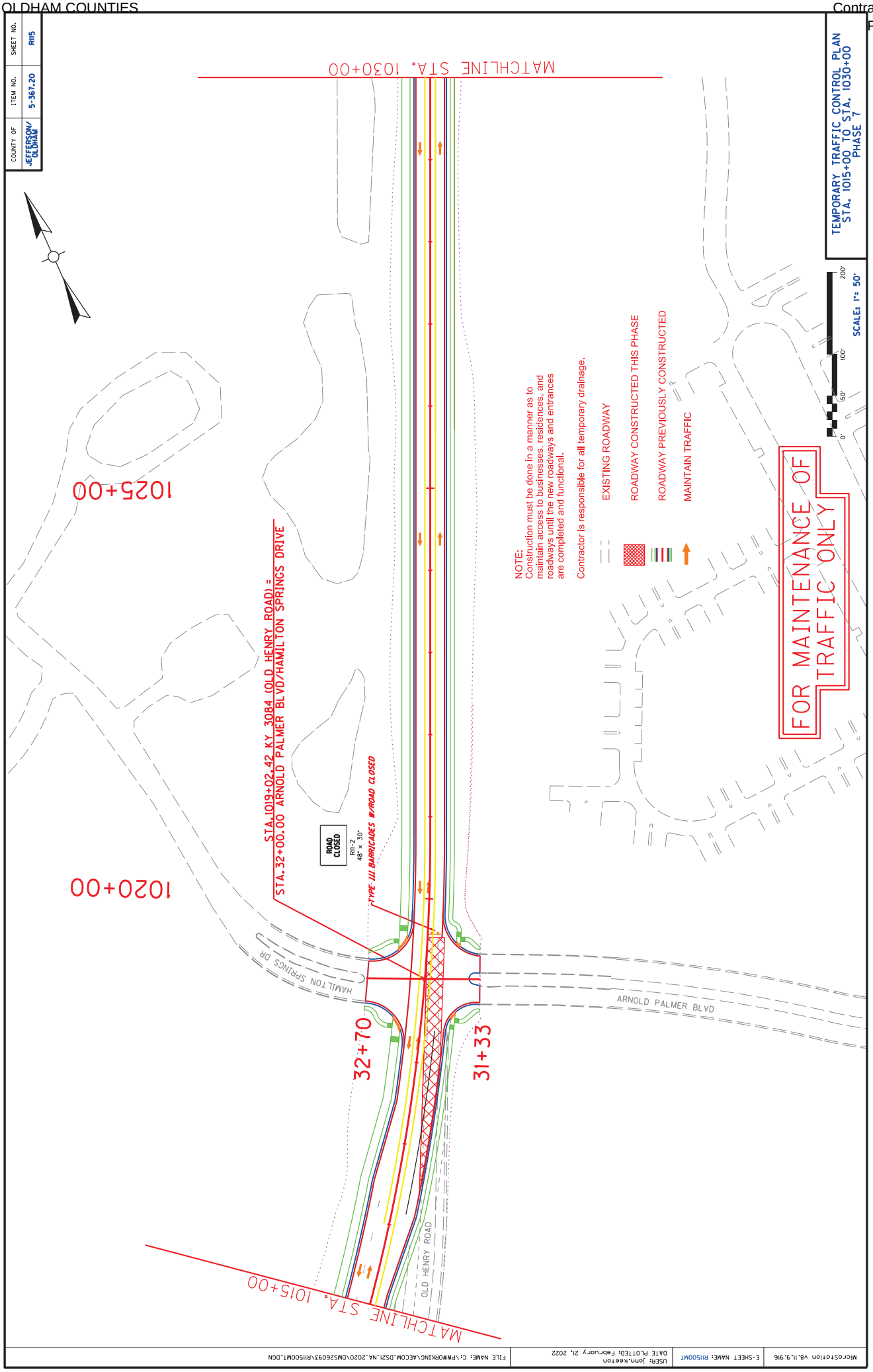
COUNTY OF	ITEM NO.	SHEET NO.
JEFFERSON/ OLDHAM	5-367.20	R114



TEMPORARY TRAFFIC CONTROL PLAN
STA. 1003+50 TO STA. 1015+00
PHASE 7 - STEP A

MicroStation v8.11.9.916
E-SHEET NAME: RI400MT
USER: johnkeaton
DATE PLOTTED: February 21, 2022
FILE NAME: C:\PWWORKING\AECOM_DS2\NA_2020\DMS26093\RI400MT.DGN


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
RII4A
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1003+50 TO STA. 1015+00
PHASE 7 - STEP B
SCALE: 1"= 50'
0' 50' 100' 200'
MATCHLINE STA. 1015+00
BUSH FARM ROAD
HIGH WICKHAM PLACE
1010+00
1005+00
1003+00
27+00
26+00
STA.1013+09.54 KY 3084 (OLD HENRY ROAD)
= STA.25+00.00 BUSH FARM ROAD
(5) TYPE III BARRICADES W/ROAD CLOSED
(7) TYPE III BARRICADES W/ROAD CLOSED
(3) TYPE III BARRICADES W/ROAD CLOSED
ROAD CLOSED
RII-2
48" x 30"
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
REMOVE EXISTING INTEGRAL CURB & BRICK MEDIAN.
STA. 1003+50 ~ BEGIN PROJECT & BEGIN CONSTRUCTION KY 3084 (OLD HENRY ROAD)
FILE NAME: G:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\RII40AMT.DGN
USER: Jonn.keeton
DATE PLOTTED: February 21, 2022
E-SHEET NAME: RII40AMT
MicroStation V8.11.9.916


COUNTY OF
JEFFERSON/ OLDHAM
ITEM NO.
5-367.20
SHEET NO.
RII5
TEMPORARY TRAFFIC CONTROL PLAN
STA. 1015+00 TO STA. 1030+00
PHASE 7
SCALE: 1"= 50'
0'
50'
100'
200'
MATCHLINE STA. 1030+00
1025+00
1020+00
MATCHLINE STA. 1015+00
STA.1019+02.42 KY 3084 (OLD HENRY ROAD) =
STA.32+00.00 ARNOLD PALMER BLVD/HAMILTON SPRINGS DRIVE
ROAD CLOSED
R11-2
48" x 30"
TYPE III BARRICADES W/ROAD CLOSED
HAMILTON SPRINGS DR
ARNOLD PALMER BLVD
OLD HENRY ROAD
32+70
31+33
NOTE:
Construction must be done in a manner as to maintain access to businesses, residences, and roadways until the new roadways and entrances are completed and functional.
Contractor is responsible for all temporary drainage.
EXISTING ROADWAY
ROADWAY CONSTRUCTED THIS PHASE
ROADWAY PREVIOUSLY CONSTRUCTED
MAINTAIN TRAFFIC
FOR MAINTENANCE OF TRAFFIC ONLY
MicroStation V8.11.9.916
E-SHEET NAME: RII5OOMT
USER: John.keeton
DATE PLOTTED: February 21, 2022
FILE NAME: c:\PWWORKING\AECOM.DS21_NA_2020\DMS26093\RII5OOMT.DGN

Jim Tharpe - Director
Phone (502) 564-3020
FAX (502) 564-7759

DIVISION OF TRAFFIC OPERATIONS

PROJECT MATERIALS RELEASE FORM FOR SIGNAL AND LIGHTING

Note: Email form with signatures to KYTC's warehouse (kim.stamper@ky.gov) at least two (2) days prior to arrival for pickup. Ensure Contractor's delivery driver has a copy of form with signatures. Failure to do either may result in long delays or refusal to distribute materials upon arrival.

Item Number: **5-367.20**
County: **JEFFERSON**
Description: **KY 3084 @ FARM BUSH RD TRAFFIC SIGNAL**

Cabinets	Master code		
1	T-01-0020	Base Mounted 332 Cabinet	
1	T-01-0105	ATC Controller	
1	T-01-0106	1C w/Maxtime (this should go with item ATC controller)	
1	T-01-0501	Conflict Monitor, Model 2018	
3	T-01-0510	Isolator, Model 242 (1 for 2070, plus for ped detector and railroad)	
11	T-01-0700	Load Switches	

Signals			
6	T-02-0009	Siemens 3 Section Signal	
6	T-02-0032	Siemen 3 section backplate	
4	T-02-0033	Siemen 4 secton 12" signal (poly)	
1	T-02-0040	Siemen 5 section, 12 inch signal (poly)	
1	T-02-0041	Siemen 5 section backplate	
4	T-02-0043	Siemen 4-sec. straight signal backplate	
8	T-02-0090	Pedestrian signal housing	
3	T-02-0300	LED Module 12" red arrow	
6	T-02-0310	LED Module 12" yellow arrow	
6	T-02-0320	LED Module 12" green arrow	
8	T-02-0330	LED Module 12" red ball	
8	T-02-0340	LED Module 12" yellow ball	
8	T-02-0350	LED Module 12" green ball	
8	T-02-0365	LED Countdown Pedestrian Module	

Special items			
1		Radar Equipment - **Purchased by D5**	
1	T-02-0504	Router (this includes power supply/antenna/cabling)	
8	T-09-0415	30 X 36 through 36 X 36 sign hanger (New)	
2	T-02-0650	Pedstl.top mntg.bkt One-way	
2	T-02-0660	Pedstl.top mntg.bkt Two-way	
4	T-02-0670	Pedestal	
8	T-06-0710	Ped Detector Pole Mount FSA Box	
8	T-06-0730	Ped Button w/o Plunger	
8	T-17-0015	9 X 15 Countdown Ped Sign DBL Sided	

Poles		
2	T-04-0040	Steel Strain Pole 34 foot
2	T-04-0051	Steel Strain Pole 36 foot

REQUIRED

Electrical Contractor Name _____

Electrical Contractor Supervisor _____ Contact number for Supervisor _____

Project Engineer _____ Contact number for Project Engineer _____

Project Engineer attests that the mentioned contractor is the actual electrical contractor on this project

Signature of Project Engineer or Designee _____

PPL companies

POWER LINE SAFETY

OSHA Cranes in Construction Standard Power Line Safety Section 1926.1408 and 1926.1409

This is a high level summary only. Refer to www.osha.gov for details.

Employer must identify the work zone by either: (1) demarcating boundaries (with flags, range limit device or range control warning device) and prohibit operator from operating past those boundaries; OR (2) define the work zone as the area 360 degrees around the equipment, up to the equipment's maximum working radius.

Determine if any part of equipment, load line, or load could get closer than 20 feet for less than 350 kV or 50 feet for greater than 350 kV if operated up to the equipment's maximum working radius.

NO → Crane operator can proceed with crane operations.

YES → Employer must do either **Option 1, 2, or 3.**

Option 1. Confirm from the utility that the power line has been de-energized and visibly grounded at the worksite. Proceed with crane operations.

Option 2. Employer must ensure that no part of the equipment, load line, or load gets closer than 20 feet if less than 350 kV or 50 feet if more than 350 kV to the power line by implementing the Encroachment Precautions. Employer needs to know if line is more or less than 350 kV but does not need to know exact voltage.

Option 3. Employer contacts utility to determine line voltage. Utility provides within 2 days. Determine if any part of equipment, load line, or load while operating up to the maximum working radius in the work zone could get closer than the Table A distances. If so, implement Encroachment Precautions.

Table A Distances:

Up to 50 kV:	10 feet
50 to 200 kV:	15 feet
200 to 350 kV:	20 feet
350 to 500 kV:	25 feet

Implement encroachment precautions.

Operations where any part of crane, load line, or load is closer than Table A distance to an energized power line is prohibited unless the requirements on Page 2 are met.

Encroachment Prevention Precautions required for Options 2 or 3:

1. Conduct a planning meeting with operator and other workers.
2. Tag lines, if used, must be non-conductive.
3. Erect and maintain elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags at 20 feet from the power line if less than 350 kV or 50 feet if more than 350 kV (if using Option 2) or the distance shown in Table A if using Option 3. If operator is unable to see the elevated warning line, a dedicated spotter (B) must be used in addition to implementing one of A, C, D, or E below.

In addition to the items above, implement at least one of these:

A. Use a proximity alarm set to give operator sufficient warning to prevent encroachment.
B. Use a dedicated spotter who is in continuous contact with the operator.
C. Use a device that automatically warns the operator to stop (range control warning device).
D. Use a device that limits range of movement, set to prevent encroachment.
E. Use an insulating link between the end of the load line and the load.

PPL companies

POWER LINE SAFETY

Power Line Safety requirements for getting closer than the Table A distances

Table A Distances:

Up to 50 kV:	10 feet
50 to 200 kV:	15 feet
200 to 350 kV:	20 feet
350 to 500 kV:	25 feet

Operations where any part of crane, load line, or load is closer than Table A distance to an energized power line is prohibited unless the requirements on this page are met.

Crane operator employer shall determine that it is infeasible to work without breaching Table A distances.

Employer determines after consulting with utility that it is infeasible to de-energize and ground or relocate the power line.

Utility or registered professional engineer (PE) shall determine minimum clearance distance that shall be maintained to prevent electrical contact.

Planning meeting with employer and utility (or PE) shall be held to determine procedures that shall be followed.

If so equipped, the automatic reclosing features shall be made inoperative by the utility before work begins.

Crane operator is required to have utility install line hose or coverup except where unavailable for the voltage.

Documented procedures must be developed and kept on site. Equipment user, operator and others shall meet with utility to review procedures.

Utility and employers of employees involved in the work shall identify one person to direct implementation of procedures.

If procedures are not effective, crane operator shall stop work OR have utility de-energize lines.

Crane operator is also required to do these items.

- Dedicated spotter shall be used.
- Elevated warning line or barricade in view of operator equipped with flags shall be installed.
- Insulating link shall be installed between end of load line and load.
- Non-conductive rigging shall be used.
- If equipment has device that limits range of movement, it shall be used.
- Tag lines shall be non-conductive.
- Barricades set up 10 feet around crane to prevent personnel from entering the work area.
- Workers, other than operator, shall be prohibited from touching load line.
- Only essential personnel shall be allowed.
- Crane shall be grounded.

SPECIAL NOTE FOR CONCRETE SEALING

These Notes or designated portions thereof, apply where so indicated on the plans, proposals or bidding instruction.

I. DESCRIPTION. Perform all work in accordance with the Department's 2019 Standard Specifications, and applicable Supplemental Specifications, the attached sketches, and these Notes. Section references are to the Standard Specifications.
This work consists of: (1) Furnish all labor, materials, tools, and equipment; (2) Clean the bridge deck; (3) Seal the bridge deck; (4) Maintain & control traffic; and, (5) Any other work specified as part of this contract.

II. MATERIALS.

A. Sealer. Use one of the following:

Product	Supplier
Protectosil BHN	Evonik Industries
Protectosil 300S	Evonik Industries
TK-590-40 Tri-Silane 40%	TK Products
SW-244-100	Chemical Products Industries, Inc.
TK-590-1 MS Tri-Silane	TK Products
MasterProtect H1000	BASF
Aquanil Plus 40	ChemMasters
SIL-ACT ATS-100	Advanced Chemical Technologies
Certivex Penseal BTS 100%	Vexcon
Pentreat 244-40	W.R. Meadows
Aquanil Plus 40A	ChemMasters

B. Coverage Rate: Follow all manufacturers recommendations for coverage rates except the application rate must not exceed the square footage coverage rate per gallon of sealer as given in the chart below. If the manufacturer recommends a coverage rate greater than given in the table below, apply sealer at the rate given in the table below for the chosen sealers silane percentage.

% Silane	Coverage rate (ft^2/gallon)
100	300
40	120
20	60

III. CONSTRUCTION.

A. Curing Compound. Contrary to Section 609.03.12 of the specifications, curing compound is not to be used on this deck due to potentially causing issues with the concrete sealer. During the deck pour, finishing, and tining operations the Class AA concrete shall be kept continuously moist with the use of a mister until burlap or curing blankets are applied to the surface. At no point should water be pooling or running off the surface or the surface of the concrete be allowed to become dry. After the burlap or curing blankets are installed, cure in accordance with the specifications. Include all costs in the unit price bid for Class AA concrete. Failure to properly cure the concrete in accordance with this note and the specifications may result in weakened or cracked concrete. If the concrete is weakened or cracked due to improper curing, the contractor will be responsible for providing alternates to fix the issues to the Engineer for review and the contractor will be solely responsible for all costs to do so, up to complete replacement. Do not begin any construction on fixing any issues without approval of the Engineer.

B. Cleaning the Deck. Dry clean the deck to remove all loose debris. Remove all visible hydrocarbons from the surface with detergent approved by the manufacturer of the deck sealant. Pressure wash all surfaces to be sealed at 2000 to 3000 psi. Install pressure gauges at each wand to verify pressure. Use 30° fan tip or as recommended by the manufacturer of the deck sealant. Hold pressure washing wand a minimum of 45° from the deck with a maximum stand-off distance of 12 inches.

C. Sealing the Deck. Allow new concrete to cure a minimum 28 days prior to application of sealer. Monitor weather conditions prior to sealer application. Refer to manufacturer's recommendations for proper ambient conditions. Do not apply sealer if precipitation is anticipated within the time stated by the manufacturer. Allow the deck to dry 24 hours (after washing or rain event) before sealer application. The deck can be reopened to traffic while drying. Sealer must be applied within 48 hours of washing or the deck must be rewashed. Divide the deck into predefined areas of specific square footage to aid in determining usage. Comply with manufacturer's usage recommendation. Using a low

pressure pump, apply sealer and spread evenly with broom or squeegee; do not allow pooling to remain. When each predefined area is complete, measure the amount of sealer used to verify proper usage. After sealing, follow manufacturer's recommended cure time before opening to traffic. On vertical surfaces, apply the sealer in a flooding application from the bottom up, so the material runs down 6 to 8 inches below the spray pattern.

D. Inspection: Monitor all aspects of the project to assure compliance to this specification. Observe and document general conditions during the entirety of the project. Verify that each phase of work has been satisfactorily completed prior to beginning the next phase. Phases are described as follows:

1. Dry cleaning to remove loose debris, verify and document:
   a. All debris has been removed and disposed of properly.
2. Removal of hydrocarbons, verify and document:
   a. The manufacturer's recommended detergent is used for removal.
   b. Hydrocarbons have been satisfactorily removed.
3. Pressure washing, verify and document:
   a. Washing pressure at the wand.
   b. Tip size used.
   c. Wash angle and stand-off distance.
   d. The deck is satisfactorily cleaned.
4. Sealer application, verify and document:
   a. Proper cure time for new concrete.
   b. Deck surface is dry.
      1. Document time since washed.
      2. Was deck opened to traffic after washing?
   c. Ambient conditions.
      1. Document ambient temperature, surface temperature, relative humidity, and dew point.
   d. Application and distribution method.
   e. Coverage to be complete and even.
   f. Material is not allowed to remain pooled.
   g. Monitor material usage.
   h. No traffic until proper cure time is allowed.

IV. MEASUREMENT

A. Concrete Sealing. The Department will measure the quantity per square feet of each area sealed.

V. PAYMENT

A. **Concrete Sealing.** Payment at the contract unit price per square feet is full compensation for the following: (1) Furnish all labor, materials, tools, and equipment; (2) Clean the bridge deck; (3) Seal the bridge deck; (4) Maintain & control traffic; and, (5) Any other work specified as part of this contract.

SPECIAL NOTE

For MS4 Application

Jefferson County
KY 3084
Old Henry Road Extension
Item No. 5-367.20

Application for MS4 permitting shall be made to Brad Selch at MSD (brad.selch@louisvillemsd.org).

Application forms can be found at https://louisvillemsd.org/what-we-do/stormwaterdrainage/permitting/forms

Plan requirements and types of permits can be found at https://louisvillemsd.org/what-we-do/stormwaterdrainage/permitting

SPECIAL NOTE

For Property Access

Jefferson County
KY 3084
Old Henry Road Extension
Item No. 5-367.20

The Contractor shall make all provisions necessary to maintain access to all parcels during construction. A minimum of one access point shall remain open at all times, or provisions must be made to provide access when necessary. The Contractor shall coordinate with affected property owners / associations at locations where such provisions cannot be made. The Contractor shall establish times with said owners when access will be available and at no time shall access be continuously restricted such that residential property owners cannot access their residence for an entire evening. Should such loss of access occur, the Contractor will be subject to a special liquidated damage for each parcel affected and made liable for costs associated with providing alternative lodging for the affected residents.

SPECIAL NOTE FOR GENERAL UTILITY COORDINATION

The Contractor shall communicate, cooperate, and coordinate with the Department, the utility owners, and potentially affected third parties, as necessary for the utility relocation work. The Contractor shall be responsible for all coordination needed to ensure that the road construction and utility relocation work may concurrently and effectively take place. No delay claims will be considered due to utility relocations.

This item shall include assignment of a Utility Coordinator for the project to coordinate plans, work and schedules directly with the utility companies and KYTC personnel. The Utility Coordinator shall be a licensed professional engineer with project management experience. This item includes responsibility to ensure the project progresses efficiently and in accordance with the proposed contract documents. The Department may consult the Utility Coordinator on matters of utility work construction, cost, and/or schedule. Any changes in the proposed scope, design, construction, cost, and/or schedule for the utility work shall be approved by the Department. This item includes conducting weekly coordination meetings with involved utility companies and as needed on project site visits to manage utility relocation activity, resolve conflicts with the road activity, and minimize impact to the project. The department shall be invited to Utility Coordination meetings.

The Department will consider payment as full compensation for all work required under this note.

Code	Item Description	Unit
24845EC	Utility Coordination	Lump Sum

SPECIAL NOTE
FOR PROJECT COMPLETION DATE AND LIQUIDATED DAMAGES

Jefferson County
Old Henry Road (KY 3084)
Item No. 5-367.20

FAILURE TO COMPLETE WORK ON TIME

Specified fixed completion date for this contract is October 31, 2024. For each calendar day beyond a fixed completion date of October 31, 2024, the Department will assess liquidated damages per Section 108.09 of the current edition of the Standard Specifications for Road and Bridge Construction.

All liquidated damages will be applied cumulatively.
All other applicable portions of KYTC Standard Specifications Section 108 apply.

SPECIAL NOTE

For Tree Removal

Jefferson and Oldham Counties
KY-146 New Route Project
Item No. 05-367.20

NO CLEARING OF TREES 5 INCHES OR GREATER (DIAMETER BREAST HEIGHT) FROM JUNE 1- JULY 31.

If there are any questions regarding this note, please contact Danny Peake, Director, Division of Environmental Analysis, 200 Mero Street, Frankfort, KY 40601, Phone: (502) 564-7250.

SPECIAL NOTE FOR CONCRETE SLURRY

If diamond grinding, grooving or any other process which produces slurry is required on roadways or bridges, the contractor shall ensure that all concrete slurry associated with these processes is collected, managed, and disposed of appropriately. The waste material shall be disposed of at a permitted disposal facility, in accordance with the Kentucky Standard Specifications for Road and Bridge Construction and the Environmental Performance Standards outlined in 401 KAR 47:030, or managed as a material for beneficial reuse. Any fines or remediation related to improper disposal shall be the sole responsibility of the contractor.

Disposal of concrete slurry will not be paid separately and shall be considered incidental to other bid items.

8/20/2019

SPECIAL NOTE FOR PIPELINE INSPECTION

1.0 DESCRIPTION. The Department will perform visual inspections on all pipe on the project. A video inspection will be required on projects having more than 250 linear feet of storm sewer and/or culvert pipe and on routes with an ADT of greater than 1,000 vehicles. Conduct video inspections on all pipe located under the roadway and 50 percent of the remaining pipe not under the roadway. Storm sewer runs and outfall pipes not under the roadway take precedence over rural entrance pipes. Contractors performing this item of work must be prequalified with the Department in the work type J51 (Video Pipe Inspection and Cleaning). Deflection testing shall be completed using a mandrel in accordance with the procedure outlined below or by physical measurement for pipes greater than 36inches in diameter. Mandrel testing for deflection must be completed prior to the video inspection testing. Unless otherwise noted, Section references herein are to the Department's Standard Specifications for Road and Bridge Construction, current edition.

2.0 VIDEO INSPECTION. Ensure pipe is clear of water, debris or obstructions. Complete the video inspection and any necessary measurement prior to placing the final surface over any pipe. When paving will not be delayed, take measurements 30 days or more after the completion of earthwork to within 1 foot of the finished subgrade. Notify the Engineer a minimum of 24 hours in advance of inspection and notify the Engineer immediately if distresses or locations of improper installation are logged.

2.1 INSPECTION FOR DEFECTS AND DISTRESSES

A) Begin at the outlet end and proceed through to the inlet at a speed less than or equal to 30 ft/minute. Remove blockages that will prohibit a continuous operation.

B) Document locations of all observed defects and distresses including but not limited to: cracking, spalling, slabbing, exposed reinforcing steel, sags, joint offsets, joint separations, deflections, improper joints/connections, blockages, leaks, rips, tears, buckling, deviation from line and grade, damaged coatings/paved inverts, and other anomalies not consistent with a properly installed pipe.

C) During the video inspection provide a continuous 360 degree pan of every pipe joint.

D) Identify and measure all cracks greater than 0.1" and joint separations greater than 0.5".

E) Video Inspections are conducted from junction to junction which defines a pipe run. A junction is defined as a headwall, drop box inlet, curb box inlet, manhole, buried junction, or other structure that disturbs the continuity of the pipe. Multiple pipe inspections may be conducted from a single set up location, but each pipe run must be on a separate video file and all locations are to be referenced from nearest junction relative to that pipe run.

F) Record and submit all data on the TC 64-765 and TC 64-766 forms.

3.0 MANDREL TESTING. Mandrel testing will be used for deflection testing. For use on Corrugated Metal Pipe, High Density Polyethylene Pipe, and Polyvinyl Chloride Pipe, use a mandrel device with an odd number of legs (9 minimum) having a length not less than the outside diameter of the mandrel. The diameter of the mandrel at any point shall not be less than the diameter specified in Section 3.6. Mandrels can be a fixed size or a variable size.

3.1 Use a proving ring or other method recommended by the mandrel manufacturer to verify mandrel diameter prior to inspection. Provide verification documentation for each size mandrel to the Engineer.

3.2 All deflection measurements are to be based off of the AASHTO Nominal Diameters. Refer to the chart in section 3.6.

3.3 Begin by using a mandrel set to the 5.0% deflection limit. Place the mandrel in the inlet end of the pipe and pull through to the outlet end. If resistance is met prior to completing the entire run, record the maximum distance achieved from the inlet side, then remove the mandrel and continue the inspection from the outlet end of the pipe toward the inlet end. Record the maximum distance achieved from the outlet side.

3.4 If no resistance is met at 5.0% then the inspection is complete. If resistance occurred at 5.0% then repeat 3.1 and 3.2 with the mandrel set to the 10.0% deflection limit. If the deflection of entire pipe run cannot be verified with the mandrel then immediately notify the Engineer.

3.5 Care must be taken when using a mandrel in all pipe material types and lining/coating scenarios. Pipe damaged during the mandrel inspection will be video inspected to determine the extent of the damage. If the damaged pipe was video inspected prior to mandrel inspection then a new video inspection is warranted and supersedes the first video inspection. Immediately notify the Engineer of any damages incurred during the mandrel inspection and submit a revised video inspection report.

3.6 AASHTO Nominal Diameters and Maximum Deflection Limits.

Base Pipe Diameter	AASHTO Nominal Diameter	Max. Deflection Limit	
		5.0%	10.0%
(inches)	(inches)	(inches)	
15	14.76	14.02	13.28
18	17.72	16.83	15.95
24	23.62	22.44	21.26
30	29.53	28.05	26.58
36	35.43	33.66	31.89
42	41.34	39.27	37.21
48	47.24	44.88	42.52
54	53.15	50.49	47.84
60	59.06	56.11	53.15

4.0 PHYSICAL MEASUREMENT OF PIPE DEFLECTION. Alternate method for deflection testing when there is available access or the pipe is greater than 36 inches in diameter, as per 4.1. Use a contact or non-contact distance instrument. A leveling device is recommended for establishing or verifying vertical and horizontal control.

4.1 Physical measurements may be taken after installation and compared to the AASHTO Nominal Diameter of the pipe as per Section 3.6. When this method is used, determine the smallest interior diameter of the pipe as measured through the center point of the pipe (D2). All measurements are to be taken from the inside crest of the corrugation. Take the D2 measurements at the most deflected portion of the pipe run in question and at intervals no greater than ten (10) feet through the run. Calculate the deflection as follows:

% Deflection = [(AASHTO Nominal Diameter - D2) / AASHTO Nominal Diameter] x 100%

Note: The Engineer may require that preset monitoring points be established in the culvert prior to backfilling. For these points the pre-installation measured diameter (D1) is measured and recorded. Deflection may then be calculated from the following formula:

$$\% \text{ Deflection} = [(D1 - D2) / D1] (100\%)$$

4.2 Record and submit all data.

5.0 DEDUCTION SCHEDULE. All pipe deductions shall be handled in accordance with the tables shown below.

FLEXIBLE PIPE DEFLECTION	
Amount of Deflection (%)	Payment
0.0 to 5.0	100% of the Unit Bid Price
5.1 to 9.9	50% of the Unit Bid Price [(1)]
10 or greater	Remove and Replace [(2)]

[(1)] Provide Structural Analysis for HDPE and metal pipe. Based on the structural analysis, pipe may be allowed to remain in place at the reduced unit price. [(2)] The Department may allow the pipe to remain in place with no pay to the Contractor in instances where it is in the best interest to the public and where the structural analysis demonstrates that the pipe should function adequately.

RIGID PIPE REMEDIATION TABLE PIPE	
Crack Width (inches)	Payment
≤ 0.1	100% of the Unit Bid Price
Greater than 0.1	Remediate or Replace [(1)]

(1) Provide the Department in writing a method for repairing the observed cracking. Do not begin work until the method has been approved.

6.0 PAYMENT. The Department will measure the quantity in linear feet of pipe to inspect. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
24814EC	Pipeline Inspection	Linear Foot
10065NS	Pipe Deflection Deduction	Dollars

SPECIAL NOTE FOR NON-TRACKING TACK COAT

1. DESCRIPTION AND USEAGE. This specification covers the requirements and practices for applying a non-tracking tack asphalt coating. Place this material on the existing pavement course, prior to placement of a new asphalt pavement layer. Use when expedited paving is necessary or when asphalt tracking would negatively impact the surrounding area. This material is not suitable for other uses. Ensure material can "break" within 15 minutes under conditions listed in 3.2.

2. MATERIALS, EQUIPMENT, AND PERSONNEL.

2.1 Non-Tracking Tack. Provide material conforming to Subsection 2.1.1.

2.1.1 Provide a tack conforming to the following material requirements:

Property	Specification	Test Procedure
Viscosity, SFS, 77 ˚ F	20 – 100	AASHTO T 72
Sieve, %	0.3 max.	AASHTO T 59
Asphalt Residue[1], %	50 min.	AASHTO T 59
Oil Distillate, %	1.0 max.	AASHTO T 59
Residue Penetration, 77 ˚ F	0 - 30	AASHTO T 49
Original Dynamic Shear (G*/sin δ), 82 ˚ C	1.0 min.	AASHTO T 315
Softening Point, ˚ F	149 min.	AASHTO T 53
Solubility, %	97.5 min.	AASHTO T 44

[1] Bring sample to 212 ˚F over a 10-15 minute period. Maintain 212 ˚F for 15-20 minutes or until 30-40 mL of water has distilled. Continue distillation as specified in T59.

2.2. Equipment. Provide a distributor truck capable of heating, circulating, and spraying the tack between 170 ˚F and 180 ˚F. Do not exceed 180 ˚F. Circulate the material while heating. Provide the correct nozzles that is recommend by the producer to ensure proper coverage of tack is obtained. Ensure the bar can be raised to between 14" and 18" from the roadway.

2.3. Personnel. Ensure the tack supplier has provided training to the contractor on the installation procedures for this product. Make a technical representative from the supplier available at the request of the Engineer.

3. CONSTRUCTION.

3.1 Surface Preparation. Prior to the application of the non-tracking tack, ensure the pavement surface is thoroughly dry and free from dust or any other debris that would inhibit adhesion. Clean the surface by scraping, sweeping, and the use of compressed air. Ensure this preparation process occurs shortly before application to prevent the return of debris on to the pavement. If rain is expected within one hour after application, do not apply material. Apply material only when the surface is dry, and no precipitation is expected.

3.2 Non-tracking Tack Application. Placement of non-tracking tack is not permitted from October 1st to May 15th. When applying material, ensure the roadway temperature is a minimum of 40˚F and rising. Prior to application, demonstrate competence in applying the tack according to this note to the satisfaction of the Engineer. Heat the tack in the distributor to between 170 – 180 ˚F. After the initial heating, between 170 – 180 ˚F, the material may be sprayed between 165 ˚F and 180 ˚F. Do not apply outside this temperature range. Apply material at a minimum rate of 0.70 pounds (0.08 gallons) per square yard. Ensure full coverage of the material on the pavement surface. Full coverage of this material is critical. Increase material application rate if needed to achieve full coverage. Schedule the work so that, at the end of the day's production, all non-tracking tack is covered with the asphalt mixture. If for some reason the non-tracking tack cannot be covered by an asphalt mixture, ensure the non-tracking tack material is clean and reapply the non-tracking tack prior to placing the asphalt mixture. Do not heat material more than twice in one day.

3.3 Non-tracking Tack Certification. Furnish the tack certification to the Engineer stating the material conforms to all requirements herein prior to use.

3.4 Sampling and Testing. The Department will require a sample of non-tracking tack be taken from the distributor at a rate of one sample per 15,000 tons of mix. Take two 1 gallon samples of the heated material and forward the sample to the Division of Materials for testing within 7 days. Ensure the product temperature is between 170 and 180 °F at the time of sampling.

4. MEASUREMENT. The Department will measure the quantity of non-tracking tack in tons. The Department will not measure for payment any extra materials, labor, methods, equipment, or construction techniques used to satisfy the requirements of this note. The Department will not measure for payment any trial applications of non-tracking tack, the cleaning of the pavement surface, or furnishing and placing the non-tracking tack. The Department will consider all such items incidental to the non-tracking tack.

5. PAYMENT. The Department will pay for the non-tracking tack at the Contract unit bid price and apply an adjustment for each manufacturer's lot of material based on the degree of compliance as defined in the following schedule. Non-tracking tack will not be permitted for use from October 1st to May 15th. During this timeframe, the department will allow the use of an approved asphalt emulsion in lieu of a non-tracking tack product but will not adjust the unit bid price of the material. When a sample fails on two or more tests, the Department may add the deductions, but the total deduction will not exceed 100 percent.

Non-Tracking Tack Price Adjustment Schedule						
Test	Specification	100% Pay	90% Pay	80% Pay	50% Pay	0% Pay
Viscosity, SFS, 77 ˚ F	20 – 100	19 - 102	17 - 18 103 - 105	15 - 16 106 - 107	14 108 - 109	≤13 ≥ 110
Sieve, %	0.30 max.	≤ 0.40	0.41 - 0.50	0.51 - 0.60	0.61 - 0.70	≥ 0.71
Asphalt Residue, %	50 min.	≥49.0	48.5 – 48.9	48.0 – 48.4	47.5-47.9	≤ 47.4
Oil Distillate, %	1.0 max.	≤1.0	1.1-1.5	1.6 - 1.7	1.8-1.9	>2.0
Residue Penetration, 77 ° F.	30 max.	≤ 31	32 - 33	34 - 35	36 - 37	≥ 38
Original Dynamic Shear (G*/sin δ), 82 ˚ C	1.0 min.	≥0.95	0.92 – 0.94	0.90 – 0.91	0.85 - 0.89	≤ 0.84
Softening Point, º F	149 min.	≥145	142 - 144	140 - 141	138 - 139	≤ 137
Solubility, %	97.5 min.	≥ 97.0	96.8 – 96.9	96.6 – 96.7	96.4 – 96.5	≤ 96.3

Code	Pay Item	Pay Unit
24970EC	Asphalt Material for Tack Non-Tracking	Ton

Revised: May 23, 2022

SPECIAL NOTE FOR EXPERIMENTAL KYCT AND HAMBURG TESTING

1.0 General

1.1 Description. The KYCT (Kentucky Method for Cracking Test) and the Hamburg test results will help determine if the mixture is susceptible to cracking and rutting. During the experimental phase, data will be gathered and analyzed by the Department to determine the durability of the bituminous mixes. Additionally, the data will help the Department to create future performance-based specifications which will include the KYCT and Hamburg test methods.

2.0 Equipment

2.1 KYCT Testing Equipment. The Department will require a Marshall Test Press with digital recordation capabilities. Other CT testing equipment may be used for testing with prior approval by the Department.

2.2 Water Baths. One or more water baths will be required that can maintain a temperature of 77^{o} +/- 1.8^{o} F with a digital thermometer showing the water bath temperature. Also, one water bath shall have the ability to suspend gyratory specimen fully submerged in water in accordance with AASHTO T-166, current edition.

2.3 Hamburg Wheel Track Testing. The department encourages the use of the PTI APA/Hamburg Jr. test equipment to perform the loaded wheel testing. The Department will allow different equipment for the Hamburg testing, but the testing device must be approved by the Department prior to testing.

2.4 Gyratory Molds. Gyratory molds will be required to assist in the production of gyratory specimens in accordance with AASHTO T-312, current edition.

2.5 Ovens. Adequate (minimum of two ovens) will be required to accommodate the additional molds and asphalt mixture necessary to perform the acceptance testing as outlined in Section 402 of the Kentucky Standard Specifications for Road and Bridge Construction, current edition.

2.6 Department Equipment. The Department will provide gyratory molds, PINE 850 Test Press with digital recordation, and CT testing equipment to assist during this experimental phase so data can be gathered. Hamburg test specimens will be submitted to the Division of Materials for testing on the PTI APA/Hamburg Jr if the asphalt contractor or district materials office does not have an approved Hamburg testing device.

3.0 Testing Requirements

3.1 Acceptance Testing. Perform all acceptance testing and aggregate gradation as according with Section 402 and Section 403 of the Kentucky Standard Specifications for Road and Bridge Construction, current edition.

3.2 KYCT Testing. Perform crack resistance analysis (KYCT) in accordance with the current Kentucky Method for KYCT Index Testing during the mix design phase and during the plant production of all surface mixtures. For mix design approvals, submit KYCT results on the Department MixPack. For Class 4 mixtures, submit ingredient materials to the Division of Materials for verification.

3.2.1 KYCT Frequency. Obtain an adequate sample of hot mix asphalt to ensure the acceptance testing, gradation, and KYCT gyratory samples can be fabricated and is representative of the bituminous mixture. Acceptance specimens shall be fabricated first, then immediately after, fabricate the KYCT samples with the gyratory compactor in accordance with Section 2.4 of this Special Note. Analysis of the KYCT specimens and gradation will be required one per sublot produced from the same asphalt material and at the same time as the acceptance specimen is sampled and tested.

3.2.2 Number of Specimens and Conditioning. Fabricate specimens in accordance with the Kentucky Method for KYCT Index Testing. Contrary to the method, for field specimens, fabricate a minimum of 3 and up to 6 test specimens. The specimens shall be compacted at the temperature in accordance with KM 64-411. KYCT mix design specimens shall be short-term conditioned uncovered for four hours at compaction temperature in accordance with KM 64-411. Contrary to the Kentucky Method, plant produced bituminous material shall be short-term conditioned immediately after sampling for two hours uncovered in the oven at compaction temperature in accordance with KM 64-411. Additionally, fabricated specimens shall be allowed to cool in air (fan is permissible) for 30 minutes +/- 5 minutes and conditioned in a 77 °F water bath for 30 minutes +/- 5 minutes. To ensure confidence and reliability of the test results provided by KYCT testing and Hamburg testing, reheating of the asphalt mixture is prohibited.

3.2.3 Record Times. For each sublot, record the time required between drying aggregates in the plant to KYCT specimen fabrication. The production time may vary due to the time that the bituminous material is held in the silo. Record the preconditioning time when the time exceeds the one-hour specimen cool down time as required in accordance with The Kentucky Method for KYCT Index Testing. The preconditioning time may exceed an hour if the technician is unable to complete the test on the same day or within the specified times as outlined in The Kentucky Method for KYCT Index Testing. The production time and the preconditioning time shall be recorded on the AMAW.

3.2.4 File Name. As according to section 7.12 of The Kentucky Method for KYCT Index Testing, save the filename with the following format: “CID_Approved Mix Number_Lot Number_Sublot Number_ Date”

3.3 Hamburg Testing. Perform the rut resistance analysis (Hamburg) in accordance with AASTHO T-324, not to exceed 20,000 passes for all bituminous mixtures during the mix design phase and production. For mix design approvals, submit Hamburg results on the Department MixPack. For Class 4 mixtures, submit ingredient materials to the Division of Materials for informational verification.

3.3.1 Hamburg Testing Frequency. Perform testing and analysis per lot of material. The plant produced bituminous material sampled for the Hamburg test does not have to be obtained at the same time as the acceptance and KYCT sample. If the Hamburg test sample is not obtained at the same time as the KYCT sample, determine the Maximum Specific Gravity of the KYCT sample in accordance with AASHTO T-209 coinciding with the Hamburg specimens.

3.3.2 Record Times. Record the production time as according to section 3.2.3 in this special note. Also record the time that the specimens were fabricated and the time the Hamburg testing was started. All times shall be recorded on the AMAW.

3.3.3 File Name. Save the Excel spreadsheet with the following file name; "Hamburg_CID_Approved Mix Number_Lot Number_Sublot Number_Date" and upload the file into the AMAW.

4.0 Data

Submit the AMAW and all test data that was obtained for acceptance, gradation, KYCT, and Hamburg testing within five working days once all testing has been completed for a lot to Central Materials Lab and the District Materials Engineer. Also, any data and or comments that the asphalt contractor or district personnel deem informational during this experimental phase, shall also be submitted to the Central Materials Lab and the District Materials Engineer. Any questions or comments regarding any item in this Special Note can be directed to the Central Office, Division of Materials, Asphalt Branch.

5.0 Payment

Any additional labor and testing equipment that is required to fabricate and test the KYCT and Hamburg specimens shall be considered incidental to the asphalt surface line item. The Department will perform the testing for the KYCT and Hamburg specimens if a producer does not possess the proper equipment.

June 15th, 2022

KENTUCKY TRANSPORTATION CABINET
Department of Highways
DIVISION OF RIGHT OF WAY & UTILITIES

TC 62-226
Rev. 01/2016
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RIGHT OF WAY CERTIFICATION

☐ Original	☒ Re-Certification	RIGHT OF WAY CERTIFICATION	
ITEM #	**COUNTY**	**PROJECT # (STATE)**	**PROJECT # (FEDERAL)**
5-367.20	Oldham/Jefferson	1381 JL04 93/56 6484601R	

PROJECT DESCRIPTION

Construct new route from Old Henry Interchange @ I-265 to Crestwood Bypass

☐ **No Additional Right of Way Required**

Construction will be within the limits of the existing right of way. The right of way was acquired in accordance to FHWA regulations under the Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970, as amended. No additional right of way or relocation assistance were required for this project.

☒ **Condition # 1 (Additional Right of Way Required and Cleared)**

All necessary right of way, including control of access rights when applicable, have been acquired including legal and physical possession. Trial or appeal of cases may be pending in court but legal possession has been obtained. There may be some improvements remaining on the right-of-way, but all occupants have vacated the lands and improvements, and KYTC has physical possession and the rights to remove, salvage, or demolish all improvements and enter on all land. Just Compensation has been paid or deposited with the court. All relocations have been relocated to decent, safe, and sanitary housing or that KYTC has made available to displaced persons adequate replacement housing in accordance with the provisions of the current FHWA directive.

☐ **Condition # 2 (Additional Right of Way Required with Exception)**

The right of way has not been fully acquired, the right to occupy and to use all rights-of-way required for the proper execution of the project has been acquired. Some parcels may be pending in court and on other parcels full legal possession has not been obtained, but right of entry has been obtained, the occupants of all lands and improvements have vacated, and KYTC has physical possession and right to remove, salvage, or demolish all improvements. Just Compensation has been paid or deposited with the court for most parcels. Just Compensation for all pending parcels will be paid or deposited with the court prior to AWARD of construction contract

☐ **Condition # 3 (Additional Right of Way Required with Exception)**

The acquisition or right of occupancy and use of a few remaining parcels are not complete and/or some parcels still have occupants. All remaining occupants have had replacement housing made available to them in accordance with 49 CFR 24.204. KYTC is hereby requesting authorization to advertise this project for bids and to proceed with bid letting even though the necessary right of way will not be fully acquired, and/or some occupants will not be relocated, and/or the just compensation will not be paid or deposited with the court for some parcels until after bid letting. KYTC will fully meet all the requirements outlined in 23 CFR 635.309(c)(3) and 49 CFR 24.102(j) and will expedite completion of all acquisitions, relocations, and full payments after bid letting and prior to AWARD of the construction contract or force account construction.

Total Number of Parcels on Project	42	**EXCEPTION (S) Parcel #**	**ANTICIPATED DATE OF POSSESSION WITH EXPLANATION**
Number of Parcels That Have Been Acquired			
Signed Deed	41		
Condemnation	1		
Signed ROE			

Notes/ Comments (Use Additional Sheet if necessary)

LPA RW Project Manager		Right of Way Supervisor	
Printed Name		Printed Name	
Signature		Signature	
Date		Date	

Right of Way Director		FHWA	
Printed Name		Printed Name	
Signature		Signature	
Date		Date	

UTILITIES AND RAIL CERTIFICATION NOTE

Oldham County
JL04 093 64846 01U
Mile point: 7.477 To 8.825
EXTENSION OF OLD HENRY ROAD EAST TO ASH AVENUE (12CCR) (18CCN) (2020CCR) (2022CCR)
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PROJECT NOTES ON UTILITIES

For all projects over 2000 linear feet, which are defined as a "Large Project" in KRS 367.4903(18), the awarded contractor shall initially mark the first 2000 linear feet minimally of proposed excavation or construction boundaries of the project to be worked using the procedure set forth in KRS 367.4909(9)(k). This temporary field locating of the project excavation boundary shall take place prior to submitting an excavation location request to the underground utility protection Kentucky Contact Center. For large projects, the awarded contractor shall work with the impacted utilities to determine when additional white lining of the remainder of the project site will take place. This provision shall not alter or relieve the awarded contractor from complying with requirements of KRS 367.4905 to 367.4917 in their entirety.

Please Note: The information presented in this Utility Note is informational in nature and the information contained herein is not guaranteed.

The contractor will be responsible for contacting all utility facility owners on the subject project to coordinate his activities. The contractor will coordinate his activities to minimize and, where possible, avoid conflicts with utility facilities. Due to the nature of the work proposed, it is unlikely to conflict with the existing utilities beyond minor facility adjustments. Where conflicts with utility facilities are unavoidable, the contractor will coordinate any necessary relocation work with the facility owner and Resident Engineer. The Kentucky Transportation Cabinet maintains the right to remove or alter portions of this contract if a utility conflict occurs. The utility facilities as noted in the previous section(s) have been determined using data garnered by varied means and with varying degrees of accuracy: from the facility owners, a result of S.U.E., field inspections, and/or reviews of record drawings. The facilities defined may not be inclusive of all utilities in the project scope and are not Level A quality, unless specified as such. It is the contractor's responsibility to verify all utilities and their respective locations before excavating.

The contractor shall make every effort to protect underground facilities from damage as prescribed in the Underground Facility Damage Protection Act of 1994, Kentucky Revised Statute KRS 367.4901 to 367.4917. It is the contractor's responsibility to determine and take steps necessary to be in compliance with federal and state damage prevention directives. The contractor is instructed to contact KY 811 for the location of existing underground utilities. Contact shall be made a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor shall submit Excavation Locate Requests to the Kentucky Contact Center (KY 811) via web ticket entry. The submission of this request does not relieve the contractor from the responsibility of contacting non-member facility owners, whom are to be contacted through their individual Protection Notification Center. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area. Non-compliance with these directives can result in the enforcement of penalties.

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NOTE: DO NOT DISTURB THE FOLLOWING FACILITIES LOCATED WITHIN THE PROJECT DISTURB LIMITS

AT&T KY – Communication

Charter Communications – Communication

Kentucky Wired, KCNA – Communication

Louisville Gas & Electric – Electric

Louisville Gas & Electric – Gas

Louisville Water Company – Water

Lumen Technologies - Communication

Metropolitan Sewer District – Sewer

The Contractor is fully responsible for protection of all utilities listed above

THE FOLLOWING FACILITY OWNERS ARE RELOCATING/ADJUSTING THEIR FACILITIES WITHIN THE PROJECT LIMITS AND WILL BE COMPLETE PRIOR TO CONSTRUCTION

Charter Communications – Communication - the company has relocated communication lines onto the Louisville Gas & Electric distribution pole route located west/north of Old Henry Road, running parallel to the roadway from Old Henry Trail to Woodmont Ridge Drive. The company has existing and relocated underground facilities located on the North side of KY 3084 from High Wickham Place to Bush Farm Road at station 1012+84.00. At station 1010+77.7 the company has constructed new underground facilities crossing Old Henry Road. From the new handhole on the east/south side of Old Henry Road the company has constructed more new underground facilities that parallel the roadway until connecting to existing facilities at Arnold Palmer Boulevard and then leaving the ROW.

Louisville Gas & Electric – Electric – the company owns the poles on the relocated distribution pole route located west/north of Old Henry Road, running parallel to the roadway from Old Henry Trail to Woodmont Ridge Drive.

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THE FOLLOWING FACILITY OWNERS HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE OWNER OR THEIR SUBCONTRACTOR AND IS TO BE COORDINATED WITH THE ROAD CONTRACT

AT&T KY – Communication - the company has facilities on the existing Louisville Gas & Electric pole route on the North side of the roadway from Old Henry Trail to the end of the project better described in the section above. The company has an existing underground facility starting at the beginning of the project Station 1004+00 on the N/W side and running parallel to Old Henry Road until Station 1036+00 at Old Henry Trail. This line has an existing crossing of Old Henry Road at station 1006+00. The company has an existing underground facility starting at Bush Farm Road on the S/E side of Old Henry Road until it crosses perpendicular to C/L approximately 145 feet south of the intersection of Arnold Palmer Blvd where it connects to the previously mentioned facility. The company has existing facilities on paralleling Old Henry Road on both sides of the roadway starting at Ridge Brook Circle and ending at stations 1070+38 52'LT and to station 1067+55 34'RT. The company has a buried phone crossing of Old Henry Road at station 1077+68. **AT&T anticipates completion of their relocation work by April 21, 2023**.

Louisville Gas & Electric – Natural Gas – the company has two existing 8-IN gas mains (one high pressure and one medium pressure located north/west of and running parallel to KY 3084 Old Henry Road from the beginning of the project to Old Henry Trail. This section includes two new 6" medium pressure crossings at station 1006+9.2 and station 1019+54.2. At Old Henry Trail a new medium pressure 8" medium pressure crosses Old Henry Road at station 1036+00 where it parallels Old Henry Road on the south/east until it leaves R/W. This main is typically offset at a minimum of 28' RT but will be installed under proposed pavement from station 1069+75 to station 1073+00. This main has multiple crossings of Old Henry Road with a 2" medium pressure crossing at 1054+17.7, a 4" medium pressure crossing at 1067+41.5, a 4" medium pressure crossing at 1080+63.6, and an 8" medium pressure crossing at 1086+64. There is a 4" medium pressure gas main that parallels the roadway from station 1077+8.5 to station 1080+52 with a minimum offset of 34' LT. **LG&E anticipates completion of their relocation work by April 21, 2023**.

Louisville Gas & Electric – Electric – the company will relocate the existing pole route on Ash Avenue after the contractor has completed the clearing work necessary for the extension. **LG&E anticipates that work to take approximately 2 months following the completion of the clearing work.**

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THE FOLLOWING FACILITY OWNERS HAVE FACILITIES TO BE RELOCATED/ADJUSTED BY THE ROAD CONTRACTOR AS INCLUDED IN THIS CONTRACT

Louisville Water Company – The Company has an existing 12" DPW water main that crosses KY 3084 at station 1018+43.2 that will be untouched by the project. The Company has a 12" ductile iron water main that is being relocated with this project. The water main starts at Old Henry Trail on the north/west side of the roadway. It runs parallel to Old Henry Road until it crosses to the east/south side of Old Henry Road approximately 100 feet south of the culvert being replaced at station 1072+51. From that crossing the relocated water main parallels the rest of Old Henry Road until it leaves Right-of-Way at the end of the project. There are additional 6", 8", and 12" crossings as noted in the utility relocation plans for distribution purposes.

Metropolitan Sewer District – The District has an existing 18" sanitary sewer that crosses Old Henry Road at Old Henry Trail where it then parallels Old Henry Road on the east/south until a manhole at station 1047+2.8 165.1' RT. From this manhole at the Factory Lane intersection, a new 18" sewer crossing of Old Henry Road is installed with a new 24" sewer being installed to cross the culvert channel 116' north of the new intersection of Old Henry Road at Factory Lane. Once across the creek the 24" sanitary sewer connects to a new manhole with connections to an existing 8" and 24" sanitary sewers.

RAIL COMPANIES HAVE FACILITIES IN CONJUNCTION WITH THIS PROJECT AS NOTED

☒ **No Rail Involvement** ☐ **Rail Involved** ☐ **Rail Adjacent**

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AREA FACILITY OWNER CONTACT LIST

1. All Points Broadband
   Manager
   148 Citizens Blvd
   Simpsonville, KY 40067

   DJ Anderson, Regional Operations

   Cell (502) 390-6806
   DAnderson@allpointsbroadband.com
   Vince West, Regional Operations

2. Atmos Energy
   105 Hudson Blvd
   Shelbyville, KY 40065

   Jake Basham
   Cell (270) 779-7381
   Jake.Basham@atmosenergy.com
   Silas Bohlen
   Cell (270) 570-0445
   Silas.Bohlen@atmosenergy.com

3. AT&T KY
   1340 E. John Rowan Blvd
   Bardstown, KY 40004

   Scott Roche
   Office (502) 348-4528
   Cell (502) 827-4703
   SR8832@att.com

4. AT&T Legacy
   7555 E. Pleasant Valley Road, Suite 140
   Independence, OH 44131

   AT&T Corporation, Long Haul

   Bill Taggart, Sr. Tech Project Manager
   WT2462@att.com
   Office (614) 868-2511
   Cell (614) 370-5414
   Don Garr, Cell (502) 741-8374
   DonGarr@outlook.com

5. Center Point Energy
   2520 Lincoln Drive
   Clarksville, IN 47129

   Jeff Donnelly, Transmission Department
   Office (812) 431-5670
   Jeff.Donnelly@centerpointenergy.com
   Chris Wood, Engineering Manager

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6. Charter Communications
   10168 Linn Station Road, Suite 120
   Louisville, KY 40223

   Nathen L Howerton
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   Cell (502) 639-6838
   Nathen.Howerton@charter.com
   Kevin Mercer
   Office (502) 357-4724
   Cell (502) 817-5055
   Kevin.Mercer@charter.com
   Michael York
   Cell (502) 548-1632
   Michael.York@charter.com

7. Crown Castle Network Operations
   10300 Ormsby Park Place, Suite 501
   Louisville, KY 40223

   Mona Couch
   Office (317) 249-2029
   Cell (317) 439-1578
   Mona.Couch@crowncastle.com
   Lisa Clark, Construction Manager
   (810) 223-3780
   Lisa.Clark@crowncastle.com

8. Crown Castle Fiber
   3310 Ruckreigel Parkway
   Jeffersontown, KY 40299

   Lisa Clark, Construction Manager
   (810) 223-3780
   Lisa.Clark@crowncastle.com
   Craig Brown, Network Construction
   Office (317) 819-8648
   Cell (585) 402-8342
   Craig.Brown@crowncastle.com

9. Intercarrier Networks, LLC
   Subsidiary of Great Plains Communications
   1600 Great Plains Center
   PO Box 500
   Blair, NE 68008

   Finley Engineering Company, Inc.
   2456 Fortune Drive, Suite 105
   Lexington, KY 40509

   CWulf@gpcom.com
   Nancye Allison, Consultant
   Office (859) 231-9831
   Cell (502) 541-3442
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   Dustin Nobbe
   (812) 209-9012
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10. Jefferson County Public Schools (JCPS)
    C B Young
    Building 6
    3001 Crittenden Drive
    Louisville, KY 40209

    Jeff Hardy
    Office (502) 485-7975
    Cell (502) 379-9315
    Jeff.Hardy@Jefferson.kyschools.us
    JDHardy70@gmail.com
    Scott McMahan (Team Fishel)
    Office (502) 456-2900
    Cell (502) 664-9312

11. Kentucky Wired, KCNA
    500 Mero Street – Suite 1-1 NC #59
    Frankfort, KY 40601

    Ledcor, Service Provider
    LTS Kentucky Managed Technical Services LLC
    2008 Mercer Rd. 2nd floor
    Lexington, KY 40511

    Mike Hayden,
    Chief Operating Officer
    Office (502) 782-2535
    Mike.Hayden@ky.gov
    Nick Blake
    Operations Manager
    Office (859) 286-8158
    Cell (859) 447-0781
    Nick.Blake@Ledcor.com

12. LG&E KU (Electric)
    820 West Broadway
    Louisville, KY 40202
    LG&E Emergency Number (502) 589-1444
    LG&E and KU Emergency Number 1-800-331-7370

    Caroline Justice
    Office (502) 627-3708
    Caroline.Justice@LGE-KU.com

13. LG&E (Gas)
    820 West Broadway
    Louisville, KY 40202
    Gas Emergency Number (502) 589-5511
    LG&E and KU Emergency Number 1-800-331-7370

    Caroline Justice
    Office (502) 627-3708
    Caroline.Justice@LGE-KU.com

14. Louisville Water Company
    550 South Third Street
    Louisville, KY 40202

    Pat Howard, PE
    Office (502) 569-3615
    Cell (502) 287-7568
    PHoward@lwcky.com

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15. Lumen Technologies Inc.
    11857 Commonwealth Drive
    Louisville, KY 40299

    Tim Sewell
    Tim.Sewell@lumen.com
    (502) 389-4812 / (502) 295-0940
    Richard Compton
    Richard.Compton@lumen.com

16. Marathon Pipeline, LLC
    539 South Main Street, Room X-05-018
    Findlay, OH 45840

    20-C Industrial Drive
    Lexington, OH 44904

    Austin Guyer
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    Cell: (317) 473-7441
    AGuyer@marathonpetroleum.com
    Aron Velasquez
    Office (419) 421-3704
    AdVelasquez@marathonpetroleum.com

17. Metropolitan Sewer District
    700 West Liberty Street
    Louisville, KY 40203-1911

    Brandon Flaherty
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    Greg Powell
    Greg.Powell@LouisvilleMSD.org

18. Mid - Valley Pipeline Company
    4910 Limaburg Road
    Burlington, KY 41005

    Richard (Todd) Calfee
    Office (859) 371-4469
    Cell (859) 630-8271
    Fax (866) 699-1185
    Todd.Calfee@energytransfer.com
    Justin White
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    Cell (859) 630-1823
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    Phillip Noel
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19. Shelby Energy Cooperative
    PO Box 311
    620 Old Finchville Road
    Shelbyville, KY 40065

    Dylan Staples - Manager of Engineeriing
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    Dylan@shelbyenergy.com
    Jason Ginn
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20. Texas Gas Transmission, LLC
    2332 Hwy 60 West
    Hardinsburg, KY 40143
    610 W 2nd Street
    PO Box 20008
    Owensboro, KY 42301

    10327 Gaslight Way
    Louisville, KY 40299

    Howard K. Menser Jr., Area Manager
    Office (502) 491-0251
    Cell (502) 396-2418
    Howard.Menser@bwpipelines.com
    Kevin Carman
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    Kevin.Carman@bwpmlp.com
    Amanda Isom
    (270) 688-5854
    (270) 231-7629
    Amanda.Isom@bwpmlp.com

21. T-Mobile (Sprint) Fiber Optics
    3007 Tucumcari Dr.
    Sardinia, OH 45171

    Steven T. Hughes
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    Cell (814) 553-2300
    Steven.Hughes1@T-Mobile.com

22. TRIMARC
    Public Safety & Transportation Systems
    901 West Main Street
    Louisville, KY 40202

    Todd Hood
    Office (502) 290-7201
    Cell (270) 307-7456
    Todd.Hood@peraton.com

23. Verizon
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    Indianapolis, IN 46225

    Verizon
    2421 Holloway Road
    Louisville, KY 40299

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24. Windstream
111 S. Main Street
Elizabethtown, KY 42701

James Galvin
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Windstream
Steve Johnson, Sr Engineer OSP
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Steve Johnson, Sr Engineer OSP
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Steve.Johnson@windstream.com

Ronald (Todd) Moore
(502) 818-7605
Ronald.Moore@windstream.com

25. Zayo
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Indianapolis, IN 46256

Jeff Beggs
Jeff.Beggs@zayo.com
765-655-3870

GENERAL UTILITY NOTES AND INSTRUCTIONS APPLICABLE TO ALL UTILITY WORK MADE A PART OF THE ROAD CONSTRUCTION CONTRACT

The contractor should be aware the following utility notes and KYTC Utility Bid Item Descriptions shall supersede, replace and take precedence over any and all conflicting information that may be contained in utility owner supplied specifications contained in the contract, on plans supplied by the utility owner, or any utility owner specifications or information externally referenced in this contract.

Where information may have been omitted from these notes, bid item descriptions, utility owner supplied specifications or plans; the KYTC Standard Specifications for Road and Bridge Construction shall be referenced.

PROTECTION OF EXISTING UTILITIES

The existing utilities shown on the plans are shown as best known at the time the plans were developed and are to be used as a guide only by the Contractor. The Contractor shall use all means at his disposal to accurately locate all existing utilities, whether shown on the plans or not, prior to excavation. The contractor shall protect these utilities during construction. Any damage to existing utilities during construction that are shown or not shown on the plans shall be repaired at the Contractor's expense.

PREQUALIFIED UTILITY CONTRACTORS

Some utility owners may require contractors that perform relocation work on their respective facilities as a part of the road contract be prequalified or preapproved by the utility owner**. Utility contractors may be added via addendum if KYTC is instructed to do so by the utility owner. Potential contractors must seek prequalification from the utility owner. Any revisions must be sent from the utility owner to KYTC a minimum of one week prior to bid opening.** Those utility owners with a prequalification or preapproval requirement are as follows:

The bidding contractor needs to choose a subcontractor who is a Louisville Water Company prequalified contractor in the categories of 6-inch to 12-inch ductile iron, and 2-inch to 12-in PVC water mains.

The bidding contractor needs to review the above list and choose from the list of approved subcontractors at the end of these general notes as identified above before bidding. When the list of approved subcontractors is provided, only subcontractors shown on the following list(s) will be allowed to work on that utility as a part of this contract. In such instances, the utility subcontractor is not required to be prequalified with the KYTC Division of Construction Procurement.

IF A UTILITY SUPPLIED CONTRACTOR LIST IS NOT PROVIDED

When the above list of approved subcontractors for the utility work is not provided, the utility work can be completed by the prime contractor, or a prime contractor-chosen subcontractor. In such instances, the subcontractor shall be prequalified with the KYTC Division of Construction Procurement in the work type of "Utilities" (I33). Those who would like to become prequalified may contact the Division of Construction Procurement at (502) 564-3500. Please note: it could take up to 30 calendar days for prequalification to be approved. The prequalification does not have to be approved prior to the bid, but must be approved before the subcontract will be approved by KYTC and the work can be performed.

CONTRACT ADMINISTRATION RELATIVE TO UTILITY WORK

All utility work is being performed as a part of a contract administered by KYTC; there is not a direct contract between the utility contractor and utility owner. The KYTC Section Engineer is ultimately responsible for the administration of the road contract and any utility work included in the contract.

SUBMITTALS AND CORRESPONDENCE

All submittals and correspondence of any kind relative to utility work included in the road contract shall be directed to the KYTC Section Engineer, a copy of which may also be supplied to the utility owner by the contractor to expedite handling of items like material approvals and shop drawings. All approvals and correspondence generated by the utility owner shall be directed to the KYTC Section Engineer. The KYTC Section Engineer will relay any approvals or correspondence to the utility contractor as appropriate. At no time shall any direct communication between the utility owner and utility contractor without the communication flowing through the KYTC Section Engineer be considered official and binding under the contract.

ENGINEER

Where the word "Engineer" appears in any utility owner specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the "Engineer" is the Kentucky Transportation Cabinet (KYTC) Section Engineer or designated representative and the utility owner engineer or designated representative jointly. Both engineers must mutually agree upon all decisions made with regard to the utility construction. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

INSPECTOR OR RESIDENT PROJECT REPRESENTATIVE

Where the word "Inspector" or "Resident Project Representative" appears in the utility specifications included in this proposal, utility owner specifications included as a part of this contract by reference or on the utility relocation plans, it shall be understood the "Inspector" or "Resident Project Representative" is the utility owner inspector and KYTC inspector jointly. The Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.

NOTICE TO UTILITY OWNERS OF THE START OF WORK

One month before construction is to start on a utility, the utility contractor shall make notice to the KYTC Section Engineer and the utility owner of when work on a utility is anticipated to start. The utility contractor shall again make confirmation notice to the KYTC Section Engineer and the utility owner one week before utility work is to actually start.

UTILITY SHUTDOWNS

The Contractor shall not shut down any active and in-service mains, utility lines or services for any reason unless specifically given permission to do so by the utility owner. The opening and closing of valves and operating of other active utility facilities for main, utility line or utility service shut downs are to be performed by the utility owner unless specific permission is given to the contractor by the owner to make shutdowns . If and when the utility owner gives the contractor permission to shutdown mains, utility lines or utility services, the contractor shall do so following the rules, procedures and regulations of the utility owner. Any permission given by the utility owner to the contractor to shutdown active and in-service mains, utility lines or services shall be communicated to the KYTC Section Engineer by the utility owner that such permission has been given.

Notice to customers of utility shut downs is sometimes required to be performed by the utility contractor. The contractor may be required; but, is not limited to, making notice to utility customers in a certain minimum amount of time in advance of the shut down and by whatever means of communication specified by the utility owner. The means of communication to the customer may be; but is not limited to, a door hanger, notice by newspaper ad, telephone contact, or any combination of communication methods deemed necessary, customary and appropriate by the utility owner. The contractor should refer to the utility owner specifications for requirements on customer notice.

Any procedure the utility owner may require the contractor to perform by specification or plan note and any expense the contractor may incur to comply with the utility owner's shut down procedure and notice to customers shall be considered an incidental expense to the utility construction.

CUSTOMER SERVICE AND LATERAL ABANDONMENTS When temporary or permanent abandonment of customer water, gas, or sewer services or laterals are necessary during relocation of utilities included in the contract, the utility contractor shall perform these abandonments as part of the contract as incidental work. No separate payment will be made for service line and lateral abandonments. The contractor shall provide all labor, equipment and materials to accomplish the temporary or permanent abandonment in accordance with the plans, specifications and/or as directed by the engineer. Abandonment may include, but is not limited to, digging down on a water or gas main at the tap to turn off the tap valve

or corporation stop and/or capping or plugging the tap, digging down on a sewer tap at the main and plugging or capping the tap, digging down on a service line or lateral at a location shown on the plans or agreeable to the engineer and capping or plugging, or performing any other work necessary to abandon the service or lateral to satisfactorily accomplish the final utility relocation.

STATIONS AND DISTANCES

All stations and distances, when indicated for utility placement in utility relocation plans or specifications, are approximate; therefore, some minor adjustment may have to be made during construction to fit actual field conditions. Any changes in excess of 6 inches of plan location shall be reviewed and approved jointly by the KYTC Section Engineer or designated representative and utility owner engineer or designated representative. Changes in location without prior approval shall be remedied by the contractor at his own expense if the unauthorized change creates an unacceptable conflict or condition.

RESTORATION

Temporary and permanent restoration of paved or stone areas due to utility construction shall be considered incidental to the utility work. No separate payment will be made for this work. Temporary restoration shall be as directed by the KYTC Section Engineer. Permanent restoration shall be "in-kind" as existing.

Restoration of seed and sod areas will be measured and paid under the appropriate seeding and sodding bid items established in the contract for roadway work.

BELOW ARE NOTES FOR WHEN "INST" ITEMS ARE IN THE CONTRACT MEANING THE UTILITY COMPANY IS PROVIDING CERTAIN MATERIALS FOR UTILITY RELOCATION

MATERIAL

Contrary to Utility Bid Item Descriptions, those bid items that have the text **"Inst"** at the end of the bid item will have the major components of the bid item provided by the utility owner. No direct payment will be made for the major material component(s) supplied by the utility company. All remaining materials required to construct the bid item as detailed in utility bid item descriptions, in utility specifications and utility plans that are made a part of this contract will be supplied by the contractor. The contractor's bid price should reflect the difference in cost due to the provided materials.

The following utility owners have elected to provide the following materials for work under this contract:

> ***No materials are being supplied by the utility owner(s). All materials are to be supplied by the contractor per bid item descriptions, utility specifications and utility plans."***

SECURITY OF SUPPLIED MATERIALS

If any utility materials are to be supplied by the utility owner, it will be the responsibility of the utility contractor to secure all utility owner supplied materials after delivery to the project site. The utility contractor shall coordinate directly with the utility owner and their suppliers for delivery and security of

the supplied materials. Any materials supplied by the utility owner and delivered to the construction site that are subsequently stolen, damaged or vandalized and deemed unusable shall be replaced with like materials at the contractor's expense.

Standard Water Bid Item Descriptions

W AIR RELEASE VALVE This bid item description shall apply to all air release valve installations of every size except those defined as "Special". This item shall include the air release valve, main to valve connecting line or piping, manhole, vault, structure, access casting or doors, tapping the main, labor, equipment, excavation, proper backfill and restoration required to install the air release valve at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. All air release/vacuum valves on a project shall be paid under one bid item regardless of size. No separate pay items will be established for size variations. Only in the case of the uniqueness of a particular air release valve would a separate bid item be established. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

BOLLARDS This item is for payment for furnishing and installing protective guard posts at above ground utility installations. A bollard may consist of, but not limited to, a steel post set in concrete or any other substantial post material. This item shall include all labor, equipment, and materials needed for complete installation of the bollard as specified by the utility owner specifications and plans. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

NOTE: A bid code for this item has been established in standard roadway bid items and shall be used for payment of this item. The bid code is 21341ND

W CAP EXISTING MAIN This item shall include the specified cap, concrete blocking and/or mechanical anchoring, labor, equipment, excavation, backfill, and restoration required to install the cap at the location shown on the plans or as directed in accordance with the specifications. This item is not to be paid on new main installations. This pay item is only to be paid to cap existing mains. Caps on new mains are incidental to the new main. Any and all caps on existing mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W DIRECTIONAL BORE Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of water main under streets, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W ENCASEMENT CONCRETE Includes all labor, equipment, excavation, concrete, reinforcing steel, backfill, restoration, and etc., to construct the concrete encasement of the water main as shown on the plans, and in accordance with the specifications and standard drawings. Payment under this item shall be in addition to the carrier pipe as paid under separate bid items. Carrier pipe is not included in this bid item. Any and all concrete encasement shall be paid under one bid item included in the contract regardless of the size of the carrier pipe or the volume of concrete or steel reinforcement as specified in the plans and specifications. No separate bid items will be established for size variations. Measurement of pay quantity shall be from end of concrete to end of concrete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W ENCASEMENT STEEL BORED This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W ENCASEMENT STEEL OPEN CUT This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to open cut and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W FIRE HYDRANT ADJUST Includes all labor, equipment, excavation, materials, and backfill to adjust the existing fire hydrant using the fire hydrant manufacturer's extension kit for adjustments of 18" or less. Adjustments greater than 18" require anchoring couplings and vertical bends to adjust to grade. The Contractor will supply and install all anchor couplings, bends, fire hydrant extension, concrete blocking, restoration, granular drainage material, etc, needed to adjust the fire hydrant complete and ready for use as shown on the plans, and in accordance with the specifications and standard drawings. This also includes allowing for the utility owner inspector to inspect the existing fire hydrant prior to adjusting, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

W FIRE HYDRANT ASSEMBLY Includes all labor, equipment, new fire hydrant, isolating valve and valve box, concrete pad around valve box (when specified in specifications or plans), piping, anchoring tee, anchoring couplings, fire hydrant extension, excavation, concrete blocking, granular drainage material, backfill, and restoration, to install a new fire hydrant assembly as indicated on plans and on standard drawings compete and ready for use. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FIRE HYDRANT RELOCATE This item includes all labor and equipment to remove the existing fire hydrant from its existing location and reinstalling at a new location. This item shall include a new isolating valve and valve box, concrete pad around valve box (when required in specifications or plans), new piping, new anchoring tee, anchoring couplings, fire hydrant extensions, concrete blocking, restoration, granular drainage material, excavation, and backfill as indicated on plans, specifications, and on standard drawings compete and ready for use. This item shall also include allowing for utility owner inspector to inspect the existing fire hydrant prior to reuse, contractor returning unusable fire hydrants to the utility owner warehouse and picking up a replacement hydrant for use, if the existing fire hydrant is determined unfit for reuse. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FIRE HYDRANT REMOVE This bid item includes removal of an abandoned fire hydrant, isolating valve, and valve box to the satisfaction of the engineer. The removed fire hydrant, isolating valve and valve box shall become the property of the contractor for his disposal as salvage or scrap. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FLUSH HYDRANT ASSEMBLY This item shall include the flushing hydrant assembly, service line, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the flush hydrant at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W FLUSHING ASSEMBLY This item shall include the flushing device assembly, service line, meter box and lid, tapping the main, labor, equipment, excavation, backfill, and restoration required to install the

flushing device at the location shown on the plans and in accordance with the specifications and standard drawings, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W LEAK DETECTION METER This item is for payment for installation of a water meter at main valve locations where shown on the plans for detection of water main leaks. The meter shall be of the size and type specified in the plans or specifications. This item shall include all labor, equipment, meter, meter box or vault, connecting pipes between main and meter, main taps, tapping saddles, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. No separate payment will be made under any other contract item for connecting pipe or main taps. Any and all leak detection meters shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete and ready for use.

W LINE MARKER This item is for payment for furnishing and installing a water utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

W MAIN POINT RELOCATE This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing water main at point locations such as to clear a conflict at a proposed drainage structure, pipe or any other similar short relocation situation, and where the existing pipe material is to be reused. The contractor shall provide any additional pipe or fitting material needed to complete the work as shown on the plans and specifications. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. New polyethylene wrap is to be provided (if wrap exists or is specified in the specifications to be used). If it is necessary that the pipe be disassembled for relay, payment under this item shall also include replacement of joint gaskets as needed. Bedding and backfill shall be provided and performed the same as with any other pipe installation as detailed in the plans and specifications. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Water Main Relocate shall not be paid on a linear feet basis; but, shall be Paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

W METER This item is for payment for installation of all standard water meters of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER ADJUST This item includes all labor, equipment, excavation, materials, backfill, restoration, and etc., to adjust the meter casting to finished grade (whatever size exists) at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER RELOCATE This item includes all labor, equipment, excavation, additional fittings, disinfection, testing, restoration, and etc., to relocate the existing water meter (whatever size exists), meter yoke, meter box, casting, and etc., from its old location to the location shown on the plans or as directed, in accordance with the specifications and standard drawings complete and ready for use. The new service pipe (if required) will be paid under short side or long side service bid items. Any and all meter relocations of 2 inches or less shall be paid under one bid item included in the contract regardless of size. Each individual relocation shall be paid individually under this item; however, no separate bid items will be established for meter size variations of 2 inches ID or less. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER VAULT SIZE RANGE 1 OR 2 This item is for payment for installation of an underground structure for housing of a larger water meter, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s) valve(s), all piping, and fitting materials associated with installing a functioning meter and vault in accordance with the plans, standard drawings, and specifications, complete and ready for use. The size shall be the measured internal diameter of the meter and piping to be installed. The size meter vault to be paid under size 1 or 2 shall be as follows:

Size Range 1 = All meter and piping sizes greater than 2 inches up to and including 6 inches
Size Range 2 = All meter and piping sizes greater than 6 inches

This item shall be paid EACH (EA) when complete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

W METER/FIRE SERVICE COMBO VAULT This item is for payment for installation of an underground structure for housing of a water meter and fire service piping, fittings, and valves as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or access doors, the specified meter(s), valve(s), all piping, and fitting materials associated with installing a functioning meter and fire service vault in accordance with the plans and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W METER WITH PRESSURE REDUCING VALVE (PRV) This item is for payment for installation of all standard water meters with pressure reducing valves (PRV) of all sizes 2 inches ID or less as specified on the plans. This item shall include all labor, equipment, meter, PRV, meter box, casting, yoke, and any other associated material needed for installation of a functioning water meter with PRV in accordance with the plans and specifications, complete and ready for use. This item shall include connections to the new or existing water service line. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

This item shall be paid EACH (EA) when complete.

W PIPE This description shall apply to all PVC, ductile iron, and polyethylene/plastic pipe bid items of every size and type to be used as water main, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, sanitizing, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This item shall include all temporary and permanent materials and equipment required to pressure test and sanitize mains including, but not limited to, pressurization pumps, hoses, tubing, gauges, main taps, saddles, temporary main end caps or plugs and blocking, main end taps for flushing, chlorine liquids or tablets for sanitizing, water for testing/sanitizing and flushing (when not supplied by the utility), chlorine neutralization equipment and materials, and any other items needed to accomplish pressure testing and sanitizing the main installation. This item shall also include pipe anchors, at each end of polyethylene pipe runs when specified to prevent the creep or contraction of the pipe. Measurement of quantities under this item shall be through fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W PLUG EXISTING MAIN This item shall include the specified plug, concrete blocking and/or anchoring, labor, equipment, excavation, backfill, and restoration required to install the plug in an existing in-service main that is to remain at the location shown on the plans or as directed in accordance with the specifications. Any and all plugs on all existing in-service mains shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

NOTE: This utility bid item is not to be paid on new main installations or abandoned mains. This pay item is to plug existing in-service mains only. Plugs on new mains are incidental to the new main just like all other fittings.

NOTE: Plugging of existing abandon mains shall be performed and paid in accordance with Section 708.03.05 of KYTC Standard Specifications For Road And Bridge Construction and paid using Bid Code 01314 Plug Pipe.

W PRESSURE REDUCING VALVE This description shall apply to all pressure reducing valves (PRV) of every size required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for PRVs being installed with new main. This item includes the PRV as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), pit or vault, backfill, restoration, testing, disinfection, and etc., required to install the specified PRV at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, PRVs shall be restrained. PRV restraint shall be considered incidental to the

PRV and adjoining pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W PUMP STATION This item is for payment for installation of pumps and an above or below ground structure for housing of the pumps. This item shall include all pumps, piping, fittings, valves, electrical components, building materials, concrete, any other appurtenances, labor, equipment, excavation, and backfill, to complete the pump station installation as required by the plans, standard drawings, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LUMP SUM (LS) when complete.

W REMOVE TRANSITE (AC) PIPE This item shall include all labor, equipment, and materials needed for removal and disposal of the pipe as hazardous material. All work shall be performed by trained and certified personnel in accordance with all environmental laws and regulations.
Any and all transite AC pipe removed shall be paid under one bid item included in the contract regardless of size. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

W SERVICE LONG SIDE This bid item description shall apply to all service line installations of every size bid up to and including 2 inch inside diameter, except those service bid items defined as "Special". This item includes the specified piping material, main tap, tapping saddle (if required), and corporation stop materials, coupling for connecting the new piping to the surviving existing piping, encasement of 2 inches or less internal diameter (if required by plan or specification), labor, equipment, excavation, backfill, testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service installations where the ends of the service connection are on opposite sides of the public roadway and the service line crosses the centerline of the public roadway as shown on the plans. The length of the service line is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for special bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W SERVICE SHORT SIDE This bid item description shall apply to all service line installations of every size up to and including 2 inch internal diameter, except those service bid items defined as "Special". This item includes installation of the specified piping material of the size specified on plans, encasement of 2 inches or less internal diameter (if required by plan or specification), main tap, tapping saddle (if required), corporation stop, coupling for connecting the new piping to the surviving existing piping, labor, equipment, excavation, backfill, testing, disinfection, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and

ready for use. This bid item is to pay for service installations were both ends of the service connection are on the same side of the public roadway, or when an existing service crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service line is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the service crosses a private residential or commercial entrance; but, not a public roadway.
Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. This pay item does not include installation or relocation of meters. Meters will be paid separately. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W SERVICE RELOCATE This item is for the relocation of an existing water service line where a meter is not involved, and where an existing service line can easily be adjusted by excavating alongside and moving the line horizontally and/or vertically a short distance without cutting the service line to avoid conflicts with road construction. This item shall include excavation, labor, equipment, bedding, and backfill to relocate the line in accordance with the plans and specifications complete and ready for use. Payment under this item shall be for each location requiring relocation. Payment shall be made under this item regardless of service size or relocation length. No separate pay items will be established for size or length variation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W STRUCTURE ABANDONMENT This item is to be used to pay for abandonment of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this time shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., abandonment of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted fill or flowable fill for abandonment of the structure in place and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W STRUCTURE REMOVAL This item is to be used to pay for removal of larger above or below ground water structures such as meter vaults, fire pits, pump stations, tanks, and etc. Payment under this time shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to water construction, (i.e., removal of standard water meters up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted backfill for removal of the structure and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W TAPPING SLEVE AND VALVE SIZE 1 OR 2 This item shall include the specified tapping sleeve, valve, valve box, concrete pad around valve box (when required in specifications or plans), labor, and equipment to install the specified tapping sleeve and valve, complete and ready for use in accordance with

the plans and specifications. The size shall be the measured internal diameter of the live pipe to be tapped. The size tapping sleeve and valve to be paid under sizes 1 or 2 shall be as follows:

Size 1 = All live tapped main sizes up to and including 8 inches
Size 2 = All live tapped main sizes greater than 8 inches

Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W TIE-IN This bid description shall be used for all main tie-in bid items of every size except those defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, blocking, anchoring, restoration, disinfection, testing and backfill required to make the water main tie-in as shown on the plans, and in accordance with the specifications complete and ready for use. Pipe for tie-ins shall be paid under separate bid items. This item shall be paid EACH (EA) when complete.

W VALVE This description shall apply to all valves of every size required in the plans and specifications except those bid items defined as "Special". Payment under this description is to be for gate or butterfly valves being installed with new main. This item includes the valve as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), valve box and valve stem extensions, backfill, concrete pad around valve box (if required by specification), restoration, testing, disinfection, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, valves shall be restrained. Valve restraint shall be considered incidental to the valve and adjoining pipe. This description does not apply to cut-in valves. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE ANCHOR EXISTING This bid item is intended to pay for installation of restraint hardware on an existing valve where no restraint exists to hold the valve in place to facilitate tie-ins and other procedures where restraint is prudent. This work shall be performed in accordance with water specifications and plans. This bid item shall include all labor equipment, excavation, materials and backfill to complete restraint of the designated valve, regardless of size, at the location shown on the plans, complete and ready for use. Materials to be provided may include, but is not limited to, retainer glands, lugs, threaded rod, concrete, reinforcing steel or any other material needed to complete the restraint. Should the associated valve box require removal to complete the restraint, the contractor shall reinstall the existing valve box, the cost of which shall be considered incidental to this bid item. No separate bid items are being provided for size variations. All sizes shall be paid under one bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE BOX ADJUST Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, and etc., to adjust the top of the box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE CUT-IN This bid description is for new cut-in valve installations of all sizes where installation is accomplished by cutting out a section of existing main. This item shall include cutting the existing pipe, supplying the specified valve, couplings or sleeves, valve box, concrete pad around valve box (when required in specifications or plans), labor, equipment, and materials to install the valve at the locations shown on the plans, or as directed by the engineer, complete and ready for use. Any pipe required for installation shall be cut from that pipe removed or supplied new by the contractor. No separate payment will be made for pipe required for cut-in valve installation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

W VALVE VAULT This item is for payment for installation of an underground structure for housing of specific valve(s) as required by the plans and specifications. This item shall include all labor, equipment, excavation, concrete, manhole castings or doors, the specified valve(s), all piping, and fitting materials associated with installing a functioning valve vault in accordance with the plans, standard drawing, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

2022

TECHNICAL SPECIFICATIONS
AND
STANDARD DRAWINGS
FOR
4” – 20” PIPELINE CONSTRUCTION

Louisville Water

LOUISVILLE WATER COMPANY
LOUISVILLE, KENTUCKY

SPENCER W. BRUCE, P.E. – PRESIDENT
TIMOTHY KRAUS, P.E. – VICE PRESIDENT, CHIEF ENGINEER

LOUISVILLE WATER COMPANY
TECHNICAL SPECIFICATIONS AND STANDARD DRAWINGS
4” – 20” PIPELINE CONSTRUCTION
2022

The Technical Specifications and Standard Drawings are provided as a technical resource for the construction of water projects managed and contracted by the Louisville Water Company. The Technical Specifications and Standard Drawings will apply to water projects with 4-inch through 20-inch pipeline sizes. All work shall be performed in accordance with accepted workmanship practices and the Technical Specifications and Standard Drawings.

The Technical Specifications and Standard Drawings revisions shall become effective immediately upon formal adoption by the Chief Engineer of the Louisville Water Company and shall supersede all former Technical Specifications and Standard Drawings for Pipeline Construction. Revisions are planned on a 5-year cycle. A copy of the current edition of the Technical Specifications and Standard Drawings may be obtained from the Chief Engineer at the 550 S. Third St. office, the Louisville Water Supervisor of Construction Inspection, Construction Inspection Services at the 4801 Allmond Ave. office, or at Louisville Water.com.

The Technical Specifications and Standard Drawings have been prepared under the direction of the Vice President / Chief Engineer on behalf of the Louisville Water Company and no part of the Technical Specifications and Standard Drawings may be reproduced or copied in any form without the written prior consent of the Vice President / Chief Engineer.

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TECHNICAL SPECIFICATIONS FOR PIPELINE CONSTRUCTION

1. GENERAL REQUIREMENTS

1.1 Pre-construction Valve Inspection

Prior to the beginning of construction, the Contractor shall be responsible for locating and inspecting all existing valves associated with the work to be done. Specific valve information and locations can be found in the **SUPPLEMENTARY SPECIFICATIONS**. Inspection work to be done on these valves shall be included in the Contractor's base bid, and shall consist of the following:

A. Locate the valve in the field. Valve boxes that are paved over or buried shall be uncovered and made accessible.

B. Inspect key tubes and operating nut. Key tubes shall be cleared of debris and the operating nut made accessible. Gate Keys must be placed and turned on Gate Valve Operating Nuts to ensure the functional operation of the valve. Company's Inspector must be present when operating gate valves.

C. Valve boxes (round tops) and lids shall be raised to grade where necessary.

Any valve determined by the Company to be inoperative shall be excavated and repaired or replaced by the Contractor as deemed necessary by the Company's Project Manager. Unit costs shall be as submitted by the Contractor in the **BIDDER'S PROPOSAL** form.

Except in cases of emergency, the Contractor shall not operate any valve without the direct supervision of the Company's Project Manager or Inspector. In an emergency, the Company's Inspector and Company's Radio Room shall be immediately notified by the Contractor. The Company's Radio Room direct phone line is (502) 569-3600, ext. 2700.

1. 2 Signage

1.2.1 Project Identification

The Contractor is required to install a project sign on each end of the project limits, at a minimum, unless on dead end roads where only one sign will be required. The sign shall be furnished by the Company and consist of a 4ft. x 4ft. or a 4ft. x 8ft. sheet of 1/4in. corrugated plastic board. The Contractor

shall supply the materials to install the sign using two – 4in. x 4in. posts by 10ft. in length set in concrete anchors with 18in. diameter and 3ft deep, primed and painted white, or other suitable posting method approved by the Company's Inspector.

The Contractor shall supply the materials to mount the sign to the posts using three – 2 ½ in. galvanized lag bolts with 1in. diameter galvanized washers on each post. The Contractor must install the signs prior to beginning any work and not remove the signs until final restoration is approved. Project Identification signs may not be required on new development projects, Kentucky Transportation Cabinet projects, on non-public roadways or projects less than 500 ft. The Project Identification signs shall be returned to Allmond Avenue inspection after project completion by the Contractor.

1.2.2 Contractor Vehicle Signage

The Contractor is required to display Louisville Water Contractor magnetic signs on both sides of all licensed vehicles when performing Louisville Water project contract work. The Company's Inspector will assign and collect magnetic signs on a project basis.

1.3 Traffic Control, Permits, and Regulations

1.3.1 Traffic Control

Wherever the excavation is in right-of-way, the Contractor shall conduct their operations so that at least one lane of traffic is always kept open, unless otherwise approved by the permitting agency. Where the excavation is performed in an intersection, the work shall be completed in one work day, including backfilling, placement of a concrete cap, or temporary bituminous pavement. Temporary paving restoration shall be adequately maintained until permanent pavement is placed.

A traffic control plan is required by the permitting agency and shall be provided by the Contractor to the Company's Project Manager prior to the permit request. The plan shall be digitally drafted utilizing an approved software and shall be in accordance with the Kentucky Department of Highways and/or Louisville Metro Public Works regulations and templates. The traffic control plan will be prepared by the Contractor and submitted by the Company to the respective agencies with the requested permit.

Traffic control shall be in accordance with the Federal Highway Administration Part VI of the Manual on Uniform Traffic Control Devices (MUTCD) latest edition.

Traffic control on streets shall be in accordance with requirements of appropriate City or County jurisdiction.

Specific signing and traffic control are incidental to this project and shall be determined by representatives from the appropriate agencies. No extra payment will be made for placement of these traffic controls.

Specific traffic control signage referencing lane blockages, detours, flaggers, etc. shall be removed from the site or covered when not in use. Signs that provide general messages such as "Construction Ahead" shall be left in place throughout the completion of the project.

The contractor shall be responsible for establishing temporary "No Parking" zones. The zones shall be confined to the immediate work area and appropriate transition zones and shall be limited in duration to the length of time work is performed in that area.

All construction vehicles shall be legally parked. Privately owned vehicles including vehicles owned by the construction crew shall not be parked in the "No Parking" zones.

1.3.2 Encroachment Permits

A road permit will be required for work performed within the right-of-way limits. No construction work shall start until these permits are obtained and provided to the Contractor by the Company. A copy of any approved permits obtained by the Contractor shall be provided to the Company's Project Manager and Inspector before work shall be begin.

Applicable permits shall be obtained by the Company from the appropriate agency: Louisville Metro Public Works, Louisville Metro Parks, Bullitt County Road Department, Oldham County Public Works, Kentucky Department of Highways and / or any other Jurisdictional Authority that governs the location within which work will be conducted for installing water mains in public right-of-way. The Contractor shall coordinate their time schedule for performing this work with the Company's Project Manager in order that the appropriate authority can be notified of the progress of construction. Special attention is directed to the working hours as specified by any of these traffic control departments in their respective permit.

A minimum fourteen (14) day advanced notice of the need for a permit shall be provided to the Company's Project Manager. Copies of the permit(s), along with the approved traffic control plan, shall be on-site, readily available, legible and displayed in construction vehicles used at the project site. The Contractor will be responsible for obtaining appropriate permits for

Joint-Bid Projects (i.e. Kentucky Transportation Cabinet (KTC) Projects, MSD Projects, or Developer Installed Projects, etc.).

The Contractor shall submit a traffic control plan to the Company's Project Manager with the request for the permit. As a minimum, the traffic control plan shall include lanes to be blocked, "No Parking" zones to be created, parking meters to be "bagged", method of controlling traffic, designated work hours, and proposed work schedule. Contractors must use certified traffic control devices and not deviate from the approved Traffic Control Plans unless directed by the Jurisdictional Authority and any such deviation shall be documented.

Unless specifically approved by the Permitting Agency, all roadways (including side roads) shall remain open, with traffic maintained in a safe manner. Outside the designated work hours, all travel lanes shall be temporarily restored and reopened to traffic, and all construction vehicles, equipment, and personnel removed from the roadway.

1.3.3 Crossing of Roads

With respect to all roadways: water main crossings, fire hydrant crossings, and/or service crossings shall be bored, jacked, or tunneled as specified within these Contract Documents. Any alteration(s) to the above shall require written approval from both the Company's Project Manager and the Jurisdictional Authority prior to the work being performed. Any additions and/or deletions in roadway bores/jacks/tunnels from those included in the project's scope of work shall require compensation adjustment in accordance with the **BIDDER'S PROPOSAL** form's Supplementary Unit Prices (if applicable) or with **CHANGES IN THE WORK**, in the **TERMS AND CONDITIONS** (if said Supplementary Unit Prices are not applicable).

1.3.4 Parking Meter Permit

The Contractor shall arrange for and pay for a permit as required by Louisville Metro Public Works Ordinance Title VII Traffic Code: Chapter 72: Parking Regulations for the bagging of all parking meters affected by the construction. Issuance and enforcement are administered by the Louisville Metro Public Works. Information may be obtained at the following address. All costs shall be included in the Contractor's base bid.

Louisville Metro Public Works
444 South 5th Street
Louisville, Kentucky 40202

1.3.5 Soil Erosion and Sediment Control Permit

The Contractor shall abide by and shall arrange for and pay for any and all permits involving the Kentucky Division of Water regulations pertaining to erosion and sediment control requirements as administered by the Louisville and Jefferson County Metropolitan Sewer District (MSD) or other jurisdictional authority where required. The Contractor shall comply with the applicable provisions of KRS Chapters 220 and 224 of the State Water Pollution Control Laws and other applicable statutes relating to the prevention and/or abatement of water pollution.

Projects involving disturbed areas of more than one (1) acre shall require the Contractor to submit a "Notice of Intent" Letter to the Kentucky Division of Water, as well as an "Erosion and Sediment Control" plan submitted to MSD for MSD's approval where required.

In any event, regardless of the size of the project, the Contractor shall: exercise every reasonable precaution at all times to prevent water pollution by the erosion and deposition of sediment in streams, lakes, and reservoirs; conduct and schedule operations so as to avoid or minimize the muddying or siltation of areas adjacent to the construction site including streets, storm sewers, vacant lots, etc.; and not leave partially completed areas of work in a manner that will contribute to erosion during the period in which work is suspended.

For each stream crossing (a "stream" being defined as a so-called blue-line stream, either solid or broken, as shown on the United States Geological Survey (USGS) quadrangle map), the Company shall apply for a construction permit, or for an exemption thereto, from the Kentucky Division of Water, if applicable, (see Section 1.3.6). In any event, the Contractor shall: utilize adequate and environmentally-responsible construction practices, placing silt control prior to the start of construction and maintaining it until vegetation has been established; revegetate all disturbed areas upon completion of construction; maintain at least three and one-half feet (3 ½') of cover over the top of pipe with respect to the stream bed elevation; and obtain approval from MSD where required, prior to the start of construction, of an "Erosion and Sediment Control" plan.

Louisville Water hereby gives notice to Contractors (and, Contractors are directed to provide notice to their employees, agents, assigns and Contractor's subcontractors, their employees, agents and assigns, and Contractor's suppliers, their employees, agents and assigns on the project site) that Louisville Water holds an Erosion Prevention Sediment Control Plan General Permit issued by MSD, pursuant to the Louisville/Jefferson County Metro Government Code of Ordinance No. 186, Series 2007 (amending Jefferson County Ordinance Chapter 159), Erosion Prevention

and Sediment Control, and, that certain activities require additional Individual Site Disturbance Permits, also issued by MSD, pursuant to the Louisville/Jefferson County Metro Government Code of Ordinance No. 186, Series 2007, Erosion Prevention and Sediment Control.

Pursuant to the requirements of that General Permit where required and any required individual site disturbance permits, Louisville Water further gives notice to Contractors of the County's Erosion Prevention and Sediment Control Ordinance. Louisville Water hereby expressly requires Contractors, their employees, agents, and assigns and Contractor's subcontractors, their employees, agents and assigns, and Contractor's suppliers, their employees, agents and assigns on the project site to comply with the provisions of that Ordinance and all permits, General and Individual, as part of the required compliance with "any federal, state or local government statute, ordinance, regulation and law which controls or limits in any way the actions of persons working on the project and which affects the purchase, installation, or disposition of any materials related to the project" ─set out in **CONTRACTOR'S RESPONSIBILITIES**, in the **TERMS AND CONDITIONS**.

The Contractor's responsibility for compliance with the Erosion Prevention and Sediment Control Ordinance is in addition to those set out in **CONTRACTOR'S RESPONSIBILITIES**, in the **TERMS AND CONDITIONS.**

See Standard Drawing: 4501 in Appendix of Drawings.

1.3.6 Stream – Wetland Crossing Permit

The Kentucky Division of Water (KDOW) requires a General Water Quality Certification (W.Q.C.) Permit #12 for the crossing of streams or wetlands. It is not necessary to apply for an individual General Water Quality Certification (W.Q.C.) Permit #12 unless the stream is classified as an Outstanding, Exceptional, or Cold Water stream (Special Waters) by the KDOW. Listings of streams with these classifications can be found on KDOW's webpage: eec.ky.gov

For subfluvial (streams and rivers) pipe crossings, a flood plain construction permit will not be required pursuant to KRS 151.250 if the following requirements of 401 KAR 4:050 Section 2 are met:

- No material shall be placed in the stream or in the flood plain of the stream to form construction pads, coffer dams, access roads, etc. during construction of pipe crossings.

- Crossing trenches shall be backfilled as closely as possible to the

original contour.

- All excess material resulting from construction displacement in a crossing trench shall be disposed of outside the flood plain.

- For erodible channels, there must be at least three and one half (3.5) feet of backfill on top of all pipe or conduit (casing) points in the crossing.

- For non-erodible channels, pipes or conduits (casing) in the crossing shall be encased on all sides by at least six (6) inches of concrete with all pipe or conduit (casing) points in the crossing at least six (6) inches below the original contour of the channel.

For subfluvial (streams and rivers) pipe crossings greater than fifteen (15) feet in width:

- The water main shall be of special construction, having flexible, restrained, or welded watertight joints.

- Valves shall be provided at both ends of the water crossings so that the section can be isolated for testing or repair.

- Valves shall be easily accessible, not subject to flooding, and if closest to the supply source, shall have a meter vault installed with permanent taps made on each side of the valve to allow insertion of a small meter to determine leakage and for sampling purposes.

See Standard Drawings: 1608 & 4501 in Appendix of Drawings.

1.4 Project Drawings and Specifications

1.4.1 General

The Contractor shall make available a set of stamped plans and specifications at the job site at all times, including all addendums, revisions, changes, etc.

1.4.2 Combined Specification

This specification discusses the installation of ductile iron pipe, PVC (polyvinyl chloride) pipe, ductile iron appurtenances, and other project specified piping and materials.

The type of pipe to be installed is specified on the stamped plans or in the **SUPPLEMENTARY SPECIFICATIONS**.

1.5 Daily Materials Installed Form

The Contractor shall maintain the Daily Materials Installed forms supplied by the Company as a record of the pipe, fittings, and valves installed each day, and shall provide same to the Company's Inspector daily. Pipeline materials shall be listed on the form in the same sequence as installed.

1.6 Video Recording

Prior to the start of construction, the Contractor shall provide one (1) original walking, narrative continuous DVD video, or other acceptable media approved by the Company's Project Manager representative of the complete project area. The video should include narration of the video footage, verbal descriptions of the locations shown, and at a speed which clearly shows the condition of all areas which could be affected by project construction.

2. CONDUCT OF WORK

2.1 Safety

Wherever necessary, to prevent caving during the excavating of sand, gravel, sandy soil, or other unstable material, the trench shall be adequately sheeted, braced, and drained. The trench shall be maintained in accordance with OSHA regulations so that workers may work thereon safely and efficiently, and vehicular and pedestrian traffic, livestock, and animals are protected at the worksite. It is essential that trench pumps discharge into natural drainage channels or drain toward storm drains in compliance with regulatory agency requirements.

Any excavated materials to be stockpiled, shall be piled in a manner that will not endanger personnel, property, adjacent properties and pedestrians, and will not obstruct driveways, sidewalks, or thoroughfares. Drainage lines shall not be obstructed.

With respect the entry of and/or working within confined spaces, the Contractor shall abide by the KOSHA Standards referenced by 803 KAR 2:300 thru 2:320 for General Industry and 803 KAR 2:240 thru 2:423 for Construction Standards, plus any and all additional related regulations required by the Commonwealth of Kentucky.

For questions or concerns relating to this matter, the Contractor shall contact the KOSHA–Kentucky Occupational Safety & Health Program, (phone (502) 564-3070).

2.2 Jobsite / Work Area Cleanliness

The Contractor shall routinely and regularly remove all dirt and rubbish resulting from its operations and shall keep the jobsite or work area neat and tidy.

When its work is complete, it shall at once remove from the premises all tools and machinery belonging to the Contractor and all rubbish in connection with the work and render the jobsite or work area clean and free from all obstructions, delivering the work at completion whole, clean, tight, and ready for use, with the grounds in a neat and presentable condition.

2.3 Cooperation

The Contractor shall cooperate with local governing agencies, Kentucky Department of Highways, Louisville Water, other utilities, and other contractors to cause as little interference as possible, to avoid inconvenience and delay, and to facilitate prompt completion of the work.

The Contractor shall coordinate and schedule with the Company's Inspector valving off mains for each connection or change in existing mains, and will conduct the work to cause the shortest possible interruption of service.

3. SITE WORK

3.1 Utilities

3.1.1 General

The Company has endeavored to locate sub-surface obstructions from available records, and such structures are shown on the project drawings. The Company does not guarantee the accuracy of the information there shown, although it has undertaken to present available data. The project drawings do not show the size or location of services.

Wherever the Contractor deems it necessary to determine the exact location of existing pipe, valve, or other underground structures, the Contractor may make any examinations that it may determine desirable in advance of the work and no added compensation will be paid. Only in the event that the Company's Project Manager by written order directs the Contractor to make additional exploration and excavation will extra compensation be allowed.

The Contractor's attention is directed to the Kentucky 811 (811 or 1-800-752-6007), which has been established to provide accurate locations of below-ground utilities. The Contractor shall notify Kentucky 811 a minimum of two (2) business days in advance of any construction on this

project. Additional information for Kentucky 811 can be found at www.kentucky811.org.

3.1.2 Utilities in Conflict with the Pipeline

In excavating trenches and installing pipe, where any existing utilities (including water pipe, sewer pipes, inlets and drains, gas pipes, electric lines and conduits, telephone lines and conduits, cable television lines and conduits, communication – fiber optic lines and conduits, service connections from these utilities, trolley tracks used for cathodic protection, traffic signal loop detector system or street light system), cross the trench, they shall be protected, supported, and maintained in service and restored to the condition in which they were found, all at no additional cost to the Company.

Where because of location or grade, such utilities cannot be replaced to occupy their original location, they shall be changed at no additional cost to the Company and as directed by the Company's Project Manager and utility owner to accomplish their original purpose with adequate provision for drainage over or under the pipe as circumstances require.

Where any utility facility, including service connections, is touched or endangered by the work, the utility's management shall be notified by the Contractor, and the Contractor shall cooperate with the utility and pay the cost of protection and repair if damaged.

The Contractor shall protect all abandoned trolley tracks. If abandoned trolley tracks are damaged, the Contractor shall contact Pipeline Integrity Group of Louisville Gas and Electric Company at (502) 627-4427 prior to the repair of any cut or damaged rail. Repair, if required, shall be as directed by Louisville Gas and Electric Company.

3.1.3 Utilities Parallel to the Pipeline

Where utilities exist parallel to the water main and at a location which will interfere with its installation, they shall be handled as follows:

A. The affected utility shall be notified at least five days in advance, if possible, of the time necessary to do the work. The cost of temporary hook-up and any charges from the utility will be paid by the Contractor unless previously authorized by The Company.

B. Gas, sewers, telephone, or electric facilities shall be gently uncovered, and personnel from the pertinent utility must remove its facility after accomplishing a temporary hook-up to prevent loss of service. After the water main has been placed, the utility line will be reinstalled near its

original location and grade by the utility personnel, and the Contractor will complete the necessary backfill.

3.1.4 Water / Sewer Main Separation

Water mains shall be installed in accordance with Kentucky Division of Water regulations and Recommended Standards for Water Works (Ten States Standards).

Water mains shall be installed at a minimum of ten feet (10') horizontally from any existing or proposed non-storm sewer main or non-storm sewer manhole; measured from the outside diameters. ("Non-storm sewer" is defined as sanitary sewer, combined sewer, septic tank, or subsoil treatment system.)

When crossing over or under a non-storm sewer main, the water main shall maintain one and one-half feet (1.5') vertical separation with one (1) full length of the water pipe located so that both joints of the water pipe will be as far from the non-storm sewer as possible. Special structural support for the non-storm sewer and water pipes may be required.

When ten feet (10') of horizontal separation or one and one-half feet (1.5') of vertical separation cannot be maintained, the Company's Project Manager must be notified for resolution. There shall be no deviation from the above ten feet (10') horizontal and one and one-half feet (1.5') vertical separation requirements when water pipes are crossing non-storm sewer force mains. Only in the event that the Company's Project Manager directs the Contractor by written order may changes be made to these minimum separations.

3.1.5 Water Service Line Depth and Service / Non-Storm Sewer Separation

Water service lines shall be installed at the standard depth of forty-two inches (42"). Service lines crossing over or under a non-storm sewer shall maintain a minimum vertical separation of one and one-half feet (1.5').

See Standard Drawing: 1000 in Appendix of Drawings.

3.2 Laying Out the Work

The location of the work shall be defined by lines and elevations furnished by the Company's Project Manager on project drawings or specifications. The Contractor shall layout their own work, lines, measurements, bench marks, levels and grades, right-of-way and easement lines. The Contractor shall contact the Company's Project Manager prior to entering a property

on which the pipeline is being installed in an easement to ensure that the easement has been obtained.

Unless otherwise directed by the Company's Inspector or Project Manager, the Contractor shall complete each block of water main installation, or in the absence of intersecting streets, every 500 feet of water main installation in urban areas, every 1,000 feet of water main installation in suburban / residential areas, or 1,500 feet in rural areas before proceeding. This includes chlorination, pressure testing, service work, and permanent restoration of all areas affected by the construction.

The pipeline shall be installed throughout the public right-of-way or in easements as indicated on the project drawings. Generally, all work must be confined to the public right-of-way or easement provided; however, the Contractor may make arrangements for more operating room at its own expense and responsibility.

The Contractor shall obtain written permission for use of private property by the property owner and furnish an affidavit to the Company's Project Manager that proper arrangements are made prior to occupation of the property. Otherwise, the Contractor shall conduct its operations in a manner that will not interfere with adjacent property owners.

3.3 Stakes

The Contractor shall furnish and set all stakes necessary in laying out the location of lines and grades, shall protect all stakes by suitable guard stakes, and shall be responsible for maintenance of all stakes after being set.

3.4 Temporary Contractor Facilities

3.4.1 Power

The Contractor shall arrange and pay for all power required for construction purposes.

3.4.2 Heat and Enclosures

The Contractor shall furnish at its own expense, all temporary heat and/or enclosures that may be deemed necessary.

3.4.3 Light

The Contractor shall provide and pay for temporary electric light necessary for the execution of the work. This will include all necessary wiring, fixtures, and electric bulbs. Torches or other sources of light which can

cause damage by fire or smoke shall not be used.

3.4.4 Water

The Contractor may purchase water from the Company for use in construction operations. The Contractor shall include the cost of Temporary Water Service, and cost of water purchased, in the base bid.

3.4.4.1 Temporary Water Service

Water used by the Contractor or Company for disinfection, flushing, pressure testing, and leakage testing will be supplied by the Company at no cost. If water is needed for other purposes, the Contractor may obtain a temporary water service meter as outlined below. The Contractor will be responsible for fees and usage charges for the temporary water service.

To obtain a temporary water service meter, an application, with deposit, must be completed in Metering Services offices at 4801 Allmond Avenue between the hours 9:00am to 3:00pm Monday through Friday. Applications can be obtained in Metering Services or at LouisvilleWater.com.

Routine questions regarding a temporary service meter or billing concerns may be directed to our Call Center, (502) 583-6610.

Use of temporary services must comply with all Louisville Water Service Rules and Regulations found at LouisvilleWater.com. The Company prohibits the unauthorized use of fire hydrants and will work with law enforcement officials to pursue each incident to the extent allowed by law.

The Contractor is responsible to protect the fire hydrant temporary service meter and fire hydrant wrenches from loss and theft. Fire hydrant temporary service meters must be dismantled when not in use to protect from theft or freezing weather. Fire hydrant wrenches shall never be left unattended on a fire hydrant.

Fire Hydrants must be turned on completely to prevent flooding through the hydrant's weep holes. Flow shall be regulated by the temporary meter assembly valve. The Contractor must notify the Louisville Water Radio Room (569-3600, ext. 2700 or 2701) of all hydrants flowed between November 1 and March 31, or as freezing conditions dictate, so the hydrant can be winterized after use to prevent freezing.
Some fire hydrants have a locking device attached to prevent unauthorized use. The Contractor shall notify the Company's Project Manager or Inspector 48 hours in advance of the need to use such a fire hydrant, so the lock can be removed by Company personnel. The Contractor shall immediately notify the Company's Project Manager or Company

Inspector when the fire hydrant is no longer needed so the lock can be re-installed.

It is the responsibility of the Contractor to properly protect the fire hydrant temporary service meter, and to ensure that proper replacement techniques be applied, including placement of gasket to prevent water loss upstream of the meter.

3.4.4.2 Water Uses Excluded in Temporary Water Service

Any water used from a fire hydrant or blow off shall be metered or estimated. In some instances, the Company Inspector may approve non-metered water use (e.g. filling the main, flushing of hyper-chlorinated or potable water where practical.)

See Standard Drawing: 1601 in Appendix of Drawings.

3.4.5 Temporary Toilets

The Contractor shall provide in the vicinity of the work at locations satisfactory to the Company, and maintain in a sanitary condition, suitable temporary toilets for the use of the workers and Company personnel.

Upon completion of the work, the temporary toilets shall be removed, and the premises left in a sanitary condition. The temporary toilets shall be satisfactory to the governing jurisdiction's Board of Health.

3.4.6 Temporary Fencing

The Contractor shall supply and install temporary fencing when necessary to control livestock or property owner's animals requiring containment. The Contractor shall make arrangements with the property owner for removal / containment of the animals during any removal of existing fencing and placement of the temporary fencing.

3.4.7 Contractor Communications

The Contractor shall supply a 24 hour emergency contact number to allow direct communication from the project site or after working hours with the Company's Project Manager or Company Inspector.

4. PIPELINE MATERIALS

4.1 Pipe and Fittings

4.1.1 Pipe and Fittings Furnished by the Company

Pipe and fittings to be furnished by the Company shall be as specified in the Contract Documents.

4.1.2 Pipe and Fittings Furnished by the Contractor

Materials provided for “Furnish and Install” projects shall be as specified in the Contract Documents.

The Company’s Inspector shall verify that all materials meet project specifications prior to installation.

The Contractor retains ownership of all Contractor furnished materials under “Furnish and Install” contracts until the project is completed and accepted by the Company. Materials not installed cannot be returned to the Company.

4.2 Furnished to the Contractor

4.2.1 Materials

The Contractor shall requisition and haul, on appropriate vehicles, all Company supplied materials from the Company’s warehouse to the points of their respective installation.

The Contractor shall protect pipe and fittings to avoid vehicle exhaust, debris, and damage during transit from the Company’s warehouse to being installed.

As referenced in the current edition of the Company's "Process for Job Site Delivery of Line Pipe" Document, a copy of which is available from the Company’s Project Manager, pipe delivery from the pipe manufacturer to the jobsite is available if the Contractor makes arrangements as stated in said Document.

4.2.2 Requisition and Return of Materials

The Contractor shall requisition and return materials per current warehouse procedures, and shall account for or promptly return all materials so requisitioned.

Any unused materials shall be returned within five (5) working days after the date of substantial completion of the work as specified by the Company's Inspector. The cost of any unused materials not returned to the warehouse by this date shall be billed to the Contractor.

Below is a list of guidelines to draw or return materials from the Company's Allmond Avenue warehouse:

A. Call (502) 569-3633 or email warehouse@lwcky.com to make an appointment with the Warehouse. Appointments are scheduled for 30 minutes in length. Email or fax a copy of the materials list to the warehouse at 569-0812.

B. Appointments, including standing appointments, will be scheduled on a first-come first-served basis. Appointments are not required for emergency situations but must be approved by the Company's Project Manager.

C. Issues and returns are considered equal in regard to scheduling.

D. Warehouse office hours are 7:30 a.m. - 4:00 p.m., Monday thru Friday (except Company's holidays). Appointments are scheduled from 8:00 a.m. - 2:00 p.m.

E. All returned material must be in the same condition as it was when issued - clean and with all accessories. Returns of dirty, corroded, and/or rusted material, and/or fittings missing accessories, or otherwise damaged shall not be accepted.

F. The Contractor shall not return cut pieces of pipe to the Company's Warehouse. Contractors shall make best use of pipe, minimize cut pieces of pipe and shall not install more than two (2) pieces of cut pipe adjacent in a straight run. Only whole – uncut pipe may be returned to the Company's Warehouse and it must be clean and in good condition.

4.2.3 Loading and Unloading Procedures

Refer to **PIPE AND PIPE APPURTENANCES FURNISHED BY THE COMPANY**, in the **TERMS AND CONDITIONS**.

4.2.4 Pressure Test Pump

For pressure and leakage testing, the Company shall issue a test pump and meter kit to the Contractor. Contractors may furnish their own test pump if it is equipped with a quick-connect coupling to allow placement of the Company Inspector's pressure gauge and the test pump meter is approved

by the Company's Inspector.

The Contractor is to: notify the Gate Shop (502) 569-3600, ext. 2766, at the Warehouse at least two days in advance of the day of intended use; pick up the test pump kit between the hours to 7:30 a.m. and 3:30 p.m.; have the test pump kit for 48 hours at no charge (Saturdays and Sundays are excluded from the allowed time frame); and return the test pump kit to the Gate Shop within 48 hours of pick-up. If outstanding for more than two days, beginning on the third day, a rental fee will be charged to the Contractor; this fee shall be waived only if the Company's Inspector notifies the Warehouse Office or the Gate Shop at the Warehouse of special circumstances.

The Contractor shall be held responsible for the test pump and all test kit contents and shall be invoiced for all cleanup and/or repair costs. The Company does not loan or lease hoses and/or tools, including tapping machines.

4.3 Storage of PVC Pipe (Polyvinyl Chloride)

When storing PVC (polyvinyl chloride) pipe, caution should be exercised to avoid compression, damage, or deformation to the pipe, including the bell ends. Ensure that the weight of the upper units does not cause deformation to the lower units. All pipe shall be placed on wooden skids or other suitable material, be stored in accordance with AWWA's M23 Manual and be stored in a manner to prevent deformation and dirt, debris, foreign objects, or any other substance from entering the pipe.

5. EXCAVATION

5.1 Rock Excavation

5.1.1 Definition of Rock

Rock, for the purpose of this contract, shall mean boulders, pieces of concrete or masonry of sufficient size, and solid ledge rock (usually limestone) which, in the opinion of the Company's Project Manager, requires mechanical removal or drilling and blasting as approved by the Company's Project Manager. All rock shall be Unclassified. Unclassified rock shall mean any rock which has to be removed for construction and the cost of removal shall be included in the base bid price.

5.1.2 Trench Dimensions

Trench rock excavation shall be based on a trench width of eighteen inches (18") wider than the outside diameter of the pipe, equally spaced at nine

inches (9”) on each side of the pipe and a trench depth of six inches (6”) below the outside bottom of the pipe.

5.2 Rock Soundings

The Company does not know or pretend to know, nor does it undertake to state, the nature of all materials which will be necessary to excavate in order to construct the work contemplated herein. The Contractor is advised to perform rock soundings or subsurface investigations where feasible on all projects prior to bid. If rock sounding information is provided on the plans, the Contractor is advised that the rock sounding location is approximate and that the location and quality of rock can be highly variable and if the Contractor uses such data he/she does so at their own risk. The Contractor shall assume all risks arising from, or out of, the nature of all forms of materials necessary to be excavated, except as otherwise specified.

It shall be distinctly understood that reference to rock, earth, or any other material on the Plans or in the Contract, whether in numbers, words, letters, or lines, is not to be taken as a complete indication of classified rock excavation or the quantity or quality of either rock, earth, or any other material involved. The Contractor is advised to draw their own conclusions regarding the actual conditions to be encountered. The Company does not provide a guarantee as to the accuracy of the data and no claim will be considered for additional compensation when the materials encountered are not in accordance with the classification shown.

5.3 Rock Blasting Requirements

All blasting for excavations shall be conducted by a blaster licensed in the State of Kentucky in compliance with provisions of KRS 351 and KAR 803 and 805. Blasting will be permitted only after securing the approval of the Company’s Project Manager and only when proper precautions are taken for the protection of persons or property. Any damage caused by blasting, including damaged or raised pavement, shall be repaired by the Contractor at their expense.

The Contractor shall abide by all Federal, State, and Local laws and regulations regarding the storage and use of blasting materials (KRS 351 and KAR 803 and 805). The hours of blasting will be fixed by the Company’s Project Manager and adhere to state and federal guidelines. A blasting log must be kept, and a copy furnished to the Company.

5.4 Excavation in Streets and Parking Areas

5.4.1 Procedure

Where a specific road permit exists, it shall take precedence; otherwise, the following language shall apply.

Wherever the excavation is in paving, whether in the streets or in parking lots, the Contractor shall so conduct their operations that at least one lane of traffic is kept open at all times. Where the excavation is performed in a traveled lane, the trench shall be made safe during non-working hours by installing backfill and temporary bituminous pavement, backfill and concrete subbase, or plates (see "Plating" Section 5.4.3).
Where the excavation is performed in an intersection, the work shall be completed in one work day, including backfilling and temporary bituminous pavement. Temporary paving restoration shall be adequately maintained until permanent pavement is placed.

Traffic warning signs shall be placed and maintained on the streets being crossed, in accordance with the applicable agency as described in "Traffic Control" (Section 1.3.1).

5.4.2 Twelve-Inch (12") Cutback Requirement

The Contractor shall make two pairs of straight paving cuts of uniform width: the first pair being along the edges of the anticipated trench location, to be performed prior to excavating the pipe trench; and the second pair being along the anticipated twelve-inch (12") cutback locations, to be performed upon completion of trench backfill placement up to the subbase bottom elevation and prior to subbase placement.

Saw cuts shall be of sufficient penetration of the pavement base to ensure straight edges during pavement removal. Irregular edges shall be sawcut to provide straight edges at a uniform width.

Twelve-Inch (12") Cutback Requirement is not required when backfilling the trench with flowable fill (Controlled Low Strength Cementitious Material).

5.4.3 Plating

5.4.3.1 General

Recessed and surface mounted plates shall have a minimum thickness of one inch (1") and shall be placed on a minimum bearing area of one foot of pavement bordering the perimeter of the excavation.

All plates, whether or not in a traveled lane, are to have 45-degree beveled edges along the entire perimeter. All plates must have readily identifiable markings to reflect Contractor ownership.

If plates are unable to be recessed and must be pinned due to other utility encumbrances, the appropriate Road Maintenance Agency or property owner must be notified immediately.

5.4.3.2 Traveled Lanes

In traveled lanes, the Contractor shall provide plates recessed flush with the pavement for any excavation and trenches must be backfilled to subbase prior to placing plates. Any lane that is open to the traffic at any time during the day is defined as a traveled lane.

5.4.3.3 Non-Traveled Lanes

In non-traveled lanes, the Contractor shall also provide recessed plates where required by the Company's Project Manager and as described in the **SUPPLEMENTARY SPECIFICATIONS**. Otherwise, for non-traveled lanes and parking lots, surface mounted plates, properly secured to pavement, shall be provided, with the exception that all plates are to be recessed from November 15th thru March 31st, so as to minimize the potential hazards to snow removal vehicles, or as specified by the permitting authority.

See Standard Drawing: 4000 and 4100 in Appendix of Drawings.

5.5 Trenching

5.5.1 General

The Contractor shall make all excavations for pipe, blow-off connections, valves and vaults, etc. which may be required for this project. All excavations shall be backfilled or plated overnight with open pipe ends plugged or capped.

5.5.2 Alignment and Grade

The trench shall be excavated to the alignment and depth required and only so far in advance of pipe installation as the Company's Inspector shall permit. All pipe shall be installed and maintained to the lines and grades shown on the project drawings.

5.5.3 Trench Width

The trench width shall be as narrow as practicable to permit the pipe to be installed and jointed properly with a minimum of nine inches (9”) of separation between outside of the pipe and each sidewall of the trench. Trench width must allow for the backfill to be placed and compacted around the pipe. Vertical trench sides are desired where the nature of the excavated material and depth of trench will permit.

A trench width of eighteen inches (18”) plusthe outside pipe diameter shall be the pay width for any items of work for which compensation is made where trench width is a factor in computing the value of work done.

5.5.4 Trench Depth

The pipe trench shall be excavated to such depth as to provide for six inches (6") of depth under and a minimum forty-two inches (42") of cover over the outside of the pipe barrel. Unless otherwise specified, the trench shall have a flat bottom conforming to this grade. Any pipe installed with more than fifty-four inches (54”) or less than forty-two inches (42”) of cover must have written approval from the Company’s Project Manager.

Any part of the trench excavated below grade (grade being six inches (6”) under the pipe) shall be backfilled to grade with the same backfill material used to bed the pipe or other material approved by the Company’s Project Manager, and compacted to ninety percent of Modified Proctor as required in "BACKFILLING PROCEDURES AND TAMPING" (Section 7).

Unstable soil material shall be excavated from the trench, and the trench backfilled and compacted as described above.

Backfill greater than a depth of forty-two inches 42” shall be provided where indicated on the project drawings with no additional compensation.

The pipe trench shall not be excavated to exceed forty-eight inches (48”) of cover over the outside of the pipe barrel under normal conditions unless indicated on the project drawings.

In locations where pipe is installed on a sloped surface the minimum depth of cover of forty-two inches (42”) must be maintained at all points along the pipe.

Variations from these required depths will be allowed only on written authority from the Company’s Project Manager.

5.5.5 Minimum Clearances

Boulders, large stones, and rock (including shale) shall be removed to provide a clearance of at least six inches (6”) below the barrel of the pipe, valves, or fittings and to provide a clear width of at least nine inches (9") on each side of all pipe and appurtenances.

Bell holes of ample dimension shall be dug to permit jointing to be made properly and to ensure that the pipe is evenly supported throughout in length rather than on bells or couplings.

5.5.6 Contaminated Soil

In the event the Contractor suspects encountering contaminated soil (i.e., soils containing asbestos, PCBs, petroleum products, hazardous waste, radioactive material, and/or any other substance that presents a potential danger to persons or property exposed thereto), the Contractor shall take the following steps:

- Immediately secure the work site to prevent access by unauthorized personnel;

- Notify the Kentucky Department for Environmental Protection, if reportable, (reportable is when an actual spill or release of a hazardous material occurs or when there appears to be a threat of severe environmental harm), at (502) 564-0323;

- Immediately notify "Emergency Response" at 911;

- Immediately stop all work in the vicinity of the contaminated soil, and notify the Company’s Inspector, Project Manager, and Safety Representative.

- Follow the instructions from the Kentucky Department for Environmental Protection for disposal of excavated soils which are contaminated.

- Water lines installed or replaced in areas of organic contamination or in areas within 200 feet of underground or petroleum storage tanks or petroleum pipelines require ductile iron or other non-permeable materials and shall be used in all portions of the water line installation or replacement as approved by the Company’s Project Manager. These particular water lines shall also be installed with nitrile gaskets or other petroleum resistant gasket as approved by the Company’s Project Manager.

- Resume work only after receiving approval by the Company's Project Manager.

5.5.7 Preservation of Landscape

See also "RESTORATION" (Section 11).

Trees and shrubs shown on the project drawings identified for protection are to be protected from any damage both above and below ground, and the property owner is to receive full remuneration for any damage. Trees at other locations shall not be damaged or removed without explicit instructions from the Company's Project Manager and owner or responsible agency. Any limbs damaged during construction shall be trimmed and pruned to the approval of the Company's Inspector.

The project drawings may call for certain shrubs and trees in private roadways or easements to be transplanted until operations are completed and replaced in their original location or replaced with new stock.

5.5.8 Preservation of Historical Construction Materials

When historical construction materials (such as cobblestones, large brick, granite blocks, limestone, or other large stone building blocks used in the course of pavement, curbs, and sidewalks) are encountered in public streets or alleys, they shall be replaced with like material. The Contractor may request a waiver when this is not possible from the Company's Project Manager for approval. Brick masonry pavers that cannot be incorporated back into the work shall be palletized and delivered to Louisville Metro Public Works for preservation and maintenance of existing brick streets and alleys – See Section 7.02 M of the latest edition of Louisville Metro Public Works & Assets' Right-Of-Way Guide & Utility Policy.

5.5.9 Preservation of Boundary Monuments

Contractors shall be responsible for the location and protection of any boundary monuments locating property lines, property corners or right-of-way lines within project limits. If any monuments are removed or disturbed during construction, the Contractor will be responsible for replacement of the monuments by a Professional Land Surveyor of the State of Kentucky.

5.5.10 Archaeological

Contractors shall immediately stop work, if during the execution of work; they encounter any archaeological artifacts, skeletal remains, abandoned cemeteries or burial grounds within the work area and immediately notify the Company's Project Manager or Inspector.

6. INSTALLATION

6.1 Handling Pipe and Appurtenances

6.1.1 General

Proper equipment, tools, and facilities satisfactory to the Company's Project Manager shall be provided and used by the Contractor for the safe and convenient progression of the work. Slings used in handling the pipe shall be made of non-abrasive materials such as nylon. Chains or any sharp abrasive material shall not be used to lift or move pipe. Pipe fittings, valves, and other accessories shall at all times be handled with care to avoid damage.

The method of handling, hauling, and placing pipe in the trench shall be such that it will not damage the ductile iron pipe and its coating or polyethylene wrap or the PVC (polyvinyl chloride) pipe, and shall be done in accordance with the latest edition of AWWA's M23 & M41 manuals. The Contractor shall pay to replace all pipe and/or appurtenances that are damaged.

In loading and unloading, pipe shall be lifted in such manner as to avoid shock. Under no circumstances shall the pipe be dropped. Forklifts' forks or other tools and equipment shall not be inserted into the barrels of pipe, valves or other fittings to lift or move them.

6.1.2 PVC Pipe (Polyvinyl Chloride)

When handling PVC (polyvinyl chloride) pipe, the Contractor shall avoid abrasion damage and gouging or cutting by metal surfaces or rocks, and any stressing of bell joints and damage of bevel ends.

Avoid severe impact, particularly in subfreezing temperatures. In subfreezing temperatures, caution is advised in handling to prevent impact damage.

6.2 Installing Pipe and Appurtenances

6.2.1 General

All pipe installation shall be done under the supervision of an experienced superintendent who will be present on the job site during all construction activities.

Full pipe lengths shall be carefully lowered into the trench, individually, installed and backfilled, in such a manner as to prevent damage.

Unless shown otherwise on the project drawings, PVC (polyvinyl chloride) and Ductile Iron pipe joints will be rubber ring gasketed bell end type.

The Contractor shall furnish all equipment and materials necessary to make all joints completely assembled, except as described in "Furnished to the Contractor" (Section 4.2).

All pipe shall require a six inch (6”) undercut and a six inch (6”) compacted depth layer of backfill to ensure proper bedding for the pipe. These requirements are described in the sections "Trenching" and "BACKFILLING PROCEDURES AND TAMPING" (Sections 5.5 and 7, respectively).

The interior of all pipe, fittings, and other accessories shall be kept free from dirt and foreign material at all times. All pipe shall be clean and kept clean.

The exposed ends of pipe in the trench shall be closed by a water tight plug at all times when pipe installation is not actually in progress. See Section 6.14 “Plugging Ends of Pipe.”

6.2.2 PVC Pipe (Polyvinyl Chloride)

All PVC (Polyvinyl Chloride) pipe installation shall be in accordance with AWWA’s Manual No. M23 "PVC Pipe - Design and Installation", unless otherwise specified herein.

Wherever either horizontal or vertical curves or angles are shown on the project drawings, or found to be needed, appropriate ductile iron bends shall be used with PVC (Polyvinyl Chloride) pipe.

Under no circumstances will the bending of PVC pipe be allowed.

Backfilling procedures and mechanical tamping of backfill material shall be strictly adhered to as specified in the "BACKFILLING PROCEDURES AND TAMPING" (Section 7) of these specifications.

When installing PVC pipe, joint deflections shall not exceed that of the manufacturer’s recommendations.

6.2.3 Ductile Iron Pipe

All ductile iron pipe installation shall be in accordance with the latest editions of AWWA’s Standard Specification C600, "AWWA Standard for Installation of Ductile Iron Water Main and Their Appurtenances", and

AWWA's M41 manual, unless otherwise specified herein.

Wherever either horizontal or vertical curves or angles are shown on the project drawings, or found to be needed, appropriate ductile iron bends shall be used with ductile iron pipe.

When installing ductile iron pipe, joint deflections shall not exceed that of the manufacturer's recommendations.

Backfilling procedures and mechanical tamping of backfill material shall be strictly adhered to as specified in the "BACKFILLING PROCEDURES AND TAMPING" (Section 7) of these specifications.

Maximum Deflection for Full Length Ductile Iron Pipe @ 3 degrees (Push on Joint Pipe)		
Pipe Size	4" - 20"	
Pipe Length	18 feet	20 feet
Maximum Offset (inches)	15 in.	12 in.
Approx. Radius of Curve Produced by Succession of Joints (feet)	255 ft.	285 ft.

6.3 Boring and Tunneling

When boring is required, the Contractor shall use a boring tool of the proper size to form a tunnel for the purpose of installing the pipe from one excavation to the other without disturbing the surface. Where such methods are used, a plug or suitable closure shall be inserted in the end of the pipe to exclude any earth from the inside of said pipe.

Where it is necessary to cut the paved surfaces to accomplish the above boring beyond the limits of the excavation necessary to make the tap, the cost of making such pavement repairs shall be borne by the Contractor.

When installing main within the dripline of any tree with a diameter of 6 inches or larger, the root system shall be free bored. All tree root systems that require boring shall be free bored a minimum of 20 feet; 10 feet either side of the tree trunk. The bore shall be located a minimum of 4 feet below the ground surface and a minimum of 5 feet from the center of the tree. If the Contractor requests to bore utilizing Horizontal Directional Drilling methods, the Contractor must make the request in writing to the Company's Project Manager in advance. Regardless of the method selected, the cost of the tree bore shall be considered incidental to the installation of the pipeline,

and no extra compensation will be provided. The Contractor shall be responsible for the survival of the trees disturbed by the bore installation for a period of two (2) years after final contract payment for the project.

Whenever water main is to be installed through casing pipe, the water main shall be ductile iron pipe with restrained joints. Casing runners (spacers) shall be used to prevent damage during installation and to provide long term support. Pipe shall not rest on bells. Casing runners (spacers) shall provide sufficient height between bell joint and casing wall and should be fastened securely to the pipe.

Unless otherwise stated in the **BIDDER'S PROPOSAL** form and/or the **SUPPLEMENTARY SPECIFICATIONS**, there shall be three (3) casing runners (spacers) for each full pipe length, to be placed at the center and 3-foot from each end of each section of pipe. Ends of casing pipes must be grouted or End Seals installed to prevent debris and seepage from entering the casing pipe. The casing pipe shall extend a minimum of five (5) feet beyond the edge of pavement, unless otherwise noted on the project drawings.

Pipe may be installed in the casing using winch-drawn cable or jacking. Exercise care to avoid damage to the pipe, bell joints, interior and exterior coatings and polywrap.

For ease of installation, use a lubricant such as flax soap or drilling mud between casing runners and casing. Do not use petroleum products such as oil or grease.

Any rock encountered in the construction of bore pits and/or receiving pits shall be unclassified.

If voids shall develop or if the excavation is greater than the outside diameter of the casing pipe or tunnel liner by more than approximately one inch (1”), they shall be filled by pressure grouting. In the case where sections of casing pipe are field welded in order to meet the plan requirements, the Contractor shall weld the casing pipe fully around the entire circumference of the casing pipe and make the casing pipe available for weld inspection prior to installation of the water main.

All interior weld beads or slag shall not extend more than 3/32 inch from the interior pipe face.

See Standard Drawing: 1500 in Appendix of Drawings.

6.4 Mechanical and Push-on Joint Assembly

6.4.1 General

All rubber-gasket joints for Ductile Iron pipe shall be made in accordance with the current edition of AWWA's Standard Specifications C111 "Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings", as recommended by the manufacturer, and as described in the following Sections: 6.4.2; 6.4.3; and 6.4.4.

All rubber-gasket joints for PVC (polyvinyl chloride) pipe shall be made in accordance with the current edition of AWWA's Standard Specification C900 "Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch Through 12-inch, for Water Distribution", as recommended by the manufacturer, and as described in the following Sections: 6.4.2; 6.4.3; and 6.4.4.

6.4.2 Mechanical Joint

The inside of the bell and the outside spigot end shall be thoroughly cleaned to remove oil, dirt, grit, excess coating, and other foreign matter from the joint, and then painted with a manufacturer's approved lubricant.

The ductile iron gland shall then be slipped on the spigot end of the pipe with the lip extension of the gland toward the joint. The rubber gasket shall be painted with the lubricant and placed on the spigot end with the thick edge toward the gland. The entire section of pipe shall be pushed forward to seat the spigot end in the bell.

The gasket shall then be pressed into place within the bell with care being taken so that the gasket shall be evenly located around the entire joint.

The ductile iron gland shall then be moved along the pipe into position for bolting, all of the bolts inserted, and the nuts screwed up tightly, with the fingers. Nuts spaced 180 degrees apart shall be tightened alternately, in order to produce an equal pressure on all parts of the gland.

The torque applied for various sizes of bolts shall be as follows, unless otherwise specified by the manufacturer:

Mechanical Joint Bolt Torque Table:

5/8"	45-60 ft.-lbs
3/4"	75-90 ft.-lbs
1"	100-120 ft.-lbs
1-1/4"	120-150 ft.-lbs

Any mechanical joint restraints or gripper rings shall be retightened to Bolt Torque Table specifications no sooner than thirty (30) minutes after initial tightening, or as directed by the manufacturer.

All bolts installed above ground shall be rechecked for proper torque after placement in the excavation.

6.4.3 Push-on Joint

The inside of the bell and the outside of the spigot end shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter. If placement of the gasket occurs in the field, the circular rubber gasket shall be flexed inward and inserted in the gasket recess of the bell socket. A thin film of gasket lubricant shall be applied to the spigot end of the pipe.

Lubricant shall be applied evenly over the entire surface requiring lubrication, but avoid using an excessive amount. Use only lubricant approved by the pipe manufacturer. Failure to do so may promote bacterial growth or damage to the gaskets or the pipe.

Correct alignment of the pipe is essential for ease of assembly. The spigot end of the pipe shall be entered into the socket with care to keep the joint from contacting the ground.

The PVC (polyvinyl chloride) pipe shall be inserted into the bell or coupling by application of firm and steady pressure by hand or by block assembly until the spigot end slips through the gasket. The spigot end of the pipe is marked by the manufacturer to indicate the correct depth of insertion. Over-insertion (over-belling) of the pipe shall not be permitted and can cause rolled gaskets, split bells, failure of hydrostatic pressure test, and damage to previously assembled joints.

Ductile iron pipe joints shall be completed by forcing the spigot end to the bottom of the socket using a pry bar, backhoe, jack-type tool, or other device recommended by the manufacturer or approved by the Louisville Water Project Manager. When using a backhoe to home a section of pipe, a timber header should be used to protect the pipe from damage.

6.4.4 Field Cut Pipe

Field-cut ductile iron or PVC (polyvinyl chloride) pipe requires a cut perpendicular to the pipe. It is recommended that the pipe be marked around its entire circumference prior to cutting to ensure a perpendicular cut.

The end shall be beveled by using a beveling tool, rasp or grinder as appropriate to assemble the push-on joint. Round-off any sharp edges on

the leading edge of the bevel. Reinstall depth mark using original mark by manufacturer as a guide.

Mechanical Joint Assembly: When field-cut PVC (polyvinyl chloride) pipe is to be inserted into a mechanical joint end, the beveled end shall not be inserted into the MJ end. The above-stated requirements for a square cut, rounding off sharp edges, and establishing a correct-depth marker shall be performed.

6.5 Tie-ins to Existing Mains

The Contractor shall install the necessary pipe and fittings for the connections to the existing mains, as shown on the project drawings, and shall make the connections complete, ready-for-use.

It is imperative that the sequence of work involving an interruption of service be such that all operations be completed and the new pipeline ready to be connected prior to shutting off existing mains that are serving customer connections. Except for filling of the main, tie-ins shall not be accomplished until the main has passed pressure testing and disinfection.

All pipe, fittings and materials installed for tie-ins or taps not exposed to pipeline chlorination / dechlorination shall be disinfected with an adequate chlorine solution.

When tapping a main, the Contractor shall make the tap only after a hydrostatic pressure test of 125 psi is applied for fifteen (15) minutes with no leakage to the tapping sleeve and gate valve assembly. Before cutting an existing main under pressure, the Contractor shall ensure the adjacent existing valve and fittings are sufficiently secure. The Contractor shall be responsible to provide the tapping coupon to the Company's Inspector.

When connections to existing pressurized PVC water mains are to be made with a tapping sleeve and gate valve, the tapping sleeve and gate shall be installed a minimum distance of twenty–four inches (24") from any fitting end or pipe end.

The Contractor shall be responsible for a minimum advance notification of forty–eight (48) hours to the Company's Inspector to make connections to existing mains.

The Contractor shall be responsible to make up to three (3) connection attempts in situations due to circumstances outside of their control such as inoperable valves or unavailable Company assistance.

Subsequently, water mains abandoned in-place shall be capped at all open

ends as shown on the project drawings or as directed by the Company's Project Manager.

In cases where the water main must be put into service as soon as possible, very early strength concrete and mechanical joint restrained glands (gripper glands) can be specified by the Company's Project Manager for thrust restraint.

6.6 Transition of Pipe Materials (Ductile Iron Pipe and PVC Pipe)

All pipe material transitions (locations where ductile iron pipe is connected to PVC pipe, or vice versa) shall be made at a ductile iron fitting (tee, valve, coupler, sleeve, bend, reducer, etc.).
The joining of pipe ends by inserting the spigot to bell of different pipe materials will not be allowed.

6.7 Removal of Asbestos-Cement (AC or Transite) Pipe

Any required cutting or tapping of asbestos-cement pipe shall be performed by qualified Company personnel, or the Contractor as approved by the Company's Project Manager, and shall follow current Company Work Instructions for handling and cutting AC pipe. Any cutting or tapping shall be in compliance with all OSHA requirements. This work shall be coordinated by the Contractor through the Company's Inspector.

6.8 Setting Valves and Fittings

Valves, air valves, blow offs, and drains shall be assembled, and joints made up, both flanged and mechanical joint, as indicated on the project drawings. All valves and all reducers must be anchored by coated and deformed reinforcing bars, as detailed per the Company's Standard Drawing 1400, wrapped around each end of the valve or reducer, and cast in a cast-in-place concrete anchor block under each valve or reducer.

The weight of each valve shall be supported by solid pre-cast concrete bricks. Bricks should not be removed prior to concrete placement and shall not inhibit installation of polywrap. Cast-in-place concrete shall then be poured up to the bottom of the valve. In no instance shall the weight of the valve be supported by the adjacent pipe.

If PVC pipe is used with iron fittings, the weight of each fitting shall be supported by a two feet (2') x two feet (2') width x one foot (1') depth cast-in-place concrete support block; rod anchorage is required at vertical bends which require the placement of the thrust block under the fitting.

The concrete support block shall bear against undisturbed earth, as shall the

other above-mentioned types of concrete blocking. In cases where the water main must be put into service as soon as possible, very early strength concrete and mechanical joint restrained glands (gripper glands) can be specified by the Company's Project Manager for thrust restraint.

See Standard Drawing: 1400 in Appendix of Drawings.

6.9 Polyethylene Wrap for Ductile Iron Pipe and Fittings

Polyethylene wrap shall be installed in accordance with the current edition of AWWA Standard Specification C105 (ANSI A21.5) for American National Standard for Polyethylene Encasement, unless otherwise specified herein.

The Contractor shall cut the polyethylene roll in tubes 2 feet (2') longer than the standard length of pipe. Each tube shall be slipped over the length of ductile iron pipe, with centering to allow a one-foot overlap on each adjacent pipe section. After the lap is made, slack in the tubing shall be taken up for a snug fit, and the overlay shall be secured with polyethylene tape. Each length of ductile iron pipe shall receive two separate polyethylene wraps as described above.

Ductile iron pipe shall not be wrapped for more than 5 days in advance of placement into the trench. Pipe to be wrapped shall include ductile iron and ductile iron restrained-joint pipe and iron fittings. For any pipe that is wrapped prior to installation, Contractor shall use a method to lift and carry the pipe, such as canvas/nylon strapping, that will prevent damage to the wrapping.

Odd shaped appurtenances such as valves, tees, fittings, and other ferrous metal pipeline appurtenances shall be wrapped by using a flat sheet of polyethylene. Wrapping shall be done by placing the sheet under the appurtenances and bringing it up around the item to be wrapped. Seams will be made by bringing the edges together, folding twice, and taping down. Each appurtenance shall receive two separate polyethylene wraps as described above.

Care shall be taken when backfilling to prevent damage to the polyethylene wrapping. Sections of wrapping having cuts, tears, punctures, or other damage shall be repaired or replaced.

PVC (polyvinyl chloride) pipe requires no polyethylene wrap.

AWWA Standards for installing polyethylene wrap and the manufacturers' recommended methods for installing polyethylene wrap can be made available for review by the Company's Project Manager at the request of the Contractor.

See Standard Drawing: 1200 A-C in Appendix of Drawings.

6.10 Installation of Tracing Wire for PVC Pipe

The Contractor shall install tracer wire along with the PVC pipe and it shall be installed directly over the water main. For open trench installation, tracer wire shall be 12 AWG copper clad steel with a minimum of 30 mil blue HDPE or HMWPE insulation. For directional drill, boring, or other trenchless method installation, tracer wire shall be 12 AWG high strength copper clad steel with a minimum of 45 mil blue HDPE or HMWPE insulation . All tracer wire shall be rated for direct burial at 30 volts. The wire shall also be connected to each end of the water main. The tracing wire shall be wrapped once around each copper or ductile iron service line. The wire shall be stripped of insulation and connected or wrapped with each valve, and service line.

At each and every valve: the wire shall be directly connected to one of the valve joint bolts and shall extend upward along the outside of the key tube but inside the round top frame. The wire shall be looped upward along the outside of the key tube to maintain the wire continuity. This wire shall be taped securely to the top of the pipe at the midpoint and bell of each section of pipe.

6.11 Identification Ribbon

The Contractor shall install Identification Ribbon (I.D. Tape) on all PVC, Ductile Iron, and any other direct bury pipe four-inch (4”) through twenty-inch (20”) in diameter. Under paved or unpaved surfaces, this ribbon shall be installed at approximately eighteen inches (18”) below the surface or finished grade and directly over the water main.

6.12 Frames and Covers (Lids)

The Contractor shall set all frames and covers (lids) for air valves, blow-offs, and meter vaults. These frames and covers (lids) shall be set to grade and maintained in the proper position for the duration of the period covered by this contract.

Frames and covers (lids) shall be removed on all discontinued vaults, and surfaces shall be restored in accordance with the appropriate requirements of the sections "BACKFILLING PROCEDURES AND TAMPING" and "RESTORATION" (Sections 7 and 11, respectively). All removed frames and lids shall be returned to the Allmond Avenue warehouse.

6.13 Valve Boxes

Standard valve boxes consisting of key tubes, valve extension rods, and round tops and lids shall be installed on all valves by the Contractor. The box shall be centered on the operating nuts, shall be vertical, shall be set to grade, shall be placed and maintained in the proper position, and shall be free of dirt or other matter for the duration of the period covered by this contract.

Styrofoam collars or polywrap tape may be placed around each valve round top before placement of concrete and in such a manner to allow the valve box to be raised to grade without demolishing the concrete subbase.

Valve extension rods shall be placed on gate valve operating nuts to extend to within two feet (2') and three feet (3') of ground elevation. Valve extension rods may be welded together to reach the appropriate length. Valve extension rods are available at Louisville Water's warehouse if the project is a Company Supplied project.

Round tops and lids on all valves that are to be abandoned shall be removed and returned to the Allmond Avenue warehouse. The key tube shall be filled with concrete in paved areas; with compacted stone in other areas and surfaces restored in accordance with the appropriate requirements of the sections "BACKFILLING PROCEDURES AND TAMPING" and "RESTORATION" (Sections 7 and 11, respectively).

6.14 Plugging Ends of Pipe

When work has stopped at the end of a day, a cap or plug shall be installed in place in the open end of the pipe to maintain a water tight seal. If trench water or debris enters the pipeline or trench, it shall be removed from the pipe and trench before work proceeds. Permanent plugs or caps shall be installed where shown on the project drawings and shall be securely braced as shown on the thrust anchor details included on the detail sheet of the project drawings. Permanent plugs shall not be installed on PVC mains; only mechanical joint caps will be allowed. Plastic tape over pipe ends will only be permitted on non-standard / oversized pipe with approval of the Company's Inspector.

6.15 Thrust Anchors, Counterweights, and Restrained-Joint Hardware

The Contractor shall install concrete thrust anchors or counterweights (3,500 psi concrete) at all bends, reducers, deflection couplings, tees, offsets, gate valves and plugs/caps against undisturbed soil to withstand maximum test pressure. The Contractor shall provide all labor and material to construct the thrust anchors, piers, and counterweights, for all fittings, both horizontal and vertical. These concrete thrust anchors shall have

minimum dimensions as indicated on the thrust anchor schedule shown on the detail sheet in the project drawings.

If field conditions prevent standard concrete thrust anchors placement as shown in project drawings, the Company's Project Manager must approve any modification. Concrete thrust anchors in solid rock trenches may be modified with approval of the Company's Project Manager.

The Company's Inspector may require forming (plywood or steel) in order to properly locate and position concrete thrust anchors. Restrained-joint hardware is not intended to be used in lieu of concrete thrust anchors and counterweights. Such hardware is to be used only when it is necessary to return a water main to service immediately, as when making tie-ins or at the specific instructions of the Company. The Company Inspector may require restrained joint hardware in areas where the water main may be disturbed after installation by other utility crossings or nearby excavation.

Whenever restrained-joint hardware is used to restrain fittings, the Contractor must also pour a concrete thrust block. In no instances, shall restrained-joint hardware alone be accepted as a permanent thrust restraint. Mechanical joint restraining glands (gripper glands) are not to be used on plain end fittings.

Any mechanical joint restraints or gripper glands shall be retightened to Bolt Torque Table specifications no sooner than thirty (30) minutes after initial tightening, or as directed by the manufacturer.

All bolts installed above ground shall be rechecked for proper torque after placement in the excavation.

See Standard Drawing: 1400 in Appendix of Drawings.

7. BACKFILLING PROCEDURES AND TAMPING

7.1 General

In general, trench dimensioning and backfill materials shall be as follows: six inches (6") of vertical clearance with the bottom of the trench, and the subsequent layered placement of pit run sand, DGA or manufactured sand bedding along the bottom of the pipe; nine inches (9") of horizontal clearance with each side of the trench, and the subsequent layered placement of pit run sand, DGA, or manufactured sand backfill along each side of the pipe; the layered placement of pit run sand, DGA, or manufactured sand to the elevation of twelve inches (12") above the crown of the pipe; and, if in a lawn area, the remainder of the backfill to be common (but acceptable) fill, or, if in a paved and/or a to-be-paved area,

the remainder of the backfill to be the layered placement of pit run sand, DGA, manufactured sand, #57 stone or flowable fill up to the bottom elevation of the respective pavement restoration scheme. All bedding and backfill material shall be uniform and continuous for the entire trench excavation limits.

The total depth of cover (i.e., the vertical distance from crown-of-pipe to ground/pavement surface) shall be at least forty-two inches (42”). The cost of applicable backfill material, backfilling, and required tamping shall be covered in the base bid as shown on the **BIDDER'S PROPOSAL** form.

All backfill (except flowable fill) shall be properly compacted by pneumatic, vibratory, or other approved compaction equipment. A backhoe bucket is not an approved compaction device. The compaction effort and lift thicknesses shall be performed in a uniform and consistent manner in accordance with these specifications. The Company reserves the right to conduct compaction testing and observation, and such testing or observation will not relieve the Contractor of any future warranty responsibilities. When instructed by the Company’s Project Manager, the Contractor shall excavate backfilled material to a particular grade for testing. Backfilled areas which do not pass this test shall be excavated and re-compacted until they meet compaction specifications. Areas excavated for testing shall be re-compacted in accordance with this compaction specification. The cost of this work shall be included in the base bid.

Appropriate and sufficient backfill material shall be furnished by the Contractor to replace material deemed unsatisfactory by the Company’s Project Manager or Inspector.

Unsatisfactory material includes unsuitable soil as described in "FINAL BACKFILLING" (Section 7.6) and frozen or exceptionally wet backfill material and may include backfill material excavated for testing purposes or backfill material excavated for failure to meet compaction requirements. See Standard Drawing: 4300 in Appendix of Drawings.

7.2 Acceptable Backfill Materials

7.2.1 Pit Run Sand (Natural Sand)

Pit Run Sand is sand resulting from the natural degradation of rock and shall meet the material and gradation requirements of Section 804 Fine Aggregates of the current edition of the Kentucky Department of Highways “Standard Specifications for Road and Bridge Construction”.

7.2.2 Dense Graded Aggregate (Kentucky DGA or Indiana #73)

Dense Graded Aggregate shall meet the material and gradation requirements of Section 805 Coarse Aggregates of the current edition of the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction".

7.2.3 Flowable Fill (Controlled Low Strength Cementitious Material)

Flowable fill, a quick-setting, cementitious, self-compacting, shrinkless fill material, may only be used with the prior written approval of the Company's Project Manager.

The mix design must be approved prior to placement by the Company's Project Manager. The 28-day compressive strength of said fill shall not exceed 150 psi, and the minimum strength shall be 25 psi. The mix shall include sand, cement, fly ash with water not included as part of the volume mix. Fly ash shall have a pH value of no less than 7.0 and no greater than 12.5. The pipe shall be enveloped with pit run sand, manufactured sand or dense graded aggregate and backfilled in accordance with "Initial Backfilling" (Section 7.5).

7.2.4 Manufactured Sand (Kentucky 3/8" Manufactured Sand)

Manufactured Sand shall be the material resulting from the crushing and classification by screening, or otherwise, of rock and gravel. Manufactured Sand shall be washed and contain no fine particles and or dust.

The Contractor shall be responsible for all dust control associated with the use of Manufactured Sand. Manufactured Sand shall meet the material and gradation requirements of Section 804.08 Pipe Bedding of the current edition of the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction".

7.2.5 Kentucky #57 Stone (or Indiana #8 Stone)

Kentucky #57 Stone shall only be used for creating a firm base in undercut excavations when wet or excessively soft soil conditions are encountered. Any other use shall be approved by the Chief Engineer. Kentucky #57 stone shall not be used as bedding, initial backfilling, or for trench backfill in paved areas. Kentucky #57 Stone shall meet the material and gradation requirements of Section 805 Course Aggregates of the current edition of the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction".

7.2.6 Kentucky #3 Stone (or Indiana #2 Stone)

Kentucky #3 Stone shall only be used for Fire Hydrant Drainage Pits. (See Section 9.2 Drainage Pit). Kentucky #3 Stone shall meet the material and gradation requirements of Section 805 Coarse Aggregates of the current edition of the Kentucky Department of Highways “Standard Specifications for Road and Bridge Construction”.

7.2.7 By-Product of Trench Rock Excavator

The by-product of trench rock excavator equipment may be acceptable for pipe bedding and/or backfill material if prior written approval is granted by the Company’s Project Manager.

The Company’s Project Manager must review the material and be assured of the Contractor’s ability to compactthe material. The Contractor must wash the material thoroughly (i.e., no dust particles); and to sieve the material thoroughly so that no individual rock pieces exceed sieve size of one inch (1”) (25.0mm).

7.3 Un-Acceptable Backfill Materials

Un-washed Manufactured Sand, Black Sand (coal or coke by-products), slag, or foundry by-products will not be allowed as pipe bedding and / or backfill material.

7.4 Bedding

For the entire length of the trench, the excavation shall provide a six inch (6”) space below the pipe, which shall be placed and firmly compacted with approved backfill materials, pit run sand, manufactured sand, Dense Graded Aggregate, or #57 stone, as specified by the Kentucky Transportation Cabinet Department of Highways Standard Specification for Road and Bridge Construction, (latest edition) “Fine Aggregates” or "Coarse Aggregates," to form bedding for the pipe.

The bedding shall be excavated at bells, valves, and fittings so the barrel of the pipe will have bearing on the bedding for its full length.
See Standard Drawing: 4300 in Appendix of Drawings.

7.5 Initial Backfilling

Initial backfill should occur as soon as possible after the installation of pipe, so as to prevent the pipe from shifting. After the pipe has been placed on the bedding, pit run sand, manufactured sand, #57 stone, or Dense Graded Aggregate, shall be deposited in the trench by mechanical equipment and

distributed in six inch (6”) layers on both sides of the pipe for the full width of the trench, the trench width having nine inches (9”) of horizontal clearance along each side of the pipe. The initial backfill shall be tamped in six-inch (6”) layers and thoroughly compacted under the centerline and on each side of the pipe. Backfill shall be placed and tamped to a height of at least twelve inches (12") above the top of the pipe.

See Standard Drawing: 4300 in Appendix of Drawings.

7.6 Final Backfilling

When not under paved surfaces or surfaces where paving is not intended, the remainder of the trench shall be backfilled with soil that is not excessively wet, and is free from brush or vegetative matter, rocks larger than fist-size, pieces of concrete larger than fist-size, cinders, or any other matter which could prevent proper consolidation. Place in 12-inch lifts and compact with hand-held mechanical plate compactor, rammer or a sheepsfoot roller. Use a minimum of two passes.

When under paved surfaces or surfaces where paving is intended, the remainder of the trench shall be backfilled for the full depth with pit run sand, manufactured sand, Dense Graded Aggregate, or #57 stone as specified by the Kentucky Department of Highways Standard Specification for Road and Bridge Construction, (latest edition) “Fine Aggregates” or "Coarse Aggregates." Flowable Fill may be used if approved by the Company’s Project Manager. At pavement crossings, this pavement backfill shall extend five feet (5') beyond each end of the paving or proposed paving.

The final backfill in paved areas shall be placed and compacted in accordance with the following table.

Trench Backfill and Compaction Requirements Beneath Pavements

	Max. Loose Lift Thickness (inches)				Min. # of Passes	Example Models
	MFD* Sand	Pit Run Sand	DGA	No. 57 Stone		
Lightweight Vib. Plate Compactors (100-220lbs)	8	8	6	8	3	Wacker-Neuson WP 1540; MBW GP18
Mediumweight Vib. Plate Compactors (220-660lbs)	12	12	9	12	3	MultiQuip MVH206GH; MBW GPR77H
Heavyweight Vib. Plate Compactors (>660lbs)	18	18	12	18	3	Wacker-Neuson BPU 4045A; MBW GPR135H
Smooth Drum Vibratory Rollers	12	12	9	12	3	Wacker-Neuson RTLx with Smooth Drum Att.
Equipment Mounted Compactors	24	24	24	24	3	Allied 1000B; Caterpillar CVP 110

*MFD=Manufactured

The total depth of cover (i.e., the vertical distance from crown-of-pipe to ground/pavement surface) shall be at least forty-two inches (42") and no more than forty-eight inches (48") unless approved prior to installation by the Company's Project Manager.
See Standard Drawing: 4300 in Appendix of Drawings.

8. PLACING WATER MAIN IN SERVICE

8.1 General

After a section of main has been properly installed and valved, the main shall be filled, disinfected, pig cleaned, flushed, and pressure and leakage tested before being placed in service. The Company's Project Manager or Inspector may require for the pressure test to be performed prior to the disinfection process.

The Contractor shall provide adequate personnel to assist the Company's Inspector on-site for placing the water main in service.

The pig shall be inserted into the pipeline at the time of installation. Pipe soap shall not be applied directly to pigs. Pipeline pigs shall be supplied by the contractor unless otherwise specified in the Supplementary Specifications.

Disinfection, cleaning, and flushing of the water main must result with subsequent water samples passing all of the Company's water quality tests.

8.2 Filling and Disinfection of the Water Main

8.2.1 Filling of the Water Main

The main shall be chlorinated prior to beginning the pigging operation and shall be filled from downstream of the pig. Contractors must use a flushing meter assembly with check valve for filling mains to account for water usage and provide backflow prevention.

The main shall be filled with hyperchlorinated water for at least 24-hours prior to the beginning of flushing operations.

The primary method of disinfection shall be the tablet method using a tablet chlorinator supplied by the Company's Inspector. Use of granular calcium hypochlorite (HTH or equal) must be approved by the Company's Project Manager or Inspector only if the tablet method is not feasible. If the granular method is approved, the granular calcium hypochlorite (HTH or equal) must be applied into each section of pipe during installation and prior to filling the water main. See Section 8.2.2.

While the pipe is filling, air shall be expelled through fire hydrants, air valves, or flushing connections as directed by the Company's Inspector.

The Contractor may be instructed to install additional taps as needed to facilitate the filling or expelling of air and they shall be provided at no additional cost to the Company. Abandoned taps shall be protected by covering with concrete.

All flushing connections, fill connections, discharge connections, and check valves shall be installed by the Contractor at locations indicated on the project drawings or as directed by the Company's Project Manager or Inspector if a fire hydrant or service connection cannot be utilized.

If not specified to be furnished by the Company, particular components of flushing/discharge hardware shall be furnished by the Contractor.

8.2.2 Disinfection of the Water Main

New or relocated water mains shall be disinfected in accordance with the requirements of the Kentucky Division of Water, Natural Resources and Environmental Cabinet and AWWA Standard C651 upon completion of construction and before being placed in service.

The primary method of disinfection shall be accomplished by using a tablet chlorinator while filling. The granular method is not the preferred method and must be approved by the Company's Project Manager or Inspector. For large volumes of water, the Company's chlorination trailer may be utilized using liquid chlorine (Sodium Hypochlorite 12.5%) supplied by the Contractor.

The tablet method utilizes a tablet chlorinator supplied by the Company's Inspector. Calcium Hypochlorite disinfecting tablets (Norweco Bio-Sanitizer or equal) shall be inserted into the tablet chlorinator. The tablet chlorinator must be fed by a 2" hose with a check valve placed upstream of the chlorinator, and shall then be connected to the water main by a 2" hose. All hoses used for the feed or supply line shall be supplied by the Company. If discharge hoses are needed, they shall be supplied by the Contractor. The Contractor shall lay out the hoses for the chlorination operation at the direction of the Company's Inspector.

The granular method is not preferred, but may be used for special circumstances as approved by the Company's Project Manager or Inspector. Use of this method requires the application of chlorine or chlorine compounds (calcium hypochlorite granules - HTH or equal) to each pipe length at the time of installation. The Contractor shall supply granular calcium hypochlorite or sodium hypochlorite as needed. Granular calcium

hypochlorite shall conform to ANSI / AWWA B300 and contain a minimum of 65% available chlorine by weight and be stored in a cool, dry, and dark environment to minimize its deterioration in accordance with the manufacturer's recommendation. Granular calcium hypochlorite must meet NSF /ANSI Standard 60 requirements.

For large volumes of water, the Company's chlorination trailer may be utilized using liquid chlorine (sodium hypochlorite 12.5%) supplied by the Contractor. Sodium hypochlorite liquid shall conform to ANSI / AWWA B300 and contain a minimum of 12.5% available chlorine by volume and the storage conditions and time must be controlled to minimize deterioration. Sodium hypochlorite liquid (12.5%) will freeze at -10 degrees Fahrenheit (F). Sodium hypochlorite liquid must meet NSF /ANSI Standard 60 requirements.

Any other disinfection methods not listed in this specification must be in accordance with the Kentucky Division of Water, Natural Resources and Environmental Cabinet and AWWA Standard C651 and shall be approved by the Company's Project Manager.

The chlorination method selected shall provide a concentration of at least fifty (50) ppm and a residual of at least twenty-five (25) ppm at the end of 24 hours, to be followed by thorough flushing in compliance with 401 KAR 8:150 "Disinfection, Filtration, and Recycling ", Sections 4(1) and 4(2).

The following amounts of calcium hypochlorite tablets or granules or sodium hypochlorite liquid (@ 12.5 %, per 100 linear feet of pipeline, should produce fifty (50) ppm of chlorine:

Amount of Tablet or Granular Chlorine or Sodium Hypochlorite per 100 Linear Feet of Pipeline:			
Pipe Size	Number of calcium hypochlorite Tablets	Volume of calcium hypochlorite Granules	Volume of Sodium Hypochlorite @12.5% solution
4"	1/2 tablet	1/8 cup	0.031 gallons
6"	1/2 tablet	1/4 cup	0.072 gallons
8"	1/2 tablet	3/8 cup	0.126 gallons
12"	1-1/2 tablets	7/8 cup	0.286 gallons
16"	2-1/2 tablets	1-1/2 cups	0.501 gallons
20"	3-1/2 tablets	2-1/2 cups	0.787 gallons

After the disinfection procedure has begun, the Contractor shall tag-out and not operate any valves, including those newly installed, without consent and presence of the Company's Project Manager or Inspector.

The Contractor shall perform the chlorination under the complete control of the Company's Project Manager or Inspector.

8.3 Pigging and Flushing the Water Main

8.3.1 Pigging the Water Main

At the beginning of the pigging operation and under the direction of the Company's Inspector, the upstream valve (feeder valve) shall be partially opened first and adjusted as needed after the pigging operation has begun. Next, the valve downstream of the pig (outlet valve) shall be opened immediately allowing the pig to move at approximately one (1) foot per second. When pushing the pig fed by a blow-off, flushing connection, or a tap, a check valve is required. All new ductile iron and PVC pipe installations shall be pigged. Pipeline pigs shall be supplied by the Contractor unless otherwise specified in the Supplementary Specifications. Pigs shall be used one time and discarded.

At no time shall trench water be allowed to enter the pipeline during or after the pigging operation. If trench water enters the pipe, the Company's Inspector may require the water main to be disinfected and pigged again. Hyperchlorinated water shall be discharged through the end of the pipeline from which the pig shall be removed in accordance with the requirements of Section 8.4, "DISCHARGE OF HYPERCHLORINATED WATER".

Following are the Outside Diameters (O.D.) for the Pigs. Due to the manufacturing process these can vary, + / - , by 1/8 to 1/4 inch.

C900 PVC Pipe (Blue Pigs)

4" DR 14	Pig O.D. = 4 - 1/8"
6" DR 14	Pig O.D. = 6"
8" DR 14	Pig O.D. = 7 - 7/8"
12" DR 14	Pig O.D. = 11 - 1/2"
4" DR 18	Pig O.D. = 4 - 3/8"
6" DR 18	Pig O.D. = 6 - 1/4"
8" DR 18	Pig O.D. = 8 - 1/8"
12" DR 18	Pig O.D. = 11 - 7/8"

Ductile Iron Pipe (Red Pigs)

4" PC 350	Pig O.D. = 4 - 1/2"
6" PC 350	Pig O.D. = 6 - 5/8"
8" PC 350	Pig O.D. = 8 - 3/4"
12" PC 350	Pig O.D. = 12 - 3/4"
16" PC 350	Pig O.D. = 17"

8.3.2 Flushing the Water Main

With respect to flushing, the Company's standard operating procedure is as follows. The flushing assembly is to be checked-out from the Company's Meter Shop by the Contractor and shall be returned in same or better condition by the Contractor within 5 days of the end of the flushing operations. The Company reserves the right to bill the Contractor for unreturned materials and/or repairs.

The meter/check valve portion of the flushing assembly is not to be installed until after the completion of disinfection and pigging operations (so as to protect the meter/check valve from internal damage caused by debris). Upon the completion of pigging operations and prior to the start of flushing operations, the meter/check valve is to be installed.

The Contractor is to supply a two inch (2") minimum sized discharge hose to be used during flushing operations. The Company's Inspector shall supply the feeder hose.
No flushing device, blow-off, or air relief valve shall be directly connected to any non-storm sewer ("Non-storm sewer" is defined as a sanitary sewer, combined sewer, septic tank or subsoil treatment system), storm sewer, or storm drain, and shall be located at a distance greater than ten (10) feet from any non-storm sewer.
See Standard Drawing: 1601, 1602, and 1603 in Appendix of Drawings.

8.4 Discharge of Hyperchlorinated Water

Discharge of hyperchlorinated water can be directed to combined or sanitary sewer facilities only after the Company's Project Manager has received approval from the Permit Section Supervisor of the Louisville and Jefferson County Metropolitan Sewer District (MSD) or other jurisdictional sewer agency authority. Flushing outside the MSD service area shall be in accordance with Kentucky Division of Water requirements. All flushing operations shall be in accordance with the governing authority's requirements, including rain event requirements.

The Contractor shall provide 72 hours of notice to the Company's Project Manager of their intent to discharge hyperchlorinated water. In locations

where discharge of hyperchlorinated water is restricted, the Company's Project Manager may approve tanker truck transportation for disposal at other sites. If hyperchlorinated water cannot be discharged to a combined or sanitary sewer, the hyperchlorinated water shall be neutralized to a chlorine concentration of less than 0.019 ppm (mg/L) before discharge to a storm drain or onto the ground surface in a manner which will not violate 401 KAR 5:031 Surface Water Standards.

The Contractor shall be responsible for all chlorinated water disposal (neutralized to acceptable levels per regulations prior to release) and adherence to "LWC Best Management Practice & Procedures on Chlorinated Water Disposal" and 401 KAR 5:031 and 401 KAR 8:020. The Contractor's disposal methods must have the approval of the Company's Project Manager. The Contractor is responsible for supplying all BMP's necessary to protect all storm inlets and waterways as required per Louisville and Jefferson County Metropolitan Sewer District or the applicable jurisdictional storm water authority.

The Company shall furnish all dechlorination hardware necessary for the dechlorination operation. The Contractor will be responsible for furnishing hoses and fittings required for the flushing operation.

The Company's Project Manager or Inspector shall reserve the right to postpone the dechlorination operation in the event of an anticipated major rain event or sub-freezing temperatures.

The Company's Project Manager or Inspector shall reserve the right to dechlorinate water with calcium thiosulfate (Captor), sodium thiosulfate, or other approved method supplied by the Company. For large volumes of water when the chlorination trailer is utilized, the Contractor shall supply the calcium thiosulfate or sodium thiosulfate in liquid form.

Calcium thiosulfate (Captor) will dechlorinate water with 50 ppm chlorine at a rate of one gallon of Captor per 4,000 gallons of hyperchlorinated water.

8.5 Pressure and Leakage Test

Before the hydrostatic test is begun, the Contractor shall: backfill all pipe, provide all temporary and permanent thrust anchor blocking, and install taps for releasing air at all points of highest elevation where no fire hydrant or flushing connection has been installed. All valves within the test area shall be fully open including valves on fire hydrant supply pipes.

It shall be the Contractor's responsibility to locate and repair any and all leaks that may develop.

The water main (ductile iron and PVC) and appurtenances shall be discharged of hyperchlorinated water, flushed and filled with potable water prior to performing the pressure and leakage test, unless directed otherwise by the Company's Project Manager or Inspector.

The water main shall then be subject to a hydrostatic pressure of 200 PSI for ductile iron pipe, 200 PSI for PVC DR-14, and 150 PSI for PVC DR-18 or at a pressure specified by the Company's Project Manager at the lowest point along the section being tested for a period of two (2) hours with the test pressure not dropping more than 5 PSI during the test. At elevated sections of the pipeline the minimum test pressure shall be 75% of the hydrostatic test pressure. In special circumstances, such as extreme elevation differential, the pressure test may be divided into multiple sections as directed by the Company's Inspector or Project Manager.

In conjunction with the hydrostatic test, a leakage test shall be conducted at the same pressure and for the same period of time.

The leakage allowed will be as given by the following table. All of this testing shall be accomplished in the presence of the Company's Project Manager or Inspector.

Allowable Leakage per 1000 feet of Ductile Iron or PVC Pipeline in gallons/hour.						
Pipe Diameter	4"	6"	8"	12"	16"	20"
D.I. or PVC DR14 Leakage @ 200 PSI (gal/hour)	0.38	0.57	0.76	1.15	1.53	1.91
PVC DR 18 Leakage @ 150 PSI (gal/hour)	0.33	0.5	0.66	0.99	1.32	1.66

All pipe, fittings, and other materials found to be defective under pressure and leak testing shall be removed and replaced. These tests shall be repeated until satisfactory to the Company's Project Manager and Inspector. All visible leaks shall be repaired regardless of the amount of leakage. The pressure test shall be voided until such visible leaks are repaired.

The required testing apparatus, consisting of a gasoline motor driven pump, valves, pressure gauge, meter, test pump hose, and connections, shall be checked-out from the Company at 4801 Allmond Ave by the Contractor and returned to same location, the day the test is to be run, and shall be returned in same or better condition. The Company reserves the right to bill the Contractor for unreturned materials and/or repairs.

The Contractor may furnish a test pump if approved by the Company's Inspector and it shall be disinfected at the direction of the Company's Inspector. The test pump must be equipped with a quick-connect coupling to allow the connection of the Company Inspector's pressure gauge.

The Contractor shall be responsible for all phases of testing the water main.

8.6 Coliform Monitoring

The water main shall be placed in service only after coliform monitoring (sampling and analysis) applicable to the water main does not show the presence of coliform. If coliform is detected, repeat flushing of the water main and coliform monitoring. If coliform is still detected, repeat disinfection and flushing as if the line has never been disinfected. Continue the described process until monitoring does not show the presence of coliform. The presence or absence of total coliform monitored by sampling and analysis as needed shall be determined for new, cleaned, repaired or relocated water main(s).

Water samples shall be taken within 1,200 feet of each connection point to existing lines, at one (1) mile intervals, and at each dead end, without omitting any branch of the new, cleaned, repaired or relocated water main(s).

Sample bottles shall be clearly identified with a unique project identification note and delivered to the Company's Water Quality Laboratory.

8.7 Air Relief Valves

Air relief valves or hydrants shall be placed at necessary high points in water mains where air can accumulate. The Contractor shall install air relief valves at all locations as identified on project plans. Additional air relief valves that may be required by the Company's Project Manager will be compensated as described in **CHANGES IN THE WORK**, in the **TERMS AND CONDITIONS**.

Corporation stops for air relief valves shall be installed with tapping saddles to minimize pig damage when pig cleaning the water main.

8.7.1 Automatic Air Relief Valves

Where practical, the open end of an air relief pipe from automatic valves shall be extended a minimum distance of one foot (1') above grade and provided with a screened, downward-facing elbow.

Automatic air relief valves shall not be installed in situations where the flooding of the manhole or chamber may occur.
See Standard Drawing: 1603 in Appendix of Drawings.

8.7.2 Manual Air Relief Valves

The open end of an air relief pipe from a manually operated valve shall be extended to the top of the pit and provided with a screened, downward-facing elbow if drainage is provided for the manhole.

Use of automatic air relief valves are recommended wherever possible.
See Standard Drawing: 1603 in Appendix of Drawings.

8.8 Leak Detection By-Pass Meter at Underwater Crossings

Leak Detection By-Pass Meters are required at all underwater crossings which are greater than fifteen feet (15') in width.

Water main valves shall be installed at both sides of the water crossing so that section can be isolated for testing or repair. The valves and meter vault shall be easily accessible and not subject to flooding. The valve closest to the supply source shall have permanent taps on each side to allow the installation of a meter to determine leakage and for sampling purposes.

See Standard Drawing: 1608 in Appendix of Drawings.

9. FIRE HYDRANT

9.1 Materials and Installation

The fire hydrant installation shall consist of the following items and shall be as shown on the project drawing's detail sheet.

The field location of fire hydrants shall be approved by the Company's Inspector prior to installation. Fire hydrants shall be installed to allow proper drainage. When fire hydrants are located on project drawings in areas of poor drainage, the Contractor shall contact the Company's Project Manager or Inspector for movement to a suitable location. The fire hydrant shall be furnished by the Company, designed for proper depth of bury, and shall be so installed that the barrel will properly drain. Effort shall be made to install the shortest hydrant possible, while complying with the requirements of this section.

The fire hydrant anchor tee and auxiliary gate valve shall be installed as the main is installed. A tapping sleeve and gate valve shall be installed if the main is in service. The auxiliary valve shall be installed at the main. Fire

hydrant supply pipe (pipe, fittings, gate valve, and fire hydrant) must be secured to the water main for proper thrust restraint. All joints in the fire hydrant supply pipe (between fire hydrant and the main to which it is connected) shall be installed using a restrained joint method. Concrete is not required on direct bolt non-friction type restrained joint fittings between the fire hydrant and the auxiliary valve.

The fire hydrant supply pipe shall be ductile iron pipe, in all cases, regardless of the type of main being connected to. The fire hydrant supply pipe shall be a minimum diameter of six (6) inches and connected to a main with a minimum diameter of six (6) inches.

The fire hydrant shall be set plumb and shall have the pumper nozzles set facing perpendicular to the curb. The bottom of the break-away flange bolts shall be located from two inches (2”) to seven inches (7”) above finished grade, with the center of the nozzle a minimum of eighteen inches (18”) above finished grade.

The fire hydrant shall be set to established grade, with the center of the barrel two feet (2’) back of the face of the curb line (eighteen inches (18”) behind the back edge of the curb for rolled curbs) or as directed, or in the absence of a curb approximately five feet (5’) to fifteen feet (15’) from the edge of the pavement, no more than fifteen feet (15’) from a hard traveled surface, in accordance with governing fire department ordinances and accessible to the fire department. The base of the fire hydrant shall be set on a precast concrete block. The back of the elbow shall be well supported against undisturbed earth by means of precast concrete blocks.

Where fire hydrants are installed along a roadway, parking within ten feet (10’) will be prohibited. Fire hydrants installed in parking areas must allow ten feet (10’) clear access to the hose connection side of the fire hydrant. In all locations a four feet (4’) minimum clear radius around the fire hydrant is required.

Two layers of polyethylene wrapping shall be installed from the fire hydrant anchor tee to the base elbow of the fire hydrant, including the fire hydrant valve, connecting pipe, and thrust restraints. The wrapping shall not extend to the weep holes located on the hydrant elbow. Do not install polyethylene wrapping on the hydrant barrel.

Fire hydrant barrel extension kits shall not be used for new fire hydrant installations unless approved by the Chief Engineer or designee prior to requisitioning from the Company’s Warehouse. No more than one (1) fire hydrant barrel extension kit shall be used on an existing fire hydrant when raising is required. All fire hydrant barrel extension kits must be installed by the Company’s Fire Hydrant Crew. Unless, if approved by the

Company's Chief Engineer, the Contractor may install the extension kit in the presence of the Company's Inspector.

Fire hydrant wrenches shall never be left unattended on a fire hydrant.

When flowing a fire hydrant the operating nut must be opened completely to prevent flooding through the hydrant's weep holes. Flow shall be regulated by the temporary meter assembly valve attached to the fire hydrant's discharge nozzle. The Inspector must notify the Company's Radio Room (569-3600, ext. 2700 or 2701) of all hydrants flowed between November 1 and March 31 so the hydrant can be winterized after use to prevent freezing.

Some fire hydrants have a locking device attached to prevent unauthorized use. The Contractor shall notify the Company's Inspector 48 hours in advance of the need to use such a fire hydrant so the lock can be removed by the Company's personnel. The Contractor shall immediately notify the Company's Inspector when the fire hydrant is no longer needed so the lock can be re-installed.

The Contractor shall notify the Company's Inspector of any "Out of Service" fire hydrants. "Out of Service" fire hydrant tags shall be placed on the nozzle of all inoperable or "Out of Service" fire hydrants.

The Contractor shall paint fire hydrants after installation at the Company Inspector's request to cover scraped or chipped areas on the fire hydrant, or to match the fire hydrant color chosen by the local Fire District. Fire hydrant paint will be supplied by the Company's Warehouse. Fire hydrant attachment number labels shall not be painted over.

Fire hydrant attachment number labels shall be installed by the Company's personnel.

The Contractor shall assist the Company's Inspector in fire hydrant flow testing and perform any clean-up necessary after tests are completed.

See Standard Drawing: 2000 in Appendix of Drawings

9.2 Drainage Pit

Whenever a fire hydrant is set, a drainage pit shall be excavated for the fire hydrant. Dimensions of the pit shall be three (3) ft. long x three (3) ft. wide x four (4) ft. deep, with the pit centered about the barrel of the fire hydrant. Once the fire hydrant is installed and prior to filling the pit with washed #3 stone, the fire hydrant shall be pressurized, the weep holes flushed and then depressurized to ensure that the fire hydrant drains properly. Once the weep

holes have been flushed and proper drainage is verified, the drainage pit shall be filled compactly with washed #3 stone under and around the elbow of the fire hydrant and to a level of two feet (2') above the base of the elbow.

Before this dry well (drainage pit) is covered with backfill, the Contractor shall notify the Company's Inspector in order that each drainage system may be inspected. The top of the entire drainage pit shall be covered with geotextile fabric (four fire hydrant blankets or as many needed to cover the entire top) before backfilling.

Fire hydrant drainage pits shall not be connected to or located within ten (10) feet of non-storm sewers ("Non-storm sewers are defined as sanitary sewers, combined sewers, septic tanks and subsoil treatment systems), and where practical storm sewers or storm drains.

See Standard Drawing: 2000 in Appendix of Drawings

9.3 Removal of Fire Hydrants

Fire hydrants that are discontinued, abandoned or replaced shall be removed and returned with caps to the Allmond Avenue Warehouse. The Contractor shall be billed for any fire hydrants not returned. Surfaces shall be restored in accordance with Section 11: "RESTORATION".

9.3.1 Removal of Fire Hydrants on Active Water Mains

All discontinued fire hydrants shall be abandoned by turning off the fire hydrant's connecting valve and excavating and removing the fire hydrant and fire hydrant lead.

The hydrant's gate valve shall be turned off and a mechanical joint plug installed on the gate valve. A concrete thrust block shall be poured behind the plug. The fire hydrant gate valve's round top and lid shall be removed and the key tube filled with concrete.

9.3.2 Removal of Fire Hydrants on Abandoned Water Mains

Fire hydrants which are abandoned with the water main, in lieu of removal by excavation and with approval of the Company's Project Manager, the fire hydrant may be cut off no less than one foot (1') below finished grade, the abandoned barrel filled with concrete, the fire hydrant gate valve turned off, round top and lid removed, and key tube filled with concrete.

10. SERVICE WORK

10.1 Notification of Customers

It is the Contractor's responsibility to notify customers of upcoming interruption of service and to coordinate this notification with the Company's personnel. It is the intent of the Company not to interrupt service to existing customers, unless absolutely necessary. When it is necessary to interrupt service, all customers affected by the shut-off shall be notified in person, or in cases where the customer cannot be contacted, by a Louisville Water notification tag attached to the front door of their premises by the Contractor.

Such notification shall be made a minimum of twenty-four hours prior to shut-off and with the Company's approval, allowing sufficient time for the customer to draw and reserve an ample supply of water. Notification tags are available from the Company.

10.2 Service Installation - General

A service installation is defined to include all work necessary to install the copper tubing or pipe and all related items from the main to the property line. The installation shall include, the following: tapping of the main, installing the corporation stop or gate valve; service line tubing or pipe, meter vault, ductile or cast iron frame and lid/cover, water meter assembly, backfilling and restoring of paved and unpaved surfaces and flushing. Installation may require reconnection to existing service lines. Excavation, backfilling, and restoring paved and unpaved surfaces shall be done in accordance with these specifications.

Short services are defined as services to meters on the same side of the street as the water main to which it is connected.

Long services are defined as services to meters on the opposite side of the street of the water main to which it is connected and shall be bored or jacked under pavements unless an open cut is approved by the Company's Project Manager.

The Contractor must verify the service size with the Company's Project Manager or Inspector where any service length is greater than one hundred feet (100').

Where under pavement, tubing shall be installed continuously and in one piece without intermediate joints or couplings except at the terminals and except where the continuous length to be installed exceeds one hundred feet (100') for 3/4" and 1" sizes.

All taps in water mains shall be made by the Contractor, and corporation stops shall be inserted by means of a tapping machine in such manner that will permit continued conditions of water flow and pressure within these mains. The Contractor shall use care in inserting and tightening the corporation stop and shall reimburse the Company for any damage or expense caused by any of their activities under this contract.
Wet tapping of water mains shall be required on all pipe. No service taps shall be installed on dry water mains.

10.3 Service Installation - Two Inches (2”) and Smaller

During installation of corporation stops, the corporation stop shall not be turned using a pipe wrench. The corporation stop must be turned using a smooth jaw, adjustable crescent type wrench or open-end wrench. Special care shall be observed in handling the copper tubing so as not to kink, mash, or otherwise damage it. No such damaged tubing shall be installed. No bend shall be made in the tubing with a radius less than four inches (4”).

All intermediate and terminal joints for 3/4" and 1" sizes of copper tubing shall be the compression type, using the proper tools for the sizes of tubing and types of fittings involved.

Service connections shall be installed so that the outlet is at an angle of 45° above the horizontal. A bend in the service line shall be provided to ensure flexibility and to accommodate the effects of loads.

The service line shall be flushed for two (2) minutes through the meter stop before connecting to the meter. Once the corporation stop has been turned on, and prior to backfilling, the corporation barrel set nut may need to be securely tightened to prevent leakage.

For Double Setter meters (where two meters are to be installed in one vault) the tail pipes of a service installation shall be installed parallel for their entire length and at least eight inches (8") apart, and in no event shall they touch or cross one another.

See Standard Drawings: 3002, 3003, 3004, 3400, 3401, 3403, 3404, 3420, 3430, 3200, and 3202 in Appendix of Drawings

10.3.1 Tapping Ductile or Cast Iron Pipe for Service Installation - Two Inches (2”) and Smaller

In locations where Ductile Iron or Cast Iron Pipe will be tapped, the pipe shall be wrapped with three (3) layers of polyethylene compatible tape completely around the pipe to cover the area where the tapping machine and

chain is mounted. The tap shall install the corporation stop directly through the tape and polywrap.

After the tap is completed on mains with polyethylene wrap, the Contractor shall repair and replace the polyethylene wrap to completely cover the main and corporation stop in accordance with the details in the Appendix of Drawings.

The corporation stop and a minimum distance of three feet (3') of the copper service line shall be wrapped with polytape.

For ductile iron pipe Pressure Class 350 service outlets shall be made per the table below:

Service Installation Guide for Pressure Class 350 Ductile Iron Pipe					
Pipe Size	Tap Size				
	3/4"	1"	1-1/2"	2"	> 2"
4"	tap	saddle	saddle	saddle	requires tapping
6"	tap	tap	saddle	saddle	sleeve or fitting
8"	tap	tap	saddle	saddle	"
12"	tap	tap	saddle	saddle	"
16" & 20"	tap	tap	tap	tap	"

All direct taps require the installation of 2 to 3 layers of 3-mil thread sealant tape on the corporation stop. This guide is based on either a direct tap method or tapping saddle using an AWWA standard taper thread Corporation Stop.

See Standard Drawings: 3002, 3003, 3004, 3400, 3401, 3403, 3404, 3420, 3430, 3200, 3202 and 3804 in Appendix of Drawings

10.3.2 Tapping PVC Pipe for Service Installation - Two Inches (2") and Smaller

For PVC (polyvinyl chloride) pipe, service outlets of three-quarter inch (3/4") through two inches (2") shall be made with a tapping saddle.

Tapping saddle bolts shall be tightened with a torque wrench according to the saddle manufacturer's torque recommendations.

When installing a service to PVC, the Contractor shall use a shell cutter that is designed for DR14 (pressure class 200, AWWA C900) or DR18 (pressure class 150, AWWA C900) and one that will remove the material and retain the coupon. The cutting tool must be sharp and without damage. Drill

cutting tools are prohibited because they may increase the risk of causing the pipe to split longitudinally. The coupon must be delivered to the Company's Inspector.

When tapping the PVC pipe under pressure, the pipe temperature shall be between 32° and 90° F.

The taps shall be located a minimum of twenty-four inches (24") from the joint of the PVC pipe, and, if installing more than one tap in one length of PVC pipe, the taps shall be staggered and a minimum of eighteen inches (18") apart, measured longitudinally. Taps shall not be made in an area of PVC pipe that shows damage.

When a service tap is made on a PVC water main, a tracer wire shall be connected to the tracer wire on the main and then wrapped, with insulation and jacket removed, around the copper service line or affixed to the tapping saddle. When connecting the tracer wire to a tapping saddle, add two washers and a second nut to one of the bolts of the saddle. Strip a small section of the wire jacket and sandwich the bare portion of wire between the two washers and tighten the second bolt. Tracer wire must be rated for direct burial at 30 volts and be 12 AWG solid copper, copper clad steel (CCS), or high strength copper clad steel (CCS). Tracer wire shall be jacketed with blue HDPE or HMWPE insulation and designed for direct burial.

See Standard Drawings: 3002, 3003, 3004, 3400, 3401, 3403, 3404, 3420, 3430, 3200, 3202, and 3804 in Appendix of Drawings

10.4 Service Installation – Larger than Two Inches (2")

Service outlets larger than two inches (2") shall be made with a ductile iron tee or stainless steel or ductile iron tapping sleeve and gate as directed by the Company's Project Manager or Inspector on new ductile iron or PVC pipe.

When tapping a main, the Contractor shall make the tap only after a hydrostatic pressure test of 125 psi is applied for fifteen (15) minutes with no leakage to the tapping sleeve and gate valve assembly. Before cutting an existing main under pressure, the Contractor shall ensure the adjacent existing valve and fittings are sufficiently secure. The Contractor shall be responsible to provide the tapping coupon to the Company's Inspector.

The service line shall be flushed for two (2) minutes through the meter stop before connecting to the meter.

There shall be no tapping of same size on same size pipe with tapping sleeve

and gate, a tee must be installed.

10.4.1 Tapping Ductile or Cast Iron Pipe for Service Installation - Larger than Two Inches (2”)

After the tap is completed on mains with polyethylene wrap, the Contractor shall repair and replace the polyethylene wrap to completely cover the main and fittings in accordance with the detail in the Appendix of Drawings.

See Standard Drawings: 3203A, 3203 and 3601 in Appendix of Drawings

10.4.2 Tapping PVC Pipe for Service Installation – Larger than Two Inches (2”)

When installing a service on PVC water main, the Contractor shall use a shell cutter that is designed for DR14 (pressure class 200, AWWA C900) or DR18 (pressure class 150, AWWA C900) and one that will remove the material and retain the coupon. No twist drills will be allowed. The cutting tool must be sharp and without damage. The coupon must be delivered to the Company Inspector.

When tapping the PVC pipe under pressure, the pipe temperature shall be between 32° and 90° F. The taps shall be located a minimum of twenty-four inches (24") from the joint of the PVC pipe. Taps shall not be made in an area of PVC pipe that shows damage.

Tapping sleeves shall be assembled according to the manufacturers' instructions and must be supported independently of PVC pipe by precast concrete blocks during the tapping operation. The support shall be left in place, filling any voids such that the pad is bearing against undisturbed earth, and thrust blocks behind tapping sleeves shall be used as with other fittings.

When a service tap is made on a PVC water main, a tracer wire shall be connected to the tracer wire on the main and then wrapped, with insulation removed, around the service line gate valve and extend to the top of the key tube. Tracer wire must be rated for direct burial at 30 volts and be 12 AWG solid copper, copper clad steel (CCS), or high strength copper clad steel (CCS). Tracer wire shall be jacketed with blue HDPE or HMWPE insulation and designed for direct burial.

See Standard Drawings: 3203A, 3203 and 3601 in Appendix of Drawings

10.5 Meters

Contractor shall install or replace meters as stated on the Project Drawings or at the direction of the Company's Project Manager or Inspector. New meters shall be picked up by the Contractor at the Meter Shop located at 4801 Allmond Avenue. Old meters shall be returned in good condition to the Company's Inspector, including any lids or tags that may identify the meter number or attachment number.

10.6 Setting Meter Vaults

Meter vaults shall be set either to the existing grade, or as indicated on the service order or to the grade given by a stake card. Earth shall be firmly tamped by pneumatic, vibratory or other approved compaction device and backfilled per Section 7: "BACKFILLING PROCEDURES AND TAMPING" around the vault and cover, the lid locked in and the meter setting centered in the middle of the vault and at the proper depth below grade, as shown on the drawing in the Appendix of Drawings.

Meter vaults shall not be installed in areas subject to vehicular traffic whenever possible. When directed to be installed in areas subject to vehicular traffic, the meter vault shall be of the heavy-duty concrete type with heavy duty frame and cover.

See Standard Drawings: 3002, 3003, 3004, 3400, 3401, 3403, 3404, 3420, 3430, 3200, 3202, 3203, and 3601 in Appendix of Drawings

10.7 Pressure Regulators (Pressure Reducing Valves)

When directed by the Company's Project Manager, the Contractor shall install a pressure regulator (pressure reducing valve). The pressure regulator shall be installed on the front side (upstream) of the meter. When the pressure at the meter is 100 psi or greater, the Contractor shall install a pressure regulator as directed by the Company's Project Manager or Inspector. Pressure regulators shall be supplied by the Company unless otherwise stated in the Contract Documents. The Contractor shall perform an operability test and check for leaks after the pressure regulator has been installed.

See Standard Drawings: 3003, 3004, 3401, and 3202 in Appendix of Drawings

10.8 Leak Testing the Service

After the complete service has been installed and before any joints are covered, the corporation stop shall be opened and the entire length of the

service shall be subjected to system water pressure and each joint shall be inspected and sounded by the Contractor for leaks. The entire tailpiece shall be included in this leak check by temporarily capping the end of the tailpiece prior to connection to the customer

Any leaks so found shall be immediately repaired. After the service has been observed by the Company's Inspector to be watertight throughout its length, the meter stop shall be shut-off, and the backfilling started. The corporation barrel set nut may need to be securely tightened to prevent leakage.

The Contractor shall leave the corporation stop fully open and the meter angle stop fully closed upon completion of the testing.

10.9 Relocate Service

Relocating a service is defined to include installing a completely new service to an existing customer, including a new tail pipe, discontinuing the old service at the main (in the event the existing main is to remain active), abandoning the old meter vault, and returning the old meter, frame and lid/cover to the Company's Allmond Avenue Yard and backfilling.

Concrete meter vaults and heavy-duty frame and covers shall be used in driveways, parking lots, and other areas of vehicular traffic.

Service installation shall be done in accordance with "Service Installation – Two Inches (2") and Smaller, (Section 10.3) and Service Installation – Larger than two inches (2"), (Section 10.4). The Contractor shall discontinue the old service in accordance with "Discontinue Service" (Section 10.16). Excavation, backfilling, and restoring of surfaces shall be done in accordance with these specifications. Abandoning of the old meter vault shall be done in accordance with "Backfill Meter Vault" (Section 10.17).

When lead is encountered, refer to Section 10.11, "Lead and Galvanized Service Renewals."

Contractors shall be responsible to make at least two (2) attempts when connecting the tailpiece to a customer's galvanized service line. The second attempt shall be limited to a maximum of three feet (3') beyond the property line or to any property improvement which would require excessive restoration. If the second attempt is unsuccessful, the Contractor shall immediately contact the Company's Inspector, and provide a representative sample of the deteriorated line, at which time, the Company's Project Manager or Inspector shall arrange for a temporary service connection to the customer to be installed by others.
See Standard Drawing: 3440 in Appendix of Drawings

10.10 Renew Service

Renewing a service is defined to include installing a new copper service line from the existing main or new main to the meter stop, and a new copper tail pipe from the meter stop to the property line or the property service connection, and shall include, the following: excavation, boring or jacking of copper tubing or pipe, installing corporation stop, tapping saddle or tapping sleeve and gate valve at the main, if applicable, installing all tubing and/or pipe and all associated fittings, meter vault, frame and lid/cover, and backfilling and restoring of all surfaces.

Service installation shall be done in accordance with "Service Installation – Two Inches (2") and Smaller, (Section 10.3) and Service Installation – Larger than two inches (2"), (Section 10.4). The Contractor shall discontinue the old service in accordance with "Discontinue Service" (Section 10.17). All lead service lines shall be renewed in accordance with "Cutting Lead Pipe" (Section 10.13) and "Flushing of Lead and Galvanized Services" (Section 10.14) unless otherwise instructed on the project drawings. Excavation, backfilling, and restoring of surfaces shall be done in accordance with these specifications.

When lead is encountered, refer to Section 10.11, "Lead and Galvanized Service Renewals."

Contractors shall be responsible to make at least two (2) attempts when connecting the tailpiece to a customer's galvanized service line. The second attempt shall be limited to a maximum of three feet (3') beyond the property line or to any property improvement which would require excessive restoration. If the second attempt is unsuccessful, the Contractor shall immediately contact the Company's Inspector, and provide a representative sample of the deteriorated line, at which time, the Company's Project Manager or Inspector shall arrange for a temporary service connection to the customer to be installed by others.

See Standard Drawing: 3441 in Appendix of Drawings

10.11 Lead and Galvanized Service Renewals

Renewing a lead or galvanized service is defined to include installing a new copper service line from the existing main or new main to the meter stop, and a new copper tail pipe from the meter stop to the property service connection, and shall include, the following: excavation, boring or jacking of copper tubing or pipe, installing corporation stop, tapping saddle or tapping sleeve and gate valve at the main, if applicable, installing all tubing and/or pipe and all associated fittings, meter vault, frame and lid/cover, and backfilling and restoring of all surfaces.

The Contractor is required to identify the property line location and excavate the service line's tail piece to locate the property service connection. If the property service connection is not found, the Contractor shall seek permission from the property owner to excavate on private property. With permission, the Contractor shall continue to excavate up to ten feet (10') beyond the property line onto private property in an effort to locate the property service connection and determine the material of the customer's service line. The Company's Inspector shall verify the material of the customer's service line prior to cutting any pipe.

If the material of the customer's service line is not lead, the Contractor shall renew/relocate the entire service line from the main to the customer's connection.

If the material of the customer's service line is lead or galvanized pipe, the Company's Project Manager or Inspector will contact the customer to make them aware of the work to be completed by the Company and the existence of lead or galvanized pipe on the customer's side of the service line. The Company's Inspector shall also enquire if the customer is willing to replace their lead or galvanized service line.

1) If the customer is willing to replace their lead or galvanized service line, the Contractor shall coordinate the renewal/relocation of the Company's lead or galvanized service line with the customer's plumber.
2) If the customer is not willing to replace their lead or galvanized service line and the service is to be relocated or renewed, the Contractor shall replace the entire service line from the main to the customer's connection and shall install a dielectric between the end of the Company's tail piece and the customer's lead or galvanized service line. The dielectric will be composed of a 24" section of like diameter schedule 80 PVC pipe and a plastic universal transition coupling (supplied by the Company). If the customer's service line is less than 10 feet in length as measured from the customer's building to the dielectric connection, the Company's Project Manager shall be contacted prior to renewing/relocating the service to determine if a new grounding system is needed.

Service installation shall be done in accordance with "Service Installation – Two Inches (2") and Smaller, (Section 10.3) or Service Installation – Larger than two inches (2"), (Section 10.4). The Contractor shall discontinue the old service in accordance with "Discontinue Service" (Section 10.17). All lead service lines shall be renewed in accordance with "Cutting Lead Pipe" (Section 10.13) and "Flushing of Lead and Galvanized Services" (Section 10.14) unless otherwise instructed on the project drawings. Excavation, backfilling, and restoring of surfaces shall be done in accordance with these

specifications.

See Standard Drawing: 3441 in Appendix of Drawings

10.12 Lead Hazards and Safety Precautions

Pure lead (Pb) is a heavy metal that can damage the central nervous system, cardiovascular system, reproductive system, hematological system, and kidneys. Symptoms of chronic overexposure include loss of appetite, constipation, nausea, excessive tiredness, headache, fine tremors, metallic taste in the mouth, weakness, nervous irritability, hyperactivity, muscle and joint pain or soreness, anxiety, insomnia, numbness, or dizziness. Lead is most commonly absorbed into the body by inhalation. Workers can also absorb lead through the digestive system if it enters the mouth and is ingested. A significant portion of lead inhaled or ingested can enter the bloodstream. Once in the bloodstream, lead circulates through the body and is stored in various organs and body tissues. Some of this lead is filtered out of the body quickly and excreted, but some remains in the blood and tissues.

Personnel performing lead service line removal activities shall:

- Wear disposable gloves when handling lead.
- Dispose of gloves and other materials that contact lead as trash on a regular basis.
- Be careful to not touch eyes or face.
- Wash hands before eating or smoking.
- Wash work clothes regularly.
- Contact management if they feel that they have been affected by lead exposure.

Information taken from 'OSHA – Lead in Construction' , OSHA 3142-12R 2004

10.13 Cutting Lead Pipe

When the cutting of pipe made of lead is required, the pipe shall be cut with a shear device, such as Reed Ratchet Shears or similar device, as approved by the Company's Project Manager. Sawing of lead pipe shall not be allowed. The Company encourages contractors to recycle any lead service pipe that is removed.

10.14 Flushing of Lead and Galvanized Services

Flushing of renewed lead services shall be conducted immediately after the renewed service is reconnected at maximum flow. Flushing shall be continued

for a minimum of sixty (60) minutes. Flushing of the service for sixty (60) minutes shall also be conducted if a copper service is renewed and it is connected to a dielectric and private lead service line. If a galvanized service that has not been previously connected to lead is renewed, it shall be flushed for a minimum of five (5) minutes. If any part of the galvanized service is connected to lead, then the service shall be flushed for a minimum of sixty (60) minutes.

The Contractor shall be responsible for supplying all hoses, fixtures, and couplings needed to perform the lead service flush.

The Contractor shall identify, on a daily basis, those services that will require renewal on the following workday. Residences requiring lead or galvanized service renewals shall be investigated to determine if an outside spigot is available and functioning properly. The Contractor shall notify the Company's Inspector when an outside spigot is not available or not properly functioning in order for the Company's Inspector to contact the customer.

Services that cannot be flushed externally by the Contractor or internally by the customer at the time of the renewal, may be renewed, but shall be left in the "off" position immediately after the renewal is completed. The Contractor shall immediately notify the Company's Inspector when any service is turned "off" in order for the Company's Inspector to leave appropriate notification with the customer and notify the Company's Radio Room.

10.15 Lead Service Renewal Notification

The Contractor shall assist the Company's Inspector with distributing customer information and notices to all properties in which a lead service is to be renewed or replaced, as directed by the Company's Inspector. Notices are supplied by the Company and typically composed of self-adhesive window hangers or door hangers.

10.16 Transfer Service

Transferring a service is defined to include installing a length of service line, as required, to reconnect an existing copper service to the existing main or new main, and shall include, the following: excavation; boring or jacking of copper tubing or pipe; installing corporation stop; tapping saddle or tapping sleeve and gate valve at the main; installing all tubing and/or pipe and all associated fittings; and backfilling and restoring of all surfaces.

Service installation shall be done in accordance with "Service Installation – Two Inches (2") and Smaller, (Section 10.3) or Service Installation – Larger than two inches (2"), (Section 10.4). The Contractor shall discontinue the old service in accordance with "Discontinue Service" (Section 10.17).

Excavation, backfilling, and restoring of surfaces shall be done in accordance with these specifications.

When lead is encountered, refer to Section 10.11, “Lead and Galvanized Service Renewals.”

See Standard Drawing: 3442 in Appendix of Drawings

10.17 Discontinue Service

Discontinuing a service is defined to include excavating a service line at a water main that is to remain active, turning off the corporation stop or ferrule, disconnecting and plugging the service line, returning the old meter, frame and lid/cover to the Company's Allmond Avenue Yard, backfilling the meter vault, and restoring all surfaces.

Driven ferrules, which are not threaded onto the main, will require water main shutdown, removal, and installation of a wrap-around repair band. Driven ferrules can be expected on most lead services.

Excavating, backfilling, and restoring of surfaces shall be done in accordance with these specifications. Abandoning the old meter vaults shall be done in accordance with "Backfill Meter Vault" (Section 10.18).

See Standard Drawing: 3442 in Appendix of Drawings.

10.18 Backfill Meter Vault

Meter vaults on all discontinued or relocated services shall be abandoned by removing the old meter, frame and lid/cover, and any existing curb stop frame and lids, and filling the void to existing grade with backfill and surface material, appropriate to the type surface. Unpaved areas shall be backfilled to grade with topsoil and restored in accordance with "RESTORATION" (Section 11).

Sidewalks shall be backfilled with pit run sand or DGA and repaved in accordance with "RESTORATION" (Section 11). Parking lots, driveways, and other areas subject to vehicular traffic shall be backfilled using DGA and restored in accordance with "Twelve-Inch (12”) Cutback Requirement" (Section 5.4.2), "BACKFILLING PROCEDURES AND TAMPING" (Section 7), and "RESTORATION" (Section 11) found in this specification.

All meters and frames and lids/covers shall be returned to the Allmond Avenue warehouse. The Contractor shall be responsible for all remedial work due to discontinuation of meter vaults as required in the section "WARRANTY" (Section 12).

10.19 Potential Shock Hazard

Due to electrical grounding of some electrical services to metal water service lines, the potential for electrically charged water service lines and/or water meters exists.
The Contractor shall check each service for electric potential before working on the service. Any electrically charged water service shall immediately be brought to the attention of the Company's Inspector and reported to the appropriate electric company.

11. RESTORATION

11.1 General

The Contractor shall be responsible for restoring all disturbed areas resulting from their construction or activity.

A maximum of 1,500 lineal feet may be disturbed at one time prior to final grade. Restoration of the area is required before the Contractor is permitted to proceed.

The Contractor shall work no more than two sites at a time. At least one site must be fully restored with the exception of milling and paving before the Contractor begins working on the next site. This work includes yard, sidewalk and curb restoration as well as the patching of all road cuts.

The Contractor is to take whatever measures are necessary to keep all traveled surfaces free of dirt, mud, or other material during all non-working hours. Unless otherwise approved by the Company's Project Manager, no excavated material shall be placed on the paved surface or any other areas near the trench; the excavated material shall be placed directly from the trench to the haul truck. The Contractor shall provide adequate dust control and follow all governing regulations applicable to the work.

Repaving over the completed trench shall be done by the Contractor, who shall furnish all materials required. Repaving shall match the original paving in type, shall be first class in all respects, and shall comply with specifications covering the type of paving to be restored as issued by the authority over the thoroughfare involved.

The restoration of parking lots and driveways serving commercial and/or public establishments shall comply with the specifications of the respective authority having jurisdiction over the abutting right-of-way.

Except for parking lots, driveways, and sidewalks, each individual pavement restoration shall have a Company-supplied pavement marker

installed by the Contractor.

All saw cuts shall be straight and perpendicular to the driveway / roadway. Restoration shall be made with the same type material and finish that is removed. Street restoration shall be as specified in the detail for Backfill and Pavement Restoration in accordance with the Appendix of Drawings, pending the jurisdiction of said street, included in these specifications. Permanent restoration of driveway, sidewalks, and street intersections shall be completed by the Contractor within ten working days after backfilling of trench is complete. If restorations are not completed, the Company may, at its option, have the repairs made by others and deduct those costs from the amount owed to the Contractor.

11.2 Asphalt Paved Surfaces

All Asphalt pavement cuts are to be restored in accordance with the permanent pavement restoration details as shown in the Appendix of Drawings.

Pavement cuts are to be uniform width and straight sawed edges. All asphalt pavement trench edges shall be saw cut regardless of paving restoration (full lane, complete roadway, etc.). Use of a hoe ram for cutting pavement trench edges is not allowed. An approved joint sealer is to be used to seal all joints between new and existing pavement. In the event asphalt plants have closed due to cold weather, the Contractor shall maintain all pavement cuts with recessed steel plates or temporary asphalt pavement, until it becomes possible to permanently restore the pavement. Asphalt pavement used for permanent pavement restoration shall have a minimum temperature of 225°F as measured when discharged from the truck.

Particular care is to be taken that existing pavement surfaces within the right-of-way are not scarred or otherwise damaged by equipment. Planking or other protective devices are to be used at all times to prevent damage to paved surfaces from tracked equipment.

In the event the asphalt paved surfaces are damaged or scarred by work on this project, resurfacing is to be required as follows:

1) If scarring or other damage is continuous, resurfacing is to be likewise continuous and is to consist of one and one-half inches (1 ½") Class A bituminous surfaces extending to the edge of damaged lane.

   The edge of the damaged pavement shall be edge keyed, with the resurfaced section being flush with the undisturbed adjacent pavement surface, allowing roadway surface drainage not to be obstructed.

2) If scarring or other damage is determined to be intermittent, individual or paved patches may be permitted and are likewise to consist of Class A bituminous surface, extending to the edge of the damaged lane.

3) All damage to the edge of pavement shall require the removal of and base repair of a minimum of two feet (2') in addition to the maximum width of the damage. The longitudinal edge is to be a uniform width with straight sawed edges. The lane is then to be milled a minimum of five feet (5') in width with a two inch (2") minimum asphalt overlay.

There will be no skip milling allowed and the minimum length will be determined in the field by the Company's Inspector or Project Manager.

All joint sealant material shall be: hot-applied, non-water-based, and produced by a competent and reputable manufacturer. Sealant shall be in accordance with the permitting agency's specifications. Sand shall be placed over the joint sealant to prevent tracking.

11.3 Asphalt Paved Surface Materials and Construction Methods

The composition of the asphalt pavement and method of construction shall be in accordance with the Kentucky Transportation Cabinet Department of Highways (KYTC) Standard Specifications for Road and Bridge Construction (latest edition). A copy of these specifications is on file with the Company's Supervisor of Construction Inspection Services, 4801 Allmond Avenue.

11.4 Concrete Paved Surfaces

All concrete used for structural purposes (such as thrusts blocks, road subbase, sidewalks, etc.) shall be produced at a concrete plant, delivered by a ready-mix concrete truck or mobile mixer (metered) concrete truck. Only concrete used for miscellaneous purposes (such as vault floor pad, end plugs for mains to be abandoned-in-place, etc.) is allowed to be that of an on-site bag mix.

All cuts in concrete driveways and sidewalks are to be replaced from construction joint to construction joint, using minimum 3,500 psi concrete. When a section of sidewalk at a street intersection is to be replaced in the Louisville / Jefferson County Metro Government jurisdiction a wheel chair ramp is to be installed in accordance with the Appendix of Drawings.

For pipeline installation work, all concrete curbs or curb and gutter which are damaged are to be entirely removed and replaced in kind between existing joints. Stone base material shall be placed and compacted under any disturbed area with the curb replacement with the same type stone base

material and compaction as removed. Base material shall extend a minimum of eighteen (18) inches beyond the back of the curb. Install one-half inch (1/2”), pre-molded expansion joint material between new and existing concrete. Concrete shall be a minimum 3,500 psi concrete.
For service line installation work, concrete curbs or curb and gutter which are saw cut (typically four inch (4)” in width) are to be replaced in kind and have additional saw cutbacks one foot (1’) to each side of the initial cut (4” cut). If either of the additional one foot (1’) saw cutbacks fall within two feet (2’) of an existing pavement joint, the entire section shall be removed and replaced to the existing joint. Stone base material shall be placed and compacted under any disturbed area with the curb replacement with the same type stone base material and compaction as removed.

Base material shall extend a minimum of eighteen (18) inches beyond the back of the curb. Install one-half inch (1/2”), pre-molded expansion joint material between new and existing concrete. Concrete shall be a minimum 3,500 psi concrete.

Particular care is to be taken that existing pavement surfaces within the right-of-way are not scarred or otherwise damaged by equipment. Planking or other protective devices are to be used at all times to prevent damage to paved surfaces from tracked equipment.

In the event the concrete paved surfaces are damaged or scarred by work on this project, repair is required as follows:

1) Concrete roadways shall be replaced per the permitting agency’s standard specifications for the full width of the lane and to the nearest construction joint on each side of the damaged area.
2) All concrete driveways and aprons that are damaged by the Contractor’s construction or activity, or that is specified for replacement on the plans shall be replaced in their entirety to the nearest construction joint. Concrete thickness and strength shall be per the Company’s standard specifications. The style shall match the existing driveway or apron. The limits of repair, style of concrete and type of concrete for each driveway or apron shall be approved by the Company’s Project Manager prior to installation. The Company’s Project Manager may modify thickness, style, type and limits of repair based on field conditions and property owner consultation which shall be installed by the Contractor at no additional cost to the Company.

See Standard Drawing: 4410 in Appendix of Drawings

11.5 Concrete Paved Surface Materials and Construction Methods

All concrete used on this project and as shown on the project drawings shall have a 28-day minimum compression strength of 3,500 pounds per square inch (psi). The proportions and construction requirements for the concrete shall be as listed in the Kentucky Transportation Cabinet Department of Highways (KYTC) Standard Specifications for Road and Bridge Construction (latest edition).
See Standard Drawings: 4000, 4100 and 4400 in Appendix of Drawings

11.6 Unpaved Surfaces

All drainage structures (such as pipe, head or wing walls, channels, flumes, and culverts), fences, signs, etc., public or private, which are damaged or removed by this Contractor, shall be repaired or replaced in kind to the satisfaction of the owner. All open ditches shall be restored to their present cross sections, depths, and slopes, and dressed and graded to provide permanent adequate drainage to present connecting ditches or culverts equal to the original drainage systems except where specifically indicated on the project drawings.

The Contractor shall replace all surface material including landscaping, shrubbery, fences, or other disturbed surfaces, to a condition at least equal to that which existed before the work began, furnishing all labor and materials.

The grassed area disturbed by the work under this contract, whether by the Contractor or by any subcontractor, within or adjacent to the right-of-way of any state, county, city or other thoroughfare, public or private (except as required below), now in grass shall be shaped, seeded, and mulched in accordance with KYTC Standard Specifications for Road and Bridge Construction (latest edition).

Seed mixture shall be Mixture No. 1 as described in Seed Mixtures for Permanent Seeding. Acceptance of Seeding Section shall be amended to disallow compensations for any corrective seeding required by the Company’s Project Manager.

All work fronting residential lots now in grass shall be shaped and seeded in accordance with KTCDOH Standard Specifications for Road and Bridge Construction (latest edition), but shall be amended to include removal of all rock from the sod bed. A minimum of six inches (6”) of top soil being free of rock shall be placed prior to final restoration.

Reseeded areas that are located within ditches or on other sloped ground of 2:1 slopes or greater shall be covered with erosion control netting secured

with pins or stakes, or prefabricated matting containing mulch, seed and fertilizer. All ditch lines in residential lots shall be covered with erosion control netting secured with pins or stakes, or prefabricated matting containing mulch, seed and fertilizer.

A maximum of 1,500 lineal feet may be disturbed at one time prior to final grade. Restoration of the area is required before the Contractor is permitted to proceed.

Certain areas as approved by the Company's Project Manager or shown on the project drawings shall be sodded. Unless otherwise approved by the Company's Project Manager, no excavated material shall be placed on any paved roadway surface.
See Standard Drawing: 4300 in Appendix of Drawings.

11.7 Site Clean Up

Surplus pipeline materials, equipment, tools, and temporary structures shall be removed by the Contractor, and all dirt, rubbish and excess earth from excavations shall be hauled and disposed by the Contractor, all in a manner satisfactory to the Company.

The Contractor shall leave the site in presentable shape and in a condition at least equal to that which existed before the work began and in compliance with all restoration provisions of this specification.

12. WARRANTY

The provisions governing work covered by warranty are contained in **WARRANTIES** section in the **TERMS AND CONDITIONS**.

13. ADDITIONAL CONTRACT DEFINITIONS, ABBREVIATIONS, and TECHNICAL REFERENCES

13.1 Additional Contract Definitions

Right-of-Way – A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to a street, highway, or other public improvement.

Service Line – Any pipe, line, or conduit used or to be used to provide water service from a water main to the property line joint. A water service line shall be owned and maintained by the Company from the tap at the water main to the property line connection.

Non-storm sewers – Sanitary sewer, combined sewer, septic tank, or subsoil

treatment system.

Stone Classifications: Equivalencies:

Kentucky # 3 = Indiana # 2
Kentucky # 57 = Indiana # 8
Kentucky # 9 = Indiana # 3/8 pea
Kentucky D.G.A. = Indiana # 73

Structures – Bridges, culverts, catch basins, drop inlets, retaining walls, cribbing, manholes, end walls, sewers, service pipes, septic tanks, lateral fields, foundation drains, fences, swimming pools, and other features which may be encountered in the work and not classified herein.

Underground Facility – means any item which shall be buried or placed below ground for use in connection with the storage or conveyance of water, sewage, electronic, telephone or telegraph communications, electric energy, oil, gas or other substances, and shall include pipes, sewers, conduits, cables, valves, lines, wires, manholes, appurtenances, attachments and those portions of poles and their attachments below ground.

Utility – Pipe lines, conduits, ducts, transmission lines, overhead or underground wires, railroads, storm drains, sanitary sewers, irrigation facilities, street lighting, traffic signals, and fire alarm systems, and appurtenances of public utilities and those of private industry, businesses or individuals solely for their own use or use of their customers which are operated or maintained in, on, under, over or across public right-of-way or public or private easement.

13.2 Abbreviations:

AC – Asbestos Cement Pipe
ANSI – American National Standards Institute
ASTM – American Society of Testing Materials
AWWA – American Water Works Association
C – Temperature in degree Celsius
CFS – Cubic Feet Per Second
CI – Cast Iron Pipe
CL – Cement Lined Cast Iron Pipe
DEG - º - Degree
DGA – Dense Graded Aggregate
DI – Ductile Iron Pipe
DIPS – Ductile Iron Pipe Size
DIW – Ductile Iron Pipe, Wrapped
DPW – Ductile Iron Pipe, Pressure Class 350, Wrapped
DR – Dimension Ratio
DVD – Digital Versatile Disc
SDR – Standard Dimension Ratio

F – Temperature in degree Fahrenheit
FPS – Feet Per Second
FT – ‘ – Feet
HDPE – High Density Polyethylene Pipe
HTH – Dry Chlorine (Calcium Hypochlorite)
IN – “ – Inch
IPS – Iron Pipe Size
KAR – Kentucky Administrative Regulations
KDOW – Kentucky Division of Water
KOSHA – Kentucky Occupational Safety and Health Association
KRS – Kentucky Revised Statutes
KTC – Kentucky Transportation Cabinet
KTCDOH - Kentucky Transportation Cabinet Department of Highways
MJ – Mechanical Joint
MSD – Louisville and Jefferson County Metropolitan Sewer District
MUTCD – Manual on Uniform Traffic Control Devices for Streets and Highways
NFPA – National Fire Protection Association
OSHA – Occupational Safety and Health Administration
PCB – Polychlorinated Biphenyls (toxic chemicals)
PPM – Parts per Million
PSF – Pounds per Square Foot
PSI – Pounds per Square Inch
PVC – Polyvinyl Chloride Pipe
USGS – United States Geological Survey
WQC – Water Quality Certification
% - per cent
@ - at
/ - per
= - equals

13.3 Technical References

Section:

1.6.1 Federal Highway Administration, Part VI (6) of the Manual on Uniform Traffic Control Devices (MUTCD).
1.6.4 Louisville / Jefferson County Metro Government Ordinance: Title VII (7), Traffic Code: Chapter 72 Parking Regulations.
1.6.5 KRS-220, 224 Soil Erosion and Sediment Control
Jefferson County Ordinance, Chapter 159, Erosion Prevention and Sediment Control
1.6.6 Kentucky Division of Water- General Water Quality Certification, Permit #12.
2.2 KOSHA – 803 KAR 2:300 – 2:320; 803 KAR 2:240 – 2:423
3.2.4 Recommended Standards for Water Works (Ten States Standards)

Latest Edition

5.3 Blasting Regulations: KRS 351 and KAR 805.

6.2.2 PVC Pipe – Design and Installation AWWA Manual No. M-23

6.2.3 AWWA Standard Specification C 600 – Installation of Ductile Iron Water Mains and Their Appurtenances.

6.4.1 AWWA Standard Specification C 111 – Rubber–Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
AWWA Standard Specification C 900 – Polyvinyl Chloride (PVC) Pressure Pipe, 4”-12” for Water Distribution.

6.7.1 AWWA Standard Specification C 105 – Polyethylene Encasement for Ductile-Iron Pipe Systems.

7.1. ASTM D-1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort.

7.4 Kentucky Transportation Cabinet Department of Highways Standard Specification for Road and Bridge Construction.

8.2.2 401 KAR 8:150 –sections 4 (1) and 4 (2) Disinfection and Filtration.

8.4 Louisville Water Company Best Management Practice and Procedures on Chlorinated Water Disposal, December 2001.

14. TECHNICAL DESIGN AND CONSTRUCTION STANDARDS

1 GENERAL DESIGN REQUIREMENTS

1.1 The Utility shall establish and maintain Technical Design and Construction Standards for all water main projects reviewed and constructed under the KDOW Plans Review Agreed Order.

1.2 The Utility shall ensure that the plans and specifications for each project meet or exceed all Technical Design and Construction Standards.

1.3 The Professional Engineer of Record shall ensure the plans and specifications for each project meet or exceed these Technical Design and Construction Standards.

1.4 **Hydraulics**

1.4.1 The utility shall define existing and potential customer peak demand in the hydraulic analysis.

1.4.2 The hydraulics analysis shall demonstrate the proposed water main projects can be flushed at least two and one half (2.5) feet per second (fps), while keeping system pressure above twenty (20) pounds per square inch (psi) within the pressure zone of the proposed project.

1.4.3 The hydraulic analysis shall demonstrate the proposed water main project maintains thirty (30) psi under peak demand.

1.4.4 The hydraulic analysis shall demonstrate that the proposed water main project does not drop ground level pressure in any part of the pressure zone below twenty (20) psi under all conditions of flow.

1.4.5 Pressure greater than or equal to thirty (30) psi shall be available on the discharge side of all water meters.

1.5 Hydrants

1.5.1 Fire hydrants shall only be installed on new or existing water mains designed to carry fire flows. The water main supplying the hydrant must have a diameter greater than or equal to six (6) inches and provide sufficient capacity to meet the required fire flow. (Louisville Water Technical Specifications Section 9.1)

1.5.2 An auxiliary valve shall be installed in all hydrant supply pipes. (Louisville Water Technical Specifications Section 9.1)

1.5.3 Hydrant drains shall not be connected to any sanitary sewer, combined sewer, septic tank or subsoil treatment system (hereinafter "non-storm sewer") or any storm sewer or storm drain, and shall be located at a distance greater than ten (10) feet from any non-storm sewer. (Louisville Water Technical Specifications Section 9.2)

1.6 Water Main Valves

1.6.1 Water mains shall have a sufficient quantity of valves so that customer inconvenience and sanitary hazards will be minimized during repairs.

1.6.2 Urban areas as determined by the Utility shall include a valve spacing distance of less than or equal to five hundred feet (500') for commercial service areas and less than or equal to one thousand feet (1,000') for residential service areas. Valves should be located at roadway intersections where practical.

1.6.3 Rural areas as determined by the Utility shall include a valve spacing distance of less than one (1) mile. Valves should be located at roadway intersections where practical.

1.7 Blow-Off or Flushing Connections

1.7.1 For water mains that dead end, a fire hydrant or blow-off shall be required at the end of each six (6) inch or larger diameter water main and a flush hydrant or blow-off shall be required at the end of each water main that is less than six (6) inches in diameter.

1.7.2 Each blow-off, fire hydrant, or flush hydrant shall be sized so that velocity of greater than or equal to two and one half (2.5) feet per second (fps) can be achieved in the water main served by the blow-off or hydrant during flushing.

1.7.3 Flushing devices, blow-offs, or air relief valve shall not be connected to any non-storm sewer or any storm sewer or storm drain, and shall be located at a distance greater than ten (10) feet from any non-storm sewer. Chambers, pits, or manholes containing valves, blow-offs, meters, or other such appurtenances shall not be directly connected to any non-storm sewer or any storm sewer or storm drain. Such chambers, pits, or manholes shall be drained to absorption pits underground or to the surface of the ground where they are not subject to flooding by surface water. (Louisville Water Technical Specifications Section 8.3.2)

1.8 Air Relief Valves

1.8.1 Air relief valves or hydrants shall be installed at high points in water mains, where air can accumulate. Automatic air relief valves shall not be used in situations where manhole or chamber flooding may occur. (Louisville Water Technical Specifications Section 8.7, 8.7.1 & 8.7.2)

1.8.2 The open end of an air relief pipe from automatic valves shall be extended a distance of greater than or equal to one (1) foot above grade and provided with a screened, downward facing elbow or shall be an equivalent standard as determined by the best professional judgment of the Utility. The pipe from a manually operated valve shall be extended to the top of the pit. (Louisville Water Technical Specifications Section 8.7.1 & 8.7.2)

1.9 Bedding and Backfill

A continuous and uniform bedding shall be provided in the trench for all buried pipe. Backfill material shall be tamped in layers

around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. Stones found in the trench shall be removed for a depth greater than or equal to six (6) inches below the bottom of the pipe. (Louisville Water Technical Specifications Section 7.1)

1.10 **Minimum Depth**

All water mains shall be covered to a depth equal to or greater than forty-two (42) inches to prevent freezing. (Louisville Water Technical Specifications Section 7.1)

1.11 **Thrust Blocks**

All valves, tees, bends, plugs, and hydrants shall be provided with reaction blocking, tie rods, or joints designed to prevent movement. (Louisville Water Technical Specifications Section 6.14 & 9.1)

1.12 **Disinfection and Coliform Monitoring**

1.12.1 New or relocated water mains shall be thoroughly disinfected in accordance with 401 KAR Chapter 8:150 Section 4 (1) upon completion of construction and before being placed into service. To disinfect the new or relocated water mains, the Utility shall use chlorine or chlorine compounds (disinfectants) in such amounts as to produce an initial disinfectant concentration of at least fifty (50) ppm and a residual disinfection of greater than or equal to twenty-five (25) ppm at the end of twenty-four (24) hours. Follow the water main disinfection with thorough flushing and place the water main into service if, and only if, coliform monitoring applicable to the water main does not show the presence of coliform. If coliform is detected, repeat flushing of the water main and coliform monitoring. If coliform is still detected, repeat disinfection and flushing as if the water main has never been disinfected. Continue the described process until monitoring does not show the presence of coliform. (Louisville Water Technical Specifications Section 8.2.2 & 8.6)

1.12.2 The presence or absence of total coliform monitored by sampling and analysis shall be determined for the new or relocated water main(s) as needed. Take samples at connection points to existing water mains at one (1) mile intervals and at dead ends, without omitting any branch of the new or relocated water main. Sample bottles shall be clearly

identified as “special” construction tests. (Louisville Water Technical Specifications Section 8.6)

1.12.3 For new construction projects, the distribution system, using the most expedient method, shall maintain coliform test results. (Louisville Water Technical Specifications Section 8.6)

1.12.4 Chlorinated water resulting from disinfection of project components shall be disposed in a manner which will not violate 401 KAR 5:031. (Louisville Water Technical Specifications Section 8.4)

1.13 Pressure Testing and Leak Detection

The presence or absence of leaks monitored by physical testing shall be determined in all types of installed pipe as needed. Pressure testing and leakage testing shall be in accordance with the latest edition of AWWA Standard C600. (Louisville Water Technical Specifications Section 8.5)

1.14 Water Main Construction and Material Standards

1.14.1 Installation of water mains and appurtenances shall meet or exceed AWWA standards or manufacturer recommendations.

1.14.2 Pipes, fittings, valves, fire hydrants, and appurtenances shall meet or exceed the latest standards issued by the AWWA, ASTM, or NSF (if such standards exist). PVC and Polyethylene piping used must be certified to ANSI/NSF Standard 61.

1.15 Sewer Crossings and Separation

1.15.1 For the purpose of this standard, “non-storm sewer” is defined as any of the following: sanitary sewer, combined sewer, septic tank, or subsoil treatment system. (Louisville Water Technical Specifications Section 3.1.4)

1.15.2 Water mains shall be laid a horizontal distance of greater than or equal to ten (10) feet horizontally from any existing or proposed non-storm sewer. The horizontal distance shall be measured from outside diameter of the water main to outside diameter of the non-storm sewer. (Louisville Water Technical Specifications Section 3.1.4)

1.15.3 In cases where the Utility determines it is not practical to maintain a ten (10) foot separation, water mains may be installed closer to a non-storm sewer provided that a variance is obtained from the Cabinet's Division of Water and maintained with the project records. (Louisville Water Technical Specifications Section 3.1.4)

1.15.4 No deviation from the ten (10) foot separation is allowed if the non-storm sewer is a force main (sewer under pressure). (Louisville Water Technical Specifications Section 3.1.4)

1.15.5 When water mains and non-storm sewers cross:

1.15.5.1 Water mains shall be laid such that there shall be a vertical distance of greater than or equal to eighteen (18) inches between the water main and non-storm sewer. The vertical distance shall be measured from the outside diameter of the water main to the outside diameter of the non-storm sewer line. (Louisville Water Technical Specifications Section 3.1.4)

1.15.5.2 One (1) full length of the water pipe shall be located so that both joints of the water pipe will be as far from the non-storm sewer as practical as determined by the Utility. (Louisville Water Technical Specifications Section 3.1.4)

1.15.5.3 Special structural support for the water and non-storm sewer may be required.
(Louisville Water Technical Specifications Section 3.1.4)

1.15.6 No water pipe shall pass through or come in contact with any part of a non-storm sewer manhole. (Louisville Water Technical Specifications Section 3.1.4)

1.16 Water Mains Near Areas with Organic Contamination

If water mains are installed or replaced in areas of organic contamination or in areas within two hundred (200) feet of underground or petroleum storage tanks, ductile iron or other non-permeable materials shall be used in all portions of the water main installation or replacement. (Louisville Water Technical Specifications Section 5.5.6)

1.17 Asbestos-Cement Pipe (Transite Pipe)

If the existing water main to be tapped is asbestos-cement pipe, then

the contractor shall conform to OSHA regulations governing the handling of hazardous waste during the process of tapping the asbestos-cement pipe. Pieces of asbestos-cement pipe resulting from the tap shall be double bagged, placed in a rigid container, and disposed of in an approved landfill. (Louisville Water Technical Specifications Section 6.7)

1.18 Subfluvial Pipe Crossings

1.18.1 For subfluvial pipe crossings, a floodplain construction permit will not be required pursuant to KRS 151.250 if the following requirements of 401 KAR 4:050 Section 2 are met:

1.18.1.1 No material may be placed in the stream or in the flood plain of the stream to form construction pads, coffer dams, access roads, etc. during construction of pipe crossings.

1.18.1.2 Crossing trenches shall be backfilled as closely as possible to the original contour.

1.18.1.3 All excess material resulting from construction displacement in a crossing trench shall be disposed of outside the flood plain.

1.18.1.4 For erodible channels, there shall be at least thirty (30) inches of backfill on top of all pipe or conduit points in the crossing.

1.18.1.5 For nonerodible channels, pipes or conduits in the crossing shall be encased on all sides by at least six (6) inches of concrete with all pipe or conduit points in the crossing at least six (6) inches below the original contour of the channel.

(Louisville Water Technical Specifications Section 1.3.6)

1.18.2 For subfluvial pipe crossings greater than fifteen (15) feet in width:

1.18.2.1 The pipe shall be of special construction having flexible, restrained, or welded watertight joints, and

1.18.2.2 Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair. Valves shall be easily accessible and not be subject to flooding.

1.18.2.3 Permanent taps or other provisions to allow insertion of a small meter to determine leakage and obtain water samples shall be made on each side of the valve closest to the supply source. (Louisville Water Technical Specifications Section 1.3.6)

1.19 Cross Connections

Cross connections shall not be allowed in accordance with 401 KAR 8:020. 401 KAR 8:020 (2) Cross-connections prohibited. All cross-connections shall be prohibited. The use of automatic devices, such as reduced pressure zone back flow preventers and vacuum breakers, may be approved by the cabinet in lieu of proper air gap separation. A combination of air gap separation and automatic devices shall be required if determined by the cabinet to be necessary due to the degree of hazard to public health. Every public water system shall determine if or where cross-connections exist and shall immediately eliminate them.

1.20 Project Approvals, Record Retention and Management requirements and stipulations under this Agreed Order are as follows:

1.20.1.1 All water main projects reviewed by the Utility require the preparation of plans and specifications stamped by a licensed Kentucky Professional Engineer (P.E.) who shall be the Engineer of Record for an individual project.

1.20.1.2 All water main projects submitted to the Utility for review shall be documented as reviewed and approved or denied by the Utility’s Designated Plans Reviewer for the project.

1.20.1.3 All water main projects that the Utility designs internally or has designed by a contractor shall include plans and specifications stamped by a licensed Kentucky Professional Engineer (P.E.) who shall be the Engineer of Record for an individual project, and shall be reviewed and approved or denied by the Utility’s Designated Plans Reviewer for the project.

1.20.1.4 All revisions to water main project plans previously approved by the Utility under the coverage of this Agreed Order shall be reviewed and approved or denied by the Utility’s Designated Plans Reviewer for the project.

1.20.1.5 During construction, a set of Utility approved plans and specifications shall be available at the job site at all times. All work shall be performed in accordance with the Utility approved plans and specifications.

1.20.1.6 The Utility shall certify the water main projects has been constructed and tested in accordance with the approved plans and specifications. The Utility shall document and maintain a record of the certification of the project consistent with the recordkeeping requirements as stated in the Agreed Order.

1.20.1.7 The Utility shall define a project approval period not to exceed twelve (12) months, during which time the project construction shall begin.

1.20.1.8 Coverage under this Agreed Order does not relieve the Utility from the responsibility of obtaining any other approvals, permits, licenses required by the Cabinet and other state, federal and local agencies.

1.20.1.9 Project files and documentation, including water main project plans, location map, engineering calculations, and hydraulic information demonstrating regulatory compliance shall be retained for a period of not less than five (5) years from the completion of the project (in-service date).

2 Qualifications for Cabinet's Division of Water Agreed Order Projects

2.1 The Cabinet's Division of Water Agreed Order Projects will be limited to projects that meet the criteria identified in this section. Projects not meeting these qualifications shall be submitted to the Cabinet's Division of Water for review and approval.

2.1.1 The water system shall have a valid Agreed Order.

2.1.2 Projects with an overall length less than ten thousand (10,000) contiguous feet shall qualify. Two (2) or more adjoining projects shall be considered one (1) project for the purposes of this requirement.

2.1.3 Projects consisting of water mains greater than or equal to three (3) inches in diameter or less than or equal to twelve (12) inches in diameter shall qualify. Additionally, circulating two (2) inch water main projects of less than five hundred (500) feet shall qualify if future extension from the line will

not occur and if the Utility determines that the two (2) inch line will benefit the overall system hydraulics and / or drinking water quality.

2.1.4 Projects qualifying for review and approval by the Utility may include water main projects with valves and / or hydrants as part of the design. However, projects, including those less than ten thousand (10,000) total linear feet, that include new construction or installation of treatment plants, storage tanks, chemical or pressure booster pumping stations, shall be reviewed by the Cabinet for final determination.

2.1.5 The water demand for the project shall not cause the Utility to exceed eighty-five (85) % of its rated or operational design capacity.

2.1.6 Projects funded in part or in full by the State Revolving Fund (SRF) or Congressional Special Appropriation Grants (SPAP) shall not qualify for review and approval by the Utility under the terms and conditions of this Agreed Order.

2.1.7 Projects under the jurisdiction of any regulating agency or funding agency other than the Kentucky Division of Water (external agencies), which in any way conflict with any regulatory process or funding process of these external agencies, shall not qualify for review and approval by the Utility under the terms and conditions of this Agreed Order.

2.1.8 The Utility is not authorized to approve any project that impacts any outstanding state resource water, outstanding national resource water, exceptional water, or cold water aquatic habitat as specified by 401 KAR Chapter 10.

2.1.9 Upon completion, projects shall meet all drinking water quality standards as set forth in 401 KAR Chapter 8.

2.1.10 The project meets all of the Technical Design and Construction Standards of the Cabinet's Division of Water Agreed Order and does not require any variances or deviations from the Technical Design and Construction Standards of the Cabinet's Division of Water Agreed Order.

APPENDIX OF STANDARD DRAWINGS FOR 4" – 20" PIPELINE CONSTRUCTION

Standard Drawing Number	
	Section 1: General Requirements
4501	Creek Crossings with Concrete Cap (Sect. 1.3.5)
	Section 3: Site
1000	Typical Utility Location Profiles (Sect.3.1)
3600	Typical Temporary Service from Fire Hydrant (Sect. 3.4.4 & 3.4.4.1)
	Section 6: Installation
1500	Steel Casing Pipe and Casing Runners (Sect. 6.3)
1400	Typical Cast-in-Place Thrust Anchors (Sect.6.8 & 6.15)
1200	A-C Methods for Installing and Restoring Polyethylene Wrap (Sect. 6.9)
	Section 7: Backfilling Procedures and Tamping
4300	Common Backfill and Lawn Restoration (Sect. 7.1, 7.4, 7.5, 7.6 & 11.6)
	Section 8: Placing Water Main In Service
1601	Typical 2" Blow-off and Flushing Connection (Sect. 8.3.2)
1602	Typical 1" Manual Air Valve (For mains up to 20") (Sect. 8.3.2, 8.7 & 8.7.2)
1603	Typical Combined 2" Automatic and Manual Air Valve (For mains 16" and larger) (Sect. 8.3.2, 8.7 & 8.7.1)
1608	Leak Detection By-Pass Meter for Underwater Crossings (Sect. 1.3.6 & 8.8)
	Section 9: Fire Hydrant
2000	Typical Fire Hydrant Installation (Sect. 9)
	Section 10: Service Work
3804	Method for Tapping Polyethylene Encased Pipe (Sect. 10.3.1)
3002	Typical Copper Service 1" and Smaller (Sect.10.3, 10.3.1, 10.3.2 & 10.6)
3003	Typical 1" Copper Service with Pressure Reducing Valve (Sect.10.3, 10.3.1, 10.3.2, 10.5 & 10.7)
3004	Typical 3/4" Copper Service with Pressure Reducing Valve (Sect.10.3, 10.3.1, 10.3.2, 10.6 & 10.7)
3400	Typical Double 1" Domestic/Irrigation Copper Service (Sect. 10.3, 10.3.1, 10.3.2)
3401	Typical Double Domestic/Irrigation 1" Copper Service With Pressure Reducing Valve (Sect. 10.3, 10.3.1, 10.3.2, 10.6 & 10.7)
3403	Typical ¾" Irrigation Retro Fit Copper Service (Sect. 10.3, 10.3.1, 10.3.2, & 10.6)
3404	Typical 1" Tandem 2-Way Domestic Copper Service (Sect. 10.3, 10.3.1, 10.3.2, & 10.6)
3420	Typical 1" 3-Way Domestic Copper Service (Sect. 10.3, 10.3.1, 10.3.2, & 10.6)

3430	Typical 1” 4-Way Domestic Copper Service (Sect. 10.3, 10.3.1, 10.3.2, & 10.6)
3200	Typical 1-1/2" or 2" Copper Service (Sect. 10.3, 10.3.1, 10.3.2, & 10.6)
3202	Typical 1-1/2" or 2" Copper Service with Pressure Reducing Valve (Sect. 10.3, 10.3.1, 10.3.2, 10.6 & 10.7)
3203A	Typical Ductile Iron Domestic Service 4"x3” (Sect. 10.4, 10.4.1, 10.4.2, & 10.6)
3203	Typical Ductile Iron Domestic Service 4" and Larger (Sect. 10.4, 10.4.1, 10.4.2, & 10.6)
3601	Typical Fire Protection Service 4" and Larger (Sect. 10.4, 10.4.1, 10.4.2, & 10.6)
3440	Relocate Service (Sect.10.9)
3441	Renew Service (Sect. 10.10, 10.11)
3442	Transfer Service (Sect.10.16) and Discontinue Service (Sect.10.17)
3805	Service Sleeve Installation Detail (Sect.10)

Section 11: Restoration

4000	State of Kentucky Backfill and Paving Restoration (Sect. 11)
4100	Metro Louisville/Jefferson County Backfill and Paving Restoration (Sect. 11)
4400	Sidewalk/Backfill Detail (Sect. 11)
4410	Concrete Curb and Gutter Restoration Detail (Sect. 11.4)

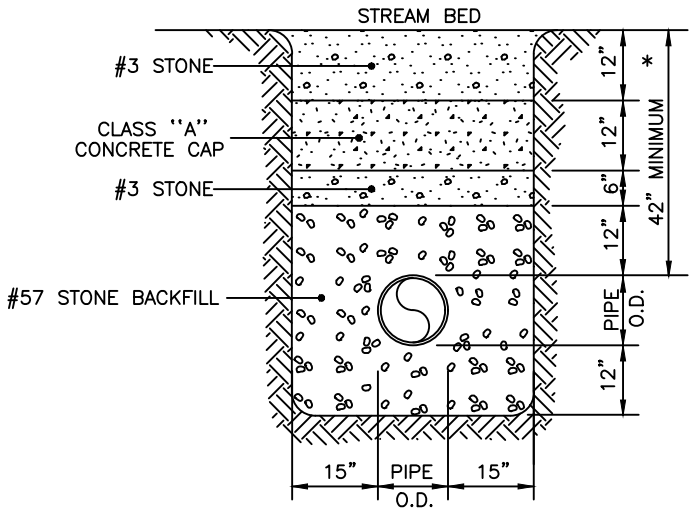
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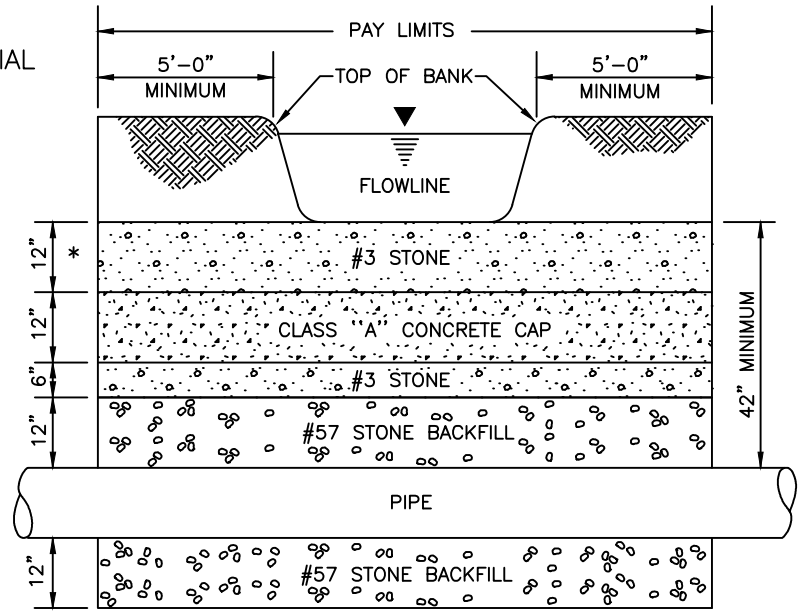
4600	Typical Master Meter Detail
5005	Valve Status Marker

Contract ID: 221055
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*THE TOP 12" TO BE #3 STONE OR OTHER SELECT MATERIAL APPROVED BY THE KENTUCKY DIVISION OF WATER.

TYPICAL SECTION





TYPICAL PROFILE

STREAM CROSSING CONDITIONS

1. COMPLY WITH SECTION 1.3.5, SOIL EROSION AND SEDIMENT CONTROL.
2. THIS DETAIL APPLIES ONLY TO BLUE-LINE STREAMS, AS SHOWN ON THE PERTINENT USGS QUADRANGLE MAP.
3. BEST MANAGEMENT CONSTRUCTION PRACTICES MUST BE USED AT ALL TIMES DURING CONSTRUCTION. ADEQUATE SILT CONTROL MUST BE PLACED PRIOR TO THE START OF CONSTRUCTION AND MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
4. REVEGETATE ALL DISTURBED GRASSY AREAS ON THE STREAM SLOPES. SOD STAKES MAY BE REQUIRED TO SECURE SOD ON THE STREAM BANKS.
5. MAINTAIN AT LEAST 3.5' OF BACKFILL AT THE STREAM CROSSING FROM THE TOP OF PIPE TO THE ORIGINAL STREAM BED ELEVATION.
6. OBTAIN APPROVAL FROM THE METROPOLITAN SEWER DISTRICT PRIOR TO THE START OF THE STREAM CROSSING WHEN CONSTRUCTION IS UNDER THEIR JURISDICTION.
7. THRUST BLOCKING SHALL BE CONSTRUCTED AT ALL BENDS.

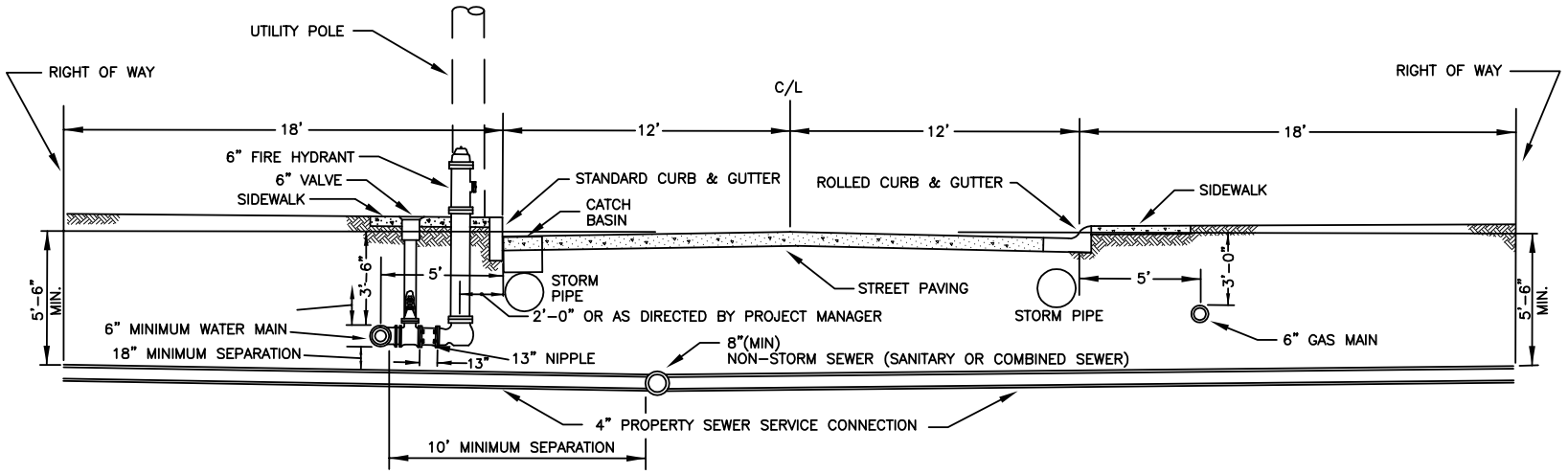
LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
SPENCER W. BRUCE, P.E. - PRESIDENT
TIMOTHY KRAUS, P.E. - VICE PRESIDENT / CHIEF ENGINEER

STANDARD DRAWING

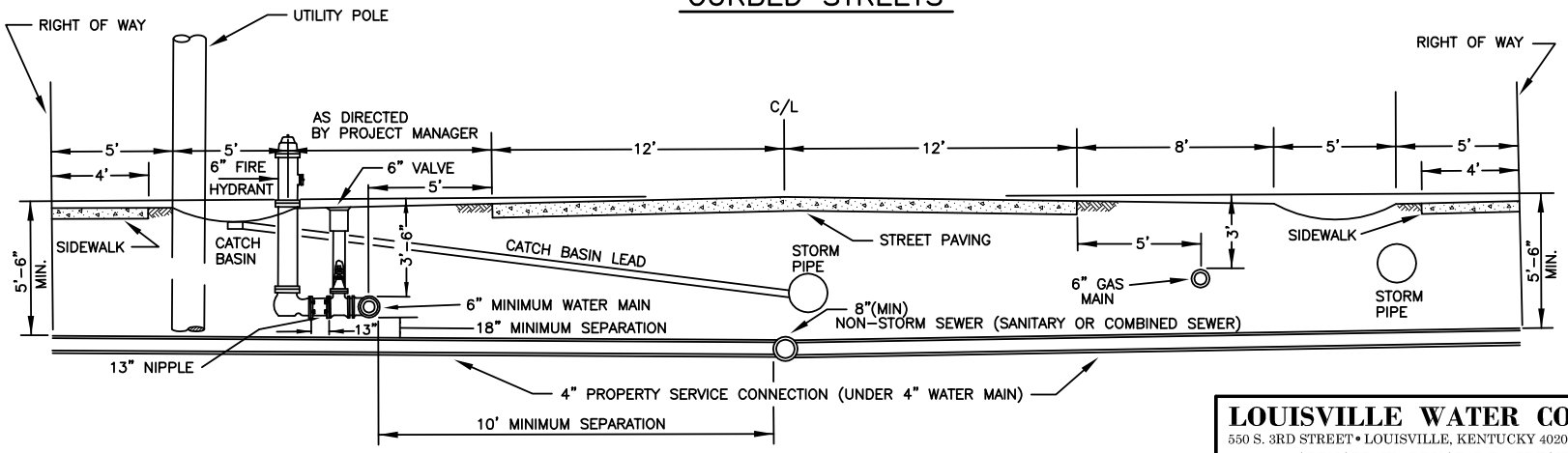
CREEK CROSSING WITH CONCRETE CAP

DATE	MAY 2021	SCALE	NONE
DRAWING NO.	4501	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1210[illegible]



UTILITY LOCATIONS
CURBED STREETS



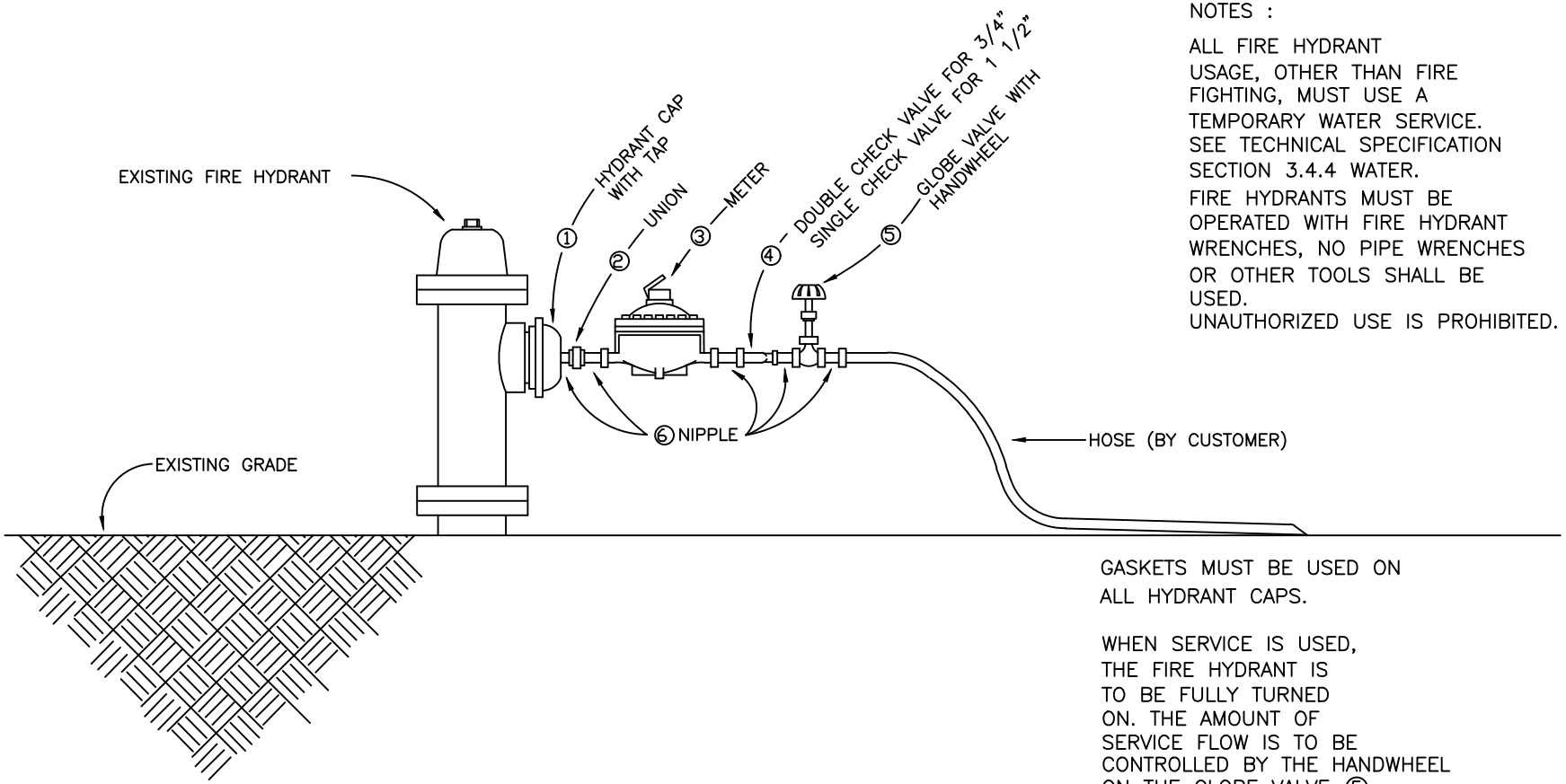
UTILITY LOCATIONS
WITHOUT CURBED STREETS

LOUISVILLE WATER COMPANY
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SPENCER W. BRUCE, P.E. - PRESIDENT
TIMOTHY KRAUS, P.E. - VICE PRESIDENT / CHIEF ENGINEER

STANDARD DRAWING
TYPICAL
UTILITY LOCATION PROFILES

DATE	AUGUST 2018	SCALE	NONE
DRAWING NO.	1000	SHEET	1 OF 1

Contract ID: 221055
Page 220 of 612



NOTES :

ALL FIRE HYDRANT USAGE, OTHER THAN FIRE FIGHTING, MUST USE A TEMPORARY WATER SERVICE. SEE TECHNICAL SPECIFICATION SECTION 3.4.4 WATER.

FIRE HYDRANTS MUST BE OPERATED WITH FIRE HYDRANT WRENCHES, NO PIPE WRENCHES OR OTHER TOOLS SHALL BE USED.

UNAUTHORIZED USE IS PROHIBITED.

GASKETS MUST BE USED ON ALL HYDRANT CAPS.

WHEN SERVICE IS USED, THE FIRE HYDRANT IS TO BE FULLY TURNED ON. THE AMOUNT OF SERVICE FLOW IS TO BE CONTROLLED BY THE HANDWHEEL ON THE GLOBE VALVE ⑤.

NO.	QUANTITY	FITTING	JOINT	SERVICE SIZES 3/4"	SERVICE SIZES 1-1/2"
①	1	Hydrant Cap w/Gasket	Female Threaded	4"x3/4"	4"x1-1/2"
	1	& Tap	Female Threaded	3/4"	1-1/2"
②	1	Union	Female Threaded	3/4"	1-1/2"
③	1	Meter	Flanged with Adapter	3/4"	1-1/2"
④	1	Check Valve	Female Threaded	3/4"	1-1/2"
⑤	1	Globe Valve W/Handwheel	Female Threaded	3/4"	1-1/2"
⑥	5	Nipple	Inlet-Male Threaded Outlet-Male Threaded	3/4"	1-1/2"

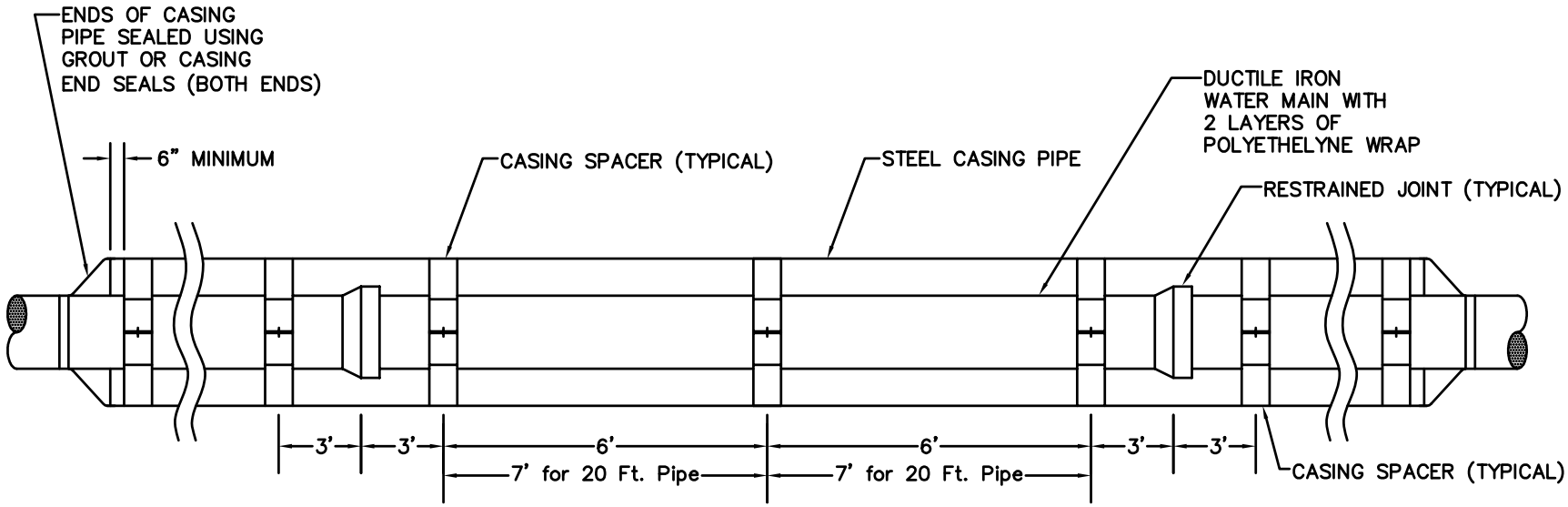
LOUISVILLE WATER COMPANY
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SPENCER W. BRUCE, P.E. - PRESIDENT
TIMOTHY KRAUS, P.E. - VICE PRESIDENT / CHIEF ENGINEER

STANDARD DRAWING

TYPICAL TEMPORARY SERVICE FROM FIRE HYDRANT 3/4" OR 1-1/2"

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3600	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1210[illegible]



TYPICAL SPACER SPACING
(PER 18 FT. PIPE LENGTH)

NOTES:
1) STEEL CASING TO EXTEND A MINIMUM OF FIVE (5) FEET BEYOND THE EDGE OF PAVEMENT.
2) THREE (3) CASING SPACERS PER EACH PIPE LENGTH (MINIMUM). WITH ONE CASING SPACER WITHIN 3 FT. OF EACH PIPE END.
3) WATER MAIN SHALL HAVE RESTRAINED JOINTS WITHIN CASING PIPE. (SEE SECT. 6.3)

CASING PIPE SIZES		
WATER MAIN PIPE SIZE (INCHES)	CASING PIPE SIZE (INCHES)	CASING THICKNESS (INCHES)
4	12	0.375
6	16	0.375
8	16	0.375
12	24	0.375
16	30	0.500
20	36	0.500

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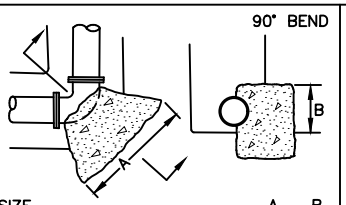
STANDARD DRAWING

STEEL CASING PIPE
AND CASING SPACERS

DATE	AUGUST 2018	SCALE	NONE
DRAWING NO.	1500	SHEET	1 OF 1

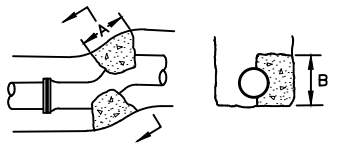
Contract ID: 221055
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90° BEND



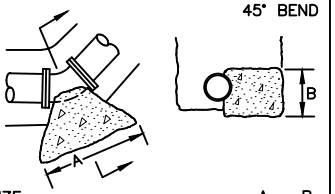
SIZE	A	B
4",6",8", & 12"	4'-6"	2'
16"	5'-9"	2'-6"
20"	6'-6"	3'

HORIZONTAL OFFSET



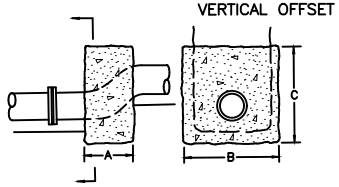
SIZE	A	B
4",6",8", & 12"	2'	2'
16"	2'-6"	2'-6"
20"	3'	3'

45° BEND



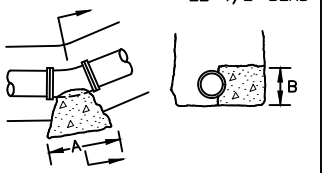
SIZE	A	B
4",6",8", & 12"	4'-6"	2'
16"	5'-9"	2'-6"
20"	6'-6"	3'

VERTICAL OFFSET



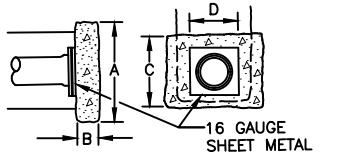
SIZE	A	B	C
4",6",8", & 12"	2'	4'	4'
16"	3'	6'	4'
20"	3'-6"	7'	4'-6"

22-1/2° BEND



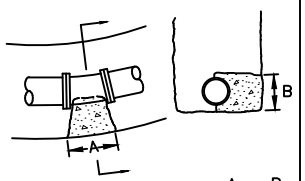
SIZE	A	B
4",6",8", & 12"	3'	1'-6"
16"	3'-9"	2'
20"	4'-6"	2'-9"

PLUG



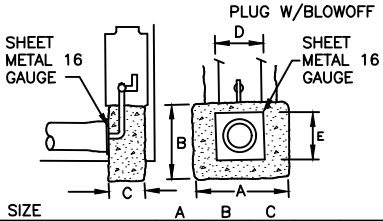
SIZE	A	B	C	D	E
4",6",8",& 12"	4'	9"	3'	2'	2'
16"	5'	1'-3"	4'	2'-6"	2'-6"
20"	6'-6"	2'	4'	3'	3'

11-1/4° BEND



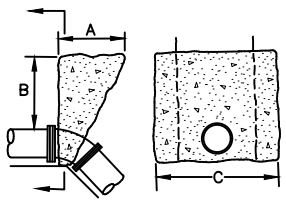
SIZE	A	B
4",6",8", & 12"	2'-6"	1"
16"	3'	1'-6"
20"	4'	2'-3"

PLUG W/BLOWOFF



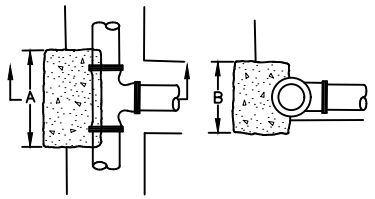
SIZE	A	B	C		
4",6",8", & 12"	4'	3'	1'-6"	2'	2'
16"	5'	4'	2'	2'-6"	2'-6"
20"	6'	5'	2'-6"	3'	3'

45° VERTICAL BEND



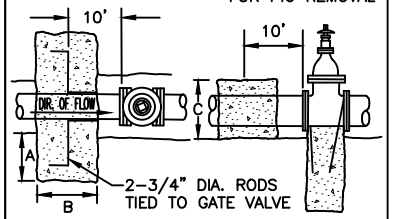
SIZE	A	B	C
4",6",8", & 12"	3'	3'	5'
16"	3'-9"	3'-9"	6'
20"	5'	4'	7'

TEE OR TAPPING SLEEVE



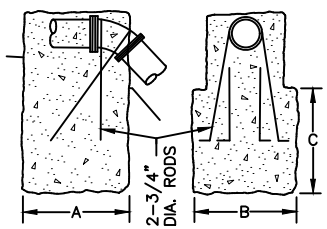
SIZE	A	B
4",6",8", & 12"	4'	3'
16"	5'	3'-9"
20"	6'	4'-6"

HORIZONTAL THRUST BLOCKING FOR PIG REMOVAL



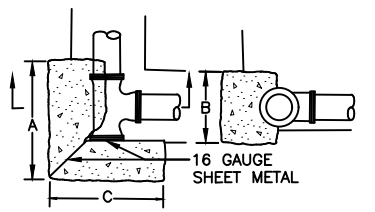
SIZE	A	B	C
4",6"	1'	2'	2'
8"	1'	2'	2'
12"	2'	3'	2'
16"	2'	4'	3'
20"	3'	4'	3'

45° VERTICAL BEND



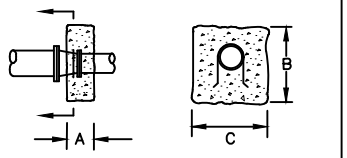
SIZE	A	B	C
4",6",8", & 12"	4'	4'	4'
16"	5'	5'	5'
20"	6'	6'	6'

TEE PLUGGED



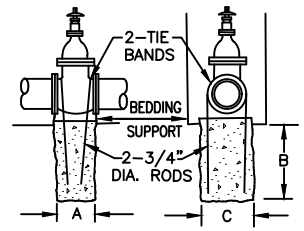
SIZE	A	B	C
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16"	5'	3'-9"	5'-6"
20"	6'	4'-6"	6'

REDUCER



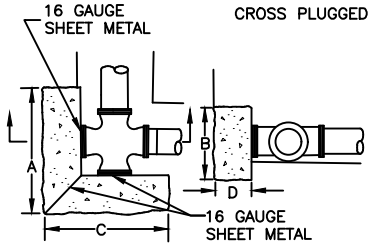
SIZE	A	B	C
4",6",8", & 12"	1'-6"	3'	2'
16"	2'	3'-9"	2'-6"
20"	2'-6"	4'	3'

GATE VALVE



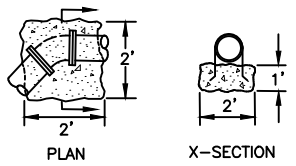
SIZE	A	B	C
4",6",8", & 12"	1'-6"	3'	2'
16"	2'	3'-9"	2'-6"
20"	2'-6"	4'	3'

CROSS PLUGGED



SIZE	A	B	C	D
4",6",8", & 12"	4'-6"	3'	4'-6"	1'-6"
16"	5'	3'-6"	5'	2'
20"	6'	4'	6'	3'

TYPICAL CONCRETE ANCHORED THRUST BLOCKING UNDER ALL FITTINGS USED WITH P.V.C. PIPE



NOTE:

1. ALL DUCTILE AND GRAY IRON PIPE AND APPURTENANCES SHALL BE DOUBLE POLYWRAPPED.
2. CARE SHALL BE TAKEN TO AVOID DAMAGING POLYWRAP. ANY DAMAGE OR TORN POLYETHYLENE WRAP MUST BE REPAIRED WITH POLYETHYLENE TAPE AND ADDITIONAL POLYETHYLENE WRAP IF NECESSARY TO PROVIDE TWO (2) LAYERS OF PROTECTION.
3. CONCRETE THRUST BLOCKING MUST BE ALLOWED TO CURE, OR PROTECTED AS APPROVED BY THE PROJECT MANAGER, BEFORE BACKFILLING.
4. ALL CONCRETE SHALL BE 3,500psi FROM A COMMERCIAL PLANT, OR SHALL BE AN ON-SITE MIXTURE PREVIOUSLY APPROVED BY THE PROJECT MANAGER.
5. ALL FITTINGS INVOLVED WITH PVC PIPE SHALL HAVE A CONCRETE SUPPORT BLOCK, IN addition TO THE PERTINENT THRUST BLOCK.
6. SIZING OF THRUST BLOCKING ASSUME AN ALLOWABLE SOIL BEARING CAPACITY OF 3,000 PSF.
7. REINFORCING STEEL ANCHORS USED IN THRUST BLOCKING SHALL BE GRADE 60 AND EPOXY COATED.
8. CONCRETE FOR THRUST BLOCKING MUST EXTEND TO AND BE PLACED AGAINST UNDISTURBED EARTH UNLESS DIRECTED OTHERWISE BY THE COMPANY'S PROJECT MANAGER OR INSPECTOR.
9. RODS USED FOR THRUST RESTRAINT ARE TO BE USED ONLY AS TEMPORARY THRUST RESTRAINT. THRUST ANCHORS MUST BE POURED FOR ALL FITTINGS AS DETAILED IN THIS DRAWING. MECHANICAL RESTRAINT MAY BE USED IN PLACE OF RODS AT THE DISCRETION OF THE COMPANY'S PROJECT MANAGER.

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STANDARD DRAWING

TYPICAL CAST-IN-PLACE CONCRETE THRUST BLOCKING

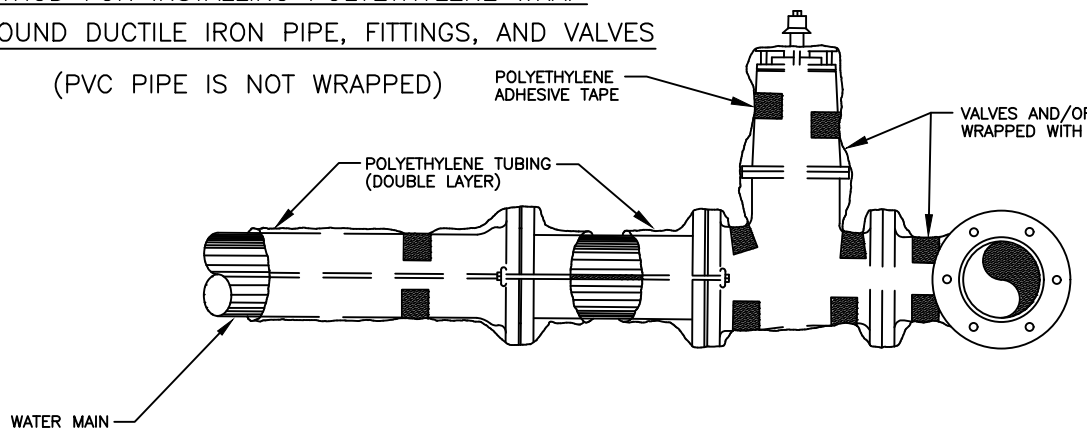
DATE	JULY 2021	SCALE	NONE
DRAWING NO.	1400	SHEET	1 OF 1

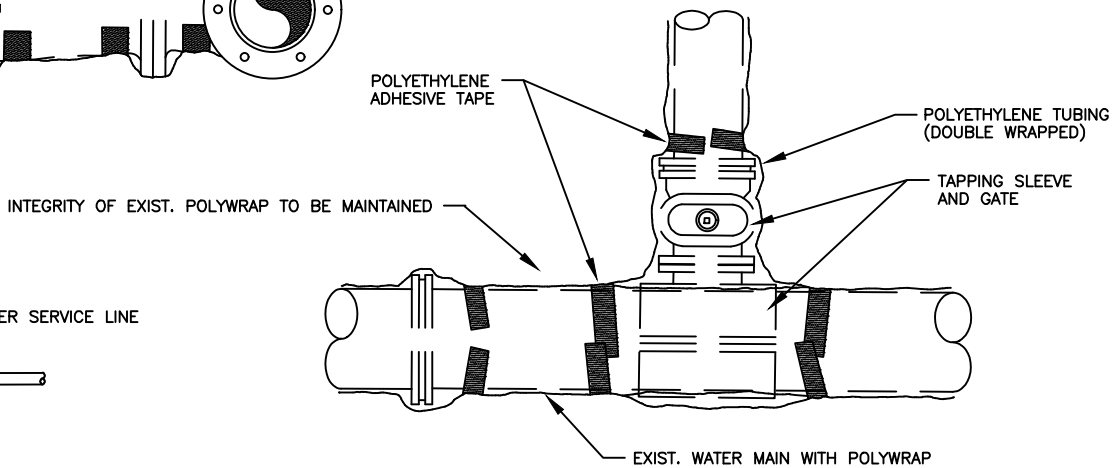
JEFFERSON - OLDHAM COUNTIES
1210100035

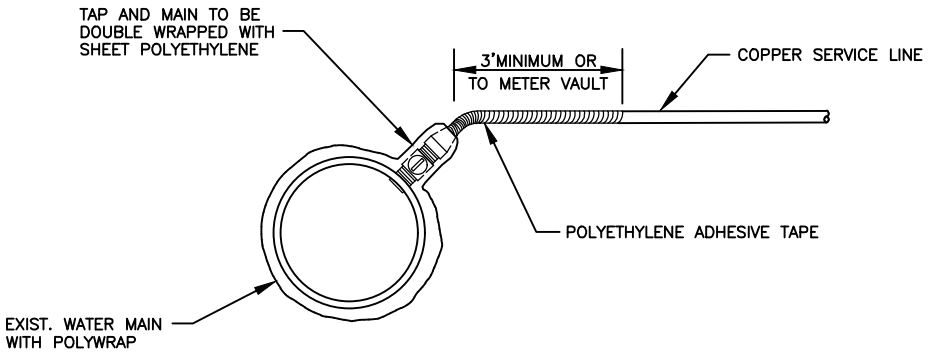
Contract ID: 221055
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METHOD FOR INSTALLING POLYETHYLENE WRAP AROUND DUCTILE IRON PIPE, FITTINGS, AND VALVES

(PVC PIPE IS NOT WRAPPED)







METHOD FOR RESTORING POLYETHELENE WRAP WHEN TAPPING WATER MAINS

NOTES:

1) ANY DAMAGE OR TORN POLYETHYLENE WRAP MUST BE REPAIRED WITH POLYETHYLENE ADHESIVE TAPE AND ADDITIONAL POLYETHYLENE WRAP IF NECESSARY TO PROVIDE TWO (2) LAYERS OF PROTECTION.

2) PIPE SHALL NOT BE WRAPPED FOR MORE THAN FIVE (5) DAYS IN ADVANCE OF PLACEMENT INTO THE TRENCH.

3) ALL DUCTILE IRON TEES, VALVES AND FITTINGS ON PVC PIPE SHALL BE DOUBLE WRAPPED WITH POLYETHYLENE AND ENDS FASTENED SECURELY ON PVC PIPE.

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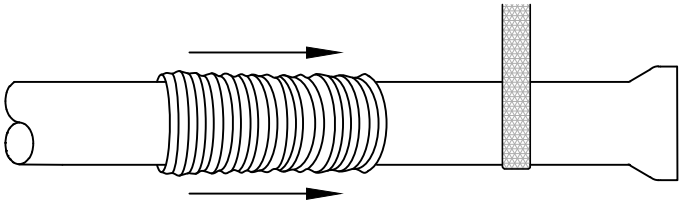
STANDARD DRAWING

METHODS FOR INSTALLING AND RESTORING POLYETHYLENE WRAP

DATE	MAY 2021	SCALE	NONE
DRAWING NO.	1200-A	SHEET	1 OF 3

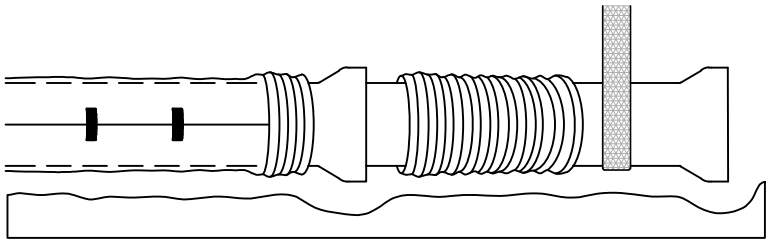
JEFFERSON - OLDHAM COUNTIES

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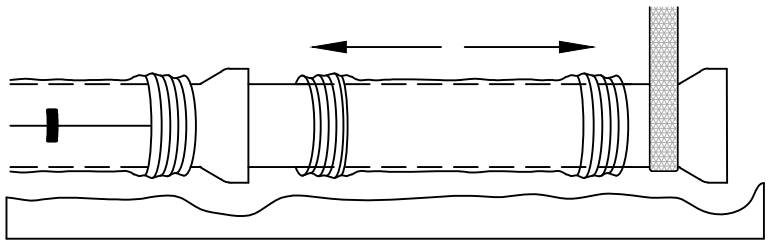
STEP 1.

CUT A SECTION OF POLYETHYLENE TUBE APPROXIMATELY TWO FEET LONGER THAN THE PIPE SECTION. REMOVE ALL LUMPS OF CLAY, MUD, CINDERS, OR OTHER MATERIAL THAT MIGHT HAVE ACCUMULATED ON THE PIPE SURFACE DURING STORAGE. SLIP THE POLYETHYLENE TUBE AROUND THE PIPE, STARTING AT THE SPIGOT END. BUNCH THE TUBE ACCORDIAN–FASHION ON THE END OF THE PIPE. PULL BACK THE OVERHANGING END OF THE TUBE UNTIL IT CLEARS THE PIPE END.



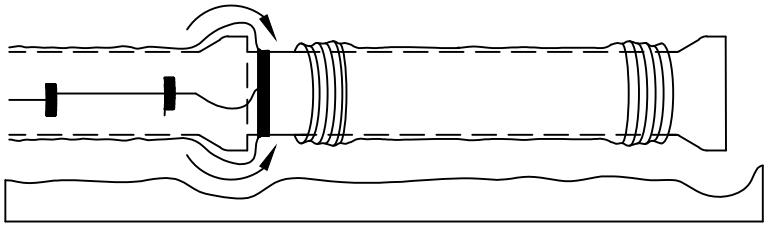
STEP 2.

DIG A SHALLOW BELL HOLE IN THE TRENCH BOTTOM AT THE JOINT LOCATION TO FACILITATE INSTALLATION OF THE POLYETHYLENE TUBE. LOWER THE PIPE INTO THE TRENCH AND MAKE UP THE PIPE JOINT WITH THE PRECEDING SECTION OF PIPE.



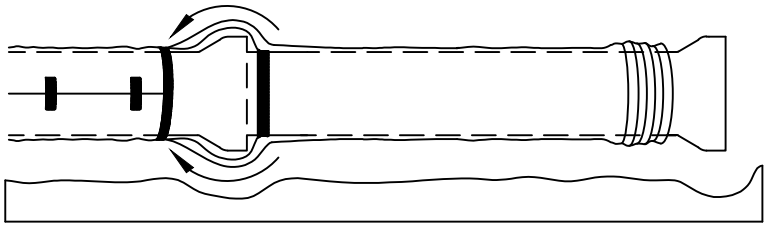
STEP 3.

MOVE THE CABLE TO THE BELL END OF THE PIPE AND LIFT THE PIPE SLIGHTLY TO PROVIDE ENOUGH CLEARANCE TO EASILY SLIDE THE TUBE. SPREAD THE TUBE OVER THE ENTIRE BARREL OF THE PIPE. NOTE: MAKE SURE THAT NO DIRT OR THE BEDDING MATERIAL BECOMES TRAPPED BETWEEN THE WRAP AND THE PIPE.



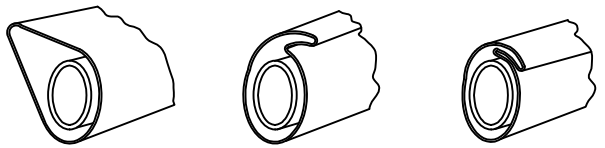
STEP 4.

MAKE THE OVERLAP OF THE POLYETHYLENE TUBE BY PULLING BACK THE BUNCHED POLYETHYLENE FROM THE PRECEDING LENGTH OF PIPE AND SECURING IT IN PLACE. NOTE: THE POLYETHYLENE MAY BE SECURED IN PLACE BY USING POLYTAPE.



STEP 5.

OVERLAP THE SECURED TUBE END WITH THE TUBE END OF THE NEW PIPE SECTION. SECURE THE NEW TUBE END IN PLACE WITH POLYTAPE.



STEP 6.

TAKE UP THE SLACK IN THE TUBE ALONG THE BARREL OF THE PIPE TO MAKE A SNUG, BUT NOT TIGHT, FIT. FOLD EXCESS POLYETHYLENE BACK OVER THE TOP OF THE PIPE AND SECURE WITH POLYTAPE.

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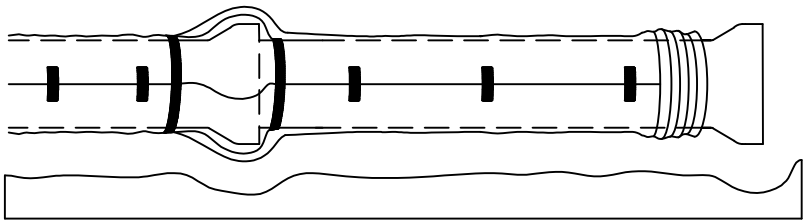
STANDARD DRAWING

METHODS FOR INSTALLING AND RESTORING POLYETHYLENE WRAP

DATE	MAY 2021	SCALE	NONE
DRAWING NO.	1200-B	SHEET	2 OF 3

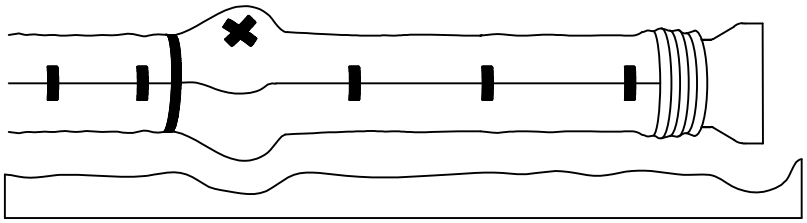
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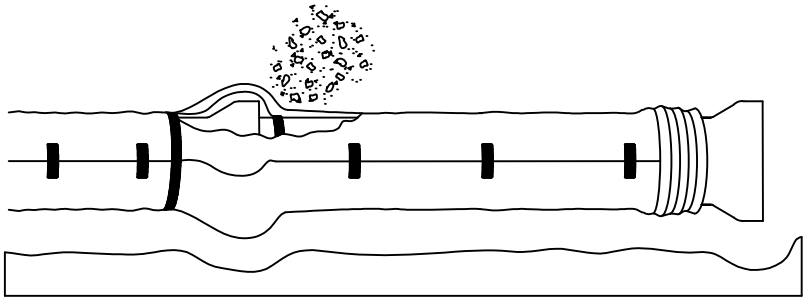
STEP 7.

SECURE THE FOLD AT SEVERAL LOCATIONS ALONG THE PIPE BARREL (APPROXIMATELY EVERY THREE FEET) WITH POLYTAPE.



STEP 8.

REPAIR ALL SMALL RIPS, TEARS, OR OTHER TUBE DAMAGE WITH ADHESIVE TAPE. IF THE POLYETHYLENE IS BADLY DAMAGED, REPAIR THE DAMAGED AREA WITH A SHEET OF POLYETHYLENE AND SEAL THE EDGES OF THE REPAIR WITH POLYTAPE.



STEP 9.

CAREFULLY BACKFILL THE PIPE ACCORDING TO LOUISVILLE WATER COMPANY'S TECHNICAL SPECIFICATIONS AND STANDARD DRAWINGS FOR 4–20" PIPELINE CONSTRURCTION, SECTION 7, BACKFILLING PROCEDURE AND TAMPING. TO PREVENT DAMAGE DURING BACKFILLING, ALLOW ADEQUATE SLACK IN THE TUBE AT THE JOINT. BACKFILL SHOULD BE FREE OF CINDERS, ROCKS, BOULDERS, NAILS, STICKS, OR OTHER MATERIALS THAT MIGHT DAMAGE THE POLYETHYLENE. AVOID DAMAGING THE POLYETHYLENE WHEN USING TAMPING DEVICES.

TABLE FOR MINIMUM FLATTENED POLYETHYLENE TUBE WIDTHS

NOMINAL PIPE SIZE (INCHES)	RECOMMENDED POLYETHYLENE FLAT TUBE WIDTH (INCHES)
4	24
6	24
8	24
12	30
16	36
20	48

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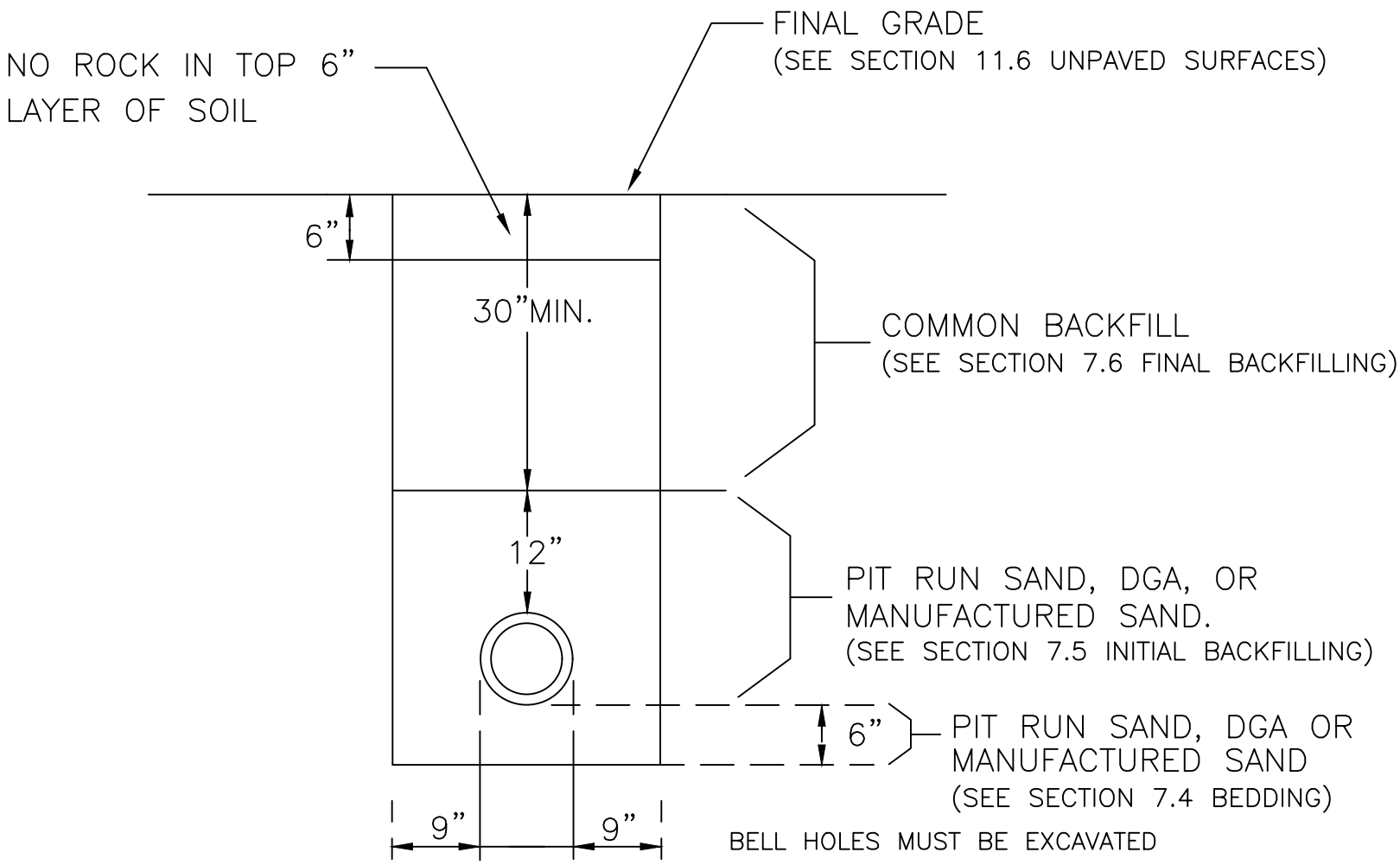
STANDARD DRAWING

METHODS FOR
INSTALLING AND RESTORING
POLYETHYLENE WRAP

DATE	MAY 2021	SCALE	NONE
DRAWING NO.	1200-C	SHEET	3 OF 3

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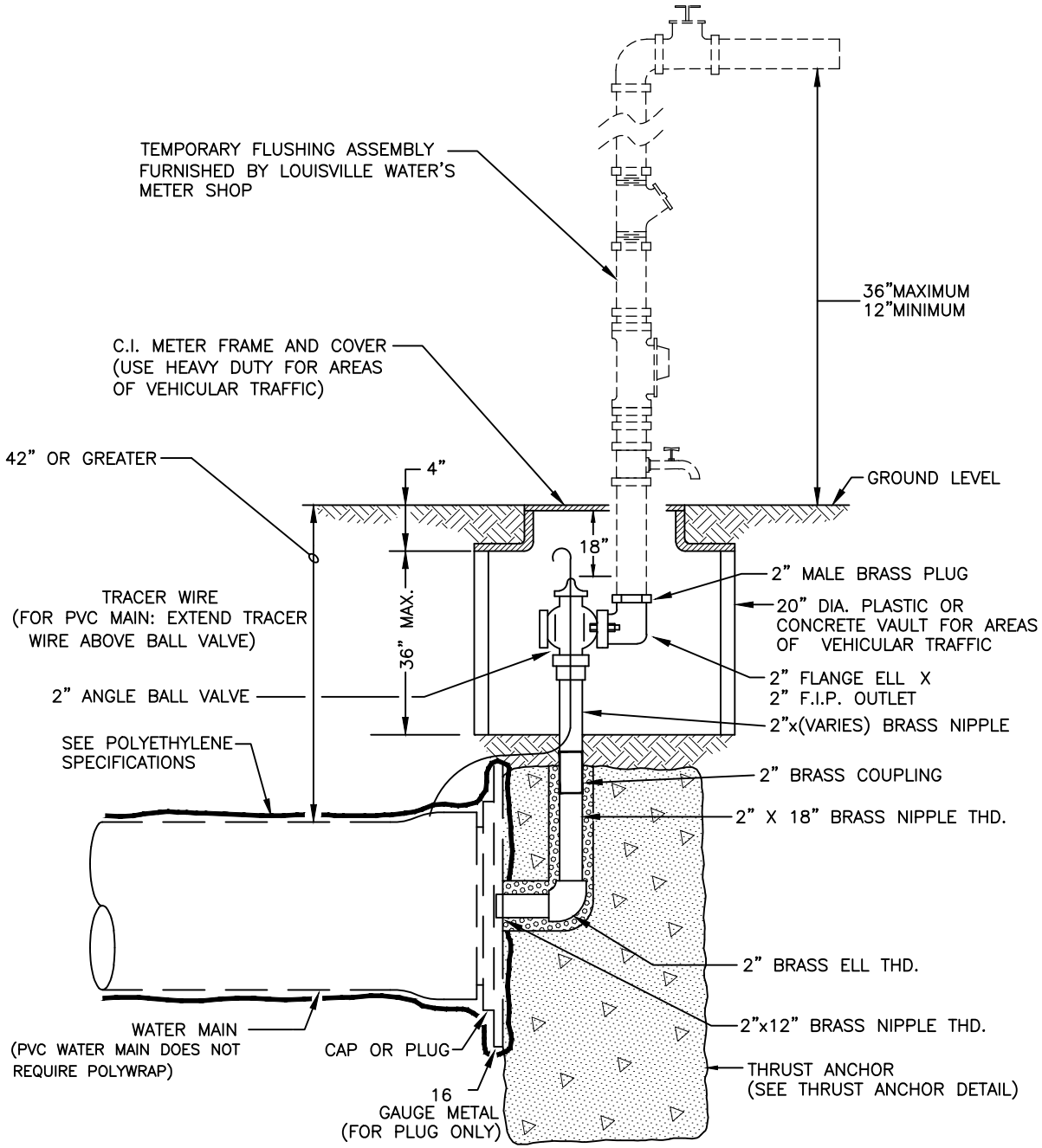
STANDARD DRAWING

COMMON BACKFILL AND LAWN RESTORATION

DATE	MAY 2021	SCALE	NONE
DRAWING NO.	4300	SHEET	1 OF 1

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1210[illegible]

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NOTES:

1. CAUTION: DO NOT CONNECT PRESSURE TEST EQUIPMENT TO TEMPORARY FLUSHING ASSEMBLY.
2. 1–1/2" TURBINE METER AND 2" DUAL CHECK VALVE ARE TO BE INSTALLED AFTER PIGGING OPERATIONS. A 2" HOSE IS TO BE USED DURING ALL FLUSHING OPERATIONS.
3. 8" AND LARGER WATER MAINS MAY REQUIRE LARGER THAN A 2" FLUSHING OUTLET TO MEET THE KDOW 2.5 F.P.S. FLUSHING REGULATION.
4. PERMANENT PLUGS SHALL NOT BE INSTALLED ON PVC MAINS; ONLY MECHANICAL JOINT CAPS WILL BE ALLOWED.

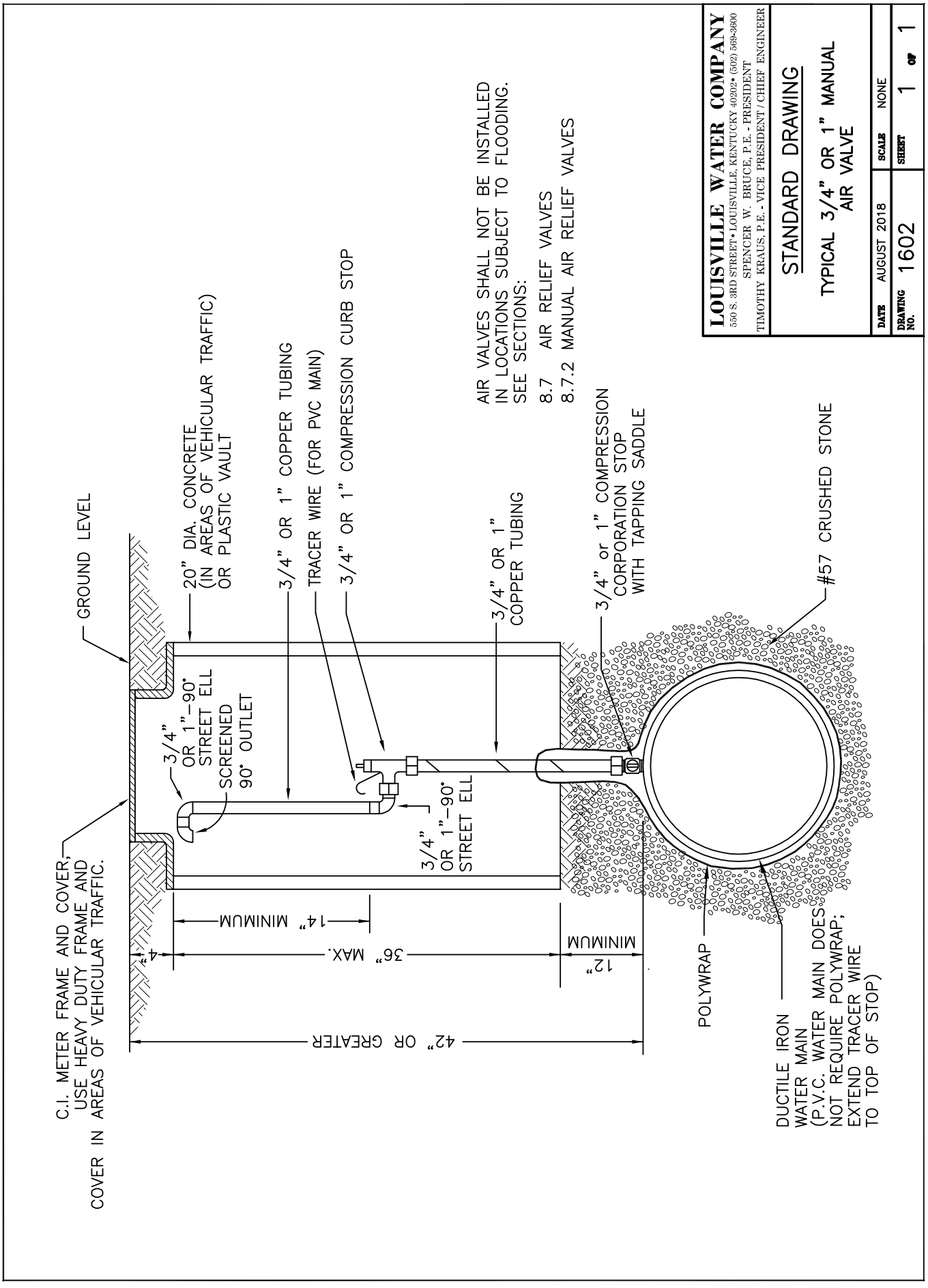
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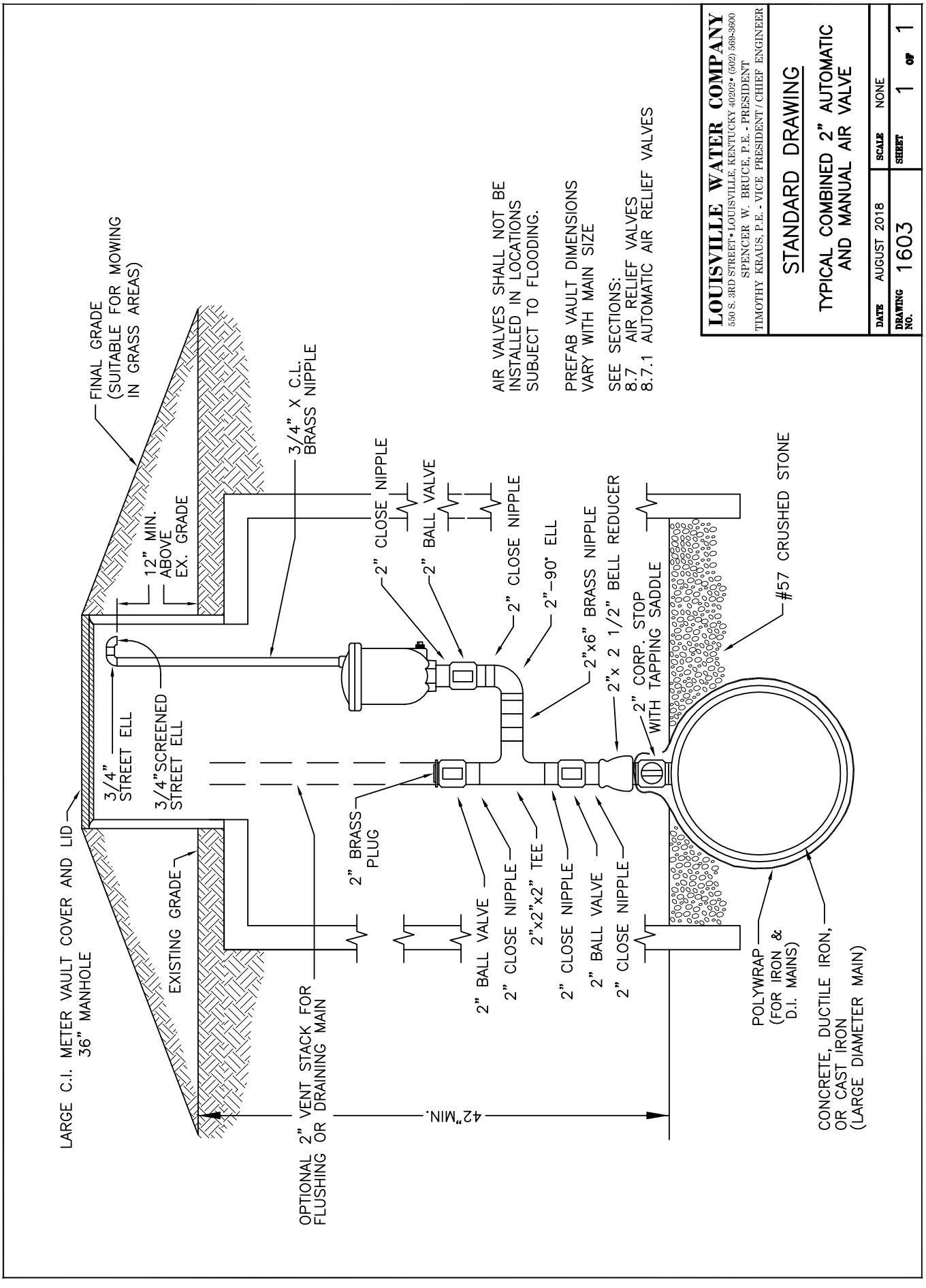
STANDARD DRAWING

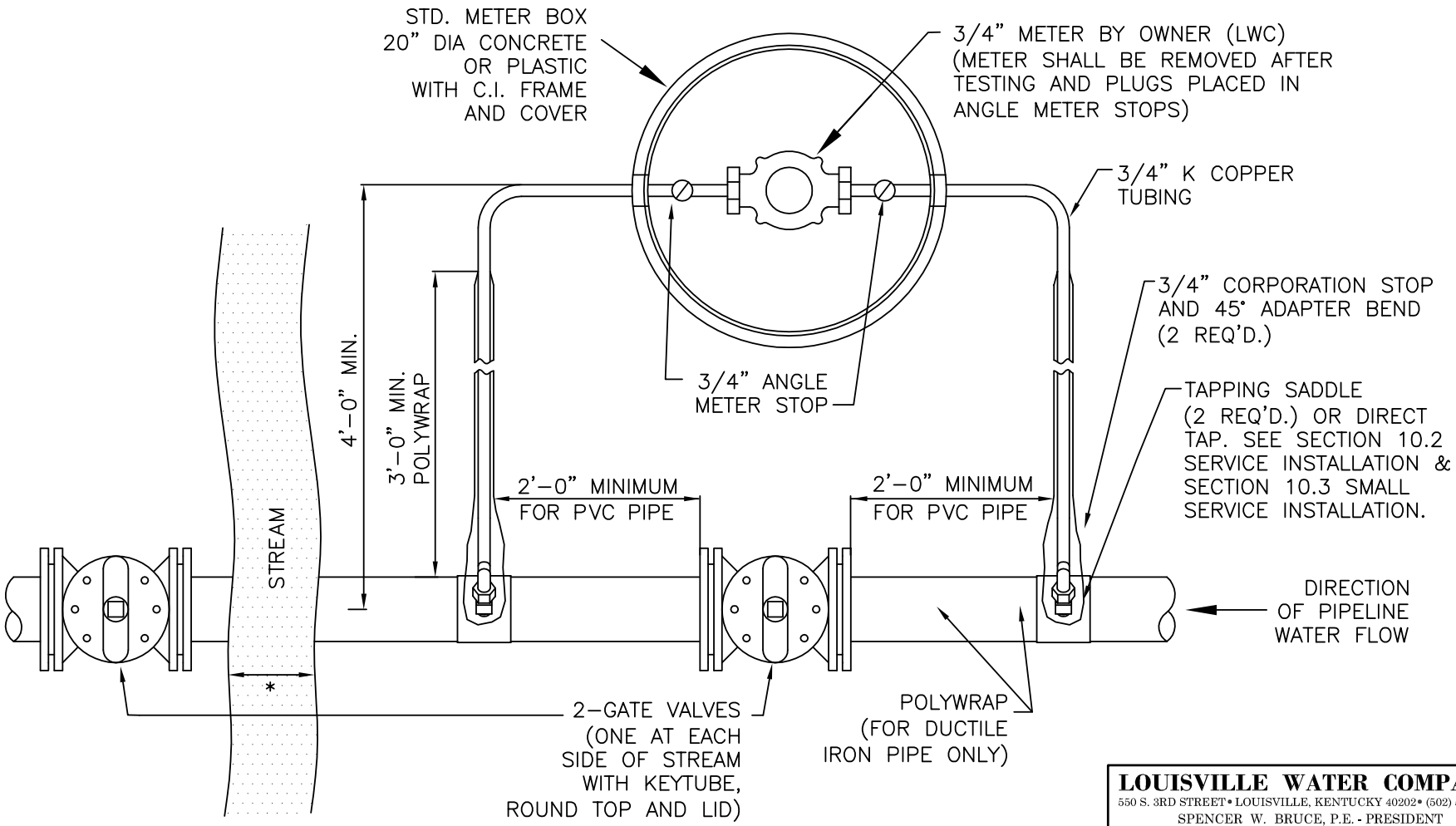
TYPICAL 2" BLOW-OFF AND FLUSHING CONNECTION

DATE	MAY 2021	SCALE	NONE
DRAWING NO.	1601	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1210100035


GROUND LEVEL
20" DIA. CONCRETE
(IN AREAS OF VEHICULAR TRAFFIC)
OR PLASTIC VAULT
3/4" OR 1" COPPER TUBING
TRACER WIRE (FOR PVC MAIN)
3/4" OR 1" COMPRESSION CURB STOP
AIR VALVES SHALL NOT BE INSTALLED
IN LOCATIONS SUBJECT TO FLOODING.
SEE SECTIONS:
8.7 AIR RELIEF VALVES
8.7.2 MANUAL AIR RELIEF VALVES
3/4" OR 1"
COPPER TUBING
3/4" or 1" COMPRESSION
CORPORATION STOP
WITH TAPPING SADDLE
#57 CRUSHED STONE
3/4"
OR 1"-90°
STREET ELL
SCREENED
90° OUTLET
3/4"
OR 1"-90°
STREET ELL
C.I. METER FRAME AND COVER,
USE HEAVY DUTY FRAME AND
COVER IN AREAS OF VEHICULAR TRAFFIC.
4"
14" MINIMUM
36" MAX.
12"
MINIMUM
42" OR GREATER
POLYWRAP
DUCTILE IRON
WATER MAIN
(P.V.C. WATER MAIN DOES
NOT REQUIRE POLYWRAP;
EXTEND TRACER WIRE
TO TOP OF STOP)
LOUISVILLE WATER COMPANY
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STANDARD DRAWING
TYPICAL 3/4" OR 1" MANUAL
AIR VALVE
DATE AUGUST 2018
SCALE NONE
DRAWING NO. 1602
SHEET 1 OF 1


FINAL GRADE
(SUITABLE FOR MOWING
IN GRASS AREAS)
3/4" X C.L.
BRASS NIPPLE
12" MIN.
ABOVE
EX. GRADE
2" CLOSE NIPPLE
2" BALL VALVE
2" CLOSE NIPPLE
2"-90° ELL
2"x6" BRASS NIPPLE
2"x 2 1/2" BELL REDUCER
2" CORP. STOP
WITH TAPPING SADDLE
#57 CRUSHED STONE
AIR VALVES SHALL NOT BE
INSTALLED IN LOCATIONS
SUBJECT TO FLOODING.
PREFAB VAULT DIMENSIONS
VARY WITH MAIN SIZE
SEE SECTIONS:
8.7 AIR RELIEF VALVES
8.7.1 AUTOMATIC AIR RELIEF VALVES
3/4"
STREET ELL
3/4"SCREENED
STREET ELL
LARGE C.I. METER VAULT COVER AND LID
36" MANHOLE
EXISTING GRADE
2" BRASS
PLUG
2" BALL VALVE
2" CLOSE NIPPLE
2"x2"x2" TEE
2" CLOSE NIPPLE
2" BALL VALVE
2" CLOSE NIPPLE
OPTIONAL 2" VENT STACK FOR
FLUSHING OR DRAINING MAIN
42"MIN.
POLYWRAP
(FOR IRON &
D.I. MAINS)
CONCRETE, DUCTILE IRON,
OR CAST IRON
(LARGE DIAMETER MAIN)
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STANDARD DRAWING
TYPICAL COMBINED 2" AUTOMATIC
AND MANUAL AIR VALVE
DATE AUGUST 2018
SCALE NONE
DRAWING NO. 1603
SHEET 1 OF 1



* LEAK DETECTION BY-PASS METER IS REQUIRED IF UNDERWATER CROSSING IS GREATER THAN 15 FT. SEE SECTION 8.8.

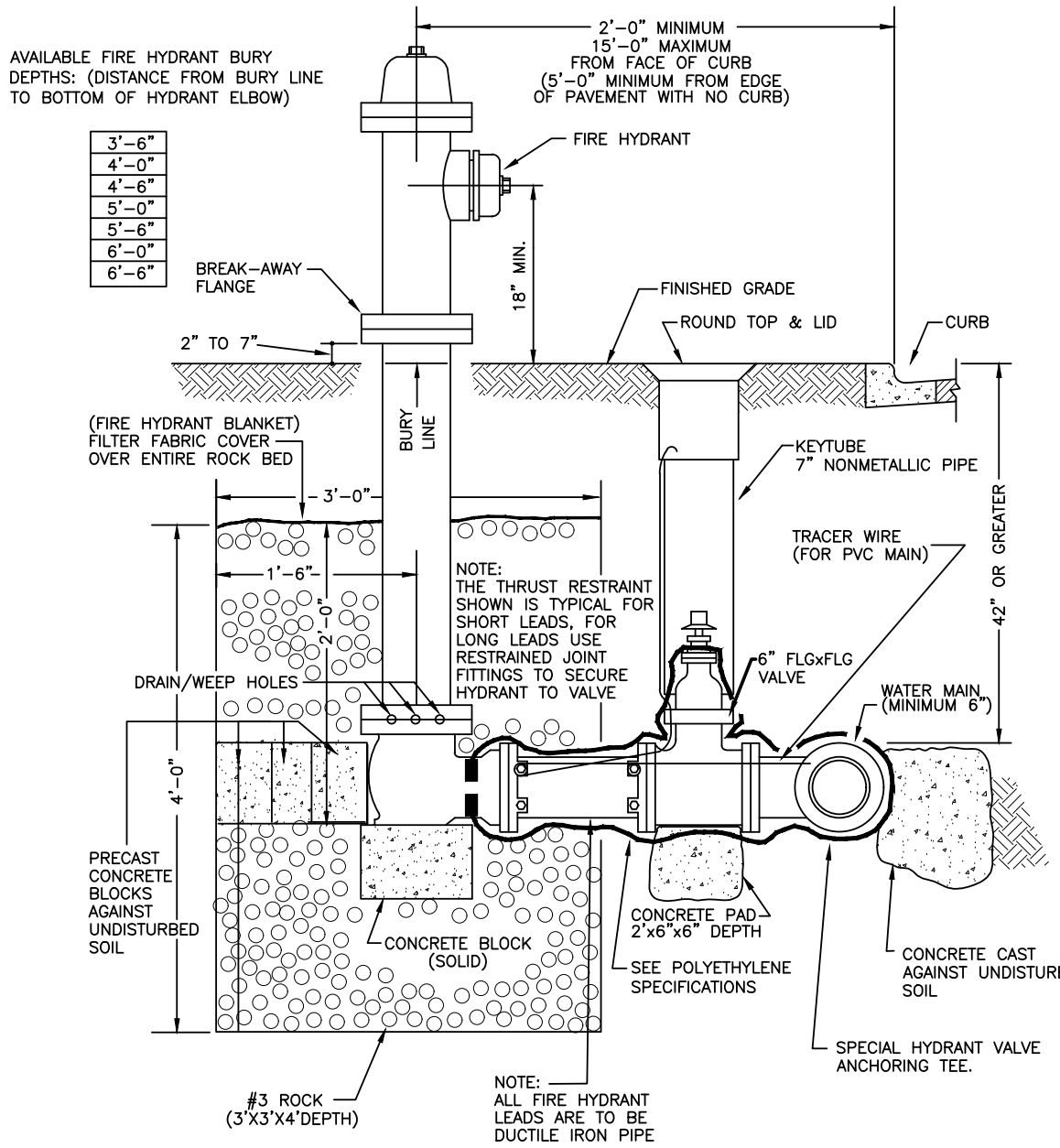
LEAK DETECTION BY-PASS METER FOR UNDERWATER CROSSINGS

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STANDARD DRAWING

LEAK DETECTION BY-PASS METER

DATE	FEBRUARY 2020	SCALE	NONE
DRAWING NO.	1608	SHEET	1 OF 1



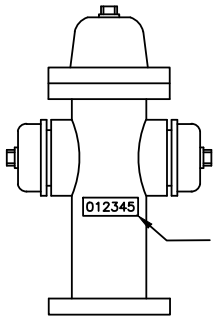
NOTE:

LOUISVILLE WATER COMPANY SUPPLIES HYDRANTS OF VARIOUS BURY DEPTHS. EXTENSION KITS SHALL NOT BE USED FOR NEW INSTALLATIONS. UNLESS APPROVED BY THE LOUISVILLE WATER COMPANY PROJECT MANAGER.

WHEN TURNING FIRE HYDRANT OFF, ALLOW TIME FOR FIRE HYDRANT TO DRAIN BEFORE REPLACING NOZZLE CAPS.

DO NOT INSTALL POLYWRAP ON HYDRANT BARREL. DO NOT COVER HYDRANT DRAIN/WEEP HOLES.

ALL HYDRANTS SHALL BE YELLOW WITH THE EXCEPTION OF WHEN INSTALLED WITHIN THE LOUISVILLE FIRE DEPARTMENT'S DISTRICT. THOSE HYDRANTS SHALL BE ORANGE.



PLACE FIRE HYDRANT ATTACHMENT STICKER ON SMOOTH SURFACE, CENTERED BETWEEN NOZZLES ON BARREL.

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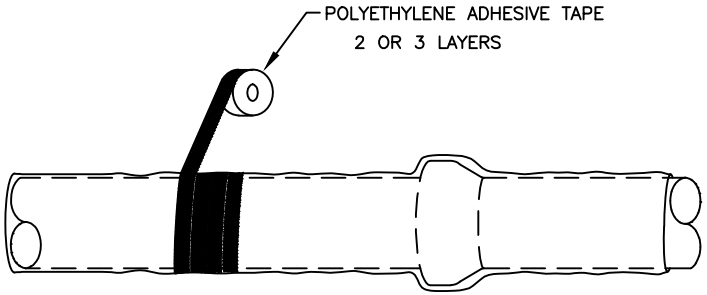
TIMOTHY KRAUS, P.E. - VICE PRESIDENT / CHIEF ENGINEER

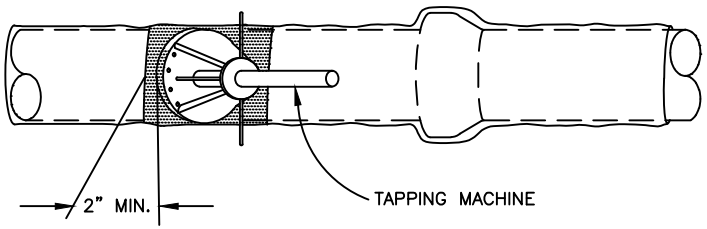
STANDARD DRAWING

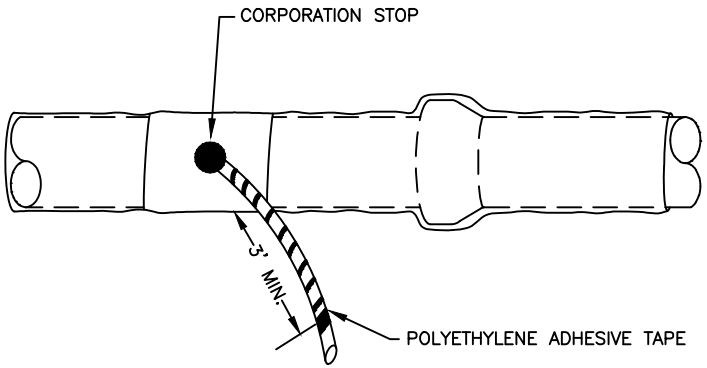
TYPICAL
FIRE HYDRANT INSTALLATION

DATE	MAY 2021	SCALE	NONE
DRAWING NO.	2000	SHEET	1 OF 1

Contract ID: 221055
Page 240 of 612







OPENINGS FOR BRANCHES, SERVICE TAPS, BLOW OFFS, AIR VALVES, AND SIMILAR APPURTENANCES SHALL BE MADE BY :

1.) WRAPPING 2 OR 3 LAYERS OF POLYETHYLENE ADHESIVE TAPE COMPLETELY AROUND THE PIPE TO COVER THE AREA WHERE THE TAPPING MACHINE AND CHAIN WILL BE MOUNTED, EXTENDING A MINIMUM OF 2" BEYOND THE MOUNTING SURFACE.

2.) MOUNT THE TAPPING MACHINE ON THE PIPE AREA COVERED BY THE TAPE. MAKE THE TAP AND INSTALL THE CORPORATION STOP DIRECTLY THROUGH THE TAPE AND POLYETHYLENE.

3.) INSPECT THE ENTIRE CIRCUMFERENTIAL AREA FOR DAMAGE AND MAKE ANY NECESSARY REPAIRS WITH TAPE.

4.) ON HOUSE SERVICES, TO MINIMIZE THE POSSIBILITY OF DISSIMILAR METAL CORROSION AT SERVICE CONNECTIONS, WRAP THE CORPORATION STOP AND A MINIMUM CLEAR DISTANCE OF THREE (3) FEET OF THE COPPER SERVICE WITH POLYETHYLENE ADHESIVE TAPE.

5.) SEE SECTION 10.3.1 & 10.4.1

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STANDARD DRAWING

METHOD FOR TAPPING POLYETHYLENE ENCASED PIPE

DATE	MAY 2021	SCALE	NONE
DRAWING NO.	3804	SHEET	1 OF 1

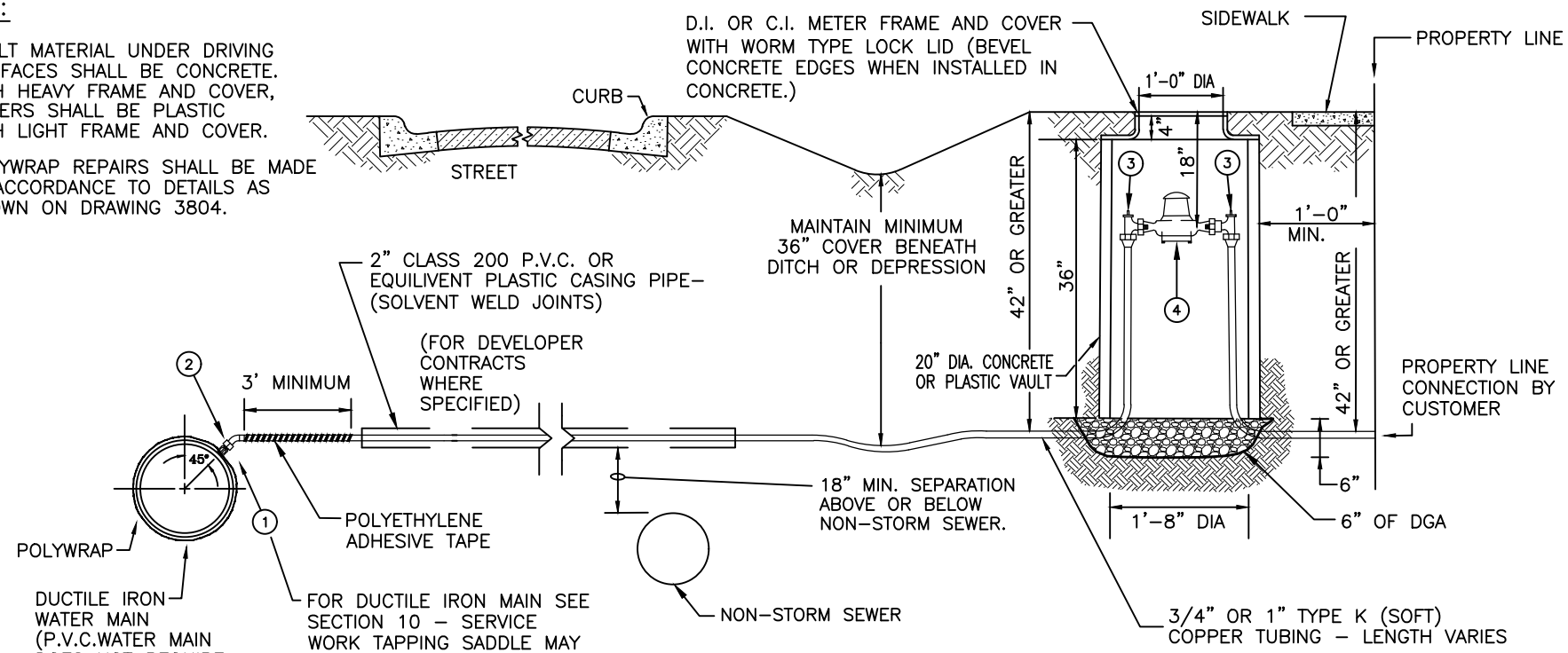
JEFFERSON - OLDHAM COUNTIES
1210R0030055

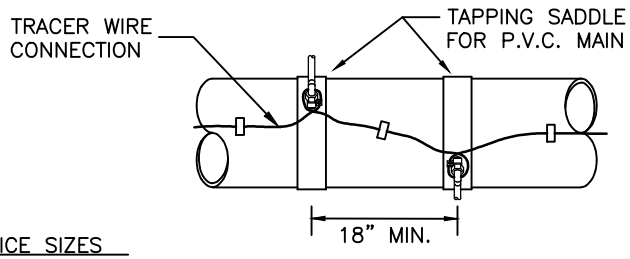
Contract ID: 221055
Page 241 of 612

NOTE:

1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE. WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.

2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.





PLAN FOR PVC MAIN

TYPICAL COPPER SERVICE 1" AND SMALLER

NO.	QTY	FITTING	JOINT	SERVICE SIZES	
(1)	1	CORPORATION STOP	INLET-MALE THREAD (TAPERED)	3/4"	1"
			OUTLET-MALE THREAD	3/4"	1"
(2)	1	ADAPTER BEND (45° OR 90°)	INLET-FEMALE THREAD	3/4"	1"
			OUTLET-FEMALE COMPRESSION	3/4"	1"
(3)	2	ANGLE METER STOP	FEMALE COMPRESSION	3/4"	1"
			FEMALE THREAD	3/4"	1"
(4)	1	METER	MALE THREAD	3/4"	1"

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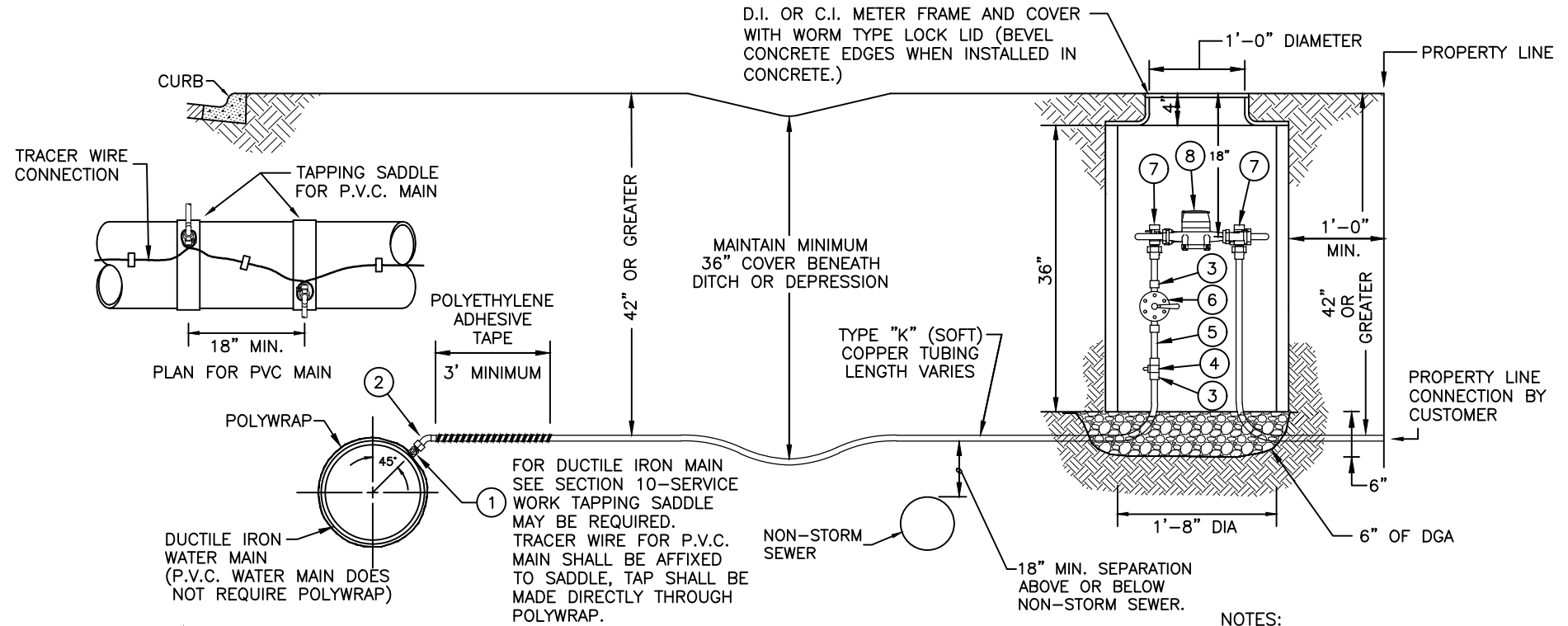
STANDARD DRAWING

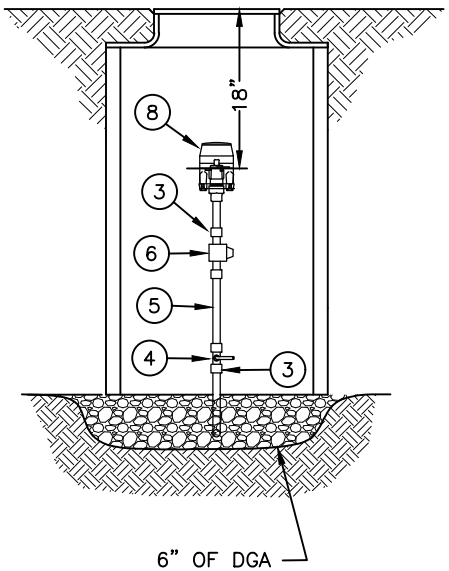
TYPICAL COPPER SERVICE 1" AND SMALLER

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3002	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1210

Contract ID: 221055
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TYPICAL 1" COPPER SERVICE WITH PRESSURE REDUCING VALVE

NO.	QTY	FITTING	JOINT	SIZE
1	1	CORPORATION STOP	INLET-MALE THREAD (TAPERED)	1"
			OUTLET-MALE THREAD	1"
2	1	ADAPTER BEND (45° OR 90°)	INLET-FEMALE THREAD	1"
			OUTLET-FEMALE COMPRESSION	1"
3	2	ADAPTER	FEMALE COMPRESSION	1"
			MALE THREAD	1"
4	1	BALL VALVE W/HANDLE	FEMALE THREAD	1"
5	1	BRASS NIPPLE	MALE THREAD	1"
6	1	PRESSURE REDUCING VALVE	FEMALE THREAD	1"
7	2	ANGLE METER STOP	FEMALE COMPRESSION	1"
			FEMALE THREAD	1"
8	1	METER	MALE THREAD	1"

NOTES:

1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.

2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

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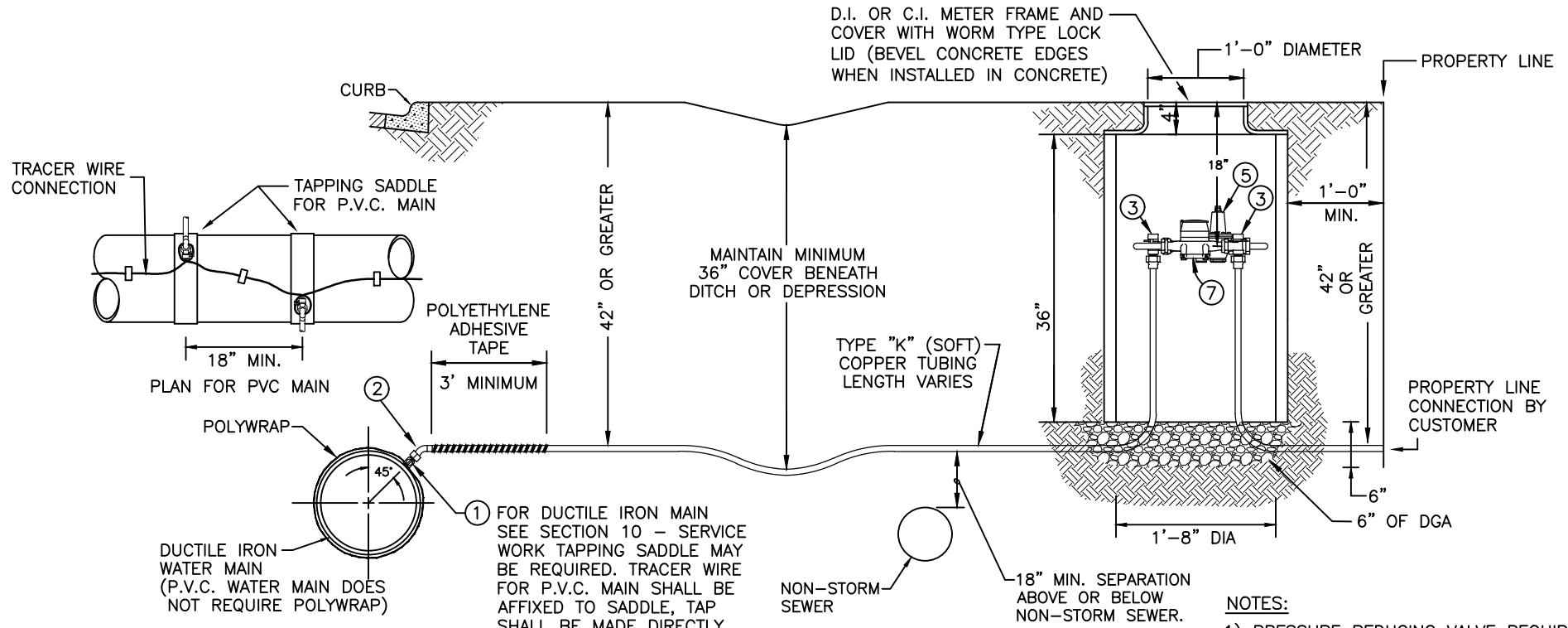
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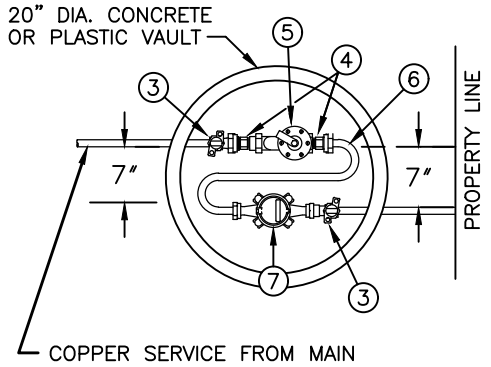
TYPICAL 1" COPPER SERVICE WITH PRESSURE REDUCING VALVE

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3003	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1210100035

Contract ID: 221055
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NOTES:

1) PRESSURE REDUCING VALVE REQUIRED FOR GREATER THAN 100 P.S.I.
2) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE. WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.
3) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

TYPICAL 3/4" COPPER SERVICE WITH PRESSURE REDUCING VALVE

NO.	QTY	FITTING	JOINT	SIZE
1	1	CORPORATION STOP	INLET–MALE THREAD (TAPERED) OUTLET–MALE THREAD	3/4" 3/4"
2	1	ADAPTER BEND (45° OR 90°)	INLET–FEMALE THREAD OUTLET–FEMALE COMPRESSION	3/4" 3/4"
3	2	ANGLE METER STOP	FEMALE COMPRESSION FEMALE THREAD	3/4" 3/4"
4	2	ADAPTER FOR PRESSURE REGULATOR	MALE THREAD	3/4"
5	1	PRESSURE REGULATOR	FEMALE THREAD	3/4"
6	1	S–TUBE	FEMALE THREAD	3/4"
7	1	METER	MALE THREAD	5/8"x3/4" (or ¾")

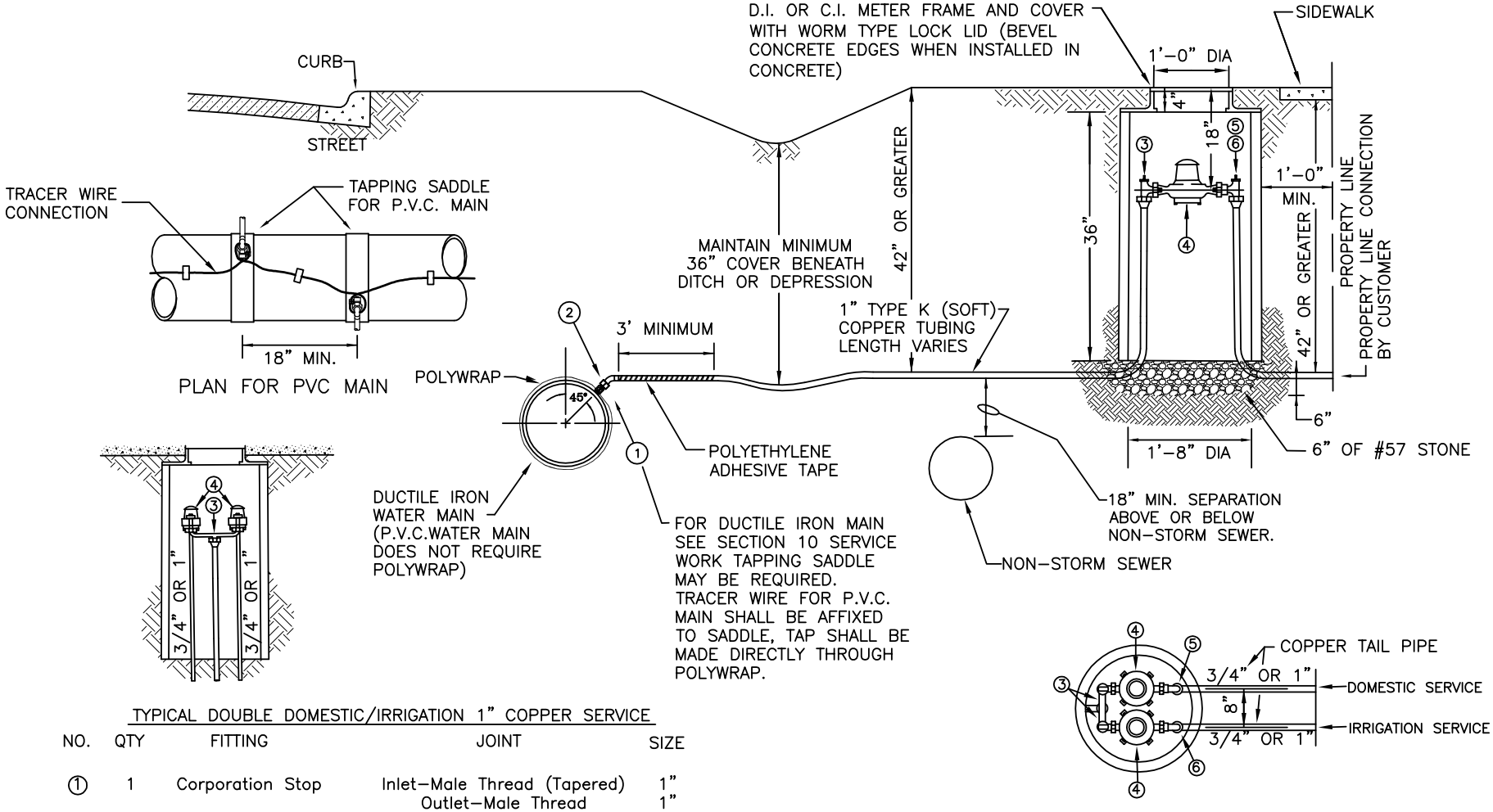
LOUISVILLE WATER COMPANY
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STANDARD DRAWING

TYPICAL 3/4" COPPER SERVICE WITH PRESSURE REDUCING VALVE

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3004	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1210100035



TYPICAL DOUBLE DOMESTIC/IRRIGATION 1" COPPER SERVICE

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet–Male Thread (Tapered) Outlet–Male Thread	1" 1"
②	1	Adapter Bend (45° OR 90°)	Inlet–Female Thread Outlet–Female Compression	1" 1"
③	1	Branch Piece, with 2 Angle Meter Stops	Inlet–Female Compression Outlet–Female Compression	1" 3/4"
④	2	Meter	Male Thread	3/4"
⑤	1	Angle Meter Stop	Female Thread Female Compression	3/4" 3/4" or 1"
⑥	1	Angle Check Valve (Irrigation Service Only)	Female Thread Female Compression	3/4" 3/4" or 1"

NOTE:

1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.

2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

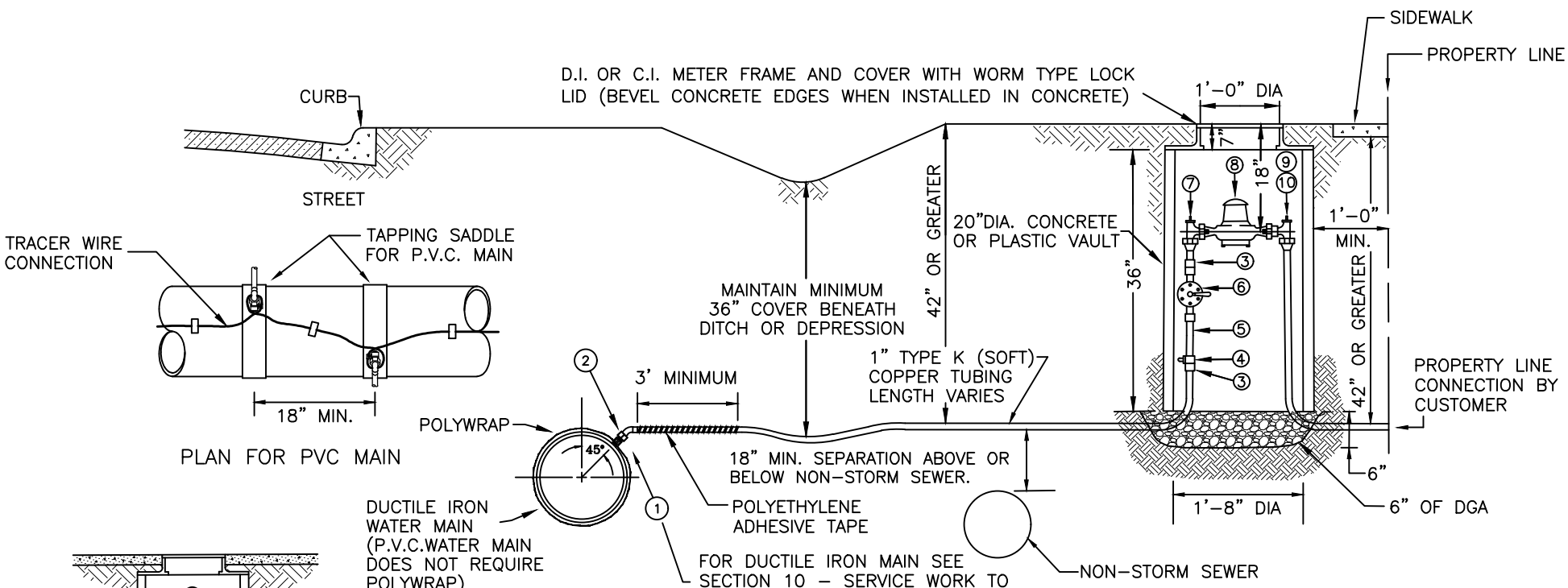
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STANDARD DRAWING

TYPICAL DOUBLE 1" DOMESTIC/IRRIGATION COPPER SERVICE

DATE	FEBRUARY 2020	SCALE	NONE
DRAWING NO.	3400	SHEET	1 OF 1

Contract ID: 221055
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TYPICAL DOUBLE DOMESTIC/IRRIGATION 1" COPPER SERVICE WITH PRESSURE REDUCING VALVE

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet–Male Thread (Tapered)	1"
			Outlet–Male Thread	1"
②	1	Adapter Bend	Inlet–Female Thread	1"
		(45° OR 90°)	Outlet–Female Compression	1"
③	2	Adapter	Female Compression	1"
			Male Thread	1"
④	1	Ball Valve w/ Handle	Female Thread	1"
⑤	1	Brass Nipple	Male Thread	1"
⑥	1	Pressure Reducing Valve	Female Thread	1"
⑦	1	Branch Piece with 2 Angle Meter Stop	Inlet–Female Compression Outlet–Female Thread	1"
⑧	2	Meter	Male Thread	3/4"
⑨	1	Angle Meter Stop (Domestic Service Only)	Female Thread Female Compression	3/4" 3/4" or 1"
⑩	1	Angle Check Valve (Irrigation Service Only)	Female Thread Female Compression	3/4" 3/4" or 1"

NOTE:

1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.

2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

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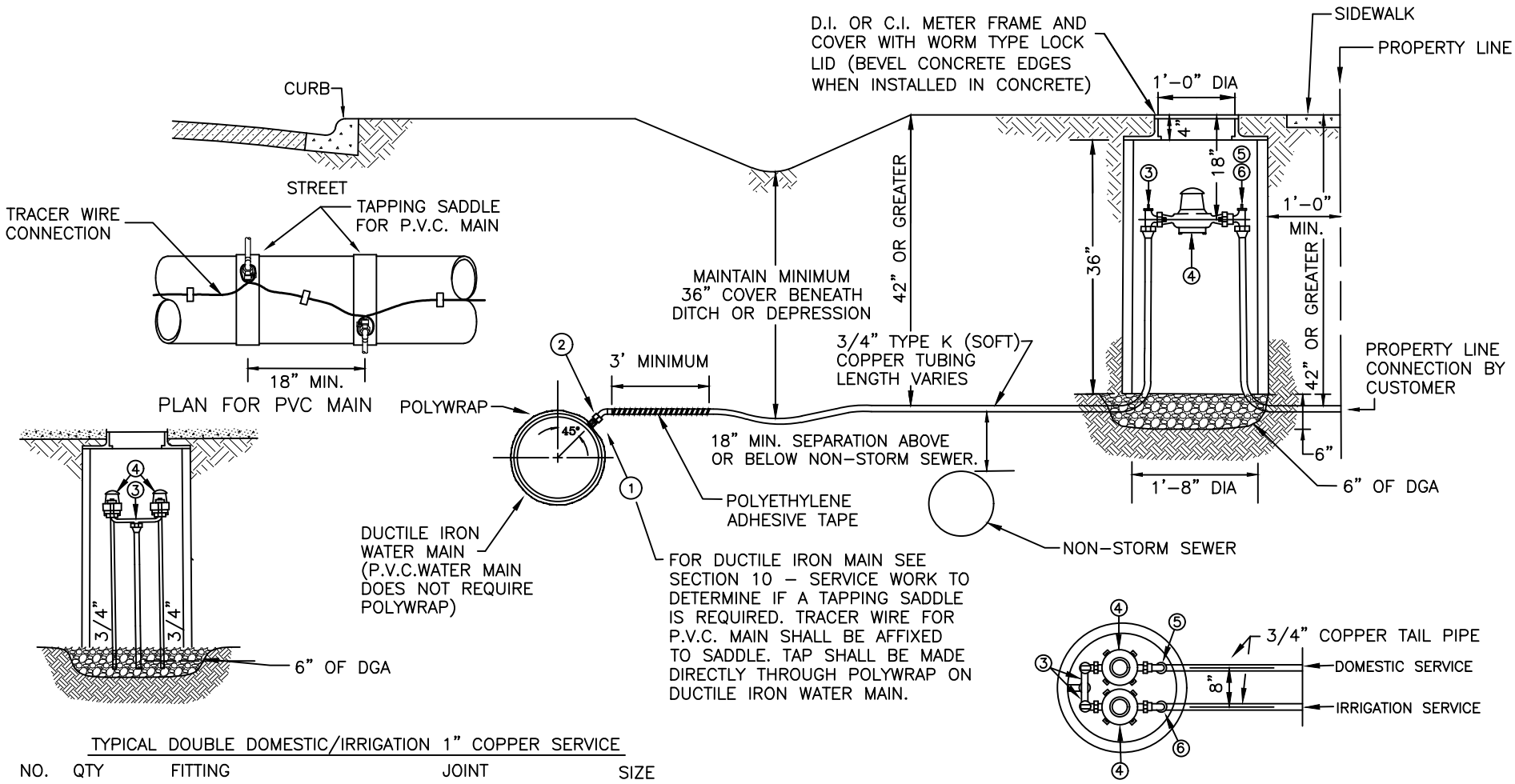
STANDARD DRAWING

TYPICAL DOUBLE 3/4" OR 1" DOMESTIC / IRRIGATION COPPER SERVICE WITH PRESSURE REDUCING VALVE

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3401	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1215R2D055

Contract ID: 221055
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TYPICAL DOUBLE DOMESTIC/IRRIGATION 1" COPPER SERVICE

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet–Male Thread (Tapered)	3/4"
			Outlet–Male Thread	3/4"
②	1	Adapter Bend (45° OR 90°)	Inlet–Female Thread	3/4"
			Outlet–Female Compression	3/4"
③	1	Branch Piece, with 2 Angle Meter Stops	Inlet–Female Compression	3/4" x 3/4"
			Outlet–Female Compression	3/4"
④	2	Meter	Male Thread	3/4"
⑤	1	Angle Meter Stop (Domestic Service Only)	Female Thread	3/4"
			Female Compression	3/4"
⑥	1	Angle Check Valve (Irrigation Service Only)	Female Thread	3/4"
			Female Compression	3/4"

NOTE:

1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.

2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

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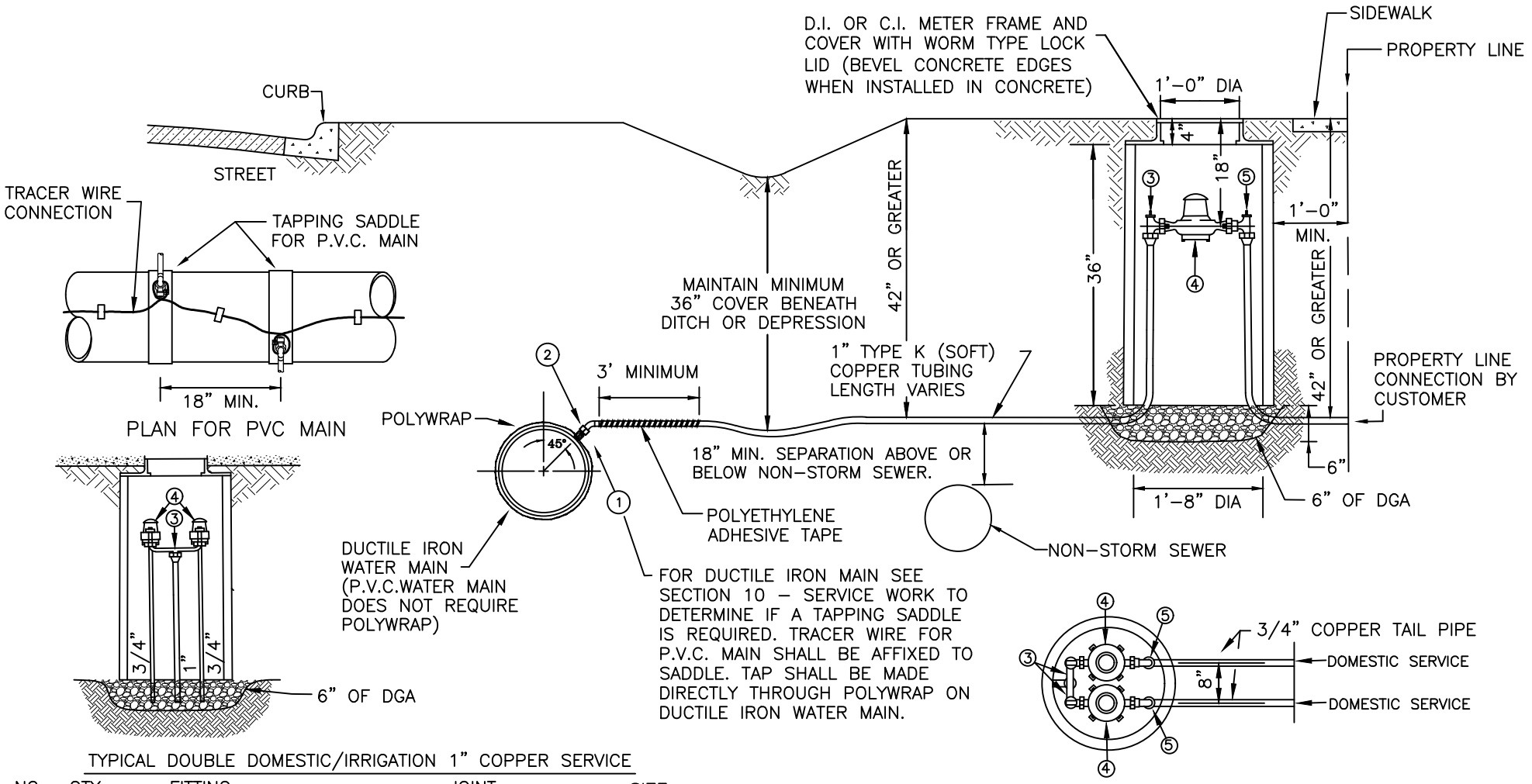
STANDARD DRAWING

TYPICAL 3/4" IRRIGATION RETRO FIT COPPER SERVICE

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3403	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES

Contract ID: 221055
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TYPICAL DOUBLE DOMESTIC/IRRIGATION 1" COPPER SERVICE

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet–Male Thread (Tapered) Outlet–Male Thread	1" 1"
②	1	Adapter Bend (45° OR 90°)	Inlet–Female Thread Outlet–Female Compression	1" 1"
③	1	Branch Piece, with 2 Angle Meter Stops	Inlet–Female Compression Outlet–Female Thread	1" x 3/4" 3/4"
④	2	Meter	Male Thread	3/4"
⑤	2	Angle Meter Stop	Female Thread Female Compression	3/4" 3/4"

NOTE:

1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.

2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

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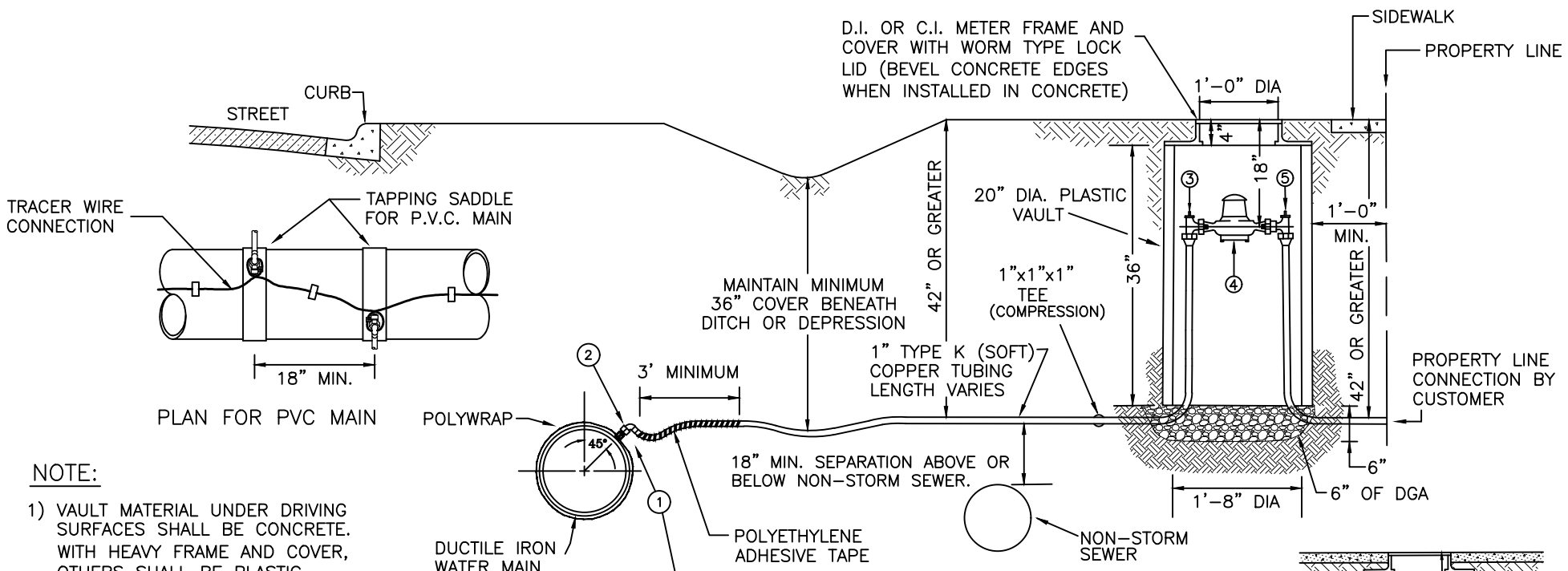
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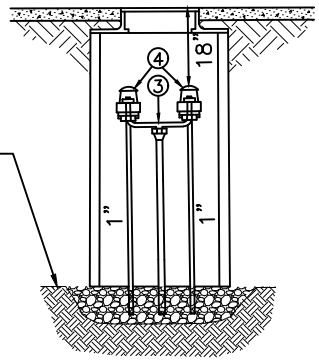
TYPICAL 1" TANDEM 2-WAY DOMESTIC COPPER SERVICE

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3404	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES

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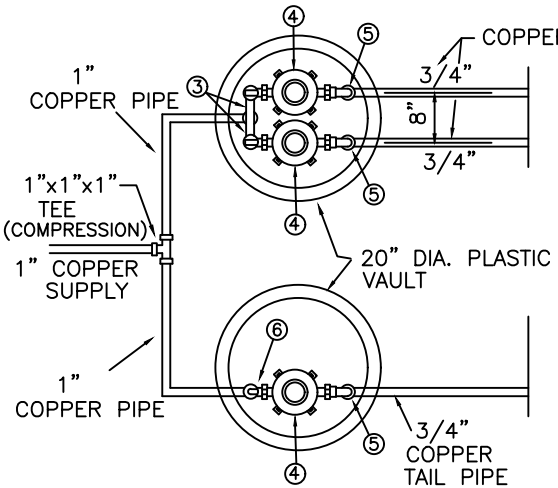
NOTE:

1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE. WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.

2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

TYPICAL 1" 3-WAY DOMESTIC COPPER SERVICE

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet-Male Thread (Tapered) Outlet-Male Thread	1" 1"
②	1	Adapter Bend (45° OR 90°)	Inlet-Female Thread Outlet-Female Compression	1" 1"
③	1	Branch Piece, with 2 Angle Meter Stops	Inlet-Female Compression Outlet-Female Thread	1"x3/4" 3/4"
④	3	Meter	Male Thread	3/4"
⑤	3	Angle Meter Stop	Female Thread Female Compression	3/4" 3/4"
⑥	1	Angle Meter Stop	Female Thread Female Compression	3/4" 1"



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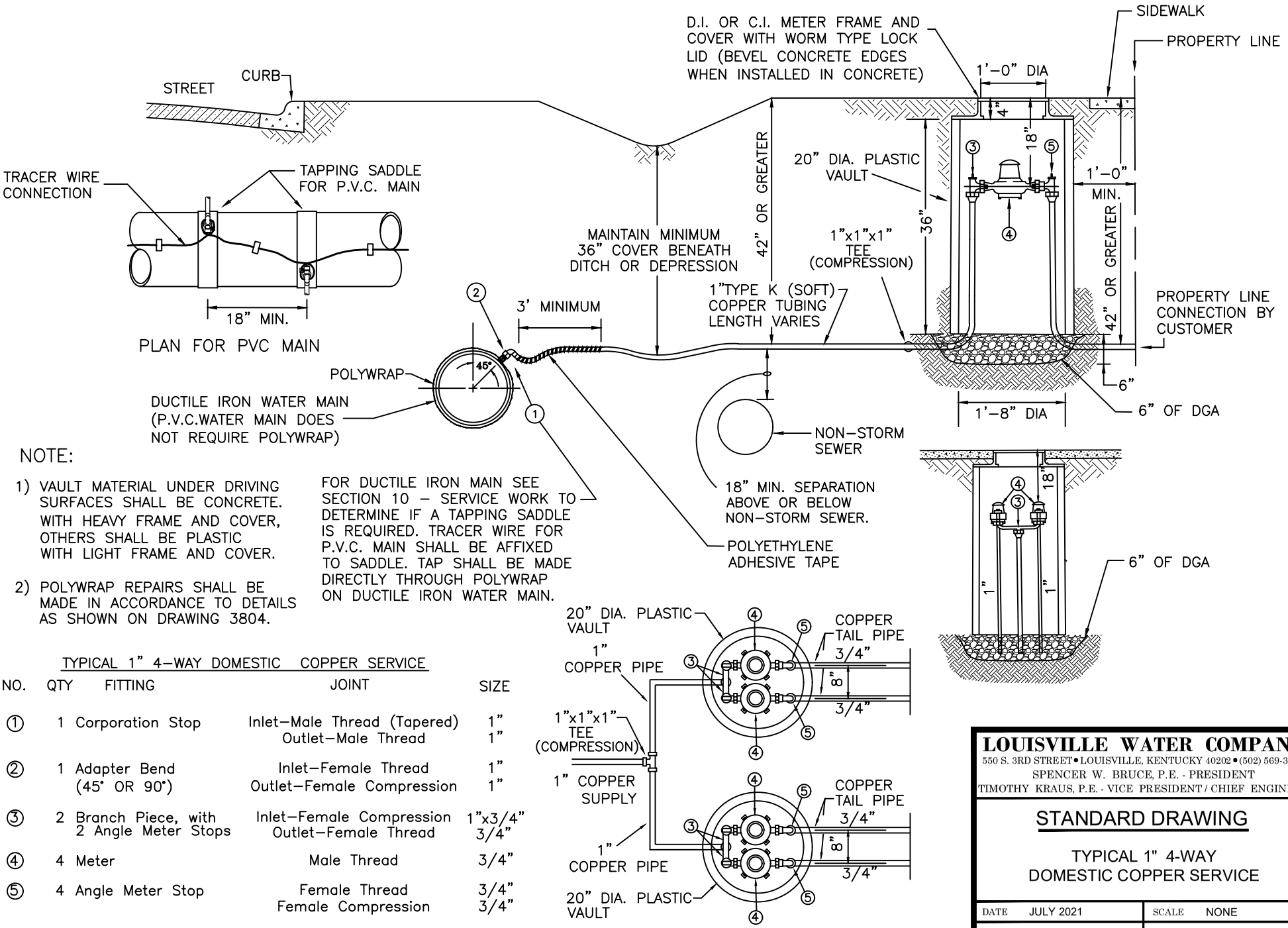
STANDARD DRAWING

TYPICAL 1" 3-WAY DOMESTIC COPPER SERVICE

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3420	SHEET	1 OF 1

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NOTE:

1) VAULT MATERIAL UNDER DRIVING SURFACES SHALL BE CONCRETE. WITH HEAVY FRAME AND COVER, OTHERS SHALL BE PLASTIC WITH LIGHT FRAME AND COVER.

2) POLYWRAP REPAIRS SHALL BE MADE IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING 3804.

FOR DUCTILE IRON MAIN SEE SECTION 10 – SERVICE WORK TO DETERMINE IF A TAPPING SADDLE IS REQUIRED. TRACER WIRE FOR P.V.C. MAIN SHALL BE AFFIXED TO SADDLE. TAP SHALL BE MADE DIRECTLY THROUGH POLYWRAP ON DUCTILE IRON WATER MAIN.

TYPICAL 1" 4-WAY DOMESTIC COPPER SERVICE

NO.	QTY	FITTING	JOINT	SIZE
①	1	Corporation Stop	Inlet–Male Thread (Tapered) Outlet–Male Thread	1" 1"
②	1	Adapter Bend (45° OR 90°)	Inlet–Female Thread Outlet–Female Compression	1" 1"
③	2	Branch Piece, with 2 Angle Meter Stops	Inlet–Female Compression Outlet–Female Thread	1"x3/4" 3/4"
④	4	Meter	Male Thread	3/4"
⑤	4	Angle Meter Stop	Female Thread Female Compression	3/4" 3/4"

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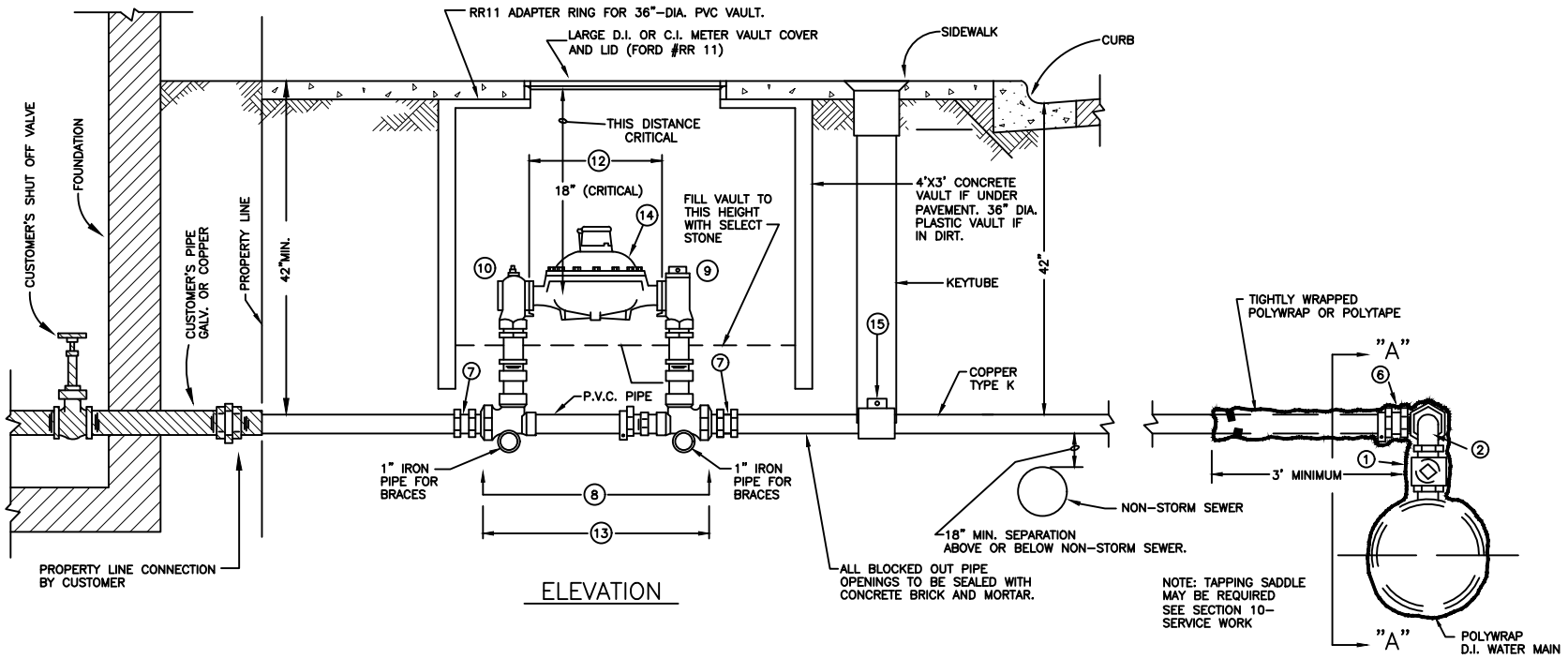
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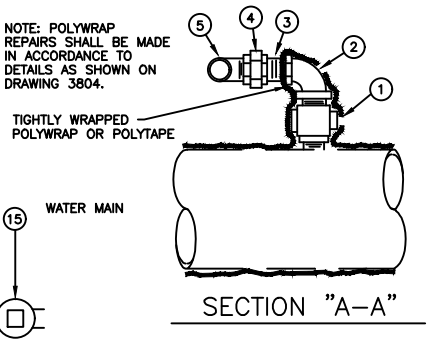
TYPICAL 1" 4-WAY DOMESTIC COPPER SERVICE

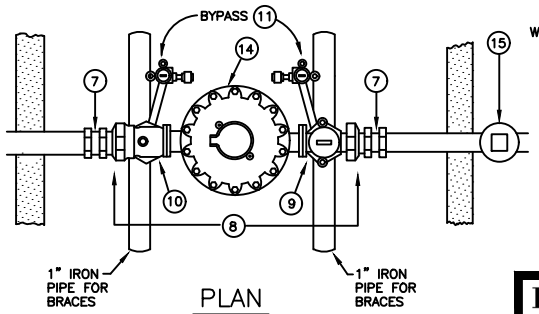
DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3430	SHEET	1 OF 1

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TYPICAL 1 1/2" or 2" COPPER SERVICE

NO.	QTY	FITTING	JOINT	1.5" SERVICE'S FITTING SIZES	2" SERVICE'S FITTING SIZES
1	1	CORPORATION STOP	INLET-MALE THREAD (TAPERED) OUTLET-MALE THREAD	1-1/2" 1-1/2"	2" 2"
2	1	BRASS REDUCING ELL	INLET-FEMALE THREAD OUTLET-FEMALE THREAD	2" 2"	2-1/2" 2-1/2"
3	1	BRASS NIPPLE (CLOSE)	MALE THREAD	1-1/2"	2"
4	1	BRASS UNION	FEMALE THREAD	1-1/2"	2"
5	1	BRASS STREET ELL	MALE THREAD	1-1/2"	2"
6	1	COMPRESSION COUPLING	FEMALE THREAD FEMALE COMPRESSION	1-1/2" 1-1/2"	2" 2"
7	2	ADAPTER	FEMALE COMPRESSION MALE THREAD	1-1/2" 1-1/2"	2" 2"
8	1	METER SETTER	FEMALE THREAD	1-1/2"	2"
9		ANGLE METER STOP	----------	-----	--
10		ANGLE CHECK VALVE	----------	-----	--
11		BY-PASS 1	----------	-----	--
12		---------	----------	13-3/8"	17-3/8"
13		---------	----------	22"	27-1/8"
14	1	METER	MALE THREAD	1-1/2"	2"
15	1	STOP	FEMALE THREAD	1-1/2"	2"

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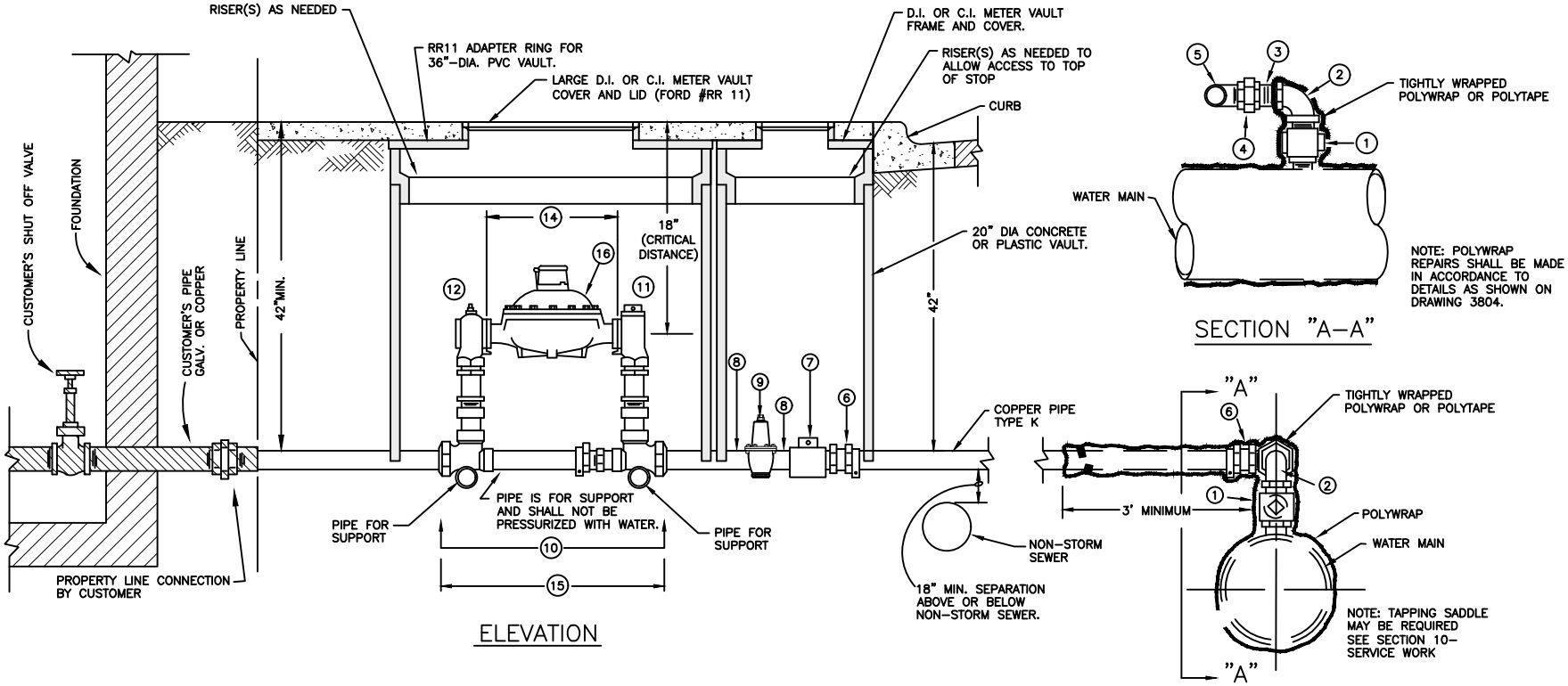
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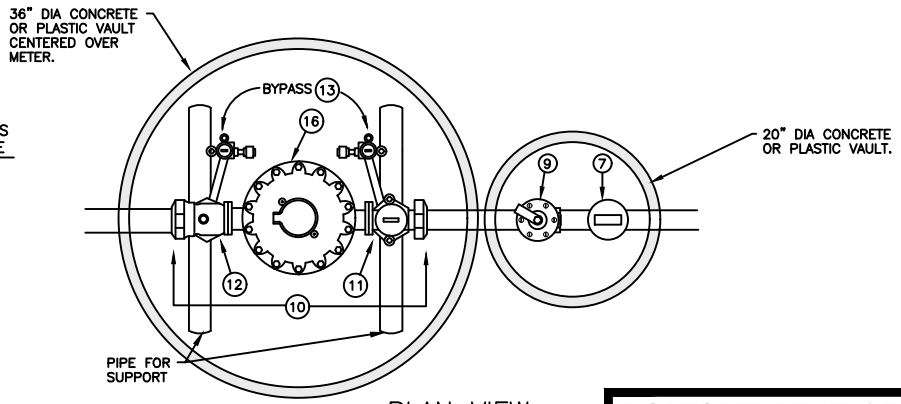
TYPICAL 1-1/2" OR 2" COPPER SERVICE

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3200	SHEET	1 OF 1

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PLAN VIEW
(INSIDE VAULTS)

TYPICAL 1 1/2" or 2" COPPER SERVICE

NO.	QTY	FITTING	JOINT	1.5" SERVICE'S FITTING SIZE	2" SERVICE'S FITTING SIZE
1	1	CORPORATION STOP	INLET–MALE THREAD (TAPERED) OUTLET–MALE THREAD	1–1/2" 2"	2" 2–1/2"
2	1	BRASS REDUCING ELL	INLET–FEMALE THREAD OUTLET–FEMALE COMPRESSION	2" 1–1/2"	2–1/2" 2"
3	1	BRASS NIPPLE (CLOSE)	MALE THREAD	1–1/2"	2"
4	1	BRASS UNION	FEMALE THREAD	1–1/2"	2"
5	1	BRASS STREET ELL	MALE THREAD	1–1/2"	2"
6	1	COMPRESSION COUPLING	FEMALE THREAD FEMALE COMPRESSION	1–1/2" 1–1/2"	2" 2"
7	1	STOP	FEMALE THREAD	1–1/2"	2"
8	2	BRASS NIPPLE (X6)	MALE THREAD	1–1/2"	2"
9	1	PRESSURE REDUCING VALVE	FEMALE THREAD	1–1/2"	2"
10	1	METER SETTER	FEMALE THREAD	1–1/2"	2"
11	1	ANGLE METER STOP	----------		
12	1	ANGLE CHECK VALVE	----------		
13		BYPASS 1"	----------	1–1/2"	2"
14		----------	----------	13–3/8"	17–3/8"
15		----------	----------	22"	27–1/8"
16	1	METER	MALE THREAD	1–1/2"	2"

NOTES:
1. VAULTS SHALL NOT REST DIRECTLY ON PIPE. A CLEAN CUT ARCH SHALL BE CUT IN VAULT TO ALLOW 3" SEPARATION BETWEEN VAULT AND PIPE.
2. VAULTS SHALL BE PLACED ON A 6" BEDDING OF DGA THAT EXTENDS 6" BEYOND VAULT EXTERIOR.

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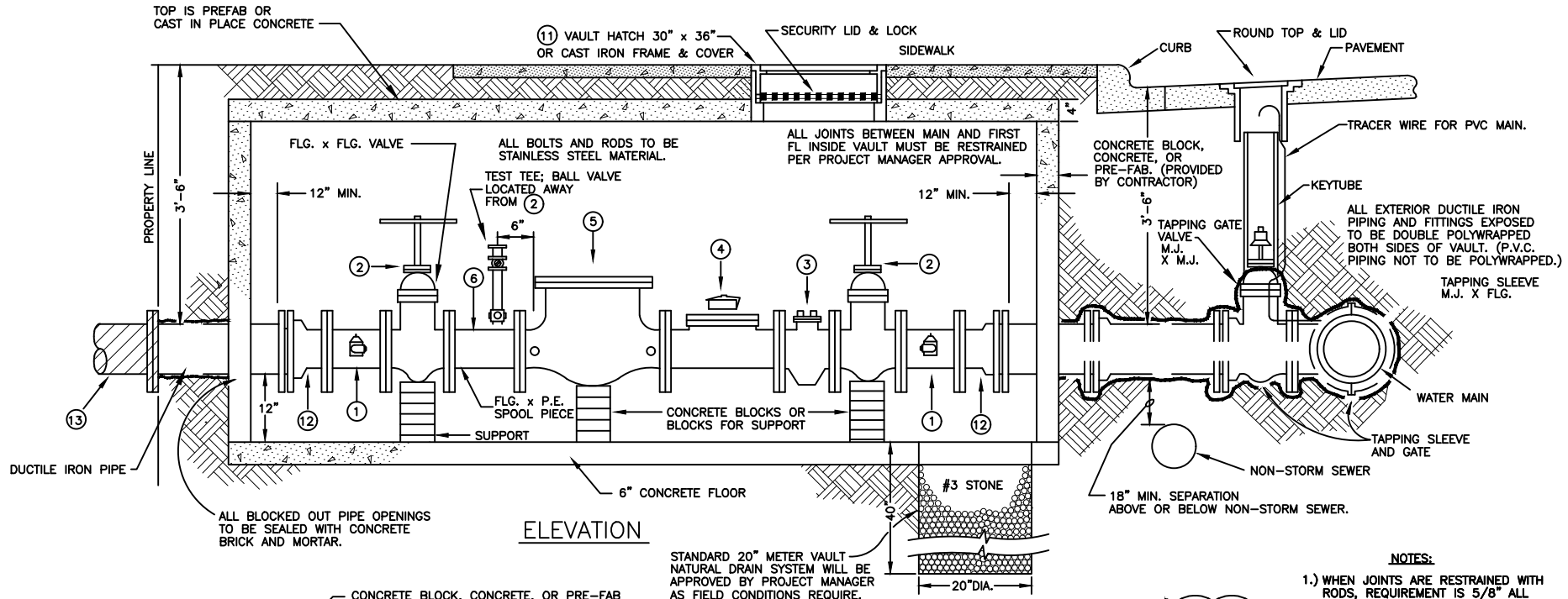
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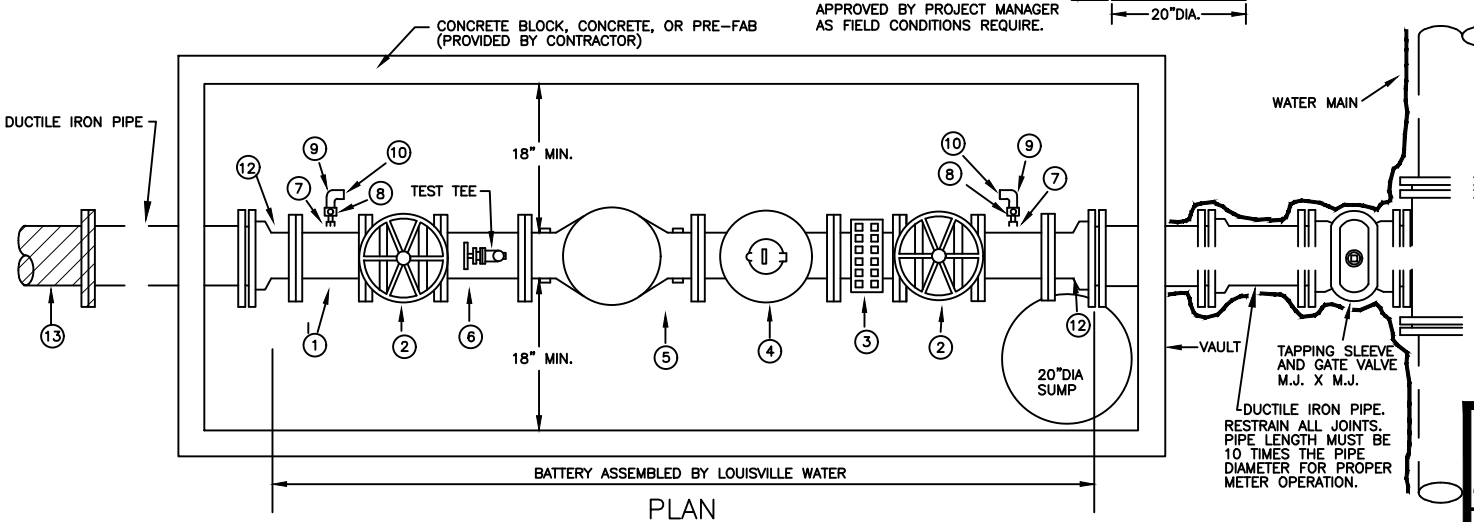
TYPICAL 1-1/2" OR 2" COPPER SERVICE WITH PRESSURE REDUCING VALVE

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3202	SHEET	1 OF 1

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NOTES:

1.) WHEN JOINTS ARE RESTRAINED WITH RODS, REQUIREMENT IS 5/8" ALL THREAD ROD (STAINLESS STEEL) WITH A MINIMUM OF TWO RODS PER JOINT.

2.) RESTRAIN ALL JOINTS BETWEEN THE MAIN AND THE ADAPTER FLANGE JOINT THAT'S INSIDE THE VAULT.

3.) IF ANY PORTION OF THE SERVICE PIPING IS ENCASED, THEN THE ENTIRE LENGTH OF SERVICE PIPING SHALL BE DUCTILE IRON WITH RESTRAINED JOINTS.

4.) ACCESS HATCH AND VAULT MUST MEET OR EXCEED H-20 TRAFFIC LOADING DESIGN CRITERIA. CAST IRON FRAME & COVER REQUIRED IN AREAS OF VEHICULAR TRAFFIC.

5.) COMPOUND METER INSTALLATIONS SAME AS TURBINE METERS.

(1) TWO (2) 4"x3" SPOOL PIECES WITH TWO (2) 2" OUTLETS, FLG x FLG
(2) TWO (2) GATE VALVES, WHEEL FLG x FLG
(3) ONE (1) STRAINER, FLG x FLG
(4) ONE (1) METER, FLG x FLG
(5) ONE (1) CHECK VALVE, FLG x FLG
(6) ONE (1) SPOOL PIECE, FLG x FLG WITH ONE (1) 2" OUTLET, 2" BALL VALVE ASSEMBLY FOR TEST TEE
(7) TWO (2) NIPPLES, MALE THREAD
(8) TWO (2) STOP OR VALVES, MALE THREAD
(9) TWO (2) STREET ELLS, MALE THREAD
(10) TWO (2) PLUGS, MALE THREAD
(11) ONE (1) VAULT HATCH-30" x 36"
(12) TWO (2) 4"x3" ADAPTERS-FLG. x MJ WITH GRIPPER GLAND
(13) CUSTOMER PIPING

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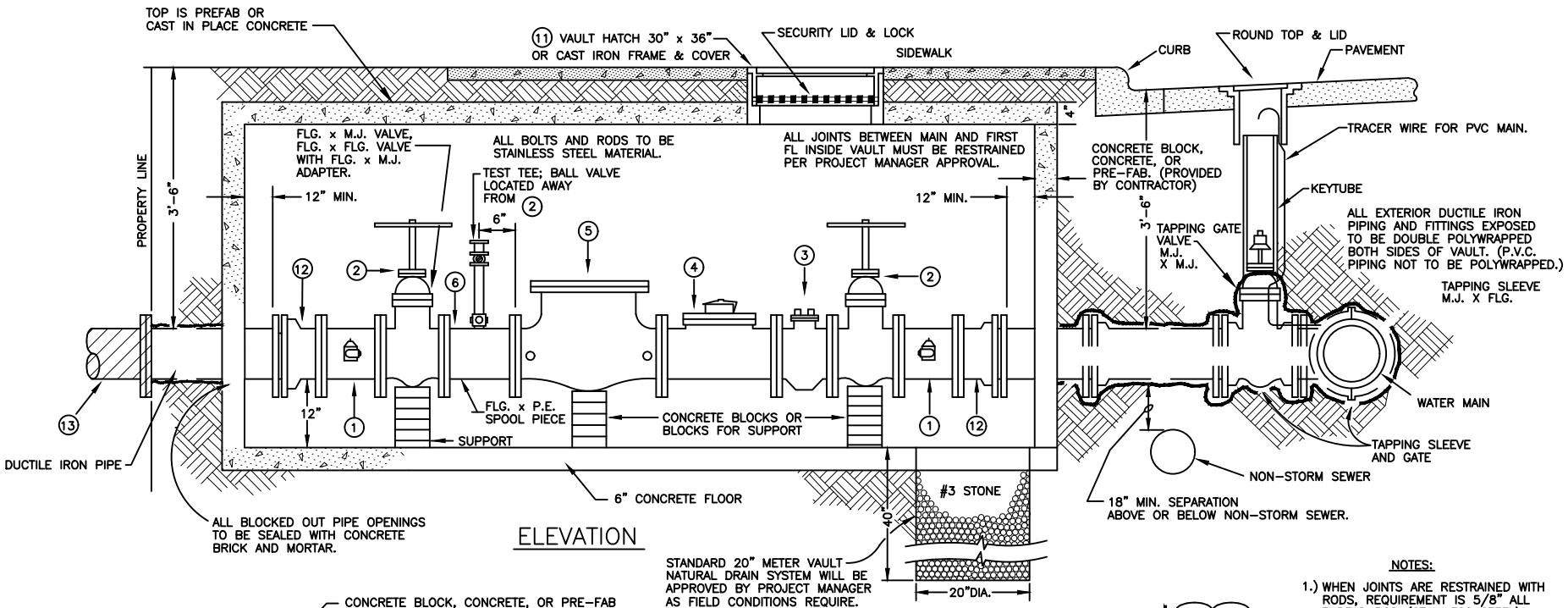
STANDARD DRAWING

TYPICAL DUCTILE IRON DOMESTIC SERVICE 4" x 3"

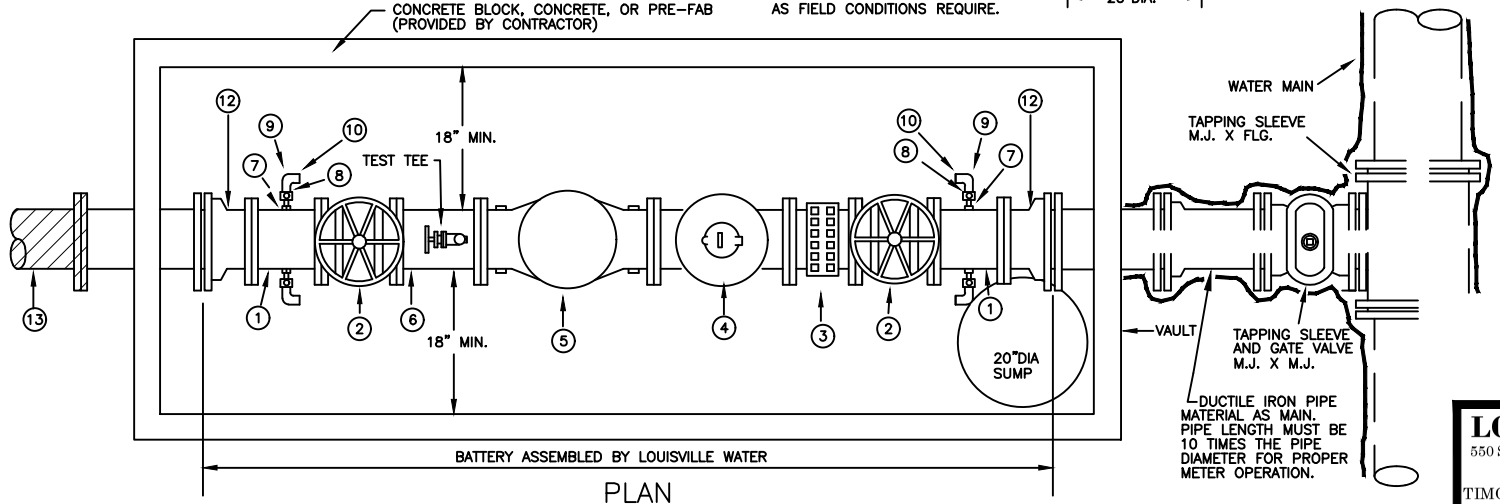
DATE	OCT. 2021	SCALE	NONE
DRAWING NO.	3203A	SHEET	1 OF 1

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ELEVATION



PLAN

NOTES:

1.) WHEN JOINTS ARE RESTRAINED WITH RODS, REQUIREMENT IS 5/8" ALL THREAD ROD (STAINLESS STEEL) WITH A MINIMUM OF TWO RODS PER JOINT.

2.) RESTRAIN ALL JOINTS BETWEEN THE MAIN AND THE ADAPTER FLANGE JOINT THAT'S INSIDE THE VAULT.

3.) IF ANY PORTION OF THE SERVICE PIPING IS ENCASED, THEN THE ENTIRE LENGTH OF SERVICE PIPING SHALL BE DUCTILE IRON WITH RESTRAINED JOINTS.

4.) ACCESS HATCH AND VAULT MUST MEET OR EXCEED H-20 TRAFFIC LOADING DESIGN CRITERIA. CAST IRON FRAME & COVER REQUIRED IN AREAS OF VEHICULAR TRAFFIC.

5.) COMPOUND METER INSTALLATIONS SAME AS TURBINE METERS.

(1) TWO (2) 4"x4" SPOOL PIECES WITH TWO (2) OUTLETS, FLG. x FLG.
(2) TWO (2) GATE VALVES, WHEEL FLG x FLG
(3) ONE (1) STRAINER, FLG x FLG
(4) ONE (1) METER, FLG x FLG
(5) ONE (1) CHECK VALVE, FLG x FLG
(6) ONE (1) SPOOL PIECE, FLG x FLG, WITH ONE (1) 2" OUTLET, 2" BALL VALVE ASSEMBLY FOR TEST TEE
(7) FOUR (4) NIPPLES, MALE THREAD
(8) FOUR (4) STOP OR VALVES, MALE THREAD
(9) FOUR (4) STREET ELLS, MALE THREAD
(10) FOUR (4) PLUGS, MALE THREAD
(11) ONE (1) VAULT HATCH-30" x 36"
(12) TWO (2) 4"x3" ADAPTERS-FLG. x MJ WITH GRIPPER GLAND
(13) CUSTOMER PIPING

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STANDARD DRAWING

TYPICAL DUCTILE IRON DOMESTIC SERVICE 4" AND LARGER

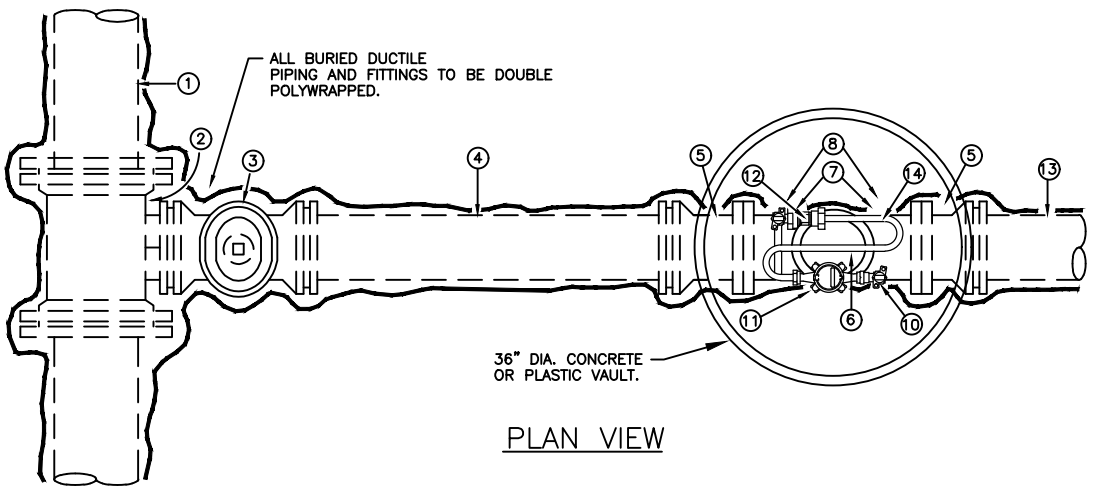
DATE	OCT. 2021	SCALE	NONE
DRAWING NO.	3203	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
121CD22D055

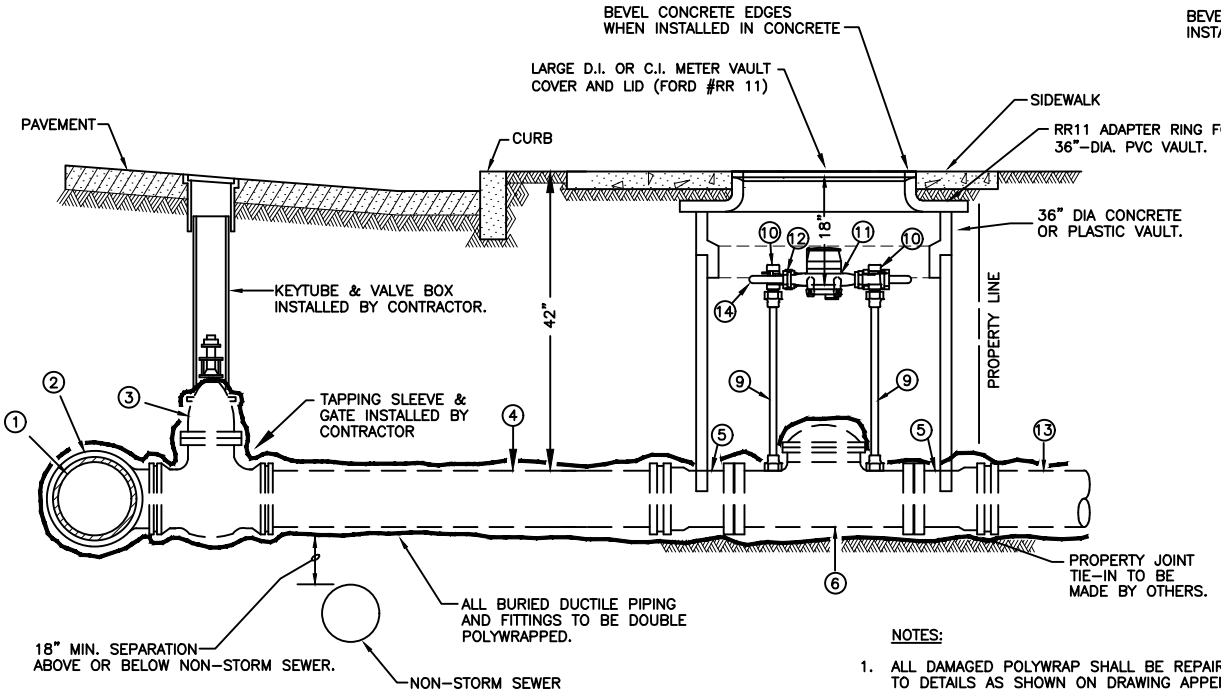
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TYPICAL FIRE PROTECTION SERVICE 4" OR LARGER

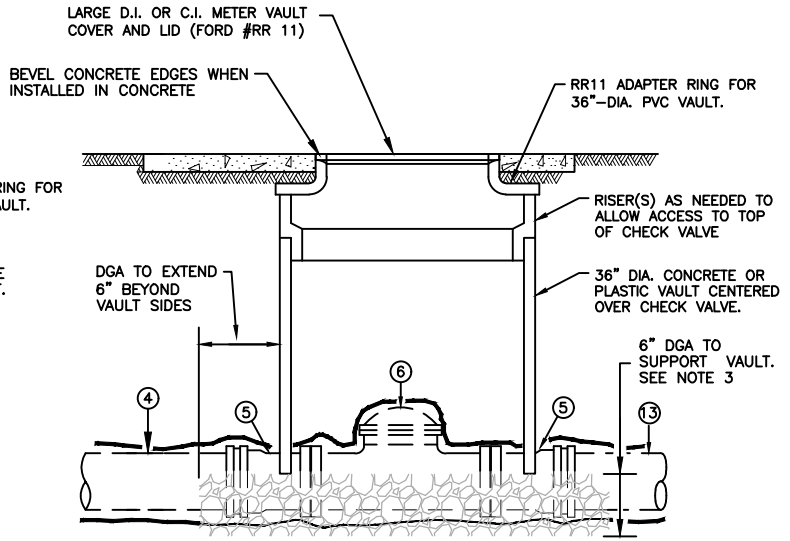
NO.	QTY	FITTING	JOINT	FIRE SERVICE SIZES 4"	6"
1	—	Main in Street	Varies	—	—
2	1	Tapping Sleeve	MJ	4"	6"
3	1	Tapping Gate Valve	MJ x MJ (restrained)	4"	6"
4	varies	D.I. Service Piping	MJ / Bell & Spig (restrain all joints up to check valve)	4"	6"
5	2	Adapter	Flange X MJ or PE	4"	6"
6	1	Detector Check Valve	Flange X Flange	4"	6"
7	2	Bushing	Male Thread Female Thread	1" 3/4"	1-1/2" 3/4"
8	2	Adapter	Male Thread Female Compression	3/4"	3/4"
9	varies	Copper Tubing	Female Compression	3/4"	3/4"
10	2	Angle Meter Stop	Female Compression Female Thread	3/4" 3/4"	3/4" 3/4"
11	1	Meter	Male Thread X Male Thread	3/4"	3/4"
12	1	Swing Check Valve	Female Thread	3/4"	3/4"
13		Customer Piping			
14	1	S-Tube	Female Thread	3/4"	3/4"



PLAN VIEW



PROFILE VIEW



ELEVATION OF CHECK VALVE VAULT

NOTES:

1. ALL DAMAGED POLYWRAP SHALL BE REPAIRED IN ACCORDANCE TO DETAILS AS SHOWN ON DRAWING APPENDIX.
2. RESTRAIN ALL JOINTS BETWEEN THE MAIN AND THE DETECTOR CHECK VALVE.
3. 36" DIA. VAULT SHALL NOT REST DIRECTLY ON PIPE. A CLEAN CUT ARCH SHALL BE CUT IN VAULT TO ALLOW 3" SEPARATION. VAULT SHALL REST ON A 6" BEDDING OF DGA
4. ALL BOLTS ON TOP OF CHECK VALVE SHALL BE MADE ACCESSIBLE FROM INSIDE OF VAULT
5. CAST CONCRETE THRUST ANCHOR ON TAPPING SLEEVE AS PER DRAWING 1400

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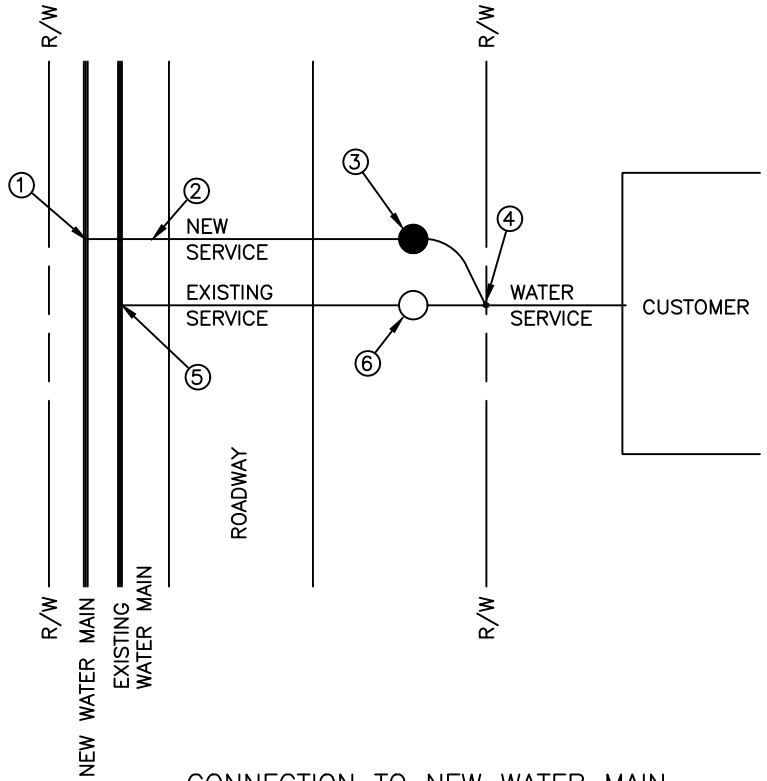
STANDARD DRAWING

TYPICAL FIRE PROTECTION SERVICE 4" AND LARGER

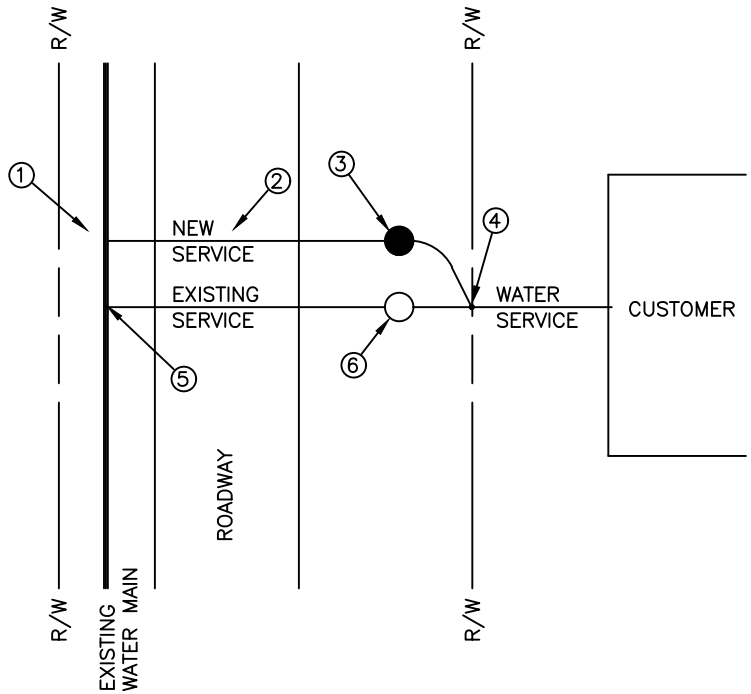
DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3601	SHEET	1 OF 1

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CONNECTION TO NEW WATER MAIN



CONNECTION TO EXISTING WATER MAIN

NOTES:

① INSTALL NEW CORPORATION STOP ON MAIN.

② INSTALL NEW SERVICE LINE.

③ INSTALL METER, VAULT, FRAME AND LID. CONCRETE METER VAULTS WITH HEAVY FRAME AND COVER SHALL BE INSTALLED IN AREAS OF VEHICULAR TRAFFIC.

④ INSTALL TAIL PIECE AND TIE–IN TO CUSTOMER SERVICE LINE. IF EXISTING TAIL PIECE OR CUSTOMER SERVICE LINE IS LEAD OR GALVANIZED IRON THEN FOLLOW CURRENT INSTALLATION PROCEDURES PER THE LOUISVILLE WATER PROJECT MANAGER.

⑤ DISCONTINUE OLD SERVICE AT EXISTING WATER MAIN. DRIVEN FERRULES MUST BE REMOVED AND A TAPPING SADDLE INSTALLED AT TAP IF MAIN WILL REMAIN ACTIVE. (SEE SECT. 10.17)

⑥ ABANDON OLD METER VAULT, RETURN METER AND CAST IRON FRAME & COVER TO ALLMOND AVENUE, BACKFILL METER VAULT (SEE SECT.10.18)

* CONNECTION AS SHOWN IS A "LONG SERVICE" TO MAIN ON OPPOSITE SIDE OF ROAD. "SHORT SERVICE" IS DEFINED AS METER AND MAIN ON THE SAME SIDE OF ROADWAY.

LEGEND

○ = EXISTING METER VAULT

● = NEW METER VAULT

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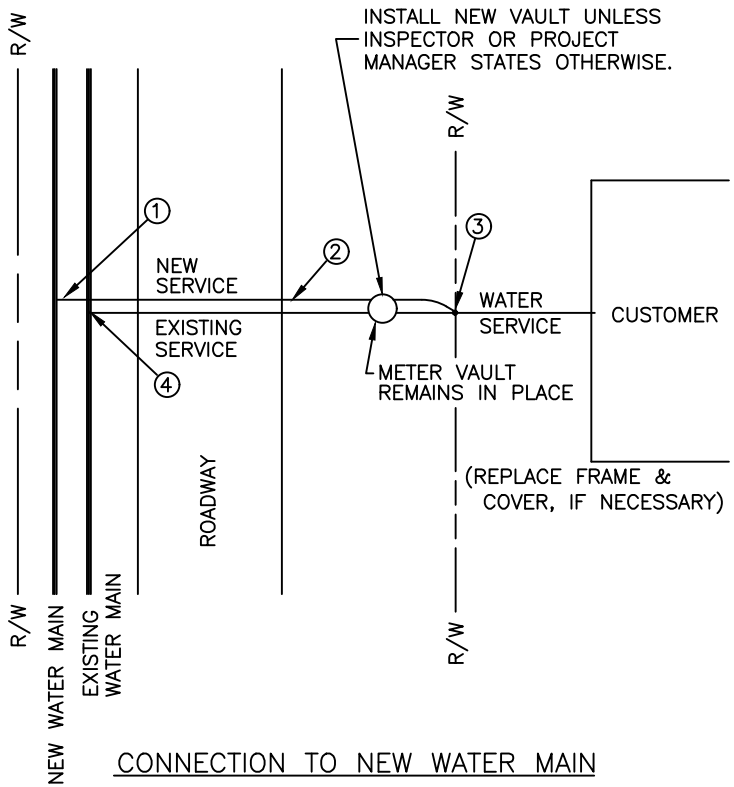
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RELOCATE SERVICE

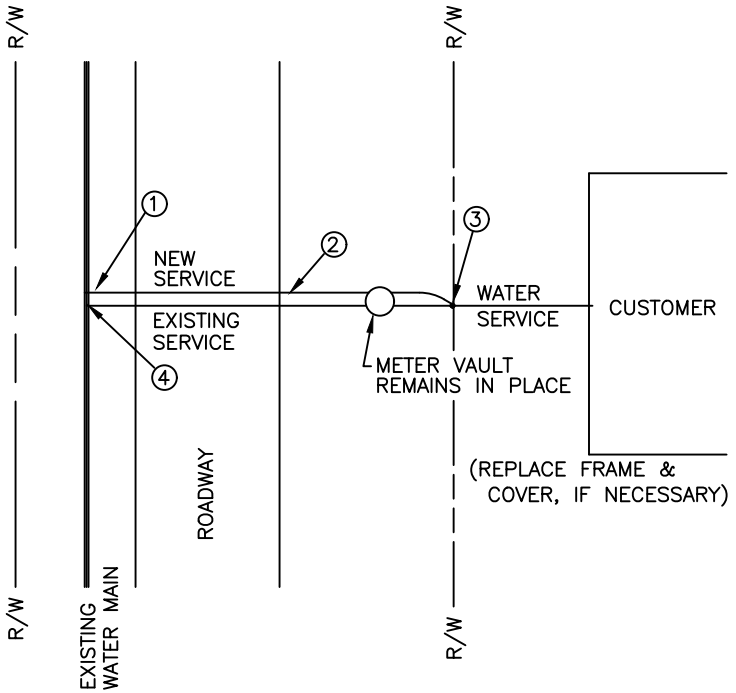
DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3440	SHEET	1 OF 1

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CONNECTION TO NEW WATER MAIN



CONNECTION TO EXISTING WATER MAIN

LEGEND

◯ = EXISTING METER VAULT

NOTES:

① INSTALL NEW CORPORATION STOP ON MAIN.

② INSTALL NEW SERVICE LINE TO EXISTING METER STOP.

③ INSTALL TAIL PIECE AND TIE–IN TO CUSTOMER SERVICE LINE. IF EXISTING TAIL PIECE OR CUSTOMER SERVICE LINE IS LEAD OR GALVANIZED IRON THEN INSTALL TAIL PIECE AND TIE–IN TO CUSTOMER SERVICE LINE. IF CUSTOMER SERVICE LINE IS LEAD THEN FOLLOW CURRENT INSTALLATION PROCEDURES PER THE LOUISVILLE WATER PROJECT MANAGER.

⑤ DISCONTINUE OLD SERVICE AT EXISTING WATER MAIN. DRIVEN FERRULES MUST BE REMOVED AND REPAIR BAND INSTALLED AT TAP IF MAIN WILL REMAIN ACTIVE. (SEE SECT. 10.17)

⑥ REPLACE EXISTING VAULT, FRAME, AND COVER IN SAME LOCATION AS OLD METER VAULT UNLESS THE LOUISVILLE WATER PROJECT MANAGER OR INSPECTOR APPROVES OF LEAVING THE EXISTING VAULT IN PLACE.

* CONNECTION AS SHOWN IS A "LONG SERVICE" TO MAIN ON OPPOSITE SIDE OF ROAD. "SHORT SERVICE" IS DEFINED AS METER AND MAIN ON THE SAME SIDE OF ROADWAY.

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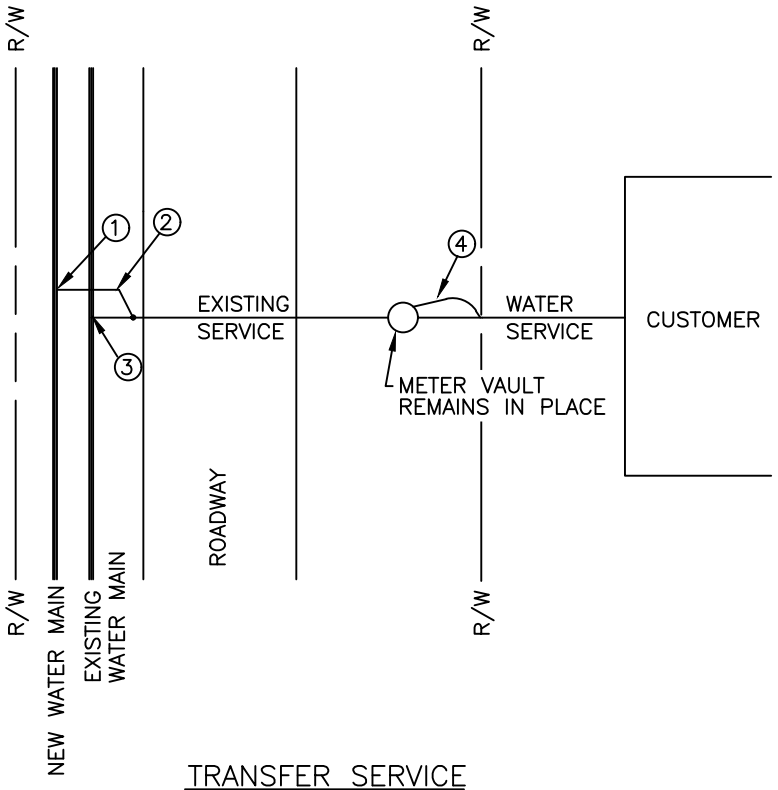
STANDARD DRAWING

RENEW SERVICE

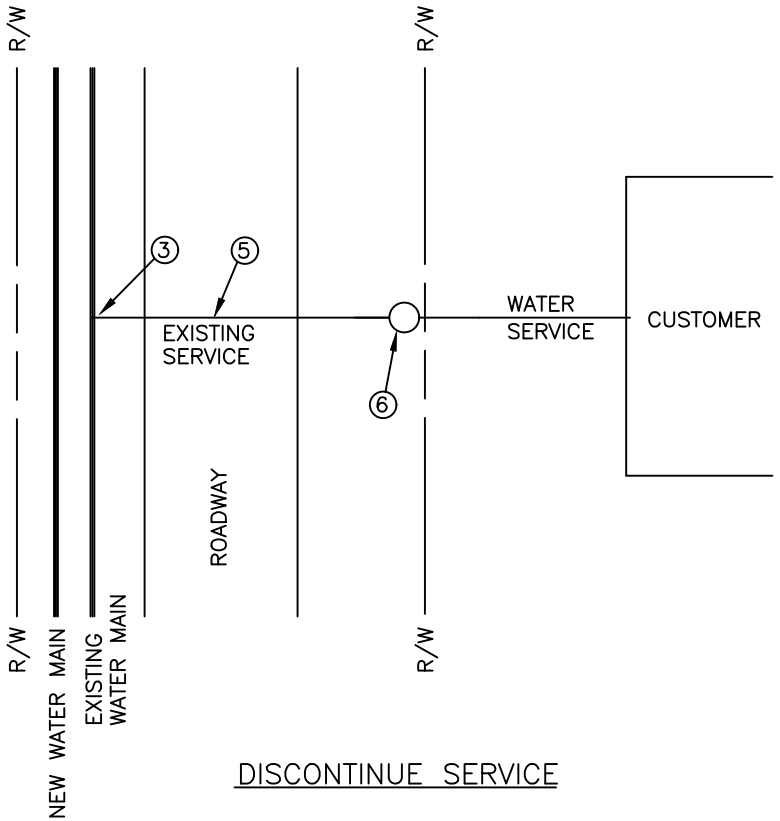
DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3441	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1210[illegible]

Contract ID: 221055
Page 697 of 712



TRANSFER SERVICE



DISCONTINUE SERVICE

NOTES:

1. INSTALL NEW CORPORATION STOP ON MAIN.
2. INSTALL NEW SERVICE LINE FROM NEW MAIN AND TIE–IN TO EXISTING SERVICE LINE. (AS REQUIRED)
3. DISCONTINUE OLD SERVICE AT EXISTING WATER MAIN. DRIVEN FERRULES MUST BE REMOVED AND REPAIR BAND INSTALLED AT TAP IF MAIN WILL REMAIN ACTIVE. (SEE SECT. 10.17)
4. INSTALL TAIL PIECE AND TIE–IN TO CUSTOMER SERVICE LINE. IF EXISTING TAIL PIECE OR CUSTOMER SERVICE LINE IS LEAD OR GALVANIZED IRON THEN INSTALL TAIL PIECE AND TIE–IN TO CUSTOMER SERVICE LINE. IF CUSTOMER SERVICE LINE IS LEAD THEN FOLLOW CURRENT INSTALLATION PROCEDURES PER THE LOUISVILLE WATER PROJECT MANAGER.
5. DISCONNECT AND PLUG SERVICE LINE.
6. ABANDON OLD METER VAULT, RETURN METER AND CAST IRON FRAME & COVER TO ALLMOND AVENUE, BACKFILL METER VAULT (SEE SECT.10.18)

* CONNECTION AS SHOWN IS A "LONG SERVICE" TO MAIN ON OPPOSITE SIDE OF ROAD. "SHORT SERVICE" IS DEFINED AS METER AND MAIN ON THE SAME SIDE OF ROADWAY.

LEGEND

○ = EXISTING METER VAULT

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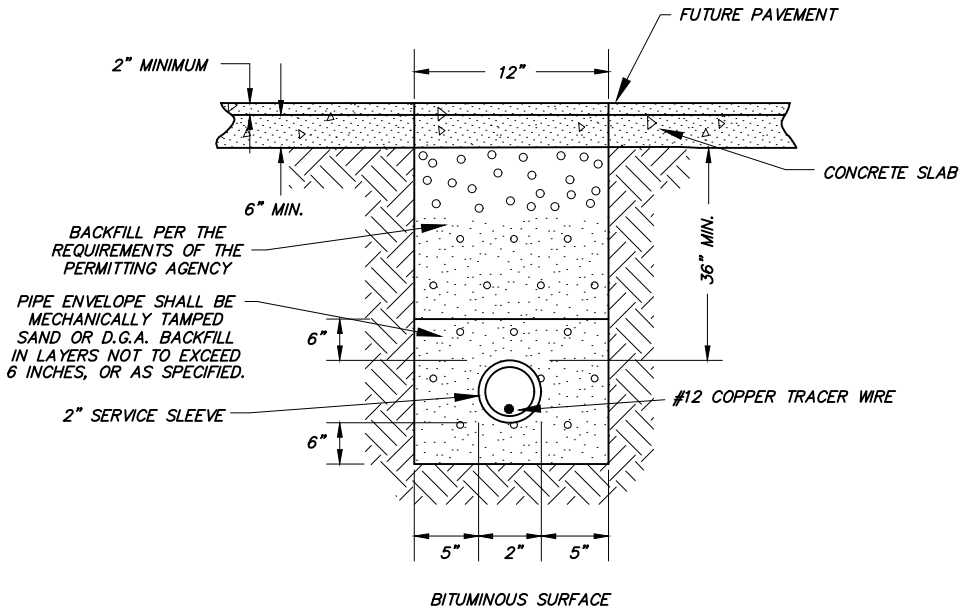
STANDARD DRAWING

TRANSFER SERVICE
DISCONTINUE SERVICE

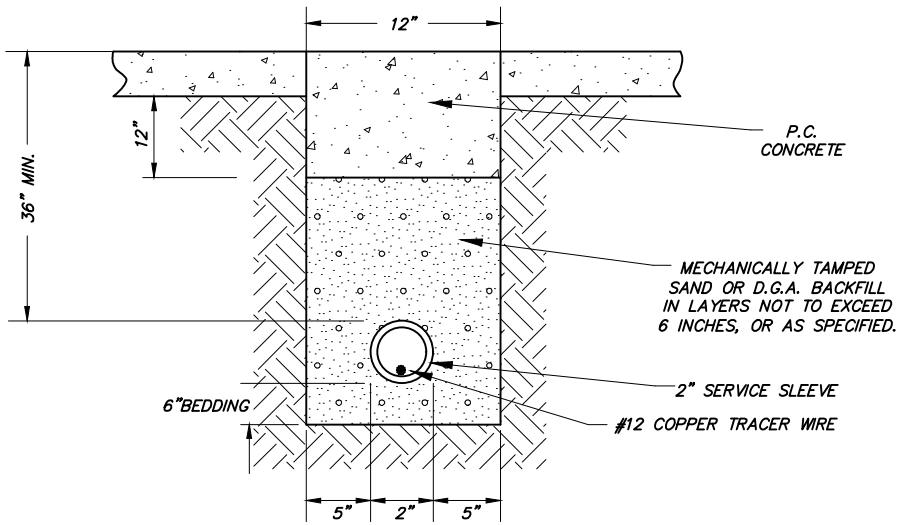
DATE JULY 2021	SCALE NONE
DRAWING NO. 3442	SHEET 1 OF 1

JEFFERSON - OLDHAM COUNTIES
1210[illegible]

Contract ID: 221055
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BITUMINOUS SURFACE



CONCRETE PAVEMENT

SERVICE SLEEVE INSTALLATIONS

IN ORDER TO AVOID CURB AND PAVEMENT CUTS DURING SERVICE INSTALLATIONS, THE FOLLOWING PROCEDURES HAVE BEEN ESTABLISHED FOR NEW DEVELOPMENT PROJECTS:

- SERVICE SLEEVES ARE TO BE INSTALLED BY THE DEVELOPER'S WATER MAIN INSTALLATION CONTRACTOR AS SHOWN ON THE PLANS. LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE; THE CONTRACTOR SHALL COORDINATE EXACT SERVICE SLEEVE LOCATIONS WITH THE DEVELOPER OR THEIR REPRESENTATIVE.
- WHEN THE SERVICE SLEEVES ARE SUPPLIED BY THE DEVELOPER, THE COMPANY WILL ADJUST THE DEVELOPER'S PROJECT MATERIAL COSTS TO REFLECT DEVELOPER–DOCUMENTED SLEEVE MATERIAL COST.
- SLEEVES MUST BE INSTALLED AT 36" COVER, AND ALIGNED SO THAT FUTURE INSTALLATION OF SERVICE PIPING CAN BE ACCOMPLISHED WITHOUT PAVEMENT, OR CURB CUTS. SLEEVES MUST BE INSTALLED IN A STRAIGHT LINE WITHOUT ANY BENDS OR OBSTRUCTIONS.
- ALL SERVICE SLEEVES MUST EXTEND AT LEAST 2 FEET BEYOND THE BACK OF CURBS, WITH SEALED END CAPS AND MARKED BY ABOVE–GRADE P.V.C. PIPE THAT SHALL BE PAINTED BLUE ON THE EXPOSED END EXTENDING A MIN. OF 6" ABOVE FINISH GRADE TO EACH END OF THE SERVICE SLEEVE OR OTHER MARKER ACCEPTABLE TO LOUISVILLE WATER.
- ALL SLEEVES MUST HAVE #12 COPPER TRACER WIRE INSTALLED THROUGH EACH SLEEVE AND THE TRACER WIRE MUST BE MADE ACCESSIBLE FOR THE COMPANY'S SERVICE INSTALLER FOR THE PURPOSE OF LOCATING THE SERVICE SLEEVE.

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STANDARD DRAWING

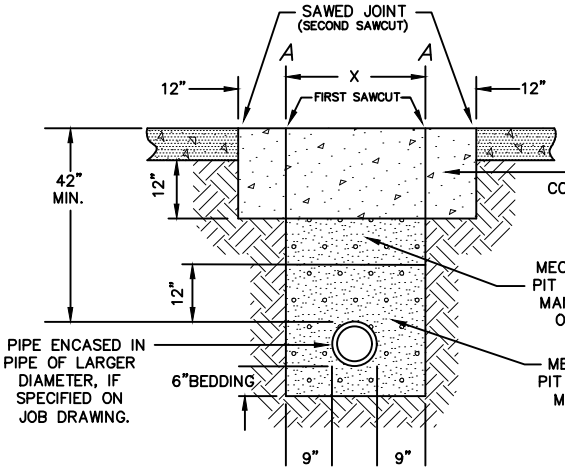
SERVICE SLEEVE INSTALLATION DETAIL

DATE	JULY 2021	SCALE	NONE
DRAWING NO.	3805	SHEET	1 OF 1

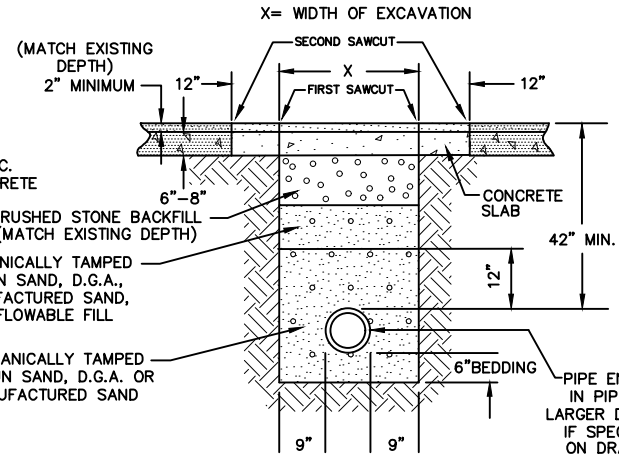
JEFFERSON - OLDHAM COUNTIES
1210[illegible]

Contract ID: 221055
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NOTE: FROM POINTS "A" (CONCRETE PAVEMENT) TO NEAREST JOINT OR BREAK IN PAVEMENT MUST BE SIX(6) FEET OR MORE. IF LESS THAN 6, REMOVE PAVEMENT TO JOINT OR BREAK AND REPLACE ENTIRE SLAB.
CONCRETE SLAB UNDER BITUMINOUS SURFACE TO EXTEND 12 INCHES ON EACH SIDE OF TRENCH.

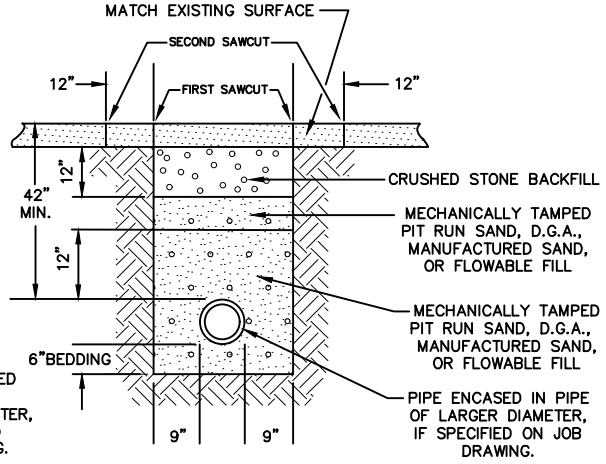


CONCRETE PAVEMENT



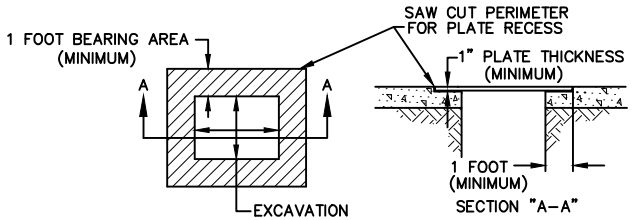
BITUMINOUS SURFACE 2"+

(12" CUTBACK IS NOT REQUIRED
WHEN FLOWABLE FILL IS USED)



BITUMINOUS SURFACE LESS THAN
2" AND TRAFFIC BOUND MACADAM

(12" CUTBACK IS NOT REQUIRED
WHEN FLOWABLE FILL IS USED)



TYPICAL RECESSED PLATE

NO SCALE

NOTE: REPLACE CONCRETE PAVEMENT WITH NEW PAVEMENT SAME THICKNESS OF EXISTING PAVEMENT + 12".
REPLACE BITUMINOUS PAVEMENT WITH SAME TYPE AND DEPTH AS EXISTING PAVEMENT.

STATE OF KENTUCKY SPECIFICATIONS

1. BEDDING SHALL BE PIT RUN SAND, DENSE-GRADE AGGREGATE, MANUFACTURED SAND MECHANICALLY COMPACTED PER SPECIFICATION SECTION 7.4 AND 7.5.
2. SELECT GRANULAR BACKFILL SHALL COMPLY WITH SPECIFICATION 7.6
3.. ANY USE OF NO. 57 STONE FOR BEDDING OR BACKFILL MUST BE APPROVED BY THE DIRECTOR OF ENGINEERING.
4. CONTRACTOR WILL BE HELD RESPONSIBLE DURING THE ENSUING 5 YEARS FOR PROPER BACKFILLING AND REPLACEMENT OF SURFACE DURING THE 5 YEAR PERIOD AFTER THE DATE OF THE FINAL CONTRACT PAYMENT. ANY PAVEMENT SETTLEMENT SHALL BE IMMEDIATELY REPAIRED IN AN APPROVED MANNER AT THE EXPENSE OF THE CONTRACTOR.
5. BACKFILLING UP TO BOTTOM OF SUBBASE ELEVATION SHALL BE COMPLETED PRIOR TO SECOND PAIR OF SAWCUTS AMD EXCAVATION FOR THE ADDITIONAL 12" OF CONCRETE ON EACH SIDE OF THE TRENCH.
6. DILUTE SS1H (OR OTHER APPROVED TACK COAT MATERIAL) SHALL BE APPLIED AT THE RATE OF 0.1 GAL. PER SQUARE YARD OVER THE CONCRETE BASE. ALLOW SUFFICIENT TIME FOR IT TO "BREAK" BEFORE THE FINISHED BITUMINOUS CONCRETE IS PLACED, AND SEAL ALL JOINTS SECURELY AFTER PAVING.

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STANDARD DRAWING

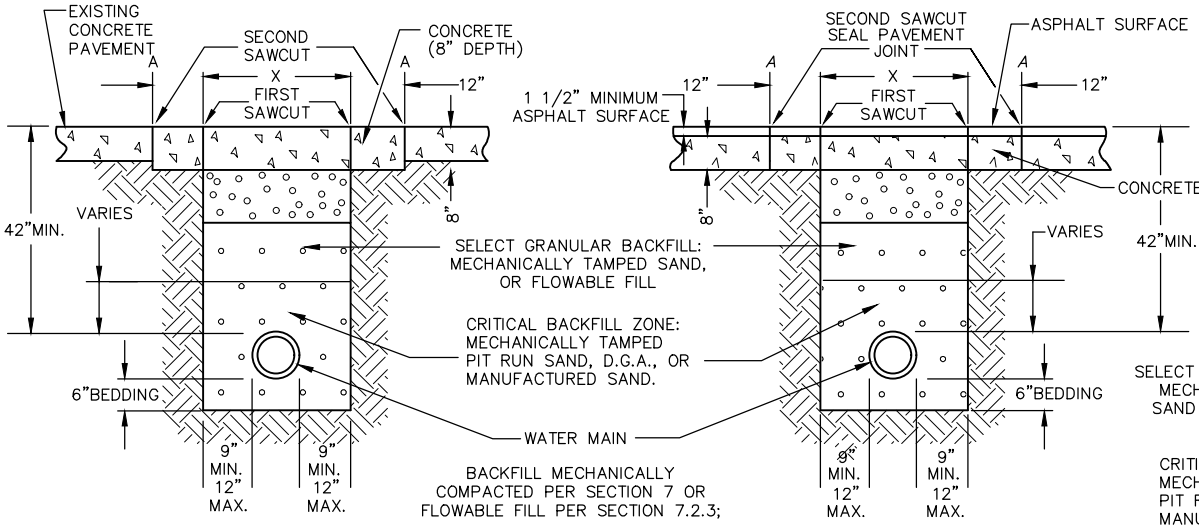
STATE OF KENTUCKY BACKFILL AND PAVING RESTORATION

DATE	AUG. 2021	SCALE	NONE
DRAWING NO.	4000	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1215R2023055

Contract ID: 221055
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NOTE: FROM POINTS "A" (CONCRETE PAVEMENT) TO NEAREST JOINT OR BREAK IN PAVEMENT MUST BE FOUR (4) FEET OR MORE. IF LESS THAN 4 REMOVE PAVEMENT TO JOINT OR BREAK AND REPLACE ENTIRE SLAB. CONCRETE SLAB UNDER BITUMINOUS SURFACE TO EXTEND 12" ON EACH SIDE OF TRENCH.



CONCRETE PAVEMENT

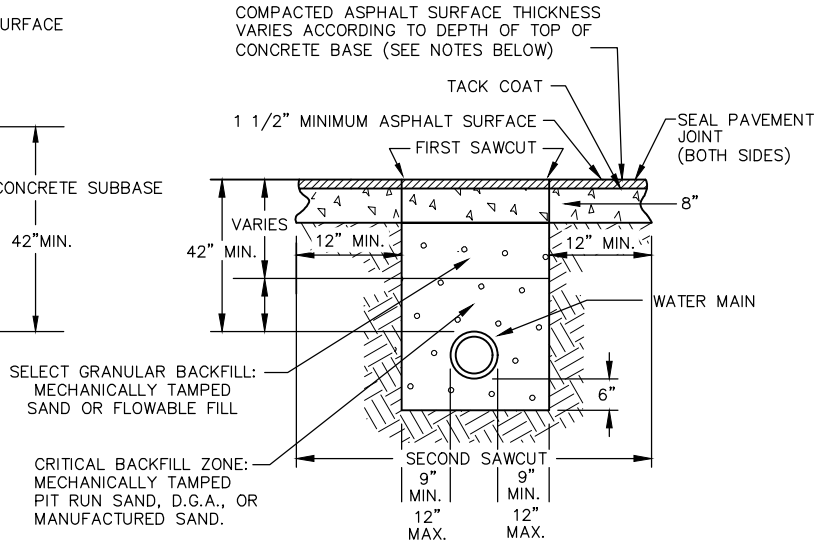
(12" CUTBACK IS NOT REQUIRED WHEN FLOWABLE FILL IS USED)

SEE KTC SPECIFICATION FOR SPECIAL PROVISIONS SECTION 76 PAGES 1–12 FOR PAVEMENT REPAIRS.

BITUMINOUS SURFACE

NEW ASPHALT SHALL BE A MINIMUM OF 1 1/2" THICK (12" CUTBACK IS NOT REQUIRED WHEN FLOWABLE FILL IS USED)

NOTE: THE CONCRETE BASE SHALL BE FLOAT FINISHED OR BROOMED OR LIGHTLY RAKED AFTER FLOATING TO A UNIFORM GRADE.



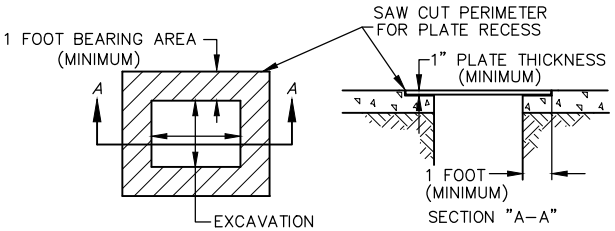
BACKFILL MECHANICALLY COMPACTED PER SECTION 7 OR FLOWABLE FILL PER SECTION 7.2.3;

BASE OTHER THAN CONCRETE HAVING AN ASPHALT SURFACE

(12" CUTBACK IS NOT REQUIRED WHEN FLOWABLE FILL IS USED)

NOTE: THE CONCRETE BASE SHALL BE FLOAT FINISHED OR BROOMED OR LIGHTLY RAKED AFTER FLOATING TO A UNIFORM GRADE.

1. CRITICAL BACKFILL ZONE SHALL CONSIST OF MECHANICALLY TAMPED PIT RUN SAND, DENSE–GRADE AGGREGATE, MANUFACTURED SAND PER SPECIFICATION SECTION 7.4 AND 7.5.
2. SELECT GRANULAR BACKFILL SHALL COMPLY WITH SPECIFICATION SECTION 7.6.
3. ANY USE OF NO. 57 STONE FOR BEDDING OR BACKFILL MUST BE APPROVED BY THE DIRECTOR OF ENGINEERING.
4. BACKFILLING UP TO BOTTOM OF SUBBASE ELEVATION SHALL BE COMPLETED PRIOR TO SECOND PAIR OF SAWCUTS AND EXCAVATION FOR THE ADDITIONAL 12" OF CONCRETE ON EACH SIDE OF THE TRENCH, UNLESS FLOWABLE FILL IS USED.
5. PLATES MUST BE SECURED AND/OR RECESSED AT ALL TIMES.
6. CONCRETE CAP MUST BE PLACED UNTIL CONCRETE REACHES STRENGTH REQUIREMENTS (MINIMUM 3500 PSI).
7. DILUTE SS1H (OR OTHER APPROVED TACK COAT MATERIAL) SHALL BE APPLIED AT THE RATE OF 0.1 GAL. PER SQUARE YARD OVER THE CONCRETE BASE. ALLOW SUFFICIENT TIME FOR IT TO "BREAK" BEFORE THE FINISHED BITUMINOUS CONCRETE IS PLACED, AND SEAL ALL JOINTS SECURELY AFTER PAVING.
8. PAVEMENT JOINTS SHALL BE SEALED WITH AN APPROVED JOINT SEALER AFTER PLACEMENT OF THE BITUMINOUS CONCRETE SURFACE. SEE SECTION 11.2 AND 11.3.
9. CONTRACTOR WILL BE HELD RESPONSIBLE DURING THE ENSUING 5 YEARS FOR PROPER BACKFILLING AND REPLACEMENT OF SURFACE. DURING THE 5 YEAR PERIOD AFTER THE DATE OF THE FINAL CONTRACT PAYMENT, ANY PAVEMENT SETTLEMENT SHALL BE IMMEDIATELY REPAIRED IN AN APPROVED MANNER AT THE EXPENSE OF THE CONTRACTOR.



TYPICAL RECESSED PLATE

NO SCALE

LOUISVILLE WATER COMPANY

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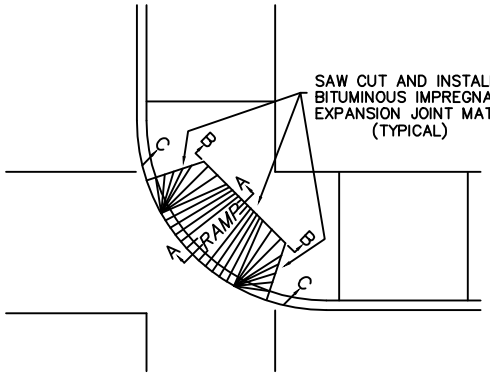
STANDARD DRAWING

METRO LOUISVILLE
BACKFILL AND PAVING
RESTORATION

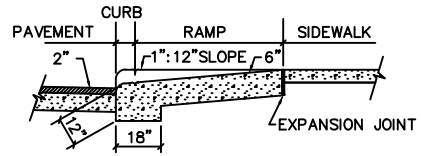
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DRAWING NO.	4100	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1210100035

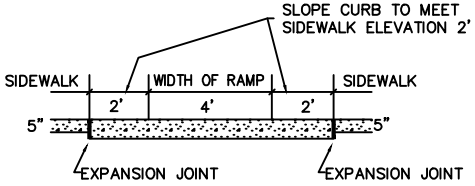
Contract ID: 221055
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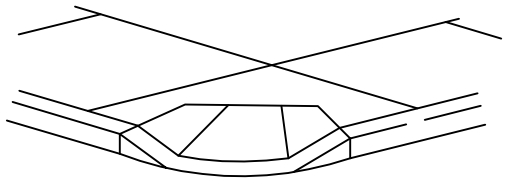
PLAN VIEW

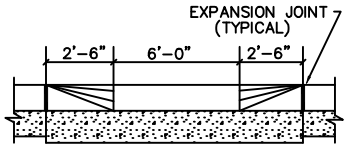


SECTION A–A



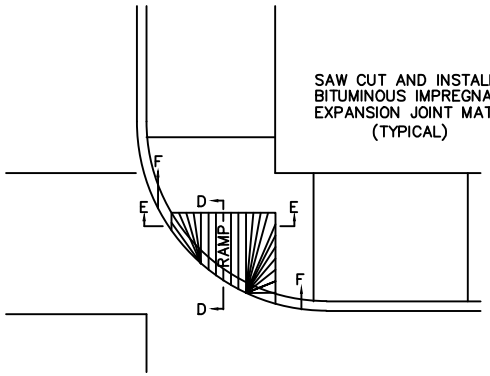
SECTION B–B



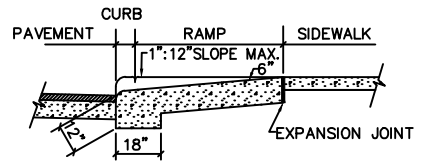


SECTION C–C

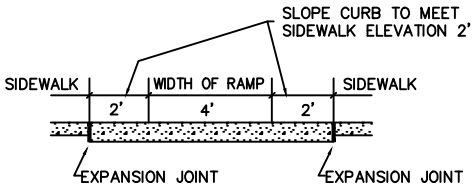
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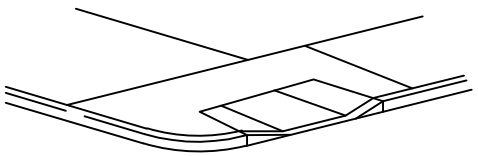
PLAN VIEW

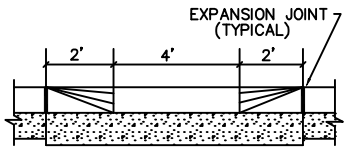


SECTION D–D



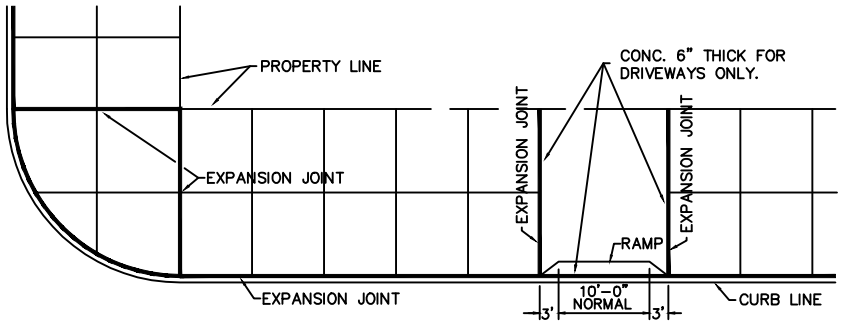
SECTION E–E





SECTION F–F

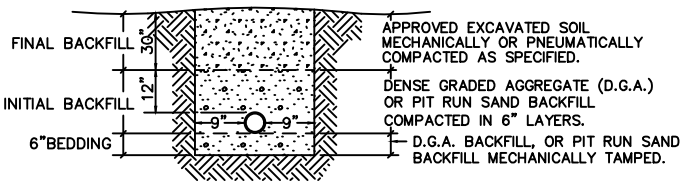
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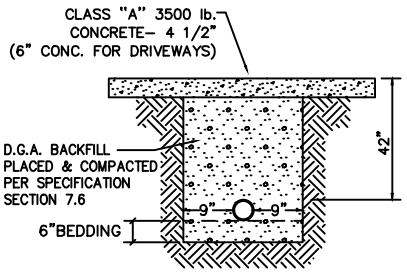
PLAN OF SIDEWALK AND DRIVEWAY–FULL WIDTH

NOTES:
ALL SIDEWALKS SHALL BE 5" THICK. ALL DRIVEWAYS SHALL BE 6" THICK. ALL CONCRETE SHALL BE CLASS "A"(3500 lb. CONCRETE). WOOD FLOAT FINISH FOR ALL WORK. AN APPROVED TYPE OF LIQUID CURING COMPOUND WILL BE PERMITTED. EXPANSION JOINTS ACROSS THE LINE OF THE WALK SHALL BE SPACED NOT MORE THAN 50' APART. EXPANSION JOINTS PARALLEL TO THE LINE OF WALK WILL BE REQUIRED AT THE BACK OF CURB FOR FULL WIDTH WALKS. AT DRIVEWAYS, EXPANSION JOINTS SHALL BE USED ON BOTH SIDES AGAINST THE SIDEWALK. OTHER JOINTS DETERMINED BY THIS LOCATION. AT DRIVEWAYS AND ENTRANCE WALKS ACROSS GRASS PLOTS, AN EXPANSION JOINT SHALL BE USED AT BACK OF CURB. ALL EXPANSION MATERIAL SHALL BE APPROVED NON–EXTRUDING PREFORMED STRIPS 1/2" THICK. BLOCKS SHALL BE MARKED OR SCORED IN SUITABLE SIZED BLOCKS, BUT NOT LESS THAN 4' OR MORE THAN 6' ON A SIDE. CONTRACTION JOINTS (PLANES OF WEAKNESS) SHALL BE AT EVERY THIRD BLOCK AND SHALL BE CUT AT LEAST 1 1/2" IN DEPTH (IN LIEU OF A SCORE). AT BACK OF WALK, TERRACE SHALL BE HAND TRIMMED OR FINISHED TO A 1 TO 1 SLOPE OR FLATTER.

ALL SIDEWALK AND DRIVEWAY CONSTRUCTION IN THE PUBLIC WAYS OF THE CITY OF LOUISVILLE SHALL CONFORM WITH THE REQUIREMENTS ON THIS SHEET UNLESS OTHERWISE APPROVED IN WRITING BY THE CHIEF ENGINEER. MINIMUM WIDTH OF SIDEWALK SHALL BE 5' EXCEPT WITH PERMISSION OF CHIEF ENGINEER.



BACKFILL NOT UNDER PAVEMENT



BACKFILL UNDER SIDEWALK

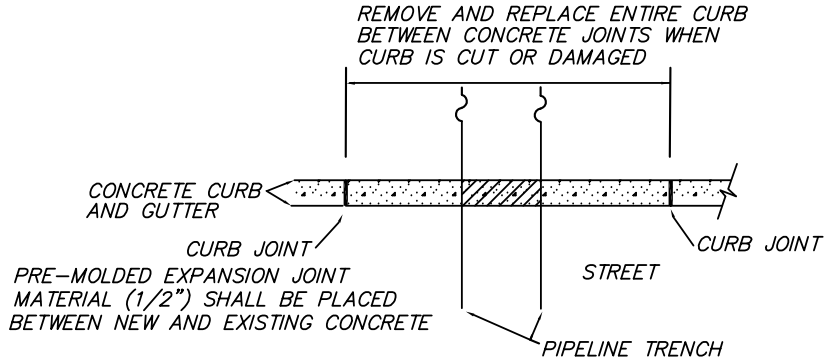
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STANDARD DRAWING

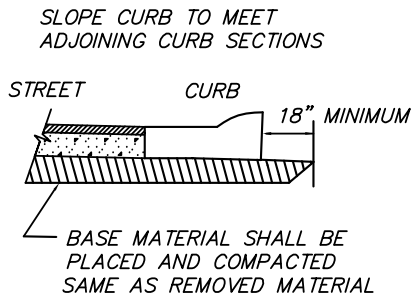
SIDEWALK / BACKFILL DETAIL

DATE	MAY 2021	SCALE	NONE
DRAWING NO.	4400	SHEET	1 OF 1

JEFFERSON - OLDHAM COUNTIES
1215



PLAN VIEW



SECTION

CURB RESTORATION FOR PIPELINE INSTALLATION

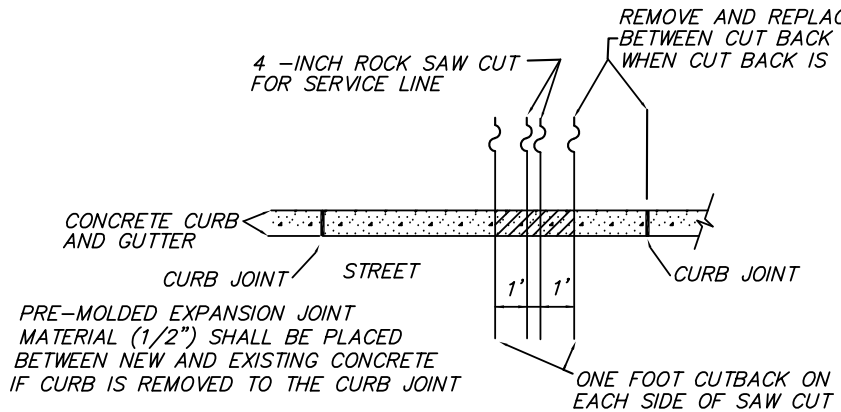
NOTES:

ALL CONCRETE SHALL BE A MINIMUM CLASS "A" (3500 lb. CONCRETE).

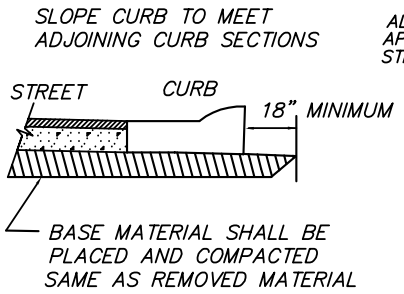
AN APPROVED TYPE OF LIQUID CURING COMPOUND WILL BE REQUIRED ON CONCRETE.

EXPANSION JOINT MATERIAL SHALL BE USED BETWEEN CURB JOINTS AND CURBS AND ADJOINING SIDEWALKS.

ALL EXPANSION MATERIAL SHALL BE APPROVED NON-EXTRUDING PREFORMED STRIPS (1/2" THICK).



PLAN VIEW



SECTION

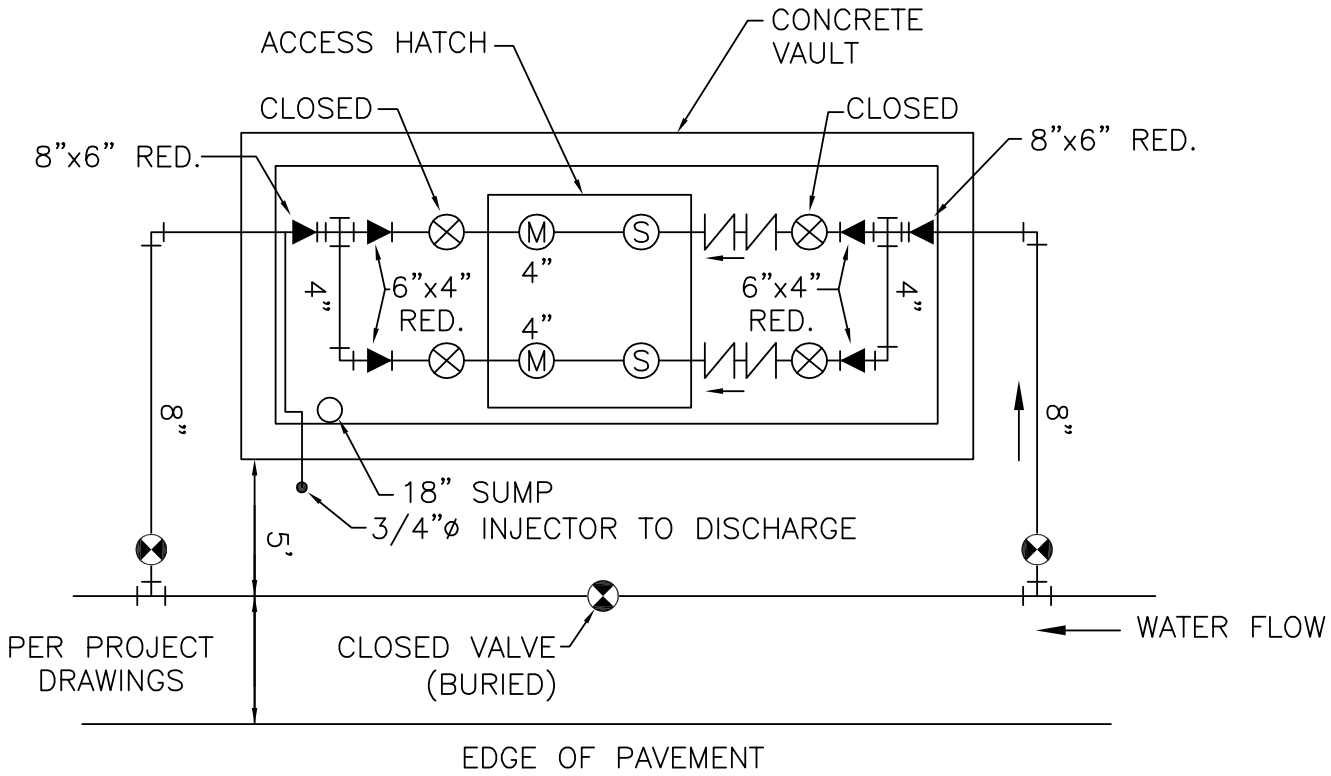
CURB RESTORATION FOR SERVICE LINE INSTALLATION

LOUISVILLE WATER COMPANY
550 S. 3RD STREET • LOUISVILLE, KENTUCKY 40202 • (502) 569-3600
SPENCER W. BRUCE, P.E. - PRESIDENT
TIMOTHY KRAUS, P.E. - VICE PRESIDENT / CHIEF ENGINEER

STANDARD DRAWING

CONCRETE CURB AND GUTTER RESTORATION DETAIL

DATE	AUGUST 2018	SCALE	NONE
DRAWING NO.	4410	SHEET	1 OF 1



DOUBLE CHECK

STRAINER

TURBINE METER

WHEEL GATE VALVE

LINE VALVE

REDUCER

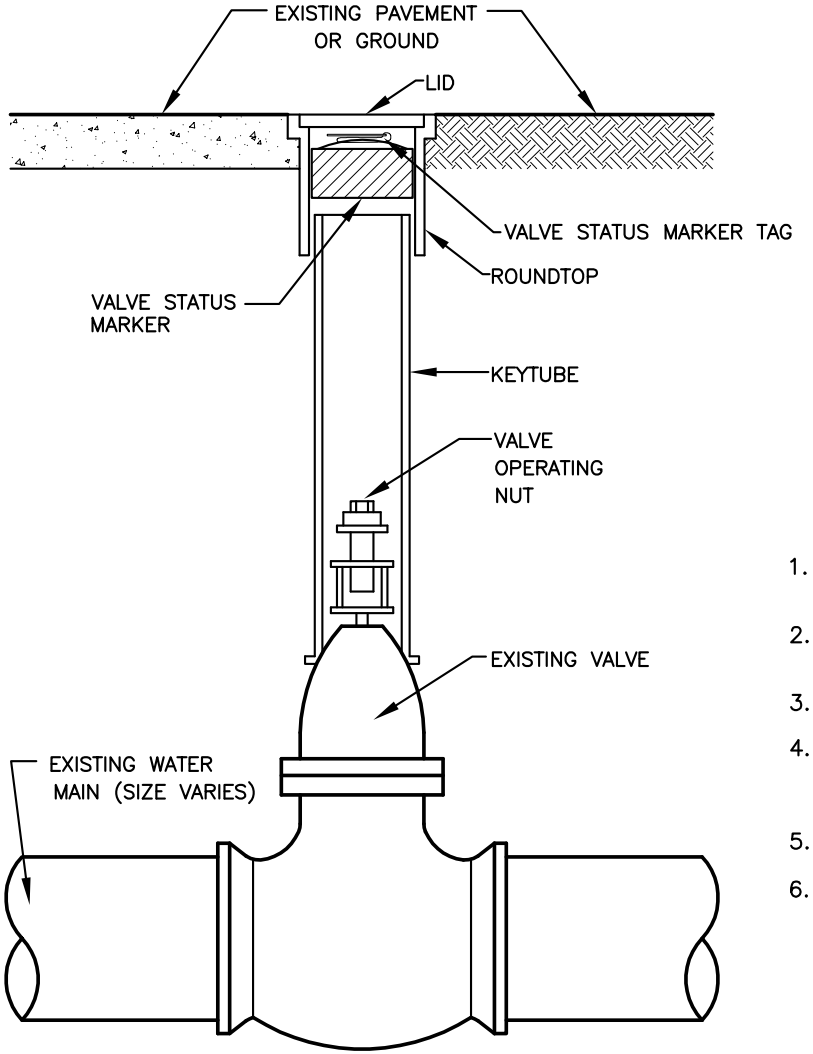
MASTER METER LAYOUT

LOUISVILLE WATER COMPANY
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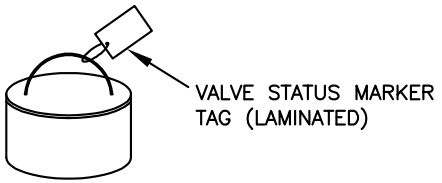
STANDARD DRAWING

TYPICAL MASTER METER DETAIL

DATE	AUGUST 2018	SCALE	NONE
DRAWING NO.	4600	SHEET	1 OF 1



VALVE STATUS MARKER
IN PLACE (TYPICAL)



VALVE STATUS MARKER

TYPICAL MARKER TAG NOTES:

1. PRESSURE PLANE BOUNDARY VALVE – DO NOT OPEN
2. CLOSED VALVE – DO NOT OPEN
3. LEFT HAND OPEN
4. TEMPORARY CONSTRUCTION –CLOSED VALVE: CONTACT LWC RADIO ROOM OR INSPECTION
5. VALVE PARTIAL OPEN # TURNS
6. NAME/DATE/CELL# (MORE DETAIL).

NOTES:

1. CONTACT PROJECT MANAGER OR COMPANY INSPECTOR FOR APPROVAL BEFORE OPERATING ANY VALVE.
2. NOTES ON PLUGS SHALL BE MADE USING A LAMINATED TAG ZIP TIED TO THE STRAP OR BY WRITING DIRECTLY ON TOP OF THE PLUG WITH A PERMANENT INK MARKER.

LOUISVILLE WATER COMPANY
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SPENCER W. BRUCE, P.E. - PRESIDENT
TIMOTHY KRAUS, P.E. - VICE PRESIDENT / CHIEF ENGINEER

STANDARD DRAWING

VALVE STATUS MARKER

DATE	FEBRUARY 2020	SCALE	NONE
DRAWING NO.	5005	SHEET	1 OF 1

Standard Sanitary Sewer Bid Item Descriptions

S BYPASS PUMPING This item shall include all labor, equipment, and materials needed to complete a bypass pumping and/or hauling operation for diversion of sewage during sanitary sewer construction. Examples of such operations when bypass pumping and/or hauling may be necessary is during force main tie-ins, manhole invert reconstruction, insertion of new manholes into existing mains, or other similar construction. There may be more than one bypass pumping/hauling operation on a project. This item shall be paid for each separate bypass pumping/hauling operation occurrence as called out on the plans or directed by the engineer and actually performed. There will be no separate bid items defined for length, duration, or volume of sewage pumped or hauled in each occurrence. If a bypass pumping/hauling operation is called out on the plans; but, conditions are such that the bypass pumping/hauling operation is not needed or utilized, no payment will be made under this item. The contractor shall draw his own conclusions as to what labor, equipment, and materials may be needed for each bypass pumping/hauling occurrence. The contractor should be prepared to handle the maximum volume of the sewer being bypassed, even during a storm event. This item shall not be paid separately, but shall be considered incidental, when bypass pumping and/or hauling is needed during cast-in-place-pipe (CIPP) and/or point repair operations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA).

S CIPP LATERAL SERVICE INVSTIGATION This item shall include all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confided space requirements and perform the identification, assessment and pre-measurement of all existing and abandoned laterals for the placement of Cured-In-Place-Pipe lining. This item shall be in payment for all lateral service investigation for all sewer segments to be lined as a part of this contract. This bid item shall include bypass pumping when required. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be LUMP SUM (LS).

S CIPP LATERAL REINSTATEMENT This item is to pay for installing a Cured-In-Place-Pipe liner in service laterals and service/mainline connections to stabilize structural defects and construction inadequacies. This bid item shall include all labor, equipment, materials and incidentals necessary to perform the service lateral reinstatement in accordance with the plans and specifications. Work under this item shall include bypass pumping, `1`sewer flow control, pre-installation cleaning, sealing connections to existing sewer main, pre- and post- construction CCTV inspection and final testing of the CIPP system. This item shall also include the "top hat" required by the specifications. All CIPP lateral reinstatements shall be paid under this item regardless of the size or length of reinstatement. No separate bid items of varying sizes or length of CIPP lateral reinstatement will be provided in the contract. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be EACH (EA) for each CIPP lateral reinstatement complete and ready for use.

S CIPP LINER This bid Item is to pay for rehabilitation of existing sanitary sewers using the Cured-In-Place-Pipe method. This bid item description applies to all CIPP sizes included in the contract.

All CIPP Liner items of all varying sizes shall include all labor, materials, customer notification, testing, necessary permits, ingress and egress procedures, bypass pumping, pre-construction video, sediment and root removal, dewatering, traffic control, erosion and sediment control, excavation pits, removal and replacement of manhole frames and covers as necessary to facilitate the lining work, sealing at manholes and service connections, clearing and grubbing, pipeline cleaning, re-cleaning and video inspection as many times as necessary, debris collection and disposal, root removal, pre- and post-construction video inspection, all digital inspection footage, final report preparation and approval, the cost of potable water from the Owner, required compliance tests, site restoration, site cleanup, sealing of liner at manholes, acceptance testing and all other rehabilitation work and incidentals not included under other pay items necessary to complete the rehabilitation per the plans and specifications. There will be no separate payment for acceptance testing of the lined pipe; but shall be considered incidental to this item. Pay under this item shall be by each size bid in the contract. Pay measurement shall be from center of manhole to center of manhole. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S CIPP PROTRUDING LATERAL REMOVAL This item includes all equipment, materials, labor and incidentals necessary to enter the sewer in compliance with all safety/confined space requirements, remove a sufficient amount of the protruding tap to insure a proper and safe Cured-In-Place-Pipe lining insertion and perform pre-installation CCTV. This bid item shall include bypass pumping when required. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. Payment for this item shall be EACH (EA) for each protruding lateral removed.

S CONCRETE PIPE ANCHOR This item shall be constructed on the sewer pipe at the locations shown on the plans in accordance with sanitary sewer specifications and standard drawings. Payment for concrete anchors will be made at the contract unit price each in place complete and ready for use. Each concrete anchor of sewer pipe or force main shall be paid under one bid item per contract regardless of the sizes of carrier pipe being anchored in the contract. No separate bid items will be established for size variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S DIRECTIONAL BORE Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of force main or gravity sewer under streets, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S ENCASEMENT CONCRETE Includes all labor, equipment, excavation, concrete, reinforcing

steel, backfill, restoration, and etc., to construct the concrete encasement of the sewer or force main as shown on the plans, and in accordance with the specifications and standard drawings. Payment under this item shall be in addition to the carrier pipe as paid under separate bid items. Carrier pipe is not included in this bid item. Any and all concrete encasement shall be paid under one bid item included in the contract regardless of the size of the carrier pipe or the volume of concrete or steel reinforcement as specified in the plans and specifications. No separate bid items will be established for size variations. Measurement of pay quantity shall be from end of concrete to end of concrete. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF) when complete.

S ENCASEMENT STEEL BORED This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to bore and install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The sizes of encasement to be paid under the size ranges specified in the bid items shall be as follows:

Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S ENCASEMENT STEEL OPEN CUT This item shall include the steel encasement pipe size as specified on the plans and in the specifications, casing spacers, end seals, labor, and equipment to open cut install the encasement in accordance with the plans and specifications, complete and ready for use. The size shall be the measured internal diameter of the encasement pipe. The size encasement to be paid under the size ranges specified in the bid items shall be as follows:

Range 1 = All encasement sizes greater than 2 inches to and including 6 inches
Range 2 = All encasement sizes greater than 6 inches to and including 10 inches
Range 3 = All encasement sizes greater than 10 inches to and including 14 inches
Range 4 = All encasement sizes greater than 14 inches to and including 18 inches
Range 5 = All encasement sizes greater than 18 inches to and including 24 inches
Range 6 = All encasement sizes greater than 24 inches

(Encasement sizes of 2 inches internal diameter or less shall not be paid separately; but, shall be considered incidental to the carrier pipe.) Payment under this bid item shall not include the carrier pipe. Carrier pipe shall be paid under a separate bid item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S FORCE MAIN This description shall apply to all PVC and ductile iron and polyethylene/plastic pipe bid items of every size and type, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, bends, tees, reducers, plugs, and caps), tracing wire with test boxes (if required by specification), polyethylene wrap (when specified), labor, equipment, excavation, bedding, restoration, testing, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. No additional payment will be made for rock excavation. This bid item includes material and placement of flowable fill under existing and proposed pavement, and wherever else specified on the plans or in the specifications. This item shall also include pipe anchors on polyethylene pipe runs as shown on the plans or required by the specifications to prevent the creep or contraction of the pipe. Measurement of quantities under this item shall be through fittings, encasements, and directional bores (only when a separate carrier pipe is specified within the directional bore pipe). No separate payment will be made under pipe items when the directional bore pipe is the carrier pipe. Measurements shall be further defined to be to the center of tie-in where new pipe contacts existing pipe at the center of connecting fittings, to the outside face of vault or structure walls, or to the point of main termination at dead ends. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S FORCE MAIN AIR RLS/VAC VLV This bid item description shall apply to all force main air release/vacuum valve installations of every size except those defined as "Special".
This item shall include the air release/vacuum valve, main to valve connecting line or piping, manhole/vault/structure, access casting or doors, tapping the main, labor, equipment, excavation, proper backfill and restoration required to install the air release/vacuum valve at the location shown on the plans or as directed in accordance with the specifications and standard drawings complete and ready for use. All air release/vacuum valves on a project shall be paid under one bid item regardless of size. No separate pay items will be established for size variations. Only in the case of the uniqueness of a particular air release/vacuum valve would a separate bid item be established. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S FORCE MAIN DIRECTIONAL BORE Payment under this item is made whenever the plans or specifications specifically show directional boring is to be utilized in order to minimize the impact of open cut for the installation of sewer or force main under streets, buildings, creeks, and etc. Payment under this item shall include the specified bore pipe, labor, and equipment. No separate payment shall be made for bore pipe installed in the bore whether used as a carrier pipe or an encasement of a separate carrier pipe. This item shall also include pipe anchors at each end of the bore when specified to prevent the creep or contraction of the bore pipe. Carrier pipe installed within a bore pipe shall be paid separately under pipe items. Payment under this item shall not be size specific and no separate bid items will be established for size variations. The bore pipe sizes to be included under this item shall be as shown on the plans and/or in the specifications. Any and all directional bores in each contract shall be paid under one directional bore bid item included in the contract regardless of size. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S FORCE MAIN POINT RELOCATE This item is intended for payment for horizontal and/or vertical relocation of a short length of an existing main at the locations shown on the plans. This bid item is to be used to relocate an existing force main at point locations such as to clear a conflict at a

proposed drainage structure, pipe or any other similar short relocation situation, and where the existing pipe material is to be reused. The contractor shall provide any additional pipe or fitting material needed to complete the work as shown on the plans and specifications. The materials provided shall be of the same type and specification as those that exist. Substitution of alternative materials shall be approved by the engineer in advance on a case by case basis. New polyethylene wrap is to be provided (if wrap exists or is specified in the specifications to be used). If it is necessary that the pipe be disassembled for relay, payment under this item shall also include replacement of joint gaskets as needed. Bedding and backfill shall be provided and performed the same as with any other pipe installation as detailed in the plans and specifications. Payment under this item shall be for each location requiring an existing main to be relocated horizontally or vertically regardless of pipe size or relocation length. No separate pay items will be established for pipe size variations or relocation segment length variations. Force Main Relocate shall not be paid on a linear feet basis; but shall be shall be paid EACH (EA) at each location when complete and placed in service. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced.

S FORCE MAIN TAP SLEVE/VALVE RANGE 1 OR 2 This item shall include the specified tapping sleeve, valve, valve box, concrete pad around valve box (when required in specifications or plans), labor, and equipment to install the specified tapping sleeve and valve, complete and ready for use in accordance with the plans and specifications. The size shall be the measured internal diameter of the live pipe to be tapped. The size tapping sleeve and valve to be paid under sizes 1 or 2 shall be as follows:

Range 1 = All live tapped main sizes up to and including 8 inches
Range 2 = All live tapped main sizes greater than 8 inches

Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S FORCE MAIN TIE-IN This bid description shall be used for all force main tie-in bid items of every size except those defined as "Special". This item includes all labor, equipment, excavation, fittings, sleeves, reducers, couplings, blocking, anchoring, restoration, testing and backfill required to make the force main tie-in as shown on the plans and in accordance with the specifications complete and ready for use. This bid item shall include purge and sanitary disposal of any sewage from any abandoned segments of force main. Pipe for tie-ins shall be paid under separate bid items. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S FORCE MAIN VALVE This description shall apply to all force main valves of every size required in the plans and specifications, except those bid items defined as "Special". Payment under this description is to be for gate or butterfly force main valves being installed with new force main. This item includes the valve as specified in the plans and specifications, polyethylene wrap (if required by specification), labor, equipment, excavation, anchoring (if any), valve box and valve stem extensions, backfill, concrete pad around valve box (if required by specification), restoration, testing, and etc., required to install the specified valve at the location shown on the plans in accordance with the specifications and standard drawings complete and ready for use. If required on plans and/or proposed adjoining DIP is restrained, force main valves shall be restrained. Force main valve restraint shall be considered incidental to the force main valve and adjoining pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be

referenced. This item shall be paid EACH (EA) when complete.

S FORCE MAIN VALVE BOX ADJUST Includes all labor, equipment, valve box and valve stem extensions (if required), excavation, backfill, concrete pad around valve box (when specified in specifications or plans), restoration, and etc., to adjust the top of the force main valve box to finished grade complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LATERAL CLEANOUT This item shall be for payment for installation of a cleanout in a service lateral line. This item shall include furnishing and installation of a tee, vertical pipe of whatever length required, and threaded cap. The cleanout shall extend from the lateral to final grade elevation. The size of the cleanout shall be equivalent to the size of the lateral. The cleanout materials shall meet the same specification as those for the lateral. The cleanout shall be installed at the locations shown on the plans or as directed by the engineer. Only one pay item shall be established for cleanout installation. No separate pay items shall be established for size or height variances. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LATERAL LOCATE This bid item is to pay for all labor, equipment, and materials needed in locating an existing sanitary sewer service lateral for tie-in of the lateral to new mainline sewers and/or for the relocation of a lateral. This bid item shall be inclusive of any and all methods and efforts required to locate the lateral for tie-in or relocation of the lateral. Locating methods to be included under this items shall include, but are not limited to, those efforts employing the use of video cameras from within an existing sanitary sewer main or lateral, electronic locating beacons and/or tracers inserted into the sanitary sewer main or lateral, careful excavation as a separate operation from mainline sewer or lateral excavation, the use of dyes to trace the flow of a lateral, or any combination of methods required to accurately locate the lateral. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA).

S LATERAL LONG SIDE This bid item description shall apply to all service lateral installations of every size up to and including 6 inch internal diameter, except those lateral bid items defined as "Special". This item includes the specified piping material, main tap, bends, clean outs, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for service lateral installations where the ends of the lateral connection are on opposite sides of the public roadway. The new lateral must cross the centerline of the public roadway to qualify for payment as a long side lateral. The length of the service lateral is not to be specified. Payment under this item shall not be restricted by a minimum or maximum length. The contractor shall draw his own conclusions as to the length of piping that may be needed. Payment under this item shall include boring, jacking, or excavating across the public roadway for placement. Placement of a service lateral across a private residential or commercial entrance alone shall not be reason to make payment under this item. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LATERAL SHORT SIDE This bid item description shall apply to all service lateral installations of every size up to and including 6 inch, except those lateral bid items defined as "Special". This item includes the specified piping material, main tap tee, bends, clean outs, labor, equipment, excavation, backfill, testing, and restoration, at the locations shown on the plans or as directed, in accordance with the specifications and standard drawings, complete and ready for use. This bid item is to pay for lateral installations where both ends of the lateral connection are on the same side of the public roadway, or when an existing lateral crossing a public roadway will remain and is being extended, reconnected, or relocated with all work on one side of the public roadway centerline as shown on the plans. The length of the service lateral is not to be specified and shall not be restricted to any minimum or maximum length. Payment shall be made under this item even if the lateral crosses a private residential or commercial entrance; but, not a public roadway. Private or commercial entrances shall not be considered a public roadway in defining payment under this item. The contractor shall draw his own conclusions as to the length of piping that may be needed. No additional payment will be made for rock excavation or for bedding required in rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S LINE MARKER This item is for payment for furnishing and installing a sewer utility line marker as specified by the utility owner specifications and plans. A line marker may consist of a post or monument of whatever materials specified and shall include markings and/or signage on same as specified by plans or specifications. This item shall include all labor, equipment, and materials needed for complete installation of the marker. This item shall be paid EACH (EA) when complete.

S MANHOLE Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup in accordance with the specifications and standard drawings. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE ABANDON/REMOVE Payment under this item is for the partial removal and/or filling of any sanitary sewer manhole regardless of size or depth that no longer serves any purpose. Payment shall be made regardless of whether the manhole is or is not in conflict with other work. Any manhole requiring partial removal, but not total removal, in order to clear a conflict with other work shall be paid under this item. All manholes partially removed shall be removed to a point at least one foot below final grade, one foot below roadway subgrade, or one foot clear of any other underground infrastructure, whichever is lowest. If partial removal of an abandoned manhole is elected by the contractor, the remaining manhole structure shall be refilled with flowable fill. Payment for disposal of a sanitary sewer manhole will be made under this item only. Please refer to the Utility Company's

Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE ADJUST TO GRADE Payment under this item is for the adjustment of sanitary sewer casting elevation on all sizes of existing sanitary manholes. This work shall be performed in accordance with the sanitary sewer specifications. Payment shall be made under this bid item regardless of the amount of adjustment necessary to a sanitary sewer manhole casting or diameter of the manhole. Work under this pay item may be as simple as placing a bed of mortar under a casting; but, shall also be inclusive of installation of adjusting rings, and /or addition, removal, or replacement of barrel sections. The existing casting is to be reused unless a new casting is specified on the plans. New casting, when specified, shall be paid as a separate bid item. Anchoring of the casting shall be incidental to this item. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE CASTING STANDARD Payment under this bid items is for furnishing of a new standard traffic baring casting for sanitary manholes meeting the requirements of the sanitary sewer specifications and standard drawings. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when installed.

S MANHOLE CASTING WATERTIGHT Payment under this bid item is for furnishing of a new watertight traffic baring casting for sanitary manholes meeting the requirements of the sanitary sewer specifications and standard drawings. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when installed.

S MANHOLE RECONSTRUCT INVERT This bid item is to pay for all labor, equipment, and material for rework of the manhole bench to redirect or eliminate flow, such as when the flow of a pipe or pipes are being removed or redirected. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in elimination or redirect of flow. This item shall also include providing and placement of a rubber seal or boot as required by utility specification, standard drawing or plan. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. No payment shall be made under this bid when MANHOLE TAP EXISTING, or MANHOLE TAP EXISTING ADD DROP are being paid at the same location, as this type of work is included in those items. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE TAP EXISTING This bid item is to pay for all labor, equipment, and material for coring one opening in an existing manhole base, addition of a rubber seal as specified, and rework of the manhole bench to direct the additional pipe flow. The bid item shall be paid for each core opening added to a single manhole. This bid item shall also include any rework of the existing manhole bench due to the elimination of other existing pipes and flow. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in the addition, elimination, or redirect of flow. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the

specifications, standard drawings, and plans. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE TAP EXISTING ADD DROP This bid item is to pay for all labor, equipment, and material for coring one opening in an existing manhole base, addition of a rubber seal as specified, addition of a vertical drop pipe to the outside of the manhole, placement of reinforcing steel and concrete to encase vertical pipe, and rework of the manhole bench to direct the additional pipe flow. The bid item shall be paid for each drop added to a single manhole. This bid item shall also include any rework of the existing manhole bench due to the elimination of other existing pipes and flow. This work will be as specified in the plans, specifications, or directed by the engineer. This work may consist of, but is not limited to, removal of concrete and/or placement of concrete in the addition, elimination, or redirect of flow. The contractor shall draw his own conclusions as to the effort and scope of work needed to comply with the specifications, standard drawings, and plans. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE WITH DROP Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole with drop. Payment for drop manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Drop manholes shall include concrete base, barrel sections, drop materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE WITH LINING Payment under this item is for the installation of new 4 foot interior diameter sanitary sewer manhole with corrosion resistant lining. Payment for manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Manholes shall include concrete base, barrel sections, cone section or slab top, steps, lining, excavation, backfilling, air testing, restoration, and cleanup in accordance with the standard drawings. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). All materials, except casting, shall be new and unused. An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S MANHOLE WITH TRAP Payment under this item is for the installation of a new manhole with

trap. Payment for trap manholes will be made at the contract unit price each in place complete and ready for use at the locations shown on plans in accordance with specifications and standard drawings. Trap manholes shall include concrete base, manhole structure and trap materials, cone section or slab top, steps, excavation, backfilling, air testing, restoration, and cleanup. All materials, except casting, shall be new and unused. Payment shall be made under this item regardless of whether the base is to be precast or cast-in-place (doghouse). An existing casting from an existing abandoned or removed manhole is to be reused and shall be considered incidental to this item. When a new casting is specified, or an existing casting is unavailable, it shall be paid as a separate bid item. Anchoring of casting, new or used, shall be considered incidental to this bid item. No additional compensation will be paid for manhole height variations. No additional payment will be made for rock excavation. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S PIPE This description shall apply to all PVC and ductile iron gravity sewer pipe bid items of every size and type 8 inches internal diameter and larger, except those bid items defined as "Special". This item includes the pipe specified by the plans and specifications, all fittings (including, but not limited to, tap tees and couplings for joining to existing similar or dissimilar pipes), polyethylene wrap (if required by specification), labor, equipment, excavation, bedding, restoration, pressure or vacuum testing, temporary testing materials, video inspection, backfill, and etc., required to install the specified new pipe and new fittings at the locations shown on the plans, or as directed, in accordance with the specifications and standard drawings complete and ready for use. This bid item shall include material and placement of flowable fill under existing and proposed pavement, and wherever specified on the plans or in the specifications. No additional payment will be made for rock excavation. Measurement of quantities under this item shall be through fittings and encasements to a point at the outside face of manhole barrels, or to the point of main termination at dead ends or lamp holes. Carrier pipe placed within an encasement shall be paid under this item and shall include casing spacers and end seals. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S PIPE POINT REPAIR This item is to be used to pay for repair of short lengths of existing sanitary sewer pipe that, through prior video inspection or other means, are known to have pre- existing failure. Pipe Point Repair may be needed in preparation for installation of cured-in-place-pipe (CIPP) lining or other instances where failure is known and repair is prudent. The size of pipe shall not be defined in separate bid items. All diameter sizes of point repair shall be paid under this one item. The materials to be used to make the repair shall be as defined on the plans or in the specifications. This bid item shall include all excavation, pipe materials, joining materials to connect old and new pipe, bedding, and backfill to complete the repair at the locations shown on the plans or as directed by the engineer, complete and ready for use. This bid item shall include bypass pumping when required. Measurement shall be from contact point to contact point of old and new pipe. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid LINEAR FEET (LF).

S PUMP STATION This item is for payment for installation of sanitary pump stations including above or below ground structure for housing of the pumps. This item shall include all pumps, piping, fittings, valves, electrical components, building materials, concrete, any other appurtenances, labor, equipment, excavation, and backfill, to complete the pump station installation as required by the plans, standard drawings, and specifications, complete and ready for use. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall

be referenced. This item shall be paid LUMP SUM (LS) for each when complete.

S STRUCTURE ABANDON This item is to be used to pay for abandonment of larger above or below ground sewer structures such as air release/vacuum valve vaults, pump stations, tanks, etc. Payment under this time shall not be limited to size or scope; however structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to sewer construction, (i.e., abandonment of standard air release/vacuum valves up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted fill or flowable fill for abandonment of the structure in place and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

S STRUCTURE REMOVAL This item is to be used to pay for removal of larger above or below ground sewer structures such as air release/vacuum valve vaults, pump stations, tanks, and etc. Payment under this time shall not be limited to size or scope; however, structures with connecting pipes of 2 inches or less shall not be paid under this item; but, shall be considered incidental to sewer construction, (i.e., removal of standard air release/vacuum valves and their structure up to and including 2 inches would not be paid under this item). Payment under this item shall include all labor, equipment, and compacted backfill for removal of the structure and restoration complete. No separate bid items will be established for size or structure variations. Please refer to the Utility Company's Specifications. If the Company does not have specifications, KYTC's Specifications shall be referenced. This item shall be paid EACH (EA) when complete.

MSD
Metropolitan Sewer District

STANDARD SPECIFICATIONS

LOUISVILLE AND JEFFERSON COUNTY
METROPOLITAN SEWER DISTRICT
700 WEST LIBERTY STREET
LOUISVILLE, KENTUCKY 40203-1911

MSD STANDARD SPECIFICATIONS

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SECTION 1

MSD STANDARD SPECIFICATIONS

GENERAL PROVISIONS

1.1. DESCRIPTION OF WORK

All labor, materials, equipment, tools and services required for the furnishing, installation, construction, video recording**,** and testing of all sanitary sewer or storm drainage facilities required for this Project shall be furnished, installed, constructed, recorded and tested in compliance with the Contract. These Specifications cover the materials to be utilized in construction, and the installation and construction standards to be required of the Contractor.

1.2. VIDEO RECORDING

Prior to the start of construction, the Contractor shall provide one original walking, narrative continuous **digital-type** video, a minimum 2 to 3 minutes per 100 feet of alignment, of the complete Project as directed by MSD's Construction Inspector. The tape counter value should be keyed to each manhole, drainage structure, or building address, labeled accordingly.

1.3. UNDERGROUND STRUCTURES AND UTILITIES

Every effort will be made to show on the Plans known utilities, structures, drains, etc., adjacent to or to be encountered by construction. The locations shown on the Plans are taken from existing records and are believed to be the best information available. However, it is expected that there may be some discrepancies or omissions in the locations and quantities shown. The Contractor shall verify the locations of all underground structures and utilities in critical areas or as directed by MSD prior to the start of construction. The Contractor shall avoid damaging the existing utilities while verifying their locations. Such information is furnished subject to the limitations set out in MSD's Information to Bidders.

The Contractor shall notify the Kentucky **811 Before Your Dig (BUD)** at 1-800-752-6007, 48 hours in advance of any construction. The Contractor shall notify MSD's Base One (540-6812) prior to any personnel being allowed to enter into an MSD active manhole or sewer. All precautions as delineated in the MSD Health & Safety Rule Book shall be followed.

The Contractor shall be responsible for protection of any structure or utility encountered on the site. The cost of repair, removal, replacement, relocation, etc. of such facilities arising because of carelessnes**s** or negligence on the part of the Contractor shall be the Contractor's responsibility.

The Contractor shall make every effort to protect private structures and utility service connections whether in right-of-way/easement or on private property, including sewer facilities.

They may not be shown on the Plans. When these facilities are disturbed or damaged by the Work, the Contractor shall make necessary repairs to the facilities for continuous service prior to the close of the work day, at the Contractor's expense.

Should uncharted or incorrectly charted piping or other utilities be encountered within utility easements or the public rights-of-way, the Contractor shall immediately contact MSD.

Suitable arrangements will be made with the proper agency by MSD and the responsibility for the cost will be determined by MSD. The Contractor shall cooperate and coordinate with the utility companies to keep respective services and facilities in operation. Coordination is the responsibility of the Contractor.

1.4. WORK AROUND LOUISVILLE GAS AND ELECTRIC COMPANY FACILITIES

1.4.1. General. The Louisville Gas and Electric Company shall be given 5 working days advance notice before Work is begun. When revamping of facilities will be required, at least 2 weeks advance notice shall be given the Louisville Gas and Electric Company to allow sufficient time for engineering Work to be completed. On major modifications or relocations, longer notice will be necessary. Coordination is the responsibility of the Contractor. The Contractor shall cooperate and coordinate with the utility companies to keep respective services and facilities in operation.

1.4.2. Electric Facilities

Blasting shall not be done under or near an electric line unless a representative of the Louisville Gas and Electric Company is present.

The Contractor shall not utilize utility poles for physical support of any of his operations. Cables, ropes or support systems shall not be attached to utility poles.

If damage to electric lines should occur, the Contractor shall notify the Louisville Gas and Electric Company immediately by calling 627-3400, Electric Trouble Department.

1.4.3. Gas Facilities

No blasting shall be done within 10 feet of a gas main unless a representative of the Louisville Gas and Electric Company is present.

Special care should be taken not to break or damage gas mains or service lines during construction. If damage does occur to gas mains or service lines the Contractor is responsible for coordinating all repairs and notifying affected property owners before and after repairs.

Damage to a **LG&E facility** by the Contractor shall immediately be reported to Louisville Gas and Electric Company and shall be repaired at the expense of the Contractor. Such repairs shall be limited to that portion of the service line which is in the public right-of-way or

easement.
Extra precaution shall be taken during construction near high pressure mains. If it becomes necessary to expose the Louisville Gas and Electric Company's pipelines as a precautionary measure, advise the Company by calling 589-5511, Gas Trouble Clerk (24 hours).

1.5. GEOTECHNICAL INFORMATION

Borings and soundings may or may not be shown on the Plans. If borings and soundings are not shown, and the Contractor desires to have positive soil information, the Contractor shall make such borings and soundings at the Contractor's expense. Prior to making borings or soundings, the Contractor shall receive approval from the property owner, or if within the road rights-of-way, from the appropriate agency and shall notify MSD's Customer Service of such activity. MSD does not guarantee that the boring information shown in the Bid Documents is accurate or correct. Such information is furnished subject to the limitations set out in the Contract. ***See Chapter 17 of MSD's Design Manual for clarification.***

1.6. SURVEYING AND STAKING

1.6.1. General. The responsibilities for the surveying and staking necessary for the construction of the Project shall be as defined herein. MSD will provide all surveying necessary to establish the horizontal and vertical control coordinates, including the setting of monuments meeting MSD standards, and benchmarks for such control on all MSD projects. In all other cases, the Developer's Engineer shall provide for such control on plans.

All surveying control points ***on MSD projects*** will be furnished by MSD one time only unless otherwise provided in the Contract. The Contractor shall be responsible for protecting and preserving all such surveys provided by MSD, including monuments, benchmarks, survey stakes, reference points, or other survey markers and shall be required to bear the expense of replacing or resetting same if damaged or destroyed. Should ***a control point need to be replaced or reset, the Contractor shall pay the Design Engineering firm at their approved hourly rate to perform this work.***

The Contractor will provide all construction survey and staking necessary for layout and construction from the control points. The Contractor, through the field inspector, shall give the MSD **Project Manager** two weeks advance notice prior to the start of survey. The Contractor shall provide temporary benchmarks within 300 linear feet of all proposed structures.

Where new construction connects to existing facilities, it shall be the Contractor's responsibility to check and determine the exact location of the existing facilities. Whenever field conditions are found to vary from those indicated on the Plans, the Contractor shall notify MSD immediately. MSD will investigate such conditions and, if warranted, make revisions or adjustments. The Contractor shall not proceed with that portion of the Work until the investigation is complete and red-lined Plans have been approved by MSD.

1.6.2. Construction Staking. Offset hubs and stakes, one short (12 inch) hub and one tall (36 inch) stake at each location, shall be set at all 100-foot stations for gravity flow sanitary and storm drainage facilities, and at 200-foot stations for all force mains. In paved areas, PK nails and paint shall be used. In addition, offset hubs and stakes shall be provided at line intersections, appurtenances, points where the alignment or grade changes, and a minimum of two offset hubs shall be provided at ***all*** structure corners.

The stakes shall be strong, sound, straight, and free from knots, dressed on two sides, and pointed. Hubs shall be strong, sound, undressed oak lumber, and pointed. Stakes shall be a minimum of 3/4 inch x 1 1/2 inches when dressed, and hubs shall be a minimum of 2 inches square and 12 inches long. Stake widths, and lengths of both stakes and hubs may vary if so ordered by MSD.

1.6.3. Checking Line and Grade. If requested, the Contractor shall provide MSD with a copy of field book notes and complete cut sheets showing stations, grade stake elevations, required slopes, invert elevations and cut distances for sewer main, structures and pipe stubs. **Additionally, the contractor's surveyor will provide support to MSD when checking and verification is requested.** All property service connections (PSC) and pipe stubs with lengths in excess of 5 feet shall have elevations and stations referenced by the Contractor's Professional Land Surveyor. All stubs ends shall be referenced before being covered.

If a laser beam is used to maintain the line and grade, the Contractor shall have it calibrated per manufacturer's recommendation not less than once per year. Calibration seal shall be kept with the instrument on site for review by MSD representative as requested. The Contractor shall use a blower or other acceptable device to vent enclosed conduits as required to prevent refraction.

1.6.4. Final Record Drawings. **On MSD projects, the Final Record Drawings will be prepared by MSD, or the project design engineer/consultant, based on record information provided to MSD by the contractor. At the completion of the project, the contractor will be responsible for providing MSD a set of "Red Line Drawings" and "As-Built Survey Information" as indicated below. The information will be incorporated into the bid plans to become the Final Record Drawings.**

Note - On private development projects, the project design engineer/consultant will be responsible for preparing the Final Record Drawings, subject to the same requirements as a MSD project.

1.6.4.1 Red-Line Drawings

The Contractor shall keep a record of all deviations in location or elevation of any installation from that shown on the Plans. Records shall also be kept of any significant changes in installations from shop drawings. The information will be compiled in a red-lined format on the shop drawings and a copy of the initial bid plan set. Plans shall be available to MSD at any time upon request during construction. No such deviations from the Plans or approved shop drawings shall be made without prior approval by MSD. Should the as-built drawings reflect

that unapproved deviations during the construction process have taken place, MSD shall be notified in writing. If it is determined by MSD that said deviations compromise the intent of the design, the contractor shall be held responsible for reconstruction. **At the completion of the project the as-built information is submitted to MSD. The information should be recorded in a clear and concise format, allowing for an easy transfer.**

1.6.4.2 As-Built Survey Information

The Contractor's Licensed Professional Land Surveyor **will be responsible for"as-builting" the items listed below. The survey information will be compiled in an electronic fashion, compatible with the .dwg format, and submitted to MSD. Location and elevations shall be tied to the project survey control.**

The following construction items, at a minimum, should be reviewed and verified to produce the Final Record Drawings:

- **Alignment Changes**
  - **Changes in Location for:**
    - **Manholes**
    - **Catch Basins or Surface Inlets**
    - **Headwalls**
    - **Retaining Walls**
    - **Slope Protection**
    - **Channel Linings**
    - **Pump Station Wet Wells**
    - **Pump Station Valve Vaults**
    - **Air Release Valves**
    - **Property Service Cleanouts**
  - **Changes in Elevation for:**
    - **Nearest hundredth**
      - **Inverts**
      - **Rims**
      - **Surface Inlet Grates**
      - **Paved Ditches**
    - **Nearest tenth**
      - **Turf Ditches**
      - **Miscellaneous Structures**
- **Structure Changes**
  - **General**

- **Manhole collar sizes**
- **All revisions in pipe size, lengths, slopes, and angles**
- **Identify pipe material if different from the plans**

➢ **For Pump Stations and Wastewater Treatment Plants:**

- **All revisions in pipe sizes**
- **All revisions to electrical controls**
- **All revisions to exhaust and ventilation systems**
- **Pump modifications**
- **Changes in elevation for inverts and level controls**
- **Equipment layout modifications**
- **Building modifications**

❖ **Miscellaneous Changes:**

➢ For Property Service Connections

- Size
- Length
- Depth at R/W or Property Line
- Sewer Station
- End Location, if the PSC is not perpendicular to the sewer

➢ For changes in Lot or Unit Designations

- Lot Numbers
- Tract Numbers
- Apartment Unit Designations
- Condominium Unit Designations
- Patio Home Designations

1.6.4.3 Process

Proposed information shall under no circumstances be erased from the original Plans. Plan corrections must be made to ensure a quality image. No red line markings will be accepted for final record drawings. A check mark should be placed beside the original Plan information which has been verified to be correct as constructed. Any unverified data shall show +/- thereby indicating that information has not been verified.

The following stamp will be inserted into each plan sheet after all as-built information has been added.

Final Record Drawing
By_____**Date**_____
Contractor_____
Record Drawings have been prepared based on information provided by the Contractor in accordance with the specifications.

1.7. MAINTENANCE AND CONTROL OF TRAFFIC

1.7.1. Permits and Notification. MSD will be responsible for obtaining the necessary ***Louisville Metro Government***, and/or State encroachment permits for work in public rights-of-way as applicable. The Contractor shall obtain all other permits. The Contractor is required to abide by all the conditions of the encroachment permit(s) and they shall be made a part of this Contract.

The Contractor shall notify the ***Louisville Metro Department of*** Public Works or the Kentucky Transportation Cabinet, where applicable, in writing and with a copy to MSD, at least one week prior to beginning any work in the public rights-of-way. Maintenance of traffic (or traffic control) plan shall be supplied by the Contractor, and approved by the appropriate governing agency. The Contractor shall obtain permits on private development projects, stormwater, and non-MSD sanitary sewer facilities.

1.7.2. Traffic Control. At a minimum the Contractor shall provide and maintain traffic control signs, barricades, barriers, warning lights and flaggers as necessary to meet the standards for traffic control, as outlined in the Manual on Uniform Traffic Control Devices, latest revision, or as noted in the permits and the Contract. Additional traffic control measures, including signs, shall be furnished at no additional cost to MSD.

1.7.3. Maintenance of Traffic. Unless otherwise shown in the Bid Documents, all roads and streets, affected by construction, shall be kept clean from mud or debris and open to all traffic by the Contractor. Where so provided on the Plans or as directed by MSD, the Contractor may route the traffic over approved detour routes. The Contractor shall keep the portion of the Project being used by public traffic in such condition that traffic will be adequately and safely accommodated.

The Contractor must maintain proper, sufficient, and continuous ingress and egress to private properties and access to buildings unless otherwise shown in the Contract or where temporary interference to access is authorized by MSD. Provisions shall be made for owners and occupants to reach their premises and for emergency vehicles to have access at all times. The Contractor shall provide access to private properties by bridging, use of steel plates, or other means acceptable to MSD. Where temporary interference is

authorized, it shall be interrupted only for such time as necessary to provide temporary substitutes for surfaces disturbed by the construction and to restore street and sidewalk surfaces after the completion of the Work. The Contractor is to notify each day, all community services which includes contacting TARC, School Districts, U.S. Mail, and central Dispatch of the local Fire Marshall by facsimile when performing Work on the pavement that may in any way impede traffic. When fire hydrants are taken out of service, a facsimile of the location of the fire hydrant must be sent to the local Fire Marshall, Central Dispatch, and a copy given to the inspector on site prior to this occurring.

1.8. AIR POLLUTION CONTROL

1.8.1. General. The Contractor shall perform construction activities in such manner so as to prevent air pollution from occurring as the result of drilling, blasting, grading, hauling, or any other construction activities of any kind in conformity with applicable provisions of the Air Pollution Control Regulations enforced by the ***Louisville Metro*** Air Pollution Control Board.

1.8.2. Open Burning. Open burning will not be permitted on the construction site.

1.8.3. Dust Control. Water or approved chemical additives shall be applied on roadways, stockpiles, graded areas, etc. to prevent and abate fugitive dust resulting from the Contractor's operations. Paved streets and roads shall be kept clean of all earth materials deposited by the Contractor's operations. When water is used for cleaning operations, all affected inlets will be protected to prevent mud, silt and debris from entering the system.

1.8.4. Equipment. The Contractor's equipment shall be maintained to prevent excessive fumes, gases, vapors, noise, or fluids from escaping and creating a nuisance to the public.

1.9. STANDARDS AND SPECIFICATIONS

1.9.1. KTC Standard Specifications and Drawings (latest editions). Reference is made to the Kentucky Transportation Cabinet's (KTC) Standard Specifications for Road and Bridge Construction and the Standard Drawings binder. The Contractor shall secure copies of both documents when performing work which is described therein. Copies may be obtained from:

Kentucky Transportation Cabinet
Manager, Policy and Procedures
Development Branch
112 State Office Building
Frankfort, Kentucky 40622

1.9.2. Latest Revisions. Wherever reference is made to any published standards, codes or standard specifications, it shall mean the latest standard code, specification or tentative specification of the technical society, organization or body to which reference is made. Where specified articles, sections, paragraphs or other subdivisions of the referenced publications are

not stated, the referenced publication shall apply in full.

1.10. WATER SUPPLY AND SANITARY FACILITIES

1.10.1. Water Supply. The Contractor shall provide, at convenient points, including MSD's field office, ample fresh supplies of water of proper quality and quantity for all labor, inspection, and operations required under this Contract. The supply of drinking water shall be contained in a suitable cooler or other approved sanitary container. The Contractor shall also provide paper cups.

1.10.2. Sanitary Facilities. The Contractor shall provide sanitary facilities for the duration of this Contract for all labor and inspection personnel and will comply with the regulations of the local and state health departments. Inspection and Contractor's facilities shall be separate. The sanitary facilities for the MSD inspector shall be a lockable, portable toilet and shall be located at or near MSD's field office when a field office is specified. The Contractor shall clean and maintain these facilities on a weekly basis.

1.11. ENGINEER'S FIELD OFFICE

When specified in the Contract, the Contractor shall furnish, for the exclusive use of MSD, an approved weatherproof, lockable building to be utilized as a field office. It shall be located conveniently on or near the Project, and shall be independent of any buildings used by the Contractor. Adjacent to the field office there shall be two graveled parking spaces for the exclusive use of MSD. The field office shall have approved OSHA steps with handrail. The field office shall have not less than: 200 square feet of usable floor space, 8 feet ceiling heights, 3 windows, a door, and a wooden floor or better. The field office shall be furnished with an instrument locker 2 feet by 3 feet in plan and 5 feet high, with adjustable shelves, a hinged wall table 3 feet by 6 feet, a suitable desk, drafting stool, 2 serviceable swivel office chairs, a coat rack, trash can, fire extinguisher, a fully stocked first aid kit (in accordance with Kentucky Occupational Safety and Health Standards for the Construction Industry Subpart C, Section 1926.50), and a standard 4 drawer lockable file cabinet with key. The building shall be equipped with, electric lighting, adequate heating and air-conditioning, and an integrated telephone answering machine and facsimile, including call waiting and touch-tone service. Facsimile machines shall be either Brother Multi-Function Fax1950 or Sharp Multi-Function Plain Paper Fax - Model UX-1400, or their equivalents.

Contractors, whose main office is outside the Louisville calling area, shall furnish the field office with a toll-free number. All costs of local phone calls, all other utilities and calls to the general Contractor shall be included in that part of the Contract Price attributable to MSD's field office.

The Contractor shall have MSD's field office set up and fully operational within two (2) weeks from the date of execution of the Contract and prior to commencing construction. The field office shall remain on the Work site and be cleaned and maintained weekly until

formal acceptance of the Project. No Work shall be performed until the field office is operational.

All items stored in the field office shall be covered by the Contractor's insurance, including all property of MSD and MSD's employees located within the field office. Any property of MSD and MSD's employees shall be itemized on a list and given to the contractor and MSD for their project files so that those items are covered by the Contractor's insurance.

SECTION 2

MSD STANDARD SPECIFICATIONS

SITE PREPARATION, EROSION PREVENTION AND SEDIMENT CONTROL

2.1. DESCRIPTION OF WORK

2.1.1. Site Preparation. This Work shall consist of the removal and disposal of all rubbish, fences, pavements, structures, all trees, shrubs, brush and herbaceous vegetation not to be protected, and all other obstacles within the rights-of-way/easement limits shown on the Plans. It shall include the protection of trees, shrubs, plants, fences, turfed areas, pavements and structures as identified in the contract documents throughout the construction project.

2.1.2. Erosion Prevention. This Work shall consist of the temporary erosion control measures to be performed during the life of the Project to minimize soil erosion from land surfaces and water conveyances. Measures include temporary **and permanent** soil stabilization, flow diversion, and outlet stabilization.

2.1.2.1. Temporary Soil Stabilization. This Work shall consist of seed bed preparation, furnishing and placing seed, mulch, netting and staples, erosion control blankets, and caring for such areas until acceptance. The Contractor shall remove the netting and staples, 30 to 45 days after installation, or after the grass has become established.

Temporary soil stabilization shall be used in the following circumstances:

(A) In non-paved areas, rough grading and permanent soil stabilization or temporary soil stabilization shall be maintained within 1,500 linear feet of the active excavation unless more stringent limits are required by the Erosion Prevention and Sediment Control Plan. In no case shall the time between completion of construction activities and the completion of permanent or temporary stabilization exceed 14 calendar days.

(B) Where construction operations are temporarily suspended for 14 days or longer and permanent soil stabilization is not practical.

(C) When an immediate cover would be desirable to minimize erosion, siltation, or pollution of any area.

2.1.2.2. Temporary Stabilization of Waterways. This work shall consist of the installation of erosion control blankets as temporary protection for waterways when their construction is completed outside the acceptable work interval for permanent seeding or sodding.

2.1.2.3. Flow Diversion. This Work shall consist of the construction and stabilization of runoff channels and/or berms to divert runoff from undisturbed areas around disturbed areas.

The Work may also consist of the diversion of stream flow around active construction areas during Work across a stream.

2.1.2.4. Outlet Stabilization. The Work shall consist of the installation of measures that slow flow velocities to acceptable levels to prevent erosion of water conveyances (ditches, swales and diversions) and land surfaces.

2.1.2.5. Temporary Stream Crossings. This work shall consist of the installation, maintenance and removal of temporary structures to provide construction and equipment access across streams and the diversion of stream flow around construction activities.

2.1.3. Sediment Control. This Work shall consist of the temporary sediment control measures, such as those included in Section 2.3.3 of these Specifications, to be performed during the life of the Project to control water pollution caused by erosion of exposed soil. Sediment control facilities shall be properly installed and maintained per details, and the Erosion Prevention and Sediment Control Plan. Controls found to be inadequate must **be *redesigned and modified in accordance with an approved redline drawing.***

2.1.4. Erosion Prevention and Sediment Control Plan. An EPSC Plan is developed for every MSD Project as part of the Project design. The Plan may be revised, with MSD's approval, to work within constraints imposed by equipment or construction techniques.

2.2. MATERIALS

2.2.1. Topsoil. Topsoil shall meet the requirements set forth in Section 827 of the KTC Standard Specifications.

2.2.2. Temporary Seed. Seed used for temporary seeding may be accepted on the basis of purity and germination values shown on the seed bag. The Work of temporary seeding of erosive earth areas shall be done promptly at the locations and times directed. Rye grain, annual rye or winter wheat seed shall be used for temporary seeding. Rye grain shall not be used in areas to be planted with native vegetation.

2.2.3. Straw Mulch. Refer to Section 9.2.5 of these Specifications.

2.2.4. Wood Cellulose Fiber Mulch. Refer to Section 9.2.6 of these Specifications.

2.2.5. Mulch Anchoring. Refer to Section 9.2.7 of these Specifications.

2.2.6. Stone Bags. Stone bags shall meet the specifications given in MSD Standard Drawing EF-03-**02**.

2.2.7. Sand Bags. Sandbags shall be ***18-1/2-inch x 28-inch woven polypropylene, or other non-photodegradable, bags filled one-half to two-thirds full with sand.***

2.2.8. Silt Fence. Silt fence shall meet or exceed the specifications of MSD Standard Drawing EF-09-**02**.

2.2.9. Prefabricated Silt Fence. Prefabricated silt fence shall meet or exceed the specifications given in MSD Standard Drawing No. EF-09-**02**.

2.2.10. Reinforced Silt Fence. Reinforced silt fence shall meet or exceed the specifications of MSD Standard Drawing EF-10-**02**.

2.2.11. Prefabricated Reinforced Silt Fence. Prefabricated reinforced silt fence shall meet or exceed the specifications given in MSD Standard Drawing No. EF-10-**02**.

2.2.12. Geotextile Fabrics for Silt Fences. Geotextile fabric shall meet or exceed the specifications given in MSD Standard Drawings No. EF-09-**02** and No. EF-10-**02**.

2.2.13. Hardwood Posts. Hardwood posts shall meet the specifications given in MSD Standard Drawing No. EF-09-**02**.

2.2.14. Steel Posts. Steel posts shall be "U" shaped or "T" shaped posts that meet the requirements given in MSD Standard Drawing No. EF-10-**02**.

2.2.15. Steel Reinforcement Mesh. Steel reinforcement mesh shall meet or exceed the specifications for reinforcing mesh given in MSD Standard Drawing No. EF-10-**02**.

2.2.16. Synthetic Reinforcement Mesh. Synthetic reinforcement mesh shall meet or exceed the specifications for reinforcing mesh given in MSD Standard Drawing No. EF-10-**02**.

2.3. EXECUTION OF WORK

2.3.1. Site Preparation

2.3.1.1. Rights-of-Way and Easements. The Contractor shall confine his construction activities within the rights-of-way and/or easements shown on the Plans. The Contractor shall be responsible for obtaining written agreements for use of private property outside of MSD acquired easements for such purposes as storage of material and equipment and access to the construction site. The private agreement shall be specific to the responsibilities of both parties and shall provide MSD with indemnification and shall hold MSD harmless. The Contractor shall provide a copy of all such written agreements to MSD immediately upon obtaining same. Access shall not be made through areas or obstructions designated as "Do Not Disturb (DND)" or "Do Not Remove (DNR)" without prior approval by MSD.

2.3.1.2. Temporary Construction Easements. Temporary construction easement shall be used for access to the construction site and temporary storage of materials and/or equipment. The

Contractor shall protect trees within the temporary easement where possible. Where damage to trees is unavoidable, the Contractor will be responsible for compensating property owners, obtaining written agreements with the property owners, and shall indemnify and hold MSD harmless. The Contractor shall provide MSD with a copy of all such written agreements prior to performing the Work. No borrow material can be removed from a temporary construction easement, nor can construction material be buried within a temporary construction easement, without the written consent of MSD and property owner.

2.3.1.3. Limits of Disturbance. The limits of disturbance define the areas in which construction operations are allowed. Construction activities include, but are not limited to; construction traffic, excavation, earth moving activities, stockpiling and staging activities.

2.3.1.4. Existing Obstructions. Locations of obstructions shown on the Plans are approximate. They are shown only for information purposes and are not intended as an accurate location of such obstructions. Obstructions not shown on the Plans but encountered by the Contractor shall be removed as necessary and, if directed by MSD, replaced in their original state or protected by the Contractor at no additional cost to MSD.

2.3.1.5. Protection of Trees and Shrubs. No existing trees or shrubs in rights-of-way and/or easements which are marked "Do Not Disturb (DND)" or "Do Not Remove (DNR)" on the Plans, shall be damaged or destroyed. Where branches of such trees or shrubs interfere with the Contractor's operations, they shall be protected by tying back wherever possible. When possible, put up fencing or other barriers around trees to be protected.

Prior to the start of construction, MSD's Arborist shall identify and flag all trees not previously noted for protection or removal on the Plans, where damage might occur.

Any trees that are in question shall be examined by the Contractors' certified Arborist, before clearing and grubbing or any construction. Any trees that the Arborist determines to be at risk should be marked with caution tape or a certain color of flagging, by the Arborist. The Contractor's Arborist's services shall be provided at no additional cost to MSD.

When working around trees, the Contractor shall make every effort to save as many trees as possible by utilizing the following methods of **construction.**

- Make every effort not to cut or damage any root 2-inches or larger.
- When constructing a trench and roots are encountered, cut 2-inch diameter and larger roots with a clean saw flush with the sides of the trench.
- When roots 2-inches or larger are broken or split, dig out enough of the single trench side to saw through an undamaged portion of the root.
- Use a solution of chorine bleach and water or a commercial solution to clean the saw before cutting next tree, to reduce the chance of spreading disease.
- In trenches where roots have been cut, backfill as soon as possible or keep all root ends moist with wet burlap, peat moss or similar material.

- Pile excavated soil on the side of the trench opposite the tree. If this procedure is not possible, place the soil on a plastic tarp, a sheet of plywood or a 4-inch thick bed of mulch outside the drip line of the tree to be protected.
- Do not dispose of cable scraps, oil cans, wood scraps, machine fluids, paint, left over concrete or any other debris in the backfill.
- The last 24-inches of backfill shall be compacted to original ground firmness, but no more.
- Water the backfill, until the last 24-inches of backfill is moist.
- Do not scrape or gouge any bark on trunks or lower limbs with equipment. Tie back lower limbs when possible.
- Where equipment is working in confined space near trees, wrap the tree trunk in old tires or snow fence, or place 2-inch x 4-inch studs around the tree trunk and rope or band them in place.
- Protect valuable trees or groups of trees by erecting a fence outside the dripline.
- Do not park or operate vehicles and/or equipment within the dripline of a tree unless the Mulch Method or the Bridge Method has been used.

(A) Mulch Method Root Protection. Place a 12-inch thick layer of **wood chips** around the base of the tree that extends from the trunk beyond the baseline of the tree.

(B) Bridge Method Root Protection. Place steel plates on railroad ties to bridge construction traffic over the tree's root zone to prevent soil compaction.

When limbs are accidentally broken by equipment, remove the-jagged edge by sawing at the broken limb's junction with the trunk or the next larger limb. Cut as close as possible without cutting into the branch collar, and follow other recommended pruning practices as outlined in "Pruning Trees Near Electric Utility Lines" by Dr. Alex L. Shigo. Do not paint the pruning wound. Remember to clean the saw blade before cutting the limb and before cutting on a another tree.

- Do not store materials within the dripline of a tree.
- Do not add additional soil within the dripline of a tree.
- Do not remove any soil within the dripline of a tree.

If the Contractor's operations will not permit saving certain trees marked "DND" or "DNR" on the Plans, the Contractor shall be wholly responsible for satisfying all claims for restoration or restitution resulting from their damage or removal. If the Work is within public rights-of-way in the City of Louisville, the Contractor shall contact the Arborist/Forester of the City of Louisville before cutting or removing any trees affected by his Work and shall comply with the Forester's requirements. If the Work is within public rights-of-way in Jefferson County, the Contractor shall first contact Arborist/Forester of the Jefferson County Public Works Department before cutting or removing any trees affected by his Work and shall comply with the Forester's requirements. Within the easement, the Contractor shall first advise MSD and then shall replant or replace trees or shrubs with a species and size agreed by the property owners in writing, or the Contractor shall compensate the property owner for the loss. The Contractor shall provide MSD with a copy of all written Agreements, with specific responsibilities detailed, prior to performing any Work, and shall hold MSD

harmless.

If trees and shrubs are moved or pruned, this Work shall be done in accordance with Home and Garden Bulletin No. 83, U.S. Department of Agriculture, "Pruning Shade Trees and Repairing Their Injuries". However, the Contractor shall obtain in writing and provide to MSD the property owner's permission to move or prune trees or shrubs on the property. Trees and shrubs damaged by the Contractor's operations shall be repaired in accordance with said Bulletin No. 83. Any trees whose stumps will not be removed shall be ground out 6-inches below the ground surface. All grindings shall be removed. Backfill with suitable material and revegetate appropriately.

Payment for protecting trees and shrubs shall be the obligation of the Contractor at no additional cost to MSD.

2.3.1.6. Protection of Obstructions Outside Right-of-Way/Easement Limits. The Contractor shall protect and avoid damage to all trees, shrubs, plants, fences, turfed areas, structures and all other objects outside the right-of-way/easement limits shown on the Plans and right-of-way/easement plats from damage due to construction operations. Damage caused by the Contractor shall be repaired or restored at no additional cost to MSD. Particular care shall be used to avoid damage to trees, shrubs, bushes, turfed areas, and private property located adjacent to rights-of-way/easements on private property. No trees, plants, turfed areas, or other objects outside such limits shall be disturbed or damaged without the written permission of the property owner. The Contractor shall provide MSD a copy of all written agreements prior to performing any Work, and shall hold MSD harmless.

2.3.1.7. Special Protection of Obstructions Inside Easement Limits. Wherever the installation of sanitary or storm drainage facilities conflicts with other improvements previously made by other agencies, utility companies, governmental bodies, or adjacent property owners, then the Contractor shall be responsible for their protection and preservation, including necessary removal and storage of such improvement, and subsequent replacement to obtain, to the fullest extent possible, the undisturbed condition.

2.3.1.8. Clearing and Grubbing. Sediment control devices as required by the Erosion Prevention and Sediment Control Plan shall be in place before clearing and grubbing is performed. Those areas contained within the rights-of-way and/or easements shown on the Plans and which will be excavated or used for embankment shall be cleared of trees, stumps, brush, projecting roots, hedges, weeds, logs, and other protruding obstructions, except for trees and shrubs marked "Do Not Disturb". All trees, stumps, roots, brush, hedge, and other protruding obstructions within the rights-of-way/easements which are to be removed shall be cut to within 3 inches of existing ground. The area shall be grubbed to a minimum depth to 6 inches below existing grade to remove grass, roots, and other organic material. This Work shall be done well in advance of earthwork operations in accordance with the Erosion Prevention and Sediment Control Plan.

2.3.1.9. Removal of Obstructions and Pavements. Existing fence material and posts within

the right-of-way/easement limits shown on the Plans and right-of-way/easement plats shall be moved from the construction area and stored in such a manner as to protect them against damage. The Contractor shall be responsible for the condition of the removed fence material and posts. The Contractor shall demolish and remove all structures and structure foundations within the right-of-way/easement limits unless otherwise directed by MSD. Such structure and foundations shall be removed to 24 inches below grade or as directed by MSD. The Contractor shall protect and avoid damage to existing structures when they are to be relocated as directed by MSD. The Contractor shall remove all abandoned vehicles, appliances, and rubbish within the right-of-way/easement limits.

Cuts in all existing pavements shall be made along straight saw cut lines parallel with each edge of the trench or structure. If directed by MSD, cuts in concrete pavements or sidewalks shall be to the nearest construction joint. Cuts in existing curb and gutter shall be made to straight lines perpendicular to the alignment of the curb.

2.3.1.10. Disposal of Debris. All trees, brush, logs, leaves, construction debris, and refuse shall be collected and disposed of in accordance with all applicable codes and ordinances. Debris shall be removed from the site as soon as practical. Unless otherwise provided in the Contract, the Contractor shall make his own arrangements for disposing of such material off-site. All disposal Plans must be approved by MSD. Disposal site shall be on approved site and copy of permits supplied to MSD.

2.3.1.11. Topsoiling. Unless otherwise directed by MSD or shown on the Plans, topsoil shall be stripped from Project areas to be graded and stockpiled for later use at no additional cost to MSD.

(A) Topsoil Stripping: Strip 4 inches (minimum) of topsoil only from those areas that will be disturbed by excavation, filling, road building, or compaction by equipment. Topsoil stripping is a construction activity. Sediment controls shall be installed prior to the start of topsoil stripping in any area.

(B) Topsoil Stockpiling: Select stockpile location(s) to avoid slopes, floodplains and natural drainage ways. Do not place stockpiles near waterbodies or traffic routes. Install sediment barriers (e.g. silt fence sediment barrier) as necessary to retain sediment from stockpiles. Protect topsoil stockpiles with temporary stabilization when they will not be utilized for **fourteen (14)** days or more. If stockpiles are not to be used within twelve (12) months, they shall be permanently stabilized to control erosion and weed growth.

2.3.1.12. Temporary Fencing used to Contain Livestock/Domestic Animals. All temporary fencing erected to contain livestock or domestic animals shall be constructed in such a manner as to maintain a level of closure as good or better than that which existed prior to construction. The Contractor shall examine all such temporary fencing daily to ensure that all livestock or domestic animals are sufficiently contained.

2.3.1.13. Replacement of Fences. Any fences disturbed within right-of-way/easement limits

shall be replaced to the satisfaction of the Engineer at no additional cost to MSD. Fences in such poor condition that they cannot be removed and replaced shall be replaced with fence material similar in original quality, size, and appearance to the removed fence, or a written release shall be obtained from the property owner and a copy provided to MSD.

2.3.2. Erosion Prevention

2.3.2.1. Temporary Soil Stabilization

(A) Preparing the Seed Bed. Areas to be temporarily seeded shall require the preparation of a seed bed only when the soil surface is desiccated, is non-uniform, or contains clods of large stones. Disturbance of the soil surface by whatever means that is practicable, such as disking, to create a 2-inch thick loose and roughened condition capable of retaining the seed and mulch will be required when the soil surface is desiccated or non-uniform. The preparation of a seed bed will not be required when the soil surface is in an acceptable condition from the normal grading operations.

(B) Seeding. Temporary seeding shall be permitted only during the periods indicated in the table below. In order to stabilize erodible areas with vegetation through the winter, temporary seeding must be completed no later than October 31. Working the soil to cover the seed will not be required. Temporary seeding shall be sown at the approximate rate of 3 pounds per 1000 square feet.

Work Item	Accepted Work Interval
Temporary Seeding with Annual Rye	March 1 through November
Temporary Seeding with Winter Wheat or Rye Grain	September 1 through November

(C) Protection. All seeded areas shall be promptly protected with straw mulch or wood cellulose fiber mulch. The materials shall be uniformly applied and anchored to the seeded areas in accordance with Section 9.2.7 of these Specifications.

(D) Dormant Season Stabilization. Areas requiring temporary stabilization during the period of November through February, when seeding is not permitted, shall receive only an application of straw mulch held in place by crimping or netting. The approximate rate of application of the straw mulch shall be 3 tons per acre.

2.3.2.2. Temporary Stabilization of Waterways. Erosion control blankets for temporary stabilization of waterways shall be the equivalent of the temporary blanket specified for permanent stabilization of the waterway. In waterways where erosion control blankets are not specified for permanent stabilization, or a permanent erosion control mat is specified for permanent stabilization, the erosion control blanket for temporary stabilization shall be that specified on the Erosion Prevention and Sediment Control Plan or by MSD. The blankets shall be installed in accordance with Section 9 of these specifications.

2.3.2.3. Flow Diversions. Temporary diversions for runoff from undisturbed areas shall be constructed in accordance with **Exhibit 12-12 in Chapter 12 of the Design Manual**.

(A) Installation: Temporary diversions shall be constructed according to the sections and on the alignment and grade shown on the Erosion Prevention and Sediment Control Plan. Install diversions in the sequence specified on the Erosion Prevention and Sediment Control Plan or as directed by MSD.

(B) Inspection and Maintenance: Temporary diversions shall be inspected and maintained in strict accordance with the requirements given in **Exhibit 12-12 in Chapter 12 of the Design Manual**.

(C) Removal: Remove temporary diversions in accordance with the requirements given in **Exhibit 12-12 in Chapter 12 of the Design Manual** and according to the requirements of the Erosion Prevention and Sediment Control Plan.

2.3.2.4. Outlet Stabilization

(A) Culvert Outlet Protection. Culvert aprons and headwalls shall be constructed in accordance with Section 5.3.6.2 of these Specifications.

2.3.2.5. Temporary Stream Crossings. All temporary stream crossings shall be **constructed** in accordance with the Kentucky Stream Crossing Permit from the Kentucky **Energy and Environment Cabinet**, Division of Water. Stream banks shall be permanently or temporarily stabilized **as soon as possible, but no later than**14 days of initial streambank disturbance. Copies of all applicable permits shall be kept at the job site. Temporary stream crossings shall be built in accordance with the approved Erosion Prevention and Sediment Control Plan prior to using the crossing.

(A) Long-Term Stream Crossings: For locations where a crossing will be used for access, a bridge or a pipe system shall be installed in accordance with Standard Drawing No. ER-02-**02** to prevent personnel, equipment, and material from disturbing the stream with each crossing. Bridges and culverts shall be constructed to the dimensions given in the Erosion Prevention and Sediment Control Plan. Visible build-up of silt and mud in the creek will be cleaned out on a regular basis and appropriate measures shall be taken to stabilize the crossing and prevent further erosion according to Standard Drawing No. ER-02-**02** and the Erosion Prevention and Sediment Control Plan.

Pump-around flow diversion shall be established prior to any construction activity in the stream in accordance with Standard Drawing No. ED-01-**01**. Flow diversion is not required when the stream is dry for the duration of construction activities in the stream.

(B) Short-Term Stream Crossings: For locations where a crossing is not used for access,

streambank disturbance shall be kept to the minimum required to construct the pipeline stream crossing. Pump-around flow diversion in the stream (in accordance with Standard Drawing No. ED-01-**01**) shall be established in the stream prior to the start of any construction activities in the stream and shall be maintained until construction and stabilization (permanent or temporary) are complete. Flow diversion is not required when the stream is dry.

2.3.2.6. Surface Roughening. Surface roughening, including tracking, stair-step grading, and slope grooving shall be performed at the locations shown on the Erosion Prevention and Sediment Control Plan in accordance with Standard Drawing Nos. EC-04-**01**, EC-05-**01** and EC-06-**01**.

2.3.3. Sediment Control

2.3.3.1. General. The Contractor shall exercise every reasonable precaution at all times to prevent water pollution by the deposition of **sediment** in streams, lakes, and reservoirs. **The Contractor** shall conduct and schedule operations so as to avoid or minimize the muddying or siltation of areas adjacent to the construction site including streets, storm sewers, vacant lots, etc. The Contractor shall comply with the applicable provisions of KRS Chapters 220 and 224 of the State Water Pollution Control Laws and other applicable statutes relating to the prevention or abatement of water pollution.

2.3.3.2. Stone Bag Checks. Stone bag checks shall be constructed using stone-filled bags in accordance with Standard Drawing No. EF-12-**02**.

(A) Installation: Stone bag checks shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction on areas that drain to the check location.

(B) Inspection and Maintenance: Stone bag checks shall be inspected and maintained in strict accordance with the requirements given in Standard Drawing No. EF-12-**02**.

(C) Removal: Remove Stone bag checks in accordance with the requirements given in Standard Drawing No. EF-12-**02**. Checks temporarily removed to facilitate construction activities shall be replaced immediately following completion of such activity.

2.3.3.3. Silt Fence. Where called for on the Erosion Prevention and **Sediment Control** Plan or the Project Plans and Specifications, silt fence shall be installed, inspected, maintained, and removed in accordance with the requirements given in Standard Drawing No. EF-09-**02**.

(A) Installation: Silt fence shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction on areas that drain to the fence location.

(B) Inspection and Maintenance: Silt fence shall be inspected and maintained in strict accordance with the requirements given in Standard Drawing No. EF-09-**02**.

(C) Removal: Remove silt fence in accordance with the requirements given in Standard Drawing No. EF-09-**02**. Silt fences temporarily removed to facilitate construction activities shall be replaced immediately following completion of such activity.

2.3.3.4. Reinforced Silt Fence. Where called for on the Erosion Prevention and Sediment Control Plan or the Project Plans and Specifications, reinforced silt fence shall be installed, inspected, maintained, and removed in accordance with the requirements of Standard Drawing No. EF-10-**02**.

(A) Installation: Reinforced silt fence shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction activities on areas that drain to the fence location.

(B) Inspection and Maintenance: Reinforced silt fence shall be inspected and maintained in strict accordance with the requirements given in Standard Drawing No. EF-10-**02**.

(C) Removal: Remove reinforced silt fence in accordance with the requirements given in Standard Drawing No. EF-10-**02**. Silt fences temporarily removed to facilitate construction activities shall be replaced immediately following completion of such activity.

2.3.3.5. Stabilized Temporary Construction Entrances. Stabilized temporary construction entrances shall be constructed in accordance with Standard Drawing No. ER-01-**02.**

(A) Installation: Stabilized temporary construction entrances shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to accessing the construction site.

(B) Inspection and Maintenance: Stabilized temporary construction entrances shall be inspected and maintained in strict accordance with the requirements given in Standard Drawing No. ER-01-**02.**

(C) Removal: Remove stabilized temporary construction entrances in accordance with the requirements given in Standard Drawing No. ER-01-**02**. Stabilized entrances temporarily removed to facilitate construction activities shall be replaced immediately following completion of such activity.

2.3.3.6. Stone Bag Inlet Protection. Stone bag inlet protection shall be constructed in accordance with Standard Drawing No. EF-03-**02.**

(A) Installation: Stone bag inlet protection shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction activities on areas that drain to the inlet, or immediately following the time at which a new inlet can receive runoff from a disturbed area. **The item is not to be used in**

curb-line locations where traffic could be impacted.

(B) Inspection and Maintenance: Stone bag inlet protection shall be inspected and maintained in strict accordance with the requirements given in Standard Drawing No. EF-03-**02.**

(C) Removal: Remove stone bag inlet protection in accordance with the requirements given in Standard Drawing No. EF-03-**02**. Inlet protection temporarily removed to facilitate construction activities shall be replaced immediately following completion of such activity.

2.3.3.7. Filter Fabric Inlet Protection. Filter fabric inlet protection shall be constructed in accordance with Standard Drawing No. EF-01-**02.**

(A) Installation: Filter fabric inlet protection shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction activities on areas that drain to the inlet, or immediately following the time at which a new inlet can receive runoff from a disturbed area.

(B) Inspection and Maintenance: Filter fabric inlet protection shall be inspected and maintained in strict accordance with the requirements given in Standard Drawing No. EF-01-**02.**

(C) Removal: Remove stone bag inlet protection in accordance with the requirements given in Standard Drawing No. EF-01-**02**. Inlet protection temporarily removed to facilitate construction activities shall be replaced immediately following completion of such activity.

2.3.3.8. Block and Gravel Inlet Protection. Block and gravel inlet protection shall be constructed in accordance with Standard Drawing No. EF-13-**01**.

(A) Installation: Block and gravel inlet protection shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction activities on areas that drain to the inlet, or immediately following the time at which a new inlet can receive runoff from a disturbed area.

(B) Inspection and Maintenance: Block and gravel inlet protection shall be inspected and maintained in strict accordance with the requirements given in Standard Drawing No. EF-13-**01**.

(C) Removal: Remove block and gravel inlet protection in accordance with the requirements given in Standard Drawing No. EF-13-**01**. Inlet protection temporarily removed to facilitate construction activities shall be replaced immediately following completion of such activity.

2.3.3.9. Gravel and Wire Mesh Inlet Protection. Gravel and wire mesh inlet protection shall be constructed in accordance with Standard Drawing No. EF-14-**01**.

(A) Installation: Gravel and wire mesh inlet protection shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction activities on areas that drain to the inlet, or immediately following the time at which a new inlet can receive runoff from a disturbed area.

(B) Inspection and Maintenance: Gravel and wire mesh inlet protection shall be inspected and maintained in strict accordance with the requirements given in Standard Drawing No. EF-14**-01**.

(C) Removal: Remove gravel and wire mesh inlet protection in accordance with the requirements given in Standard Drawing No. EF-14**-01**. Inlet protection temporarily removed to facilitate construction activities shall be replaced immediately following completion of such activity.

2.3.3.10. Temporary Sediment Traps. Temporary Sediment traps shall be constructed in accordance with **Exhibit 12-9 in Chapter 12 of the Design Manual**.

(A) Installation: Temporary Sediment traps shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction activities on areas that drain to the trap.

(B) Inspection and Maintenance: Temporary Sediment traps shall be inspected and maintained in strict accordance with the requirements given in **Exhibit 12-9 in Chapter 12 of the Design Manual**.

(C) Removal: Remove temporary sediment traps in accordance with the requirements given in **Exhibit 12-9 in Chapter 12 of the Design Manual**.

2.3.3.11. Temporary Sediment Basins. Temporary Sediment basins shall be constructed in accordance with **Exhibit 12-8 in Chapter 12 of the Design Manual**.

(A) Installation: Temporary Sediment basins shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction activities on areas that drain to the basin.

(B) Inspection and Maintenance: Temporary Sediment basins shall be inspected and maintained in strict accordance with the requirements given in **Exhibit 12-8 in Chapter 12 of the Design Manual**.

(C) Removal: Remove Temporary sediment basins in accordance with the requirements given in **Exhibit 12-8 in Chapter 12 of the Design Manual**.

2.3.3.12. Diversions for Sediment-Laden Water. Temporary diversions shall be constructed in accordance with **Exhibit 12-12 in Chapter 12 of the Design Manual**.

(A) Installation: Temporary diversions shall be constructed according to the sections and on the alignment and grade shown in the Erosion Prevention and Sediment Control Plan. Install diversions in the sequence specified on the Erosion Prevention and

Sediment Control Plan or as directed by MSD.

(B) Inspection and Maintenance: Temporary diversions shall be inspected and maintained in strict accordance with the requirements given in **Exhibit 12-12 in Chapter 12 of the Design Manual**.

(C) Removal: Remove temporary diversions in accordance with the requirements given in **Exhibit 12-12 in Chapter 12 of the Design Manual** and according to the requirements of the Erosion Prevention and Sediment Control Plan.

2.3.3.13. Rock Ditch Checks. Rock ditch checks shall be constructed in accordance with Standard Drawing No. EB-03-**01**.

(A) Installation: Rock ditch checks shall be installed at the locations shown on the Erosion Prevention and Sediment Control Plan prior to the start of construction activities on areas that drain to the ditch.

(B) Inspection and Maintenance: Rock ditch checks shall be inspected and maintained in strict accordance with the requirements given in Standard Drawing No. EB-03-**01**.

(C) Removal: Remove rock ditch checks in accordance with the requirements given in Standard Drawing No. EB-03-**01**.

2.3.3.14. Vegetated Filter Strips (VFS). VFS are zones of vegetation through which sediment and pollutant-laden runoff are directed before being discharged to a concentrated flow channel. VFS shall be constructed as shown on the Erosion Prevention and Sediment Control Plan.

2.3.3.15. Dewatering. Sediment-laden groundwater that is pumped from bore pits, trenches, or other excavations should be pumped to an appropriate receiving area, including but not limited to sediment basins, sediment traps, or vegetated filter strips, before discharging to a stream or lake. Direct pumping to a stream or lake is **ILLEGAL** and shall be avoided.

2.4. EROSION PREVENTION AND SEDIMENT CONTROL PLAN

2.4.1. General. Construction shall conform to all requirements of the Erosion Prevention and Sediment Control Plan as provided in the Contract Documents.

2.4.2. Certification. For all MSD projects, the Contractor and all Subcontractors shall sign a certification statement, as required by the KPDES General Permit KYR 100000. This statement will be held in MSD's project file.

2.4.3. Revisions. Revisions to the Erosion Prevention and Sediment Control Plan must be approved by MSD. All revisions must be shown on the EPSC Plan.

2.4.4. Spill Prevention, Control, and Countermeasures (SPCC) Plan. The Contractor and Subcontractors shall be responsible for obtaining and implementing SPCC Plans for

petroleum products and hazardous materials stored on the job site as required by National Oil Pollution Prevention (NOPP) Regulations. If petroleum products are stored in containers with capacity in excess of 660 gallons, the storage tanks are regulated by NOPP regulations and an SPCC plan is required.

SECTION 3

MSD STANDARD SPECIFICATIONS

EARTHWORK

3.1. DESCRIPTION OF WORK

This Work shall consist of excavations, backfilling of excavations, construction of embankments, and grading for all types of sanitary and storm drainage facilities, and all other items as may be necessary to complete the earthwork as shown on the Plans, in the Contract, or as directed by MSD.

3.2. MATERIALS

3.2.1. Crushed Stone. Crushed stone used to stabilize and backfill excavations shall be coarse aggregate conforming to Size No. 57 as set forth in Section 805 of the KTC ***Standard*** Specifications **(latest edition)** and shall be free from sharp, angular pieces which could, in the judgment of MSD, cause damage to the pipe.

3.2.2. Sand. Sand for backfill placed in accordance with Section 3.3.4.2 (A) herein referred to as Type 1-A backfilling shall be comprised of sand or sand-gravel mixtures containing less than 30 percent passing a No. 40 sieve and less than 5 percent passing a No. 200 sieve. Sand or sand-gravel mixtures shall classify as SW, SP, or GW, and shall have a uniformity coefficient of 4.5 or more, as set forth in ASTM D 2487, Standard Specification for Classification of Soils for Engineering Purposes. Sands which have a coefficient of uniformity less than 4.5 but greater than or equal to 1.5 will be permitted, but placement and compaction shall be in accordance with Section 3.3.4.2.(B). These sands are referred to as Type 1-B backfill.

The Contractor shall provide a Certification of Compliance stating that the sand fully complies with the requirements stated herein. In addition, the Contractor shall provide the results of the sieve analysis, including a graph depicting the percent finer versus particle size and the uniformity coefficient.

Sand used on the basis of Certificates of Compliance may be sampled and tested by the agency designated by MSD at any time and, when found not to be in conformity, will be subject to rejection, whether in place or not. Should the test results show the sand to not meet the requirements stated herein, then the Contractor shall assume the full cost of the testing, removal of the undesirable material, replacement of the materials and other Work resulting from the removal of the undesirable material and replacement by acceptable material.

3.3. Execution of Work

3.3.1. General. Prior to beginning earthwork operations, all necessary clearing, grubbing,

removal of obstructions and pavements, installation of required sediment control facilities shall have been completed in accordance with Section 2 of these Specifications. Rough grading and restoration shall be maintained within a maximum distance of 1,500 L.F. of the active disturbance, with logical limits between structures, unless otherwise approved by MSD.

The Contractor shall at all times be responsible for the condition of the trenches and filled areas. He shall maintain frequent inspection of same, and if at any time before the final acceptance of the Work by MSD, the trenches or filled areas settle or sunken areas appear, he shall be required to refill these sunken areas with suitable material as soon as they are discovered. Barricades are to be closely spaced to provide a nearly continuous protection. All trenches shall be barricaded and caution-lighted or covered with steel trench plates at all times for the protection of the public.

3.3.2. Excavation

3.3.2.1. Classification. Without regard to the materials encountered, all excavation shall be unclassified. It shall be distinctly understood that reference to rock, earth, or any other material on the Plans or in the Contract, whether in numbers, words, letters, or lines, is solely for MSD's information and is not to be taken as an indication of classified excavation or the quantity of either rock, earth, or any other material involved.

The Contractor must draw his own conclusions as to the conditions to be encountered. MSD does not give any guarantee as to the accuracy of the data and no claim will be considered for additional compensation when the materials encountered are not in accord with the classification shown. In the event contaminated materials are encountered, the Contractor shall cease Work and immediately contact the appropriate agencies, including MSD, in accordance with Section 3.3.3.2.

Blasting ***and rock removal*** shall be performed at a safe distance ahead of the installation of the pipes and structures to prevent damage as the shots are fired. Blasting of rock for property service connections, branches, and stubs shall be performed concurrent with the trench blasting. The rock at the ends of all pipes, branches, stubs and property service connections, shall be shattered by continuing the blasting operations approximately 6 feet beyond the end of the pipe.

For property service connections consent and release ***must*** be obtained by MSD and ***include*** approximately one full joint of pipe beyond the manhole or the end of the main line sewer. Sufficient explosive shall be used to shatter the rock to allow for future excavation. To prevent damage to installed sewers or structures, concrete for walls, footings, or encasements shall not be poured in direct contact with bedrock unless otherwise shown on the Plans or directed by MSD.

The blasting of rock under existing pavement, prior to uncovering the rock, may be permitted provided the Contractor assumes full responsibility for all damage to the

existing pavement. MSD reserves the right to require the uncovering of rock prior to blasting if blasting without uncovering proves unsatisfactory.

If the Contractor chooses to shoot rock under pavement without uncovering the rock, the Contractor shall immediately repair humps in the paving which create a traffic hazard. All distortions outside the limits of the trench caused by the blasting shall later be removed and replaced as part of the pavement restoration **at no additional cost to MSD.**

After the blast is fired, the Contractor shall thoroughly scale the excavation. All loose, shattered rock or other loose material which may be dangerous to the workmen, pipe, or structure shall be removed and the excavation made safe before proceeding with the work. The fact that the removal of loose, shattered rock or other loose material may enlarge the excavation beyond the required width will not relieve the Contractor from making such removal and filling the extra space. If rock is excavated beyond the trench width indicated on MSD's Standard Drawings, such unauthorized excavation, or overbreakage, shall be refilled with crushed stone in the pipe zone ***and*** the remaining backfill will be per section 3.3.4 or Class B concrete in ditches and streams, at no additional cost to MSD. Remove all blasting debris to ensure public and Contractor's safety.

3.3.2.2. Stockpiling Excavated Materials. The Contractor shall be responsible for determining the limits of stockpiles in relation to excavations and maintaining such limits to prevent excessive loads on the sides of excavations or sheeting and bracing systems. Excavated material shall not obstruct crosswalks, sidewalks, street intersections, nor interfere unreasonably with travel on streets by occupants of adjoining property. Gutters or other surface drainage facilities shall not be obstructed. When clear access to fire hydrants, mail boxes, sewer or conduit manholes, and similar utilities or municipal service facilities is required, the Contractor must provide such access. All work shall conform to the Kentucky Occupational Safety and Health Program and Section 29 CFR 1926, Subpart P, "Trenching and Shoring."

3.3.2.3. Wasting Excavated Materials. All materials excavated by the Contractor not used for backfilling trenches, channels, or structure excavations or ***not*** used in restoration of the ground surface, shall be removed from the site and disposed of by the Contractor at a pre-approved site, unless otherwise specified in the Contract. MSD reserves the right to retain excess excavated materials and direct the Contractor to deliver it to a site specified by the Contract at the Contractor's expense. When the Contractor proposes to waste unsuitable or excess excavated material upon any privately-owned property, written consent from the property owner must be secured in advance and a copy provided to MSD prior to scheduling the work. All filling operations must be approved by MSD Water Management prior to placement of said material. No surplus or unsuitable materials shall be deposited in any stream channel nor in any place where pre-construction surface drainage would be changed without written permission from MSD.

3.3.2.4. Sheeting and Bracing and Trench Boxes. The Contractor shall furnish, place and

maintain adequate sheeting and bracing or trench boxes as may be required to support the sides of the excavation and prevent any movements of earth which could, in any way, diminish the width of the excavation to less than that necessary for proper construction, cause damage to the sewer or structure being constructed or to adjacent structures, utilities, pavements or walks, or cause injury to workmen or others through movement of the adjacent earth banks, or to otherwise damage or delay the work. All work shall conform to the Kentucky Occupational Safety & Health Program and Section 29 CFR 1926, Subpart P, "Trenching and Shoring."

Sheeting and bracing or trench boxes shall be of wood or steel and shall be of adequate strength for excavation. Wherever possible, the sheeting and bracing shall be driven ahead of the excavation to avoid loss of material from behind the sheeting. If it is necessary to excavate below the sheeting, care shall be taken to avoid trimming behind the face along which the sheeting will be driven. Care shall be taken to prevent voids outside the sheeting, but if voids develop, they shall be immediately filled with sand backfill and densified by flushing and jetting with water. Where drop inlets, stacks or other appurtenances are constructed, the trench excavation shall be offset, as required, without additional compensation.

Sheeting left in place shall be cut off at least 18 inches below the ground surface and the cutoff material shall be removed from the excavation. All voids created by cutting off the sheeting shall be immediately filled with sand backfill and densified by flushing and jetting with water. Sheeting and bracing specified to be left in place as shown on the Plans or as ordered by MSD shall be paid for by MSD. Sheeting and bracing left in place at the Contractor's option, shall be at his expense.

All sheeting, bracing, and shoring which is not left in place under the foregoing provisions shall be removed in a manner which will not endanger the completed work or other structures, utilities, sewers, or property whether, public or private. The Contractor shall exercise care to prevent the opening of voids during the extraction process. Any voids created while pulling sheeting and bracing shall be immediately filled with sand backfill and densified by flushing and jetting with water.

3.3.2.5. Trench Dimensions. No more than 300 feet of trench in unpaved areas and 100 feet of trench in paved areas shall be opened at any time in advance of the pipe, nor shall more than 100 feet be left unfilled except by written permission from MSD. In special cases, MSD may limit the distance to which the trench may be open by notifying the Contractor in writing. Excavations for pipe in both earth and rock trenches shall display a width between the minimum and maximum allowable width, below a level 1 foot above the outside top of the pipe, as shown on MSD's Standard Drawings. If the maximum allowable trench width is exceeded, a higher strength classification of pipe may be required, at no additional cost to MSD.

Trench excavations for cast-in-place concrete sewers and structures shall have the minimum width necessary, as determined by the Contractor, for proper and safe

construction. Trenches shall be excavated to a subgrade depth of six inches below the outside of the pipe, unless unsuitable foundation materials are encountered at the subgrade level.

3.3.2.6. Unsuitable Foundation. Unsuitable foundation materials shall consist of soft, spongy earth, mud, unconsolidated fill, organic matter, or any other materials which will not, in the opinion of MSD, provide suitable support. MSD may order extra work performed when the bottom of the excavation is unsuitable. It shall be undercut below the subgrade level, to a depth approved by MSD, and backfilled with crushed stone or other approved backfill material. Class B concrete shall be used to backfill the undercut zones in ditches and streams. At MSD's direction, on MSD funded Projects, payment shall be made for removal or replacement of unsuitable material within the first 2 feet below the subgrade level.

If the unsuitable material is mud or muck caused by the activity of the Contractor or by his failure to provide adequate drainage for the excavation, no payment shall be made for the removal or replacement of such material.

3.3.2.7. Drainage of Excavations. The Contractor shall maintain all excavations free of water. He shall provide all dams, flumes, channels, sumps, or other works necessary to keep the excavation entirely clear of water and shall provide and operate pumps or other suitable equipment of adequate capacity for dewatering the excavations. He shall avoid producing mud in the trench or channel bottom by his operations. If necessary or so directed by MSD, the Contractor shall place crushed stone at his own expense to maintain a firm, dry excavation bottom and base. Pipe bedding, laying, jointing, and the placing of concrete shall be done in a water-free trench or excavation. The water shall be disposed of at the Contractor's expense.

Where the excavation extends below the water table, and lowering of the water table is necessary to prevent excessive inflows and maintain stability within the excavation, dewatering shall be performed. The Contractor shall use well points, sump pumps, or any other method of dewatering as required to lower the water table below the bottom of the excavations in a manner that will prevent saturated soil from flowing into open trenches, shafts, structures and tunnels, and render such excavations firm until the structures to be built therein are completed. The Contractor shall obtain MSD's approval prior to the use of special dewatering equipment other than well points or sump pumps. Dewatering operations are considered incidental to the work and no additional compensation shall be made to the Contractor. The groundwater shall not be allowed to rise until the backfilling operations are complete. The Contractor shall be responsible for preventing pipe flotation.

Prior to beginning the work, the Contractor shall obtain, at his expense, a water withdrawal permit from the Commonwealth of Kentucky, Department of Natural Resources and Environmental Protection Cabinet (KNREPC) in accordance with the following criteria:

(A) Where the average withdrawal rate is more than ten thousand gallons per day (10,000

gal/day), a permit shall be required, except as exempted by KRS 151.140.

(B) Where the withdrawal of water is made at a relatively constant rate each day and the average withdrawal rate is ten thousand gallons per day (10,000 gal/day), or less, no permit will be required.

(C) ***Where withdrawals are made on an irregular basis at an irregular rate, permits may be required where the Division of Water determines that the water withdrawn represents a significant portion of the available water supply or that collection of withdrawal data is necessary for water resource planning purposes.***

The Contractor shall assume all responsibility for claims resulting from damage to any land, wells, structures or improvements due to his dewatering operations.

Prior to any point discharge into a blueline stream or intermittent blueline stream, the Contractor shall obtain necessary permits from the Kentucky Division of Water and provide a copy to MSD. Point discharge operations are considered incidental to the work and no additional compensation shall be made to the Contractor.

3.3.2.8. Blasting and Hoe-Ramming. When blasting is required to excavate rock, the Contractor shall comply fully with the provisions of the Laws and Regulations Governing Explosives and Blasting, as issued by the Kentucky Department of Mines and Minerals, and the Kentucky Occupational Safety and Health Standards for the Construction Industry, Subpart U, Blasting, as issued by the Kentucky Labor Cabinet.

Prior to any blasting or hoe-ramming operations, a pre-blast survey of potentially affected homeowners and properties shall be conducted by the Contractor or his agent. The Contractor shall provide MSD with the name of the agency and person(s) who will be performing the survey. All appointments for surveys shall be made in advance by the Contractor or his agent. MSD will provide the person(s) performing the pre-blast survey an original letter of introduction to identify them to the residents. No copies of the letter shall be permitted.

The property owner(s) will be notified of the above procedure for the pre-blast survey by the Contractor or his agent. The affected property owners will be instructed by the Contractor to only accept an original letter of introduction on MSD's letterhead. The Contractor shall furnish, upon request, all photographs taken and reports made during the pre-blast and post-blast surveys, without any additional cost to MSD.

No blasting or hoe-ramming shall be done unless proper insurance has been secured and is in force. Except with written permission by MSD, no blasting of rock, or hoe-ramming, will be permitted at nights or on Sundays.

During blasting operations, every precaution shall be used for the protection of persons and private and public property. Each blast shall be well covered with mats and other suitable means to confine the rock fragments. Only the minimum amounts of explosives shall be used

to shatter the rock. The Contractor shall monitor the blasts to ensure that excessive charges are not being used. The debris from the blasting operations shall be disposed of properly, in accordance with Department of Mines and Minerals Standards.

3.3.3 Embankment

Non trench-type embankment shall conform to section 206 of the KYTC Standard Specifications

3.3.4 Excavation and Borrow Materials

3.3.4.1. Selected Excavated Material. This material shall consist of earth removed from excavations and used for backfill. It shall be free from rubbish, organic matter, frozen soil, muck, and other perishable, compressible debris which prevent compaction of the material to a dense, uniform state. Rock and other hard, durable fragments shall be limited to the particle sizes described in Section 3.3.4., with adequate fines to fill all voids, and shall be uniformly distributed ***throughout*** the material.

3.3.4.2. Unsuitable Contaminated Materials. For MSD Projects, MSD-or in some instances the property owner-shall be responsible for any asbestos, PCB's, petroleum, hazardous waste or radioactive material uncovered or revealed at the site, which was not shown or indicated in MSD Project Plans or identified in the Contract to be within the scope of the work and which may represent a substantial danger to persons or property exposed thereto in connection with the Work site. Once a problem is identified, work shall stop until the course of action can be determined by MSD. It shall then be up to MSD to participate in paying additional costs for hauling and disposal at a landfill or appropriate facility or ***the*** cost of testing as delineated further within these specifications.

MSD SHALL NOT be responsible for any such materials brought to the site by the Contractor sub-Contractor, suppliers, or anyone else for whom the Contractor is responsible.

If unsuitable contaminated materials are encountered, the Contractor shall take the following action:

(A) The Contractor shall immediately stop all work in connection with such hazardous condition and notify the MSD inspector (and thereafter confirm in writing such notice to the MSD Construction Contracts Administrator).

(B) The Contractor shall then be responsible for making notification to "911" (Emergency Response) in the event of discovery of a release of contaminated material.

(C) The Contractor is responsible for making notification to the Kentucky Department for Environmental Protection at (502) 564-2380 or 1-800-928-2380.

(D) The Contractor is responsible for securing the work site to prevent access by unauthorized personnel.

NOTE: The above notices should include the precise location, the suspected material type, and the approximate quantity and concentration if known.

IF MATERIALS ARE HAULED WITHOUT NOTICE TO MSD, IT SHALL BE THE PROPERTY OF THE CONTRACTOR. MSD WILL NOT PAY FOR DISPOSAL OR ASSOCIATED ADDITIONAL COSTS.

The Contractor shall not be required to resume work in connection with such condition until MSD and/or the owner of the property has obtained any required permits for disposal of the unsuitable materials. MSD's engineer shall promptly determine the means and methods to evaluate such condition or take corrective action on a case-by-case basis. This action could involve realignment or other design changes. MSD will provide the Contractor special written notice specifying that the condition is rendered safe for the resumption of work, or specifying any special conditions under which the work may be resumed. The cost of sampling and lab testing will be the responsibility of MSD. MSD will also be responsible for substantiated additional costs for disposal such as receiving fees at the local landfill or additional hauling fees.

The Contractor shall resume such work based on special conditions or MSD may order such portion of the work that is in connection with hazardous condition to be deleted from the work according to the unit price of the Contract. MSD may choose to perform the deleted portion of the work with its own forces or make such provisions as necessary to complete that portion of the Project.

3.3.4.3.. Borrow Material. Borrow material used as backfill or embankment shall be approved for such use by MSD. The Contractor shall not use borrow material from the permanent or temporary construction easement without the written consent of MSD. Prior to its use, the Contractor shall identify the source and provide samples for soil classifications and moisture-density tests. Borrow material shall meet the following requirements:

(A) Unless otherwise permitted by MSD, borrow material shall not be comprised of soils represented by the following classifications, as determined in accordance with ASTM D 2487: MH, CH, OL, OH, or Pt.

(B) The borrow material shall be free from rubbish, organic matter, frozen soil, muck or other perishable, compressible debris, which prevent compaction to a dense, uniform state. Rock and other hard, durable fragments shall be limited to particles displaying a maximum dimension of 4 inches, shall not exceed 10 percent of the total volume, and shall be uniformly distributed throughout the material.

(C) ***The maximum dry density of the borrow material shall meet or exceed 98 pounds per cubic foot in accordance with ASTM D 698, Standard Specification for Test***

Methods for Moisture-Density Relations for Soils and Soil-Aggregate Mixtures, Using a 5.5-lb. Rammer and a 12-in. Drop.

3.3.5. Backfill of Trench Excavations

3.3.5.1. General. Backfilling of trenches, and tunnel shaft excavations shall be accomplished as soon as possible after the pipe is placed or the tunnel is completed. The Contractor shall have the option of using flushed and jetted or compacted backfill materials. The Contractor shall notify MSD 48 hours in advance of all flushing and jetting and/or mechanical compaction operations.

3.3.5.1.1. Compaction. Compaction around structures will be performed by **a** mechanical compactor when flushing and jetting of sand and earth material is not possible or practical, or when required by the Plans.

3.3.5.2. Within Limits of Existing or Proposed Paved Surfaces. At the Contractor's option, with prior approval by MSD (based on the availability of sand which meets the requirements of Section 3.2.2), backfill within the limits of existing or proposed paved surfaces shall consist of: Type I-A Backfill - sand, flushed and jetted, Type I-B Backfill - sand, combination flushed and jetted and mechanically compacted, or Type III Backfill - selected excavated material and/or approved borrow material - mechanically compacted. In special cases and with the approval of MSD, the Contractor may utilize Type I-A sand backfill - flushed and jetted in the lower portion of the excavation and Type III backfill selected excavated materials - mechanically compacted in the upper portion of the excavation.

(A) Sand - Flushed and Jetted (Type I-A). After the trench has been completely backfilled with sand, the backfill shall be densified by thoroughly flushing and jetting with water, beginning at the downstream end of the trench and proceeding upstream. Water to be used for flushing and jetting shall be supplied through hoses and pipes having a minimum diameter of 2 inches. The jet pipe shall have a minimum diameter of 1-1/2 inches. Jet pipes used to penetrate the backfill material shall be equipped with a shut-off valve and be of sufficient length to completely penetrate the sand backfill. The jet pipe shall be inserted into the sand backfill at a maximum spacing along the trench of 6 feet and the spacing shall be staggered along the trench area. The jet pipe shall penetrate the sand backfill to within 12 inches of the crushed stone encasement. Care shall be exercised to prevent the jet pipe from penetrating the crushed stone encasement. When the depth of the trench exceeds the length of the jet pipe the flushing and jetting shall be completed in lifts. The pipe shall remain in place until water is observed rising above the backfill throughout the full width of the trench and over a length of the trench equal to one-half the distance between adjacent jet installations. If this condition is not observed within a reasonable period, the Contractor shall increase the water flow or provide additional jet pipes. If the Contractor fails to flush and jet the sand backfill in accordance with the Specifications, the sand backfill shall be excavated and replaced with properly flushed and jetted sand backfill or material compacted in accordance with Section 3.3.4.2.C., at no additional cost to MSD.

The Contractor shall provide all piping, fittings, etc., necessary to deliver the water along the site of the work and shall arrange with the Louisville Water Company, if applicable, for making the necessary taps and metering. All expenses incurred for installing the pipe and hose, together with the cost of the water, shall be borne by the Contractor. Following flushing and jetting and prior to pavement construction, the surface of the sand subgrade shall be thoroughly compacted following the procedures described in Section 3.3.4.2.(B).

(B) Sand, Combination Flushed and Jetted, and Mechanically Compacted (Type I-B). The trench shall be completely backfilled with sand, and the backfill shall be densified by thoroughly flushing and jetting with water. Flushing and jetting procedures shall be in accordance with Section 3.3.4.2.(A) above. Next, the sand backfill shall be removed to a depth of 3 feet below the pavement surface and stockpiled for later mechanical compaction. The exposed surface shall then be thoroughly compacted. The remainder of the trench shall be backfilled in two lifts of sand (approximately 12-inches thick) up to the pavement subgrade level with each lift being thoroughly compacted. For compaction, the Contractor shall supply a vibratory plate compactor or smooth drum vibratory roller capable of compacting sands to a minimum effective depth of 16-inches. The Contractor shall submit the manufacturer's equipment specifications for proof of this required effective compaction depth. The required number of passes of the roller or plate shall be established at the beginning of compaction operations for the Project by taking nuclear density tests to monitor the density increase with increased passes of the roller or plate. The required number of passes shall be set when no further increase in sand backfill density is measured.

(C) Earth Materials - Compacted (Type III-A). Selected excavated materials or approved borrow materials containing no rock fragments with a maximum dimension larger than 4 inches shall be carefully deposited in uniform, horizontal layers, not exceeding 6 inches in compacted depth, in a zone located from the top of the cradle or encasement up to a horizontal plane located 2 feet above the exterior top of the pipe. Prior to compaction, each layer shall be level and evenly distributed on both sides of the pipe so as to not disturb, displace or damage the pipe. Each layer shall be thoroughly compacted to a minimum of 95 percent of the standard Proctor density, at moisture content between plus 2 percent and minus 4 percent of the optimum moisture content, as determined by ASTM D 698, utilizing mechanical compaction. Each layer shall be properly compacted before the next succeeding layer is placed. Any lift of fill which pumps under the weight of the compaction equipment shall be rejected, regardless of the field density test results.

The remainder of the trench from the horizontal plane located 2 feet above the pipe up to the ground surface or top of the existing subgrade shall be backfilled with selected excavated materials containing no rock fragments with a maximum dimension larger than 4 inches, or approved borrow materials. The backfill shall be placed in uniform horizontal layers not exceeding 12 inches in compacted depth. Each layer shall be thoroughly compacted to a minimum of 95 percent of the standard Proctor density and a moisture content between plus 2 percent and minus 4 percent of the optimum moisture content, as determined by ASTM D 698,

utilizing mechanical compaction methods. Each layer shall be properly compacted before the next succeeding layer is placed. Any lift of fill which pumps under the weight of the compaction equipment shall be rejected, regardless of the field density test results. Follow guidelines set forth in MSD Specifications Section 3.3.9.3. at no additional cost to MSD.

(D) Combination Sand (Type I-A) and Earth Backfill (Type III-A). In trench situations where the lower trench dimensions limit the use of mechanical compaction equipment, the existing site conditions limit the effectiveness of the mechanical compaction methods, or where additional backfill material is required to replace unsuitable excavated materials, the Contractor may utilize flushed and jetted sand backfill in the lower portion of the trench and mechanically compacted earth material in the upper portion of the trench with prior approval of MSD. The sand backfill operations shall extend from the top of the cradle or encasement up to a point where mechanical compaction can be properly accomplished in accordance with Section 3.3.4.2.C. The mechanical compaction operations shall extend from the top of the sand backfill up to the ground surface or top of the existing subgrade. Follow guidelines set forth in MSD Specifications Section 3.3.9.3.

(E) No. 57 Crushed Stone - Compacted. With prior approval from MSD, No. 57 crushed stone may be used as trench backfill within paved areas. The stone shall be carefully deposited in uniform, horizontal layers not exceeding 12 to 24 inches in compacted depth, depending on the type and size of compaction equipment used. The initial lift(s) of stone immediately above the pipe shall be level and evenly distributed on both sides of the pipe. Each layer shall be thoroughly compacted by making a minimum of two passes using a vibratory plate compactor or smooth drum vibratory roller capable of compacting clean stone to a minimum effective depth of the lift thickness selected. The Contractor shall submit the manufacturer's equipment specifications for proof of this required effective compaction depth.

3.3.5.3. Outside Limits of Existing or Proposed Paved Surfaces. At the Contractor's option, except as otherwise specified in Section 3.3.4.4., trench backfill outside the limits of existing or proposed paved surfaces shall consist of earth materials (selected excavated or approved borrow materials) which are flushed and jetted or compacted. The upper one foot of the earth backfill shall be essentially free from rock, gravel or other hard, durable fragments.

(A) Earth Materials - Flushed and Jetted (Type II Backfill). The lower portion of the trench backfill extending from the top of the cradle or encasement to a horizontal plane located 2 feet above the exterior top of the pipe shall contain no rock or rock fragments with a maximum dimension larger than 1 inch. The remainder of the trench shall be backfilled with selected excavated materials or approved borrow materials containing no rock fragments larger than 1 cubic foot. After the trench has been completely backfilled with selected excavated material or approved borrow material, the backfill shall be densified by thoroughly flushing and jetting with water, beginning at the downstream end of the trench and proceeding upstream. The backfill shall be thoroughly and uniformly sluiced and flooded by introducing water at the top of the trench and by inserting the jet pipe into the backfill at intervals as

specified in Section 3.3.4.2. (A) along the trench. This process shall be continued until the backfill is completely saturated and no further settlement is observed. Hoses, jet pipes and the maximum depth of insertion shall be as specified in Section 3.3.4.2.A. After the backfill in the trench has substantially dried and completed any additional settlement, any settlement below the finish grade shall be refilled with additional earth, and compacted in accordance with (B), below.

(B) Mechanical Compaction of Earth Materials (Type III-B). Selected excavated materials or approved borrow materials, containing no rock or rock fragments with a maximum dimension larger than 3 inches, shall be carefully deposited in uniform, horizontal layers, not exceeding 6 inches in compacted depth, in a zone located from the top of the cradle or encasement up to a horizontal plane located 2 feet above the exterior top of the pipe. Prior to compaction, each layer shall be leveled and evenly distributed on both sides of the pipe so as not to disturb, displace or damage the pipe. Each layer shall be thoroughly compacted to a minimum of 85 percent of the Standard Proctor density before the next succeeding layer is placed. Any lift of fill which pumps under the weight of the compaction equipment shall be rejected, regardless of the field density test results. Follow guidelines set forth in MSD Specifications Section 3.3.9.3. The remainder of the trench from the horizontal plane located 2 feet above the top of the pipe up to the ground surface shall be backfilled with selected excavated materials or approved borrow material containing no rock fragments larger than 1 cubic foot. The material shall be placed in uniform horizontal layers not exceeding 12 inches in compacted depth. Each layer shall be compacted with a dozer or other heavy, earth-moving equipment traveling back and forth over the material until no further settlement is observed.

3.3.5.4. Between Pipe and Drainage Swale or Ditch. The Contractor shall use Type III - A backfill in pipe trenches where a surface ditch or swale is to be constructed above the pipe. This includes all ditches and swales - paved, sodded, rip-rapped or seeded.

3.3.6. Depositing Backfill Material. All backfilling shall be done in a manner to avoid displacing or damaging the pipe or structure. Any pipe or structure damaged or displaced shall be excavated and repaired or replaced at the Contractor's expense.

3.3.7. Backfill Against Structures

3.3.7.1. Backfill Against Retaining Walls and Box Culverts. Unless shown otherwise on the Plans, backfill shall be selected excavated materials or approved borrow materials. The placement of any backfill shall be delayed until representative test samples of the concrete have attained a compressive strength of 3,500 pounds per square inch and the concrete has been in place at least seven days.

When the back slopes bounding the excavation lie within the slope limits of 6:1 to 1/4:1, the planes of the slopes shall be destroyed by stepping or serrating to prevent wedging action during compaction.

Backfill material shall be placed and compacted in uniform horizontal layers not exceeding 6 inches in thickness, loose measurement. Each layer shall be compacted by means of approved manually-directed mechanical tampers or rollers. Successive blows of the tamper shall overlap no less than one-fourth of the width of the tamper head. Successive passes of the roller shall overlap no less than one-fourth the width of the roller. Each layer shall be dampened when necessary to ensure the maximum density obtainable, as directed. The Contractor shall not permit heavy rolling compaction equipment to operate closer to the back of the culvert or retaining walls than a distance equal to the unbalanced height of the fill at any time. Backfill that will be beneath or within a proposed embankment or pavement area shall be thoroughly compacted to a minimum of 95 percent of the standard Proctor density, as determined by ASTM D 698. Each layer shall be properly compacted before the next succeeding layer is placed. Backfill shall be brought up equally on both sides of the walls to the elevation shown on the drawings to prevent unequal loading.

3.3.7.2. Backfill Against Wet Wells and Deep Structures. Unless otherwise shown on the Plans, backfill shall be selected excavated materials, approved borrow materials, sand, or crushed stone. The backfill shall be brought up evenly on all sides to reduce any unbalanced lateral loading that could cause tilting, or opening of joints between riser sections.

For earth materials, backfill shall be flushed and jetted, or mechanically compacted as set forth in MSD Specifications Section 3.3.4.3. Section (B) and Section 3.3.9.3. when directed by MSD or as required by the Plans.

3.3.8. Embankments. Embankments placed in areas over which sanitary or storm drainage facilities will be constructed, pavements will be constructed, which will be subjected to erosive action of water flowing through adjacent channels or streams, or for the purpose of storm water detention basins, shall be constructed of selected excavated materials or approved borrow materials. Embankment material shall be placed and compacted in uniform horizontal layers not exceeding 12 inches in thickness, loose measurement. Each layer shall be thoroughly compacted to a minimum of 95 percent of standard Proctor density at a moisture content between plus 2 percent and minus 4 percent, as determined by ASTM D 698. Each layer shall be properly compacted before the next succeeding layer is placed. Any lift of fill which deflects under the weight of compaction equipment shall be rejected, regardless of field density test results.

3.3.9. Final Grading. Final grading around and above sanitary sewer or storm drainage improvements shall be shaped to the slope of adjacent undisturbed ground. Sufficient grading operations shall be performed to prevent ponding and to provide natural surface drainage from adjacent areas into storm water inlets, ditches or swales.

3.3.10. Inspection and Testing

3.3.10.1. Inspection Personnel. All flushing and jetting operations shall be performed in the presence of the MSD Inspector assigned to the Project. All backfill operations which

involve mechanical compaction and which are required to meet a specified degree of compaction, shall be performed in the presence of an MSD inspector or an experienced earthwork inspector who represents an Agency designated or approved by MSD to provide earthwork inspection and testing on Projects involving MSD facilities.

3.3.10.2. Laboratory Tests. Selected excavated materials or approved borrow materials shall be sampled and tested for standard Proctor density, optimum moisture content and classification by the Agency approved by MSD. These tests will be required whenever such materials are proposed for use in compacted backfill or embankment and a specified degree of compaction is required. A minimum of one week should be allowed for the Agency to obtain samples and complete the tests.

3.3.10.3. Field Density Tests. Field density tests shall be performed on compacted backfill or embankment materials. MSD must be notified 24 hours in advance. Scheduling of field density tests with an approved Agency shall be performed 24 hours in advance of the backfill operations. Acceptable methods of performing field density tests include the following:

(A) Nuclear Density Test - ASTM D 2922, Standard Specification for Test Methods for Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).

(B) Sand Cone Test - ASTM D 1556, Standard Specification for Test Method for Density of Soil In-Place by the Sand Cone Method.

(C) Rubber Balloon Test - ASTM D 2167, Standard Specification for Test Method for Density and Unit Weight of Soil In-Place by the Rubber Balloon Method.

(D) Drive-Cylinder Method - ASTM D 2937, Standard Specification for Test Method for Density of Soil In-Place by the Universal Cylinder Method.

The frequency that field density tests shall be performed will be in accordance to the following minimum schedule. Additional testing shall be performed when directed by the Inspector or by MSD.

(A) A minimum of 1 test per 100 cubic yards of material placed and compacted in trenches or 500 cubic yards of material in embankments.

(B) A minimum of 1 test per lift per 200 feet of material placed and compacted in trenches.

(C) A minimum of 1 test per lift of material placed and compacted in embankments.

(D) A minimum of 1 test per shift (day) of compaction operations.

(E) A minimum of 1 test whenever there is a suspicion of a change in material, moisture content, or degree of compaction control.

When instructed by MSD, the Contractor shall excavate previously untested backfill or embankment material to a particular grade for testing. Backfilled areas which do not pass this test shall be excavated and recompacted until they meet the compaction specifications. Areas excavated for testing shall be recompacted in accordance with the Project Specifications. The cost of this Work shall be at the Contractor's expense.

3.3.10.4. Payment for Inspection and Testing. When the Contract requires mechanical compaction on MSD Projects, earthwork inspection and testing shall be performed as specified at MSD's expense. When the Contractor has the option of backfilling by flushing and jetting or by mechanical compaction, and he selects to backfill using mechanical compaction, earthwork inspection and testing shall be performed as specified at the Contractor's expense for any Project. The mechanical compaction option shall be approved by MSD prior to placement of backfill and the Testing Agent must be designated in writing.

SECTION 4

MSD STANDARD SPECIFICATIONS

PIPEWORK

4.1. DESCRIPTION OF WORK

This work shall consist of the furnishing, bedding, laying, jointing, backfilling, compaction and testing of all sanitary sewers, force main or drainage pipe shown on the Plans or otherwise required by the Contract. The Contractor shall limit active pipe installation to assure clean up following such work, in accordance with Section 4.3.1. of these Specifications.

4.2. MATERIALS

4.2.1. General. Sanitary sewer, force main or drainage pipe may be any of the following types, unless shown otherwise in the Contract. Pipe strength classes listed are the minimum acceptable classes for each type of pipe. Conditions of the construction may warrant a stronger pipe than listed herein, and the pipe supplied shall be as required by the Specifications or shown on the Plans, subject to the approval of MSD. If the contractor request**s** a method other than ***that of*** the Plans and Specifications, and the method requires a stronger pipe ***or alternate***, the contractor will incur the additional cost of the stronger pipe needed. Should MSD request a stronger ***or alternate*** pipe other than specified on the Plans and Specifications, MSD will reimburse the contractor for the stronger pipe. Any pipe found defective, or otherwise not meeting the Specifications shall be rejected and replaced by pipe meeting these Specifications at no additional cost to MSD. MSD reserves the right to randomly test up to 3 sections of pipe for each size furnished, in accordance with ASTM standards. Upon passing the tests, MSD shall reimburse the Contractor for the cost of the testing. The Contractor shall pay for any failed tests.

The Contractor shall furnish three copies of the supplier's certification stating that pipe materials were manufactured, sampled, tested and inspected in accordance with the standards listed in this Section and have been found to meet those requirements.

4.2.2. Sanitary Sewers

4.2.2.1. Concrete Pipe. Reinforced concrete pipe shall meet the requirements of ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe. Unless shown otherwise on the Plans or required by the Contract, Class III, Wall B or thicker pipe shall be used. For circular pipe sizes 12-inch through 24-inch diameter, non-reinforced concrete pipe meeting ASTM C14, Class 3 can be used where reinforced concrete pipe Class III is allowed.

Cement used in the manufacture of reinforced concrete pipe shall meet the requirements of

ASTM C 150, Standard Specification for Portland Cement, for Type II cement. All reinforcing cages shall be circular; elliptical reinforcement shall not be permitted unless shown on the Plans or allowed by MSD. Joints shall be sealed **with Type A -** rubber compression or confined O-ring or other MSD approved gaskets. Joints shall meet the requirements of ASTM C 443-**05A**, Standard Specification for Joints for Concrete **Pipe and Manholes,** Using Rubber Gaskets.

Unless otherwise directed by MSD, T-branch and Y-branch fittings shall be manufactured at the pre-cast plant and supplied to the Project site as single units. When field-fabricated branches are permitted, the openings in the pipe shall be properly cast at the time of manufacture.

4.2.2.2. Ductile Iron Pipe and Fittings. Ductile iron pipe shall meet the requirements of ANSI/AWWA C151/A21.51, Ductile Iron Pipe, and Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids. Unless shown otherwise on the Plans or in the Contract, the thickness class shall be determined based on a working pressure of 150 psi, in accordance with ANSI/ AWWA C150/A21.50, Thickness Design for Ductile Iron Pipe.

Flanged joint ductile iron fittings shall meet the requirements of ANSI/AWWA C110/A21.10, Ductile Iron and Gray Iron Fittings, 3 inch through 48 inch for Water and Other Liquids. Unless shown otherwise on the Plans or in the Contracts, Class 250 fittings with class 53 wall thickness shall be used.

Mechanical, push on and other such joints shall meet the requirements for ductile iron fittings, 3 in. through 16 in., ANSI/AWWA C153/A21.53. Where these short bodied compact fittings are to be fitted to aged existing cast iron pipe of larger diameter than specified in A21 standards, mechanical joint sleeves or bell-and-spigot sleeves shall provide transition.

All pipe and fittings shall be cement-lined in accordance with ANSI/AWWA C104/A21.4, Cement-Mortar Lining for Ductile Iron and Gray Iron Pipe and Fittings, or polyurethane lined over concrete or ductile iron or gray iron pipe and fittings. The polyurethane lining shall be an ASTM Type V, chemical cure, 100% solids, elastomeric and aromatic with no sand fillers or extenders added. It shall be capable of being spray applied to 50 mils nominal thickness in a single application. Minimum lining thickness shall be 40 mils. The polyurethane lining shall be ***a seamless*** flexible membrane that is corrosion, abrasion, and impact resistant; with a Shore "D" hardness of 60 to 65 at 78ºF (25.5ºC); a tensile strength of 2,878 psi and elongation of 52% per ASTM D-412; shall be resistant to abrasion as measured by a weight loss of no more than 42 mgs. per ASTM D-1044; and shall have a water vapor transmission rate (WVTR) of no more than 0.016 grams per 100 square inches (254 cm2) per 24 hours (75 mils DFT @ 73ºF (22.7ºC), 100% RH, per ASTM F-1249-90). Unless otherwise noted on the Plans or in the Special Provisions, all pipes shall be cement lined. Lining thickness per ANSI/AWWA C-104/A21.4 shall be 1/16 in. (min.) for 3 through 12 in. pipe, 3/32 in. for 14 in. through 24 in. pipe, and 1/8 in. for 30 through 54 in.

pipe.

Joints shall be push-on rubber gasket types which meet the requirements of ANSI/AWWA C111/A21.11, Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.

When flanged joints are required, they shall meet the requirements of ANSI/AWWA C115/A21.15, Flanged Ductile Iron and Gray Iron Pipe with Threaded Flanges. Mechanical flanged restrained joints may be used when approved by MSD.

All flanged and mechanical joints for ductile iron pipe and fittings shall be made with stainless steel nuts, bolts, etc.

4.2.2.3. Polyvinyl Chloride (PVC) Pipe and Fittings. Unless shown otherwise on the Plans, in the Contract, or stipulated by MSD, the Contractor may, at his option, use any of the following types of PVC pipe:

(A) PVC pipe meeting the requirements of ASTM D 3034, Standard Specification for Type PSM Poly (Vinyl Chloride)(PVC) Sewer Pipe and Fittings. Unless shown otherwise on the Plans or in the Contract, SDR 35 pipe shall be required.

(B) PVC pipe meeting the requirements of ASTM F 679, Standard Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings. Unless shown otherwise on the Plans or in the Contract, SDR 35 (approximate) shall be required.

(C) PVC pipe meeting the requirements of ASTM F 789, Standard Specification for Type PS46 Poly (Vinyl Chloride) (PVC) Plastic Gravity Flow Sewer Pipe and Fittings.

(D) PVC pipe meeting the requirements of ASTM D 1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120. Unless shown otherwise on the Plans or in the Contract, Schedule 40 pipe shall be required. Fittings shall meet the requirements of ASTM D 2466, Standard 4 Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings.

(E) PVC open or closed profile pipe meeting the requirements of ASTM F 794, Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.

(F) Corrugated PVC pipe meeting the requirements of ASTM F 949, Latest Revision, "Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings".

Polyvinyl Chloride Pipe shall be installed in accordance with these Specifications and ASTM Standards for "Underground Installation of Flexible Thermoplastic Sewer Pipe", D2321 requiring a minimum trench width of not less than the greater of either the pipe outside diameter plus 16 inches or the pipe outside diameter times 1.25 plus 12 inches.

Joints for PVC pipe meeting the requirements of ASTM D 3034, ASTM F 679, ASTM F 789, ASTM F949, and ASTM F 794 shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe. For 4 inch diameter pipe meeting the ASTM F 949 requirements, double gaskets shall be used at the Tee/ Wye.

4.2.2.4. Polyethylene Pipe and Fittings. Polyethylene pipe shall meet the requirements of ASTM F 894, Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe. The pipe shall be manufactured from material which meets the requirements of ASTM D 1248, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials for Type III, Class C, Category 5, Grade P34 High Density Polyethylene. The pipe class shall be as shown on the Plans or in the Contract. Polyethylene pipe shall not be delivered to the site until MSD has provided approval for the pipe class to be used.

Polyethylene pipe shall be installed in accordance with these Specifications and ASTM Standards for "Underground Installation of Flexible Thermoplastic Sewer Pipe", D2321.

Joints shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

4.2.2.5. Adapters and Couplings. Connections of sanitary sewer pipes of dissimilar materials or different sizes shall be made with connectors or adapters of the compression or mechanical seal types, and which have been approved by MSD. Bitumastic, butyl resin and mastic types of connections will not be acceptable.

4.2.3. Force Mains

4.2.3.1. Polyvinyl Chloride (PVC) Pipe and Fittings. Unless shown otherwise on the Plans or in the Contract, the Contractor may use any of the following types of PVC pipe.

(A) PVC pipe meeting the requirements of AWWA C 900, Standard Specification for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch. The minimum pressure class allowance should be class 150 (DR18). PVC pipe meeting the requirements of AWWA C 905, Standard Specification for Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 inch through 36 inch, pressure rated 165 psi (DR25). The minimum pressure class allowed shall be Class 150 (DR18). Joints shall be gasket, bell and spigot, push-on types which meet the requirements of AWWA C 900. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

(B) PVC pipe meeting the requirements of ASTM D 1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, 120. The minimum pressure rating allowed shall be 150 psi.

Joints can be solvent-cement joints on pipes less than 4 inch and shall meet the requirements of ASTM D 2855, Standard Specification for Making Solvent-Cement Joints with Poly (Vinyl Chloride) (PVC) Pipe Fittings. The solvent-cement shall meet the requirements of ASTM D 2564, Standard Specification for Solvent-Cement for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

(C) PVC pipe meeting the requirements of ASTM D 2241, Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series). The minimum pressure rating shall be 150 psi.

Joints shall be gasket, bell and spigot, push-on types which meet the requirements of ASTM D 3139, Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals. Gaskets shall meet the requirements of ASTM F 477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

4.2.3.2. Ductile Iron Pipe and Fittings. Ductile iron pipe shall meet the requirements of ANSI/AWWA C151/A21.51, Ductile Iron Pipe, and Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids. Unless shown otherwise on the Plans or in the Contract, the thickness class shall be determined based on a working pressure of 150 psi, in accordance with ANSI/ AWWA C150/A21.50, Thickness Design for Ductile Iron Pipe.

Flanged joint ductile iron fittings shall meet the requirements of ANSI/AWWA C110/A21.10, Ductile Iron and Gray Iron Fittings, 3 inch through 48 inch for Water and Other Liquids. Unless shown otherwise on the Plans or in the Contracts, Class 250 fittings with class 53 wall thickness shall be used.

Mechanical, push on and other such joints shall meet the requirements for ductile iron fittings, 3 in. through 16 in., ANSI/AWWA C153/A21.53. Where these short bodied compact fittings are to be fitted to aged existing cast iron pipe of larger diameter than specified in A21 standards, mechanical joint sleeves or bell-and-spigot sleeves shall provide transition.

All pipe and fittings shall be cement-lined in accordance with ANSI/AWWA C104/A21.4, Cement-Mortar Lining for Ductile Iron and Gray Iron Pipe and Fittings, or polyurethane lined over concrete or ductile iron or gray iron pipe and fittings. The polyurethane lining shall be an ASTM Type V, chemical cure, 100% solids, elastomeric and aromatic with no sand fillers or extenders added. It shall be capable of being spray applied to 50 mils nominal thickness in a single application. Minimum lining thickness shall be 40 mils. The polyurethane lining shall be a seamless flexible membrane that is corrosion, abrasion, and impact resistant; with a Shore ”D” hardness of 60 to 65 at 78ºF (25.5ºC); a tensile strength of 2,878 psi and elongation of 52% per ASTM D-412; shall be resistant to abrasion as measured

by a weight loss of no more than 42 mgs. per ASTM D-1044; and shall have a water vapor transmission rate (WVTR) of no more than 0.016 grams per 100 square inches (254 cm2) per 24 hours (75 mils DFT @ 73ºF (22.7ºC), 100% RH, per ASTM F-1249-90). Unless otherwise noted on the Plans or in the Special Provisions, all pipes shall be cement lined. Lining thickness per ANSI/AWWA C-104/A21.4 shall be 1/16 in. (min.) for 3 through 12 in. pipe, 3/32 in. for 14 in. through 24 in. pipe, and 1/8 in. for 30 through 54 in. pipe.

Joints shall be push-on rubber gasket types which meet the requirements of ANSI/AWWA C111/A21.11, Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings. When flanged joints are required, they shall meet the requirements of ANSI/AWWA C115/A21.15, Flanged Ductile Iron and Gray Iron Pipe with Threaded Flanges. Mechanical flanged restrained joints may be used when approved by MSD.

All flanged and mechanical joints for ductile iron pipe and fittings shall be made with stainless steel nuts, bolts, etc.

4.2.3.3. Polyethylene Pipe and Fittings. Polyethylene pipe shall meet the requirements of ASTM F 714, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Inside Diameter. Materials shall meet the requirements of ASTM D 3350, Standard Specification for Polyethylene Plastic Pipe and Fittings Materials, for Polyethylene Cell Classification PE 345434C. Unless shown otherwise on the Plans or in the Contract, the pressure rating to be used shall be 160 psi (SDR 11).

Joints shall be butt fused joints which meet the requirements of ASTM D 3261, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

4.2.4. Drainage Pipe

4.2.4.1. Concrete Pipe. Circular reinforced concrete pipe shall meet the requirements of ASTM C 76, Standard Specification for Reinforced Concrete Culvert, Storm Drain and Storm Pipe. For circular pipe sizes 12-inch through 24-inch diameter, non-reinforced concrete pipe meeting ASTM C-14 Class 3 can be used where reinforced concrete pipe Class III is allowed. Elliptical reinforced concrete pipe shall meet the requirements of ASTM C 507, Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe. Unless shown otherwise on the Plans or in the Contract, Class III pipe shall be used.

Joints shall be sealed with either Type A rubber compression gaskets in conformance with ASTM C443-05a- Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets, or Type B preformed flexible butyl rubber sealant in conformance with ASTM C990-06 - Joints for Concrete Pipe Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealant.

Bituminous mastic joint sealing material shall not be allowed in the construction of

reinforced concrete pipe systems.

4.2.4.2. High Density Polyethylene Corrugated Pipe. Corrugated polyethylene pipe with an integrally formed smooth interior shall meet the requirements of AASHTO M 294, Standard Specification for Corrugated Polyethylene Pipe, 12 to 36 inch diameter, for Type S pipe. Polyethylene pipe shall not be delivered to the site until MSD has provided written approval for the pipe to be used.

The pipe shall have a minimum pipe stiffness at 5% deflection as follows when tested in accordance with ASTM D-2412.

Diameter	Pipe Stiffness
12"	45 psi
15"	42 psi
18"	40 psi
24"	34 psi
30"	28 psi
36"	22 psi

Joints shall be **watertight and** made using split-corrugated couplings manufactured by the pipe manufacturer and exceeding the soil tightness requirements of the AASHTO Standard Specifications for Highway Bridges, Section 23 (2.23.3.).

4.2.4.3. Corrugated Steel Pipe. Corrugated steel pipe and coupling bands shall meet the requirements of AASHTO M 36, Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains. Pipes shall be fabricated from aluminum-coated steel sheet which meets the requirements of AASHTO M 274, Standard Specification for Steel Sheet, Aluminum-Coated (Type 2) for Corrugated Steel Pipe. The gage of the steel sheet used to fabricate the pipe shall be as shown on the Plans.

Joints shall be made using coupling bands and gaskets meeting the requirements of AASHTO M 36 and AASHTO M 274.

4.2.4.4. Polyvinyl Chloride (PVC) Pipe and Fittings. Polyvinyl chloride pipe shall meet the requirements of Subsection 4.2.2.3. of these Specifications.

4.2.5. Cast-In-Place Pipe

4.2.5.1. Concrete. Concrete for all cast-in-place sewer pipes and collars shall be Class A concrete as specified in Section 6 of these Specifications.

4.2.5.2. Steel Reinforcement. Deformed steel reinforcing bars shall be Grade 60 bars of the sizes, dimensions, spacings and locations shown on the Plans. Steel reinforcement and its storage shall be as specified in Section **6** of these Specifications.

4.2.5.3. Waterstops. Waterstops shall be PVC waterstops of the shape and dimensions as shown on the Plans and meeting the material requirements as specified for waterstops in Section 5 of these Specifications.

4.2.6. Cradles and Encasements

4.2.6.1. Crushed Stone. Crushed stone for cradles and encasements shall be as set forth in Subsection 3.2.1. of these Specifications.

4.2.6.2. Concrete. Concrete for cradles, encasements or caps shall be Class B concrete as set forth in Section 6 of these Specifications.

4.2.7. Marking Tape. Marking tape shall be a composite plastic metallic tape, at least 5 mils in thickness with impervious plastic film on both sides and aluminum foil in center. The minimum tensile strength shall be 185 lbs. The tape shall be at least 3 inches in width, colored green, and shall be permanently printed on both sides "Caution Buried Sewer Below".

4.3. EXECUTION OF WORK

4.3.1. General. Prior to beginning pipe laying operations, the trench shall have been excavated to the subgrade level and unsuitable foundation conditions, when encountered, shall be corrected in accordance with Section 3 of these Specifications. The pipe within the right-of-way shall be supported on a crushed stone cradle or a concrete cradle as shown on the plans, specified herein, or directed by MSD. For concrete pipe installed outside the right-of-way, see Section 4.3.2.2. of these Specifications.

Crushed stone or concrete shall be used to encase the pipe as specified herein or directed by MSD.

4.3.2. Cradle and Encasement. Cradle and encasement shall be of crushed stone or concrete and shall be installed as specified and within the limits shown on the Plans or directed by MSD.

4.3.2.1. Crushed Stone Cradle. Crushed stone cradle shall mean the placement of crushed stone from the subgrade level (6 inches below the outside of the pipe) up to the springline of the pipe. The crushed stone shall be deposited in the trench to grade, allowing for the thickness of the pipe wall. Bell holes shall be dug to relieve the bells of all concentrated loads and to provide uniform support throughout the pipe section. For larger pipes, the crushed stone shall be shoveled and shovel-sliced beneath the haunches of the pipe to assure uniform support. Unless shown otherwise on the Plans or directed by MSD, the following types of pipes shall be supported on a crushed stone cradle.

A. Concrete Pipe

B. Ductile Iron Pipe

4.3.2.2. Soil Bedding/Cradle. For concrete pipe installed outside the roadway right-of-way with 9 feet of cover or less, the crushed stone cradle can be eliminated and replaced with job excavated native soil material. The earth trench bottom foundation should be scarified for the middle third of the pipe O.D. or at the Contractors option a minimum thickness of granular bedding can be provided. For rock foundations provide a standard 6-inch thick granular bedding.

4.3.2.3. Crushed Stone Encasement. Crushed stone encasement shall mean the placement of additional crushed stone above the crushed stone cradle to a level at least 6 inches above the outside top of the pipe **and leveled off between the trench walls**. The additional stone shall be placed in such manner to prevent damage to the pipe. Unless shown otherwise on the Plans or directed by MSD, the following types of pipe shall be encased in crushed stone.

A. Polyvinyl Chloride Pipe
B. Polyethylene Pipe
C. Corrugated Polyethylene Pipe
D. Corrugated Steel Pipe
E. Corrugated Polyvinyl Chloride Pipe

4.3.2.4. Concrete Cradle. Where a concrete cradle is required as additional support for a sanitary sewer or storm drainage pipe, or if a sanitary sewer pipe will have less than 2 feet of vertical clearance above an existing or proposed storm drain or utility conduit, a concrete cradle shall be installed. The length of the concrete cradle shall be as shown on the Plans or 2 feet beyond the outside edge of the underlying storm drain or utility conduit. The pipe shall be laid to line and grade, and shall be supported on concrete blocks, bricks or saddles set to prevent both vertical and lateral movement of the pipe. The use of wooden blocks will not be permitted. Concrete shall be placed around the pipe up to the springline of the pipe. Proper bracing shall be provided to prevent displacement or flotation of the sewer pipe during placing of concrete.

4.3.2.5. Concrete Cap. **The length of the concrete cap shall either be as shown on the plans; or 2 feet beyond the outside edge of the storm drain or utility conduit; or 2 feet beyond the point where the sewer pipe attains 30 inches of cover in an easement; or 4 feet of cover in a right-of way or surfaces subject to vehicular traffic, or as directed by MSD**. The sewer pipe shall be laid and supported on a crushed stone cradle, and concrete shall be placed around the pipe and at least 6 inches above the top of the pipe for the full trench width, as shown on MSD's Standard Drawings. Proper bracing shall be provided to prevent displacement or flotation of the sewer pipe during placing of the concrete.

4.3.2.6. Concrete Encasement. Where shown on the Plans or where conditions exist requiring additional pipe protection (stream crossings, ditch crossings, shallow trench or poor soil conditions), pipes shall be encased in concrete, as determined by MSD. The length of the concrete encasement shall be at least 2 feet beyond the point where additional pipe

protection is required, as shown on the Plans, or as directed by MSD. The sanitary sewer or storm drainage pipe shall be laid and supported as required for a concrete cradle, and concrete shall be placed around the pipe 6 inches either side of it and up to at least 6 inches over the top of the pipe. Proper bracing of the pipe shall be provided to prevent movement or flotation of the sewer pipe during placing of concrete. In rock-bottom streams, the encasement shall extend from 6 inches below the pipe up to the original rock level. Encasement shall be required when crossing a blue line stream and shall extend to 5 feet beyond the top of bank on each side of said stream. Concrete encasement is required for plastic pipe with less than ***4 feet*** of cover in easements and less than **5** feet of cover in street rights-of-way. Unless otherwise directed by MSD, a 4-inch PVC drain pipe shall be placed in the trench next to the carrier pipe and shall extend through the concrete encasement and 5 feet into the crushed stone encasement on both sides. The drain pipe shall be open on both ends. This will allow unimpeded flow of any groundwater in the sewer trench.

4.3.2.7. Safeloading. Safeloading shall consist of completely filling the designated areas with grout in such a manner to make them safe from collapse or at the Contractor's option, safeloading may be done by filling the designated area with free-flowing ***grout of sand or other approved free flowing material***. Appreciable deposits of debris shall be removed from other structures prior to safeloading. The ends of existing culverts shall be plugged by use of bulkheads containing small openings at the tops through which the grout may be pumped at a minimum pressure of 15 pounds per square inch.

4.3.2.8. Thrust Block. ***Concrete Thrust Blocks, or reaction backing, shall be placed at all fittings used for changes of horizontal and vertical direction, at reducers, and at each valve, unless otherwise directed by the Engineer. Thrust blocks shall be installed in accordance with the details illustrated on the plans.***

Thrust blocks shall be placed between solid ground and the fitting to be anchored. The backing shall, unless otherwise shown or directed, be placed such that the pipe and fitting joints will be accessible for repair. Do not encase bolts or nuts.

Class B Concrete shall be used to fabricate Thrust Blocks, in accordance with Section 6.3.4.3 of the MSD Standard Specifications, and have a minimum 28-day compressive strength of 2,500 psi.

4.3.3. Pipe Installation

4.3.3.1. Inspection and Handling. All pipes shall be inspected on delivery and such pipe sections that do not conform to these Specifications and which are not suitable for use shall be rejected and immediately removed from the Work site. Equipment used to handle, lay, and joint pipe shall be so used to prevent damage to the pipe and its jointing materials. All pipe and fittings shall be carefully handled and lowered into the trench. Damaged pipe or jointing material shall not be installed.

4.3.3.2. Pipe Laying and Jointing. The laying of pipe shall begin at the lowest point and proceed upstream with the bell pointing upstream **unless conditions dictate otherwise, in**

which case MSD approval must be obtained. Prior to making pipe joints, all joint surfaces shall be clean and dry and free from gravel or other extraneous materials. All necessary lubricants or adhesives shall be used as recommended by the pipe manufacturer. Suitable means shall be used to force the spigot or tongue end of the pipe the proper distance into the bell or groove end without damage to the pipe and its jointing materials and without disturbing previously laid pipe sections. Special care shall be taken to ensure that the pipe is solidly and uniformly cradled or encased in accordance with these Specifications. No section of pipe shall be brought into position for jointing until the preceding section has been bedded and secured in place.

4.3.3.3. Line and Grade. Each section of pipe shall be checked for vertical and horizontal alignment immediately after being laid. A calibrated survey transit shall be on site and in use at all times during pipe laying operations. All adjustments to line and grade must be made by scraping away or filling in under the barrel of the pipe and not by wedging or blocking up any portion of the pipe or striking the pipe in an effort to drive it down. Curved alignments may be allowed on a case-by-case basis, as approved by MSD, except on gravity sanitary sewers smaller than 48 inches in diameter.

4.3.3.4. Protection of Installed Pipe. As the Work progresses, the interior of the pipe shall be protected from and cleaned of all dirt, cement, extruded joint materials, debris, and other extraneous materials. Whenever pipe laying is stopped for any significant length of time, such as at the end of a workday, the unfinished end shall be protected from displacement, floatation, cave-in, and in-wash of soil or debris. A suitable temporary tight-fitting plug, stopper or bulkhead shall be placed in the exposed end of the pipe.

Water shall not be allowed to rise in the excavation until the joint materials and/or concrete cradle or encasement has hardened and cannot be damaged by the water. Particular care shall be used to prevent disturbance or damage to the pipe and the joints during backfilling or at any other time. Walking or working over the pipe, except as necessary for placing and compacting backfill, or operating compaction equipment directly over the pipe shall be allowed until a minimum of 24 inches of cover over the outside top of the pipe has been placed. Mechanical compaction in this zone shall be with manual pneumatic tampers or other hand-operated methods which will not damage the pipe.

4.3.3.5. Property Service Connections. Property service connections shall be installed at the locations and with the pipe sizes shown on the Plans. Manufactured wye and tee fittings and reducers shall be used for new sewer line installations, unless noted otherwise in the Contract. The property service connection pipe shall be laid on a uniform grade from the sanitary sewer to the property **or easement** line. Where a stack is required, the pipe shall be laid on a uniform grade from the top of the stack to the property **or easement** line. The pipe depth at the property **or easement** line shall be at least 30 inches in easements, and shall be 4 feet below the final street grade, unless shown otherwise on the Plans or directed by MSD. Where no final street grade has been established, the depth of the connection shall be as directed by MSD. For existing sewer lines, property service connections shall be made with MSD approved wye, tee saddles or insert-a-tees only.

***In MSD easement or right-of-way*, two-way (or double wye) polyethylene cleanout fittings shall be installed at each property service connection unless otherwise directed by MSD.**

Four or six-inch corrugated PVC property service connections will not be allowed.

At the upstream end of each property service connection, the Contractor shall install a watertight stopper or cap. For any thermoplastic pipe other than SDR-35, ***a Schedule 40*** adapter shall be installed at the end of each property service connection in the event that the cleanout is not installed. The Contractor shall mark the end of each property service connection with a 2x4 board which extends from the pipe to approximately 3 feet above the ground surface and marked with green paint (Catalog No. 4634 Sewer Green Fluorescent by Rainbow Manufacturing, or approved equal).

4.3.3.6. Stacks. Stacks shall be constructed at the locations and to the height shown on the Plans or directed by MSD. Stacks shall be constructed in accordance with MSD's Standard Drawings.

4.3.3.7. Stoppers and Bulkheads. When the open ends of pipes or fittings smaller than 18 inches in diameter are to be sealed, the openings shall be sealed with stoppers, cemented into place using a rubber gasket between the stopper and bell or socket. Openings 18 inches in diameter or larger shall be sealed with ***concrete*** brick masonry or concrete bulkheads at least 4 inches thick, ***verified or redesigned by a professional engineer to meet pressure requirements.***

All openings into pipes shall be protected from the entrance of earth, water or other extraneous materials. If a temporary bulkhead is constructed to prevent sewage from backing into the excavation or to prevent extraneous material from entering the sewer, the Contractor shall be responsible for reconstructing, repairing or replacing those portions of the existing sewer removed or damaged by this operation.

When an existing bulkhead is to be removed, its removal shall be coordinated with MSD.

During construction, use a mechanical plug, properly braced and tied off, when tying into an existing sewer. The plug shall remain until the sewer lines are accepted by MSD. It is the Contractor's responsibility to remove the plug prior to approval of flow being allowed into the system. The Contractor shall assume full responsibility for any damage or claims due to the installation and removal of the plug.

4.3.3.8. Marking Tape for Force Mains and Property Service Connections. Detectable marking tape shall be as specified in Section 4.2.7 of these specifications, buried approximately 12 inches below the finished grade except under pavement, when it shall be 24 inches into the subgrade over all force mains and property service connections.

4.3.4. Cast-In-Place Pipe

4.3.4.1. General. Cast-in-place pipe construction shall be performed in accordance with the applicable provisions of Section 6 of these Specifications.

4.3.4.2. Construction Joints. When shown on the Plans, concrete shall be placed in the invert and the arch sections of the barrel in two separate operations. A keyed construction joint shall be formed between the invert and arch sections. Transverse construction joints shall be constructed with **key-ways** and at locations shown on the Plans. Waterstops shall be placed at all longitudinal and transverse construction joints in cast-in-place sanitary sewer barrels.

4.3.4.3. Concrete Collar. Where cast-in-place pipes join precast pipe, a concrete collar shall be constructed around the joint, as shown on the Plans **or as directed by MSD**.

4.3.5. Leakage Testing for Sanitary Sewers

4.3.5.1. General. Testing shall not be scheduled until at least 48 hours after verbal contact is made with the project inspector. The Contractor shall perform leakage tests on sanitary sewer pipes and force mains to ensure that installed pipes are not subject to excessive infiltration or exfiltration. Sanitary sewer pipes installed in areas where other underground facilities will be constructed subsequent to the sanitary sewer shall be tested twice; at the completion of the sanitary sewer installation, and following the installation of the other underground facilities. All leakage testing must be performed in the presence of a representative of MSD. No leakage testing shall be performed prior to jetting.

When conducting any leakage test, the Contractor shall provide all meters, weirs, gages, water, equipment and personnel necessary to perform the test as specified. MSD shall provide the inspection personnel, stopwatch, recording forms and calculations to demonstrate if the test passed or failed.

If a pipe installation fails to pass the requirements as specified herein, the Contractor shall repair or replace all defective materials or Workmanship, and conduct additional leakage tests necessary to demonstrate that the repaired section meets the leakage requirements, at no additional cost to MSD. If requested by MSD the Contractor shall submit in writing a method of repair, and must be approved by MSD before repair can begin.

4.3.5.2. Low-Pressure Air Tests. When conducting a low-pressure air test, the Contractor shall securely install and brace all plugs prior to pressurizing the pipe. Personnel shall not be allowed to enter manholes when the sewer pipe is pressurized. Low-pressure air tests shall be conducted in accordance with the following:

(A) Reinforced Concrete Pipe - ASTM C 924, Recommended Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Test Method.

(B) Polyvinyl Chloride Pipe (PVC), Corrugated PVC Pipe, Polyethylene Pipe, Corrugated Polyethylene Pipe - UNI-B-6 Recommended Practice for Low-Pressure

Air Testing of Installed Sewer Pipe. The "half-time" testing method will be accepted for these pipes only if the section of pipe being tested has a zero drop in pressure for half the test time specified for the pipe's length to diameter ratio.

4.3.5.3. Infiltration/Exfiltration Tests for Concrete Pipe. Reinforced concrete pipe may be tested for direct infiltration or exfiltration in lieu of performing low-pressure air tests. Tests shall be performed in accordance with ASTM C 969, Standard Practice for Infiltration and Exfiltration

Acceptance Testing of Installed Precast Concrete Pipe Lines, except that the allowable rate of infiltration or exfiltration shall be 150 gallons per 24 hours per inch diameter per mile of pipe. Regardless of the leakage test results, any spurting or gushing streams of water entering the sewer or manhole shall be sealed at no additional cost to MSD.

4.3.5.4. Hydrostatic Tests for Force Mains. Force mains shall be tested by performing a hydrostatic test. The force main shall be completely filled with water and subjected to an internal pressure of 100 psi or twice the surge plus operating pressure, whichever is greater, not to exceed 125 percent of the maximum pressure rating for the pipe, measured at the downstream end. The pressure shall be held for a period of 2 hours. During the test, leakage from the force main shall be measured. The maximum allowable leakage shall be 1/2 gallon per inch diameter per 1,000 feet of pipe per hour.

4.3.6. Deflection Tests for Storm Sewers and Sanitary Sewers. The Contractor shall test all thermoplastic main line pipe by use of a calibrated mandrel, or other device approved by MSD, to ensure that no pipe deflection has occurred greater than 5 percent of the inside diameter of the pipe. Pipe shall be fully backfilled ***and compacted*** at least 15 days prior to testing. The Contractor shall test the entire length of the sewer installed. Any pipe section exhibiting greater than 5 percent deflection shall be replaced and retested, at no additional cost to MSD. Should this time frame for testing be waived, and MSD requires a second deflection test after 30 days, it will be at the Contractor’s expense.

Deflection testing shall be performed at the time of the first or final air test. If conditions warrant, the MSD inspector may request additional tests to be performed after final restoration.

NOTE: When failure of the second air test requires repair of the main line sewer, an additional deflection test shall be required.

SECTION 5

MSD STANDARD SPECIFICATIONS

STRUCTURES

5.1. DESCRIPTION OF WORK

This Work shall consist of the construction of manholes, inlets, catch basins, junction boxes, headwalls, box culverts and other sanitary sewer or storm drainage structures of the kind and dimensions shown on the Plans. The construction shall be accomplished in accordance with these Specifications and in conformity with the lines, grades, cross-sections, and details shown on the Plans or established by MSD. The Work shall include such labor, material, equipment, removal and abandonment of structures, brick masonry, cast-in-place concrete construction, precast concrete construction, rims and covers, frames and grates, miscellaneous iron castings, and all other items as may be necessary to complete the structures as shown on the Plans.

5.2. MATERIALS

5.2.1. Concrete. Concrete for all cast-in-place sanitary sewer and storm drainage structures shall be Class A concrete as specified in Section 6 of these Specifications.

5.2.2. Steel Reinforcement. Deformed steel reinforcing bars shall be Grade 60 bars of the sizes, dimensions, spacings and locations shown on the Plans. Steel reinforcement and its storage shall be as specified in Section 6 of these Specifications.

5.2.3. Grout. Grout shall consist of a mixture of water and cement or cement with fly ash, or water and one part cement or cement with fly ash to two parts mortar sand as defined in Section 804.05 of the *KYTC* ***Standard*** Specifications **(current edition)**, by volume. The water may be adjusted to produce a mixture of a consistency suitable for job conditions; however, not over 5 1/2 gallons of water shall be used per sack of cement.

5.2.4. Non-Shrink Grout. Non-shrink grout shall be an approved non-shrink, non-staining grout consisting of either a mixture of hydraulic cement, water, fine aggregate, and an approved nonferrous expansive admixture, or a packaged commercial product and shall meet the requirements of Section ***601.03.03B3 of the*** KTC Standard Specifications.

5.2.5. Precast Structures. Any use of precast structures must be so noted on the Plans, including a typical detail for each type of structure for the Project. Round structures shall conform to ASTM C 478 and square and rectangular structures shall meet the requirements of ASTM C 913.

Structures which require specially designed footings, cut-off walls, etc. will not be

allowed as precast.

Openings in precast structures for pipes shall be the outside diameter of the pipe plus a maximum of 6 inches. In order to use non-shrink grout, the opening shall be the outside diameter of pipe plus 3 inches. (Outside diameter of pipe plus 4 1/2 inches is permissible when tapered hole forms are utilized).

For precast structures (other than those with knockout panels) the opening around the pipe shall either be filled with non-shrink grout for the wall thickness of the structure or the pipe shall be encased with minimum 6 inch collar of concrete from the inside face of the wall to 1'-0" outside the outer face of the wall. The pipe shall be adequately supported to prevent settling while the grout or the concrete encasement is setting up. The inside faces of the structure walls shall be finished with a trowel and wet brush finish.

For circular structures and rectangular structures (other than those with knockout panels) the minimum vertical distance from the holes for the pipes to the top of the structure wall shall be 4 inches. If this vertical distance is less than 12 inches, then additional reinforcing steel shall be furnished for this section. The top slab must be designed for **AASHTO** HS-20 loading.

For precast structures with knockout panels, holes for the pipes shall not be cut into the structural members (i.e., top beams and corner columns) and non-shrink grout shall not be allowed to be placed around the pipes. The pipes shall be encased with concrete a minimum 6 inch collar around the outside of pipe or a minimum of 3 inches beyond the hole knocked in the wall, whichever is greater. Also, the concrete encasement shall extend from the inside face of the wall to 1'- 0" outside the outer face of the wall.

Precast structures with knockout panels shall not be used with more than 2 feet of earth cover, as measured from the top of the structure, unless load calculations are supplied.

For rectangular structures where pipe will be installed in adjacent walls (other than those with knockout panels), at least 6 inches of wall (measured from the interior corner) is required on each side of the pipe beyond the precast opening for the pipe. This rule is not applicable for structures which have pipe installed in opposite walls or where one outlet reinforced concrete pipe is utilized.

A wash is required in the bottom of catch basins to provide positive drainage (sloped toward outlet).

Precast structures in roadways other than installed sanitary manholes and wet wells shall have a minimum of two 4” weep holes. There will be a 2 cubic foot burlap or plastic sack filled with No. 57 stone over the weep holes.

5.2.5.1. Precast Manhole Sections. All precast concrete manhole risers, cones, grade rings, flat slab tops, and bases shall conform to the requirements of ASTM C 478, Standard

Specification for Precast Reinforced Concrete Manhole Sections, and MSD's Standard Drawings. All cone and transition sections shall be eccentric in shape. Base and riser sections shall be custom-made with openings to meet indicated pipe alignment conditions. The following applies as to the maximum inside diameter (or horizontal dimension) of pipe to be used with a given size of manhole.

Diameter of Structure	Maximum Size Pipe*
4'-0"	24 inches
5'-0"	36 inches
6'-0"	48 inches

*Outside diameter may be considered on a case-by-case basis for other pipe materials. The minimum distance allowed between precast holes for the pipes shall be 12 inches, or one-half the outside diameter, whichever is larger.

5.2.5.2. Precast Structures (Except Manholes). If precast structures are furnished, the following requirements shall apply. The structures furnished shall be products on the list of approved precast structures on file with MSD. To be considered for addition to the list, five copies of shop drawings shall be submitted for review. The shop drawings shall show details of any variation from MSD's Standard Drawings and shall include any special installation instructions necessary. Specifications for any special materials for joint construction shall be submitted with the shop drawings, and samples of joint materials shall be submitted when requested.

5.2.6. Watertight Sewer Pipe Connections. Watertight sewer pipe connections shall be elastomeric gaskets or couplings manufactured in accordance with ASTM C 923, Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures and Pipes, and shall be on MSD's list of approved materials.

5.2.7. Joint Sealants.

Type A - Is a compression rubber gasket in conformance with ASTM C443-05a Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets. Note – in applications where a Type A joint is specified, the receiving structure joint will need to be manufactured such to accept the particular gasket type selected (Example O-Ring, Press-Seal, Forsheda, etc)

Type B - Is a preformed flexible butyl rubber sealant in conformance with ASTM C990-06 - Joints for Concrete Pipe Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealant.

Reference is made to 5.3.4 for applications.

Neither bituminous mastic joint sealing material (brush on type) nor (oil-based) bitumastic asphaltic butyl shall be allowed in the construction of structure joints.

5.2.8. Exterior Joint Wrap.

A six-inch wide strip of polyolefin covered with butyl mastic joint sealant, or a hydrophilic sealant having a 50% expansion factor and being capable of withstanding 25 PSI of pressure shall be placed over all exterior manhole joints, including grade rings. The product will be in accordance with ASTM C877-08. Standard Specification for External Sealing Bands for Concrete Pipe, Manholes, and Precast Box Sections.

5.2.9. Waterstops. Waterstops shall be extruded from an elastomeric plastic compound, the basic resin of which shall be polyvinylchloride. The compound shall contain any additional resins, plasticizers, stabilizers, or other materials needed to ensure that when the material is compounded it will meet the physical property requirements shown below:

Physical Property	Required Value	Test Method
Tensile Strength (Die "C")		
Sheet Material	2,000 psi	ASTM D 412
Finished Waterstop	1,700 psi	ASTM D 412
Ultimate Elongation (Die "C")		
Sheet Material	350% Min.	ASTM D 412
Finished Waterstop	300% Min.	ASTM D 412
Stiffness in Flexure	750 psi Min.	ASTM D 747
Accelerated Extraction		CRD C 572
Tensile Strength (Die "C")	1,750 psi	ASTM D 412
Elongation (Die "C")	300%	ASTM D 412
Effect of Alkali (After 7 Days)		
Change in Weight	-0.1 to 0.25%	
Change in Hardness, shore Durometer	+ or - 5%	
Low Temperature Brittleness	-35°	ASTM D 746
Specific Gravity	1.3	ASTM D 792

When required, the Contractor shall submit a manufacturer's certificate stating that all of the physical property requirements specified above for the sheet material have been satisfied. Field splices for waterstops shall be performed by heat-sealing the adjacent surfaces in accordance with the manufacturer's recommendations. Waterstops shall be manufactured with an integral cross-section which shall be uniform within plus or minus 1/8 inch in width, and the web thickness or bulb diameter within plus 1/16 inch and minus 1/32 inch.

5.2.10. Manhole Steps. Manhole steps shall be polypropylene plastic-coated steel bar with treads having anti-skid properties for hand and foot grips. Manhole steps shall be cast, epoxy grouted, or attached by mechanical means into the walls of the manholes in such manner as to conform with ASTM C 478. Steps shall be spaced not more than 12 inches vertically on

centers and shall be so arranged that the lowest rung is no more than 12 inches above the bench, and the top rung is 18 inches below the ***bottom of the casting***. The steps shall be arranged out of alignment of the flow channel, and shall be centered on the grate or lid opening.

5.2.11. Castings. Castings shall be of the standard MSD type as detailed on MSD's Castings Standards. Castings shall be of uniform good quality, free from scale, lumps, blowholes, shrinkage, distortions or other defects. They shall be smooth and thoroughly cleaned by shot-blasting. Castings shall meet the requirements of ASTM A 48, Standard Specification for Gray Iron Castings, for Class No. 35-B, Gray Iron. Manhole rims and covers and inlet frames and grates shall be machined or ground at touching surfaces so as to seat firmly and prevent rocking. Any set not matching perfectly shall be removed and replaced at no additional cost to MSD.

5.2.12. Manhole Inverts. Manhole Inverts on 8" **and larger** size lines **shall** have a **minimum 0.10 foot drop** through the structure unless one of the lines exceeds a 10% grade. All grades exceeding 10% on 8" lines and all other pipe sizes shall continue to have their grade ending at the manhole P.I.

5.2.13. Chimney Seals. The manhole chimney section shall be sealed and made watertight using either a mechanically locking internal butyl rubber chimney seal or a chemically bonding chimney seal as identified on the plans. **Installation of the chimney seals shall be performed by manufacturer certified personnel. The chimney-sealing product shall be on the MSD pre-approved product list. The actual product used shall be identified on the shop drawing submittal.**

5.3. EXECUTION OF WORK

5.3.1. Modification to Existing and Proposed Structures

5.3.1.1. Removal. Existing structures to be removed shall be indicated on the Plans or as directed by MSD. MSD reserves the right to retain or reject salvage of any materials encountered. Unless otherwise directed by MSD, all castings and mechanically locking internal chimney seals shall be retained by MSD. All salvage materials retained by MSD shall be delivered to the appropriate storage yard as directed by MSD. All remaining materials shall become the property of the Contractor who will be responsible for disposing of same. The excavation shall be backfilled in accordance with Section 3 of these Specifications.

5.3.1.2. Abandonment. Existing structures to be abandoned in place shall be as shown on the Plans or as identified by MSD. After removing structure frames, covers, grates, mechanically locking internal chimney seals and similar items, all pipes shall be bulkheaded as specified in Section 4 of these Specifications. The walls shall be lowered to 2 feet below final grade if in earth or to 12 inches below subgrade if in pavement. The remaining structures shall be filled with crushed stone or sand. In paved areas or where

directed by MSD, a 12 inch thick plain concrete slab shall be installed over the manhole or structure top such that it extends 12 inches beyond the outside face of the manhole or structure. MSD reserves the right to retain or reject salvage of any materials encountered. All remaining materials shall become the property of the Contractor who will be responsible for disposing of same.

5.3.2. Wastewater Treatment Plant Decommissioning

5.3.2.1. General. The Contractor shall furnish all labor, materials, equipment and incidentals required to eliminate the wastewater facilities, including all demolition and removal Work, for the wastewater treatment plant(s) (WWTP) as specified herein.

The Contractor shall submit to MSD for review and acceptance a written plan and schedule for the elimination of the WWTP(s) including the demolition, removal and disposal Work. This plan and schedule shall include certain elements and milestones specified for the subject WWTP(s). After the Contract is awarded and prior to commencement of the Work, the Contractor shall meet with MSD to discuss the transfer of flow to the new sanitary sewer system and demolition, removal, and disposal plan. The plan shall include a schedule for disconnection of existing utility services and procedures for the careful removal and disposal of building materials and existing sewage, bio-solids, grit and mixed liquor which may be in tanks, lagoons, etc. Included in the plan must be a detailed description of the methods and equipment to be used for each operation and the sequence of operations.

Do not proceed with elimination of the facilities until MSD has given written acceptance of the elimination plan.

Specific guidelines for the removal and disposal of material contained in the various individual treatment units are provided below. These guidelines are intended to provide the Contractor with a method of elimination that will meet the approval of MSD, the Louisville and Jefferson County Board of Health and the Kentucky Natural Resources and Environmental Protection Cabinet, Division of Waste Management (DWM) and Division of Water. The Contractor is responsible for obtaining all demolition permits, including any transportation permits required to transport the material to their appropriate disposal site(s), prior to commencement of Work. Two (2) copies of these permits shall be submitted to MSD prior to commencement of Work.

Modifications to the landfill disposal site's existing permit(s) are required by the Division of Waste Management regarding the disposal of wastewater by-product materials at the landfill. MSD is responsible for preparing the "Application to Accept an Additional Waste Stream" to be submitted to the Kentucky Division of Waste Management (DWM), including obtaining the required laboratory test results required by both DWM and the landfill. A copy of the permit modification letter from DWM to the landfill allowing them to accept the additional waste stream will be provided to the Contractor prior to commencement of Work.

5.3.2.2. Existing Facility Elimination. Unless otherwise directed by MSD, the Contractor shall provide MSD with written notification as stated in the special provisions prior to removing a facility from service.

The Contractor shall utilize the following steps during the process of removing a facility from service. These steps will generally include, but are not limited to:

(A) Influent Diversion: Discontinue wastewater flow to the existing facility by permanent influent diversion to the newly constructed and approved MSD sanitary sewer system, in accordance with the Contract.

(B) Supernatant and Mixed Liquor: Carefully remove and transfer the liquor supernatant and mixed liquor to the newly constructed and approved MSD sanitary sewer system in accordance with MSD's directions.

(C) Equipment: Remove grit and bio-solids from the previously submerged equipment to render the equipment salvageable.

(D) Three to Five Percent Bio-solids: Bio-solids which remain in liquid holding tanks or lagoons after removal of supernatant and mixed liquor that have no greater than 3% - 5% solids concentration with no additional water added, may be removed and hauled to a septage receiving facility approved by MSD. A waste hauler must be permitted by the Board of Health and registered with MSD in order to dispose of waste at the SRF. It is the Contractor's option and responsibility to make arrangements for disposal of 3% - 5% solids, by volume, in the manner and pay all associated costs and fees; the Contractor may handle this bio-solids component in the same manner described in Paragraph (E) below.

(E) All Other Bio-solids and Grit: Bio-solids and grit which remain in liquid holding tanks or lagoons shall be dewatered using portable dewatering equipment located on-site. The liquid by-product from the dewatering process can be returned to the newly constructed and approved MSD sanitary sewer system. The Contractor shall use shovels, brooms and/or other appropriate methods to assure that residual grit and/or bio-solids are removed from corners and hard to reach areas of holding tanks and treatment vessels. For lagoons, the Contractor shall remove all grit and bio-solids down to residual earth or synthetic liner, and stabilize the earth/liner area with hydrated lime to a pH of 10.0 or greater. The dewatered bio-solids material shall then be transported to an approved landfill site.

The Contractor shall be aware that the landfill receiving the dewatered material may randomly sample the material at the landfill and perform filter laboratory testing. If the dewatered material does not pass this test, the landfill will reject the material and not allow its disposal at the landfill. In addition, any evidence of free water in the material will also result in its rejection by landfill personnel. In either case, additional dewatering of the rejected material will be the Contractor's responsibility prior to acceptance and disposal at the landfill.

The Contractor shall have a maximum of 30 days to dewater and/or remove all bio-solids and grit from the facility beginning at the time of wastewater influent flow diversion. During this 30-day time frame, the Contractor is responsible for controlling odors emanating from the facility.

(F) Utility Disconnection: Disconnect the existing utility services in accordance with the appropriate utility company's recommendations. Utility disconnection shall not occur until all bio-solids and grit materials have been dewatered and/or removed from the facility.

Once the facility is taken out of service, and the steps outlined in Sections (A) through (F) are complete, the Contractor shall provide written notification to MSD that the facility is prepared for equipment salvage. Unless otherwise directed by MSD, the Contractor shall then vacate the facility site for a period of time as specified in the special provisions to allow equipment salvage by MSD or the Owner.

The Contractor is encouraged to supplement any information about the WWTP site, components and waste constituents provided by the Contract, with his own on-site evaluation.

The Contractor shall be responsible for obtaining all demolition and transportation permits, their attendant costs, and all costs associated with pre-bid investigation, removal and disposal of the sanitary wastewater bio-solids and grit material.

5.3.2.3. Existing Facility Demolition and Closure. At the end of the salvage period, the Contractor shall remobilize at the site, stabilize any remaining residual solids with hydrated lime to a pH of 10.0 or greater and proceed with demolition. For the liquid holding tanks that have been stabilized and are to be left-in-place, the Contractor shall break holes in the bottom of the below grade structures for groundwater pressure relief and demolish/remove the structure(s) to a minimum of 3 feet below finished grade. The remaining void spaces within the structures shall be backfilled with a sand material to 3 feet below finished grade, and then backfilled with select topsoil fill material to finish grade as shown on the Contract. The above-grade structures located at the WWTP facilities and not identified on the Drawings or in the Specifications as "To Remain" or "Do Not Disturb" shall also be demolished/removed to a minimum of 3 feet below finished grade and backfilled as described above. For lagoons, the Contractor shall backfill the entire lagoon area with select fill material, as approved by MSD, and mechanically compact the material to 90% Standard Proctor maximum dry density in accordance with Section 3 of these Specifications. All disturbed areas shall be graded to provide positive drainage; and shall be seeded, fertilized and mulched in accordance with Section 9 of these Specifications.

5.3.3. Connections. The Contractor shall verify the exact locations and elevations of existing structures or sewers prior to construction and any differences between actual and plan locations and elevations shall be brought to the attention of MSD before proceeding with the Work. If a bulkhead opening of adequate size, or a stub of proper size, elevation,

location and direction exists, the connection shall be made as required for normal pipe laying.

For ***all*** sanitary sewer pipes an opening ***shall be core drilled*** in the structure to permit inserting the pipe at the required elevation, direction, and slope. The circumference of the opening shall ***allow*** approximately two inches of space between the inserted pipe and the structure. Care shall be used to avoid unnecessary damage to existing concrete or brick masonry. All loose material shall be removed from the cut surfaces and the cut surfaces shall be completely coated with non-shrink grout. Before setting the pipe, a sufficient thickness of grout shall be placed at the bottom and sides of the opening for proper bedding of the pipe. After setting the pipe, all spaces around the pipe shall be solidly packed and filled with non-shrink grout which shall be neatly pointed up on the inside to present a smooth joint, flush with the inner wall. When making connections to existing stubs, approved pipe adapters shall be used.

For all drainage pipe, an opening may be saw cut and provided with approved connectors. Modifications to the existing invert shall be made as needed to provide a smooth plastered channel to accommodate the flow from the new pipe.
When reconstruction of a manhole is required, entry into the manhole shall be at the elevation indicated on the Plans or at the invert of the manhole. Entries shall not be allowed on top of the wash unless otherwise directed.

5.3.4. Manholes and Wet Wells.

5.3.4.1 General. Manholes shall be neatly and accurately built in accordance with the Plans and MSD's Standard Drawings. Precast manhole and wet well bases, when used for sanitary sewer manholes and wet wells, shall be supplied with watertight sewer pipe connections. When the manhole base slab will consist of cast-in-place concrete for existing sewer lines, the sewer pipe and the lower precast barrel section shall be in place and supported by concrete blocks prior to placing concrete for the slab. All rough openings between pipes and precast sections shall be thoroughly and completely filled with non-shrink grout, applied so that there will be no leakage around pipes. The grout shall be finished smooth and flush with the ,interior and exterior manhole or wet well wall surfaces. When the manhole base slab will consist of cast-in-place concrete for new construction, pipe to manhole connections in the precast barrel section shall be done at the manufacturing plant. Field modifications will be allowed to precast structures if approved by MSD Inspection. When core drilling is not possible, saw cutting shall be performed when modifying an existing structure.

Manhole inverts shall consist of Class A concrete, placed to conform to the shapes indicated on MSD's Standard Drawings. Inverts shall include both channel and wash sections with channels so constructed as to create the least resistance to flow. A smooth, uniform dense finish shall be required. Inverts may be either precast or cast-in-place.

5.3.4.2. Joints

Joint sealant materials shall be of the sizes recommended by the manufacturer to provide watertight seals between precast manhole sections. When requested, the Contractor shall furnish information showing that the sizes of the joint sealants being supplied meet the manufacturer's recommendations.

Storm Manholes

Either a Type A Gasket or Type B Sealant, as described in 5.2.7, shall be used in storm structures. Exterior Joint Wrap is not required.

Sanitary Manholes and Wet Wells

Joints between precast sections shall be sealed in **a two-way fashion consisting of a Type B sealant, described in 5.2.7., and an exterior joint wrap described in 5.2.8. Reference is made to MSD's Manhole standard drawings for additional reference.** For wet well joints, **the same two-way** sealing system **described for sanitary manholes** shall be used. For non-circular valve vaults and wet wells, the sealing system shall consist of a double strip of butyl rubber mastic sealant conforming to ASTM C990 under Section 6.2.1., and a 6-inch wide strip of polyolefin covered with butyl mastic exterior wrap joint sealant. The butyl rubber mastic sealant shall be placed approximately 1 to 2 inches apart, centered on the structure shoulder. Refer to section 10.2.17 Wet Well of these specifications for further information on wet wells and pump stations.

5.3.4.3. Future Connections and Drop Inlets. When indicated on the Plans, provisions for future sewers shall be provided at manholes by providing 12 inch long stubs of the sizes, lines and grades shown. The upstream ends shall consist of the bell or spigot ends, and they shall be sealed with removable stoppers or bulkheads. If the specified length of any stub is exceeded, it shall be at no additional cost to MSD, unless the extra length is ordered by MSD. Drop inlets shall be constructed at manholes where indicated on the Plans as per MSD standard drawings. Inside drops are not allowed on new facilities and must have prior MSD approval on existing structures. Manhole barrel sections shall be supplied with openings for upper and lower inlet pipes. The annular spaces between the inlet pipes and the manhole walls shall be filled with non-shrink grout. Grout shall be finished smooth and flush with the adjoining interior and exterior manhole wall surfaces. Encasement of the outside drop pipe shall be with Class B concrete. In case of precast, concrete encasement shall be doweled with reinforcing steel and shall extend a minimum of 2 L.F., or to the undisturbed soil.

For the purposes of property service connection reference and manhole identification, each manhole shall be sequentially numbered with a number provided by MSD. The Contractor shall stamp the numbers into the north edge of the rim of each manhole as shown on the approved Plans. Numbers shall be 3/8 inch high block numerals clearly visible without removing the manhole lid.

5.3.4.4. Frames and Chimney Seals. Manhole frames shall be placed in the positions shown on the Standard Drawings and shall be set to the correct elevations or adjusted to match final grade. Manhole adjusting rings shall only be used to make final elevation corrections and are not required otherwise. Use the least number of standard size rings as required for proper grade. If the concrete adjusting ring height will equal or exceed 12 inches, use 1-ft. barrel sections. Frames shall be set concentrically with the precast concrete collars and sealed between the two with a strip of butyl resin (Type B). The remaining annular space shall be filled with grout so that the spaces between the collars and the bottom flanges of the frames shall be completely filled and made watertight. A frame shall not be disturbed until the grout has hardened to adequate strength.

Chimney Seals shall be installed in accordance with the Manufacturer's Specification for installation. The Installer shall be certified by the product manufacturer and proof of such certification shall be provided to MSD prior to installation of chimney seals. In addition, the installer shall carry a copy of his/her certification at all times during installation. Chimney Seals shall be installed after the binder course is placed when the manholes are constructed in roadways and after rough grading in all other areas.

MSD reserves the right to visually inspection and/or water test all chimney seal installations to ensure that the seal has not been damaged or compromised during final site restoration and/or paving. The contractor at no additional cost to MSD shall correct any defects identified by these inspections and tests.

The water test method shall be either a Static Head Test or Gravity Test as defined below. The test method shall be selected by the Inspector and may vary from manhole to manhole.

Static Head Test - A 1-foot tall section of PVC pipe with external diameter matching the internal diameter of the manhole frame shall be temporarily sealed to the frame. Sandbags or an approved alternative shall be used to form a 6 inch tall ring around the PVC pipe allowing a 6 inch annular space between the PVC pipe and the outer ring. The annular space shall then be filled with water to a height of 6 inch and the water level maintained for 10 minutes. The inspector shall observe the sealed area during the test for leakage. The installation shall be deemed unacceptable if any visible, continuous stream of water leaking from the sealed area is observed.

Gravity Test – The gravity test may be used as an alternative to the static head test on mechanically locking seals. The test shall be performed by introducing approximately 1 gallon of water directly behind the seal and extension, if used. The installation shall be deemed unacceptable if MSD or its representative observes any visible, continuous stream of water leaking from the sealed area.

The following restrictions apply to the use of Chemical Chimney Seals:

(A) Shall not be used when wet weather is expected before the product is sufficiently cured to withstand water contact per the manufacturer's recommendations.

(B) Shall not be used to bridge gaps greater than ½-inch.

(C) Shall not be used with HDPE grade adjustment rings.

(D) Shall not be used on concrete or grout that has not cured for at least 30 days.

5.3.4.5. Testing. All manholes installed for a project shall be subject to vacuum testing in accordance with ASTM C1244. Vacuum testing shall be conducted in the presence of the MSD inspector after Chimney Seal installation. Chemical Chimney Seals shall not be subject to vacuum testing until the product has sufficiently cured to withstand vacuum pressures. Manholes shall be capable of holding a vacuum of 5 psi (10-inches of Mercury) without dropping more than 0.5 psi (1 inch of Mercury) for the times stated below:

	Depth (ft)											
Diameter (in)*	8	10	12	14	16	18	20	22	24	26	28	30
	Times (s)											
48	20	25	30	35	40	45	50	55	59	64	69	74
60	26	33	39	46	52	59	65	72	78	85	91	98
72	33	41	49	57	67	73	81	89	97	105	113	121

*Refer to ASTM C1244 –99 for required test times on manholes with other diameters

Minimum test times for typical MSD manhole diameters (ASTM C1244)

Vacuum testing of manholes exceeding 15 feet in depth shall take groundwater into consideration and the vacuum pressure for testing shall be reduced by 0.5 psi (1 inch of Mercury) for every five feet of groundwater depth above the outgoing pipe. The contractor shall determine the groundwater elevation immediately prior to vacuum testing. Manholes that do not pass the initial vacuum test shall be repaired and retested at no cost to MSD. A 100% pass rate shall be achieved.

Exfiltration tests will not be allowed for manhole acceptance testing unless directed otherwise by MSD or its representative. When required, exfiltration tests shall be performed in accordance with ASTM C 969, Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines. The maximum allowable exfiltration rate shall be 0.1 gallons per foot diameter, per foot of head, per hour. If the exfiltration rate exceeds this value, the Contractor shall make repairs as required including re-testing, at no additional cost to MSD.

5.3.5. Small Structures. Inlets, catch basins, drains, junction structures, and other small structures shall be neatly and accurately built in accordance with the Plans and MSD's Standard Drawings. The structure shall be either of cast-in-place concrete or of precast concrete, provided the precast sections have been approved by MSD. Square and rectangular structures shall meet the requirements of ASTM C913 and round structures shall be made in accordance with ASTM C478. Inlet and outlet pipes shall be cut off flush with the inside

surfaces of the wall. Pipe bells shall not be allowed inside the structure wall. The pipes shall intersect at the structure so that the invert channel between the inlet and outlet pipes can be smoothly formed. Invert channels shall be of Class A concrete and shall conform to the shapes indicated on the Plans, MSD's Standard Drawings, or as otherwise directed. The invert channels shall be so constructed as to cause the least possible resistance to flow. The shapes of the invert channels shall conform uniformly to inlet and outlet pipes. Smooth and uniform finishes will be required. All inlets, and junction structures deeper than 4 feet, as measured from the top of the rim or frame to the invert of the structure, shall be provided with steps unless otherwise shown on the Plans or directed by MSD.

Steps shall be spaced not more than 12 inches vertically and shall be so arranged that the lowest rung shall not be more than 12 inches above the bench, and the top rung shall be 18 inches below the ***bottom of casting***. The steps shall be arranged out of alignment of the flow channel, and shall be centered horizontally of the grate or lid opening.

All cast-in-place structures shall be built using Class A concrete. The structures shall be built on prepared foundations and conform to the dimensions and shapes shown on the Plans and MSD's Standard Drawings. The construction shall conform to the methods, forms, placement, protection, and curing for concrete as specified in Section 6 of these Specifications.

Any required reinforcement shall be of the kind, type, and size and shall be located, spaced, bent, and fastened as shown in the Plans and MSD's Standard Drawings. Installed concrete reinforcing shall be approved by MSD before any concrete is placed.

Connections for inlet and outlet pipes shall conform to the sizes, alignments, and elevations shown on the Plans. The sealing around pipes for small sanitary sewer structures shall conform to Subsection 5.2.6. of these Specifications.

Waterstops shall be required at construction joints for cast-in-place sanitary sewer structures. Waterstops shall be installed and securely held in place during concreting, in accordance with the manufacturer's recommendations.

Precast sections may be used in the construction of small structures provided that such sections are on MSD's approved list for precast structures.

No sledge hammer modifications are allowed to precast structures. Saw cuts should be utilized when modifying an existing structure.

When shown on the Plans, cast iron grates and lids shall be attached to the frames, or to the concrete in the event there are no frames, with chains of sufficient lengths to permit moving for clean out and maintenance purposes.

5.3.6. Concrete Box Culverts, Retaining Walls and Headwalls

5.3.6.1. Footings. Footings shall be constructed to the elevations shown on the Plans, but such depths may be increased when it is determined by MSD that the increases are necessary to provide sufficient bearing or to prevent undermining. Footing elevations should only be raised when solid rock is encountered at elevations above those shown.

5.3.6.2. Precast Concrete Box Culverts. Precast concrete box culverts shall be submitted to Louisville MSD for approval on a job by job basis. Precast Box Culverts shall be manufactured in accordance with ASTM C1433 Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers. Follow the requirements of the KTC Standard Specifications Section 611- Precast Reinforced Concrete Box Culvert Sections. The precast box culverts shall be built neatly an accurately in accordance to the plans and specifications of the project.

The outside faces of all footings of concrete headwalls for pipe, box, or arch culverts shall be formed to full depths of the footings. Whenever the natural foundation material is insufficiently stable to support the structure or whenever it is anticipated that high water may cause excessive erosion around the footings, MSD may order extra Work performed as necessary to provide the structure with adequate support or protection.

5.3.6.3. Culvert Inverts, Aprons, Curtain Walls, and Headwalls. All culverts, except those founded on solid rock, shall be constructed with a substantial concrete slab through the invert or stream bed. This slab shall terminate at each end of the culvert in apron walls, curtain walls, or cutoff walls carried to a depth that will eliminate danger of undermining. Inverts for concrete culverts shall be paved with a reinforced concrete slab, unless otherwise directed.

Apron or cutoff walls shall, in general, be carried down at both ends to the depths shown, but may be ordered to additional depths necessary to prevent undermining. The outside faces of inlet and outlet concrete aprons or cutoff walls for single span or multiple span culverts shall be formed for the full depths of the aprons or cutoff walls.

MSD may direct the space between wings to be paved. In this event, the apron walls will extend in a straight line between the ends of the wings, or at such locations as may afford the best protection.

When headwalls for pipe culverts are located at the shoulder of a road, the tops of the headwalls shall be parallel to the shoulder line for both line and grade. When shown on the Plans, the KTC Standard Drawings for pipe culvert headwalls list dimensions from the face of concrete to steel reinforcement as clear distances and dimensions for bar spacings as center to center of bars.

Otherwise, MSD's Standard Drawings shall be used for determining the sizes and reinforcing steel requirements. Precast concrete pipe headwalls shall conform to the

requirements of Subsection 5.2.5. of these Specifications.

Surfaces shall be finished in accordance with the requirements of Section ***601.03.18 of the*** current edition of the KTC Standard Specifications or as directed by the Engineer.

5.3.6.4. Retaining Walls. Gravity type or non-reinforced retaining walls shall be constructed of Class B concrete and shall be constructed as shown on the Plans. Reinforced concrete retaining walls shall be constructed of Class A concrete and shall be constructed as shown on the Plans.

5.3.6.5. Placing Concrete. Concrete shall be placed as specified in Section 6 of these Specifications. The base slab or footing shall be placed and allowed to harden before the remainder of the structure is constructed. When shown on the Plans or directed by MSD, suitable provisions shall be made for bonding the walls to the base by means of longitudinal keys formed by insertion and subsequent removal of beveled timbers. Base slabs, footings, and apron walls shall be constructed as monolithic units, when practicable. When construction joints are necessary, they shall be placed at right angles to the culvert barrel or retaining wall and suitable provision shall be made for bonding adjacent sections by means of keys formed by beveled timbers.

Before concrete is placed in the walls, the footings shall be thoroughly cleaned of all debris, or other extraneous material and the surface carefully chipped and roughened in accordance with the method of bonding construction joints, as specified under Section 6 of these Specifications.

In the construction of all box culverts having a clear height of 5 feet or more, concrete in the side walls shall be placed and allowed to set before the top slab is placed.

For culverts having a clear height of less than 5 feet, the culvert may be poured monolithic when the Contractor so desires. When this method of construction is used, any necessary construction joints shall be vertical and at right angles to the axis of the culvert.

Each wingwall shall be constructed as a monolithic unit. Construction joints, where unavoidable and when not shown, shall be horizontal.

5.3.6.6. Placing Fill. Backfill or embankment shall not be placed against culverts, retaining walls, and headwalls until permission is given by MSD. Backfill and embankment shall be constructed as specified in Section 3 of these Specifications.

5.3.7. Adjusting Manholes and Catch Basins. All frame height and alignment adjustments shall be subject to field inspection by MSD and be subject to correction as directed by MSD.

Concrete brick (conforming to ASTM C-55 for Type II Grade 5) may be used when adjusting the casting no more than 4 inches.

Precast concrete riser rings may be used when the casting is raised more than 4 inches or when total combined height of existing and proposed exceeds 4 inches. If the concrete riser ring height will exceed 12 inches, use 1-ft. barrel sections. Use the least number of standard size rings as required for proper grade.

No wood shims, wood blocks or shot rock shall be used to adjust or reset the frame height.

In asphalt pavement, the excavated area around the manhole or catch basin that is raised shall be backfilled with a minimum of 8 inches Class "A" concrete to a level 2 inches below the new top of grate or lid elevation. The remaining 2 inches shall be paved with bituminous surface.

Prior to raising manhole or catch basin frames, the Contractor, Design Engineer, and MSD representative shall inspect for damaged frames and grates or lids. Damaged frames, grates or lids shall be replaced by the Contractor at no expense to MSD unless item was damaged prior to start of construction.

SECTION 6

MSD STANDARD SPECIFICATIONS

CONCRETE

6.1. DESCRIPTION OF WORK

Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, and water, with air entrainment as specified, combined in the proportions and mixed to the consistency specified, and shall be formed or cast to dimensions indicated on the Plans or as directed by MSD. The Contractor shall provide materials, material proportions, equipment, and construction methods that will ensure that concrete produced meets the requirements of these Specifications.

6.2. MATERIALS

6.2.1. Portland Cement Concrete

6.2.1.1. Portland Cement. Portland cement shall meet requirements set forth in ASTM C 150, Standard Specification for Portland Cement, for Type I or Type II cement, and the requirements set forth in ASTM C 595, Standard Specification for Blended Hydraulic Cements, for Type IP cement.

6.2.1.2. Water. Water used in mixing or curing Portland cement concrete shall meet the requirements set forth in Section 803 of the KYTC Standard Specifications **(latest edition).**

6.2.1.3. Fine Aggregates. Fine aggregates shall meet the requirements set forth in Section 804 of the KYTC Standard Specifications **(latest edition).**

6.2.1.4. Coarse Aggregates. Coarse aggregates shall meet the requirements set forth in Section 805 of the KYTC Standard Specifications**(latest edition).**

6.2.1.5. Air-Entraining Admixtures. Air-entraining admixtures shall meet the requirements set forth in ASTM C 260, Standard Specification for Air-Entraining Admixtures for Concrete, except the chloride content shall not exceed one percent by weight.

6.2.1.6. Chemical Admixtures. Chemical admixtures shall meet the requirements set forth in ASTM C 494; Standard Specification for Chemical Admixtures for Concrete, except the chloride content shall not exceed one percent by weight.

6.2.1.7. Fly-Ash. Fly ash shall meet the requirements set forth in ASTM C 618, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete, for Class F Fly Ash. The loss on ignition shall not exceed 3.0 percent, except 4.0 percent will be permitted when the uniformity requirements of ASTM C 618 are met.

6.2.2. Concrete Reinforcement

6.2.2.1. Steel Bars. Steel reinforcing bars shall be deformed bars meeting the requirements of ASTM A 615, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement. All bar reinforcement shall be Grade 60 bars. When epoxy coated steel reinforcing bars are used, epoxy coated tie wire shall be required.

6.2.2.2. Welded Steel Wire Fabric. Welded steel wire fabric shall meet the requirements set forth in ASTM A 185, Standard Specification for Steel Welded Wire Fabric for Concrete Reinforcement.

6.2.2.3. Polypropylene Fibers. Fibers shall be 100 percent polypropylene fibers specifically designed for use as concrete reinforcement and shall contain no reprocessed olefin materials. No textile waste materials or other textile products will be allowed. The polypropylene fibers shall meet the following requirements:

	MIN.	MAX.
Melt Temperature	320 F	
Specific Gravity	0.87 -	0.93
Tensile Strength	70 -	110 ksi.
Fiber Fineness	Less than 100 Denier	
Fiber Length	3/4 inch	
Dosage Rate	2 Lbs/Cy	

6.2.3. Curing and Finishing Materials

6.2.3.1. Concrete Curing Materials. Concrete curing materials shall meet the requirements set forth in Section 823 of the KYTC Standard Specifications **(latest edition)**, for type 1D Clear, Class B.

6.2.3.2. Masonry Coating Materials. Masonry coating materials shall meet the requirements set forth in Section 828 of the KYTC Standard Specifications **(latest edition).**

6.3. EXECUTION OF WORK

6.3.1. Care, Storage, and Handling of Concrete Materials. Aggregates, cement, and fly ash shall be furnished, stocked and handled at the plant in accordance with the requirements set forth in Section 601.03 of the KYTC Standard Specifications **(latest edition).**

6.3.2. Admixtures. Chemical admixtures to improve workability, retard and/or accelerate the time

of set shall be used where specified or directed. When not specified or directed for use, these admixtures may be used only upon written permission. Determination of quantities of water-reducing and retarding admixture required to produce the desired results shall be the responsibility of the Contractor. The Contractor shall also establish the quantity of air-entraining admixture necessary to produce a concrete mixture having a net air content, by volume, of 5.5 plus or minus 1.5 percent.

6.3.3. Proportioning. Proportioning of concrete mixtures shall be in accordance with Section 601.03.03 of the KYTC Standard Specifications **(latest edition).** For concrete exposed to sewage, the mixture shall contain the necessary proportions of Type II, Type IP, or Type I cement and fly ash to ensure a maximum Tricalcium Aluminate content of 8 percent of the total weight of cementitious materials.

6.3.4. Class of Concrete. The following classes of concrete shall be as specified in Section 601.03.03 of the KYTC Standard Specifications (**latest edition)** and shall be used in the types of construction designated, unless shown otherwise on the Plans, in the Contract, or directed by MSD. Concrete of all classes and for all uses above grade shall be air-entrained.

6.3.4.1. Class AA Concrete. Class AA concrete shall be used in structural concrete. It shall have a minimum 28-day compressive strength of 4,000 psi, a minimum slump of 2 inches and a maximum slump of 4 inches. For fiber reinforced concrete, a tolerance of $\pm$ 1 inch shall be allowed outside the minimum and maximum specified.

6.3.4.2. Class A Concrete. Class A concrete shall be used in cast-in-place sewers, headwalls, catch basins, manholes, small retaining walls, culverts, sidewalks, curbs, driveways, pavements, paved ditches and paved channel linings. It shall have a minimum 28-day compressive strength of 3,500 psi, a minimum slump of 2 inches and a maximum slump of 4 inches. For fiber reinforced concrete, a tolerance of $\pm$ 1 inch shall be allowed outside the minimum and maximum.

6.3.4.3. Class B Concrete. Class B concrete shall be used in concrete encasements, caps, cradles, stacks, gravity retaining walls and for all non-reinforced concrete deposited as fill for cavities or voids and mass footings. It shall have a minimum 28-day compressive strength of 2,500 psi, a minimum slump of 3 inches and a maximum slump of 5 inches. For fiber-reinforced concrete, a minimum slump of 2 inches and a maximum slump of 6 1/2 inches is allowed.

6.3.4.4. Class M1 Concrete. Class M concrete shall be used for high early strength in driveways and sidewalks, when required by the Special Provisions or the plans. It shall meet the requirements for Class M1 concrete set forth in Section 601.03.03 of the KYTC Standard Specifications **(latest edition).**

6.3.4.5. Flowable Fill. Flowable fill shall be used as required by the Special Provisions or the plans. It shall meet the requirements for flowable fill set forth in Section 601.03.03 of the KYTC Standard Specifications **(latest edition).**

6.3.5. Batching and Mixing

6.3.5.1 General. The concrete shall be batched and mixed in the quantities required for immediate use. Unless otherwise specified or directed, all concrete shall be manufactured by ready-mixed methods.

6.3.5.2. Ready-Mixed Concrete. Ready-mixed concrete shall be manufactured and supplied in accordance with ASTM C 94, Standard Specification for Ready-Mixed Concrete, Alternate No. 3. The placement shall commence within 60 minutes of batch to trucks as indicated on ticket. The interval between delivery of separate batches placed continuously in the Work shall not exceed 20 minutes unless otherwise permitted by MSD. Batch tickets with batch weight shown, shall be provided to MSD when requested.

6.3.5.3. Hand-Mixed Concrete. Hand mixing will not be permitted, except in case of emergency or in case of isolated small units such as pipe headwalls and then only by permission of MSD. When hand-mixing is permitted, proportioning by volume will be allowed and mixing shall be done only on water-tight platforms. The sand shall be spread evenly over the platform and then the cement spread upon it. The sand and cement shall then be thoroughly mixed while dry by means of shovels until the mixture is of a uniform color, after which it shall be formed into a crater and water added in an amount necessary to produce mortar of the proper consistency. The total water content shall not exceed that specified in Section 601.03.03, of the KYTC Standard Specifications **(latest edition).** The material on the outer portion of the crater ring shall then be shoveled to the center and the entire mass turned and sliced until a uniform consistency is produced.

The coarse aggregate shall then be added to the mortar and the entire mass turned and re-turned at least 6 times and until all coarse aggregate particles are thoroughly coated with mortar and the mixture is of a uniform color. Hand-mixed batches shall not exceed l/2 cubic yard.

6.3.6. Forms

6.3.6.1. General. All forms shall be mortar-tight, true to the dimensions, lines, and grades of the structure, and of sufficient strength to prevent appreciable deflection during placing concrete. Aluminum or aluminum alloy forms will not be permitted except when provision is made to prevent their direct contact with the concrete, or be detrimental to masonry coating if the surface will be coated.

The inside surfaces of forms shall be cleaned of all dirt, mortar, and foreign material. Forms, which will later be removed, shall be thoroughly coated with form oil, prior to use. The form oil shall be commercial quality form oil or other equivalent coating which will permit ready release of the forms and will not discolor the concrete, or be detrimental to masonry coating if the surface will be coated.

Concrete shall not be deposited in forms until all work connected with constructing the forms

has been completed, all materials required to be embedded in the concrete have been placed for the unit to be poured, and MSD has inspected forms and materials. Such Work shall include removal of all dirt, chips, sawdust, water, and other foreign material from the forms.

Forms for all concrete surfaces, which will not be completely enclosed or hidden below the permanent ground surface, shall conform to the requirements herein for forms for exposed surfaces. Interior surfaces of underground sewers and structures will be considered to be completely enclosed surfaces.

Forms for exposed concrete surfaces shall be designed and constructed so the formed surfaces of concrete do not undulate excessively in any direction between studs, joists, form stiffeners, form fasteners, or wales. Plywood forms shall be at least 3/4 inch thick and shall be placed with the face grain perpendicular to the studs or joists, unless the Contractor furnishes calculations showing that excessive deflection or stresses will not occur when the grain is parallel to the studs or joists. The clear span between supporting studs or joists shall be placed no more than 20 times the thickness of the form facing and in no case shall the deflection exceed 1/360 of the clear span. Should any form or forming system, even though previously reviewed prior to use, produce a surface with excessive undulations, its use shall be discontinued until modifications satisfactory to MSD have been made.

All exposed surfaces of each element in a concrete structure shall be formed with the same forming material or with materials which produce similar surface texture, color, and appearance.

Forms for exposed surfaces shall be faced with form panels. A form panel shall be considered to be the continuous section of form facing material, unbroken by joint marks, against which concrete is placed.

Form panels for exposed surfaces shall be plywood conforming to the requirements of U. S. Product Standard PS-1 for Exterior B-B (Concrete Form) Class I Plywood or any material other than plywood which will produce a smooth uniform concrete surface substantially equal to that which would result from use of such plywood. Only form panels in good condition, free of defects, such as scars, dents, or delaminations, shall be used for exposed surfaces.

Form panels for exposed surfaces, in general, shall be furnished and placed in uniform widths of 3 feet or more and in uniform lengths of 5 feet or more, except where the dimensions of the member formed are less than these dimensions. Panels shall be arranged in symmetrical patterns conforming to the general lines of the structure. Form panels on each side of the panel joint shall be precisely aligned, by means of supports or fasteners common to both panels, to result in a continuous, unbroken concrete plane surface.

Forms for exposed surfaces shall be constructed with chamfer strips no less than 3/4 inch by 3/4 inch attached to prevent mortar runs and to produce smooth, straight chamfers at all sharp edges of the concrete.

Form fasteners consisting of form bolts, clamps, or other devices shall be used as necessary to

prevent spreading of the forms during concrete placement. The use of ties consisting of twisted wire loops to hold forms in position will not be permitted.

Metal ties or anchorages within the form shall be constructed to permit their removal to a depth of at least one inch from the face without injury to the concrete. All fittings or metal ties shall be of such design that upon their removal the cavities, which will remain, will be the smallest possible size. Cavities, regardless of their position in the completed construction, shall be rammed and filled with mortar and the surface shall be sound, smooth, even, and uniform in color.

For narrow walls where access to the bottom of forms is not readily attainable otherwise, the lower form boards shall be left loose so they may be removed for removal of all chips, dirt, sawdust, or other extraneous material immediately prior to placing concrete.

Forms which are intended for re-use shall be maintained in good condition to ensure accuracy of shape, strength, rigidity, water-tightness, and surface smoothness. Forms that are unsatisfactory in any respect in the opinion of MSD shall not be used and shall be removed immediately from the job site.

6.3.6.2. Removal of Falsework and Forms. In determination of the time for removal of falsework and forms, consideration shall be given to the location and character of the structure, weather, and other conditions influencing hardening of the concrete and materials used in the mixture. Removal of falsework and forms shall be done in accordance with the KYTC *Standard* Specifications **(latest edition)**, Sections 601.03.14 and 601.03.15 unless otherwise directed by MSD.

Forms shall be removed with care so as not to damage the surface of the concrete structure and shall be the sole responsibility of the Contractor.

6.3.7. Concrete Reinforcing

6.3.7.1. Protection of Steel Reinforcing. Proper care shall be used in handling and storing steel reinforcement or epoxy coated steel reinforcement to prevent bending, excessive rusting, or coating with objectionable substances. Steel reinforcement, when incorporated in the Work shall be reasonably free from dirt, paint, oil, grease, loose/thick rust, and other foreign substances, and when deemed necessary, shall be cleaned to the satisfaction of MSD.

6.3.7.2. Bending Steel Reinforcing Bars. Steel reinforcing bars shall be bent cold. Bars shall be bent accurately to the dimensions and shapes shown on the Plans and to within tolerances designated in the CRSI Manual of Standard Practice. Bars shall be bent in the shop before shipment and shall not be bent in the field, unless otherwise directed by MSD.

6.3.7.3. Placing and Fastening. All steel reinforcement shall be accurately placed in positions shown and firmly held in position during placement and hardening of concrete. All steel reinforcement, shall be spaced to within a tolerance of plus or minus l/2 inch and placed to within a tolerance of plus or minus l/4 inch of specified clearance from the face of concrete.

Dimensions shown from the face of concrete to bars are clear distances. Bar spacings are from center to center of bars. Bars shall be tied at all intersections, except where spacing is less than one foot in both directions, then alternate intersections shall be tied. Epoxy coated steel reinforcement shall be tied with coated tie-wire.

Distances from forms shall be maintained by means of stays, blocks, ties, hangers, or other approved supports. Supports for holding reinforcement from contact with the forms shall be approved precast blocks composed of mortar or approved metal chairs. The tips of metal chair supports, which are in contact with the surface of the concrete, shall be plastic-coated steel. The steel placed in reinforced concrete slabs shall also be securely tied down to prevent any possibility of steel rising above the specified elevation during placing, vibrating, and finishing the concrete.

The top mat and bottom mat of bars shall be separated by precast mortar blocks or by other equally suitable devices. The use of pebbles, pieces of broken stone or brick, metal pipe, and wooden blocks shall not be permitted as separators. Reinforcement in any member shall be securely placed and then inspected and approved before the placing of concrete begins. Concrete placed in violation of this provision may be rejected.

6.3.7.4. Splicing. No splicing of reinforcement will be permitted, except those splices of the types and at the locations shown, without written permission from MSD. Acceptable splices may include lapped splices, welded splices, mechanical splices, or other positive connection splices shown on the Plans or directed by MSD.

Lapped splices, shall have lengths of not less than 40 times the nominal diameters of the reinforcement being spliced, unless otherwise shown on the Plans. Lapped splices in areas not designated on the Plans shall be made at points of low tensile stress, and the bars being spliced shall be rigidly clamped or wired together in an approved manner.

Rolls of welded steel wire mesh shall overlap each other by 2 cells, to maintain a uniform strength, and shall be securely fastened at the ends and edges.

Welded splices shall be in conformance with the AWS Reinforcing Steel Welding Code, current edition. Bars to be welded shall be butted and welded so as to develop, in tension, at least 125 percent of the specified yield strength of the bars. Welded splices will not be permitted unless shown on the Plans or approved by MSD.

6.3.7.5. Fiber Reinforcing. When fiber reinforcing is required by the Plans or Contract, the polypropylene fibers shall meet article 6.2.2.3 requirements. The fibers shall be added after other ingredients have been placed in the mixer and prior to leaving the batch plant. Each batch delivery ticket shall indicate the amount of fibrous concrete reinforcement material per cubic yard added to each batch of concrete. Wire mesh reinforcement shall not be used in conjunction with fiber reinforcement.

6.3.8. Placing Concrete

6.3.8.1. General. Unless other provisions are agreed upon, the contractor shall give MSD inspector 48-hour advance notice before concrete placement.

Concrete shall be delivered to its final position of placement within the time required for delivery after mixing in accordance with ASTM C 94 and within the required time interval between delivery of batches as specified in Section 6.3.5.2. Forms and reinforcement shall be moistened with water immediately before placing the concrete.

All equipment used for handling and/or placing concrete shall be such that it will accommodate concrete of the proportions and consistencies as specified. No adjustments in mixture proportions will be made to accommodate equipment, which is not capable of handling concrete of specified proportions and consistencies. Equipment used to transfer concrete from truck mixers or agitators shall be of adequate design and/or dimensions to deposit concrete of the specified slump.

Water shall be completely removed from all excavations before concrete is deposited. When it is necessary to deposit concrete under water, placement shall be in accordance with the requirements specified under Section 601.03.09, Part B of the KYTC Standard Specifications **(latest edition).** MSD's approval must be obtained prior to placing concrete under water.

In general, concrete shall not be placed unless otherwise shown on the Plans or directed by MSD.

The method and manner of placing concrete shall be such as to avoid segregation or separation of aggregates or displacement of reinforcement. The use of long chutes, troughs, belts, and pipes for conveying concrete from the point of delivery to the forms will be allowed only upon written permission. When such conveyers are allowed and the quality of concrete or methods of placing or working it therein are not satisfactory, the Contractor shall discontinue their use and equip his plant so that concrete will be placed in a satisfactory manner. Troughs, pipes, or chutes used as aids in placing concrete shall be arranged and used in such a manner that ingredients of the concrete are not separated.

Where steep slopes are required, the chutes shall be equipped with baffle boards or be in short lengths that change the direction of movement. All chutes, troughs, and pipes shall be maintained clean and free from coating of hardened concrete by thoroughly flushing with water after each run or when out of operation for more than 30 minutes. Water used for flushing shall be discharged clear of concrete in place. The troughs, pipes, and chutes shall be either metal or metal-lined and shall extend as nearly as possible to the point of deposit. Aluminum or aluminum alloy troughs, pipes, or chutes will not be permitted.

Dropping concrete in excess of 5 feet without the use of pipe or tremies, or depositing a large quantity at any point and running or working it along the forms will not be permitted. The discharge end of the pipe shall be maintained as close to the point of deposit as is feasible.

Concrete placing shall be such to entirely fill but not bulge or distort the forms or to disturb their alignment.

Special care shall be exercised to fill each part of the forms by depositing concrete as near its final position as possible, to work the coarser aggregate back from the face and to force concrete under and around reinforcing bars without displacing them. After concrete has taken its initial set, care shall be exercised to avoid jarring the forms or placing any strain on ends of projecting reinforcement.

Concrete shall be compacted either by vibration as described herein or with approved spading tools. When vibration or spading is used, it shall be distinctly understood that formation of honeycombs, voids, or air pockets against the forms will not be allowed.

Vibration shall be internal. Vibrators shall be of types and designs capable of transmitting vibration to the concrete at frequencies to adequately consolidate the concrete. Vibration shall be of sufficient intensity and duration to cause flow or settlement of the concrete and complete compaction, but shall not be used to cause concrete to flow over long distances in the forms. The Contractor shall provide and use a sufficient number of mechanical vibrators to ensure that compaction can be started immediately after concrete has been deposited in the forms. The mechanical vibrator shall not be attached to the forms or reinforcing steel or applied to the surface of the concrete. The vibrator shall be applied to the concrete immediately after deposit of the concrete and shall be moved throughout the mass, thoroughly working the concrete around the reinforcement, embedded fixtures, and into angles and corners of the forms.

Vibration shall be of such duration to accomplish thorough compaction and complete embedment of reinforcement and fixtures, but shall not be unduly prolonged to cause segregation or **the excess buildup of paste** at the surface of the lift being consolidated. Forms shall be designed to provide for requirements of vibration.

Concrete shall be placed in continuous horizontal layers, the thickness' of which shall not exceed 12 inches, unless otherwise specified for different types of structures. In any given layer, consecutive batches shall be placed and compacted before the preceding batch has taken its initial set. Each layer of concrete shall retain a rough surface in order to secure efficient bonding with the next layer. A succeeding layer placed before the underlying layer has set shall be compacted in a manner that will entirely break up and obliterate the tendency to produce a cold joint between layers.

The operations of depositing and compacting concrete shall be conducted to form a compact, dense, and impervious mass of uniform texture having smooth faces on exposed surfaces. When any section of concrete is defective, it shall be removed and satisfactorily replaced or repaired as directed.

6.3.8.2. Weather Limitations and Protection. Concrete shall be maintained at a minimum temperature of 45°F for three calendar days after placement and at a minimum temperature of

40°F for an additional four calendar days. When required, the Contractor shall submit a written outline of the method to be used for protecting concrete. The Contractor shall designate one of his employees to be responsible in order that he may be contacted by MSD in unexpected situations. MSD reserves the right to discontinue concrete placement when the means of protection and/or method of placement do not produce satisfactory results.

In cold weather, 40°F or below, all water and/or aggregate shall be heated so the temperature of the mixed concrete shall be no less than 50°F or more than 90°F at the time of placement.

When artificial heat is used, means shall be provided to maintain adequate moisture in the air within the enclosure. Surfaces of all concrete shall be maintained in a moist condition. When artificial heat is used, the temperature of concrete near the source of heat shall not exceed 80°F, and the temperature of concrete remote from the source of heat shall not be less than that designated (45°F or 40°F) for the time of curing after placement. When stoves or salamanders are used, adequate provisions shall be made for fire protection.

In hot weather, efforts shall be made to maintain temperature of the mixture below 90°F. The temperature of the concrete mixture immediately before placing shall be between 50°F and 90°F. When the ambient air temperature is above 90°F, the forms, reinforcing steel, and other surfaces which will come in contact with the mixture shall be cooled to below 90°F by means of a water spray or other approved methods. Excess water shall be allowed to drain or shall be removed from the forms before concrete is placed.

The Contractor shall assume all risks connected with placing concrete under these conditions and permission given by MSD to do the Work will in no way relieve the Contractor of responsibility for proper results. Should concrete placed under such conditions prove unsatisfactory, it shall be removed and replaced with satisfactory concrete and no allowance will be made for removing and replacing the defective concrete.

6.3.9. Joints

6.3.9.1. General. Unless authorized by MSD, all joints in non-road situations will be "tooled". The saw cutting of control and construction joints will not be allowed.

6.3.10. Curing Concrete

6.3.10.1. General. All surfaces, which are to receive a masonry coating finish, shall be wet-cured. All other concrete, shall either be wet-cured or shall be cured by application of a membrane forming compound.

At any time MSD determines concrete on the Project is not being properly cured, all or any concreting operations on the Project may be suspended.

At any time during the curing period when the atmospheric temperature is 45°F or less, the concrete shall be protected so as to satisfy the temperature requirements specified in Subsection

6.3.8.2. of these Specifications.

6.3.10.2. Wet Curing. Concrete shall be cured for a period of at least seven calendar days, beginning immediately after placement and finishing, by the frequent application of water to all surfaces so as to keep them continuously damp during the full seven-calendar-day curing period. Exposed concrete surfaces shall be protected from drying by application of a double thickness of wet burlap or similar material and the burlap or other approved material shall be kept continuously wet for a period of seven or more calendar days.

When the structure or any portion thereof is enclosed and artificial heat is provided for protection, the requirement of moisture for curing will not be waived. When steamlines are used for heating, the pipe shall be left loose so as to permit the escape of sufficient steam into the housing in order to maintain a moist atmosphere at all times. When stoves or salamanders are used, vessels containing water shall be maintained on each stove or salamander to maintain a moist atmosphere at all times.

6.3.10.3. Membrane Curing. The membrane forming curing compound shall not be diluted or altered prior to use, but shall be thoroughly agitated immediately prior to use. When the compound is too viscous for application, it shall be warmed in a water bath to approximately 100°F prior to application.

The compound shall be uniformly applied to a surface by use of an approved pressure sprayer. Curing compound may be applied in one application provided uniform and satisfactory coverage is achieved. If MSD directs that two applications are required because one application is not satisfactory, then each application shall be at the rate of one gallon per 300 or less square feet. The first application shall be started as soon as practicable after the final finish and as directed by MSD and the second application shall be started as soon as the first application is finished. The total actual application rate shall be at least one gallon per 150 square feet actual coverage.

Curing compound shall not be applied to construction joints, reinforcing steel, or surfaces, which are to receive a masonry coating. When curing compound is applied to surfaces upon which the compound is not permitted for use, it shall be removed by sandblasting.

The curing compound shall be protected and maintained in an acceptable condition for a period of at least seven calendar days. Surfaces upon which the curing compound is damaged before the end of the seven-calendar-day curing period shall be moistened and resprayed with curing compound.

6.3.11. Surface Finish

6.3.11.1. General. Unless otherwise indicated on the Plans, the surface finish that shall be applied to various parts of concrete structures shall be as follows:

Ordinary Surface Finish
Masonry Coating Finish

Floated Surface Finish

Ordinary Surface Finish shall be applied to all concrete surfaces. Unless otherwise specified in the Contract, and provided requirements are satisfactorily met, ordinary surface finish shall be considered as a final finish on all surfaces not required to have a Masonry Coating Finish or a Floated Surface Finish.

6.3.11.2. Ordinary Surface Finish. During concrete placement, care shall be taken that methods of compaction used will result in a smooth surface of even texture free from honeycombs, water, and air pockets, and that the coarse aggregate is forced away from the forms in order to leave a mortar surface.

As soon as the concrete has set sufficiently, the forms shall be carefully removed and all metal ties, anchorages, or tie wires used within the forms to hold them to correct alignment and location shall be removed as specified in Subsection 6.3.6.2. of these Specifications. Immediately following removal of forms, all fins and irregular projections shall be removed from all surfaces, except those not to be exposed in the completed Work. On all surfaces, cavities and depressions resulting from removal of form ties and all other holes, honeycomb spots, broken corners or edges, and other defects shall be thoroughly cleaned, saturated with water, and carefully pointed and trued with a mortar of the same cement and fine aggregates mixed in the same proportions as used in the class of concrete being finished. The mortar used shall not be more than 30 minutes old and the mortar patches shall be cured as specified for the structures.

After the mortar has thoroughly hardened, it shall be finished with a carborundum stone to obtain a uniform and smooth surface the same color and texture as in the surrounding concrete. When required, honeycomb areas shall be chipped out before pointing. All open and filled contraction and expansion joints in the completed Work shall be carefully tooled and free of all mortar and concrete. The joint filler shall be exposed for its full length with clean true edges.

The objective of these requirements is to obtain smooth and even surfaces of uniform color and texture without unsightly bulges, patched areas, depressions, and other imperfections. The degree of care in building forms and the character of materials used in form work, and the care with which concrete is placed will be factors in determining whether additional finishing of concrete will be required.

6.3.11.3. Masonry Coating Finish. After the concrete surfaces of members designated to have a Masonry Coated Finish have been inspected and accepted as having a satisfactory Ordinary Surface Finish, the concrete surfaces shall be cleaned of all dust, foreign matter, and form oil, and an approved Masonry Coating Finish shall be applied.

All surfaces to receive a masonry coating shall be thoroughly cleaned and free of oil, form oil, grease, dust, dirt, mud, curing compound, release agents, loose patching mortar, or any other substance deleterious to bonding. The ordinary surface finish to which the masonry coating is to be applied shall be approved by MSD before application of the masonry coating.

All surfaces to receive a masonry coating shall be checked for the presence of dust by wiping a dark cloth across the surface of the concrete. If a white powder can be seen on the dark cloth, the concrete shall be cleaned by wire brushing, grinding, or water blasting and then allowed to thoroughly dry before the masonry coating is applied. The surface will be rechecked for the presence of dust after cleaning.
All surfaces to receive a masonry coating shall be checked for the presence of oily conditions by sprinkling or fogging water on the surface of the concrete. If the water stands in droplets without spreading out immediately, this indicates the surface is contaminated with an oily substance, and cleaning, using a detergent and water followed by thorough rinsing with water, will be required. The surface will be rechecked for the presence of oily conditions after cleaning.

All surfaces to receive a masonry coating shall be thoroughly dry before coating is applied, unless the coating manufacturer specifically recommends the surface to be wet. Surfaces will not be considered dry unless an absorbent paper pressed tightly against the surface does not show any trace of moisture.

Coating application shall be suspended any time the ambient temperature or the temperature of the concrete does not comply with the coating manufacturer's recommendations.

Prior to application of the materials, the Contractor shall furnish MSD with copies of the coating material manufacturer's brochures or booklets. Masonry coating materials shall be applied in strict conformity with the manufacturer's written instructions, except that in each instance the concrete surface shall be prepared to the satisfaction of MSD before application of the material is started and the material shall be applied at a uniform rate of 50 plus or minus 10 square feet per gallon.

Any portions of the coating which are not clean, uniform in color, texture, thickness, tightly bonded, or which are damaged prior to final acceptance of the Project shall be satisfactorily repaired or removed and replaced with an acceptable finish and coating.

Care shall be exercised to secure a neat uniform appearance and to prevent the coating from being dripped, sprayed, or otherwise deposited upon concrete or steel surfaces not designated to receive the coating. Any objectionable deposits or material shall be removed and the surfaces repaired to the satisfaction of MSD.

6.3.11.4. Floated Surface Finish. Horizontal surfaces that do not receive the Masonry Coating Finish shall be finished by placing an excess of materials in the form and removing or striking off such excess with a wooden template, forcing coarse aggregate below the mortar surface. After the concrete has been struck off as described, the surface shall be thoroughly worked and floated by hand with a wooden float leaving a fine grained, smooth-sanded surface.

Sidewalks and driveways shall receive a broom finish, prior to beginning the curing process.

6.3.12. Sampling and Testing

6.3.12.1. Personnel. Structural concrete, such as foundations and any pour larger than 5 cubic yards, shall be sampled and tests will be performed throughout the work at the minimal frequencies indicated or more often as necessary to determine whether concrete supplied is of the quality specified. Tests will be performed by the Agency designated by MSD to provide concrete testing on Projects involving MSD facilities, according to procedures outlined below. On private developments and other than MSD advertised Projects, the testing company must be designated in writing and be approved by MSD prior to concrete placement. If the concrete plant is designated, MSD may elect to pay for samples to be taken from the same mix in order to run tests in parallel.

The technician who samples and tests concrete shall have demonstrated a knowledge and ability to perform the necessary test procedures equivalent to the minimum guidelines for Certification of Concrete Field Testing Technicians, Grade I in accordance with the American Concrete Institute.

6.3.12.2. Sampling Fresh Concrete. Concrete shall be sampled in accordance with the procedures set forth in ASTM C 172, Standard Specification for Sampling Freshly Mixed Concrete.

6.3.12.3. Slump Test. Slump tests shall be performed in accordance with the procedures set forth in ASTM C 143, Standard Test Method for Slump of Portland Cement Concrete.

6.3.12.4. Air Content. The air content shall be determined by the volumetric or pressure methods in accordance with the procedures set forth in ASTM C 173, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method, or ASTM C 231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

6.3.12.5. Test Cylinders. Concrete test cylinders shall be made and cured in accordance with the procedures set forth in ASTM C 31, Standard Practice for Making and Curing Concrete Test Specimens in the Field. Unless otherwise specified, four test cylinders shall be molded for each set. Cylinders to be used for determining form removal time shall be stored at the site as near to the concrete being represented as possible.

6.3.12.6. Compressive Strength Tests. The compressive strength of test cylinders shall be determined in accordance with the procedures set forth in ASTM C 39, Standard Test for Compressive Strength of Cylindrical Concrete Specimens.

6.3.12.7. Frequency of Tests. Unless otherwise directed by MSD, a minimum of one set of ***4*** test cylinders shall be made daily for each 50 cubic yards or portion thereof placed in each structure. Two cylinders shall be tested at 28 days to check the adequacy of the concrete mix. The remaining cylinders may be tested, as needed, to meet the provisions of Section 601.03.14 of the KYTC Standard Specifications **(latest edition)**, if early form removal is desired.

Slump and air content tests shall be made at the time of concrete placement as often as is necessary for control checks and acceptance purposes, and always when compressive strength specimens are made. If the measured slump or air content falls outside the specified limits, a

check test shall be made immediately on another portion of the same sample. In the event of a second failure, the concrete shall be considered to have failed the requirements of these Specifications. The first and last l/4 cubic yard discharged from the mixer are exempt from the slump and air content requirements of these Specifications.

SECTION 7

MSD STANDARD SPECIFICATIONS

TRENCHLESS PIPE INSTALLATION

7.1. GENERAL

This Work shall consist of the installation of sanitary and storm sewer pipe by one of the following methods when the open cut method cannot be used.

- **Tunneling**
- **Boring and Jacking**
- **Horizontal Directional Drilling**
- **Pipe Bursting**

The design plans will identify appropriate pipe installation method and required information to allow bidding. The CONTRACTOR will have the option to offer a different method of trenchless pipe installation than that proposed, subject to approval and acceptance by MSD. When an alternate method is proposed by the CONTRACTOR he will be responsible for the final design calculations. A plan of operation and list of proposed materials will be submitted for MSD approval. Structural calculations will be required for all components, including but no limited to: casing and carrier pipe, tunnel liner plates, the working pits sheeting and shoring, electrical facilities, ventilation, and communications. All design calculations and plans must be signed and sealed and submitted by a professional engineer licensed in the Commonwealth of Kentucky.

7.1.1 Maintenance of Traffic. Where pipe is required to be installed under railroads, highways, streets, or other facilities by trenchless installation construction shall be made in such a manner that will not interfere with the operation of the railroad, street, highway, or other facility, and shall not weaken or damage any embankment or structure.

7.1.2. Utilities. The CONTRACTOR will need to coordinate all excavations in advance with Kentucky 811 – Before you Dig (BUD). If any utility above or adjacent to the construction is endangered or has been damaged because of the trenchless operations or movements of earth caused by such operations, the owner of same shall be notified immediately and shall be given access to the Work to carry out all necessary repairs to such utilities. If any sewers are damaged, it shall be the responsibility of the CONTRACTOR to make the necessary repairs.

The CONTRACTOR shall be responsible for protection of utilities, sewers, and drains against damage by his Work. If any public or private property is endangered, or has been damaged as a direct result of the trenchless operations, it shall be repaired at the CONTRACTOR's expense. All cost and expense to the CONTRACTOR for carrying out the above requirements shall be at no additional cost to the MSD.

7.1.3. Dewatering. Prior to commencing, the CONTRACTOR shall furnish and operate all necessary pumping equipment of ample capacity and make all necessary provisions to keep tunnels, shafts and pits free of water during construction and to satisfactorily dispose of such water. During placing of concrete, drainage and pumping shall be so arranged that concrete is placed in the dry and that no water will flow over the concrete until it has hardened. Refer to Spec Section 3.3.3.8 Dewatering of Excavations.

7.1.4. Line and Grade. Line and grade shall be checked frequently by the CONTRACTOR's Professional Land Surveyor and not less than once per day. Results from these checks shall be provided to MSD. The CONTRACTOR also shall assist MSD in checking line and grade as often as MSD deems necessary to ensure that proper tolerances in line and grade are being met.

Trenchless sections of sewers shall be completely installed prior to construction of adjoining sections. If permitted by MSD, minor adjustments in the line and/or grade of the adjoining sections shall be allowed to compensate for slight deviations from the Plan line and grade of the installed sections.

7.1.5 Availability. The PRIME CONTRACTOR shall be on site during all phases of the work. The CONTRACTOR shall have a local or 1-800 cellular phone or pager active at all times.

7.1.6. Working Hours. Work hours must be approved by MSD as part of the construction schedule submittal. Tunnel construction operations may progress for 24 hours a day, except on Sundays. When Work is done at night, the CONTRACTOR shall provide adequate safety precautions such as watchmen, barricades, lights, etc., and any mechanical equipment used in the construction operations shall be of a type that produces a minimum amount of noise to avoid creating a nuisance.

7.1.7 Material of Pipe. Designer shall dictate on plans pipe material used for trenchless installations, refer to MSD Section 4 Pipework for specifications.

7.2 TUNNELING

7.2.1 DECRIPTION OF WORK

Tunneling shall involve the installation of steel liner plates or rib and lagging systems to provide support to the tunnel walls and/or protective shield for carrier pipe. Excavation of material for installation of tunnels shall be performed manually or by mechanical tunnel boring machines (TBM).

7.2.2 MATERIALS

7.2.2.1. Steel Tunnel Liner Plates. The base metal for steel plates shall conform to the chemical requirements of ASTM A 569, Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality. The flat plate (before cold forming) shall conform to the following minimum mechanical properties:

Tensile Strength	42,000 psi

Yield Strength	28,000 psi
Elongation, 2 inches	30%

Nominal plate dimensions shall provide the sectional properties shown in the current edition of the AASHTO Standard Specifications for Highway Bridges. Thickness tolerances shall conform to Paragraph 14 of AASHTO M 167, Standard Specification for Structural Plate for Pipe, Pipe-Arches, and Arches. Steel liner plates shall be of additional thickness or protected by coatings and other means when required in the Contract for resistance to abrasion or corrosion**. Four-flanged liner plates will be required unless the design requires the use of two-flanged plates.**

7.2.2.2. Bolts and Nuts. Bolts and nuts used with lapped seams shall be no less than 5/8 inch in diameter. The bolts shall conform to ASTM A 449, Standard Specification for Quenched and Tempered Steel Bolts and Studs, for plate thicknesses equal to or greater than 0.209 inch and A-307, Standard Specification for Carbon Steel Externally Threaded Standard Fasteners, for plate thickness less than 0.209 inch. The nut shall conform to ASTM A 307, Grade A.

Bolts and nuts used for 4-flanged plates shall be no less than 1/2 inch in diameter for plate thicknesses to and including 0.179 inch and no less than 5/8 inch in diameter for plates of greater thickness. The bolts and nuts shall be quick acting coarse thread and shall conform to ASTM A 307, Grade A.

7.2.2.3 Cement Grout. Cement grout for filling voids outside the tunnel liner plates, unless shown otherwise on the Plans, shall consist of a mixture of water and one part Type 1 Portland Cement to two parts mortar sand (as specified in Section 804.05 of the most current edition ***of the*** KTC Standard Specifications), by volume, or KTC 1:2 Proprietary Grout Mix #1093. The water shall be adjusted to produce a mixture of consistency suitable for pumping, with a minimum slump of 5 inches and a maximum slump of 9 inches. Provisions shall be made for releasing of air and filling with grout. A pressure of 10 to 15 PSI (23.0 to 35.0 feet of head) shall be used. Cement grout for filling the voids between the carrier pipe and tunnel liner shall be a mixture suitable for grouting and shall be approved by MSD prior to its use.

7.2.3 EXECUTION OF WORK

7.2.3.1. Submittals and Approvals. Tunnel support systems shall be with steel liner plates, ribs and lagging, steel casing pipe or other systems approved by MSD. The CONTRACTOR shall furnish a detailed Tunneling Plan for review by MSD. The Plans shall contain a description of the tunneling method and equipment proposed, tunnel support system, shop drawings, details and cross-sections, a schedule of operations, and the proposed work hours. Tunnel construction shall not commence until MSD has reviewed the submittal and provided approval of the Plan. MSD's approval shall in no way relieve the CONTRACTOR of his sole responsibility for the execution of this Work or any liability. When tunnel construction shall be beneath a Railroad right-of-way, the Tunneling Plan shall also be subject to the approval of the Railroad.

7.2.3.2. Safety. All Work shall conform to applicable Subsections of the Kentucky Occupational Safety and Health Standards for the Construction Industry and 29 CFR, Part 1926, Subpart S, "Tunneling".

7.2.3.3. Tunnel Shafts. Shafts shall be constructed at the locations shown on the Plans. If not shown on the Plans, shafts shall be constructed at locations selected by the CONTRACTOR, subject to approval by MSD. Temporary construction shafts shall be of adequate size and properly constructed and equipped to meet all requirements of safety to personnel and to the Work. All shafts shall be barricaded, lighted, fenced, and properly guarded from the beginning of the excavation until the completion of the construction requiring the shaft. A substantially constructed ladder shall be provided in each shaft and shall be kept in safe, good repair, clean, and clear of debris.

Provisions shall be made at each shaft so that plumb lines suspended on the centerline of the sewer at each end of the shaft will hang freely from the surface.

7.2.3.4. Tunnel Construction. The CONTRACTOR shall carry out the Work of tunneling and supporting the tunnel face, roof, walls, and floor so that there will be no fall, flow, caving, or heaving of earth or other materials into the tunnel excavation. If there should be any fall or movement of earth into the tunnel at any time, the CONTRACTOR shall proceed with the Work with all necessary precautions and in such a manner as will ensure the safety of life and of all sewers, utilities and public and private property above and adjacent to the tunnel.

The CONTRACTOR shall furnish, place and maintain all sheeting, bracing or lining required to support the tunnel floor, roof, sides, and face until the pipe and its bedding, jointing, encasement and backfilling have been completed. All liners shall remain in place. Care shall be used in trimming the surfaces of the excavated section and in placing the liners or sheeting and bracing so that the required minimum clearance between the outside of the pipe and the final position of the liners, sheeting and bracing in the tunnel will be attained without any deviation in sewer alignment. Sheeting or lining must be placed and held tightly against the trimmed earth surface of the excavated section so that complete filling of voids may be achieved between the earth and the lining or sheeting placed against it. No part of the lining, bracing, or flanges of steel liner plates shall project closer to the outside top of the pipe than 12 inches, or to the outside bottom of the pipe than 4 inches, unless shown otherwise on the Plans.

7.2.3.5. Prevention of Loss of Earth Materials. Cavities or spaces between the actual surfaces of excavation and the tunnel liner plates or sheeting, shall be completely filled with cement grout. Grout shall be placed under pressure through grout nipples in the steel liner plates or grout holes in sheeting. The grout holes shall be at minimum 10 feet centers and the grout placed in such sequence as to ensure the complete filling of all cavities and spaces and of carrying loads uniformly from the undisturbed material to the tunnel lining or sheeting. Grouting shall be done at frequent intervals simultaneously with the tunnel construction and immediately whenever a loss of material occurs. In no case should the tunnel be left ungrouted if Work is to be stopped or suspended for any extended period of time.

At the end of each working day, or whenever a delay in the tunneling is anticipated, the CONTRACTOR shall construct a bulkhead to prevent the caving of soil at the working face. The bulkhead shall be required unless MSD specifically grants permission to omit the bulkhead.

Wherever unstable conditions are encountered and the CONTRACTOR is unable to proceed without loosening earth or creating voids outside the tunnel lining, the CONTRACTOR shall pre-solidify the soil around the area to be excavated by freezing the soil or injecting an approved chemical that will permit the tunnel excavation to proceed without any loss of earth material, or other method approved by MSD. Before any stabilization of earth materials is begun, the CONTRACTOR shall obtain approvals. Stabilization shall be performed at no additional cost to MSD.

7.2.3.6. Installation of Carrier Pipe. All pipe used in tunnels shall be of the type shown on the Plans or in the Contract and shall be of the size and strength class required.

After the tunnel section is excavated, lined, and braced, the carrier pipe shall be placed on and supported by steel rails, a concrete pad, or other approved supports. The supporting system shall assure line and grade and shall allow sufficient space below the pipe for placing concrete. Care shall be used to avoid damage to the pipe or to the liner plates. The carrier pipe shall be rigidly braced to prevent its displacement when the annular space is backfilled.

The space between the carrier pipe and sides of the roof of the tunnel shall be completely filled with grout or with pea gravel or No. 9 crushed stone by pneumatic backstowing. The grout or granular material shall be uniformly placed and compacted to fill all spaces between the outside of the pipe and inside surface of the sheeting or lining. **Refer to MSD Standard Detail GB-01-00 for installation requirements.**

Temporary shafts shall be completely abandoned. Unless otherwise specified in the Plans or Contract, all sheeting, bracing, and similar items may be removed unless the CONTRACTOR requests and receives authorization from MSD to leave it in place. No payment will be made for such items left in place at the Contractor's option.

7.3 BORE AND JACKING

7.3.1 DECRIPTION OF WORK

Bore and Jacking shall be performed mechanically through the soil by a horizontal auger mounted inside the casing pipe or by a tunnel boring machine (TBM). The casing pipe shall be jacked simultaneously with boring operations until casing pipe is in final position, at which point the carrier pipe can be installed.

7.3.2 MATERIALS

7.3.2.1. Steel Casing Pipe. Steel casing pipe shall conform to ASTM A 139 Grade B, Standard Specification for Electric-Fusion (ARC) Welded Steel Pipe. For 30 inch and greater diameter casing pipe, a minimum clearance of 12 inches (total) must be provided between pipe bells and the inside of the casing pipe, except as otherwise stated in these specifications, or as shown on the Plans. On a case-by-case basis a smaller diameter casing will be allowed if the 12-inch minimum clearance and design grade can be achieved. All storm drains, 8 inch or greater gravity sewers, and 10 inch or greater force mains shall use a 30 inch minimum diameter casing pipe. A 12 inch diameter casing pipe shall be used for 6 inch or less gravity sewers and 8 inch or less force mains.

The minimum pipe wall thickness will be 3/8". The actual pipe wall thickness shall be determined by the contractor based on the static and dynamic loads from traffic loading and anticipated ramming forces for the selected pipe and driven pipe lengths. Pipe lengths shall be determined by the contractor.

7.3.2.2. Cement Grout. Cement grout for filling voids outside 30 inch or larger casing pipe, unless shown otherwise on the Plans, shall consist of a mixture of water and one part Type 1 Portland Cement to two parts mortar sand (as specified in Section 804.05 of the most current edition ***of the*** KTC Standard Specifications), by volume, or KTC 1:2 Proprietary Grout Mix #1093. The water shall be adjusted to produce a mixture of consistency suitable for pumping, with a minimum slump of 5 inches and a maximum slump of 9 inches. Provisions shall be made for releasing of air and filling with grout. A pressure of 10 to 15 PSI (23.0 to 35.0 feet of head) shall be used. Cement grout for filling the voids between the carrier and casing pipe shall be a mixture suitable for grouting and shall be approved by MSD prior to its use.

7.3.3 EXECUTION OF WORK

7.3.3.1. Submittals and Approvals. Boring and jacking support systems shall be with steel casing pipe or other systems approved by MSD. The CONTRACTOR shall furnish a detailed Boring and Jacking Plan for review by MSD. The Plans shall contain a description of the Boring and Jacking method and equipment proposed, boring and jacking support system, shop drawings, details and cross-sections blocking system, a schedule of operations, and the proposed Work hours. Boring and Jacking construction shall not commence until MSD has reviewed and approved the submittal. MSD's approval shall in no way relieve the CONTRACTOR of his sole responsibility for the execution of this Work or any liability. When boring and jacking construction shall be beneath a Railroad right-of-way, the Boring and Jacking Plan shall also be subject to the approval of the Railroad.

7.3.3.2. Boring and Jacking Equipment and Construction. When required by the Plans, sewers shall be constructed within steel casing pipe which have been jacked or pushed into bored holes. The holes shall be bored from the low or downstream end, unless site conditions dictate otherwise and MSD provides approval.

The access pit shall be of sufficient size to provide ample working space for the boring and jacking equipment, guide rails, reaction blocks, bracing, spoil removal, and sections of pipe as required. Provisions shall be made for the erection of guide rails in the bottom of the pit by providing a crushed stone base where applicable. The CONTRACTOR shall be responsible for providing stable foundation and wall supports during boring operations.

The boring and jacking machine to be used shall be in good mechanical condition and capable of advancing the bore hole within the required limits of accuracy. The CONTRACTOR shall push the casing pipe as the bore progresses. All cutting heads shall be removable without retracting the casing pipe. Backstops and guide rails shall be of sufficient strength and rigidity to support the thrust of the boring and jacking machine without displacement. Guide rails shall be accurately laid to line and grade and maintained in this position until completion of the boring and jacking operation. A smooth casing pipe of sufficient strength and diameter shall be forced into the bored hole to provide a tight fit against the earth sides of the bore hole. The casing pipe shall be of

minimum diameters as specified in Section 7.3.2.1. of these specifications. Joints between sections of the casing pipe shall be welded with a continuous circumferential weld. Following installation, the casing pipe shall be carefully inspected to ensure that the carrier pipe can be properly placed.

During placement of the carrier pipe in the casing, the carrier pipe shall be blocked or otherwise supported to secure the proper flow line elevations throughout its full length and to ensure that backfilling at the bottom, sides and top of the pipe can be done without any displacement or floating. The carrier pipe shall be placed in the casing pipe only by such method that will keep the pipe joints in compression. Any method tending to disjoint the pipe while being placed will not be permitted. When the casing pipe is 30" or larger, the spaces between the casing and the outside of the casing pipe shall be filled solidly with cement grout placed under pressure, after the entire casing pipe is in place. Grout meeting the requirements of Section 7.3.2.3. shall be pumped at a pressure between 10 and 15 PSI (23.0 to 35.0 feet of head). Provisions shall be made for the removal of all air and complete filling of the voids with grout mixture. Before placing grout inside the casing pipe, the exterior of the casing pipe shall be grouted on 10 feet centers and the carrier pipe shall be carefully inspected for uniformity of grade along its alignment and any required corrections shall be made. Particular attention shall be given to ensuring that the pipe will be solidly supported by the selected backfill at its bottom and sides. The method of injection of grout under mechanical pressure shall be approved by MSD. Grout shall be placed by filling the casing pipe, through 4 inch diameter holes placed on 10 feet centers, beginning at the downstream end and proceeding upstream. The space between the carrier pipe and sides of the casing pipe shall be completely filled with grout or with granular material by pneumatic backstowing, in accordance with the methods described in Section 7.2.3.6. **Refer to MSD Standard Details GB-01-00.**

Boring and jacking will be allowed for force main pipe, sanitary sewer, property service connections, and storm drains. In each of these instances, four linear feet of green marking tape, as specified in Section 4.2.7. of these specifications, shall be placed at the edge of pavement on each side.

When unforeseen obstructions or conditions require abandonment of a partially completed bore hole, plug end of pipe by filling with grout. Then the CONTRACTOR shall backfill the abandoned bore hole and start a new hole. The CONTRACTOR shall receive no compensation for any expenses incurred by any unsuccessful attempt.

7.4. HORIZONTAL DIRECTIONAL DRILLING

7.4.1 DECRIPTION OF WORK

Horizontal Directional Drilling (HDD) is a trenchless excavation method which is accomplished in three phases. First, drilling a small diameter pilot hole along a designed directional path. Second, enlarging the pilot hole to a diameter suitable for installation of the pipe. Third pulling the pipe into the enlarged hole. HDD shall be accomplished using a horizontal drilling rig with ancillary tools and equipment.

7.4.2 MATERIALS

7.4.2.1 HDD Equipment. HDD equipment shall have adequate thrust, pullback, and torque capabilities to successfully complete the installation. The equipment shall have a tracking guidance system which will accurately locate the drilling head and pilot hole during drilling of the pilot hole. The equipment shall be capable of measuring drill string axial and torsional loads, and of measuring drilling fluid discharge rate and pressure.

7.4.2.2 Drilling Fluid System. Drilling fluid system shall be capable of mixing and delivering the drilling fluid to the drill head or the reamer in the volumes and pressures required. CONTRACTOR shall maximize recirculation of drilling fluid surface returns. CONTRACTOR shall provide solids control and fluid cleaning equipment of a configuration and capacity that can process surface returns and produce drilling fluid suitable for reuse.

Drilling fluid shall be used during the installation of the pilot hole, enlarging of the pilot hole, and installation of the pipe. The composition of all drilling fluids proposed for use shall be submitted to MSD for acceptance. No fluid will be accepted or utilized that does not comply with permit requirements and environmental regulations. Drilling Fluid shall completely fill annular space between outside of installed pipe and reamed bore hole.

7.4.3 EXECUTION OF WORK

7.4.3.1. Submittals and Approvals. The CONTRACTOR shall furnish a detailed Bore Plan for review by MSD. The Plans shall contain a description of the HDD method and equipment proposed, deflection and radiuses of the pilot bore, finish grade, existing utilities with minimum vertical and horizontal clearance, shop drawings, a schedule of operations, and the proposed Work hours. HDD construction shall not commence until MSD has reviewed and approved the submittal. MSD's approval shall in no way relieve the CONTRACTOR of his sole responsibility for the execution of this Work or any liability. When HDD construction shall be beneath a Railroad right-of-way, the Bore Plan shall also be subject to the approval of the Railroad.

7.3.3.2. Horizontal Directional Drilling Equipment and Construction. CONTRACTOR shall perform surveying for layout of installation. The entire drill path shall be accurately surveyed with entry and exit stales placed in the appropriate locations. If CONTRACTOR is using a magnetic guidance system, the drill path shall be surveyed for any surface geo-magnetic variations or anomalies.

Prior to beginning the work, the Contractor shall prepare a Bore Plan for each segment drilled. The Bore Plan shall show finished grade, deflection and radiuses of the pilot bore, all existing utilities with minimum vertical and horizontal clearance. The proposed clearance shall exceed the guidance system accuracy tolerance by a minimum of 100 percent. Submit Bore Plan to MSD for review and acceptance prior to beginning boring of the pilot hole.

CONTRACTOR shall position and anchor drill unit as required. Proper setbacks shall be provided to allow for installation of the pipe at the location indicated on the Drawings and to avoid excessive steep entry and exit angles for the pilot hole and the installed pipe.

CONTRACTOR shall make necessary provisions for operation of the tracking, locating, and instrumentation systems.

Boring of Pilot Hole.

Installation of pilot hole shall be done using a steerable drilling head. Pilot hole shall be drilled along the path shown on the accepted Bore Plan to tolerances listed herein. In all cases, property line restrictions shall take precedence over the listed tolerances. Regardless of the tolerance achieved, no pilot hole will be accepted if it will result in any and/or all of the pipeline being installed in violation of property line restrictions. Additionally, concern for adjacent utilities and/or structures shall take precedence over the listed tolerances. Listing of tolerances shall not relieve CONTRACTOR from responsibility for safe operations or damage to adjacent utilities and structures.

Alignment of the pipe shall be as shown on the Drawings, Bore Plan, and within the listed tolerances. If curves are allowed by MSD, the joint deflections and/or bend radius of the pipe shall not exceed the recommendation of the pipe manufacturer.

Monitor location of drill head as required to install pilot hole to indicated lines and grades, but in no instance shall the interval between locating the drilling head exceed 15-ft in length along the alignment.

Pilot hole shall be free from abrupt changes in line or grade that could result in unacceptably high loadings on the drill pipe or the pipe during installation.

Pre-reaming of the Pilot Hole

Subsequent to MSD acceptance of pilot hole, CONTRACTOR may, at his option, pre-ream the pilot hole as necessary for installation of the pipe.

Pre-reaming operations shall be conducted at the discretion of the CONTRACTOR. The CONTRACTOR shall insure that a hole sufficient to accommodate the pull section of pipe has been produced. Any damage to the pipe resulting from inadequate pre-reaming shall be the responsibility of the CONTRACTOR. All provisions of the specification relating to simultaneous reaming and pulling back operations shall also pertain to pre-reaming operations.

Use of pre-reaming shall be at the option of the CONTRACTOR, however, lack of pre-reaming shall not result in excessive installation loads on the pipe.

Reaming and Pullback of the Pipe

The CONTRACTOR shall utilize a reamer to enlarge the pilot hole to sufficient size for installation of the pipe without imposing excessive installation loadings on the siphon pipe.

Grippers used on the pipe shall not damage adjacent sections of the pipe. Sections of the pipe utilized by the grippers shall be removed from the pipe after installation of the pipe. Pulling head, reamer, and swivel assembly shall be acceptable to the pipe manufacturer.

The CONTRACTOR shall handle and support the pull section of pipe so as to prevent damage to the pipe and minimize pullback forces. Pull section of pipe shall be supported as it proceeds during pull back so that it moves freely and the pipe is not damaged.

The pull section of the pipe shall be installed in the reamed hole in such a manner that external pressures are minimized and an appropriate counter-balancing internal pressure is maintained. Any damage to the pipe resulting from external pressure during installation shall be the responsibility of the CONTRACTOR. If required, the siphon pipe shall be filled with water prior to entering the ground to insure that adequate internal pressure is maintained at all points to counter balance external collapse pressures. The CONTRACTOR shall submit pipe filling procedure proposed for use to MSD for review and acceptance.

The CONTRACTOR shall continuously monitor the pulling loads imposed upon the pipe. The maximum allowable tensile load imposed on the siphon pipes shall not exceed the recommendation of the pipe manufacturer. If necessary, the CONTRACTOR shall at his own expense, stop the pullback of the pipe, remove the section of pipe installed with the enlarged pilot hole, and pre-ream the pilot hole as required to allow installation of the siphon pipe without exceeding the allowable pullback forces.

7.5 PIPE BURSTING

7.5.1 DECRIPTION OF WORK

Pipe bursting is a system by which the burster unit splits the existing pipe while simultaneously installing a new Polyethylene Pipe of the same or larger size pipe where the old pipe existed, then reconnecting existing service laterals, TVI of the polyethylene pipe, and completion of the installation in accordance with contract documents.

The CONTRACTOR shall provide all materials, labor, equipment, and services necessary for bypass pumping of sewage flows, cleaning and television inspection of sewer, installation of liner, reconnection of sewer service connections, and final television inspection and testing of pipe system. This specification represents the minimum requirements and specifications for Pipe Bursting. The CONTRACTOR shall abide any manufacturer's specifications that exceed these specifications

7.5.2 MATERIALS

7.5.2.1. Polyethylene Pipe The polyethylene pipe shall be high-density polyethylene pipe and meet the applicable requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, ASTM D1248, and ASTM D3550. Sizes of the insertion shall be such to renew the sewer to its original or greater flow capacity. All pipe shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used. The minimum wall thickness of the pipe shall meet the following:

MINIMUM WALL THICKNESS

Depth of Cover (feet)	Minimum SDR of Pipe
0.0 – 16.0	19
>16.1	17

The interior of the pipe shall be a light reflective color to allow better viewing for TVI.

7.5.2.2 Materials Testing. Tests for compliance with this specification shall be made as specified herein and in accordance with the applicable ASTM Specification. A certificate with this specification shall be furnished, upon request, by the manufacturer for all material furnished under this specification. Polyethylene plastic pipe and fittings may be rejected to meet any requirements of this specification.

7.5.2.3 Pipe Bursting Equipment. The pipe bursting tool shall be designed and manufactured to force its way through existing pipe materials by fragmenting the pipe and compressing the old pipe sections into the surrounding soil as it progresses. The bursting unit shall generate sufficient force to burst and compact the existing pipe line. The pipe bursting tool shall pull the polyethylene pipe with it as it moves forward and prevent collapse of the hole ahead of the polyethylene pipe. The bursting action of the tool shall increase the external dimensions sufficiently, causing breakage of the pipe at the same time as expanding the surrounding ground. The action shall not only break the pipe, but create a sufficient void to enable forward progress. The polyethylene pipe, attached to the sleeve or rear of the burster, shall also move forward. The CONTRACTOR shall protect the manholes to withstand forces generated by equipment and bracing used for pipe bursting. Shoring of insertion pits and other confined entry areas must be accomplished using a separate system from that used to protect manholes and existing sewer lines.

7.5.3 EXECUTION OF WORK

7.5.3.1 Submittals and Approvals. All CONTRACTOR Project Submittals shall be submitted to MSD within 14 days of Notice to Proceed issuance. All submittals must be approved by MSD prior to the start of construction. The CONTRACTOR will be required to submit a Bypass Pumping Plan that shall include shop drawings showing bypass pumping locations with sufficient detail to assure that the work can be accomplished without sewage spill. A Sample Customer Notification. A Traffic Control Plan including shop drawings and signage in accordance with MUTCD guidelines. Manufacturer's technical data sheets showing complete information of material composition, physical properties, storage and handling procedures, dimensions, joining procedures, gaskets, service connection saddles, end seal material, and other appropriate information. The CONTRACTOR shall provide certified test results of the properties of the polyethylene plastic pipe to the ENGINEER. A Bursting System Installation Specification. A Construction Plan including the following submittals; handling procedures, insertion locations, material storage location, installation procedures, reconnection of sewer service connections, sampling procedures, project schedule, erosion control plan, and cleanup plan.. When pipe bursting construction shall be beneath a Railroad right-of-way, the Construction Plan shall also be subject to the approval of the Railroad. All submittals shall identify the specification section(s) they address.

7.5.3.2. Qualifications. The CONTRACTOR shall be certified by the particular Pipe Bursting system Manufacturer such that the company is a fully trained user of the pipe bursting system. The CONTRACTOR shall submit certification of worker training for use of pipe bursting equipment and installation of pipe as specified by the manufacturer. Polyethylene pipe jointing shall be performed by personnel trained in the use of thermal butt-fusion equipment and recommended methods for new pipe connections. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the polyethylene pipe. Training shall be performed by a qualified representative.

7.5.3.3 Project Documentation. The CONTRACTOR shall make a walk through digital video prior to the start of construction and another immediately after the completion of the project. These digital videos shall document the condition of the entire project area. The project name, contract number, and the date and time of filming shall be clearly identified in the videos. The location within the project area shall be clearly identified as filming progresses. The CONTRACTOR shall take seven pre-rehab digital photos per 100 feet of sewer main detailing the project area. The CONTRACTOR shall provide the digital photos on a CD/DVD along with an index that provides the following information; corresponding photo number, contract number, street address as appropriate, record drawing number, CONTRACTOR name, location by station, and date. Digital videos and digital photos shall be submitted to the MSD INSPECTOR at the earliest possible date. Upon completion of application, the CONTRACTOR shall update the final as-built drawings to reflect the actual work performed and shall submit the completed as-built drawings to MSD or its representative at the completion of the project.

7.5.3.4 Public Notification. 72 hours prior to disruption of service the CONTRACTOR shall notify property owners, public, residents, and all who may be affected using a notification form approved by MSD. The CONTRACTOR shall disrupt customer sewer service for no longer than 24 hours. If the service will be disrupted more than 24 hours, the CONTRACTOR must notify the homeowner and provide on site bypass pumping as required at no additional cost to MSD until the service is restored.

7.5.3.5 Pipe Bursting Equipment and Construction. The CONTRACTOR shall transport, handle, and store pipes, fittings, and other materials as recommended by the manufacturer. If new pipes and fittings become damaged before or during installation, it shall be repaired as recommended by the manufacturer or replaced as required by the ENGINEER at the CONTRACTOR's expense, before proceeding further.

The CONTRACTOR shall carry out operations under this section in strict accordance with all applicable OSHA Standards. Particular attention is drawn to those safety requirements involving work with entry into a confined space. It shall be the CONTRACTOR's responsibility to comply with OSHA Standards and Regulations pertaining to all aspects of the work.

It shall be the responsibility of the CONTRACTOR to TVI the sewer pipe immediately before pipe bursting to locate all active service line connections If Pre-Installation TVI inspection reveals a sag in the existing sewer that is greater than one-half the diameter of the existing pipe, it shall be the CONTRACTOR's responsibility to install the replacement pipe to result in an acceptable grade without the sag. The CONTRACTOR shall take any necessary measures to eliminate these sags by pipe replacement, digging a sag elimination pit and bringing the bottom of the pipe trench to a uniform grade in line with the existing pipe invert or by other measures that shall be acceptable to the ENGINEER.

Bypass pumping shall consist of furnishing, installing, and maintaining all power, primary and standby pumps, appurtenances and bypass piping required to maintain existing and peak hourly flows and services. The CONTRACTOR shall submit a plan for bypass pumping in accordance with MSD standards and Special Provisions. The CONTRACTOR shall be aware that homes in the area may have sump pumps connected to the sanitary sewer. The bypass pumping plan shall include an emergency response plan to be followed in

the event of a failure of the bypass pumping system or sump pump activity during the rehabilitation process.

Bypass pumping shall be done in such a manner as to not damage private or public property, or create a nuisance or public menace. The pumped sewage shall be in an enclosed hose or pipe that is adequately protected from traffic, and shall be redirected into the sanitary sewer system. Dumping or free flow of sewage on private property, gutters, streets, sidewalks, or into storm sewers is prohibited. The CONTRACTOR shall be liable for all cleanup, damages, and resultant fines in the event of a spill. The CONTRACTOR shall take all necessary precautions to ensure that no private properties are subjected to sewage backup or spill.

Existing property service connections conflicting with the proposed construction shall be adjusted by the CONTRACTOR. Property service connections that are not in service and are visibly plugged shall be lined through and not re-instated unless directed otherwise by the MSD INSPECTOR. All property service connections that are lined through shall be documented as follows; CONTRACTOR's name, MSD INSPECTOR's name, upstream and downstream manhole, property address, distance from upstream manhole and clock reading. The documentation shall be submitted to the MSD INSPECTOR prior to inversion of the liner.

The CONTRACTOR shall be liable for all damages resulting from CONTRACTOR's work.

The CONTRACTOR shall be responsible for viewing MSD's TVI video documentation prior to bidding. The CONTRACTOR is responsible for bidding necessary repairs to allow pipe bursting and pipe installation in accordance with manufacturer specification on any line segment scheduled for pipe bursting in the unit cost for pipe bursting.

Sections of polyethylene replacement pipe shall be assembled and joined on the job site above the ground. Jointing shall be accomplished by the heating and butt-fusion method in strict conformance with the manufacturer's printed instructions.

The butt-fusion method for pipe joining shall be carried out in the field by certified operators with prior experience in fusing polyethylene pipe with similar equipment using proper jigs and tools per standard procedures outlined by the pipe manufacturer.

These joints shall have a smooth, uniform, double rolled back bead made while applying the proper melt, pressure, and alignment. It shall be the sole responsibility of the CONTRACTOR to provide an acceptable butt-fusion joint. All joints shall be made available for inspecting by the ENGINEER before insertion. The replacement pipe shall be joined on the site in appropriate working lengths near the insertion pit.

The joint shall be allowed adequate cooling time before the removal pressure. The fused joint shall be watertight and have a tensile strength equal or greater than that of the pipe. All defective joints shall be cut out and replaced at the CONTRACTOR's expense.

Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than 10% of the wall thickness shall not be used and must be removed from site. A defective area of pipe may be cut out and the remaining sections may be joint fused in accordance with manufacturer specifications. In addition, any section of pipe

having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness, or any other defect of manufacturing or handling as determined by the MSD or their representative shall be discarded and not used.

The replacement pipe shall be installed with a tight fitting seal with the existing or new manhole. A Fernco CMA Water Stop Gasket or approved equal shall be placed circumferentially on the replacement pipe and encased with a cementitious non-shrink grout to prevent inflow at the manhole.

The top half of the pipe shall be neatly cut off and not broken or sheared off, at least four inches away from the manhole walls. The channel in the manhole shall be a smooth, continuation of the pipe(s) and shall be merged with other lines or channels, if any. Channel cross-sections shall be 'U' shaped with a minimum height of half to three fourths of the pipe diameter for 15 inches and larger. The side of the channels shall be built up with mortar/cement, as specified, to provide benches at a maximum of 1 in 12 pitch towards the channel.

The replacement pipe shall be sealed as specified above before proceeding to the next manhole section and all manhole sections shall be inspected individually for replacement pipe cutoff, benches and sealing.

All sewer service connections shall be identified and located prior to the pipe insertion to expedite reconnection. Upon commencement, pipe insertion shall be continuous and without interruption between manholes, except as approved by the ENGINEER. Location of the service shall be made by inspection of the pre-construction TVI documentation and other proven methods. Upon completion of the insertion of the new pipe, the CONTRACTOR shall expedite the reconnection of services to customers.

Sewer service connections shall be connected to the new pipe by means of a fusion saddle, insert a tee, or approved equal using approved methods and compatible materials as recommended by the manufacturer. Any connection not satisfactory to MSD shall be repaired in accordance with the manufacturer's recommendations at no additional cost to MSD.

After the existing sewer is completely replaced, The CONTRACTOR shall furnish all equipment and personnel to conduct an acceptance test. The test shall be conducted under the supervision of MSD.

Prior to reinstating property service connections or sealing the pipe in place at the manholes, the CONTRACTOR shall perform a low pressure air test to test the integrity of the pipe.

The pipe shall be plugged at each manhole with pneumatic plugs. The plug design shall be such that they will hold against the air pressure without the use of blocking or bracing. One plug shall have three air hose connections: one for inflating of the plug, one for reading the air pressure inside the sealed line, and one for introducing air into the sealed line.

Air pressure shall be introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure resulting from any ground water that may be over the pipe. At least two minutes shall elapse to allow the pressure to stabilize. The time required for the internal pressure to decrease from 3.5 to 2.5 psig greater than the

average back pressure shall not be less than the time shown for a given pipe diameter in the following table:

Carrier Pipe Diameter (inches)	Minimum Elapsed Time (minutes)
6	3
8	4
10	5
12	6
15	7
18	8
21	9
24	11
30	14
36	17

In the absence of back-pressure due to groundwater, the test pressure shall be equal to ½ psi per vertical foot of pipe depth or 3 psi, whichever is greater.

The CONTRACTOR shall provide MSD with a digital video showing the completed work including the restored conditions after all testing and work is complete

SECTION 8

MSD STANDARD SPECIFICATIONS

ROADWAY CONSTRUCTION AND REHABILITATION

8.1. DESCRIPTION OF WORK

8.1.1. General. This Work shall consist of milling and paving operations necessary to restore all existing pavements which were damaged or removed by the Contractor's operations and construction and paving operations necessary to provide new bituminous concrete pavement. Existing pavements shall be restored to conditions at least equal to their conditions before construction. Complete resurfacing or road construction shall be performed when required in the Special Provisions. The Contractor shall notify MSD 48 hours prior to placement of binder, base or surface so areas that are to be paved can be approved by MSD.

8.1.1.1. City, County, and State Paved Surfaces. Streets, alleys, sidewalks, curbs, and gutters which are wholly or partially removed, damaged or disturbed by the Contractor's operations, shall be promptly restored to the appropriate Agency’s standards or as detailed in the Special Provisions.

8.1.1.2. Other Roadway Surfaces. Other roadway surfaces not constructed or maintained by an identified agency which are wholly or partially removed, damaged, or disturbed by the Contractor’s operations, shall be restored with like or better materials to a condition as good as or better than existed prior to the beginning of the work, so that movement of traffic, both vehicular and pedestrian, through the restored way shall be as free, safe, and unimpeded as before.

8.1.2. Maintenance or Indemnity Bond. The Contractor shall provide a Maintenance or Indemnity Bond in the amount set forth in the Special Provisions to cover the cost of all claims, loss or damage and expenses of reconstruction or additional Work occurring because of settlement of backfill in the trenches under paved surfaces.

8.1.3. MSD Road Construction Standards. All new pavements at MSD owned or maintained facilities shall be constructed in accordance with the provisions in these Specifications. Included are the construction activities associated with the preparation of the subgrade, the placement and compaction of the aggregate base material, and the placement and compaction of pavement materials. Also included are the submittals required, and the test and inspection procedures required for acceptance of the finished product.

8.2. MATERIALS

8.2.1. Asphalt Mixtures.

The contractor will utilize the specified mixture identified in the design documents.

Unless otherwise noted, materials and the preparation of mixes shall meet the requirements as set forth in Sections 403.02 and 403.03.03 of the KYTC Standard Specifications. The KYTC has adopted the "Superpave" selection and evaluation process. Adherance to the procedures will be required.

In general applications, or where a mix has not been specified, materials will comply with the following requirements developed by the Plantmix Asphalt Industry of Kentucky (PAIKY).

AGGREGATES

A General: Use materials and gradations that have performed satisfactorily in previous installations.

B Coarse Aggregate: Sound, angular crushed stone, or crushed gravel, complying with KTC Standard Specifications Section 805.

C Fine Aggregate: Natural sand or sand prepared from stone, gravel, properly cured blast-furnace slag, or combinations thereof complying with KTC Standard Specifications Section 804.

D Recycled (Reclaimed) Asphalt Pavement (RAP): milled or removed asphalt pavement may be utilized in accordance with KTC Standard Specifications Section 409.

ASPHALT MATERIALS.

E Asphalt Binder: AASHTO MP 1, Performance Graded Binder PG 64-22 for general applications.

F Tack Coat: Comply with provisions in KYTC Standard Specifications Section 406.

MIXES

G Hot-Mix Asphalt: Hot-laid, hot-mix asphalt plant mixes meeting the requirements of the Standard Specifications of the Kentucky Transportation Cabinet (KYTC) or Asphalt Institute (AI) MS-2 and complying with the following requirements:

1 Base Course: Produce KYTC mixture designation Class 2 Base or a Marshall mixture from AI MS-2. There shall be no restrictions on polish resistant aggregates (utilize KTC Type "D" aggregates). Recycled Asphalt Pavement (RAP) may be utilized in accordance with KYTC Standard Specifications Section 409.

2 **Surface Course: KYTC mixture designation Class 2 Surface or a Marshall mixture from AI MS -2. The mixture gradation may pass through the restricted zone and there shall be no restriction on polish resistant aggregates (utilize KYTC Type "D" aggregates). Recycled Asphalt Pavement (RAP) may be utilized in accordance with KTC Standard Specifications Section 409.**

H Hot-Mix Asphalt: Hot-laid, hot-mix asphalt plant mixes designed according to procedures established by the Kentucky Transportation Cabinet (KYTC) or Asphalt Institute (AI) MS-2 and complying with the following requirements.

1 Provide mixes complying with composition, grading, and tolerance requirements in KYTC Standard Specifications or AI MS-2 for the following nominal, maximum aggregate sizes:

a Base Course: Mixture with a nominal maximum aggregate size of 0.75 inch (19 mm) with a minimum Voids in the Mineral Aggregate (VMA) of 12 percent.

b Surface Course: Mixture with a nominal maximum aggregate size of 0.38 inch (9.5 mm) with a minimum VMA of 14 percent.

A Job Mix Formula previously approved by MSD will generally be accepted, but must still be submitted for each Project.

8.2.2. Bituminous Tack Coat. This material shall meet the requirements for SS-1h emulsified asphalt as set forth in Section **406** of the KYTC Standard Specifications **(latest edition).**

8.2.3. Portland Cement Concrete. This material shall meet the requirements for Class A concrete as set forth in Section 6 of these Specifications.

8.2.4. Aggregate Base. This material shall meet the requirements as set forth in Section 805 of *the* KYTC Standard Specifications **(latest edition).** If not from a previously approved source, prior to construction of the aggregate base, the Contractor shall submit a grain-size distribution for the aggregate base material. The grain-size distribution shall be developed in accordance with KM 64-620. The oven-dry bulk specific gravity, determined in accordance with KM 64-607, shall be submitted with the grain-size distribution. Testing of the aggregate base shall be performed by an Independent Testing Laboratory or by a Certified Aggregate Technician employed by the supplier.

8.2.5. Fill Materials. These materials shall be used in the construction of fill to the specified lines, grades, and cross-sections. The fill shall consist of selected excavated material meeting the requirements of Section 3.3.4.1. or borrow material meeting the requirements of Section 3.3.4.3. of the current MSD Standard Specifications.

8.3. EXECUTION OF WORK

8.3.1. Pavement Cut Back. Existing pavements shall be saw cut along straight lines running parallel to and on each side of the trench. They shall be cut such that the new pavement surface will be constructed in uniform widths at least 50 feet in length measured along the trench. Pavement material shall be removed and disposed of. An additional saw cut shall be made 12 inches back on each side of the trench, after trenching Work is complete, extending down to the base material or subgrade soil. The exposed base material, if present, or subgrade soil shall be refilled and compacted with manual tampers or rollers to a density equal to 95 percent of standard Proctor density, as determined by ASTM D 698.

For Portland cement concrete pavements, if saw cuts are within 4 feet of a formed joint in the existing pavement, then the existing slab shall be broken and removed to the joint.

8.3.2. Roadway Excavation Protective Covering (Steel Plates). The objective is to provide optimal drive ability on all streets throughout the year. Avoiding damage to snow removal equipment from objects in the street is a seasonal issue. While the City, County and MSD recognize and encourage placing plates over roadway excavation sites to enable traffic to pass over the site when work is not proceeding, the desire is also that the plates be minimally disruptive and meet all safety standards.

Requirements for Collector, Arterial Streets, and County through Roads:

November 1 to March 31: Recessed plates at all sites where Project lasts longer than two working days. No flat plates allowed.
April 1 to October 31: Recessed plates or beveled plates pinned to road surface.

Requirements for Residential Streets:

November 15 to March 31: Recessed or pinned beveled plates where Project lasts longer than two working days. No flat plates allowed.

April 1 to November 14: Recessed or beveled plates allowed where construction lasts five days or longer.

8.3.3. Manhole Adjustments. From November 1 to March 31 of the following year, manhole lids shall be adjusted in conjunction with placement of bituminous concrete pavement courses in order to avoid damage to snow removal equipment. Work related to maintaining manhole lids flush with the roadway surface shall be incidental to surfacing.

8.3.4. Pavement Milling. After milling and texturing, the finished surface shall provide a smooth riding surface free from gouges, ridges, oil film, and other imperfections of workmanship, having a uniform texture, and true to the required grade and cross section. The elevation of the longitudinal edges of adjacent cuts shall not differ more than 1/8-inch. When practicable, vertical longitudinal faces shall not be left during non-working hours to expose

public traffic. When it is necessary to expose public traffic to longitudinal faces, the faces shall be no more than 1-1/4 inches in height and shall be tapered in a manner approved by MSD, to avoid creating a hazard for traffic.

Where sound pavement has been gouged, torn, or otherwise damaged during the milling operations, or damage is done to any property of any kind including utility frames, grates, and covers, repairs shall be made by the Contractor at no cost to MSD.

Lateral limits extend from the inside edge of the integral curb and gutter section a distance of at least 6-feet 6-inches into the existing pavement area. Remove existing pavement material that extends into the gutter portion of the integral curb and gutter section.

8.3.5. Grading and Aggregate Base Construction

8.3.5.1. Clearing and Grubbing. This item of Work shall consist of clearing, grubbing, removing and disposing of all vegetation, structures and debris, which are located within the designated limits of the proposed pavement. All Work shall be performed in accordance with Section 2 of the MSD Standard Specifications.

8.3.5.2. Preparation for Placement of Fill. Prior to the placement of any fill material or the placement of any pavement materials, the surface of the cleared and grubbed area shall be thoroughly inspected by the MSD Inspector. The entire surface shall be "proof-rolled" using a loaded pan, a loaded tri-axle dump truck or a heavy flat-drum roller. The MSD Inspector shall observe the behavior of the surface for signs of pumping, rutting or excessive settlement.

Areas which pump, rut, settle, or exhibit other undesirable behavior shall be undercut to firm material and backfilled, stabilized in place using KTC No. 2 crushed aggregate ***(as specified in Section 805 of the KTC Standard Specifications)***, or aerated and compacted in-place.

8.3.5.3. Placement of Fill Material. This item of work shall include placing and compacting fill material to the specified lines, grades and cross-sections.
Only acceptable materials shall be used to construct the fill. Fill material shall not be placed on frozen areas, or areas containing snow or ice.

Where required on the Plans, benches with horizontal and vertical faces shall be excavated into the original ground.

The fill material shall be placed and compacted in uniform horizontal layers not exceeding twelve inches in thickness, loose measurement. Each layer shall be thoroughly compacted to a minimum of 95 percent of standard Proctor density at moisture content between plus two percent and minus four percent, as determined by ASTM D 698. Each layer shall be properly compacted before the next succeeding layer is placed.

8.3.5.4. Subgrade. Final grading shall be performed to construct the subgrade to the lines,

grades, and cross-sections indicated on the plans. The surface of the subgrade shall be compacted to a uniform slope at a uniform density throughout. High areas shall be removed by scarifying and low areas shall be filled by placing and compacting suitable material.

When a sheepsfoot roller is used, the compaction shall be finished with a steel-wheel roller, a multiple-wheel pneumatic-tire roller, or other suitable equipment having sufficient weight to smooth out and compact the indentations made by the sheepsfoot roller.

Once final grading is complete, the embankment shall be maintained at the specified line, grade, and cross-section and at the specified density and moisture content. If the material subsequently loses its density or moisture content, it shall be recompacted to the proper density at the required moisture content.

The subgrade shall show no deviation greater than one-half inch in 10 feet from the specified section and shall be constructed uniformly so that the base, binder, and surface courses can be constructed within their specified tolerances.

8.3.5.5. Aggregate Base. Materials shall conform to the requirements identified in the contract documents. In addition, initial layers of aggregate base shall be maintained to a uniform grade and cross-section during compaction. The final layer shall be shaped to the specified line, grade and cross-section. When the final layer is to be trimmed to the final grade by an automatic grading machine, the final layer shall be constructed approximately one-half to one inch above grade, so that the grading machine cuts constantly. After the final pass of the grading machine, the surface shall be wetted and rolled. The surface of the finished aggregate base shall be smooth and uniform and shall not deviate by more than one-half inch from the specified cross-section. The longitudinal grade shall not deviate more than three-eighths of an inch within ten feet in any direction.

Immediately prior to paving, the Contractor shall remove aggregate base material from trench areas. The thickness of the material to be removed shall equal the thickness of the bituminous concrete required in the trench area, as stated in the Special Provisions. Aggregate base remaining in the trench, but loosened by this operation, shall be wetted and recompacted, as directed by MSD.

Construction scheduling operations shall be coordinated so that the aggregate base is completely covered with the specified pavement courses before work is suspended for the winter months, or for any other long delays.

8.3.5.5.1. Dense Graded Aggregate Base Course. Where required in the Project Special Provisions or Plans, dense graded aggregate (DGA), having been thoroughly mixed with water in a twin shaft pugmill-type mixer shall be delivered to the site. The amount of water added shall be an amount which will provide the mixture with a satisfactory moisture content for compaction to the specified in-place density. The plant-mixed material shall be

transported in such manner as to deliver the mix to the Project without loss of moisture or segregation. Only the aggregate base material which can be properly placed and compacted shall be transported to the site. DGA should not be stored or stockpiled on the job site without written permission from MSD. During placement, the base material shall be wetted as directed to maintain the moisture content at the level necessary to ensure proper compaction. Unless otherwise permitted, the compacted depth of each layer shall be no less than 3 inches or more than 6 inches. The determination of target density and conformance testing with comply with section 302.03.04 of the KYTC Standard Specifications. Manually operated tampers or walk-behind rollers will be required in trenches and other restricted areas inaccessible to paving rollers.

DGA base material in trench areas will be placed as soon as practicable. Trench backfill which was flushed and jetted will have drained and completed its settlement before base material is placed. If paving operations are not to begin immediately, the aggregate base shall be placed even with the existing pavement surface, and the roadway shall be opened to traffic. Any damage which occurs to the exposed base, such as raveling or the formation of potholes, shall be repaired immediately by the Contractor. All edges of the repaired areas shall be sealed.

8.3.6. Asphalt Pavement

8.3.6.1. General. Asphalt paving shall conform with ***Section 403*** of the KTC Standard Specifications.

8.3.6.2. Cleaning Existing Pavements. The Contractor shall clean all pavement areas which are to receive tack coat and bituminous surface course. Cleaning shall be with water jets, mechanical sweepers, and hand brooms, as necessary to completely remove all foreign materials from surfaces which are to be paved.

8.3.6.3. Asphalt Tack Coat. Tack coat material shall be applied to the cleaned surface of the underlying asphalt course prior to the application of the surface course. The tack material shall be diluted with water at a ratio of 1:1, and applied at a rate of 0.10 gallons per square yard.

The tack coat shall be allowed to cure to a dark black color before the surface course is applied.

Upon approval of MSD, the application of the tack coat may be eliminated when the surface course is placed within 48 hours of the placement and compaction of underlying binder course, provided the binder is not disturbed during curing.

"Fresh Oil" signs shall be placed where they are clearly visible during the period that tack coat material has been applied to a roadway. The signs shall not be removed until the tack coat has been paved over with the bituminous surface.

8.3.6.4. Leveling and Wedging. Leveling and wedging of uneven, irregular areas, including

preexisting conditions and paved shoulders, shall be performed when necessary, to provide a smooth, uniform base upon which the asphalt surface will be placed. The asphalt mixture for leveling and wedging shall be placed with a paving machine. After satisfactory spreading of the mixture has been completed, the mixture shall be thoroughly compacted by a paving roller. Tack coat material shall be applied to areas which have received wedge or leveling course. Cost shall be incidental to surfacing. Areas that are heaved or otherwise deformed due to Contractor's operations, shall be removed and restored to original contours in accordance with section 8.3.6.3.

8.3.6.5. Edge Keys. Edge keys will be required at the paving limits where new bituminous pavements join existing pavements. An edge key shall consist of a cut in the existing pavement 2 feet wide by 1 inch deep, and shall extend across the complete width of the roadway. The Contractor shall use care when making edge key cuts, to ensure that the specified depth is not exceeded by using a milling machine.

Edge keys will not be required at driveways and entrances. The bituminous surface course shall be tapered to allow a smooth transition from the edge of the pavement into the existing driveway. Feathering of the edge will be acceptable. The edge of new paving at driveways and entrances shall be straight and parallel to the curb or centerline of the roadway.

8.3.6.6. Temperature and Weather Limitations. No paving shall take place between November 15 and April 1 without written permission from MSD. Asphalt paving shall not be placed on any wet surface or when the ambient air temperature is less than that specified in the following table.

TEMPERATURE LIMITATIONS
(Minimum ambient air temperature and minimum temperature of the existing surface for placing asphalt mixtures)

Asphalt Mixtures	(Degrees Fahrenheit)
Asphalt Surface, 1" thick or less	45
Asphalt Surface, thicker than 1"	40
Asphalt Binder	35
Leveling and Wedging	45

MIXING AND LAYING TEMPERATURES (Degrees Fahrenheit)
(Using PG64-22)

Aggregates	Min 240 - Max 330
Asphalt Cement	Min 230 - Max 330
Mixture at Plant (measured in truck)	Min 250 - Max 330
Mixture When Placed (measured in truck when discharging)	Min 230 Max 330

8.3.7 Pavement Restoration For Utility Cuts - Milled Streets. The compacted asphalt binder

course shall be 4-inches for subdivision streets and 6-inches (2-3 inch thick layers) on County through roads for utility cuts, including cuts for property service connections.

8.3.8 Adjustment of Shoulders. When the placement of asphalt results in an abrupt vertical transition at the edge of pavement, the Contractor shall place and compact additional material within a 1 to 2-foot distance from the edge of the pavement. For purposes of these Specifications, "abrupt vertical transition" shall mean a 2½-inch vertical drop over a horizontal distance of less than 6 inches. The material placed shall be of the same character as the existing shoulder material. It shall be graded so as to provide a smooth transition from the pavement surface to the original shoulder.

8.3.9. Temporary Paving

8.3.9.1. Temporary Surface. Temporary pavements shall be constructed over trenches as shown on the Plans or Special Provisions in areas of heavy traffic or where safety is a concern as directed by MSD. Temporary paving shall consist of a 6-inch thick compacted aggregate base and a 2-inch compacted asphalt binder. The thicknesses specified are minimums and may be increased by the Contractor, if in his opinion, a thicker base or surface is warranted. The temporary paving shall be maintained by the Contractor and depressions and potholes which develop shall be promptly repaired. Prior to constructing the permanent paving, all temporary binder and base material shall be removed from the trenches and wasted away from the Project.

8.3.9.2. Temporary Roads. All temporary roads shall be constructed of the materials and to the dimensions shown in the Plans or Special Provisions.

8.3.9.3 Temporary Trench Surface. Upon completing backfill work in roadways the Contractor shall immediately place DGA over trench areas to provide a temporary travel surface, at no additional cost to MSD.

8.3.9.4 Construction Entrances. Construction entrances shall be constructed as shown in the Standard Drawings or Special Provisions.

8.3.10. Concrete Paving.

Concrete paving shall be performed in accordance with ***Section 501*** of the KTC Standard Specifications.

8.3.10.1. Concrete Base Aassociated with Trench Backfill. When required in the Special Provisions or shown on the plans, Class A concrete shall be used as base material in trench and cut back areas. The thickness of the concrete base shall be as identified. In situations where asphalt surface will be placed over the concrete base, the concrete shall be thoroughly cleaned, and shall be sprayed with tack coat material as specified in Subsection 8.3.6.3of these Specifications.

8.3.11. DRIVEWAYS

8.3.11.1. Concrete Driveways. Driveways to be reconstructed shall be restored with 6 inches of Class "A" concrete, 4 inches DGA and formed and shaped as designated on the Plans. The concrete shall be reinforced with polypropylene fiber at 2 pounds per C.Y. as specified in Section
6.2.2.3. Contraction joints shall be constructed as required by MSD. Non-extruding, preformed expansion joint material, 1/2 inch thick, shall be used at back of curb and against any abutting concrete, unless otherwise directed by MSD.

8.3.11.2. Asphalt Driveways. Driveways to be reconstructed shall be restored with 4 inches of compacted DGA as a base and 2 inches asphalt surface, shaped as designated on the Plans.

8.3.11.3 Stone Driveways. Driveways to be constructed shall be restored with 4 inches of crushed stone to match existing stone driveway, shaped as designated on the Plans.

8.4. INSPECTION AND TESTING

8.4.1. General. The paving operations, including subgrade preparation, placement and compaction of the base material , and the placement and compaction of the pavement shall be performed in the presence of the MSD inspector. Field and laboratory testing shall be performed by an agency designated or approved by MSD to provide pavement inspection and materials testing.

8.4.2. Field Inspection. In addition to routine visual inspection, periodic field measurements of the thickness of the granular base shall be performed by the inspector. Areas lacking in thickness shall be noted and reported to the Contractor.

During placement of the bituminous concrete pavement, field measurements of the temperature of the mix in the truck bed shall be performed to ensure compliance with the Project specifications. Measurements of the course thickness shall be performed by the inspector during placement. Discrepancies shall be noted and reported to the Contractor.

8.4.3. Field Density Testing

8.4.3.1. Embankment. As a minimum, one field density test shall be performed on the compacted fill for each 500 cubic yards of material placed, with a minimum of one test performed each lift and one test performed each shift (day). Additional density tests shall be performed when directed by MSD, or when there is a suspicion of a change in material, moisture content, or degree of compaction control.

8.4.3.2. Granular Base. As a minimum, field density tests shall be performed on the granular base at the rate of one test per ***10,000*** square feet, with a minimum of one test per shift during which granular base is placed.

8.4.3.3. Asphalt Pavement. As a minimum, one field density test shall be performed on the asphalt pavement for every ***1,000*** linear feet of material placed, with a minimum of one test per shift during which asphalt pavement is placed.

8.4.4. Laboratory Testing

8.4.4.1. General. Laboratory tests shall be performed on the materials used for construction of the granular base and the bituminous concrete pavement. Testing shall be performed by an agency designated or approved by MSD to provide materials testing.

8.4.4.2. Granular Base. Sampling and laboratory testing of the granular base material shall be performed when difficulties are experienced by the Contractor, in obtaining the specified density, or when the inspector suspects that the material used for the granular base does not meet the Project specifications.

As a minimum laboratory testing shall consist of the performance of a moisture content test (ASTM D 2216), a specific gravity test (KM 64-607) and a wet sieve analysis (KM 64-620).

8.4.4.3. Asphalt Pavement. Sampling and laboratory testing of the asphalt pavement material shall be performed on a regular basis on MSD Projects. Samples of the asphalt materials shall be tested, both in the morning and in the afternoon on projects involving the full-time placement of pavement. On smaller Projects, a minimum of one sample shall be obtained per project.

When requested, the Contractor shall submit to MSD a sample of the asphalt cement being used in the batching of the asphalt paving mix. Samples shall be obtained, identified and delivered to the inspector in accordance with KM 64-404.

Laboratory testing shall consist of the performance of an extraction test (KM 64-405) and a sieve analysis (KM 64-407).

SECTION 9

MSD STANDARD SPECIFICATIONS

CHANNEL AND SLOPE STABILIZATION, SITE RESTORATION AND CLEAN UP

9.1. DESCRIPTION OF WORK

9.1.1. Channel and Slope Stabilization. This work consists of the stabilization of channels, waterways and ditches using grass linings, erosion control blankets, turf reinforcement mats and "hard" linings such as Class II and Class III channel lining, rip-rap, mattresses, gabions and concrete paved channels.

9.1.2. Site Restoration. This work shall consist of topsoil replacement, permanent soil stabilization, and sodding to restore or establish vegetative cover on the site.

9.1.3. Clean Up. This Work shall consist of daily and final clean-up of the project site.

9.2. MATERIALS

9.2.1. Agricultural Limestone. Agricultural limestone shall contain not less than 85 percent of calcium carbonate and magnesium carbonate combined and shall be crushed so that at least 85 percent will pass the No. 10 sieve and 100 percent will pass the 3/8 inch sieve.

9.2.2. Dolomitic Limestone. Natural dolomitic limestone containing not less than 85 percent of total carbonates with a minimum of 30 percent magnesium carbonates, ground so that not less than 90 percent passes a No. 10 sieve and not less than 50 percent passes a No. 100 sieve.

9.2.3. Fertilizer. Manufactured fertilizer shall be a standard commercial fertilizer, Grade 10-1010, or 20-10-10 as specified herein, containing the specified percentages by weight of nitrogen (N), phosphate (P_2O_5) and potash (K_2O). A minimum of 50% of the nitrogen (N) shall be slow release nitrogen or the fertilizer shall be a complete formula. The fertilizer shall be furnished in standard containers with the name, weight, and guaranteed analysis clearly marked. The containers will ensure proper protection in handling and transporting the fertilizer. All commercial fertilizer shall comply with the Kentucky Fertilizer Law.

9.2.4. Permanent Seed. The seed shall meet the requirements set forth in **Section *827.04 of the*** KYTC Standard Specifications **(latest edition). Particular attention is directed to the manufacturer's expiration date.** If requested, the Contractor shall furnish a certified laboratory report from an accredited commercial seed laboratory showing the analysis of the seed furnished and approving the seed purity and germination. The report shall be signed by a Senior Member of the Society of Commercial Seed Technologists. The seed mixture to be

used for permanent seeding shall be as follows and shall be the Turf Quality Tall Fescue mixture unless the Contract stipulates otherwise.
All seeding rates specified in these specifications and in the Contract shall be in terms of the rate of pure live seed to be seeded. The actual seeding rate shall be calculated using the following formula:

$$ASR = \frac{10{,}000\ (PLSR)}{(\%GERM)\ (PURITY)}$$

where: ASR = Actual Seeding Rate (lbs/1000 sf)

PLSR = Pure Live Seed Seeding Rate (lbs/1000 sf)

% GERM = Percent Germination

PURITY = Pure Seed Content (Percent)

Permanent Seed Mixtures

(A) Native Grasses and Forbs: For use in native woodlands, riparian buffers, and stream crossings through native areas and basins. Use mixture of grasses and forbs as specified in Section 12.

The following seed mixture shall be applied at the pure live seed rate of 0.23 lb/1000 sq. feet. (10 lb/acre).

(B) Turf-**Type** Tall Fescue: Use blend of three or four of the top ten performing varieties listed in the most current edition of the Kentucky Turfgrass Research (published by the University of Kentucky College of Agriculture), mixed in equal proportions. Seed at a pure live seed rate of 8 lbs./1000 sq. feet.

(C) Kentucky Bluegrass: Use mixture of 85 percent Bluegrass with 15 percent Perennial Ryegrass. The Bluegrass blend should consist of two or three of the top ten performing varieties listed in the most current edition of the Kentucky Turfgrass Research (published by the University of Kentucky College of Agriculture), mixed in equal proportions. Seed at a pure live seed rate of 2 lbs./1000 sq. feet.

(D) Kentucky 31 Tall Fescue: Use mixture of 70 percent of Kentucky 31 Fescue, 15 percent Creeping Red Fescue, 10 percent Redtop, and 5 percent Dutch Clover. Seed at a pure live seed rate of 3 lbs./1000 sq. feet.

9.2.5. Straw Mulch. Straw for mulching shall be baled wheat, oat, barley or rye straw. It shall be reasonably free from weed seeds, foreign matter, or chaff and shall not contain any Johnson Grass, Canada Thistle, or Nodding Thistle. Straw for mulching shall be reasonably bright in color and shall not be musty, moldy, or otherwise of low quality, and shall not contain any chemicals toxic to plant growth.

9.2.6. Wood Cellulose Fiber Mulch. Wood cellulose fiber may be used in place of straw material or as a mulch anchor. Wood cellulose fiber mulch shall consist of specially prepared wood cellulose processed into a uniform fibrous physical state. Wood cellulose fiber mulch shall not contain any germination or growth inhibiting elements. Wood cellulose fiber mulch shall be dyed green or contain a green dye in the tackifier that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry. Wood cellulose fiber mulch shall conform to the following parameters: fiber length to approximately 10mm diameter approximately 1 mm., pH range 4.0 to 8.5, maximum ash content of 1.6% and minimum water holding capacity of 90%.

9.2.7. Mulch Anchoring

9.2.7.1. Jute Netting. Undyed jute yarn woven into a uniform, open, plain weave mesh with approximately one inch openings, weighing not less than 90 pounds per 100 square yards, or in rolls.

9.2.7.2. Photodegradable Plastic Netting. Photodegradeble plastic netting for holding down mulch shall consist of extruded, oriented, photodegradable plastic net (colored green) having a minimum width of 45 inches, 5/8 inch to 3/4 inch mesh openings and weighing approximately 3 pounds per 1,000 square feet. Photodegradable plastic netting shall not be used in natural and/or riparian areas.

9.2.7.3. Staples. Staples shall be V-shaped and made from No. 11 gage steel wire, or another approved material, having an effective driving depth of at least 8 inches or a 1 or 2 inch crown. Means other than steel staples shall be used in residential areas.

9.2.7.4. Tackifier. Synthetic/chemical binders, emulsions and slurries used to and or mulch. These products shall be non-toxic and biodegradable. No asphalt emulsions shall be allowed.

9.2.8. Sod. Sod shall be well-rooted Turf Quality Tall Fescue or Kentucky Bluegrass as directed by MSD or as stipulated by the Contract. The sod shall be completely free from noxious weeds, and reasonably free from other objectionable grasses and weeds and stones or other foreign materials detrimental to the development and future maintenance of the sod. The source of sod shall be covered with grass having a height of no more than 3 inches and shall be available for inspection and approval prior to cutting.

9.2.9. Erosion Control Blankets. Erosion control blankets (straw, coconut fiber, wood fiber, etc.) shall meet the requirements set forth below, shall not be damaged or torn, and shall meet the manufacturer's specifications.

9.2.9.1. Wood (Excelsior) Blankets. Wood blankets shall consist of a machine produced mat of curled wood fibers, 80 percent of which shall be 6 inches or longer in length with consistent thickness and fibers evenly distributed over the entire area. Blankets designated on the Plans as "High Velocity" shall be covered on both sides with heavy duty plastic

netting having a mesh opening of approximately 3/4 inch by 3/4 inch. Other blankets shall be covered on one side with the plastic netting.

9.2.9.2. Straw Blankets. Straw blankets shall consist of a machine-produced mat of 100% agricultural straw evenly distributed over the entire area of the mat. The top side of the blankets designated for use on mild slopes (3:1 or flatter) and low-flow swales shall be covered with polypropylene netting having an approximate 1/2 inch x 1/2 inch mesh size. The blanket shall be sewn together with cotton thread. Other blankets shall be covered on both sides with the polypropylene netting. The blanket shall be sewn together with cotton thread. It shall be supplied in rolls weighing approximately 0.5 lbs/square yard. When required, accelerated photodegradable netting shall be provided to assure blanket deterioration in 30 to 45 days.

9.2.9.3. Straw/Coconut Fiber Blankets. The blanket shall consist of a machine produced mat of 70% agricultural straw and 30% coconut fiber evenly distributed over the entire area of the mat. The top side of the blanket shall be covered with UV stabilized polypropylene netting having an approximate 5/8 inch x 5/8 inch mesh, and the bottom side shall have a polypropylene netting with an approximate 1/2 inch x 1/2 inch mesh size. The blanket shall be sewn together with cotton thread. It shall be supplied in rolls weighing approximately 0.5 lbs/square yard.

9.2.9.4. Coconut Fiber Blankets. Coconut fiber channel lining shall consist of a machine-produced mat of 100% coconut fiber evenly distributed over the entire area of the mat. The blanket shall be covered on top and bottom with UV stabilized polypropylene netting having an approximate 5/8 inch x 5/8 inch mesh size. The blanket shall be sewn together with black polyester thread. It shall be supplied in rolls weighing approximately 0.5 lbs/square yard.

9.2.9.5. Recycled Nylon Fiber Blanket. The nylon fiber permanent channel liner shall consist of a machine-produced mat of 100% recycled nylon fiber evenly distributed over the entire area of the mat. The top side of the blanket shall be covered with UV stabilized polypropylene netting having an approximate 1/2 inch x 1/2 inch mesh size, and the bottom net shall be UV stabilized polypropylene with a 5/8 inch x 5/8 inch mesh size. The blanket shall be sewn together with black polyester thread. It shall be supplied in rolls weighing approximately 0.8 lbs/square yard.

9.2.9.6. Seed-Incorporated Blankets. The seed-incorporated blanket shall consist of 2-ply 100% recycled, unbleached, cellulose tissue. Unless specified otherwise in the Contract, a standard seed mix of 66% Ky 31 Tall Fescue and 33% Annual Ryegrass at a rate of .05 lbs/sq. yard shall be uniformly distributed upon the bottom ply of cellulose tissue and fully overlaid with a top cellulose ply to provide complete envelopment of the seed layer. The seed-filled cellulose medium shall be sewn to the bottom side of the specified erosion control fabric.

9.2.9.7. Biodegradable Blankets. Biodegradable erosion control blankets shall be composed

of straw, straw/coconut fiber, or coconut fiber mats meeting the specifications of those given in Subsections 9.2.9.2, 9.2.9.3, and 9.2.9.4 above. The blanket shall be covered on top and bottom with woven natural fiber netting having an approximate 1/2 inch x 1 inch mesh size. The blanket shall be sewn together with biodegradable thread. It shall be supplied in rolls weighing approximately 0.5 lbs/square yard.

9.2.10. Erosion Control Fabrics. Erosion fabrics (coir, jute, etc.) shall meet the requirements set forth below, shall not be damaged or torn, and shall meet the manufacturer's specifications.

9.2.10.1. Coir Fabrics. The coir erosion control fabric shall consist of 100% natural coir drawn from coconut husks. The yarn shall be wheel spun, well cleaned, evenly spun and uniformly twisted. The fabric shall have an open weave construction. The weight of the fabric, allowable water flow velocities, maximum shear stress and its durability shall equal or exceed the fabric(s) specified on the Plans or in the Contract.

9.2.10.2. Jute Fabrics. Jute erosion control fabrics shall be manufactured using woven jute that is undyed and unbleached. The fabric shall have an open weave construction. The weight of the fabric, allowable water flow velocity, maximum shear stress and its durability shall equal or exceed that of the jute fabric(s) specified on the Plans or in the Contract.

9.2.11. Turf Reinforcement Mats. Turf reinforcement mats shall be manufactured using synthetic materials, natural materials, or a combination of both. Turf reinforcement mats shall be those specified on the Plans or in the Contract. No substitutions are allowed unless directed by MSD and approved by MSD.

9.2.12. Anchors for Erosion Control Blankets, Erosion Control Fabrics, and Turf Reinforcement Mats

9.2.12.1 Staples. Staples for securing the erosion control blankets shall be U-shaped and made from No. 11 gage (minimum) steel wire or other approved material with an effective driving depth of at least 8 inches on disturbed soil and 6 inches on undisturbed soil. Staples shall have a 1-inch to 2-inch crown. Staples shall meet and be installed according to the blanket manufacturer's specifications. If any conflict exists between the manufacturer's and MSD's specifications, the more stringent requirements shall be met unless otherwise directed by MSD. The Contractor shall supply a set of specifications for MSD's use. Means other than steel staples or pins **may** be used to anchor blankets, fabrics and mats in residential areas.

9.2.12.2. Pins. Pins may be steel, plastic or wood. They must meet or exceed the requirements or recommendations of the blanket, fabric or mat manufacturer. Means other than steel staples or pins shall be used to anchor blankets, fabrics and mats in residential areas.

9.2.12.3. Dead Stout Stakes. Dead stout stakes shall be constructed using 2-inch x 4-inch

(nominal) hardwood lumber, 18 to 24 inches in length, cut diagonally across its length to form two stakes. The length of stakes shall be in accordance with the specifications of the manufacturer of the erosion control product.

9.2.12.4. Wood Stakes for Securing Sod. Wood stakes shall be 1-inch x 1-inch untreated pine with a minimum length of 6 inches.

9.2.13. Concrete. Concrete paved ditches and channels shall be constructed using Class A Concrete as defined in Section 6 of these Specifications.

9.2.14. Concrete Reinforcement. Deformed steel reinforcing bars, welded wire fabric, and polypropylene fibers shall be as defined in Section 6 of these Specifications.

9.2.15. Aggregate for Class II Channel Lining. Aggregate for Class II Channel Lining shall be limestone meeting the general requirements of KYTC ***Standard*** Specifications **(latest edition).** This material shall be produced by using a crusher, grizzly, or sieve with openings of 9 inches and by such additional processing as may be necessary so that no more than 20 percent of the finished product will pass through square openings 5 inches by 5 inches.

9.2.16. Aggregate for Class III Channel Lining and Rip-Rap. Material for Class III Channel Lining and Rip-Rap shall meet the general requirements of **the most current edition of the** KYTC ***Standard*** Specifications. No less than 80 percent, by volume, of individual stones shall range in size from 1/4 to 1-1/2 cubic feet. Stones of smaller sizes are permissible for use in filling voids in the upper surface and dressing to proper slope.

9.2.17. Aggregate for Mattresses. Aggregate for mattresses shall be hard, durable, clean limestone meeting the general requirements of **the most current edition of the** KYTC ***Standard*** Specifications. Stone size shall be from three (3) to six (6) inches for nine (9) inch deep units. For units of six (6) inch nominal depth, the stone size shall not exceed four (4) inches unless directed by MSD.

9.2.18. Aggregate Fill for Gabions. Aggregate fill for gabions shall meet the general requirements of **the most current edition of the** KYTC ***Standard*** Specifications except that stones used shall be from four (4) to eight (8) inches in size for units over 12 inches deep. In units 12 inches deep, stone size shall be from four (4) to six (6) inches, unless otherwise directed by MSD.

9.2.19. Mattress Units. Mattress units shall meet the requirements of **the most current edition of the** KTC ***Standard*** Specifications, unless otherwise stated in these Specifications. The nominal diameter, after zinc coating, of the mesh wire and lacing wire shall be 0.0866 inches (U.S. Gage No. 13); and of selvage wire shall be 0.1063 inches (U.S. Gage No. 11).

All wire gages are subject to tolerances in accordance with ASTM A 640-1982 Table 3.

An MSD inspector may sample each shipment of mattresses for testing of the wire size and

zinc coating. Any other tests deemed necessary by MSD shall be performed at the Contractor's expense. Other tests may include load test, elongation test, or test of tensile strength in accordance with the following standards:

(A) TENSILE STRENGTH of all wire used for manufacturing the gabions and lacing wire shall be in accordance with ASTM A 641, measured before fabrication of netting.

(B) LOAD TEST shall be conducted in accordance with Federal Specifications (QQ-W-461 H Class 3).

(C) ELONGATION TEST shall be conducted in accordance with Federal Specifications (QQW-461 H Class 3).

Acceptance will be based on laboratory results or visual inspection.

9.2.20. Gabion Baskets. Gabion baskets shall meet the requirements of **the most current edition of the** KYTC ***Standard*** Specifications. In addition, 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. The front, base, back and lid shall be woven into a single unit, with ends and diaphragm(s) factory connected to the base. The nominal diameter, after zinc coating, of the mesh wire shall be 0.1180 inches (U.S. Gage No. 11); of selvage wire shall be 0.1535 inches (U.S. Gage No. 9); and of lacing and connecting wire shall be 0.0866 inches (U.S. Gage No. 13).

All wire gages are subject to tolerances in accordance with ASTM 641A-71A (1980) Table 3.

An MSD inspector may sample each shipment of gabion baskets for testing of the wire size and zinc coating. Any other tests deemed necessary by MSD shall be performed at the Contractor's expense. Other tests may include load test, elongation test, or test of tensile strength in accordance with the following standards:

(A) TENSILE STRENGTH of all wire used for manufacturing the gabions and lacing wire shall be in accordance with ASTM A 641, measured before fabrication of netting.

(B) LOAD TEST shall be conducted in accordance with Federal Specifications (QQ-W-461 H Class 3).

(C) ELONGATION TEST shall be conducted in accordance with Federal Specifications (QQW-461 H Class 3).

Acceptance will be based on laboratory results or visual inspection.

9.2.21. Anchor Bars. Anchor bars for mattress units shall be Grade 40, or better, steel reinforcing bars of the dimensions shown on KTC Standard Drawing No.

RDD-030-07.

9.2.22. Geotextile Fabric. Geotextile fabric for use as a filter beneath aggregate channel linings shall be a woven or non-woven fabric consisting only of long chain polymeric filaments or yarns such as polypropylene, polyethylene, polyester, polyamide or polyvinylidene-chloride formed into a stable network such that the filaments or yarns retain their relative position to each other. The fabric shall be inert to commonly encountered chemicals, and free of defects or flaws which significantly affect its physical and/or filtering properties.
The fabric shall be formed in widths of at least 6 feet. Sheets of fabric may be sewn together to form fabric widths as required. The sheets of fabric shall be sewn together at the point of manufacture or other approved locations.

The geotextile manufacturer is responsible for establishing and maintaining a quality control program so as to assure compliance with the requirements of this Specification.

During all periods of shipment and storage, the fabric shall be wrapped in a heavy duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140°F, mud, dirt, dust, and debris.

The Contractor shall furnish, with each shipment of fabric, a Certificate of Compliance from the manufacturer of the fabric. The Certificate shall attest that the fabric meets the chemical, physical, and manufacturing requirements stated in this Specification. The Certificate also shall include actual test results for each physical requirement of this specification, as shown in the following table.

Property	Minimum Value[1]	Test Method
Grab Strength (lbs.)	200	ASTM D 4632
Elongation (%)	15	ASTM D 4632
Sewn Seam Strength[2] (lbs.)	180	ASTM D 4632
Puncture Strength (lbs.)	80	ASTM D 3787
Burst Strength (psi)	320	ASTM D 3786
Trapezoid Tear (lbs.)	50	ASTM D 4533
Apparent Opening Size (U.S. Std. Sieve)	Hole Size Equal to or Smaller than a U.S. #40 Sieve (0.425 mm)	Corps of Engineers Standards CW-02215
Permeability (cm/sec)	0.010	AASHTO M 288

Ultraviolet Degradation at 500 hours	70% Strength Retained for all Classes	ASTM D 4355
Flow Rate (gal./min./ft^2)	40	AASHTO M 288

[1]Minimum. Use value in weaker principal direction. All numerical values represent minimum average roll value (i.e., test results from any sampled roll in a lot shall meet or exceed the minimum values in the table). Stated values are for non-critical, non-severe applications.

[2]Values apply to both field and manufactured seams.

9.2.23. Fastener Pins. Fastener pins for use when fabric is installed in underdrain systems shall be formed of No. 9 or heavier steel wire and shall be at least 12 inches long with a 4 inch right angle bend on one end.

Fastener pins shall be installed according to manufacturer's specifications. The Contractor will supply a set of specifications for MSD's use.

9.3. EXECUTION OF WORK

9.3.1. Channel and Slope Stabilization

9.3.1.1. General

(A) Site Preparation and Earthwork: Site preparation and earthwork shall be performed in accordance with Sections 2 and 3 of these Specifications. The area to receive channel lining, ditch lining or slope protection shall be graded and shaped to conform to the cross-sections indicated on the Plans, within a tolerance of plus or minus 0.2 foot from the slope lines and grades.

(B) Geotextile Fabric: When shown on the Plans or in the Contract, geotextile fabric meeting the requirements of Section 9.2.22. shall be used as a filter between subgrade and aggregate channel lining, rip-rap slope protection mattresses and gabions. The fabric shall be placed in the manner and at the locations shown on the Plans. At the time of installation, fabric will be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation or storage. The surface to receive the fabric shall be prepared to a relatively smooth condition free of obstructions, debris or sharp objects that may puncture the fabric. Construction equipment will not be permitted to operate directly on the fabric. The fabric shall be protected at all times during construction from contamination by surface runoff and any fabric so contaminated shall be removed and replaced with uncontaminated fabric. Fabric shall be covered within fourteen (14) calendar days after placement; fabric not covered within the time shall be removed and replaced at the Contractor's expense if damage or deterioration is evident, as determined by MSD. Fabric not covered within thirty (30) calendar days after placement shall be removed and replaced at no additional cost to MSD. Field splices at edges or ends of the fabric made by sewing shall be sewn

by use of a portable sewing machine which produces a lock stitch. The thread shall be of a material meeting the chemical requirements specified for the plastic yarn. The adjacent sheets of fabric shall be sewn the full length of the boundary between them. The strength across the seam shall be at least 90 percent of the fabric strength in that direction. Geotextile fabric shall be placed with the long dimension parallel to the channel or toe of slope and shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. If more than one strip is necessary, the strips shall overlap a minimum of 18 inches. Transverse laps shall be placed so that the upstream strip laps over the downstream strip. Horizontal laps shall be placed so that the lower strip laps over the upper strip. Laps may be eliminated provided the joint is sewn as specified.

Fastener pins shall be installed through both strips of overlapped fabric at no less than 5 foot intervals along a line through the midpoint of the overlap, and at any other locations as necessary, to prevent any slippage of the fabric.

The fabric shall be protected from damage due to the placement of the slope protection or channel lining by limiting the height of drop of the material to no greater than 3 feet or by placing a cushioning layer of sand on top of the fabric before dumping the material, at the Contractor's option. The Contractor shall demonstrate that the placement technique will prevent damage to the fabric. Placement of material shall begin at the toe and proceed up the slope.

9.3.1.2. Grassed Channel Lining. Grassed channel lining shall be established in accordance with the seeding or sodding procedures outlined above. When shown on the Plans, erosion control blankets shall be utilized for protection in lieu of mulch and netting.

9.3.1.3. Erosion Control Blankets. Installation requirements shall be in accordance with manufacturer's instructions and the Contract Documents. If any conflict exists between these methods, the more stringent requirements shall be met unless otherwise directed by MSD. Contractor shall submit the manufacturers recommended installation method to MSD for approval. The area to be covered shall be properly prepared, fertilized and seeded in accordance with these Specifications before the blanket is placed. The blanket shall be unrolled in the direction of the water flow. When using two blankets side by side in the ditch, the seam shall not be in the center of the ditch, but offset by 6 to 12 inches. The blanket shall be butted snugly at their ends and sides and secured.

The blankets shall be secured using staples driven vertically in the ground. Four staples shall be used at the start of each roll. Staples shall be placed in rows on each side and in the middle at intervals of 2 feet. Two rows of staples shall be placed alternately between the side and middle row of staples at 2 feet intervals.

9.3.1.4. Turf Reinforcement Mats. Turf reinforcement mats shall be installed in strict accordance with the Contract Documents and the manufacturer’s installation requirements. If any conflict exists between these methods, the more stringent requirements shall be met unless otherwise directed by MSD. The Contractor shall submit the manufacturers recommended installation method to MSD for approval. No substitution may be made for the

Turf Reinforcement Mat specified in the Contract unless it is directed by MSD.

9.3.1.5. Class II and III Channel Lining. Channel Lining Class II and III shall be constructed to the dimensions shown on the Plans or directed by MSD. The stone may be dumped in place, and the placing shall be conducted in a manner to produce a surface of approximate regularity, varying no more than 3 inches from a true plane. Hand placing will not be required except as necessary to correct any surface irregularities exceeding the specified tolerance.

9.3.1.6. Rip-Rap Slope Protection. Unless otherwise shown on the Plans or unless solid rock is encountered, rip-rap slope protection shall begin in a trench 2 feet below the natural ground. Where solid rock is encountered, the lower terminus of the slope protection shall be keyed into rock.

Rip-rap shall be constructed to a minimum thickness of 2 feet measured perpendicular to the slope unless otherwise specified in the Contract. The stone may be dumped in place and placing shall be conducted in a manner to produce a surface of approximate regularity not varying more than 6 inches from a true plane.

9.3.1.7. Mattresses. Construction requirements shall be in accordance with the manufacturer's instructions and with these Specifications. If any conflict exists between these methods, the more stringent requirements shall be met unless otherwise directed by MSD. The Contractor shall submit the manufacturer's recommended assembly method to MSD for approval.

In assembling the mattresses, a single mattress base shall first be removed from the bundle, unfolded flat on the ground, and flattened to remove any kinks and bends. The mattress shall then be assembled individually, by erecting the sides, ends and diaphragm(s), ensuring that all creases are in the correct position and the tops of all sides level. The four corners of the mattress shall be laced first, after overlapping the mesh, followed by lacing the edges of the internal diaphragm(s) to the sides. The recommended lacing procedures consist of cutting a length of lacing wire approximately 1 1/2 times the distance to be laced, not to exceed five (5) feet, securing the wire terminal at the corner by looping and twisting, then proceeding to lace with alternating single and double loops at approximately four (4) to five (5) inch intervals.

The assembled mattresses are carried to the job site and placed in their proper location. For structural integrity, all adjoining empty mattresses must be laced along the perimeter of their contact surfaces in order to obtain a monolithic structure.

Mattresses may be filled by almost any type of earth-handling equipment such as backhoe, gradall, crane, etc. Along all exposed mattress edges, the outer layer of stone shall be carefully placed and packed by hand in order to ensure proper alignment and a neat, compact, square appearance. The last layer of stone shall be level with or slightly higher than the top of the mattress to allow proper closing of the lid.

The lids shall be stretched tight over the fill, using crowbars or lid closing tools, until the lid meets the perimeter edges of the front and end panels. The lid shall then be tightly laced along the edges, ends and diaphragm(s) in the same manner as described for assembling mattresses per manufacturer's recommendation. Adjacent lids may be wired down simultaneously. All ends of wire shall be turned into mesh on completion of each mattress.

WELL-PACKED FILLING WITHOUT UNDUE BULGING AND WITH SECURE LACING IS ESSENTIAL IN ALL STRUCTURES.

If the mattress unit is placed on a grade, the placing of the stone shall begin at the bottom of the slope and progress upgrade.

When a complete mattress unit cannot be installed on the slope because of space limitations, the unit shall be cut to fit, in the manner indicated on the Plans.

When mattress units are placed on a 5% or greater grade, or when otherwise required, anchor bars shall be driven in place at the locations shown on the KTC Standard Drawing No. RDD030-07.

9.3.1.8. Gabions. Construction requirements shall be in accordance with the manufacturer's instructions and with these Specifications. If any conflict exists between these two methods, the more stringent requirements shall be met unless otherwise directed by MSD.

Individual gabion baskets shall be assembled by placing flat on the ground, flattening any kinks or bends, and then erecting the sides, ends and diaphragms. All creases shall be in the correct position and the tops of all sides level. The four corners of the gabions shall be laced together with alternating single and double loops at 5 inch intervals, with both sides of the lacing wire secured by looping and twisting. Internal diaphragms shall be installed, and laced in a similar way. Lacing wire should be cut to a length of approximately 1 1/2 times the distance to be laced-not to exceed five (5) feet. Individual assembled baskets shall be placed in their proper location and all adjoining gabions connected. This connection shall be accomplished using individual tie wires looped and twisted at approximately 3 inch intervals along the entire perimeter of the contact surfaces.

Gabions may be filled by almost any means of earth-handling equipment such as backhoe, gradall, crane, etc. Along all exposed gabion faces, the outer layer of stone shall be carefully placed and packed by hand in order to ensure proper alignment and a neat, compact, square appearance.

Each course of gabions shall be stretched to proper alignment by partially filling the first gabion in line for anchorage, and stretching the connected gabions, in increments not to exceed 100 linear feet, using a come-along or other means of at least one-ton capacity. Gabions shall be kept in tension while being filled. Gabion joints shall be controlled to avoid any unraveling. Gabions shall be carefully filled in one-foot layers, in a manner that will minimize voids. Two connecting wires shall be placed in each direction between each layer

in all cells by looping lacing wire around two mesh openings in the front and back face, and in the ends and diaphragms. The ends of the connecting wires shall be securely twisted to prevent their loosening under tension.

Cells in each course of gabions shall be filled in stages, i.e. at no time shall any cell be filled to a depth exceeding one foot more than the adjoining cell. 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. Lids shall be stretched tight over the stone fill using crowbars or similar methods, until the lid meets the edges of the front and ends. The lid shall be tightly tied along all edges, ends, and diaphragms in the same manner as required for connecting adjoining gabions.

Succeeding courses of tiers shall be placed and connected as specified for the first course. Baskets for succeeding courses shall be placed so vertical joints are offset at least 18 inches from course to course, unless otherwise shown on the Plans or Standard Drawings. Gabions shall be placed as headers or stretchers in accordance with the Standard Drawings. Each course of gabions shall be tied to the lower course after stretching but before filling, by use of individual tie wires and diaphragms. Vertical edges at each end of the wall that are not connected to an adjoining gabion shall be reinforced by looping and twisting individual tie wires at approximately 3 inch spacing the full length of such edges.

Filter fabric should be used behind the baskets to keep the earthen backfill from washing through the voids.

Place backfill behind gabion walls simultaneously with the gabion construction operation in accordance with Section 3.3.5 of these Specifications.

Care shall be exercised during all gabion wall construction to ensure the stone fill is firmly in place, bulging or distortion of the filled baskets is minimal, and all lacing and tying is thoroughly wound, looped and twisted to preclude loosening in service.

9.3.1.9. Concrete Paved Channels and Ditches

(A) Subgrade Preparation: Soft or yielding materials shall be removed, replaced with suitable earth materials, and compacted to provide a firm foundation. Material type and method of application shall be submitted by the Contractor and approved by MSD. The subgrade shall be moist when concrete is placed.

(B) Concrete Work: The requirements for concrete formwork, reinforcement, placing concrete, removal of forms, removal of defective concrete, curing and finishing of concrete as defined in Section 6 of these Specifications shall apply to the construction of concrete channel and ditch lining.

(C) Drainage: Weep holes, consisting of 4 inch pipe or formed to 4 inches in diameter, covered on the backside with geotextile fabric and stone, shall be placed at horizontal intervals not to exceed 20 feet in concrete paved ditch walls, unless shown otherwise on the Plans. The outlet invert elevations of weep holes in channel walls shall be

placed 4 inches above the water surface level of the channel. Adequate provisions shall be made for thorough drainage of backfill as specified ***KYTC Standard*** Specifications **(latest edition)** or as shown on the Plans.

(D) Joints: Transverse expansion joints shall be provided as shown on the Plans or Standard Drawings in concrete channels and at all existing concrete structures and as instructed by MSD. Expansion joints shall be constructed at right angles to the centerline of the channel and throughout the channel bottom and sidewalls in conformance with the Plans. The thickness of the preformed expansion joint material shall be as directed by MSD and shall be to the full depths of the slab and walls. Formed or sawed transverse contraction joints (**1/2" to 1" deep**) will be required at 20 foot maximum intervals along concrete paved ditches. Contraction joints shall be placed or installed as soon as the concrete initial set will allow.

(E) Reinforcement: Steel reinforcing bars shall be used as reinforcement in vertical sidewalls and slabs for concrete channel lining. Polypropylene fibers shall be used as reinforcement in concrete ditch or sloped channel wall lining unless shown otherwise on the plans.

(F) Finish: Sidewalls for concrete paved channels shall be given an ordinary surface finish and the bottom slab shall be given a floated surface finish as defined in Section 6 of these Specifications. Concrete paved ditches shall be given a floated surface and broom finish. Concrete paved channels shall be tool edged when finishing.

(G) Concrete Storm Drains: Existing and new storm drains intercepted by the channel shall be formed into sidewalls and cut off flush and smooth with the inside face of the wall so as to not leave obstructions along the wall. Channel sidewalls shall be poured monolithically around pipe sections. Intercepted drains shall be oriented at right angles to the wall or skewed in the direction of the channel flow. The steel reinforcement shall be placed around each pipe end as it intersects the channel wall in accordance with the Plans. Existing pipe intercepted by the channel shall be extended as required for proper connection and pipe extensions will be of the same material as the existing pipe.

(H) Backfilling: Immediately after the concrete has set sufficiently and the forms have been removed, the spaces on each side of the ditch paving shall be filled with suitable earth material and thoroughly compacted. Full backfill behind vertical channel sidewalls shall not be placed until representative test samples of the concrete used in the channel lining attain a compressive strength of 3,500 pounds per square inch. In addition, the concrete shall have been placed a minimum of seven days. Backfill shall be brought up simultaneously behind the sidewalls to maintain uniform loading. Placement and compaction of the backfill shall be in accordance with Section 3 of these Specifications.

9.3.2. Site Restoration

9.3.2.1. General

(A) Planning: The Contractor shall notify MSD at least 48 hours in advance of the time he intends to begin sowing seed or placing sod and shall not proceed with such Work until permission to do so has been granted by MSD. Before starting seeding or sodding operations on any area, final dressing and the preparation of the seed bed or sod bed shall have been completed in accordance with these Specifications. All seeding, sodding and related operations shall be continuous operations. The following schedule shall be followed for seeding or sodding operations, unless otherwise permitted or directed by MSD.

Work Item	Accepted Work Interval
Permanent Seeding	Feb. 15 to May 15 or August 15 to Nov. 1
Native Seeding See	12.3.***6.2***.
Sodding	See 9.3.2.4.

(B) Scheduling: By August 1, the Contractor shall provide a plan to restore disturbed areas by October 31; such plan to be implemented upon approval by MSD.

Likewise, by February 1, a plan to restore disturbed areas by May 30 shall be submitted for implementation upon approval by MSD.

(C) Replacement of Vegetation: As soon as backfill operations permit, the Contractor shall replace, to the original location or nearest suitable location, all ornamental or landscape plants designated to be replaced, which were removed during excavation for the sanitary or storm drainage facility. The Contractor shall properly water and maintain the transplanted vegetation immediately upon replanting and at suitable intervals thereafter. If shrubs, plants, or trees die after transplanting and before the expiration of the guarantee period, the Contractor shall, at his expense, replace same with equal shrubbery, plants or trees.

(D) Replacement of Fences: Any fences disturbed within the right-of-way/easement limits shall be replaced to the satisfaction of MSD at no additional cost to MSD. Fences in such poor condition that they cannot be removed and replaced shall be replaced with fence material similar in original quality, size, and appearance to the removed fence, or a written release shall be obtained from the property owner and a copy provided to MSD.

(E) Restoration of Turfed Areas: After final restoration of settled trench and/or graded surfaces, all areas within the right-of-way or easement limits which were established turfed areas prior to construction will be restored in accordance with these Specifications unless otherwise provided in the Contract. ***See Section 9.3.2.2 for information about topsoil placement.***

(F) Restoration of Curb, Curb and Gutter, and Sidewalk: The Contractor shall replace, to the original location, all curb, curb and gutter, and sidewalk sections disturbed within the right-of-way/easement limits.

G) Native Plant Restoration: Refer to Sections 12 and 13 of these specifications.

9.3.2.2. Topsoil Placement

(A) Topsoil Replacement. Topsoil shall be replaced at no additional cost to MSD.

(B) Site Preparation. Maintain grades on the areas to be topsoiled according to the Plans. Adjust grades and elevations for receipt of topsoil.

(C) Subsoil Roughening. Immediately prior to spreading topsoil, loosen the subgrade by disking or scarifying to a depth of at least 4 inches to ensure bonding of the topsoil and subsoil. If no amendments have been incorporated, loosen the soil to a depth of at least 6 inches before spreading topsoil.

(D) Spreading Topsoil. Uniformly distribute topsoil to a minimum compact depth of 2 inches on 3:1 slopes and 4 inches on flatter slopes. Do not spread topsoil while it is frozen or muddy or when the subgrade is wet or frozen.

Correct any irregularities in the surface that result from topsoiling or other operations to prevent the formation of depressions or water pockets.

Compact the topsoil enough to ensure good contact with the underlying soil, but avoid excessive compaction as it increases runoff and inhibits seed germination. Light packing with a roller is required where high-maintenance turf is to be established.

9.3.2.3. Permanent Seeding

(A) Preparing the Seed Bed for Turf and Natural Areas: Each area to be seeded shall be scarified, disked, harrowed, raked, or otherwise worked until it has been loosened and pulverized to a depth of not less than three inches. Stones and other foreign materials shall be removed. This operation shall be performed only when the soil is in a tillable and workable condition. Grade 10-10-10 fertilizer, at the rate of not less than 25 pounds per 1,000 square feet, and agricultural limestone, at the rate of not less than 100 pounds per 1,000 square feet, shall be distributed evenly over the seed bed, unless other requirements are shown on the Plans or in the Contract. The limestone and fertilizer shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of approximately one-half inch. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with hydraulic equipment. The Contractor shall apply the seed, fertilizer and mulch within 24 hours of preparing the seed bed. The lime/fertilizer rates shall not relieve the Contractor of his responsibility to provide the proper amounts of these materials. The Contractor is encouraged to have soil analyses performed (at the Contractor's expense) to establish proper lime/fertilizer rates so that satisfactory turf growth is promoted.

(B) Seeding for Turf: Permanent seed shall be sown as soon as preparation of the seed bed has been completed and thoroughly watered after seeding. Care shall be

exercised not to wash seeding by overwatering. Seed shall be sown uniformly by means of a rotary seeder, wheelbarrow seeders, hydraulic equipment, or other satisfactory means, and unless otherwise shown on the Plans or in the Contract, at the rates indicated in Section 9.2.4. Permanent seeding shall be performed only when the soil is in a tillable and workable condition, and only during the acceptable work intervals given in Section 9.3.2.1 (A) of these specifications, unless otherwise permitted or directed by MSD.

(C) Seeding for Natural Areas: Seeding shall be done, weather permitting, within seven days of all topsoiling. Do not seed if soil is excessively dry or is saturated. Seed during favorable weather conditions. Mix seed with two-thirds of a bushel of moist vermiculite or one-half rate of seed oats per acre prior to sowing. No covering of seed with soil is required. Seeding shall be performed by one of these methods:

Hand Broadcasting: Hand broadcast seed over open area by walking and sowing seed first in one direction, then walking perpendicular to the first direction while sowing the remaining seed for that area. Rake lightly or drag area to cover seed no deeper than ¼ inch. Roll seeded areas with a water filled roller upon completion of seeding.

Mechanical Power Drawn Seeder: Sowing shall be performed by a mix mechanical power drawn broadcast seeder capable of uniformly mixing and broadcasting all seed sizes listed in the seed mix. Seed to be planted not deeper than ¼ inch. Seeding operation shall be kept as close as possible to the contours and not up and down slopes. After seeding, cover seed using drag mat. Then compact with land roller, such as a cultipacker or equivalent. With proper equipment, drag matting and cultipacking in one operation is satisfactory.

(D) Protection for Turf: Placing of materials for protection shall follow seeding as soon as possible, and no later than 48 hours after seeding. In no instance shall the mulch be placed on crusted seeded areas, and any eroded areas shall be repaired and reseeded before protection is applied. The materials shall be placed uniformly, all clumps loosened and scattered, and care shall be taken to avoid thicker applications than those specified.

After the seeding has been satisfactorily completed, the following methods of protection shall be used:

Straw Mulch Crimping: Straw mulch may be crimped or punched into the soil to a depth of 2 inches to 4 inches using a mulch anchoring tool or a dull, serrated farm disk that is set straight. Crimping shall not cut the mulch. This method shall be used in flat areas and on slopes no steeper than 3H:1V and only where equipment can be operated safely. Machinery shall be operated on the contour. Straw mulch material shall be applied at a rate of 90 lbs per 1,000 square feet.

Straw Mulch and Netting: This method shall be used on slopes 3H:1V or steeper.

Installation of the netting shall be in accordance with the KTC Standard Drawing No. RRE002-03. Straw mulch material used under netting shall be plain straw and shall be applied at the rate of 90 lbs per 1,000 square feet.

Tackifier: When approved by MSD, synthetic/chemical binders and tackifiers may be used in lieu of the above methods for protecting seeded areas. No asphalt emulsions shall be allowed.

Hydromulch: When approved by MSD, hydromulch may be used in lieu of the above methods for protecting seeded areas. Wood cellulose fiber mulch shall be applied at the rate of 40 pounds per 1,000 square feet. This method is not acceptable for native seeding.

Erosion Control Blankets: Manufactured erosion control blankets (straw, coconut fiber, wood fiber, etc.) shall be utilized when shown on the Plans, as directed by MSD, or at the Contractor's option in lieu of straw mulch or hydromulch. The areas to be covered shall be properly prepared, fertilized and seeded in accordance with these Specifications before the blanket is placed. The blankets shall be installed according to the manufacturer's specifications. In general, however, the blankets shall be unrolled in the direction of surface water flow. When using two blankets side by side in a ditch, the seam shall not be in the center of the ditch, but offset by 6 to 12 inches. Individual blanket rolls shall be butted snugly at their ends and sides, and properly secured. The blankets shall be secured using staples driven vertically in the ground. Staple patterns should be in accordance with the manufacturer's specifications. Loose blanket edges shall be stapled and buried in trenches according to the manufacturer’s specifications.

Use only the specified erosion control blankets or blankets that meet or exceed their specifications when they are specified on the Plans or in the Contract. When the Contractor elects or is directed to use erosion control blankets to achieve improved protection over conventional mulching and netting or hydromulch, the following guidelines shall be used to select the appropriate blanket type:

Blanket Type	Comments
Straw/Netting Matrix	Generally provides effective protection for 2H:1V to 4H:1V slopes, or low flow swales. Usually degrades in 30 to 90 days, depending on product.
Straw/Coconut/Netting Matrix	Generally provides effective protection for 2H:1V to 1H:1V slopes of medium flow channels. Can provide protection for 6 months to more than one growing season, depending on the product.
Coconut/Netting Matrix	Generally provides long lasting protection (up to 2

	years) for slopes of 1H:1V or steeper, or for high discharge channels, depending on the product.
Wood Fiber/Netting Matrix	Light to heavy duty wood fiber blankets are available with short to long term protection capabilities, similar to coconut/straw blankets.

Seed-Incorporated Erosion Control Blankets: Seed-incorporated erosion control blankets (straw, coconut fiber, wood fiber, etc.) shall be utilized when shown on the Plans, as directed by MSD. The areas to be covered shall be properly prepared and fertilized in accordance with these Specifications before the blanket is placed. The blankets shall be installed according to the manufacturer's specifications and the requirements given under Item 9.3.2.3(D) of these specifications.

(E) Stage II Topdressing: A second application of slow release fertilizer (Grade 20-10-10) shall be applied to seeded areas no sooner than 6 weeks after seeding, but not until a satisfactory stand of vegetation exists. For spring seedings, the fertilizer shall not be applied after May 1, and for fall seedings, the fertilizer shall not be applied after December 1. For spring seedings performed during the period of March 15 to May 15, the Stage II fertilizer shall not be applied until after September 1. The fertilizer shall be distributed evenly over the new grass area at a rate of 12 pounds per 1,000 square feet.

(F) Maintenance and Repair: For turf areas, all seeded areas shall be cared for and maintained properly to MSD's satisfaction until final acceptance of the Work and for the duration of the guarantee period. Such care shall include, but not be limited to, watering as necessary, fertilizing, reseeding and repairing of mulch materials as required, and mowing the seeded areas when required by MSD. When mowing is required, mower blades shall be set at 3 inches for sufficient height to protect the vitality of the growth. Areas which have been previously seeded and mulched in accordance with this Section, but which have been eroded, damaged or failed to successfully establish a stand of grass, shall be repaired as directed by MSD. All material and labor required to maintain and repair seeded areas shall be furnished by the Contractor at no cost to MSD. If MSD directs the Contractor to place additional fertilizer on the area to be reseeded, an additional 4 pounds of agricultural limestone will be required for each additional pound of fertilizer. Natural (native grasses and forbs) areas shall not be mowed.

9.3.2.4. Sodding

(A) Cutting Sod: Prior to cutting sod, the grass shall be mowed to a height of no more than 3 inches and the mowed area shall be raked to eliminate all clippings, cuts and trash. The sod shall be cut in rectangular sections as required. Sections may vary in length not exceeding 8 feet, but shall be of uniform width of 10 inches or more, and shall be cut to a depth of at least 1 inch and no more than 2 inches. The sod shall be cut to such thickness that practically all of the dense root system will be retained but exposed in the sod strip, and to such width and length so that it can be handled

without undue tearing and breaking. When cut in strips, the sod shall be rolled without damage with the grass folded inside.

The sod shall be cut by means of an approved mechanical sod cutter. During dry weather, the sod shall be watered before cutting to prevent loss of soil while handling. The sod shall not be cut when in a sufficiently wet condition which could interfere with proper handling. All sod must be delivered to the Project and placed within 18 hours after being cut.

(B) Preparation of Sod Bed: The sod bed shall be loosened to a minimum depth of one inch and shaped to a smooth even surface and shall be graded to such elevation so the sod, when in place, shall be flush with any adjacent seeded or turfed area, pavement, curb, or other structures, except when otherwise directed.

Prior to placing the sod, the fertilizer (Grade 10-10-10) and limestone shall be applied uniformly at the rate specified in Subsection 9.3.2.3; and shall be harrowed, raked, or otherwise incorporated into the soil. The sod bed, when dry, shall be moistened to the loosened depth.

(C) Placing Sod: Sod shall be placed within 18 hours of being cut and it shall not be placed when the atmospheric temperature is below 32°F, or when the sod or sod bed is frozen, or during other weather or soil conditions detrimental to the Work.

The sod shall be carefully placed by hand so that each section closely joins the adjacent section without overlapping. All open spaces or gaps shall be plugged with sod cut to the appropriate size and shape. When placed on slopes, the sod shall be laid with the long edges of the strips parallel to the contour starting at the bottom of the slope. Successive strips shall be neatly matched and all joints staggered or broken. The sodding shall be carried at least 18 inches beyond the top of the slope to prevent surface water from undermining the sod.

When placed on slopes 2H:1V or steeper and 6 feet or more in height, and in all sodded ditches, each strip or section of sod shall be staked securely with at least 2 wood stakes or wire staples no more than 2 feet apart and driven flush with the surface. Wire staples shall not be used in residential areas.

The sod, after it is placed, shall be wetted thoroughly and tamped or rolled sufficiently to incorporate the roots into the sod bed and to ensure tight joints between the sections or strips.

(D) Maintenance and Repair: The sod shall be watered as frequently as necessary to maintain and assure it in a moist and living state. After a period of two weeks, or as otherwise directed by MSD, but not during June, July or August, 20-10-10 fertilizer shall be applied at the rate of 6.0 pounds per 1,000 square feet, and the sod given an additional watering to enhance growth. The Contractor shall not allow any

equipment or material to be placed on any sodded area and shall erect suitable barricades and guards to prevent his equipment, labor, or the public from traveling on or over any area planted with sod. Care shall include periodic watering, fertilizing and mowing as necessary to maintain the vitality and appearance of the sod. When mowing is required, mower blades shall be set at 3 inches for sufficient height to protect the vitality of the growth. Sodded areas that become eroded, damaged or failed to successfully establish a stand of grass, shall be repaired and/or replaced as directed by MSD. All material and labor required to maintain and repair sodded areas shall be furnished by the Contractor at no cost to MSD. Sod must be living at the time of final acceptance of the Project and through the duration of the warranty period.

9.3.3. Clean Up

9.3.3.1. Daily Clean Up. During the progress of the Work, the Contractor shall daily maintain all areas within the limits of his operations from accumulations of waste materials, rubbish and other debris resulting from the Work.

9.3.3.2. Final Clean Up. Before final acceptance of the Work, all rights-of-way, easements, and access roads used by the Contractor, all streams in and over which he has worked, and all ground occupied by the Contractor in connection with the Work shall be cleaned of all debris, construction plant, and materials. Right-of-way and easement areas not designated for alteration by the Contract shall be restored to their original condition in accordance with the Plans and Specifications. Areas which have been sodded or seeded and mulched in accordance with this Section, but which have been eroded, damaged or failed to successfully establish a stand of grass, shall be repaired as directed by MSD. Waste and debris shall be disposed of in areas approved by MSD and provided by the Contractor outside of the rights-of-way and easements.

SECTION 10

MSD STANDARD SPECIFICATIONS

DUPLEX SEWAGE PUMP STATION

10.1 GENERAL

10.1.1 Work Included

A. These specifications cover the work necessary to furnish, install, and complete a duplex submersible non-clog or grinder pump station to MSD's Standards. These specifications are in addition to MSD's Standard Specifications which are referred to by section number throughout this specification.

B. The Work to be accomplished under this Section of the Specifications consists of furnishing all labor, materials, equipment, and services necessary for the construction of a duplex pump station and valve vault as shown on the Contract Drawings. The facility components shall include, but not necessarily be limited to, two (2) submersible raw sewage pumps; pump discharge connections; guide rails; bottom, intermediate, and upper guide rail supports; lifting cables; discharge piping, valves, and supports; aluminum access hatches; vents; liquid level sensors; electrical controls; and any other items required to make the installation function per its design intent. All components shall be installed in, on, or near a precast concrete wet well basin and valve vault. The structures and dimensions shall be as shown on the Contract Drawings.

C. The following major Work items are included in the Contract:

1. Site work.
2. Construction of new pump station, valve vault, and appurtenances.
3. Installation of a new electrical service.
4. Installation of a standby generator, if required.

10.1.2 Definition of Engineer

A. For the purposes of reviewing submittals and interpreting MSD's standard drawings, specifications, policies, and procedures, the term "Engineer" shall mean the person holding the position of *Director of the Engineering Division* of MSD or any person whom MSD may designate to act in place of said *Director*.

B. For matters concerning design, cost, and general professional judgment, the term "Engineer" or "Design Engineer" shall mean the Kentucky Registered Professional Engineer *hired by the developer or client to design and supervise the project*.

10.1.3 Contractor Requirements

A. The Contractor shall become familiar with all details of the Work, shall verify all dimensions in the field, and shall advise the Engineer of any discrepancies before initiating the Work.

B. The Contractor shall use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

C. The Contractor shall use equipment adequate in size, capacity, and numbers to accomplish the Work of this Section in a timely manner.

D. The Contractor shall comply with the permit and code provisions contained in these specifications.

E. The Contractor shall submit certified shop and erection drawings and data regarding pump and motor characteristics and performance. The data shall include performance curves, based on actual shop tests of pumping units, which show that the units meet the specified requirements for head, capacity, efficiency, and horsepower for the various capacities specified. Except as hereinafter specified, certified tests of mechanically duplicate units will be acceptable. Curves shall be submitted on 8-1/2-inch by 11-inch sheets. For units of the same size and type, only curves for a single unit need **to** be provided.

F. The Contractor shall submit complete shop drawing packages and operation and maintenance manuals in accordance with Section 1.07 of these specifications.

10.1.4 Permits and Approvals

A. Obtain any permits and inspections related to or required by the Work in this Contract. ***The Contractor is advised that Special Conditions as required by the U.S. Government are included in this Contract.***

B. The Contractor shall furnish electrical inspection by an agency licensed or otherwise qualified to perform electrical inspections in the Commonwealth of Kentucky.

1. All costs incidental to the electrical inspection shall be borne by the Contractor.
2. The Contractor shall provide a Certificate of Compliance with NEC after final approval by the electrical inspector. Final acceptance will be withheld until he has presented the Engineer with the aforementioned Certificate of Compliance.

10.1.5 Codes and Standards

A. Comply with applicable codes and regulations of authorities having jurisdiction. Submit copies of inspection reports, notices, citations, and similar communications to MSD.

B. All electrical equipment and details of installations shall comply with the requirements of the latest editions of the National Electrical Code (NFPA-70), the National Electrical Safety Code (ANSI C2), OSHA, KYOSHA, and all applicable codes.

C. Pump stations must satisfy the regulations of agencies having jurisdiction. Pump stations, at a minimum, shall conform to this specification, MSD's Miscellaneous Electrical, Instrumentation & Control Design Standards, and to the Recommended Standards for Wastewater Facilities, 2004 Edition (Ten State Standards).

10.1.6 System Characteristics

A. Duplex Station.

B. Non-clog or Grinder Pump.

C. Pump Rating:

1. _____ HP.
2. _____ volts.
3. _____ phase.
4. _____ amps.

D. Service Rating:

1. _____ volts.
2. _____ phase.
3. _____ amp.
4. _____ wire.

E. Design Operating Point:

1. _____ gpm.
2. _____ TDH (feet).
3. _____ % hydraulic efficiency.

F. Shut-off head: _____ TDH.

G. Third operating point: _____ gpm, _____ TDH.

H. Discharge diameter: _____-inch.

I. Solids passing size: _____-inch.

J. Cycle time: _____ min.; Running time: _____ min./hour.

K. Maximum operating speed: _____ RPM.

L. Manufactured by: _____.

M. Model _____, or approved equal.

N. Force main pressure rating: _____ psi.

10.1.7 Submittals

A. Shop Drawing Submittals

1. Prior to submitting the manuals described below, the Contractor shall submit seven (7) complete sets of shop drawings to MSD for review and approval. The shop drawings shall be tailored to the specific project details and shall include, but not necessarily be limited to, the following information:

   a. Pump manufacturer's literature indicating model, double guide rails, and hardware.
   b. Electrical schematics; electrical components; cut sheets; feeder, branch, and control conductors; disconnect switches; fuses, circuit breakers, and overloads; raceways and fittings; enclosure component layout; and complete motor nameplate data.
   c. Generator and transfer switch.
   d. Wet well base, barrel, and top.
   e. Vent piping.
   f. Access hatches (wet well and valve vault).
   g. Piping (force main and pump station), piping supports, watertight through-wall pipe connections, couplings, fittings, and scaled fabrication drawings.
   h. Valve vault top, base, and barrel.
   i. Swing check valves, gate valves, ball valve at gauge connection, PVC check valve on drain line between valve vault and wet well, and air release valve.
   j. Pressure gauge.
   k. Air release and cleanout vaults (top, bottom, base, frame, lid, and watertight through-wall pipe connections).
   l. Concrete and grout mix designs and mix design support history.

2. Additional information may be requested by MSD at any time for clarification.

B. Operation and Maintenance Manual

1. The operation and maintenance manual (O&M Manual) shall be a thorough and useful reference source for training, educating, and assisting MSD personnel in the operation and maintenance of the pump station facility. The information

contained in the manual shall specifically address the equipment supplied and shall contain no superfluous material. Both the draft and final versions of the O&M Manual shall be bound in suitably labeled, hard cover, 3-ring binders furnished with indexes and tabbed dividers between subject matter.

2. Four (4) copies of the draft version of the O&M Manual shall be delivered to MSD for review and comments as soon as possible after approval of the shop drawings. The draft manual shall include, but not necessarily be limited to, the following information:

   a. Complete operating instructions.
   b. Complete parts list (including catalog numbers), parts catalogs, and assembly drawings.
   c. Preventive maintenance schedules.
   d. Maintenance and alignment instructions.
   e. Troubleshooting guides.
   f. A list of complete nameplate data for each piece of equipment supplied.
   g. The necessary figures, tables, and wording to supplement the material listed above.
   h. Complete listing of manufacturers' **and local suppliers'** names**;** addresses**;** telephone numbers**; fax numbers; and web site addresses for pumps, valves, alternating relays, motor starters, and where applicable, generator and transfer switch.**

   Two (2) copies of the marked up draft O&M Manual will be returned to the Contractor so that any corrections, additions, or deletions can be incorporated into the final version.

3. **Seven (7)** copies of the final O&M Manual must be delivered to and approved by MSD prior to acceptance of the pump station. The final version of the document shall have been revised to satisfactorily address the draft review comments and to incorporate the final record drawings of the control panel, pump station, valve vault, and appurtenances.

10.1.8 Approval and Making of Equipment

Electrical devices and materials shall be listed and/or labeled by the Underwriters' Laboratories, Inc.

10.1.9 Protection of Electrical Equipment

Electrical equipment shall be protected from the weather, especially from water dripping or splashing upon it, at all times during shipment, storage, and construction. Equipment shall not be stored outdoors even if its enclosure is rated as weatherproof, watertight, etc. Where equipment is installed or stored in moist areas, such as unheated buildings, etc., it shall be provided with an acceptable means of preventing moisture damage such as a uniformly distributed source of heat to prevent condensation.

10.1.10 Defective or Damaged Equipment

A. Should it be determined by the Contractor, MSD, or Engineer that any equipment or material has been subjected to possible damage by water, it shall be thoroughly dried and put through a dielectric test as directed by the manufacturer and at the expense of the Contractor, or it shall be replaced ***by the Contractor without change in contract price***. Any equipment found to be marginal or that fails to meet manufacturer's standards shall be replaced at no additional charge to MSD.

B. Any equipment damaged during shipment, while stored, or during construction shall be replaced ***at the Contractor's expense***. Minor scratches on equipment cabinets, etc. may be repaired on site. Any current carrying parts, switch blades, operators, coils, contacts, etc., which are damaged, shall be replaced at no cost to MSD.

10.1.11 Electrical Service

A. The Contractor shall obtain and install a complete electrical service with new service equipment. The new equipment connections and conduit shall be sized for the application, and the service shall meet the requirements of the National Electrical Code (NEC), latest edition, and Louisville Gas and Electric.

B. The Contractor shall make all necessary arrangements for transfer of power by Louisville Gas and Electric.

10.2 PRODUCTS

10.2.1 General

A. Since each pump station has its own set of characteristics based on the pump model selected in the design and since it is prohibitive to prepare design specifications and drawings for each pump model approved by MSD, these Specifications and Standard Drawings have been prepared based on the constraints given for a particular pump model. This is not intended to prevent **the** use of other pump models or equipment approved by MSD but is intended to establish the standard of quality and general configuration of the equipment desired.

B. Should the Contractor propose to supply a different pump model or type of equipment which has previously been approved by MSD, the Contractor shall revise the pump station Drawing(s) and Specification(s) by red lining the revisions to detail them to meet the characteristics of the proposed pump system for MSD's review and approval. Any changes shall first be approved by the Engineer prior to submittal to MSD for review.

C. If approved by MSD, all revisions shall be shown on the final record drawings and be included in the O&M Manual, which must be furnished prior to final acceptance of the pump station.

D. Pump models and equipment not previously approved by MSD must be reviewed by MSD's "New Products Review Committee" and must have received final approval by MSD ***prior to bid*** in order to be considered for approval. The proposed product(s) for review shall be subject to conditions set forth by the committee. ***Requests for time extensions due to MSD's "New Products Review Committee" review process will not be considered.*** **As a condition of final approval, manufacturer must provide maintenance training and literature sufficient for manufacturer certification of MSD maintenance personnel as qualified technicians for repair of manufacturer's Class I, Division 1 or 2, pumps. Unless notified otherwise in writing by MSD, training must take place within 6 months of initial approval, else initial approval is void.**

10.2.2 Standard Products

Material and equipment shall be new, shall be the standard products of a manufacturer regularly engaged in the manufacture of the products, and shall essentially duplicate items that have been in satisfactory use at least two (2) years ***prior to the bid opening***.

10.2.3 Nameplates

Two nameplates shall be supplied for all pumps and motors. These nameplates shall have the manufacturer's name, address, type or style, model or serial number, catalog number, design flow in gpm, total dynamic head in feet, power in horsepower, voltage, phase, rotational speed in rpm, full load current in amperes, and safety factor stamped on them. One nameplate shall be secured to the item of equipment, and the other shall be given to the Engineer.

10.2.4 Equipment Guards

Belts, pulleys, chains, gears, projecting set screws, keys, and other rotating parts, so located that any person may come in close proximity thereto, shall be enclosed or guarded per OSHA standards.

10.2.5 Padlocks

Upon acceptance of the pump station by MSD, MSD will provide and install padlocks to secure the facility.

10.2.6 Piping

A. The pipe inside the pump station wet well and valve vault shall be either stainless steel or ductile iron as indicated on the Contract Drawings.

1. Stainless steel pipe and fittings shall conform to ASTM A167, Type 304.

a. Pipe shall be Schedule 40, and fittings shall be Schedule 80.
b. Joints shall be threaded or flanged.

2. Ductile iron pipe and fittings shall be Class 53 conforming to Section 4.2.2.2. of the MSD Standard Specifications.

a. Joints shall be flanged.
b. Pipe and fittings shall be cement lined.

3. Flanges shall be Class 125; flange bolts shall be stainless steel ASTM A193, Grade B-8, Type 304; and flange gaskets shall be 1/8-inch ring gaskets.

B. A detailed and scaled shop drawing of the piping, fittings, valves, etc. shall be submitted for approval when necessary for clarity.

C. The installed discharge piping, valve system, and force main shall meet the testing requirements described in MSD's Standard Specification Section 4.3.5.4. Hydrostatic Tests for Force Mains. The Contractor will be required to perform both pressure and leakage tests to ensure conformance to the testing requirements of the preceding paragraph if the pressure test fails.

10.2.7 Vent Pipe

A. The vent pipe shall be Schedule 40 steel pipe, ASTM A53, with butt weld, standard weight Grade B fittings, ASTM A234. A stainless steel insect/bird screen shall be provided on the vent. The vent pipe shall be painted with one (1) coat **of** Pittsburgh Paint red inhibitive primer UC 30003 and two (2) coats of **black** Pittsburgh Paint 97-600 series fast dry enamel or approved equal.

B. A prefabricated vent such as The Green Vent (4-inch pipe diameter) is also acceptable.

10.2.8 Sewage Pump General Design

A. Non-clog pumps shall be submersible, centrifugal type designed to pump raw, unscreened sewage containing solids and stringy materials.

B. Grinder pumps shall be submersible, centrifugal type designed to macerate and pump raw, unscreened sewage containing solids and stringy materials.

1. The grinder assembly shall consist of a grinder impeller and a shredding ring and shall be mounted directly below the volute passage. The grinder impeller shall be threaded onto the stainless steel shaft and shall be locked with a screw and washer. The shredding ring shall be pressed onto an iron holding flange for easy removal. The flange shall be provided with tapped backoff holes so that screws can be used to push the shredding ring from the housing. All grinding of solids shall be from the action of the impeller against the shredding ring.
2. Both the grinder impeller and the shredding ring shall be of #440 stainless steel hardened to 58-60 Rockwell C.
3. The grinder unit shall be capable of macerating all materials found in normal domestic and commercial sewage, including reasonable amounts of foreign

objects such as wood, plastic, glass, rubber, sanitary napkins, disposable diapers, panty hose, and the like, to a fine slurry that will pass freely through the pump and the discharge piping.

C. The raw sewage pumps shall be capable of continuous operation under submerged or dry motor conditions without adverse effects due to heat generation. In addition, the pumps shall be capable of adequate cooling when they are left running with the liquid level lowered to the pump suction inlet to help clean the wet well. Pumping units which require a connection to an external cooling water source to dissipate the heat generated under the conditions specified above will not be acceptable.

D. Each pump shall be supplied with a mating discharge stand which shall be permanently installed in the wet well along with the discharge piping. There shall be no need for personnel to enter the wet well. The pumps shall be automatically connected to their discharge stands when lowered into place and shall be easily removed for inspection and service. No portion of the pump shall bear directly on the floor of the wet well.

E. Connection of the pump to its discharge stand shall be accomplished by a simple linear downward motion of the pump along a rail mounted installation system as specified under Section 2.17 herein. For non-clog applications, the rail system shall be comparable to the **Pumpex** design and shall be compatible for reuse with the pumping units of other manufacturers.

F. The pumps shall be certified explosion proof for installation in Class 1, Division 1, Group D environments by Factory **Mutual**, ***UL, CSA, or other appropriate governing authorities having jurisdiction.***

10.2.9 Pump Casing

A. Pump casing shall be constructed of cast iron, ASTM A48, Class 30. The casing shall be of uniform quality and free from blow holes, porosity, hard spots, shrinkage cracks, and other injurious defects. The casing shall be capable of withstanding an operating pressure 50 percent greater than the maximum calculated operating pressure. The volute shall have smooth passages which provide unobstructed flow through the pump.

B. Watertight mating surfaces shall be machined and fitted with nitrile rubber O-rings such that sealing is accomplished by metal-to-metal contact between the mating surfaces, resulting in proper compression of the O-rings without the requirement of specific torque limits.

C. Exterior surfaces of the casing in contact with sewage shall be protected by a sewage resistant coating. All exposed nuts and bolts shall be AISI stainless steel**, Type** 304.

10.2.10 Impeller

A. The pump impellers shall be dynamically balanced.

B. Grinder pumps shall have recessed impellers designed to handle ground slurry without clogging or binding.

1. Impellers shall be of 85-5-5-5 bronze.
2. Impellers shall be threaded onto the pump shafts.

C. Non-clog pumps shall have channel type impellers designed to handle solids, fibrous materials, sludge, and other items normally found in raw wastewater. Recessed vortex type impellers may be acceptable when specific circumstances warrant; however, their use in typical installations should be avoided due to the reduced hydraulic efficiency of the equipment.

1. Impellers shall be of Grade 60-45-15 ductile iron, ASTM A395.
2. Impellers shall be slip fit and keyed to the pump shafts whereby they cannot be loosened by torque from either the forward or reverse direction.
3. The pumps shall be capable of passing a minimum 3-inch diameter solid sphere.

10.2.11 Pump Shaft

The pump shafts shall be stainless steel of the AISI type recommended by the pump manufacturer. The shafts shall be of adequate size and strength to transmit the full driver horsepower.

10.2.12 Seals

A tandem mechanical shaft seal system running in an oil bath shall be provided. Upper seals shall be carbon/ceramic with the lower seals being tungsten carbide/tungsten carbide. Each seal interface shall be held in contact by its own spring system. Conventional mechanical seals which require a constant pressure differential to effect sealing will not be allowed.

A sensor shall be mounted in the lower end of the seal chamber to detect any water leakage into the seal chamber. The sensor shall provide a discrete signal for shutting off the pump. Sensors that detect water leakage into the motor housing in lieu of the seal cavity are not acceptable.

10.2.13 Bearings

Pump bearings shall be ball or roller type designed to handle all thrust loads in either direction. Pumps depending only on hydraulic balance end thrust will not be acceptable. Bearings shall have a minimum B-10 life of 50,000 hours.

10.2.14 Motor

A. The watertight pump motors shall be designed for continuous duty, shall be capable of sustaining a minimum of ten (10) starts per hour, and shall be rated for Class 1, Division 1, Group D service.

B. The motors may be either air filled or oil filled and shall be NEMA B design in accordance with NEMA MG-1. **Temperature sensors shall be embedded in the windings to provide a discrete signal for shutting off the pump when the winding temperature exceeds the threshold established by the motor manufacturer.**

1. Air filled motors shall have Class F insulation.
2. Oil filled motors shall have Class B insulation.

C. Based on the pump manufacturer's standard design, especially for pump models with larger horsepower drives, water or oil jackets encircling the stator housings may be utilized for motor cooling purposes, provided connections to external coolant sources are not required.

D. Motor ratings shall be as shown in Section 1.06 "System Characteristics" of these specifications.

E. The Contractor shall verify that the existing electrical service is compatible with the specified equipment before ordering the equipment.

10.2.15 Spare Parts (grinder pump only)

The Contractor shall provide one (1) set of spare parts for each grinder pump furnished. The set of spare parts shall include a grinder assembly (grinder impeller and shredding ring), impeller, upper and lower seals, and any gaskets, pins, nuts, washers, etc. needed to install the above listed parts. **Spare parts shall be submitted to the MSD Project Inspector prior to pump station acceptance.**

10.2.16 Power Cable and Cable Entry

A. The pump power cable shall comply with NFPA No. 70, Type SO, and shall be of standard construction for submersible pump applications. The cable length shall be such that no splices will be required between the pump and the control panel while providing a two (2) foot vertical sag in the cable between the control panel and cable holder.

B. The cable entry water seal design shall insure a watertight and submersible seal.

10.2.17 Installation System

A. The pumps shall be easily lowered into place and removed for inspection and service without the need for personnel to enter the wet well. Connection of the pump to its

discharge stand shall be accomplished by a simple linear downward motion of the pump along a rail mounted installation system.

1. For grinder applications, the pump/check valve assembly shall be hydraulically sealed to its discharge case with dual O-rings. A brace, easily removable from the top of the wet well, shall be provided to lock the parts together and to prevent line surges from breaking the seal and allowing leakage.
2. For non-clog applications, sealing shall be accomplished by the weight of the pump pressing tightly against its discharge connection elbow with a machined metal-to-metal watertight contact. Sealing of the discharge interface by means of a diaphragm, O-ring, or other devices will not be acceptable.

B. A rail mounted installation system incorporating two (2) guide rails; bottom, intermediate, and upper guide rail supports; sliding pump bracket; and lifting cable shall be furnished for each pump.

1. The guide rails shall be non-sparking and of the size standard with the pump manufacturer.
2. The guide rails shall be Schedule 40, Type 304 stainless steel pipe, ASTM A167.
3. All supports and fasteners shall be stainless steel and of a design standard with the pump manufacturer.
4. Intermediate guide rail supports, if required, shall be spaced evenly between the discharge stand and upper guide rail support in order to minimize deflection of the rails.
5. The guide rails shall not support any portion of the weight of the pump.
6. The sliding pump bracket, designed to be non-binding and to ride on the guide rails, shall be an integral part of the pumping unit.

C. A lifting cable shall be provided to raise and lower the pump through the limits indicated on the Contract Drawings. The cable and all associated hardware shall be stainless steel and shall be capable of supporting the pump with a Safety Factor of two (2).

D. The Contractor is to demonstrate, in the presence of MSD's inspector prior to or during the start-up procedure, that pumps have proper hatch clearance, guide rail positioning, and seating. The pumps are to be raised and lowered twice to ensure proper operation. Any necessary alterations or adjustments are to be made by the Contractor, to MSD's satisfaction, at no additional cost to MSD.

10.2.18 Wet Well

A. The wet well shall be constructed of precast reinforced concrete as specified hereinafter and shall be sized as indicated on the Contract Drawings.

B. Precast Reinforced Concrete

The precast reinforced concrete wet well and top slab shall conform to "Specifications for Reinforced Concrete Manhole Sections," ASTM C478, latest

revision. The wet well sections shall contain one or two lines of circular steel reinforcement as required by the ASTM standards. All sewer pipe connections to the precast **wet well** shall be made with a positive seal gasketing system conforming to ASTM C923 and MSD's Standard Drawing No. GM-01-01. All wet well joints shall be watertight as described in MSD's Standard Specification Section 5.2.7., Joint Sealants. Preference shall be given to the use of rubber O-ring joints whenever possible. To facilitate maintenance, the wet well shall have no more than one through-wall connection for influent sewage. All sewers draining to the wet well shall converge in a single manhole adjacent to the wet well. A single pipe shall connect this manhole and the wet well. The invert of the influent line shall enter the wet well at a higher elevation than the high wet well alarm level.

C. Access Door

1. The access door(s) to the wet well shall be 1/4-inch (minimum thickness) aluminum (6061-T6 Alloy, ASTM B-221) diamond pattern plate, designed to withstand a live load of 300 pounds per square foot. The frame shall be constructed of 1/4-inch thick, one piece extruded aluminum with a continuous 1-inch (minimum) anchor flange around the perimeter. The access door(s) shall be adequately sized to allow removal of the pump(s). The actual clear opening of the frame shall allow a minimum of 3-1/2 inches clearance between the pump(s) casing(s) opposite the discharge side of the pump(s) and the inside of the frame, and a minimum of 2-1/2 inches clearance between the sides of the pump(s) casing(s) and the inside of the frame. Factory finish shall be mill finish aluminum. Installation shall be performed in accordance with the manufacturer's instructions.
2. The manufacturer shall mark each door leaf, in two locations with a steel stamp using 3/8-inch lettering, with the words "Property of Louisville MSD." When the door(s) are in the open position, one mark shall be located approximately 3 to 4 inches from the edge on the top right corner of the underside of the door(s). The second mark shall be located approximately 3 to 4 inches from the side and above the hinge on the bottom left corner of the underside of the door(s).
3. The door(s) shall be equipped with stainless steel hinges, stainless steel pins, and recessed lift handle flush mounted and not protruding above the cover. Each door leaf, with a maximum of 15 lbs. of manual assistance, shall open to 90 degrees and automatically lock in that position with a stainless steel hold-open arm. The arm shall have a conveniently positioned release handle with a vinyl grip for easy and controlled closing. Door(s) shall be equipped with stainless steel spring operators designed to provide easy operation in opening and to act as a check in retarding downward motion of the door during closing. For safety purposes, should the locking mechanism fail or unauthorized entry occur, the spring operator shall be designed such that the door(s) shall remain in a fully closed position by its own weight. No item may protrude above the access cover except the heads of the carriage bolts and padlock assembly cover.
4. To minimize tampering and improve security, the hinges shall be bolted to the door(s) with stainless steel carriage bolts and nuts. The nuts shall be welded to the bolts on both the door(s) and frame. Door(s) shall be equipped with a recessed padlock and staple assembly which shall conceal an American #570

padlock and be designed to restrict bolt cutters from severing the padlock. MSD will provide and install the padlock upon completion of the project. All stainless steel hardware shall be type 304 (minimum) stainless steel. The manufacturer shall guarantee all components of the access doors against defects in material and workmanship for a period of five years.

5. When installing wet wells six feet in diameter and larger, a double leaf access door hatch shall be installed and sized to meet the ultimate pump size access demand and actual clearance as specified between the pump(s) casing(s) and inside of the frame. A large single door shall not be acceptable. The minimum leaf size shall be 30 inches by 30 inches. The maximum leaf size shall be such that the sum of the length and width of the leaf is less than or equal to 84 inches.

D. Level Instrument Stilling Well

To prevent damage to the submersible level instrument, a 4" schedule 40 perforated stilling well shall be installed. The stilling well shall be securely supported utilizing stainless steel support hardware. The bottom of the stilling well shall end approximately 6" from the bottom of the wet well. The top of the stilling well shall end approximately 12" below the wet well top deck. The centerline of the stilling well shall be aligned with the centerline of the core-drilled hole in the top deck used for float switch cords and the level instrument cable.

10.2.19 Valve Vault

A. The valve vault shall be constructed of precast or cast-in-place reinforced concrete as specified hereinafter and shall be sized as indicated on the Contract Drawings.

B. Cast-in-Place Concrete

All cast-in-place concrete work shall conform to MSD's Standard Specification Section 5, Structures. Class AA concrete shall be used throughout the structure. All pipe connections to the vault shall be made with a positive seal gasketing system conforming to ASTM C923 and MSD's Standard Drawing No. GM-01-01.

C. Precast Reinforced Concrete

A precast reinforced concrete valve vault and top slab shall conform to "Precast Concrete Water and Wastewater Structures," ASTM C913, latest revision. All pipe connections to the precast valve vault shall be made with a positive seal gasketing system conforming to ASTM C923 and MSD's Standard Drawing No. GM-01-01.

D. Confined Space Equipment

The valve vault shall be equipped with an aluminum ladder as shown on the Contract Drawings. The ladder shall comply with OSHA requirements. A minimum clear space of 30 inches by 30 inches shall be provided as a landing area at the bottom of the ladder. The ladder shall have **retractable side rails or a retractable extension, such as a Bilco Ladder-Up or equal, to facilitate ingress and egress.**

E. Access Door

1. The access door(s) to the valve vault shall be 1/4-inch (minimum thickness) aluminum (6061-T6 Alloy, ASTM B-221) diamond pattern plate, designed to withstand a live load of 300 pounds per square foot. The frame shall be constructed of 1/4-inch thick, one piece extruded aluminum with a continuous 1-inch (minimum) anchor flange around the perimeter. The access door(s) shall be adequately sized to allow removal of the valves and fittings. Factory finish shall be mill finish aluminum. Installation shall be performed in accordance with the manufacturer's instructions.
2. The manufacturer shall mark each door leaf, in two locations with a steel stamp using 3/8-inch lettering, with the words “Property of Louisville MSD.” When the door(s) are in the open position, one mark shall be located approximately 3 to 4 inches from the edge on the top right corner of the underside of the door(s). The second mark shall be located approximately 3 to 4 inches from the side and above the hinge on the bottom left corner of the underside of the door(s).
3. The door(s) shall be equipped with stainless steel hinges, stainless steel pins, and recessed lift handle flush mounted and not protruding above the cover. Each door leaf, with a maximum of 15 lbs. of manual assistance, shall open to 90 degrees and automatically lock in that position with a stainless steel hold-open arm. The arm shall have a conveniently positioned release handle with a vinyl grip for easy and controlled closing. Door(s) shall be equipped with stainless steel spring operators designed to provide easy operation in opening and to act as a check in retarding downward motion of the door during closing. For safety purposes, should the locking mechanism fail or unauthorized entry occur, the spring operator shall be designed such that the door(s) shall remain in a fully closed position by its own weight. No item may protrude above the access cover except the heads of the carriage bolts and padlock assembly cover.
4. To minimize tampering and improve security, the hinges shall be bolted to the door(s) with stainless steel carriage bolts and nuts. The nuts shall be welded to the bolts on both the door(s) and frame. Door(s) shall be equipped with a recessed padlock and staple assembly which shall conceal an American #570 padlock and be designed to restrict bolt cutters from severing the padlock. MSD will provide and install the padlock upon completion of the project. All stainless steel hardware shall be type 304 (minimum) stainless steel. The manufacturer shall guarantee all components of the access doors against defects in material and workmanship for a period of five years.
5. When installing valve vaults six feet in diameter and larger, a double leaf access door hatch shall be installed and sized to facilitate access to valves and fittings. A large single door shall not be acceptable. The minimum leaf size shall be 30 inches by 30 inches. The maximum leaf size shall be such that the sum of the length and width of the leaf is less than or equal to 84 inches.

10.2.20 Check Valve

Check valves shall be **lever and weight** swing type **with** bronze-to-bronze seating and shall be manufactured by Kennedy Valve or approved equal. The valve design shall allow for operation when negative heads are encountered. The valve shall be designed to operate at all pressures in the sewer system. The check valve shall be installed on the discharge line as shown on the Contract Drawings. Check valves shall be installed such that the lever arm may be totally dissembled, including the removal of hinge pins, without removing the valve from the line. **A limit switch with SPDT contacts rated for 120VAC, mounted on either the valve or on an aluminum floor stand, shall be provided and adjusted so that motion of the check valve lever arm is detected.**

10.2.21 Gate Valve

The gate valve shall be AWWA C509, resilient wedge, rising stem suitable for use in sewage applications. Each valve shall be provided with a handwheel opening **counterclockwise**. The valve shall have flanged ends with 125 lb. drilling. The valve shall be furnished and installed in the discharge pipe as shown on the plans. The valve shall be a Ken-Seal gate valve manufactured by Kennedy Valve or approved equal.

10.2.22 **Emergency Pump Connection**

As shown on the Contract Drawings, a 4-inch line shall be installed in the valve vault to enable a portable pump to be connected to the force main. The end of the pipe shall protrude through the top slab of the valve vault and shall be equipped with a 4-inch stainless steel male adapter designed to accommodate a positive cam-locking female coupler for quick, secure connection of the portable pump discharge hose. The adapter shall be threaded onto the pipe and shall be protected with a stainless steel locking dust cap. MSD will provide the required padlock.

10.2.23 Ball Valve/Gauge Tap

The ball valve shall be threaded and have a stainless steel body, stainless steel ball and stem, teflon seats and seals, and a regular port. The ball valve shall be manufactured by Crane Capri, Number 9302-S, or approved equal. The gauge tap assemblies shall be stainless steel and installed as shown on the Contract Drawings.

10.2.24 Pressure Gauge and Diaphragm Seal

A. The pressure gauge shall be glycerine filled with a minimum dial size of 3-1/2 inches. The gauge shall be enclosed in a stainless steel case and shall have an operating range based on the actual system heads expected for the specific project. The operating range of the gauge shall be one of the manufacturer's standard designs and shall be labeled on the dial face in both pounds per square inch (psi) and feet of water. The

gauge shall have a polycarbonate window for shatter resistance. The lower stem shall have a 1/4-inch connection. The bourdon tube shall be AISI 316 stainless steel.

B. The diaphragm seal shall have a 1/2-inch process and 1/4-inch gauge connection. The diaphragm seal and bottom housing shall be AISI 316 stainless steel. The diaphragm fluid shall be glycerine.

C. The gauge shall be a 3-1/2-inch Ashcroft 35-1009 SWL -02L with an Ashcroft 50-310SSL-02T-CG diaphragm seal or approved equal.

10.2.25 Air Release Valve

The air release valve, when required, shall be specially designed for use in sewage applications. Specific size requirements shall be determined by the Engineer. The valve shall be furnished with backflush accessories such as inlet and outlet blowoff valves, quick disconnect couplings, and a minimum of 5 feet of hose. The valve shall be an APCO Model 400 or approved equal.

10.2.26 Mechanical Coupling

Mechanical couplings shall be installed as shown on the Contract Drawings. Mechanical couplings shall be epoxy coated ductile iron with stainless steel nuts and bolts. Couplings shall be **Dresser Style 38 or 138, Ford Style FC1 or FC2**, or approved equal.

10.2.27 Electrical

A. General

1. All materials and equipment installed shall be new and unused and shall be of the latest design of manufacturers regularly engaged in the manufacture of such products that conform with the requirements of the Contract Drawings and Specifications.
2. These Specifications, the associated Drawings, and other Contract Documents have been prepared with the intention of their yielding, through construction, electrical installations that are fully operable, safe, complete, and in full compliance with the latest editions of the National Electrical Code, local codes and ordinances, and any other authority having jurisdiction over the Work. The omission of miscellaneous electrical items or accessories not specifically called for in these Contract Documents which would detract from this intention shall not relieve the Contractor of the responsibility of furnishing and installing these items and accessories.

B. Conduit

1. All exposed conduit shall be rigid aluminum. All couplings, bushings, and connectors shall be of the same materials and intended for use in a rigid

aluminum conduit system. Threads, whether manufactured or made on the job site, shall meet the provisions of the NEC.

2. Below-grade plastic conduit shall be Schedule 40 PVC or Schedule 80 PVC, rated for use with 90-degree celsius conductors and for use in direct sunlight, with chemical weld joints. This Contractor shall provide all fittings, adapters, etc. required for a complete installation as required by the Drawings.

C. Wire and Cable

1. All conductors shall be of stranded softdrawn copper construction with thermoplastic type THHN/THWN 600 V insulation. Conductors shall be sized as shown on the Drawings. Power and lighting conductor sizes smaller than No. 12 AWG shall not be permitted.
2. Control Conductors: Conductors utilized within enclosures utilized for motor control, alarm, and discrete I/O signaling circuitry shall be type MTW, size #14 AWG stranded copper. Control conductors external to enclosures (not including pump, level transmitter, and float cables) shall be type THHN/THWN, size #14 AWG stranded copper. Conductors powered by a source in another enclosure shall be yellow. Analog signals shall utilize #18 AWG twisted, shielded pair cable with 300V insulation. Conductors within enclosures shall be neatly routed utilizing plastic Panduit-type wireway. Intrinsically-safe conductors shall maintain separation from all other conductors. Field wiring and internal control panel conductors shall be identified at each termination with black lettering on white background tags in a clear slide-on plastic sleeve as manufactured by Brady or equal. Conductor identification numbers shall indicate the terminal number on which the conductor shall terminate.

D. Control Panel Enclosures

1. Main Control Panel

a. The control system, as listed, shall be housed in a single stainless steel, NEMA 3R enclosure suitable for outdoor installations with a stainless steel, three-point vault door closing handle and drip shield. It shall be manufactured from 14 gauge, Type 304 stainless steel. All hardware, including the hinges, latches, and provisions for a 5/8-inch diameter hasp opening for a padlock, shall be stainless steel. MSD will provide the padlock upon completion of the project.
b. The enclosure shall have a 12 gauge steel, formed, removable subpanel. The panel shall be degreased, cleaned, and treated with a phosphatizing process, then primed and painted with white industrial-grade baking enamel. Space per the drawings shall be saved on the subpanel for mounting of a communication modem. Modem shall be provided and mounted by MSD. Access to this space shall not be blocked by the mounting of other internal panel components.

c. The enclosure shall have a hinged inner door (dead front). The inner door shall be hinged on one side and held closed by two (2) hand operated, 1/4-turn fasteners or thumb screw fasteners on the other side. Operator devices are to be mounted on the inner door. The hinge and inner door assembly shall be of sufficient strength to prevent sagging, buckling or warping of the inner door after inner door devices are installed.

2. Other Enclosures and Boxes

Other enclosures shall be stainless steel, NEMA 4X with hinged door and provisions for pad locking.

E. Control Panel Components

1. Phase Monitor

a. Loss of voltage on any phase, undervoltage, and loss of rotational sequence shall be detected by a phase monitor suitable for the electrical service provided. The monitor shall reset automatically when measured parameters return to the normal range of operation. The phase monitor shall include a means for adjusting drop out voltage, an LED indicating normal conditions, and shall plug into a DIN rail-mounted base.
b. The phase monitor shall be Diversified Electronic Type UOA or SLA or equal.

2. Full-Voltage, Non-Reversing (FVNR) Combination Motor Starter ***(Engineer to choose this specification or the soft starter below.)***

a. Motor starters shall be NEMA-rated combination full-voltage, non-reversing, horsepower-rated starters with motor circuit protectors and solid state overload relays mounted in individual NEMA 4X stainless steel enclosures.

b. Contactor shall meet the following requirements:

1) Easily replaceable power contacts.
2) No disconnection of wiring for contact inspection.
3) Easily replaceable coil.
4) Provide Square D Class 8536 or equal.

c. Overload relay shall meet the following requirements:

1) Phase loss and unbalance protection
2) Selectable class 10, 20, 30 time current trip characteristics.
3) Directly mountable on contactor.
4) 120VAC remote reset solenoid.
5) Isolated auxiliary contacts.

6) Provide Square D Class 9065 Motor Logic solid-state overload relay or equal.

d. Short circuit protection shall be a molded case motor circuit protector meeting the following requirements:

1) Fixed continuous current rating.
2) Adjustable magnetic trip settings
3) 250VAC, 10 amp normally-closed alarm contact to indicate breaker trip.
4) **External operating handle lockable in the open or closed position**.
5) AIC rating of 25,000A minimum @ 480VAC.
6) Provide Square D Mag-Gard motor circuit protector with alarm contact kit or equal.

2. Reduced-Voltage, Solid-State (RVSS) Combination "Soft" Starter ***(Engineer to choose this specification or FVNR starter above)***

a. Motor starters shall be an RVSS combination, horsepower-rated starters with motor circuit protectors with microprocessor-based reduced voltage starting and stopping.

b. Reduced-voltage, solid-state combination "soft starters" shall have the following features:

1) 480VAC input/output voltage.
2) Motor short circuit protection with external operator handle lockable in the open or closed position and rated for the fault current available at the starter.
3) Integral "up-to-speed" bypass contactor.
4) Current monitoring and motor protective features active in start up and bypass mode.
5) Pump control option with acceleration and deceleration ramp algorithms especially designed to reduce water hammer in pumping systems.
6) A starter-mounted operator interface module for programming parameters and displaying alarms, faults, fault logs, and metering data.
7) NEMA 4X stainless steel padlockable enclosure.
8) Line-side protective module for protection against transients.
9) RVSS starter shall be Allen-Bradley SMC Flex Smart Motor Controller.

c. Short circuit protection shall be a circuit breaker as recommended by the RVSS manufacturer. Accessories for the circuit breaker shall include a normally-closed 120VAC-rated alarm contact to indicate breaker "tripped".

3. Human-Machine Interface (HMI)

   a. Provide a touch screen color HMI with the following features:
   b. Color 8.3" x 6.2" display area with 640 x 480 resolution.
   c. Field replaceable backlight
   d. Battery-backed real-time clock.
   e. 384 touch cells rated for 1,000,000 operations.
   f. One RS-232 DF1 communication port and one RS-232 download/printer port. Note that no intermediate protocol conversion device to covert a non-DF1 protocol will be accepted.
   g. Connect communication cable to the mini-din port of the PLC specified below.
   h. 120VAC supply voltage.
   i. The HMI shall be an Allen-Bradley PanelView 1000.
   j. HMI program development shall be provided by Owner.

4. Pushbuttons and Selector Switches

   a. Push buttons shall be watertight/oil-tight NEMA 4/13, black, flush-mounted, full voltage with legend plate as indicated on the drawings.
   b. Selector Switches shall be watertight/oil tight NEMA 4/13, maintained, with black standard operator, number of positions and contact blocks as indicated on the drawings.
   c. The push buttons and selector switches shall be Square D Class 9001 Type K or equal.

5. Programmable Logic Controller

   a. General:

      1) Function: Used for process monitoring and control by emulating functions of conventional panel mounted equipment such as relays, timers, counters, PID controllers, calculations.
      2) Type: Microprocessor based , programmed using ladder logic.
      3) Parts: central processing unit (CPU), power supply, input/output modules, and cables.
      4) Provide components required to make a complete and totally operational system.

   b. Environmental:

      1) Temperature Range: Operating: 32 to 131 degrees F, minimum. Storage: -40 to +185 degrees F, minimum.
      2) Humidity: Operating range 5 to 95 percent noncondensing.
      3) Vibration Operating: 0.015 inches peak-to-peak displacement 10-57 Hz, 5g 57

   c. Central Processing Unit (CPU):

1) Type: Microprocessor, 16-bit minimum, firmware version 7.0 or later.
2) Memory Size: 14K minimum, user configurable memory for program and data.
3) Scan Time: Minimum of 1.0 ms per 1K words of relay ladder logic.
4) Instruction Set:

    a) Timers and Counters: Minimum timer resolution 0.1 seconds; minimum counter count range 0 to 32,000.
    b) Math: Signed integer and floating-point math including add, subtract, multiply, divide, square root, and compare.
    c) Register Operations: Shift registers, bit shift, bit set, bit clear, data move and data format conversion.
    d) Process Loop Control: User configurable direct or reverse acting PID loop control computation with the capability of both AUTO and MANUAL modes of operation.
    e) Real Time Clock: Date and time set and compare.
    f) Miscellaneous: Jump or skip to a label, one shots, sequencing drums, subroutines.

5) Diagnostics:

    a) Indicators: Low battery fault, PLC fault, Power On, Communications Active, PLC in Run Mode.
    b) Error Codes: Failure codes for communications, scan, configuration, communications, I/O, special functions.
    c) Power Up: PLC checks status of PROMs upon powerup; runs self-diagnostics on power-up; periodically runs self-diagnostics while in RUN mode, halts logic processor and sets outputs to configured state if fatal error is detected.

6) Agency Approvals and Standards:

    a) UL listed.
    b) CSA certified.

7) CPU shall be Allen-Bradley **MicroLogix** Model 1764-LRP.

a. Power Supply Voltage: 120VAC

b. Chassis: DIN-rail mounted.

c. Discrete Inputs:

1) Voltage: 120VAC.
2) Number of Points: As shown on drawings..
3) LED status indicator for each point.

4) Base Unit shall be Allen-Bradley Model No. 1764-24AWA or equal. Expansion input card shall be Allen-Bradley Model No. 1769-IA16.

g. Discrete Outputs:

1) Type: Isolated Form C relay.
2) Voltage: 120 volts, 60-Hz.
3) Number of Points: As shown on drawings.
4) Load Rating: 15 amps make, 1.5 amps break, 2.5 amps continuous.
5) Type: Relay Contact Outputs.
6) LED status indicator and fuse for each point.
7) Base Unit shall be Allen-Bradley Model No. 1764-24AWA.

h. Analog Inputs:

1) Type: Current, 4 to 20 mA dc, differential.
2) Number of Points: As shown on drawings.
3) Accuracy: $\pm$ 0.35 percent of full scale.
4) Analog Input Resolution: 14 bits, minimum, plus sign.
5) Normal Mode Rejection Ratio: Current –15dB at 50Hz, -18dB at 60Hz.
6) Analog Input Modules shall be Allen-Bradley Model No. 1769-IF4.

k. Communication Ports: Two RS-232 for ports configurable for DF1 half or full duplex communication. One for communication with modem, the mini-din port shall be used for communication with a panel-mounted HMI. Note that no intermediate protocol conversion device to covert a non-DF1 protocol will be accepted.

j. Programming: Programming of PLC shall be provided by Owner. Pump start and stop levels, and level transmitter calibrated span, shall be provided to Owner by Engineer.

6. Heaters

a. The control panel and starter enclosures shall have silicone rubber insulated space heaters with integral thermostats and wattage as indicated on the drawings.
b. The heaters shall be Chromalox Type SL-B or equal.

7. Legend Plates

a. All equipment, disconnect switches, circuit breakers, motor starters, pushbutton stations, relays, and similar devices shall be clearly labeled or function otherwise identified. Identification labels shall be engraved lamacoid plates having black background with white letters. Attach each plate with aluminum or stainless steel screws.

8. Packaged Power Source ***(Delete this section if single phase 120VAC power is available from the utility for the proposed pump station.)***

    a. A 120V power source for miscellaneous loads shall be provided and shall meet the following requirements:
    b. Transformer, primary circuit breaker, and secondary circuit breakers combined in a painted, stainless steel, NEMA 3R enclosure.
    c. 240/120V transformer secondary voltage, primary voltage and KVA rating as indicated on the drawings.
    d. Number of secondary breakers as indicated on the drawings including spares.
    e. The packaged power source shall be Square D Class 7400 Mini Power-Zone or equal.

9. Circuit Breakers

    a. Circuit breakers for supplying ancillary systems shall be operable from front of the control panel inner door. The breakers shall be rated for the fault current available and shall have the number of poles as indicated on the drawings.
    b. Circuit breakers shall be Square D Type QO molded case circuit breakers or equal.

13. DC Power Supply

    a. The DC power supply shall have the following features

        1) 120VAC input.
        2) 24VDC +/- 1%, 10 amps output.
        3) Internal input fusing and transient surge protection.
        4) Operating temperature of –25 to 60 degree C.
        5) Operating humidity of 0-95% non-condensing.
        6) Casing capable of horizontal DIN rail mounting.
        7) Isolated power supply failure contact

    b. Power supply shall be Phoenix Contact Quint Power Supply or equal.

14. Uninterruptible Power Supply (UPS)

    a. The UPS shall have the following features:

        1) 120VAC input, 120VAC output.
        2) 500VA/300W output capacity.
        3) Line interactive technology.
        4) Stepped sine wave output in battery mode.
        5) Automatic bi-weekly battery testing.
        6) User replaceable “hot swappable” batteries.

7) Four 15A battery back up + surge protection receptacles, 2 surge protection only receptacles.
8) Protection against frequency variations, spikes, blackouts, surges, sags, over and under voltages.
9) Battery run times: 8 minutes @ 100% load, 24 minutes @ 50% load.

b. The UPS manufacturer shall be Sola Hevi-Duty Type S2K.

14. Control Relays

a. Control relays shall be general purpose, plug-in type, with spade terminals, DIN rail sockets, a temperature operating range of -40 degrees C to +45 degrees C, on/off indicator, manual operator, 10A contacts and coil voltage as required by the drawings.
b. Control relays shall be Square D Class 8501 Type K or equal.

15. Timing Relays

a. **On-delay** timing relays shall be single range, plug-in type, with DIN rail blade-type sockets, adjustable from 0.3 to 30 seconds, 120VAC coil, and 10A contacts.
b. On-delay timing relays shall be Square D Class 9050, Type JCK or equal.
c. On-delay/off-delay timing relays shall be plug-in type, with blade-type sockets, provide individual adjustments for each timing function (on or off delay) adjustable from 0.3 to 30 seconds, 120VAC coil, and 10A contacts.
d. **On-delay/off-delay timing relays shall be Diversified Electronics TDJ series or equal.**

16. Duplex Receptacle

a. The receptacle shall be 120 volt, 20 amp NEMA 5-20R GFI receptacle with “Test” and “Reset” buttons, DIN rail-mounted device box, and external wiring terminals.
b. The receptacle shall be Phoenix Contact EM-DUO-120/20/GFI or equal.

17. Control Wiring Terminal Blocks

a. Terminal blocks for control wiring shall meet the following requirements:

1) Voltage rating of 300V.
2) Current rating of 20A.
3) Screw-type terminals made of corrosion-resistant alloys.
4) DIN rail mounted.

b. Terminal blocks shall be Phoenix Contact Type UK2,5N or equal. Provide end terminals as required. Analog terminals shall be segregated from discrete terminals.

18. Power Distribution Blocks

a. Power distribution blocks shall be aluminum, tin plated and must be compatible with copper conductors. Each block shall be sized appropriately for the size and number of wires being terminated and shall be based on NEC ampacity tables using 75^0 Celsius wire.
b. Power distribution blocks shall be Square D Class 9080, Type LB or equal.

19. Fuse Holders and Fuses

a. Fuse holders shall be 600V, 30 amp high impact thermoplastic with copper alloy, tin plated clips.
b. Fuses shall be 600V, 200,000AIC Class CC fuses.
c. Holders to be as manufactured by Square D Class 9080, Type FB or equal.

F. Grounding

1. The resistance value of the main grounding conductor measured between the main disconnect and a good earth ground shall not exceed five (5) ohms.
2. Ground Rods: Ground Rods shall be the copper clad steel type and shall be a minimum of 10 feet in length, 3/4-inch in diameter. Ground rods shall be equal to those as manufactured by Copperweld Steel Company.
3. Grounding electrode conductors shall be bare copper. Equipment grounding conductor shall be copper, THHN/THWN insulated, green (or green with yellow tracer) in color, and rated at 600 volts.

G. Float Switches

1. Liquid level detention shall be by sealed, single pole, float switches encased in a **plastic** case. **The switch shall utilize a steel ball in a tube to provide electrical switching. No mercury-type switches are acceptable.** The float switches shall be weighted, suspended by cables which shall contain the wiring for the switches All materials shall be highly resistant to sewage and associated atmospheres. Floats requiring fasteners to maintain their depth in the wet well are unacceptable. The tilt bulb hanger bracket and hardware shall be stainless steel (ASTM A167, Type 304).
2. The float cables shall be supplied of sufficient length to be installed without splicing.
3. Floats to be Anchor Scientific Eco-Float or equal.
4. Mounting bracket to be Ohio Electric Control Model 100-6 or equal.

H. Level Transmitter

A submersible level transmitter shall be provided for analog level measurement. The transmitter shall have the following features.

1. Sensor and transmitter electronics housed in the submersible casing. No above-grade electronics required for conversion of sensor signal to analog output signal.
2. 4-20mA two-wire loop powered transmitter.
3. Polypropylene casing
4. Intrinsically safe design.
5. 316 Stainless steel diaphragm for waste water applications.
6. Accuracy: +/- 0.5% full scale
7. Steel re-inforced shielded, oil-resistant PVC electrical cable.
8. The level transmitter shall be MJK model 7060 or equal, range as required by Engineer. Level transmitter shall hang within a stilling well installed within the wet well. The bottom of level transmitter shall be approximately 12" above the floor of the wet well.

I. Main Circuit Breaker

1. The main circuit breaker shall be a molded case, thermal-magnetic circuit breaker in a NEMA 4X, stainless steel enclosure, front operated, with provisions for padlocking in open or closed position; voltage; ampere rating and number of poles as noted on the drawings, and rated for use as service entrance equipment. The breaker shall include an isolated alarm contact to indicate a breaker "tripped" status, and a neutral and/or grounding kits where required.
2. The circuit breaker shall be Square D Class 610 or equal.

J. Service Pole

1. For overhead service, the Contractor shall provide a 25-foot long, Class 4, wood pole for up to 200 amp service or as required by LG&E. For services over 200 amp, Contractor shall contact LG&E at 627-3265 for pole classification and requirements.

K. Cord Grips

1. Provide standard duty, single eye, single weave, stainless steel support grips of sufficient strength for pump power and control cords, and float switch cords.
2. Provide Class I, Division 2 aluminum cord seals for sealing cord entry into enclosures.
3. Cord grips shall be Kellems Grips as manufactured by Hubbell or equal. Cord seals shall be Appleton type CG aluminum or equal.

L. Alarm Horn

1. The alarm horn shall be 120VAC, NEMA 4X, 103dB @ 10 feet with housing for outdoor mounting. Power consumption shall be 15.6VA or less.
2. The horn shall be mounted near the top of the service pole or a treated wood pole approximately 10 ft. above grade.

3. The alarm horn shall be Edwards Signaling and Security Systems Model 870P series or equal.

M. Alarm Light

1. The alarm light shall be 120VAC, NEMA 4X, 15W flashing incandescent light for outdoor industrial applications. Power consumption shall be 18VA or less.
2. The light shall include a red lens and polycarbonate, impact resistant base.
3. The light shall be mounted near the top of the service pole or a treated wood pole approximately 10 ft. above grade and near the alarm horn.
4. The alarm light shall be Edwards Signaling and Security Systems Model 114 FIN Series or equal.

N. Silence Pushbutton

1. The silence pushbutton shall be mounted in a NEMA 4X stainless steel pushbutton enclosure approximately 5 feet above finished grade and accessible to the public.
2. The pushbutton shall be as specified above under “Pushbuttons and Selector Switches”.
3. The enclosure shall be as specified above under “Other Enclosures”.

10.2.28 Emergency Generator

A. General

1. The engine, generator, and all major items of auxiliary equipment shall be manufactured by manufacturers currently engaged in the production of such equipment. The unit shall be factory assembled, tested by the engine manufacturer, and shipped to the job site by an authorized dealer having a parts and service facility in Jefferson County, Kentucky. The generator/engine shall be sized such that sequential starting of the pumps shall not produce a voltage drop greater than 20% for any step.
2. Equipment furnished under this Section shall be guaranteed against defective parts or workmanship for a period of two years after acceptance of the facility by MSD. The warranty shall cover 100% of all parts and labor.
3. On completion of the installation, start-up and testing shall be performed by a factory-trained representative.
4. Supplier shall have been regularly engaged in sales and service of engine-generator units for at least five years, have a complete service and parts facility within 100 miles, provide 24 hour service and be open for inspection.

B. Acceptable Manufacturers

1. Engine/Generator: Kohler, Caterpillar or equal.
2. Transfer Switch: Russelectric RMTD or equal.

C. Engine

1. Engine shall be diesel **or natural gas** fueled, 4 cycle, 1800 rpm, liquid cooled type with engine mounted radiator. Engine shall operate smoothly at all loads and shall be capable of acceleration to rated speed and accept full load within 10 seconds from a cold start.
2. The engine shall operate on No. 2 diesel fuel and shall have an electric starting system.
3. Prior to tests for final acceptance, the cooling system shall be filled with 50 percent ethylene glycol solution and water with rust inhibitor.
4. The engine shall be equipped with sensors and devices to interface with control panel for the following functions.

    a. Low oil pressure shutdown
    b. High water temperature shutdown
    c. Over Speed shutdown
    d. Over Crank shutdown
    e. Low oil pressure pre-alarm
    f. High water temperature pre-alarm
    g. Low water temperature alarm

5. Accessories Mounted on Engine:

    a. Thermostatically controlled block heaters. Heater input voltage shall be 208V or 240V single-phase, wattage as required by the generator manufacturer.
    b. Dry type engine air cleaner.
    c. Governor to maintain frequency regulation, no load to full load, at 60 Hz with steady state regulation plus/minus 3 %.

D. Generator

1. Generator shall be permanent magnet generator (PMG) type, 12 lead reconnectable and shall be capable of sustaining a 300% short circuit for 10 seconds. Current boost systems are not acceptable. Generator shall be drip-proof and ventilated by internal blower mounted on rotor shaft. Provide a main circuit breaker mounted on the generator set. Include an auxiliary normally-open contact on the breaker to indicate “tripped”. This auxiliary contact shall be wired in parallel with the common fault contact described below.
2. Generator shall have Class “H” or better insulation and have a continuous standby rating of _____KW (__KVA at _____P.F.) for _____volts, ____-phase, 60 Hz using the fuel stated above.

E. Voltage Regulator

1. Voltage regulator shall be completely solid state type. Regulation shall be within 2 percent from no load to full load with 10 percent adjustment range.

F. Generator Control Console

1. Unit mounted controller shall be capable of facing right, left or rear and shall be mounted on vibration isolators. The DC circuit shall be fused and be capable of automatic remote start from a remote start signal. Speed sensing and a second independent starter motor disengagement systems shall protect against starter engagement with a moving flywheel. Battery charging alternator voltage will not be acceptable for this purpose. The controller shall have the following functions, indicator lights and accessories:

   a. Cranking cycle with 15 second on and off cranking periods
   b. Over crank protection
   c. Engine cool down timer, factory set at 5 minutes
   d. Overvoltage protection to shut down the unit.
   e. 3-position (Automatic-Off-Test) selector switch
   f. Indicator lights to signal:

      1) Not-in Auto (Flashing Red)
      2) Over crank (Red)
      3) Emergency Stop (Red)
      4) High Engine Temperature Shutdown (Red)
      5) Over speed Shutdown (Red)
      6) Low Oil Pressure Shutdown (Red)
      7) Battery Charger Malfunction (Red)
      8) Low Battery Voltage (Red)
      9) Low Fuel Level (Red) **for diesel-fueled generators.**
      10) **Low Fuel Inlet Pressure (Red) for natural gas-fuel generators.**
      11) Pre-Alarm High Engine Temperature (Yellow)
      12) Pre-Alarm Low Oil Pressure (Yellow)
      13) Low Coolant Temperature (Red)
      14) Auxiliary Pre-Alarm (Yellow)
      15) Fuel Leak (Red)
      16) System Ready (Green)

   g. Instrument Panel to include:

      1) Voltmeter
      2) Ammeter
      3) Voltmeter-ammeter phase selection
      4) Lights to indicate high or low meter scale
      5) Frequency meter
      6) Panel-illuminating lights
      7) Battery charging voltmeter
      8) Coolant temperature gauge
      9) Oil pressure gauge
      10) Running-time meter

11) Voltage-adjust rheostat
12) Test button for indicating lights
13) Alarm horn with silencer switch

h. Isolated generator "running" contact.
i. Isolated generator "In Auto" contact.
j. Common alarm contact for signals indicated in Item f above.

G. Batteries and Charger

1. Batteries shall be lead acid mounted on a fully accessible rack.
2. Provide an automatic float and equalize battery charger with plus/minus 1% constant voltage regulation from no load to full load and plus/minus 10% AC input line variation, current limited during engine cranking and short circuit conditions, temperature compensated, voltmeter and ammeter, AC input and DC output fuses, and have reverse polarity protection circuitry.
3. Engine shall have a dedicated battery, and battery charger. Battery shall be located adjacent to engine. Cables from battery to starter shall be sized in accordance with manufacturer's recommendation.

H. Engine Exhaust System

1. Muffler shall be of the critical rated silencer type.2. Silencer is to be mounted on top of weather housing with manufacturer's standard mounting brackets.

I. Weather Housing

Provide a weather protective enclosure for outdoor service, sheet metal construction with hinged or removable panel access doors for service and maintenance. Unit arranged for full load service totally enclosed. Enclosure is to be mounted directly to channel base and shipped completely assembled. Exhaust muffler mounted on enclosure. Water jacket heater and battery charger installed within the enclosure.

J. Automatic Transfer Switch

1. An automatic transfer switch shall be furnished, as shown on Drawings. The switch shall be capable of switching all classes of loads and shall be rated for continuous duty, when installed in a non-ventilated enclosure. A NEMA 4X enclosure shall be provided and must conform to UL 50 standards.
2. Construction and Performance: The transfer switch shall be double throw, actuated by two electrical operators, momentarily energized and connected to the transfer mechanism by a simple over center type linkage. The time delay between the opening of the closed contacts and the closing of the open contacts shall also allow for voltage decay before transfer. Single operator switches programmed to stop in a neutral position are not acceptable. In-phase monitor will not be acceptable in lieu of two electrical operators.

3. Switching mechanism shall provide "quick-make", "quick-break" operation of contacts.
4. The normal and emergency contacts shall be positively interlocked mechanically and electrically to prevent simultaneous closing. Mechanical interlock must be separate from operating mechanism so as to provide positive interlock in the event of operator failure.
5. Operating mechanism must be metal. Plastic or phenolic type components, subject to breakage, will not be acceptable.
6. Main contacts shall be mechanically held in both positions without the use of hooks, latches, magnets or springs, and shall be silver alloy protected by arcing contacts, with deion grids and arc barriers on each pole.
7. The transfer switch shall be equipped with a manual operator that is designed to prevent injury to the operating personnel if the electrical operator should suddenly become energized during manual transfer. The manual operator shall provide the same contact to contact transfer speed as the electrical operator, to prevent a flash over from switching the main contacts slowly. Manual operation shall be safe and not require any prior disconnection of the automatic operators control wiring. Safe manual transfer shall be possible under all load conditions, energized or non-energized.
8. All operator interface devices and accessories shall be front mounted on an inner door behind a padlockable deadfront outer door.
9. Control wiring shall be flame retarding 600 volt, Type SIS throughout with numbered sleeve type identification on each end.
10. Sequence of Operation: If any phase of the normal source drops below 80% of rated line voltage, an engine start contact shall close, to start the generating plant after a time delay ignoring momentary dips. The transfer switch shall transfer to the emergency source after the voltage and frequency have reached 90% of rated. After restoration of normal power on the normal source, the load will be transferred back with a programmabledelay.
11. Switch shall include provision to instantaneously return to normal source (if available) regardless of exerciser signals, time delays, etc. in the event of emergency source failure.
12. After the switch has retransferred to normal, the engine generator shall be unloaded and be readied for a subsequent operation.
13. Approval: As a precondition for approval, all switches, complete with timers, relays and accessories shall be listed by UL in their Electrical Construction Manuals Catalog, under Standard UL 1008 Automatic Transfer Switches and approved for use on emergency system.
14. When conducting temperature rise tests to Paragraph 22 of UL 1008, the manufacturer shall include post endurance temperature rise tests to verify the ability of the switch to carry full rated current after completing the overload and endurance tests.
15. In addition to the above, the transfer switch must have a stand alone short circuit withstand capability greater than the available system fault current at the point of connection to the transfer switch.

16. Transfer switch shall include a microprocessor-based controller to allow operator configuration of various threshold values, time delays, and to display metering and status data.
17. Ratings:

    a. _____amps
    b. _____volts
    b. 3 phase
    c. 60 Hz
    d. _____poles

18. Accessories:

    a. Time delay to override momentary outages and delay engine start.
    b. Time delay relays to control contact transition time on transfer to either source
    c. Adjustable time delay on retransfer to normal
    d. Test switch to be mounted on the cabinet with automatic bypass to normal should the emergency source fail - provides for test operation of emergency generator and transfer switch
    e. Auxiliary contact to close when normal fails (pilot contact to initiate starting controls on engine)
    f. Mounted pilot light for indicating switch in normal position.
    g. Mounted pilot light for indicating switch in emergency position
    h. Auxiliary contact on main shaft, rated 25 amps, 120 VAC, (closed on normal)
    i. Auxiliary contact on main shaft, rated 25 amps, 120 VAC, (closed on emergency)
    j. Enclosure NEMA 4X
    k. Frequency relay - prevents transfer to emergency until voltage and frequency of generating plant have reached 90% of rated voltage
    l. Normal Source Available to indicate availability of normal power source regardless of transfer switch position.
    m. Emergency Source Available to indicate availability of emergency power source regardless of transfer switch position.

K. Fuel System

For diesel powered generators, provide a sub-base fuel tank to the following specifications. Fuel tank shall be mounted under generator set, capacity for 100% load operation for 24 hours, UL-142 Secondary Containment listed, and provided with a mechanical fuel gauge, low fuel level float and alarm, leak detection float, normal vent with mushroom cap and emergency vent. Steel braided flexible fuel lines with protective covers shall be installed and plumbed between the engine and tank for supply and return. There shall be a baffle between the supply and return ports inside of the tank. Tank shall provide a conduit stub up area with a removable end plate for access.

L. Installation

1. The engine/generator sets shall be delivered on a structural steel base or skid and shall be installed complete where shown on the Drawings. Vibration isolators shall be installed between the unit base and the concrete mounting surface. The isolators shall be designed and manufactured for the weight, shock, and vibration produced according to the unit manufacturer's information on the particular unit being installed.
2. The generator neutral connection shall be solidly grounded to the electrical system ground via an equipment grounding conductor. The unit frame shall be grounded connected to the system ground.
3. All wiring between remote components shall be in conduit. All wiring between components mounted on the unit base shall be completely factory wired.
4. An aluminum platform shall be constructed to allow for operator access to the generator control panel for larger generators with excessively high control panels. The Owner shall review each installation on a case by case basis and render a decision on the need for an elevated platform.

M. Manufacturer's Representative

1. The installation of the engine/generator set, shall be made using complete factory written or drawn instructions. When the installation is complete, the Contractor shall notify the supplier and a field representative shall travel to the site to inspect the installation, direct the start-up procedures and perform any necessary adjustments and the field testing. The Engineer shall be notified at least one week in advance of the start-up and testing so that he may have the opportunity of witnessing these procedures.
2. Load bank testing for 2 hours (minimum) at full load shall be performed by the generator supplier. Record engine and generator performance data. If deemed so by the manufacturer’s representative, certify the unit ready for operation upon test completion.

N. Fuel

For diesel-fueled generators, fuel shall be provided by the Contractor during all phases of testing and startup.

10.3 EXECUTION

10.3.1 General

The Contractor shall furnish and install as detailed, at the elevations given and where shown on the Drawings, complete duplex, pump stations capable of handling raw, unscreened domestic sewage. The stations shall include submersible grinder or non-clog sewage pumps, liquid level sensors, discharge piping, valves, electrical controls and alarm system, and a precast concrete wet well and valve pit.

10.3.2 Backfill and Finish Grading

A. Class I (No. 9 crushed stone aggregate) backfill material shall be placed around the pump station to within 18 inches of the surface of the surrounding ground, with sufficient allowance for settlement. The remaining fill shall be earth material free of rocks in the areas of piping and excavated material in all other areas. Rock and/or shale excavation may be placed in the top 18 inches of fill, but shall not be above piping or any closer than 12 inches from finished grade.

B. All fill shall be placed so as to load structures symmetrically, Rough grading shall be held below finish grade and then topsoil which has been stockpiled shall be evenly spread over the surface.

C. Grading shall be brought to the levels shown on the Drawings or to elevations established by the Engineer. Final dressing shall be accomplished by hand work or machine work, or a combination of these methods as may be necessary to produce a uniform and smooth finish to all parts of the regrade.

10.3.3 Pump Tests

Pump tests shall be conducted on each pump. During each test, the pump shall be run at each head condition for a sufficient time to permit accurate determination of discharge, head, and power input. Certified copies of the test data shall be furnished to the Engineer for review. All tests shall be run in accordance with the Standards of the Hydraulic Institute.

10.3.4 Acceptance Tests

A. After installation of the pumping equipment, and after inspection, operation, testing, and adjustment have been completed by the manufacturer's representative, each pump shall be given a running test in the presence of the Engineer during which it shall determine its ability to operate without vibration or overheating, and to deliver its rated capacity under the specified conditions. During the tests, observations shall be made of head, capacity, and motor input. All defects or defective equipment revealed by or noted during the tests shall be corrected or replaced promptly at the expense of the Contractor, and if necessary, the tests shall be repeated until results acceptable to the Engineer are obtained. The Contractor shall furnish all labor, piping, equipment, and materials necessary for conducting the tests.

B. All adjustments necessary to place the equipment in satisfactory working order shall be made at the time of the above tests.

C. The Contractor shall provide water for testing.

D. In the event that the Contractor is unable to demonstrate to the satisfaction of the Engineer that the units will satisfactorily perform the service required and that they will operate free from vibration and heating, the pumping units may be rejected. The

Contractor shall then remove and replace the equipment at his own expense. The limits of vibrations as set forth in the 13th Edition of the Standards of the Hydraulic Institute shall govern. Field service report shall include all vibration readings made.

10.3.5 Pump Warranty

A. The pump manufacturer shall warrant the units being supplied to the owner against defects in workmanship and material for a period of five (5) years from the date of installation. The pump manufacturer shall repair or replace defective equipment, parts, or components within seven (7) days of receipt of defective items shipped prepaid by MSD to the manufacturer's authorized repair facility.

B. Warranties and guarantees by the suppliers of various components in lieu of a single source responsibility by the manufacturer will not be accepted. The manufacturer shall assume prime responsibility for the guarantee of the station and all components.

C. The replacement or repair (including cost of parts and labor) of those items normally consumed in service, such as pump seals, oil, grease, etc., shall be considered as part of routine maintenance and station upkeep.

10.3.6 Electricial Installation

A. Excavation, Backfilling and Grading:

1. The Contractor shall perform all earth and rock excavation, backfilling and grading required for this part of the work. Rock excavation shall be made to a depth of 4 inches below pipe and filled to subgrade with dense graded aggregate limestone. After the Bid is submitted there will be no additional funds forthcoming for excavation work on this project. All excavation shall be Bid as unclassified.
2. Trenches shall be maintained free of water until backfilling is completed.
3. Backfilling material in earth excavation shall be clean earth to a line at least 12 inches above the top of the conduit. From this line upward, rock not more than 6 inches in diameter may be used provided it is spaced at least 12 inches apart. Filling between rock shall be of clean earth, thoroughly tamped in 6-inch layers to the finished grade. All surplus rock and earth shall be removed from the site as directed by the Engineer.
4. Depth of bury for all conduit shall be a minimum of 24 inches below finished grade.

B. Conduit:

1. PVC shall be concrete encased where it passes under roadways. PVC shall not be used where exposed on the exterior nor where exposed to direct sunlight. This Contractor shall plan his work so that runs of conduit miss equipment by other trades. Conduit bushing shall have insulating material which has been permanently fastened to the fittings. Bushings for conduit 1-1/2 inches trade size and larger shall be complete with grounding lug and shall be bonded to the

box by means of bare copper wire. All field bends shall be made with standard tools and bending equipment manufactured especially for this purpose. Bends in metallic conduit shall be made while cold and in no case shall the conduits be heated. Conduits shall not be bent through more than 90 degrees. Size of conduits shall not be less than that required by the National Electrical Code.

2. All conduit installed on concrete surfaces shall be anchored with spacer type conduit clamps preventing contact between the conduit and the concrete surface. Conduits penetrating walls shall be grouted in place to form a seal. Conduits penetrating floors shall be sleeved.
3. All conduit shall be run continuous between devices with a minimum number of bends. Back-to-back 90 degree bends (180 degree change of direction) will not be acceptable. During construction, all new conduits shall be kept dry and free of moisture and debris.
4. No conduit smaller than 3/4-inch trade size shall be used.
5. Conduit Schedule:

Location	Schedule 40 PVC	Schedule 80 PVC	Aluminum
Underground/Encased	X		
Direct Buried		X	
Exposed			X
Emergence from UG			X

C. Wire and Cable:

1. Direct Burial Cable: No cable buried directly in the earth, not in raceway will be allowed on this project.
2. Wire shall not be installed until all work of any nature that may cause injury to the wire is completed. Mechanical means shall not be used in pulling in wires No. 8 or smaller. Approved wire pulling lubricant shall be used as required to prevent insulation damage and overstressing of the wire while pulling through conduit. In no case shall conductors be greased or coated with any substance injurious to the conductor insulation or sheath.
3. All wires connected to terminal boards, terminal blocks, or to other similar terminals shall terminate by means of pressure terminals. Where terminal boards, terminal blocks, etc. are designed and manufactured to accept bare wire and have a pressure plate on each side of the wire, no pressure terminals on the wire will be required. Where the wire would have to encircle the holding screw to make a proper connection, the wire terminals are required.
4. Where the wire is shown larger than that required for the load, it is done so for voltage drop or other purposes and must be installed as shown. Where the wire is stranded, the removal of strands in order to install the wire into a lug provided on any equipment will not be permitted. A larger lug shall be installed which will accept the wire size indicated.

D. Grounding:

1. Ground rods shall be driven vertically into the earth to at least 1 foot below finished grade. Where rock is encountered at a depth of less than 4 feet, rods shall be buried in a trench at not less than 2 feet below finished grade.
2. Connections to ground rods and all other ground connections below grade shall have a minimum mechanical contact surface area between the conductor and the ground rod of not less than three square inches. All connections made below finished grade shall be exothermic. Installation of grounding conductors shall be such that they are not exposed to physical damage. All connections shall be firm and tight.
3. All metal electrical equipment cabinets shall be securely bonded to a grounding conductor running through any conduit terminating at the cabinet or enclosure by use of a grounding lug bushing and jumper wire to the enclosure wall. Control cabinets shall be provided with an equipment ground bus (including lugs or screw terminals) securely bonded to the enclosure. Junction boxes and other enclosures shall utilize an equipment ground bus or lug as required to securely bond the equipment grounding conductor to the enclosure. The grounding conductor shall be connected with pressure connectors at the main disconnect to the main grounding system. Where screw terminals or set screw lugs are used, sufficient lugs shall be provided such that not more than one conductor is installed into each lug or terminal.
4. No flexible conduit shall serve as a grounding conductor.
5. Where lightning arresters are furnished and installed either separately or with equipment and the grounding connections are not inherently provided, a suitable, separate, grounding conductor shall connect the lightning arrester with a separate ground rod. This rod shall be bonded with any adjacent grounding system.

10.3.7 Utilities

A. Electricity

The Contractor shall coordinate the installation of a complete electrical service with Louisville Gas & Electric Company (LG&E). When applying for service, the Contractor shall inform LG&E that the service is for an MSD wastewater pumping facility. Developer's ENGINEER shall furnish all electrical data requested by LG&E. Raceway, conductors, and other installation shall be in accordance with the requirements of LG&E. The Contractor shall be responsible for securing all permits, inspections, and approvals necessary for the transfer of a functional electrical service and the associated LG&E account to MSD upon acceptance of the facility.

B. Natural Gas

For those facilities utilizing standby generators fueled with natural gas, the Contractor shall coordinate the installation of a complete natural gas service with Louisville Gas & Electric Company (LG&E). When applying for service, the Contractor shall inform LG&E that the service is for an MSD wastewater

pumping facility. Developer's ENGINEER shall furnish all natural gas usage data requested by LG&E. Piping, meter, and other installation shall be in accordance with the requirements of LG&E. The Contractor shall be responsible for securing all permits, inspections, and approvals necessary for the transfer of the natural gas service and the associated LG&E account to MSD upon acceptance of the facility.

SECTION 11

MSD STANDARD SPECIFICATIONS

NATIVE SEEDING

11.1. DESCRIPTION OF WORK

This work shall consist of revegetation in the form of native seeding. It shall include seed bed and soil preparation, and furnishing and installing seed, fertilizer, topsoil, mulch and mulch anchoring, and erosion control materials, maintenance, and warranty. All disturbed areas or other areas identified on the plans as Natural Areas for native seeding shall be revegetated in accordance with the schedule and provisions in these specifications. Those areas to be planted with live native plants are subject to the specifications provided in Section 13 Native Tree, Shrub and Herbaceous Planting. In areas where seeding and live plants are used, provisions of both sections shall apply.

11.2. MATERIALS

11.2.1. Seed

11.2.1.1. Native Seed. Native Seed includes warm season grasses, cool season grasses, and forbs/wildflowers for use in Natural Areas (those identified of the planting plan in the Plant Tables and Composition Tables). Seed supplied by the Contractor shall be clean and fresh and delivered to the site in the original, unopened containers showing net weight, composition of mix, and supplier's name and guarantee of analysis. The acceptable minimum seed viability standard shall be determined according to Pure Live Seeding (PLS) rate as per Section 11.2.1.3 of these specifications. Seed supplied by the Contractor shall also conform to applicable state and federal regulations and to test provisions of the Association of Official Seed Analysts.

11.2.1.2. Temporary Seed. **Annual Rye or Winter Wheat** shall be used as temporary seed for Natural Areas with their use to be in conformance with the acceptable time of year schedule as per Section 11.3.1.

11.2.1.3. Pure Live Seeding Rate. All seeding rates specified shall meet a minimum of 75% pure live seed (PLS) rate for native grass and forb/wild flower seed, and 90% for temporary seed, as determined by the percent germination multiplied by the percent seed purity. If the PLS is less than specified, the Contractor shall increase the seeding rate to compensate for the PLS difference at their own expense.

11.2.2. Topsoil. Topsoil shall consist of the upper portion of the soil profile and shall be loose, friable soil that is free from stones larger than one inch (1"), sub-soil, refuse and other debris including stumps, roots, brush, weeds, and non-organic materials. The acceptable soil

texture classification for topsoil, in accordance with the U.S. Department of Agriculture system is: clay (40% maximum), silt (70% maximum) and sand (60% maximum). Topsoil (both salvaged and furnished) shall meet the following minimum standards through analytical testing, unless otherwise directed by MSD:

Organic Matter	> 2%
PH (range)	5.8 – 7.0
Phosphorus	> 40 lbs / acre
Magnesium	> 35 lbs / acre
Potassium	> 85 lbs / acre
Soluble salts	< 500 parts per million

11.2.2.1. Salvaged Topsoil. Shall refer to topsoil from the site that is excavated, stockpiled and replaced on the project site. Excavated subsoil shall not be mixed with salvaged topsoil, and shall be stockpiled in a separate location.

11.2.2.2. Furnished Topsoil. Shall refer to topsoil obtained from an off-site location, the source of which shall be provided to MSD for approval.

11.2.2.3. Sub-topsoil. Shall refer to the soil layer immediately below the **topsoil**, and is variable in depth (see 11.3.4 for the minimum depth of sub-topsoil excavation).

11.2.3. Organic Fertilizers. Shall refer to commercially available products and shall include materials marketed as “organic” or natural fertilizers. Organic materials may include sea grasses/kelp, rock powder, bone meal, whey, bean meal, composted manure, and blood meal, etc. These are substances derived from plant, animal, or mineral matter not undergoing a synthetic process; typically encompassing the remains, residues, or waste products of living organisms. Organic fertilizers include a single or blended substance of the above materials, to supply any of the three primary plant nutrients, Nitrogen (N), Phosphorus (P), and Potassium (K). Product nutrient content shall be identified in the standard form of Nitrogen (N), Phosphorous (P), and Potassium (K) ratios.

11.2.3.1. Initial Fertilizer. Shall refer to a low-nitrogen organic fertilizer with a nutrient content of 1-1-1, 1-2-1, or an MSD-approved substitute.

11.2.3.2. Maintenance Fertilizer. Shall refer to organic fertilizer with a minimum nutrient content of 6-2-4, or an MSD-approved substitute.

11.2.4. Mulch

11.2.4.1. Straw Mulch. Straw for mulching shall be baled wheat, oat, barley, or rye straw. It shall be free from weed seeds, foreign matter, or chaff and shall not contain any Johnson grass, Canada thistle, or nodding thistle. Straw for mulching shall be reasonably bright in color and shall not be musty, moldy, or otherwise of low quality, and shall not contain any

chemicals toxic to plant growth.

11.2.4.2. Wood Cellulose Fiber Mulch. Wood cellulose fiber mulch shall consist of specially prepared wood cellulose processed into a uniform fibrous physical state. It shall not contain any germination or growth inhibiting elements. It shall be dyed green or contain a green dye in the tackifier that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry. Wood cellulose fiber mulch shall conform to the following parameters:

- fiber length to approximately 10 mm
- diameter approximately 1mm
- pH range 4.0 to 8.5
- maximum ash content of 1.6%
- minimum water holding capacity of 90%

11.2.4.3. Hydromulch. Shall refer to a mixture of wood cellulose fiber and water for hydraulic application. Wood cellulose fiber mulch shall be mixed with water at a ratio of 50 pounds of wood cellulose fiber per 100 gallons of water. The material shall be manufactured and processed in such a manner that it will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material shall form a blotter-like ground cover.

11.2.5. Tackifier. Shall refer to synthetic/chemical binders and emulsions to anchor mulch. The tackifier shall contain a green dye that will provide an appropriate color to facilitate visual inspection of a uniformly spread slurry. Petroleum-based tackifiers shall not be used for Native Seeding operations.

11.2.6. Anchors for Erosion Control Blankets/Fabrics. Anchors shall meet the requirements set forth in Section 9.2.12.

11.2.7. Erosion Control Blankets/Seed Incorporated Erosion Control Blankets. These shall meet the requirements set forth in Section 9.2.9. Erosion control blankets with poly-filament netting shall not be used in riparian areas (e.g., within 100 feet of a stream).

11.2.8. Water. Shall refer to water used in the establishment and care of plants shall be free from toxicants and all other substances injurious to plant life.

11.3. EXECUTION OF WORK

11.3.1. Schedule. The Contractor shall notify the MSD at least 48 hours in advance of the time they intend to begin seeding and shall not proceed with such work until permission to do so has been granted by the MSD. Before starting seeding operations on any area, final dressing and the preparation of the seed bed shall have been completed in accordance with these Specifications. All seeding and related activities shall be continuous operations. The following schedule shall be followed for seeding operations unless otherwise permitted or

directed by the MSD:

Work Item	Work Schedule
Permanent Seeding (Cool Season grasses)	**Feb. 15 to May 15 or Aug. 15 to Nov. 1**
Permanent Seeding (Warm Season grasses, forbs)	**April 15 to August 1**
Temporary Seeding with Annual Rye	**March 1 to November 1**
Temporary Seeding with Winter Wheat	**Sept. 1 to November 1**

11.3.2. Transporting Material. During hauling operations (for all seeding materials), pavement surfaces shall be kept clean and clear. Any dropped material shall be immediately removed from the roadway surface.

11.3.3. Clearing and Grubbing. Clearing and grading shall be performed within the limits of disturbance as indicated on the Design Plans and shall be in accordance with Section 2.3.1.8 of MSD Standard Specifications. The Contractor shall grub and remove tree stumps and downed trees as specified on the Design Plans and in the Contract Documents.

11.3.4. Topsoil Salvaging, Storing, and Placement

11.3.4.1. Topsoil Salvaging and Storing. MSD shall inspect areas identified for topsoil salvaging prior to beginning salvaging operations. The depth of topsoil to be salvaged shall be in accordance with the Design Plans. The Contractor shall avoid removal of subsoil or other unsuitable material with the topsoil. Do not use topsoil infested with any parts (seed, rhizomes, roots, etc.) of Johnson Grass, Canada Thistle, Quack Grass, Nodding Thistle, other noxious weeds, or exotic invasive plants. Topsoil shall be stockpiled in marked stockpile areas, on well-drained land, away from water bodies and with appropriate Erosion Prevention and Sediment Control measures in accordance with Section 2. Topsoil shall be immediately and completely covered with straw mulch a minimum one-half inch (2") thick and anchored with a tackifier. Stockpiles shall not exceed four feet (4.0') in height. The Contractor shall maintain a complete cover of straw mulch and binder over the entire stockpile area throughout the construction process.

11.3.4.2. Subsoil Roughening. Immediately prior to spreading topsoil, loosen the subgrade by ripping or tilling to a depth of at least four inches (4") to ensure adequate aeration of the subsoil. The subsoil shall be free of loose stones or other foreign material three (3") inches or greater in size.

11.3.4.3. Topsoil Placement. Prior to placing topsoil, MSD shall inspect salvaged or

furnished topsoil to ensure that the topsoil is not infested with any parts (seed, rhizomes, roots, etc.) of Johnson Grass, Canada Thistle, Quack Grass, Nodding Thistle, or other noxious weeds or exotic invasive plants. Infested furnished topsoil shall be replaced with acceptable topsoil at the contractor's expense.

(A) Topsoil Depth: Salvaged or furnished topsoil shall be placed at the depth in accordance with the Design Plans and the Contract Documents.

(B) Spreading Topsoil: Uniformly spread topsoil within the project limits as indicated on the Design Plans or as directed by the MSD. Do not spread topsoil that is frozen, saturated or when the subsoil is wet or frozen. Incorporate the topsoil into the underlying subsoil a minimum of three inches (3") by means of light disking. When topsoil is to be placed on slopes 3:1 or greater, the Contractor shall work the topsoil into the subsoil in accordance with the design plans. The Contractor shall minimize compaction of the topsoil from construction equipment. The final grade of the topsoil shall be in accordance with the Design Plans.

The completed work shall be in conformance with the thickness, lines, grades and elevations as specified on the plans. Excess topsoil shall become the responsibility of the Contractor and shall be completely removed from the project site to an area with an approved erosion prevention and sediment control plan.

11.3.5. Seeding

11.3.5.1. Preparing Seed Bed **for Native Seed and Temporary Seeding**. Each area to be seeded shall be scarified, disked, harrowed, raked, or otherwise worked until it has been loosened and pulverized to a depth of not less than three inches (3"). Stones and other foreign materials shall be removed. This operation shall be performed only when the soil is in a tillable and workable condition; i.e., not frozen, snow covered, or saturated (ball formed of topsoil releases water when squeezed).

11.3.5.2. Native Seeding. Seeding shall be performed within seven (7) days of completion of all topsoil placement and final grade establishment. Areas to be seeded shall be reviewed by MSD or the Engineer prior to seeding. Seeding shall not occur during heavy rain (greater than one inch (1") in 24 hours), snow (any ground coverage), drought (less than one inch (1") rainfall in a month), or in windy conditions (>10 miles per hour, sustained).

11.3.5.3. Temporary Seeding. Temporary seeding shall be performed promptly at the locations and times directed by MSD, or in the Contract Documents, and in accordance with the schedule and corresponding seed in Section 11.3.1 of these specifications. Temporary seeding, ***such as Annual Rye or Winter Wheat***, shall be sown at the approximate rate of three pounds (3 lbs) per 1,000 square feet. Areas disturbed for greater than seven (7) days shall be stabilized with a tackifier only. If the Natural Area is to remain open for more than 30 days, it shall be temporarily seeded in accordance with these specifications.

11.3.5.4. Seeding Techniques. Seeding shall be performed by one of the methods identified below. Warm season grass seeding or warm season grass mixtures with forb/wild flower seed (identified on Design Plans) shall be performed only by drill seeding techniques, unless otherwise approved by MSD:

(A) Hand Broadcasting: Seeding shall be performed by applying a uniform cover of seed over each area by walking and sowing seed first in one direction, then walking perpendicular to the first direction while sowing the remaining seed for that area. Rake lightly or use a drag mat to cover seed no deeper than one-quarter inch (1/4"). Roll seeded areas with a water-filled land roller immediately after covering.

(B) Mechanical Power Drawn Seed: Seeding shall be performed by a mechanical power drawn broadcast seeder capable of uniformly mixing and broadcasting all seed sizes listed in the seed mix and approved by the MSD. Application shall follow the topographic contours. Rake lightly or use a drag mat to cover seed no deeper than one-quarter inch (1/4"). Roll seeded areas with a water-filled land roller immediately after covering.

(C) Hydroseeding: Seeding shall consist of the use of mechanized equipment designed to spread seed hydraulically via a slurry, typically in solution with water. Hydroseeding may also include emulsions of tackifier and wood cellulose fiber in suspension with the seed and water. Hydroseeding is to be utilized only when specified by the Design Plans and the Contract Documents. Hydroseeding shall not be used **for native seeding** where high pressure application may damage native seeds.

(D) Drill Seeding: Drill seeding shall be used to seed warm season grasses and mixes containing warm season grasses with forb/wild flower seed, as identified on the Design Plans and in the Contract Documents. This shall be accomplished by the use of a mechanical seed drill to ensure proper seed contact with the soil. To avoid uneven rates of seed flow in a standard gravity fed seed drill, and undesirable misses within the seed row, an inert carrier shall be used. This is necessary where light chaffty, awned or pointed seeds can influence seed spread. The inert carrier shall be cracked wheat, cracked corn, oat groats, or vermiculite. The inert carrier shall be mixed with the grass seed at half the bulk seed rate to improve seed flow.

In certain situations other seeding methods for warm season grass establishment may be acceptable with prior approval of MSD. This may include modified hand broadcasting, mechanical seeding, or hydroseeding techniques appropriately altered to provide required seed to soil contact.

11.3.6. Fertilization. Native seed shall not be fertilized at the time of seed application. Native seed shall only be fertilized after seed germination, or as directed by MSD. If specified on the Design Plans, an organic “initial fertilizer” shall be applied after germination, but not until midsummer or later. Fertilizer for herbaceous areas after germination shall be referred to as the “initial fertilizer”. Fertilizer for the second growing season shall occur with the use of a “maintenance fertilizer”. Fertilization rates (initial fertilizer and maintenance fertilizer) shall be 25 pounds per 1,000 square feet, or as otherwise specified in Design Plans and Contract Documents, or as approved by MSD.

11.3.7. Mulch Stabilization. Placing of mulch for protection shall follow seeding as soon as possible, and no later than 48 hours after seeding. In no instance shall the mulch be placed on crusted seeded areas, and any eroded areas shall be repaired and reseeded before mulch is applied. The materials shall be placed uniformly, all clumps loosened and scattered, and care shall be taken to avoid thicker applications than those specified. Re-treat at the originally specified rates any mulched areas damaged by rain before materials have dried. Re-treat at the same rate any mulched area damaged before acceptance, at the Contractor's expense. If the seed bed is destroyed, re-seed at originally specified rates.

11.3.7.1. Straw Mulch Crimping. Straw mulch shall be crimped or punched into the soil to a depth of two (2) to four (4) inches using a mulch anchoring tool or a dull, serrated farm disc that is set straight. Crimping shall not cut or chop the mulch. This method may be used in flatter areas and on slopes no steeper than 3H:1V and only where equipment can be operated safely. Machinery shall be operated on the contour. Use crimping only when it is specified on the Erosion Prevention and Sediment Control Plan.

11.3.7.2. Straw Mulch Tackifiers. Straw mulch tackifier shall be used only when specified on the Erosion Prevention and Sediment Control Plan. Tackifiers and associated emulsions must be used as recommended by the manufacturer to anchor mulch. No asphalt or petroleum-based tackifier shall be used in Natural Areas.

11.3.7.3. Hydromulch. As directed by MSD, hydromulch may be used with hydraulic seeding in lieu of the above methods for protected seeded areas. Wood cellulose fiber mulch shall be applied at the rate of 40 pounds per 1,000 square feet. Wood cellulose fiber used in anchoring straw mulch shall be applied at a net dry weight of 750 pounds per acre.

11.3.7.4. Erosion Control Blankets. Manufactured erosion control blankets (straw, coconut fiber, wood fiber, etc.) shall be used when shown on the Plans, as directed by MSD, or at the Contractor's option in lieu of straw mulch or hydromulch. The areas to be covered shall be properly prepared, fertilized and seeded in accordance with these Specifications before the blanket is placed. The blankets shall be installed according to the manufacturer's specifications. Individual blankets shall be secured using staples driven vertically in the ground. Staple patterns should be in accordance with the manufacturer's specifications. Loose blanket edges shall be stapled and buried in trenches according to the manufacturer's specifications. Only blankets without mono- or poly-filaments may be used in riparian areas (e.g., within 100 feet of a stream).

11.3.7.5. Seed-Incorporated Erosion Control Blankets. Seed-incorporated erosion control blankets (straw, coconut fiber, wood fiber, etc.) shall be used when shown on the Plans. The areas to be covered shall be properly prepared in accordance with these Specifications before the blanket is placed. The blankets shall be installed according to the manufacturer's specifications and the requirements shown in Section 11.3.7.4 above.

11.3.8. Watering. It shall be the Contractor's responsibility to supply water even if there is none available on the site. Any costs associated with supplying water shall be the

responsibility of the Contractor and shall be incidental to the items specified under these revegetation specifications.

11.3.8.1. Native Seed. Unless otherwise directed by the Engineer, the seed bed shall be watered immediately at a rate of 120 gallons per 1000 square feet, following covering of the seed bed with mulch. The water shall be applied by means of a hydro-seeder or a water tank under pressure with a nozzle that will produce a spray that will not dislodge the mulch. A second watering shall be made no sooner than seven (7) days and no later than ten (10) days after the initial application, provided that no significant rainfall has occurred. Should a significant rainfall (>one inch (1") in 24 hours) occur within seven (7) days of the initial watering, MSD may elect to delay or omit the second watering. The rate of water application during the second watering shall be 120 gallons per 1000 square feet.

11.3.9. Clean-Up. Until the Contractor receives final approval from the MSD, the Contractor shall, on a daily basis, maintain all areas within the limits of his/her operations and prevent the accumulation of waste material, rubbish or other debris. Before final acceptance of the work, all rights-of-way, easements and access roads used by the Contractor, all streams in and over which he/she has worked, and all ground occupied by the Contractor in connection with the work shall be cleared of all debris and construction materials. Right-of-way and easement areas not designated for alteration by the Contract Documents shall be, at a minimum, restored to their original condition. Waste material shall be disposed off-site at an area approved by the MSD and provided by the Contractor. During construction and watering, all areas which have been seeded and mulched, but which have been eroded, damaged, or have failed to successfully become established, shall be repaired as directed by the MSD.

11.3.10. Maintenance. The Contractor shall be responsible for all maintenance activities as specified below and in accordance with the Maintenance Schedule approved for this Contract. Any changes to the Maintenance Schedule must be approved by MSD. All plant material, seeding shall be maintained for throughout the duration of the warranty period after final inspection, and approval.

11.3.10.1. Permanent Seed Areas. Maintenance shall include, but not limited to, watering as necessary, fertilizing, and mowing , and/or burning (where applicable) the seeded areas as required by the Maintenance Schedule. All native and seeded areas shall be cared for and maintained properly to MSD's satisfaction until final acceptance of the work and for the duration of the warranty period.

(A) Watering: Watering of the Permanent Seed Areas shall be as indicated in Section 11.3.8.1, or as directed by MSD.

(B) Fertilization: Fertilizer applications are usually not required for native seed in the establishment year. An application of **slow-release** "maintenance fertilizer" **may** occur during the second growing season. The application rate shall be 25 pounds per 1,000 square feet, unless otherwise specified in the Maintenance Schedule.

(C) Mowing: When mowing is required, mower blades shall be set at 6-12 inches for sufficient height to protect the vitality of the growth of native warms season grasses and forbs/wildflowers. Mowing shall occur only between March 1 to May 1 and October 1 to December 1 to protect ground nesting birds, to allow for seed set, and to provide winter cover.

(D) Protection: Areas which have been eroded, damaged or failed to successfully establish a stand of grass, shall be repaired as directed by MSD. Should MSD determine that damage or erosion of these areas has occurred as a result of the fault or negligence of the Contractor, all material and labor required to repair the seeded areas shall be furnished by the Contractor at no cost to MSD. Should damage or erosion occur to seeded and mulched areas that had previously been acceptably completed, and this damage was due to no fault or negligence of the Contractor, the repair seeding and mulch shall be paid for by MSD as an extra work item.

11.3.11. Warranty. The Contractor shall maintain a one (1) year, 85% care and replacement warranty for all seeding, as determined by percent aerial coverage of living plants. The period of care and replacement shall begin after inspection and approval of the initial installation of all plants, **and** seeding and continue for one year, with one potential plant replacement period. Native seeding amendment shall be performed in accordance with native seed establishment measures in these specifications. The Contractor shall not be responsible for damage or plant mortality due to vandalism, wildlife predation, or Acts of God beyond the Contractor's control and responsibility.

SECTION 12

MSD STANDARD SPECIFICATIONS

NATIVE TREE, SHRUB AND HERBACEOUS PLANTING

12.1. DESCRIPTION OF WORK

This work shall consist of revegetation in the form of planting natives trees, shrubs, and herbaceous plants (including forbs and grasses). It shall include planting area preparation, furnishing and installing plants, soil amendments, mulch, and plant protection (including stakes and wires, and tree shelters, etc.), maintenance and warranty. This section shall apply to areas identified in the Contract Documents and on the Design Plans as Natural Areas for native tree, shrub, and/or herbaceous planting.

12.2. MATERIALS

12.2.1. Native Plant Material. Prior to the start of work on this item, the Contractor shall submit a proposed planting schedule, including source of plant material, to MSD for review. No work shall be performed until this schedule is approved by MSD.

12.2.1.1. Native Plant Material – General

(A) Conformity: All plant material shall conform to the current issue of the American Standard for Nursery Stock (ANSI Z60.1) published by the American Association of Nurserymen.

(B) Inspection: Plant material must be selected from certified nurseries that have been inspected by State and or Federal agencies. Nursery inspection certificates shall be furnished to MSD upon request.

(C) Supply Source: The nursery supply source shall certify that the origin of the seeds from which the trees and shrubs were produced is from Hardiness Zone 6, East of the Mississippi River.

(D) Collection: Plant material collected from the “wild” is prohibited.

12.2.1.2. Plant Stock Form. The acceptable forms of plant material shall include container-grown, balled and burlapped, bare root, plugs/peat pots, and tubelings as indicated in the composition and planting tables on the Design Plans.

(A) Container-Grown Plants: Herbaceous plants, shrubs, and trees grown in a container long enough for the root system to have developed sufficiently to hold its soil. Roots shall visibly extend to the inside face of the growing container.

(B) Balled and Burlapped Plants: Shall mean trees and shrubs that are field grown and are dug with a ball of soil around its roots which is then wrapped in burlap.

(C) Bare Root Plants: Predominantly deciduous trees that are dug and handled and transported with very little or no soil on their roots.

(D) Plug, Peat Pot, and Tubeling Plants: Herbaceous plants segmented by a "plug" of soil containing the root mass of the plant and living above-ground stems and leaves; peat pots are plants germinated in peat moss or similar medium and are small containerized units; and tubelings are well-rooted tree seedlings (with long taproots) grown in tube-like containers containing a soil mix.

(E) Bulbs, Tubers, and Rhizomes: These are viable below-ground plant parts such as bulbs, roots, rhizomes, and stolons that are available for planting in the dormant state.

12.2.2. Shredded Hardwood Mulch. Mulch shall consist of aged, shredded hardwood. Mulch shall be free of weed seeds and non-organic debris and trash. The material size and individual shreds shall not exceed four inches on the longest axis.

12.2.3. Stakes and Wire. Shall consist of two-inch by two-inch by eight-foot long hardwood stakes. Wire shall be guy wire (consisting of two strands of twisted galvanized wire) with turnbuckles and rubber hose protective sleeve, or PVC chain links may be substituted.

12.2.4. Tree Shelters. Shall consist of tree tubes in the two foot (2') to five foot (5') size range (consistent with the relative height of the plants), and shall include wooden two-inch by two-inch stakes (of a length 18 inches longer than tree shelter height).

12.2.5. Waterfowl Exclusion Fencing. The standard materials shall include two-inch by two-inch woods stakes and heavy cotton twine. Other material may be substituted for waterfowl exclusion, with the approval of MSD.

12.2.6. Soil Amendments

12.2.6.1. Mycorrhizal Fungi. Mycorrhizal fungi shall consist of live spores of both endomycorrhizal and ecto-mycorrhizal fungi.

12.2.6.2. Organic Fertilizer. Shall refer to commercially available products and shall include materials marketed as 'organic' or natural fertilizers. Organic materials may include such items as sea grasses/kelp, rock powder, bone meal, whey, bean meal, composted manure, and blood meal, etc. These are substances derived form plant, animal or, mineral matter not undergoing a synthetic process; typically encompassing the remains, residues, or waste products of living organisms. Organic fertilizers include a single or blended substance of the above materials to supply any of the three primary nutrients, Nitrogen (N), Phosphorus (P), or Potassium (K). Product nutrient content shall be identified in the standard form of Nitrogen

(N), Phosphorus (P), and Potassium (K) ratios. The minimum nutrient content of organic fertilizers for the planting of trees, shrubs, and herbaceous plants shall be 6-2-4, or an MSD approved substitute.

12.2.7. Root gel. Shall consist of topically-applied hydrating root gel.

12.2.8. Water. Shall consist of clean water free from toxicants and other substances injurious to plant life.

12.3. EXECUTION OF WORK

12.3.1. General. All areas disturbed by construction identified for Native Area revegetation shall be planted in accordance with composition and planting tables for each designated planting zone on the Design Plans.

(A) The Contractor shall refer to the Plant Table and Composition Table on the Design Plans for specific plant sizes and spacing requirements.

(B) Clearing and grubbing shall occur in accordance with the Design Plans and Section 2.3.1.8 of MSD Standard Specifications, unless otherwise modified in the Special Provisions.

(C) Site preparation shall consist of establishing finished grade as indicated on site plans, prior to planting. Site preparation for planting areas identified for planting native trees, shrubs, and herbaceous plants shall include the placement of a minimum of three inches (3") of topsoil (salvaged or furnished). This shall be accomplished in accordance with the Materials (Section 2.2.1 Topsoil) and Execution (Section 9.3.2.2 Topsoiling) specifications provided.

(D) Immediately after site preparation and approval, trees, shrubs and herbaceous plants shall be planted unless otherwise specified on the Design Plans or in special provisions. Planting shall be conducted between March 15 to June 15 and September 15 to November 15, or as directed by MSD.

(E) Sweating of Bare Root Plants is a technique that shall be used for bare root trees to be planted in the Spring. It consists of keeping both the top and roots covered with moist towels, sphagnum moss, straw, or shredded newspaper in a cool (not frozen) storage area. Once the buds begin to swell, the plants are releasing rooting hormones and shall be planted. Bare root tree species that require sweating include river birch (Betula nigra), oaks (Quercus spp.), linden (Tilia spp.), dogwoods (Cornus spp.), ashes (Fraxinus spp.), hackberries (Celtis spp.), locusts (Robinia sp. or Gleditsia sp.), hawthorns (Crataegus spp.), and red maple (Acer rubrum).

(F) Root stock of the plants shall be kept moist during transport from the source to the project area and until planted.

(G) Plants damaged in transportation or handling may be rejected by MSD.

(H) All plants shall be stored in a staging area and watered daily until they are planted.

12.3.2. Planting. The Contractor is not required to stake out each individual planting pit, unless specifically directed to do so by MSD. However, upon planting a typical 100 foot by 100 foot section within each planting zone, the Contractor shall have MSD inspect and approve plant spacing and planting techniques prior to proceeding.

(A) All planting pits shall be dug by hand, or by augering, unless otherwise specified on the Design Plans or in the Special Provisions. Large trees over four-inch (4") caliper shall be planted by the use of a tree spade. Walls of the planting pits shall be dug so that they are vertical or sloping outward in heavy soils. Scarify the walls of the pit after digging.

(B) The planting pit shall be excavated to one and a half times the width of the root mass of the plant to be installed.

(C) Remove all non-organic debris from the pit and tamp loose soil in the bottom of the pit by hand.

(D) Plants shall be removed from their containers as follows:

- Container Grown Plants - Remove the plant either by cutting or inverting the container.
- Balled and Burlapped Plants – Remove top of burlap when the plant is in the planting hole and also remove all string, and wire/collars etc. before covering with soil.
- Peat Pot, Plug or Tubeling Plants - Remove the entire unit from flat, tray, or container, but do not remove the peat pot or cut the root mass of herbaceous plugs or tubelings.
- Bare Root Plants – Carefully separated individual plants and their root systems from one another when removing from packaging.

(E) Do not handle plants by the branches, leaves or stem.

(F) Place the plant straight in the center of the planting pit, always handling the plant by the root mass.

(G) The Contractor may use a mechanical tree planting device for planting bare root or tubeling trees, with the approval of MSD.

(H) For container grown, balled and burlapped, bare root trees and shrubs (more than 1 ½ foot tall), and peat pot and plug plants, place the fertilizer in the planting pit completely surrounding the root mass, within the upper one-third of the planting pit during backfilling. Place fertilizer at the time of planting according to the following rates unless otherwise specified on the Design Plans and in the Contract Documents, or as

directed by MSD:

- Container Grown Plants - Place one-half ounce (1/2 oz.) of organic fertilizer per each quart of container size for herbaceous plants. For trees and shrubs, place four ounces (4 oz.) of organic fertilizer in each planting pit for up to one gallon size containers, six ounces for up to three gallon container size, and place eight ounces for up five gallon container size.

- Balled and Burlapped Plants – Place eight ounces of organic fertilizer for every 1inch caliper of plant stem.

- Peat Pot, Plug or Tubeling Plants – Place one-quarter ounce (¼ oz.) of **slow-release** organic fertilizer per each peat pot or plug plant. Organic fertilizer tablets with comparable composition are acceptable, if approved in advance by MSD.

- Bare Root Plants (Seedlings/saplings greater than 18 " tall) – Place one ounce (1 oz.) of organic fertilizer per each one foot (1') of plant height.

- Bare Root Plants (Herbaceous and woody seedlings less than 18" tall) – Spread (by mechanical spreader) organic fertilizer at rate of 10 pounds per 1,000 square feet of areas within the planting zone in lieu of fertilizing each individual plant.

(I) In accordance with the Design Plans and the Contract Documents, mix a minimum of 500 spores of endomycorrhizal fungi and 30 million spores of ectomycorrhizal fungi to each cubic foot of backfill for tree and shrub planting. Mycorrhizal fungi tablets or packets may also be used if they provide comparable ratios of spores, and if approved by MSD prior to application.

(J) Backfill the planting pit with existing soil and tamp firmly to fill all voids and air pockets. Do not over compact soil. Make sure plant remains straight during backfilling/tamping procedure.

(K) The top of the root mass of container-grown or balled and burlapped plants should be flush with, or slightly elevated, (no more than ¼ its height) from the final grade. Do not cover above the top of the root mass with soil (i.e., do not cover stem with soil).

(L) For peat pot, plug and tubeling plants, make sure a thin layer of soil or mulch covers the root or peat ball to avoid moisture wicking out. Do not allow the edges of the root plugs or pot to stick up above the soil or mulch.

(M) As specified on Design Plans and in Contract Documents, plant protection shall be installed as indicated below and in accordance with MSD planting details.

Tree stakes and wires shall be installed with all stakes straight and driven into the ground until stable. The two stakes on an individual plant shall be driven to an even depth relative to one another. The wiring and rubber hose shall be secured fastened and installed as not to girdle the tree or interfere with the growth pattern.

When specified, tree shelters ("tree tubes") shall be installed immediately after planting. The tree tubes shall be installed in accordance with the manufacturer's instructions.

Waterfowl Exclusion Fencing shall be installed as follows: The location of stakes must meet the site configuration, but shall be a maximum of 10 feet apart. The wooden stakes are driven into the ground a minimum of one foot (1') to be secure. The twine is then strung between stakes, wrapped and tied with secure knots. The distance between strands of twine shall be no more than seven inches (7") apart horizontally. The top twine shall be no lower than three feet (3') above the ground surface.

(N) When planting bare root trees, identify the root crown to provide an indicator of where backfilled soil is to stop. This is identified visually by looking at the roots and stem. Find where the darker green color ends on the stem above the roots. Below this is the crown that is lighter in color. On seed-grown trees the crown is below the soil line and should be planted as such.

(O) Mulch plants in accordance with the Design Plans the Contract Documents. For woody plants (trees and shrubs), create a mulch ring a maximum of three inches (3") thick. On slopes, a mulch berm shall be created on the down-slope side of the plants to slow water run-off, or a depression shall be created with a raised mulch rim. Do not place mulch around the stem of the plant.

(P) During planting, all areas shall be kept neat, clean and free of all trash and debris, and all reasonable precautions shall be taken to avoid damage to adjacent existing plants.

(Q) Water the plant thoroughly immediately after planting (to saturate the backfill), unless otherwise directed by MSD. After planting and initial watering, the application of water shall correspond to applying water monthly during June, July, August, and September throughout the life of the warranty. The need for additional watering, or determination of when watering is not necessary, shall be at the discretion of MSD. Watering shall occur of a sufficient quantity to saturate the backfill, and shall be applied slowly enough to sink into the soil avoiding runoff.

(R) The Contractor shall leave no open planting pits at the end of each day.

(S) Remove all tags, labels, strings and wire from the plants, unless otherwise directed by MSD.

(T) Pruning of trees and shrubs shall be restricted to corrective pruning to enhance growth and vigor only. This includes removal of dead, damaged, diseased and/or conflicting branching. Do not cut the main leader of the tree or shrub. Pruning shall only be performed after the trees and shrubs are planted.

12.3.3. Maintenance. The Contractor shall be responsible for all maintenance activities as specified in the Maintenance Schedule. Any changes to the Maintenance Schedule must be approved by MSD. All plant material including trees, shrubs, and herbaceous plants shall be inspected and maintained for the duration of the warranty period, after final inspection and approval.

(A) Final clean-up shall be the responsibility of the Contractor and consists of removing all trash, debris and other materials incidental to the project, and disposing of them off-site.

(B) The plant material must be inspected and maintained (including replacement of plant material) for the warranty period indicated in Section 12.3.4, or as established in Special Provisions and Contract Documents.

(C) The contractor shall provide maintenance water at required intervals, also as established in the Maintenance Schedule, with any deviations to be approved in advance by MSD.

(D) It will be the Contractor's responsibility to supply water if there is none available on the project site. Any costs associated with supplying water shall be the responsibility of the Contractor.

12.3.4. Warranty. The Contractor shall maintain a one-year, **100**% care and replacement warranty for all trees, shrubs, and herbaceous plants, as determined by percent survival of original quantities planted. The care and replacement period shall begin after inspection and approval of the initial installation of all plants and shall continue for one year, with one potential replacement period. Replacement of trees, shrubs, and herbaceous plants shall be conducted in accordance with the material, execution (including schedule), and maintenance measures in these specifications. The Contractor shall not be responsible for damage or plant mortality due to vandalism, wildlife predation, or Acts of God beyond the Contractor's control and responsibility.

SECTION 13

MSD STANDARD SPECIFICATIONS

SOIL BIOENGINEERING

13.1 DESCRIPTION OF WORK

This work shall consist of harvesting (or purchasing), transporting, installing, and maintaining required materials for the installation of Live Stakes, Live Fascine, Branch Packing, Brush Mattress, Live Cribwall, Joint Planting, Coir Fiber Roll, Root Wads, Boulder Bank, and Rock Toe as specified on the plans and special provisions, or as directed by MSD.

13.2 MATERIALS

13.2.1 Live Stakes

(a.) Live cuttings for live stakes shall be one-half to one and a half inches (0.5”-1.5”) in diameter and one and one-half to three feet (1.5’-3.0’) in length. Side branches shall be removed and bark left intact prior to installation. Buds on the stakes shall be oriented in an upward position. The basal ends shall be tapered to a point for easy insertion into the soil. The top shall be cut smooth and square.

Live cuttings shall consist of a mix of three or more of the following species, with each species comprising no more than 50% and no less than 20% of the mix.

Cornus amomum	Silky dogwood
Salix exigua	**Sandbar willow**
Salix humilis	Prarie willow
Salix interior	Sandbar willow
Salix nigra	**Black willow**
Salix rigida	Heart-leaf willow
Salix sericea	Silky willow
Salix purpurea	Streamco willow
Sambucus canadensis	American elderberry
Viburnum dentatum	Southern arrowwood

13.2.2 Live Branch Layering

a. Live Branch Cuttings. Live branch cuttings shall be approximately one half inch (0.5”) in diameter. Cuttings shall be long enough to reach the bank of the bench and extend a minimum of one foot (1’) from the slope face. Side branches and bark shall remain intact prior to installation. Species selection shall be from the same list and composition requirements as for Live Stakes in Section 13.2.1 Material for Live Stake Installation (a)

b. Backfill. Backfill for the benches shall consist of existing soils excavated during bench construction.

13.2.3 Live Fascine

a. Live Fascine Cuttings. Live fascine cuttings shall be approximately one half inch (0.5") in diameter. Cuttings shall be three feet to eight feet (3'-8') in length. Species selection shall be from the same list and composition requirements as for Live Stakes in Section 13.2.1 Material for Live Stake Installation (a).

b. Live Pegs. Live cuttings for live pegs shall be one-half to one and a half inches (0.5'-1.5") in diameter and between two and four feet (2'-4') long. Side branches shall be removed and the bark left intact prior to installation. Buds on the pegs shall be oriented in an upward position. The basal ends shall be tapered to a point for easy insertion into the soil. The top shall be cut smooth and square. Live pegs shall consist of the same species identified for live branch cuttings.

c. Dead Stake. Dead stakes shall be untreated 2" x 2" x 2.5' hardwood lumber. Any stakes that split or shatter during **installation** shall be replaced.

d. Twine. Twine used for tying live branch cuttings in place shall be natural jute twine or an approved equal.

e. Footer Rock. Footer rock shall consist of native brownstone rock or rock located on site. Concrete will not be considered as an alternative to bank or footer rocks. Refer to the plans for specific sizes of boulder rocks for rock bank stabilization. Footer rocks shall come from the limits of disturbance of this contract. If sufficient material meeting the above requirements is not available from this Contract, the Contractor shall obtain material meeting specified requirements at no additional cost to MSD.

f. Backfill. Backfill for the live fascines shall consist of on-site topsoil.

13.2.4 Branchpacking

a. Live Branch Cuttings.

1. Live branch cuttings shall be approximately one quarter inch to one inch (0.25"-1.0") in diameter and long enough to reach the back of the **slope**, gully, or rill and extend a minimum of one foot (1') from the rebuilt slope face. Side branches and bark shall remain intact prior to installation.

2. Species selection shall be from the same list and composition requirements as for Live Stakes in Section 13.2.1 Material for Live Stake Installation (a).

3. When trees are grouped together, at a very close interval, locate the approximate center of the grouping and list the most dominant species of the group.

b. **Backfill.** Backfill for the **slope**, gully, or rill shall consist of existing soils excavated during construction.

13.2.5 Brush Mattress

a. Live Branch Cuttings.

1. Live branch cuttings shall be approximately one quarter inch (0.25") to inch (1.0") in diameter and long enough to cover the entire, or majority of, the area along the streambank or slope being repaired. Side branches and bark shall remain intact prior to installation.

2. Species selection shall be from the same list and composition requirements as for Live Stakes in Section 13.2.1 Material for Live Stake Installation (a).

b. Biodegradeable Rope. **Rope used for tying the branch cuttings together shall be made of natural abaca or an approved equal.** Rope shall be five-sixteenth inch (5/16") or three-eights inch (3/8") diameter rope with standard tensile strength of at least 1,000 lbs., minimum tensile strength of at least 900 lbs. and approximate density of 2.6 lbs. per hundred feet.

c. Live Stakes. Species selection shall be from the same list and **composition** requirements as for Live Stakes in Section 13.2.1.

d. Backfill. Backfill for the area shall consist of existing soils excavated during construction.

13.2.6 Joint Planting

Live Cuttings. Live cuttings for joint plantings shall be one-half to one and a half inches (0.5"-1.5") in diameter and one and one-half to three feet in length. Side branches shall be removed and the bark left intact prior to installation. Buds on the cuttings shall be oriented in an upward position. The basal ends shall be tapered to a point for easy insertion into the soil. The top shall be cut smooth and square.

Species selection shall be from the same list and composition requirements as for Live Stakes in Section 13.2.1 Material for Live Stakes Installation (a).

13.2.7 Coir Fiber Roll

a. Coir Fiber Roll. Cylindrical rolls shall consist of 100% coir fiber with a density greater than or equal to nine pounds per cubic foot (9 lbs./cf), encased in coir fiber net of two inch (2") squares. Roll diameter shall be twelve inches (12") and length shall be twenty feet (20').

b. Large Wood Stake. Oak or Southern Yellow Pine stakes shall be untreated 2" X 2" X 4' stakes, free from knots or other defects that can cause splitting. A three inch (3") galvanized nail with a head shall be located two inches (2") from the top of the stake. Any stakes that split or shatter during construction shall be replaced.

c. Backfill. Backfill for the coir fiber rolls shall consist of on-site topsoil.

13.2.8 Root Wads

a. Root Wads. Root wads shall consist of the root fan and trunk of a hardwood tree with a trunk diameter at breast height (DBH) of eighteen to thirty (18"-30") inches. Root fans shall be oblong to circular in shape and have a minimum spread of four feet (4') as measured at its narrowest axis and covering an area a minimum of 16 square feet. The **associated** trunk and root fan shall be ten to twelve (10'-12') feet in length.

b. Footer Logs. Footer logs shall consist of straight hardwood logs with a diameter of twenty-four to thirty-six inches (24" to 36") and a length of ten to twelve feet (10'-12').

c. Cutoff Logs. Cutoff logs shall consist of straight hardwood logs with a diameter of twelve to twenty-four **inches** (12"-24") and a length of fourteen to twenty feet (14'-20').

d. Anchor Rocks. Rocks for securing footer and cutoff logs shall consist of native brownstone rock and have a minimum of twenty **inches** (20") with a density of 130 lbs./cu.ft.

e. Equipment. The use of a backhoe with a "live" hydraulic thumb opposing the bucket is recommended for correct and efficient placement of all logs and boulders.

13.2.9 Boulder Bank

Boulder Banks and Footer Rocks. Preferred boulder bank and footer rocks shall consist of rock brown in color (brownstone). Concrete will not be considered as an alternative to boulder bank and footer rocks. Boulder bank and footer rocks shall be angular and have a median diameter not less than twenty-four inches **(24"). Samples** should be **approved by MSD prior to installation**.

13.2.10 Rock Toe

Footer and Boulder Toe Rocks. Footer rocks consist of rocks placed below the invert of the proposed channel to provide support for the boulder toe rocks and prevent scour at the toe of the bank. The boulder toe rocks shall be stacked on top of the footer rocks as shown on the Design Drawings.

The dimensions of the rock will be a minimum of 3 feet (3') and maximum of 5 feet (5') along the long (a) axis, a minimum of 2 feet (2') and maximum of 4 feet (4') along the median (b) axis, a minimum of 1 foot (1') and a maximum of 2 feet (2') along the short (c) axis. Samples shall be **approved by MSD prior to installation**.

13.3 EXECUTION OF WORK

13.3.1 General

These general provisions apply to soil bioengineering techniques requiring live cuttings including Live Stakes, Live Branch Layering, Live Fascine, Branch Packing, Brush Mattress, Live Cribwall and Joint Planting.

a. Inspection. All materials and construction techniques shall be inspected and approved by MSD prior to installation.

b. Harvesting. The source of all live cuttings shall be from purchased stock or located on-site or within twenty five (25) miles of the project site. The Contractor shall locate, flag, and code the live cutting sites. The Contractor shall notify MSD seventy-two (72) hours prior to harvesting to review and approve all harvesting sites. Upon approval by MSD, the Contractor shall be responsible for harvesting and transporting the cuttings to the job site.

c. Schedule. Prior to the start of work on this item, the Contractor shall submit a proposed harvesting and construction schedule, including source of supply of live cuttings, to MSD for review and approval. No work shall be performed until this schedule is approved by MSD. Harvesting, transporting, and installation shall take place when plants are dormant (December 1 through April 1).

d. Purchasing. If the Contractor is unable to located sufficient harvesting sites for the live stakes, upon approval from the MSD the Contractor may purchase live branch material. The material shall meet all of the specifications found in this section.

e. Live Material Preparation.

1. Shrubs and young trees used in preparation of live stakes shall be cut directly above the ground. All cuts shall be smooth and the cut surface kept small. The use of large pruning shears or power saws may be required. Trees that are more than three inches (3") in diameter shall be topped.

2. The live materials shall be transported to the construction site within eight (8) hours of harvesting and then cut to size, as specified above and on the details. Live materials must be protected against drying out and overheating before/during transport (e.g., they shall be covered, transported in unheated vehicles, moistened, kept in soak pits) and on-site prior to installation (e.g., by storing in controlled conditions, storing in shade, covering with evergreen branches or plastic, placing in moist soil, or spraying with anti-transpirant chemicals). Live materials shall receive continuous shade, shall be sheltered from the wind, and shall be continuously protected from drying by being heeled into moist soils.

3. Where water is available, live branch cuttings shall be sprayed or immersed. Warm water (over 59° F) stimulates growth and should be used only upon the approval of MSD. **The Contractor shall be responsible fo**r any costs associated with such.

4. Live materials **should** be installed the same day that the cuttings area harvested. If installation of live materials cannot be **accomplished** on the same day and storage is required, live materials shall be stored for a period no longer than two (2) days. Any storage of live materials must be approved by MSD prior to storing.

13.3.2 Installation Techniques

13.3.2.1 Live Stakes

a. Drive live stakes into the ground so that sixty percent (60%) of the stake is below the ground surface. The contractor shall use a dead-**blow** hammer for driving the stake directly into the ground or drive a pilot hole, smaller in diameter than the live stake, and then driving the live stake into the pilot hole. Stagger the live stakes one feet (1') on center throughout the specified planting area.

b. Placement of the live stakes shall be as indicated on the Contract Drawings and details. Live stake **shall be installed with** buds facing upward.

c. All live stakes split during installation may be left in place but must be supplemented with a new live stake that remains un-split after installation.

d. Live branches shall be bundled together in lengths varying from six to twenty feet (6'-20') depending on site conditions and limitations in handling. All growing tips shall be oriented in the same direction. Stagger the cuttings in the bundles so that tops are evenly distributed throughout the length of the live fascine.

13.3.2.2 Live Branch Layering

a. Benches for installation of live branch layering shall be constructed two to three **feet** (2'-3') deep.

b. If used in conjunction with rootwads or rock toe protection, the branch rows shall begin eighteen inches (18") above the rootwad fan or rock protection.

c. Benches shall be excavated horizontally, on the contour. The surface of the bench shall be sloped so that the outside edge is higher than the back edge.

d. Place a three inch (3") layer, a minimum of sixteen (16) branches per linear foot, of live branch cuttings on the bench, horizontal to the slope face. Place the branches in a crisscross configuration with the growing tips of the live material oriented toward the outside of the bench.

e. Live branch cutting tips shall extend a minimum of one foot (1') beyond the edge of the bench.

f. Backfill shall be placed on top of the branches and compacted to hold the live branch cuttings in place.

13.3.2.3 Live Fascine

a. Live Fascine Toe Protection shall be installed according to the Sequence of Construction, the plans and details, and the following specifications.

b. The Live Fascine shall be constructed so that approximately one quarter to one-third (1/4-1/3) of the face of the live fascine roll is exposed beyond the proposed grade.

c. The top of the footer rock shall be placed flush with the proposed stream invert.

d. Excavate a one foot (1') wide and six to eight inch (6"-8") deep trench directly above and slightly recessed behind the footer rock along the sloped contour.

f. Place the live fascine in the trench, resting on the live pegs. Overlap live fascine bundles a minimum foot (1').

f. Drive the dead pegs directly into and through the live fascine as indicated on the plans. Extras stakes shall be used at the ends of each live fascine.

g. Drive live pegs in between the footer rock and live fascine bundle. Stagger the live pegs between the dead pegs. The live pegs shall protrude two to three inches (2"-3") above the live fascine.

h. Backfill soil in trench and on top of the live fascine. Gently tamp and water backfill to ensure that all voids are filled with soil. The top of the live fascine (approximately 1/4 to 1/3 of the bundle) shall be visible when installation is completed.

13.3.2.4 Branchpacking

a. Live cuttings shall be cut to a length matching the depth of the slump, gully, rill, etc. being repaired with approximately one foot (1') of the cutting protruding from the slope.

b. Place approximately one foot (1') of fill in the bottom of the slump, gully, or rill.

c. The cuttings shall be placed three to eight inches (3"-8") thick and arranged in a criss-cross pattern. The basal end shall be installed into the slope so that the basal end is at an elevation lower than the protruding tip. When repairing a gully or rill, in plan view, the branches shall be installed in a convex pattern to direct runoff away from the center.

d. Backfill shall be placed on top of branches and compacted such that soil **reaches** between all the branches. If necessary the backfill should be saturated with water to ensure maximum soil to branch contact.

e. Continue this construction process until the entire slump, gully, or rill area has been repaired.

13.3.2.5 Brush Mattress

a. Prepare the streambank or slope by clearing away all debris and grading the area so that the branches will lay flat on the streambank or slope. Excavate a horizontal trench eight to twelve inches (8"-12") along the toe of the streambank or at the base of the slope area being repaired.

b. Place the branches flat across the graded area in a criss-cross pattern with the basal ends placed as deeply in the trench as possible. If the vertical length of the area being covered is longer than the cuttings, overlap the cuttings so the entire area is covered.

c. Lay the cuttings along the streambank or slope until approximately 80% ground cover is accomplished and the mattress is six to twelve inches (6”-12”) thick.

d. With a dead-blow mallet, pound two to three foot (2’-3’) long live stakes partially into the mattress in a grid formation with the stakes three to four feet (3’-4’) on center. Secure the brush mattress by tying the biodegradeable rope in a diamond pattern in such a way that the holding capabilities of the remaining rope will not be sacrificed if an area should break.

g. After securing the mattress with the biodegradeable rope, pound the live stakes farther into the ground to tightly compress the mattress against the streambank or slope. When constructing a brush mattress on a streambank, remove all loose overhanging branches that may catch on material floating down the stream that could rim the mattress from the streambank.

f. Secure the toe of the mattress by placing large, locally collected rocks around and on top of the basal ends. Other acceptable techniques for securing the toe of the mattress include live fascines and coir fiber rolls.

g. Backfill around and in between the branches with the material excavated from the trench. Pouring or spraying water over the mattress will help work the soil into the mattress. A minimum of one quarter (1/4) of the depth of the mattress should be covered with soil. If installing a mattress to existing vegetation for more security if possible.

13.3.2.6 Live Crib Wall

a. At the base of the streambank to be protected excavate an area two to three feet (2’-3’) below the existing grade of the streambed the length of the streambank to be protected and five to six feet (5’-6’) back into the streambank.

b. The crib wall foundation shall be excavated at a decline into the streambank at a slope ranging from 10H:1V to 6H:1V to increase the structure’s stability.

c. Place the first course of logs or timbers at the front and back of the foundation (approximately 5’-6’ apart) and parallel to the slope contour.

d. Place the next course of logs or timbers directly on top of the ends of the first course of logs or timbers perpendicular to the slope so that the ends overhang the front and back logs or timbers by three to six inches (3”-6”). Secure the two courses together with reinforcement bars.

h. Repeat Steps 3 and 4 until the structure reaches the elevation equivalent to the biological benchmark (elevation in the stream cross section where woody plants persist) as specified on the Contract Drawings or as directed by MSD. Place rock fill into the crib wall structure and fill the structure until the biological benchmark elevation is reached.

f. Place three inches (3”) of soil on top of the rock fill.

g. Place the first layer of live branch cuttings on top of the soil perpendicular to the contours of the slope so that approximately one third of cutting length will protrude out of the structure. The basal ends of the cuttings shall be placed in the back of the structure and should come in contact with undisturbed soil in the back of the structure.

h. Place the next two courses of logs or timbers as done in Steps 3 and 4 above. Place soil fill on top and around the first layer of live branch cuttings and fill the structure to where the next layer of live branch cuttings will be installed.

i. Repeat Steps 7 and 8 until the crib wall structure is built to the elevation specified on the Contract Drawings.

13.3.2.7 Joint Planting

a. Drive joint plantings into the ground between the openings of rock during or after rock placement so that sixty percent (60%) of the stake is below the ground surface. The contractor shall use a dead-**blow** hammer for driving the stake directly into the ground or drive a pilot hole, smaller in diameter than the joint planting, and then **drive** the joint planting into the pilot hole. Install the joint plantings in a random pattern.

b. Placement of the joint plantings shall be as indicated on the Contract Drawings and details. Joint planting **shall be installed with** buds facing upward.

c. All joint plantings split during installation may be left in place but must be supplemented with a new joint planting that remains un-split after installation.

13.3.2.8 Coir Fiber Roll

Prior to the start of work on this item, the Contractor shall submit a construction schedule, including source of supply for the coir fiber roll and plant material, to MSD for review. No work shall be performed until this schedule is approved by MSD.

a. Installation. Coir Fiber Roll Toe Protection shall be installed according to the Sequence of Construction, the plans and details, and the following specifications.

1. Excavate a trench along the slope contour and place the coir fiber roll so that approximately one-quarter to one-third (1/4-1/3) of the face of the coir fiber roll is exposed beyond the proposed grade.

2. The coir fiber rolls shall be laced together end-to-end with biodegradable rope to create a continuous length. End-to-end lacing may be completed before or after placement to facilitate handling. Abut the ends of the coir fiber roll tightly against one another.

3. Drive the large wood stakes directly into and through the edges of the coir fiber roll every three feet (3'). Extra stakes shall be used at the ends of each coir fiber roll. Biodegradable rope shall be tied to the stakes across the coir fiber rolls in a criss-cross pattern. The stakes shall be driven in until the rope is taught and the tops of the stakes are at

least flush or up to two inches (2") below the top of the coir fiber roll. If the stakes are driven to the point of refusal before reaching this position, excess top length shall be carefully sawed off.

b. Backfill. Backfill soil in trench and around the coir fiber roll. Gently tamp and water backfill to ensure that all voids are filled with soil. The top of the coir fiber roll (approximately 1/4 to 1/3 of the roll) shall be visible when installation is completed.

13.3.2.9 Root Wads

a. General. Prior to the start of work on this item, the Contractor shall submit a proposed harvesting schedule, including source of supply of root wad, footer and cutoff logs, and boulders, to MSD for review. No work shall be performed until this schedule is approved by MSD.

b. Source of Materials. Trees to be used for this construction can be salvaged from the project site provided that the trees are within the limits of disturbance and are flagged prior to clearing and grubbing.

1. The Contractor is responsible for supplying additional trees, at no additional cost to the Owner, in order to meet Contract quantities.

2. Footer logs, cutoff logs, and anchor rocks shall come from within the limits of disturbance of this Contract. If sufficient material meeting the above requirements is not available from this Contract, the Contractor shall obtain material meeting specified requirements. Trees on the project site, but outside the limits of disturbance, may not be cleared for materials.

c. Harvesting and Transporting Root Wads. Root wads shall be harvested by pushing over trees, leaving as much of the root fan and accompanying sod and soil clumps intact as possible. Care shall be taken in transporting root wads to the construction site to minimize breakage of the root fan and loss of sod and soil clumps.

Installation. Root Wads shall be installed according to MSD, Sequence of Construction, the Construction Drawings, and the following specifications.

1. Cut the trench for the upstream-most footer log so that the top of the footer log is at the invert of the proposed channel. The upstream footer log will be shingled with the downstream footer log (i.e. the downstream end of each upstream footer log should extend beyond and overlap the upstream end of the downstream footer log, with the downstream end of the upstream footer log nearest the stream channel) a minimum two feet (2'). Place the footer log in the trench.

2. Cut the trench for the upstream-most root wad log and place in the trench so that the root wad rests on top of the footer log. Place the root wad log on top of the footer log so that the root fan makes an angle of approximately thirty to sixty degrees (30°-60°) to the channel center line and ninety degrees (90°) to the flow. The root fan shall divert the force of the impact of the stream away from the stream banks. Placement of the rootwads shall be

initially and periodically verified by MSD to ensure that the rootwads are diverting flow away from the stream banks.

3. Place anchor rocks on top of the root wad log and on top of the footer log on both sides of the rood wad log.

4. Cut the trench for the next footer log as in Step 2. Cut the trench for the next root wad log so that there is a three to four foot (3'-4') spacing between adjacent root wad fans. Install root wad, footer logs and anchor rocks as in Steps 3 and 4.

5. Cut the trench for the cutoff log. Place the cutoff log in the trench on top of the rootwad so that the cutoff log is wedged close to the fan of the root wad and protrudes beyond the face of the bole in a downstream direction toward the location of the next root fan. Two to four feet (2'-4') of the cutoff log shall protrude out of the streambank after backfilling has been completed. The cutoff log shall be angled approximately thirty to sixty degrees (30°-60°) to the channel center line such that the downstream end of the cutoff log shall be wedged against the root fan and the upstream end of the cutoff log shall rest on the adjacent upstream rootwad.

6. Place anchor rocks on top of the root wad, behind the cutoff log and also on top of the cutoff log, at the intersection of the cutoff log and the root wad log. If needed or as directed by MSD, the Contractor shall place anchor rocks on the lower section of the cutoff log.

7. Repeat Steps 2 through 7 in a downstream direction until the revetment is complete.

8. Use rocks or logs to plug any holes between the logs to prevent the backfilled earth from falling into the channel. Backfill the area behind the root wad revetment and the trenches in which the root wads, footer logs, and cutoff logs and boulders are placed.

9. Under the direct supervision of MSD, the Contractor may be required to reset up to 10% of the root wad revetment throughout the course of the project. The process will involve removing any backfill material necessary to remove the cutoff log, root wad log, footer log, and boulders as necessary. Resetting will be performed as directed by MSD, and will include restoring all materials including backfill and stabilization and replanting as necessary.

10. The above operation will be conducted so that no sediment is permitted to enter the stream. Sand bag dikes will be used to isolate the areas of the stream that could receive sediment from the operation.

13.3.2.10 Boulder Bank

a. General. Prior to the start of work on this item, the Contractor shall submit a construction schedule, including source of supply of rocks, to MSD for review. No work shall be performed until this schedule is approved by MSD.

b. Source of Materials. If sufficient material meeting the above requirements is not available from this Contract, the Contractor shall obtain material meeting specified requirements at no additional cost to MSD.

c. Installation. Boulder bank stabilization shall be installed according to the Sequence of Construction, the plans and details, and the following specifications.

1. Boulder bank stabilization shall be constructed so that the exposed face of the rocks is flush with the proposed grade.

2. The footer bank rock shall be placed so that the top of the bottom rock is flush with the channel invert.

4. The top bank rock shall be set at the elevation specified on the Construction Drawings.

5. Each bank rock shall be placed adjacent and tight against one another. All voids shall be plugged with smaller rock. The fill material behind the boulder bank stabilization shall be placed and tamped after each layer of rock is installed.

6. On completion of rock installation, reshape slopes and stream bottom to specified elevations.

13.3.2.11 Rock Toe

a. Schedule. Prior to the start of work on this item, the Contractor shall submit a **construction** schedule, including source of supply of rocks, to MSD for review. No work shall be performed until this schedule is approved by MSD.

b. Source of Materials. If sufficient material meeting the above requirements is not available from this Contract, the Contractor shall obtain material meeting specified requirements at no additional cost to MSD.

c. Installation. Boulder Toe Protection shall be installed according to the Sequence of Construction, the plans and details, and the following specifications.

1. Boulder Toe Protection shall be constructed so that the exposed **faces of the rocks are** flush with the proposed grade.

2. The footer rock shall be placed so that the top of the rock is flush with the channel invert.

3. The boulder toe rock shall be set directly on top of the footer rock. All voids shall be plugged with smaller rock and topsoil. The fill material behind the boulder toe rock shall be placed and **tamped** after the boulder toe rock is installed.

4. On completion of rock installation, reshape slopes and stream bottom to specified elevations.

13.3.3 Clean-up

a. During installation of **soil bioengineering applications**, all areas shall be kept neat, clean and free of all trash and debris, and all reasonable precautions shall be taken to avoid damage to existing plants, turf, structures, and private property.

b. Final clean-up shall be the responsibility of the Contractor and consist of removing all trash and materials incidental to the project and **properly** disposing of them off-site.

13.3.4 Site Inspection

a. MSD shall make a final inspection with the Contractor to ensure all soil bioengineering-live cutting techniques have been installed according to the specifications, plans, and details.

b. The Contractor shall be responsible for correcting all deficiencies within ten (10) calendar days of the inspection.

c. A final inspection of the corrected actions shall be performed by MSD and the Contractor prior to completion.

13.3.5 Maintenance

a. Soil bioengineering-live cutting techniques shall be maintained and monitored for one year after the completion, final inspection, and approval of the installation.

b. The Contractor shall perform the following maintenance activities:

1. Replace all diseased and dead vegetation caused by factors other than stream erosion.

2. Keep vegetation cleared of debris after all storm events.

3. Prune all dead wood and vegetation as needed.

c. It will be the Contractor's responsibility to supply water if there is none available on the site. Any costs associated with supplying water shall be the responsibility of the Contractor and shall be included in the unit cost installation.

13.3.6 Coir Fiber Roll

The Contractor shall maintain a one (1) year, 75% care and replacement warranty for soil bioengineering techniques.

a. The period of care and replacement shall begin after inspection and approval of the initial installation and continue for one (1) year, with one potential replacement period.

b. The Contractor will not be responsible for soil bioengineering that has been damaged by vandalism, fire, flooding or other activities beyond the Contractor's control.

13.4 MEASUREMENT AND PAYMENT

Payment for soil bioengineering installations shall be according to the following units. All installations will include harvesting (or purchasing), transportation, installing, maintenance and warranty, including all materials, labor equipment, tools, and incidentals necessary to complete the work as **detailed** in these specifications and on the plans.

13.4.1 Live Stake – per square yard.
13.4.2 Live Branch Layering – per linear foot.
13.4.3 Live Fascine – per linear foot.
13.4.4 Branchpacking – per linear foot.
13.4.5 Brush Mattress – per square foot.
13.4.6 Live Cribwall – per square foot.
13.4.6 Joint Planting – per linear foot.
13.4.7 Coir Fiber Roll – per linear foot of coir fiber roll installed.
13.4.8 Root Wads – per linear foot of root wad installed including footer/cutoff logs and boulders and resetting of root wad.
13.4.9 Boulder Bank – per ton of boulder bank stabilization installed including excavation, installation, and resetting of rocks.
13.4.10 Rock Toe – per ton of boulder toe protection installed including excavation, installation, and resetting of rocks.

N O T I C E

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
NATIONWIDE PERMIT AUTHORIZATION
KENTUCKY DIVISION OF WATER 401 WQC

PROJECT: Jefferson/Oldham Counties, Item No. 5-367.2
KY 3084 extension to Ash Avenue

The Section 404 & 401 activities for this project have been previously permitted under the authority of the Department of the Army Nationwide Permit No. 14 "Linear Transportation Projects" & Division of Water General Water Quality Certification. In order for these authorizations to be valid, the attached conditions must be followed. The contractor shall post a copy of this Nationwide Permit & General WQC in a conspicuous location at the project site for the duration of construction and comply with the general conditions as required.

Station 1035+22 See sheet R13	Extend a 12 ft. X 5 ft. box culvert. The **perennial** stream a U.T. to Klementz Creek will have impacts below the normal high water mark due the culvert extension and riprap on either side. The estimated area of impact is **105 linear feet** and **0.02acres**. The drainage area at the bridge is **210 acres**. **Lat 38.279602, Long -85.487313**
Station 1050+03 See sheet R17	Replace the existing 10 ft. X 5ft. box culvert with a new 13 ft. X 7 ft. box culvert. The **perennial** stream a U.T. to Klementz Creek will have impacts below the normal high water mark due stream realignment, riprap, and culvert extension. The estimated area of impact is **100 linear feet** and **0.03acres**. The drainage area at the bridge is **577 acres**. **Lat 38.283344, Long -85.485412**
Station 1072+50 See sheet R25	Replace the existing 74 inch culvert with a new 24 ft. opening box beam bridge. The **perennial** stream Butler Branch will have impacts below the normal high water mark due stream realignment, riprap, and culvert extension. The estimated area of impact is **110 linear feet** and **0.02acres**. The drainage area at the bridge is **626 acres**. **Lat 38.288128, Long -85.480504**
Station 1100+00 See sheet R35	Replace the existing 2 span bridge with a single span bridge. The **perennial** stream a U.T. to Floyds Fork will have impacts below the normal high water mark due to minor drainage work and placement of riprap at roadside drains. The estimated area of impact is **60 linear feet** and **0.007acres**. The drainage area at the bridge is **2.5035 square miles**. **Lat 38.290979, Long -85.471648**

This project involves work near and/or within Jurisdictional Waters of the United States as defined by the United States Army Corps of Engineers and therefore requires a Nationwide 14 General 404 Permit. The Division of Water certified this General Permit with several conditions (See attached). One that should be brought to your attention is regarding the use of heavy equipment in the stream channel. If there is need to cross the stream channel with heavy equipment or conduct work from within the stream channel a working platform or temporary crossing is authorized. This should be constructed with clean rock and sufficient pipe to allow stream flow to continue unimpeded (see attached typical drawing).

In order for this authorization to be valid, the attached conditions must be followed. The contractor shall post a copy of this Nationwide Approval in a conspicuous location at the project site for the duration of construction and comply with the general conditions as required.

To more readily expedite construction, the contractor may elect to alter the design or perform the work in a manner different from what was originally proposed and specified. Prior to commencing such alternative work, the contractor shall obtain **written** permission from the Division of Construction and the Division of Environmental Analysis. If such changes necessitate further permitting then the contractor will be responsible for applying to the Army Corps of Engineers and the Kentucky Division of Water (KDOW). A copy of any request to the Corps of Engineers or the KDOW to alter this proposal and subsequent responses shall be forwarded to the Division of Environmental Analysis, DA Permit Coordinator, for office records and for informational purposes.

STEVEN L. BESHEAR
GOVERNOR

LEONARD K. PETERS
SECRETARY

ENERGY AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE
FRANKFORT, KENTUCKY 40601
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General Certification--Nationwide Permit # 14
Linear Transportation Projects

This General Certification is issued March 19, 2012, in conformity with the requirements of Section 401 of the Clean Water Act of 1977, as amended (33 U.S.C. §1341), as well as Kentucky Statute KRS 224.16-050.

For this and all nationwide permits, the definition of surface water is as per 401 KAR 10:001 Chapter 10, Section 1(80): Surface Waters means those waters having well-defined banks and beds, either constantly or intermittently flowing; lakes and impounded waters; marshes and wetlands; and any subterranean waters flowing in well-defined channels and having a demonstrable hydrologic connection with the surface. Lagoons used for waste treatment and effluent ditches that are situated on property owned, leased, or under valid easement by a permitted discharger are not considered to be surface waters of the commonwealth.

Agricultural operations, as defined by KRS 224.71-100(1) conducting activities pursuant to KRS 224.71-100 (3), (4), (5), (6), or 10 are deemed to have certification if they are implementing an Agriculture Water Quality Plan pursuant to KRS 224.71-145.

For all other operations, the Commonwealth of Kentucky hereby certifies under Section 401 of the Clean Water Act (CWA) that it has reasonable assurances that applicable water quality standards under Kentucky Administrative Regulations Title 401, Chapter 10, established pursuant to Sections 301, 302, 304, 306 and 307 of the CWA, will not be violated for the activity covered under NATIONWIDE PERMIT 14, namely Linear Transportation Projects, provided that the following conditions are met:

1. The activity will not occur within surface waters of the Commonwealth identified by the Kentucky Division of Water as Outstanding State or National Resource Water, Cold Water Aquatic Habitat, or Exceptional Waters.

2. The activity will not occur within surface waters of the Commonwealth identified as perpetually-protected (e.g. deed restriction, conservation easement) mitigation sites.

3. The activity will impact less than 1/2 acre of wetland/marsh.

4. The activity will impact less than 300 linear feet of surface waters of the Commonwealth. Stream realignment greater than 100 feet is not covered under this general water quality certification.

5. For a single and complete linear transportation project, the cumulative length of impacts less than 300 linear feet of surface waters within each Hydrologic Unit Code (HUC) 14 watershed will not exceed 500 linear feet.

6. Stream impacts covered under this General Water Quality Certification and undertaken by those persons defined as an agricultural operation under the Agricultural Water Quality Act must be completed in compliance with the Kentucky Agricultural Water Quality Plan (KWQP).

7. The Kentucky Division of Water may require submission of a formal application for an individual certification for any project if the project has been determined to likely have a significant adverse effect upon water quality or degrade the waters of the Commonwealth so that existing uses of the water body or downstream waters are precluded.

8. Activities that do not meet the conditions of this General Water Quality Certification require an Individual Section 401 Water Quality Certification.

9. Activities qualifying for coverage under this General Water Quality Certification are subject to the following conditions:

    - Erosion and sedimentation pollution control plans and Best Management Practices must be designed, installed, and maintained in effective operating condition at all times during construction activities so that violations of state water quality standards do not occur (401 KAR 10:031 Section 2 and KRS 224.70-100).
    - Sediment and erosion control measures, such as check-dams constructed of any material, silt fencing, hay bales, etc., shall not be placed within surface waters of the Commonwealth, either temporarily or permanently, without prior approval by the Kentucky Division of Water's Water Quality Certification Section. If placement of sediment and erosion control measures in surface waters is unavoidable, design and placement of temporary erosion control measures shall not be conducted in such a manner that may result in instability of streams that are adjacent to, upstream, or downstream of the structures. All sediment and erosion control devices shall be removed and the natural grade restored within the completion timeline of the activities.
    - Measures shall be taken to prevent or control spills of fuels, lubricants, or other toxic materials used in construction from entering the watercourse.
    - Removal of riparian vegetation in the utility line right-of-way shall be limited to that necessary for equipment access.
    - To the maximum extent practicable, all in-stream work under this certification shall be performed under low-flow conditions.

General Certification--Nationwide Permit # 14
Linear Transportation Projects
Page 2

- Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances in which such in-stream work is unavoidable, then it shall be performed in such a manner and duration as to minimize turbidity and disturbance to substrates and bank or riparian vegetation.
- Any fill shall be of such composition that it will not adversely affect the biological, chemical, or physical properties of the receiving waters and/or cause violations of water quality standards. If rip-rap is utilized, it should be of such weight and size that bank stress or slump conditions will not be created because of its placement.
- If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when such work will be done.
- Should evidence of stream pollution or jurisdictional wetland impairment and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the KDOW shall be notified immediately by calling (800) 928-2380.

Non-compliance with the conditions of this general certification or violation of Kentucky state water quality standards may result in civil penalties.

KENTUCKY REGIONAL GENERAL CONDITIONS

These regional conditions are in addition to, but do not supersede, the requirements in the Federal Register (Volume 77 No. 34 of February 21, 2012)

Notifications for all Nationwide Permits (NWPs) shall be in accordance with General Condition No. 31.

1. For activities that would result in a loss of Outstanding State or National Resource Waters (OSNRWs), Exceptional Waters (EWs), Coldwater Aquatic Habitat Waters (CAHs) and waters with Designated Critical Habitat (DCH) under the Endangered Species Act for the NWPs listed below, a Pre-Construction Notification (PCN) will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs for impacts to these waters.

   NWP 3 (Maintenance)
   NWP 7 (Outfall Structures and Associated Intake Structures)
   NWP 12 (Utility Line Activities)
   NWP 14 (Linear Transportation Projects)
   NWP 29 (Residential Developments)
   NWP 39 (Commercial and Institutional Developments)
   NWP 40 (Agricultural Activities)
   NWP 41 (Reshaping Existing Drainage Ditches)
   NWP 42 (Recreational Facilities)
   NWP 43 (Stormwater Management Facilities)
   NWP 44 (Mining Activities)
   NWP 51 (Land-Based Renewable Energy Generation Facilities)
   NWP 52 (Water-Based Renewable Energy Generation Pilot Projects)

2. In addition to the notification and agency coordination requirements in the NWPs, for impacts greater than 0.25 acres in all "waters of the U.S." for the NWPs listed below, a PCN will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs:

   NWP 3 (Maintenance)
   NWP 7 (Outfall Structures and Associated Intake Structures)
   NWP 12 (Utility Line Activities)
   NWP 14 (Linear Transportation Projects)
   NWP 29 (Residential Developments)
   NWP 39 (Commercial and Institutional Developments)
   NWP 40 (Agricultural Activities)
   NWP 41 (Reshaping Existing Drainage Ditches)
   NWP 42 (Recreational Facilities)
   NWP 43 (Stormwater Management Facilities)
   NWP 44 (Mining Activities)
   NWP 51 (Land-Based Renewable Energy Generation Facilities)
   NWP 52 (Water-Based Renewable Energy Generation Pilot Projects)

3. For activities in all "waters of the U.S." for the NWPs listed below, a PCN will be required to the Corps. The Corps will coordinate with the appropriate resource agencies (see attached list) on these NWPs:

   NWP 21 (Surface Coal Mining Activities)
   NWP 27 (Aquatic Habitat Restoration, Establishment & Enhancement Activities)
   NWP 49 (Coal Remining Activities)
   NWP 50 (Underground Coal Mining Activities)

4. Nationwide Permit No. 14 – Linear Transportation Projects.

   (a) Activities in Section 10 navigable waters will require a PCN to the Corps.

   (b) New public road alignments or realignments are limited to a permanent loss of 500 linear feet of intermittent or perennial stream length at each crossing. Public road crossings with permanent losses greater than 500 linear feet of intermittent or perennial stream associated with new alignments or realignments will be evaluated as an individual permit i.e., a Letter of Permission or as a Standard Individual Permit.

   (c) All linear transportation project crossings resulting in the permanent loss of greater than 300 linear feet of intermittent or perennial stream will require mitigation to compensate for impacts to the "waters of the U.S." The permanent loss of "waters of the U.S." includes the linear feet of water that is permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity and not restored to pre-construction contours and elevations after construction. In addition to the notification requirements contained in NWP 14, the permittee must submit a PCN to the district engineer prior to commencing the activity for the permanent loss of greater than 300 feet of intermittent and perennial stream of all "waters of the U.S.". (See General Condition 31 and the definition of "loss of waters of the United States" in the Nationwide Permits for further information.)

Further information:
Outstanding State or National Resource Water (OSNRWs), Exceptional Waters (EWs), and Coldwater Aquatic Habitat Waters (CAHs) are waters designated by the Commonwealth of Kentucky, Natural Resources and Environmental Protection Cabinet. The list can be found at the following link: http://eppcapp.ky.gov/spwaters/
Designated Critical Habitat (DCH) under the Endangered Species Act is determined within the Commonwealth of Kentucky by the U.S. Fish and Wildlife Service. The current list of Kentucky's Threatened, Endangered, and Federal Candidate Species can be found at the following link: http://www.fws.gov/frankfort/EndangeredSpecies.html

Information on Pre-Construction Notification (PCN) can be found at NWP General Condition No. 31 (Federal Register, Volume 77, No. 34, Tuesday, February 21, 2012, pp 10286-10288).
Mitigation includes activities that avoid, minimize, and compensate for impacts.

COORDINATING RESOURCE AGENCIES

Chief, Wetlands Regulatory Section
U.S. Environmental Protection Agency
Region IV
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303
Supervisor
U.S. Fish & Wildlife Service
JC Watts Federal Building, Room 265
330 West Broadway
Frankfort, Kentucky 40601
Supervisor
401 Water Quality Certification
Kentucky Division of Water
200 Fair Oaks Lane, 4th Floor
Frankfort, Kentucky 40601
Commissioner
Department of Fish and Wildlife Resources
#1 Game Farm Road
Frankfort, Kentucky 40601
Executive Director and State Historic Preservation Officer
Kentucky Heritage Council
300 Washington Street
Frankfort, Kentucky 40601

ADDITIONAL COORDINATING RESOURCE AGENCY FOR NWPS 21, 49, AND 50

Kentucky Department of Natural Resources
Division of Mine Permits
#2 Hudson Hollow
Frankfort, Kentucky 40601

US Army Corps of Engineers

Nationwide Permit
No. 14, Linear Transportation Projects

Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States.

a. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States.

b. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

c. This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

d. This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds
1/10-acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 31.) (Sections 10 and 404)

Note: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4).

Valid from March 19, 2012 through March 18, 2017

Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR §§ 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR § 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car

bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River

designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must

still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.

(2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist

of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with

any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
(Transferee)

_____
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

31. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative

description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments.

The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) that the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

E. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

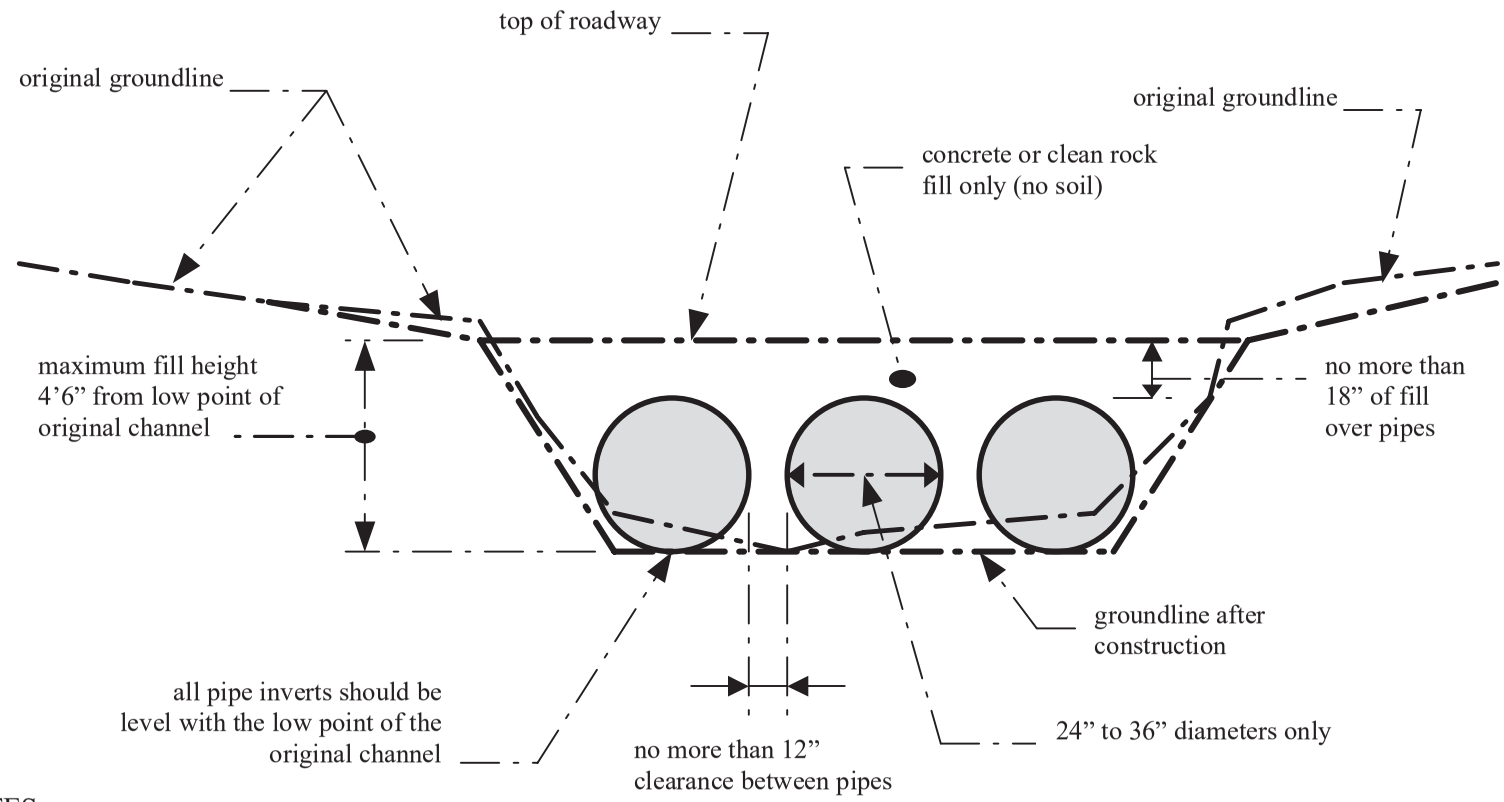
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project.

ATTACHMENT 1



NOTES:

1. This is a conceptual drawing. The number and size of pipes and other details will vary depending on specific site conditions.
2. The pipes and backfill must be contained within the stream channel as shown above. During the construction of the approaches and access roadway across the floodplain, unstable and unconsolidated materials unsuitable for roadways may be excavated and replaced with riprap, crushed stone, or other stable road construction materials. This may only be done, however, with the following provisions: (1) the disposal of excess, unconsolidated materials thus excavated must be outside of the floodplain and (2) the finished surface of the completed road may be no more than three inches (3") above the pre-construction surface of the floodplain at any point beyond the top of banks.

LOW-WATER CROSSING

STANDARD DRAWING
Not to Scale

Kentucky Transportation Cabinet

Highway District __ (1)

And

_____(2), Construction

Kentucky Pollutant Discharge Elimination System Permit KYR10 Best Management Practices (BMP) plan

Groundwater protection plan

For Highway Construction Activities

For

Old Henry Road (KY 3084) Extension to Ash Avenue Item No. 5-367.20

Project: PCN ## -

Project information

Note – (1) = Design (2) = Construction (3) = Contractor

1. Owner – Kentucky Transportation Cabinet, District __ (1)

2. Resident Engineer: (2)

3. Contractor name: (2)
   Address: (2)

   Phone number: (2)
   Contact: (2)
   Contractors agent responsible for compliance with the KPDES permit requirements (3):

4. Project Control Number (2)

5. Route (Address) – Old Henry Road (KY 3084), Louisville, KY 40245

6. Latitude/Longitude (project mid-point) – 38-16-55 North, 85-29-07 West

7. County (project mid-point) - Jefferson

8. Project start date (date work will begin): (2)

9. Projected completion date: (2)

KyTC BMP Plan for Project PCN ## - ####

A. Site description:

1. Nature of Construction Activity (from letting project description) – Widening and extension of Old Henry Road (KY 3084) to Ash Avenue

2. Order of major soil disturbing activities (2) and (3)

3. Projected volume of material to be moved – 190,280 C.Y.

4. Estimate of total project area (acres) – 40.2 Ac.

5. Estimate of area to be disturbed (acres) – 37.10 Ac.

6. Post construction runoff coefficient will be included in the project drainage folder. Persons needing information pertaining to the runoff coefficient will contact the resident engineer to request this information.(1)

7. Data describing existing soil condition – Refer to Geotechnical Notes in the plan set and Geotechnical Report. (1) & (2)

8. Data describing existing discharge water quality (if any) – Refer to Geotechnical Notes in the plan set and Geotechnical Report. Note: The water quality will not be worsened by the project. Drainage construction will consist of new storm sewer, lengthening of a box culvert, a new box culvert and two bridges. (1) & (2)

9. Receiving water name – Floyds Fork (1)

10. TMDLs and Pollutants of Concern in Receiving Waters: (1 DEA)

11. Site map – Project layout sheet plus the erosion control sheets in the project plans that depict Disturbed Drainage Areas (DDAs) and related information. These sheets depict the existing project conditions with areas delineated by DDA (drainage area bounded by watershed breaks and right of way limits), the storm water discharge locations (either as a point discharge or as overland flow) and the areas that drain to each discharge point. These plans define the limits of areas to be disturbed and the location of control measures. Controls will be either site specific as designated by the designer or will be annotated by the contractor and resident engineer before disturbance commences. The project layout sheet shows the surface waters and wetlands.

12. Potential sources of pollutants:

    The primary source of pollutants is solids that are mobilized during storm events. Other sources of pollutants include oil/fuel/grease from servicing and operating construction equipment, concrete washout water, sanitary wastes and trash/debris. (3)

B. Sediment and Erosion Control Measures:

1. Plans for highway construction projects will include erosion control sheets that depict Disturbed Drainage Areas (DDAs) and related information. These plan sheets will show the existing project conditions with areas delineated by DDA within the right of way limits, the discharge points and the areas that drain to each discharge point. Project managers and designers will analyze the DDAs and identify Best Management Practices (BMPs) that are site specific. The balance of the BMPs for the project will be listed in the bid documents for selection and use by the contractor on the project with approval by the resident engineer.

   Projects that do not have DDAs annotated on the erosion control sheets will employ the same concepts for development and managing BMP plans.

2. Following award of the contract, the contractor and resident engineer will annotate the erosion control sheets showing location and type of BMPs for each of the DDAs that will be disturbed at the outset of the project. This annotation will be accompanied by an order of work that reflects the order or sequence of major soil moving activities. The remaining DDAs are to be designated as “Do Not Disturb” until the contractor and resident engineer prepare the plan for BMPs to be employed. The initial BMP’s shall be for the first phase (generally Clearing and Grubbing) and shall be modified as needed as the project changes phases. The BMP Plan will be modified to reflect disturbance in additional DDA’s as the work progresses. <u>All DDA’s will have adequate BMP’s in place before being disturbed.</u>

3. As DDAs are prepared for construction, the following will be addressed for the project as a whole or for each DDA as appropriate:

   - Construction Access – This is the first land-disturbing activity. As soon as construction begins, bare areas will be stabilized with gravel and temporary mulch and/or vegetation.

- At the beginning of the project, all DDAs for the project will be inspected for areas that are a source of storm water pollutants. Areas that are a source of pollutants will receive appropriate cover or BMPs to arrest the introduction of pollutants into storm water. Areas that have not been opened by the contractor will be inspected periodically (once per month) to determine if there is a need to employ BMPs to keep pollutants from entering storm water.
- Clearing and Grubbing – The following BMP's will be considered and used where appropriate.
    - Leaving areas undisturbed when possible.
    - Silt basins to provide silt volume for large areas.
    - Silt Traps Type A for small areas.
    - Silt Traps Type C in front of existing and drop inlets which are to be saved
    - Diversion ditches to catch sheet runoff and carry it to basins or traps or to divert it around areas to be disturbed.
    - Brush and/or other barriers to slow and/or divert runoff.
    - Silt fences to catch sheet runoff on short slopes. For longer slopes, multiple rows of silt fence may be considered.
    - Temporary Mulch for areas which are not feasible for the fore mentioned types of protections.
    - Non-standard or innovative methods.
- Cut & Fill and placement of drainage structures - The BMP Plan will be modified to show additional BMP's such as:
    - Silt Traps Type B in ditches and/or drainways as they are completed
    - Silt Traps Type C in front of pipes after they are placed
    - Channel Lining
    - Erosion Control Blanket
    - Temporary mulch and/or seeding for areas where construction activities will be ceased for 21 days or more.
    - Non-standard or innovative methods
- Profile and X-Section in place – The BMP Plan will be modified to show elimination of BMP's which had to be removed and the addition of new BMP's as the roadway was shaped. Probably changes include:
    - Silt Trap Type A, Brush and/or other barriers, Temporary Mulch, and any other BMP which had to be removed for final grading to take place.
    - Additional Silt Traps Type B and Type C to be placed as final drainage patterns are put in place.
    - Additional Channel Lining and/or Erosion Control Blanket.
    - Temporary Mulch for areas where Permanent Seeding and Protection cannot be done within 21 days.
    - Special BMP's such as Karst Policy

- Finish Work (Paving, Seeding, Protect, etc.) – A final BMP Plan will result from modifications during this phase of construction. Probably changes include:
  - Removal of Silt Traps Type B from ditches and drainways if they are protected with other BMP's which are sufficient to control erosion, i.e. Erosion Control Blanket or Permanent Seeding and Protection on moderate grades.
  - Permanent Seeding and Protection
  - Placing Sod
  - Planting trees and/or shrubs where they are included in the project
- BMP's including Storm Water Management Devices such as velocity dissipation devices and Karst policy BMP's to be installed during construction to control the pollutants in storm water discharges that will occur after construction has been completed are : (1)

C. Other Control Measures

1. No solid materials, including building materials, shall be discharged to waters of the commonwealth, except as authorized by a Section 404 permit.

2. Waste Materials

All waste materials that may leach pollutants (paint and paint containers, caulk tubes, oil/grease containers, liquids of any kind, soluble materials, etc.) will be collected and stored in appropriate covered waste containers. Waste containers shall be removed from the project site on a sufficiently frequent basis as to not allow wastes to become a source of pollution. All personnel will be instructed regarding the correct procedure for waste disposal. Wastes will be disposed in accordance with appropriate regulations. Notices stating these practices will be posted in the office.

3. Hazardous Waste

All hazardous waste materials will be managed and disposed of in the manner specified by local or state regulation. The contractor shall notify the Resident Engineer if there any hazardous wastes being generated at the project site and how these wastes are being managed. Site personnel will be instructed with regard to proper storage and handling of hazardous wastes when required. The Transportation Cabinet will file for generator, registration when appropriate, with the Division of Waste Management and advise the contractor regarding waste management requirements.

4. Spill Prevention

The following material management practices will be used to reduce the risk of spills or other exposure of materials and substances to the weather and/or runoff.

- **Good Housekeeping:**

The following good housekeeping practices will be followed onsite during the construction project.

- An effort will be made to store only enough product required to do the job
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure
- Products will be kept in their original containers with the original manufacturer's label
- Substances will not be mixed with one another unless recommended by the manufacturer
- Whenever possible, all of the product will be used up before disposing of the container
- Manufacturers' recommendations for proper use and disposal will be followed
- The site contractor will inspect daily to ensure proper use and disposal of materials onsite

- **Hazardous Products:**

These practices will be used to reduce the risks associated with any and all hazardous materials.

- Products will be kept in original containers unless they are not resealable
- Original labels and material safety data sheets (MSDS) will be reviewed and retained
- Contractor will follow procedures recommended by the manufacturer when handling hazardous materials
- If surplus product must be disposed of, manufacturers' or state/local recommended methods for proper disposal will be followed

The following product-specific practices will be followed onsite:

- **Petroleum Products:**

Vehicles and equipment that are fueled and maintained on site will be monitored for leaks, and receive regular preventative maintenance to reduce the chance of

leakage. Petroleum products onsite will be stored in tightly sealed containers, which are clearly labeled and will be protected from exposure to weather.

The contractor shall prepare an Oil Pollution Spill Prevention Control and Countermeasure plan when the project that involves the storage of petroleum products in 55 gallon or larger containers with a total combined storage capacity of 1,320 gallons. This is a requirement of 40 CFR 112.

This project (will / will not) (3) have over 1,320 gallons of petroleum products with a total capacity, sum of all containers 55 gallon capacity and larger.

- **Fertilizers:**

Fertilizers will be applied at rates prescribed by the contract, standard specifications or as directed by the resident engineer. Once applied, fertilizer will be covered with mulch or blankets or worked into the soil to limit exposure to storm water. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

- **Paints:**

All containers will be tightly sealed and stored indoors or under roof when not being used. Excess paint or paint wash water will not be discharged to the drainage or storm sewer system but will be properly disposed of according to manufacturers' instructions or state and local regulations.

- **Concrete Truck Washout:**

Concrete truck mixers and chutes will not be washed on pavement, near storm drain inlets, or within 75 feet of any ditch, stream, wetland, lake, or sinkhole. Where possible, excess concrete and wash water will be discharged to areas prepared for pouring new concrete, flat areas to be paved that are away from ditches or drainage system features, or other locations that will not drain off site. Where this approach is not possible, a shallow earthen wash basin will be excavated away from ditches to receive the wash water

- **Spill Control Practices**

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup**:**

- Manufacturers' recommended methods for spill cleanup will be clearly posted. All personnel will be made aware of procedures and the location of the information and cleanup supplies.

- Materials and equipment necessary for spill cleanup will be kept in the material storage area. Equipment and materials will include as appropriate, brooms, dust pans, mops, rags, gloves, oil absorbents, sand, sawdust, and plastic and metal trash containers.
- All spills will be cleaned up immediately after discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contract with a hazardous substance.
- Spills of toxic or hazardous material will be reported to the appropriate state/local agency as required by KRS 224 and applicable federal law.
- The spill prevention plan will be adjusted as needed to prevent spills from reoccurring and improve spill response and cleanup.
- Spills of products will be cleaned up promptly. Wastes from spill clean up will be disposed in accordance with appropriate regulations.

D. Other State and Local Plans

This BMP plan shall include any requirements specified in sediment and erosion control plans, storm water management plans or permits that have been approved by other state or local officials. Upon submittal of the NOI, other requirements for surface water protection are incorporated by reference into and are enforceable under this permit (even if they are not specifically included in this BMP plan). This provision does not apply to master or comprehensive plans, non-enforceable guidelines or technical guidance documents that are not identified in a specific plan or permit issued for the construction site by state or local officials. (1)

E. Maintenance

1. The BMP plan shall include a clear description of the maintenance procedures necessary to keep the control measures in good and effective operating condition.

- Maintenance of BMPs during construction shall be a result of weekly and post rain event inspections with action being taken by the contractor to correct deficiencies.

- Post Construction maintenance will be a function of normal highway maintenance operations. Following final project acceptance by the cabinet, district highway crews will be responsible for identification and correction of deficiencies regarding ground cover and cleaning of storm water BMPs. The project manager shall identify any BMPs that will be for the purpose of post construction storm water management with specific guidance for any non-routine maintenance. (1)

F. Inspections

Inspection and maintenance practices that will be used to maintain erosion and sediment controls:

- All erosion prevention and sediment control measures will be inspected at least once each week and following any rain of one-half inch or more.
- Inspections will be conducted by individuals that have received KyTC Grade Level II training or other qualification as prescribed by the cabinet that includes instruction concerning sediment and erosion control.
- Inspection reports will be written, signed, dated, and kept on file.
- Areas at final grade will be seeded and mulched within 14 days.
- Areas that are not at final grade where construction has ceased for a period of 21 days or longer and soil stock piles shall receive temporary mulch no later than 14 days from the last construction activity in that area.
- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of being reported.
- Built-up sediment will be removed from behind the silt fence before it has reached halfway up the height of the fence.
- Silt fences will be inspected for bypassing, overtopping, undercutting, depth of sediment, tears, and to ensure attachment to secure posts.
- Sediment basins will be inspected for depth of sediment, and built-up sediment will be removed when it reaches 70 percent of the design capacity and at the end of the job.
- Diversion dikes and berms will be inspected and any breaches promptly repaired. Areas that are eroding or scouring will be repaired and re-seeded / mulched as needed.
- Temporary and permanent seeding and mulching will be inspected for bare spots, washouts, and healthy growth. Bare or eroded areas will be repaired as needed.
- All material storage and equipment servicing areas that involve the management of bulk liquids, fuels, and bulk solids will be inspected weekly for conditions that represent a release or possible release of pollutants to the environment.

G. Non – Storm Water discharges

It is expected that non-storm water discharges may occur from the site during the construction period. Examples of non-storm water discharges include:

- Water from water line flushings.
- Water form cleaning concrete trucks and equipment.
- Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).
- Uncontaminated groundwater and rain water (from dewatering during excavation).

All non-storm water discharges will be directed to the sediment basin or to a filter fence enclosure in a flat vegetated infiltration area or be filtered via another approved commercial product.

H. Groundwater Protection Plan (3)

This plan serves as the groundwater protection plan as required by 401 KAR 5:037.

- Contractors statement: (3)

The following activities, as enumerated by 401 KAR 5:037 Section 2 that require the preparation and implementation of a groundwater protection plan, will or may be may be conducted as part of this construction project:

_____ 2. (e) land treatment or land disposal of a pollutant;

_____ 2. (f) Storing, …, or related handling of hazardous waste, solid waste or special waste, …, in tanks, drums, or other containers, or in piles, (This does not include wastes managed in a container placed for collection and removal of municipal solid waste for disposal off site);

_____ 2. (g) …. Handling of materials in bulk quantities (equal or greater than 55 gallons or 100 pounds net dry weight transported held in an individual container) that, if released to the environment, would be a pollutant;

_____ 2. (j) Storing or related handling of road oils, dust suppressants, …., at a central location;

_____ 2. (k) Application or related handling of road oils, dust suppressants or deicing materials, (does not include use of chloride-based deicing materials applied to roads or parking lots);

_____ 2. (m) Installation, construction, operation, or abandonment of wells, bore holes, or core holes, (this does not include bore holes for the purpose of explosive demolition);

Or, check the following only if there are no qualifying activities

_____ There are no activities for this project as listed in 401 KAR 5:037 Section 2 that require the preparation and implementation of a groundwater protection plan.

The contractor is responsible for the preparation of a plan that addresses the

401 KAR 5:037 Section 3. (3) Elements of site specific groundwater protection plan:

(a) General information about this project is covered in the Project information;
(b) Activities that require a groundwater protection plan have been identified above;
(c) Practices that will protect groundwater from pollution are addressed in section C. Other control measures.
(d) Implementation schedule – all practices required to prevent pollution of groundwater are to be in place prior to conducting the activity;
(e) Training is required as a part of the ground water protection plan. All employees of the contractor, sub-contractor and resident engineer personnel will be trained to understand the nature and requirements of this plan as they pertain to their job function(s). Training will be accomplished within one week of employment and annually thereafter. A record of training will be maintained by the contractor with a copy provide to the resident engineer.
(f) Areas of the project and groundwater plan activities will be inspected as part of the weekly sediment and erosion control inspections
(g) Certification (see signature page.)

KyTC BMP Plan for Project PCN ## -

Contractor and Resident Engineer Plan certification

The contractor that is responsible for implementing this BMP plan is identified in the Project Information section of this plan.

The following certification applies to all parties that are signatory to this BMP plan:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. Further, this plan complies with the requirements of 401 KAR 5:037. By this certification, the undersigned state that the individuals signing the plan have reviewed the terms of the plan and will implement its provisions as they pertain to ground water protection.

Resident Engineer and Contractor Certification:

(2) Resident Engineer signature

Signed _____title_____, _____
Typed or printed name[2] signature

(3) Signed _____title_____, _____
Typed or printed name[1] signature

1. Contractors Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Project Control Number (PCN) and KPDES number when one has been issued.

2. KyTC note: to be signed by the Chief District Engineer or a person designated to have the authority to sign reports by such a person (usually the resident engineer) in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601 Reference the Project Control Number (PCN) and KPDES number when one has been issued.

Sub-Contractor Certification

The following sub-contractor shall be made aware of the BMP plan and responsible for implementation of BMPs identified in this plan as follows:

Subcontractor

Name:
Address:
Address:

Phone:

The part of BMP plan this subcontractor is responsible to implement is:

I certify under penalty of law that I understand the terms and conditions of the general Kentucky Pollutant Discharge Elimination System permit that authorizes the storm water discharges, the BMP plan that has been developed to manage the quality of water to be discharged as a result of storm events associated with the construction site activity and management of non-storm water pollutant sources identified as part of this certification.

Signed _____title_____, _____
Typed or printed name[1] signature

1. Sub Contractor Note: to be signed by a person who is the owner, a responsible corporate officer, a general partner or the proprietor or a person designated to have the authority to sign reports by such a person in accordance with 401 KAR 5:060 Section 9. This delegation shall be in writing to: Manager, KPDES Branch, Division of Water, 14 Reilly Road, Frankfort Kentucky 40601. Reference the Project Control Number (PCN) and KPDES number when one has been issued.

ANDY BESHEAR
GOVERNOR

REBECCA W. GOODMAN
SECRETARY

ANTHONY R. HATTON
COMMISSIONER

ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601

April 8, 2022

Charles Berger
KYTC District 5
8310 Westport Rd
Louisville, KY 40242

Re: KYR10 Coverage Acknowledgment
KPDES No.: KYR10Q276
KY 3084 - Old Henry Road Extension
Permit Type: Construction
AI ID: 123253
Jefferson County, Kentucky

Dear Charles Berger :

The discharges associated with the Notice of Intent you submitted have been approved for coverage under the "Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Storm Water Discharges Associated with Construction Activities (KYR100000)" master general permit. Your coverage becomes effective on the date of this letter, and will automatically terminate two years from the effective date of your coverage unless an extension is requested prior to the termination date, until the KYR100000 master general permit expires on November 30, 2024, or the Division of Water revokes coverage, whichever comes first. During this period of coverage all discharges shall comply with the conditions of the KYR100000 master general permit. This permit and links to the eNOI (and permit coverage extension) and eNOT forms can be found on our website:
https://eec.ky.gov/Environmental-Protection/Water/PermitCert/KPDES/Documents/KYR10PermitPage.pdf.

Any person aggrieved by the issuance of a permit final decision may demand a hearing pursuant to KRS 224.10-420(2) within thirty (30) days from the date of the issuance of this letter. Any demand for a hearing on the permit shall be filed in accordance with the procedures specified in KRS 224.10-420, 224.10-440, 224.10-470, and the regulations promulgated thereto. The request for hearing should be submitted in writing to the Energy and Environment Cabinet, Office of Administrative Hearings, 211 Sower Boulevard, Frankfort, Kentucky 40601 and the Commonwealth of Kentucky, Energy and Environment Cabinet, Division of Water, 300 Sower Boulevard, Frankfort, Kentucky 40601. For your record keeping purposes, it is recommended that these requests be sent by certified mail. The written request must conform to the appropriate statutes referenced above.

Any questions concerning the general permit and its requirements should be directed to me at 502-782-7123 or email me at Karina.Villanueva@ky.gov

Construction Site GPS Coordinates: 38.281944, -85.485278
Receiving Water: MSD-MSD

Sincerely,

Karina Villanueva
Surface Water Permits Branch
Division of Water

cc: Charles Berger, eNOI Preparer
Todd Giles, Louisville Regional Office
Shawn Hokanson, Division of Water

Lori Rafferty, Louisville MSD

5-367.20 Master CAPs List / July 29, 2022

Decorative Waterfall Feature – in existing ROW @ Old Henry Road at Ridge Brook Circle:

- The waterfall will not be removed or disturbed during the construction project. Should it be damaged, it will be repaired to like condition by the company or contractor having caused the damage. If it is needed to drain the water feature, a representative of the adjacent condominium complex will be contacted to coordinate the work.
- The DND (Do Not Disturb) does not apply to any landscaping, trees, vegetation or other land improvements within the existing right-of-way, other than the aforementioned waterfall feature.
- As there is no right-of-way being acquired from the subdivision at Ridge Brook Circle, there is no parcel number associated with this improvement and no compensation is included.

P-005 / Hamilton Garden Homes, LLC – None.

P-008 / Charles & Margaret Gowin – None.

P-009 / Charles & Barbara Downs – None.

P-010 / John & Cathy Wilhoit – None.

P-011 / The Falls at Old Henry Condos Council, Inc. – None.

P-012 / Brent & Cindy Phillips – None.

P-013 / Cypress Management, LLC – None.

P-014 / James & Libby Castleman – None.

P-015 / Barbara Isbell – None.

P-016 / Old Henry Place Condos, Inc. – None.

P-019 / Woodledge Property, LLC –

- Plans will show a “DND” (Do Not Disturb) on the water hydrant.

P-020 / Woodmont, LLC – None.

P-021 / William & Dickie Cox –

- The Cabinet provides access to the property by a residential entrance from Old Henry Road.

P-022 / Evelyn & Ollie Phillips – None.

P-023 / Megan Biddle – None.

P-024 / Jim & Sandra Chatelain – None.

P-025 / Gary & Connie Compton –

- Contractor to leave as many trees as feasible in the permanent easement areas.
- Property owner will remove and retain the wood fencing and gate with a $0.00 salvage value.

P-026 / Vernon & Clora Pridemore – None. (Condemnation)

P-028 / James Nelson – None.

P-029 / Michael & Tandeta Hettich –

- The property owner will be notified by the Department 60 days prior to any utility or highway construction work commencing on the property.

P-031 / Richard & Mary Sue Chapman – None.

P-032 / Donna Forester – None.

P-033 / Steven & Victoria Paalz –

- The KYTC will hold the Contractor to all conditions of the Contract with the KYTC in particular the "Special Note" for accessing the property and cost associated if such loss of access occurs.
- The cost of any releases of mortgages, liens, or other encumbrances on the property conveyed shall be borne by the Cabinet.
- A Special Warranty Deed will be used as the conveyance agreement provide a title search of 50 years yields no clouds to the title.
- The Final Contract Right of Way Plans will show the entrance as shown on attached Sheet No. R25 and X66.

P-035 / Commonwealth Bank & Trust Company –

- The conveyance of the needed portion of the property will be done by Special Warranty Deed.

P-035F / Commonwealth Bank & Trust Company – None.

P-036 / Robert & Michelle Wright – None.

P-037 / Glen-Mar Development, Inc. – None.

P-040 / International Church of the Four Square Gospel –

- Subject to the approval of the governing Board of the International Church of the Foursquare Gospel.

P-041 / David Johnstone – None. (Condemnation)

P-042 / Ian & Diane Crump – None.

P-043 / Charles & Vonda Edwards –

- The Edwardses agree that the agreed consideration is full compensation for the property to be conveyed; that their property is the subject of a pending boundary dispute case with Rupee Realty, but that nevertheless they have full right and power to convey the parcel being acquired by KYTC. Furthermore, the Edwardses will not seek an additional compensation from KYTC, regardless of the outcome of the boundary dispute.

P-044 / International Church of the Four Square Gospel – None.

P-045 / George & Cara Davis – None.

P-046 / Stephen Sauter & Paul Schwartz – None.

P-047 / Rupee Realty, LLC – ****(Pending Condemnation)****

P-210 / Lake Forest Fairways, LLC – None.

P-211 / Michael & Helene Tracey – None.

P-212 / Lake Forest Legacy, Inc. – None.

P-217 / Commonwealth Bank & Trust Company –

- The conveyance of the needed portion of the property will be done by Special Warranty Deed.

P-220 / Woodmont Community Assoc., Inc. –

- The property owners sign this agreement in acknowledgement that the contractor is held duly responsible for removing construction debris and restoring the property according to the current edition of the Kentucky Standard Specifications for Road and Bridge Constructions in specific: i. Section 107.12 – Protection and Restoration of Property & ii. Section 202 – Clearing and Grubbing.

P-310 / T.S. Stigler Company –

- Existing utilities, which service sign lighting and irrigation systems, running under Twin Creek Drive, if damaged, will be repaired and reestablished for continuity of service to the areas on the north and south sides of Twin Creek Drive without any expense to the property owner.

P-311 / Fox Run Investments, LLC –

- Site land improvements (signs, fences, etc.) placed within the permanent easement or within the area of the consent and release for entrance construction are acknowledged to be "at-risk" for removal during construction and the property owner understands that no compensation will be paid for such improvements. After construction, the property owner retains the right to use the permanent easement for non-conflicting uses within the bounds of local ordinances (i.e. use which will not damage utilities or prevent their repair) with no compensation to be paid should any site land improvements be damaged or removed by the lawful actions of the permanent easement holder/its assigns.

- Areas within the median and alongside the entrance and sidewalks should be finished with 1 foot deep of topsoil (areas which will be grass) to where the reconstructed entrance meets grade.

- KYTC will tie sidewalk into the development's sidewalks at the location where the reconstructed entrance meets grade.

- Replacement curb to match existing curb design to the extent reasonably possible.

- Maintenance of the temporary roadway is the responsibility of Fox Run Investments LLC and its successors as under the terms of their permit with Oldham County.

P-430 / Charles & Vonda Edwards – None.

MATERIAL SUMMARY

CONTRACT ID: 221055 **121GR22D055** **DE05630842255**

OLD HENRY ROAD(KY-3084) CONSTRUCT 5-LANE ROADWAY FROM KY-3084 MP 1.6 TO MP 1.8 AND 3-LANE ROADWAY FROM MP 1.8 TO MP 3.15 AT OLDHAM COUNTY LINE GRADE, DRAIN & SURFACE WITH BRIDGE, A DISTANCE OF 1.53 MILES.

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0005	00003	CRUSHED STONE BASE	49,265.00	TON
0010	00100	ASPHALT SEAL AGGREGATE	8.99	TON
0015	00103	ASPHALT SEAL COAT	1.10	TON
0020	00190	LEVELING & WEDGING PG64-22	101.00	TON
0025	00214	CL3 ASPH BASE 1.00D PG64-22	21,436.00	TON
0030	02101	CEM CONC ENT PAVEMENT-8 IN	1,412.00	SQYD
0035	22906ES403	CL3 ASPH SURF 0.38A PG64-22	4,106.00	TON
0040	24970EC	ASPHALT MATERIAL FOR TACK NON-TRACKING	40.19	TON
0045	00078	CRUSHED AGGREGATE SIZE NO 2	16,600.00	TON
0050	01810	STANDARD CURB AND GUTTER	16,434.00	LF
0055	01812	REMOVE CURB AND GUTTER	2,479.00	LF
0060	01830	STANDARD INTEGRAL CURB	1,250.00	LF
0065	01875	STANDARD HEADER CURB	351.00	LF
0070	01904	REMOVE CURB	2,483.00	LF
0075	01923	STANDARD BARRIER MEDIAN TYPE 5	719.00	SQYD
0080	01982	DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL WHITE	9.00	EACH
0085	02014	BARRICADE-TYPE III	25.00	EACH
0090	02058	REMOVE PCC PAVEMENT	15,423.00	SQYD
0095	02091	REMOVE PAVEMENT	20,033.00	SQYD
0100	02159	TEMP DITCH	5,810.00	LF
0105	02160	CLEAN TEMP DITCH	2,905.00	LF
0110	02165	REMOVE PAVED DITCH	103.00	SQYD
0115	02200	ROADWAY EXCAVATION	116,276.00	CUYD
0120	02242	WATER	1,834.00	MGAL
0125	02360	GUARDRAIL TERMINAL SECTION NO 1	2.00	EACH
0130	02367	GUARDRAIL END TREATMENT TYPE 1	2.00	EACH
0135	02381	REMOVE GUARDRAIL	505.00	LF
0140	02396	REMOVE GUARDRAIL END TREATMENT	2.00	EACH
0145	02429	RIGHT-OF-WAY MONUMENT TYPE 1	35.00	EACH
0150	02432	WITNESS POST	35.00	EACH
0155	02471	FILL AND CAP SINKHOLE	1.00	EACH
0160	02483	CHANNEL LINING CLASS II	1,138.00	TON
0165	02484	CHANNEL LINING CLASS III	7,164.00	TON
0170	02545	CLEARING AND GRUBBING - 24.07 ACRES- JEFFERSON	1.00	LS
0175	02562	TEMPORARY SIGNS	1,245.00	SQFT
0180	02585	EDGE KEY	128.00	LF
0185	02602	FABRIC-GEOTEXTILE CLASS 1	114,352.00	SQYD
0190	02650	MAINTAIN & CONTROL TRAFFIC - JEFFERSON	1.00	LS
0195	02651	DIVERSIONS (BY-PASS DETOURS) - JEFFERSON	1.00	LS
0200	02671	PORTABLE CHANGEABLE MESSAGE SIGN	13.00	EACH
0205	02676	MOBILIZATION FOR MILL & TEXT - JEFFERSON	1.00	LS
0210	02690	SAFELOADING	59.00	CUYD

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0215	02701	TEMP SILT FENCE	5,810.00	LF
0220	02703	SILT TRAP TYPE A	27.00	EACH
0225	02704	SILT TRAP TYPE B	27.00	EACH
0230	02705	SILT TRAP TYPE C	27.00	EACH
0235	02706	CLEAN SILT TRAP TYPE A	27.00	EACH
0240	02707	CLEAN SILT TRAP TYPE B	27.00	EACH
0245	02708	CLEAN SILT TRAP TYPE C	27.00	EACH
0250	02720	SIDEWALK-4 IN CONCRETE	4,106.00	SQYD
0255	02721	REMOVE CONCRETE SIDEWALK	590.00	SQYD
0260	02723	SIDEWALK-6 IN CONCRETE	7,037.00	SQYD
0265	02726	STAKING	1.00	LS
0270	02731	REMOVE STRUCTURE - JEFFERSON	1.00	LS
0275	02775	ARROW PANEL	5.00	EACH
0280	05950	EROSION CONTROL BLANKET	35,263.00	SQYD
0285	05952	TEMP MULCH	85,700.00	SQYD
0290	05953	TEMP SEEDING AND PROTECTION	64,275.00	SQYD
0295	05963	INITIAL FERTILIZER	11.00	TON
0300	05964	MAINTENANCE FERTILIZER	7.00	TON
0305	05985	SEEDING AND PROTECTION	94,120.00	SQYD
0310	05990	SODDING	11,822.00	SQYD
0315	05992	AGRICULTURAL LIMESTONE	120.00	TON
0320	06511	PAVE STRIPING-TEMP PAINT-6 IN	25,000.00	LF
0325	06515	PAVE STRIPING-PERM PAINT-6 IN	37,579.00	LF
0330	06517	PAVE STRIPING-PERM PAINT-12 IN	350.00	LF
0335	06547	PAVE STRIPING-THERMO-12 IN Y	39.00	LF
0340	06565	PAVE MARKING-THERMO X-WALK-6 IN	536.00	LF
0345	06568	PAVE MARKING-THERMO STOP BAR-24IN	459.00	LF
0350	06572	PAVE MARKING-DOTTED LANE EXTEN	135.00	LF
0355	06574	PAVE MARKING-THERMO CURV ARROW	66.00	EACH
0360	06575	PAVE MARKING-THERMO COMB ARROW	5.00	EACH
0365	06576	PAVE MARKING-THERMO ONLY	2.00	EACH
0370	06610	INLAID PAVEMENT MARKER-MW	74.00	EACH
0375	06612	INLAID PAVEMENT MARKER-BY	279.00	EACH
0380	10020NS	FUEL ADJUSTMENT	80,805.00	DOLL
0385	10030NS	ASPHALT ADJUSTMENT	60,305.00	DOLL
0390	20071EC	JOINT ADHESIVE	1,596.00	LF
0395	20166ES810	TEMPORARY PIPE	623.00	LF
0400	20191ED	OBJECT MARKER TY 3	4.00	EACH
0405	20550ND	SAWCUT PAVEMENT	3,442.00	LF
0410	21289ED	LONGITUDINAL EDGE KEY	1,596.00	LF
0415	21802EN	G/R STEEL W BEAM-S FACE (7 FT POST)	350.00	LF
0420	22664EN	WATER BLASTING EXISTING STRIPE	8,300.00	LF
0425	23158ES505	DETECTABLE WARNINGS	740.00	SQFT
0430	23274EN11F	TURF REINFORCEMENT MAT 1	622.00	SQYD
0435	23379EC	STAMPED CONCRETE	825.00	SQYD
0440	23839EC	REMOVE CONCRETE MEDIAN	1,164.00	SQYD
0445	24845EC	UTILITY COORDINATION - JEFFERSON	1.00	LS
0450	25079ED	THRIE BEAM GUARDRAIL TRANSITION TL-2	4.00	EACH
0455	00078	CRUSHED AGGREGATE SIZE NO 2	8.00	TON
0460	00520	STORM SEWER PIPE-12 IN	15.00	LF

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0465	00521	STORM SEWER PIPE-15 IN	2,475.00	LF
0470	00522	STORM SEWER PIPE-18 IN	3,253.00	LF
0475	00524	STORM SEWER PIPE-24 IN	1,776.00	LF
0480	00526	STORM SEWER PIPE-30 IN	760.00	LF
0485	00528	STORM SEWER PIPE-36 IN	264.00	LF
0490	00530	STORM SEWER PIPE-48 IN	410.00	LF
0495	01000	PERFORATED PIPE-4 IN	20,625.00	LF
0500	01010	NON-PERFORATED PIPE-4 IN	4,798.00	LF
0505	01015	INSPECT & CERTIFY EDGE DRAIN SYSTEM - JEFFERSON	1.00	LS
0510	01028	PERF PIPE HEADWALL TY 3-4 IN	4.00	EACH
0515	01204	PIPE CULVERT HEADWALL-18 IN	1.00	EACH
0520	01216	PIPE CULVERT HEADWALL-48 IN	1.00	EACH
0525	01390	METAL END SECTION TY 3-15 IN	1.00	EACH
0530	01433	SLOPED BOX OUTLET TYPE 1-18 IN	1.00	EACH
0535	01451	S & F BOX INLET-OUTLET-24 IN	1.00	EACH
0540	01452	S & F BOX INLET-OUTLET-30 IN	1.00	EACH
0545	01456	CURB BOX INLET TYPE A	54.00	EACH
0550	01480	CURB BOX INLET TYPE B	25.00	EACH
0555	01496	DROP BOX INLET TYPE 3	2.00	EACH
0560	01499	DROP BOX INLET TYPE 4	2.00	EACH
0565	01559	DROP BOX INLET TYPE 13G	16.00	EACH
0570	01568	DROP BOX INLET TYPE 13S	1.00	EACH
0575	01642	JUNCTION BOX-18 IN	1.00	EACH
0580	01720	RECONSTRUCT INLET	2.00	EACH
0585	01740	CORED HOLE DRAINAGE BOX CON-4 IN	162.00	EACH
0590	01756	MANHOLE TYPE A	2.00	EACH
0595	02607	FABRIC-GEOTEXTILE CLASS 2 FOR PIPE	14,212.00	SQYD
0600	08100	CONCRETE-CLASS A	23.55	CUYD
0605	24814EC	PIPELINE INSPECTION	8,915.00	LF
0610	02625	REMOVE HEADWALL	2.00	EACH
0615	08002	STRUCTURE EXCAV-SOLID ROCK	46.60	CUYD
0620	08003	FOUNDATION PREPARATION	1.00	LS
0625	08100	CONCRETE-CLASS A	209.30	CUYD
0630	08150	STEEL REINFORCEMENT	27,143.00	LB
0635	08002	STRUCTURE EXCAV-SOLID ROCK	380.00	CUYD
0640	08003	FOUNDATION PREPARATION	1.00	LS
0645	08100	CONCRETE-CLASS A	239.60	CUYD
0650	08150	STEEL REINFORCEMENT	25,494.00	LB
0655	03299	ARMORED EDGE FOR CONCRETE	80.80	LF
0660	08001	STRUCTURE EXCAVATION-COMMON	511.00	CUYD
0665	08002	STRUCTURE EXCAV-SOLID ROCK	135.00	CUYD
0670	08019	CYCLOPEAN STONE RIP RAP	367.00	TON
0675	08100	CONCRETE-CLASS A	460.30	CUYD
0680	08104	CONCRETE-CLASS AA	116.80	CUYD
0685	08150	STEEL REINFORCEMENT	53,982.00	LB
0690	08151	STEEL REINFORCEMENT-EPOXY COATED	21,774.00	LB
0695	23085EN	RAIL SYSTEM TYPE 10	55.10	LF
0700	23378EC	CONCRETE SEALING	6,406.00	SQFT
0705	06406	SBM ALUM SHEET SIGNS .080 IN	294.00	SQFT

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0710	06411	STEEL POST TYPE 2	930.00	LF
0715	20418ED	REMOVE & RELOCATE SIGNS	8.00	EACH
0720	21134ND	REMOVE-STORE AND REINSTALL SIGN	4.00	EACH
0725	24631EC	BARCODE SIGN INVENTORY	72.00	EACH
0730	04820	TRENCHING AND BACKFILLING	120.00	LF
0735	04845	CABLE-NO. 14/7C	2,900.00	LF
0740	04886	MESSENGER-15400 LB	530.00	LF
0745	04932	INSTALL STEEL STRAIN POLE	4.00	EACH
0750	04953	TEMP RELOCATION OF SIGNAL HEAD	12.00	EACH
0755	20093NS835	INSTALL PEDESTRIAN HEAD-LED	8.00	EACH
0760	20188NS835	INSTALL LED SIGNAL-3 SECTION	6.00	EACH
0765	20189NS835	INSTALL LED SIGNAL-5 SECTION	1.00	EACH
0770	20266ES835	INSTALL LED SIGNAL- 4 SECTION	4.00	EACH
0775	20390NS835	INSTALL COORDINATING UNIT	1.00	EACH
0780	21743NN	INSTALL PEDESTRIAN DETECTOR	8.00	EACH
0785	23157EN	TRAFFIC SIGNAL POLE BASE	18.00	CUYD
0790	23222EC	INSTALL SIGNAL PEDESTAL	2.00	EACH
0795	24900EC	PVC CONDUIT-1 1/4 IN-SCHEDULE 80	60.00	LF
0800	24901EC	PVC CONDUIT-2 IN-SCHEDULE 80	80.00	LF
0805	24908EC	INSTALL SIGNAL CONTROLLER-TY ATC	1.00	EACH
0810	24955ED	REMOVE SIGNAL EQUIPMENT	1.00	EACH
0815	26119EC	INSTALL RADAR PRESENCE DETECTOR TYPE A	4.00	EACH
0820	26120EC	INSTALL RADAR ADVANCE DETECTOR TYPE B	1.00	EACH
0825	02223	GRANULAR EMBANKMENT	.40	CUYD
0830	02602	FABRIC-GEOTEXTILE CLASS 1	4.00	SQYD
0835	14000	W AIR RELEASE VALVE 1 INCH	2.00	EACH
0840	14005	W ENCASEMENT CONCRETE	26.00	LF
0845	14015	W ENCASEMENT STEEL OPEN CUT RANGE 4	217.00	LF
0850	14016	W ENCASEMENT STEEL OPEN CUT RANGE 5	285.00	LF
0855	14019	W FIRE HYDRANT ASSEMBLY	6.00	EACH
0860	14028	W METER 3/4 INCH	21.00	EACH
0865	14036	W PIPE DUCTILE IRON 06 INCH	144.00	LF
0870	14037	W PIPE DUCTILE IRON 08 INCH	583.00	LF
0875	14039	W PIPE DUCTILE IRON 12 INCH	5,109.00	LF
0880	14056	W PIPE PVC 02 INCH	100.00	LF
0885	14094	W TIE-IN 06 INCH	1.00	EACH
0890	14095	W TIE-IN 08 INCH	6.00	EACH
0895	14097	W TIE-IN 12 INCH	3.00	EACH
0900	14106	W VALVE 08 INCH	14.00	EACH
0905	14108	W VALVE 12 INCH	21.00	EACH
0910	14125	W VAULT SPECIAL	1.00	EACH
0915	14136	W PRESSURE REDUCING VALVE 08 INCH	2.00	EACH
0920	14566	W SERV PE/PLST LONG SIDE 3/4 IN INST	7.00	EACH
0925	14571	W SERV PE/PLST SHORT SIDE 3/4 IN INST	14.00	EACH
0930	15000	S BYPASS PUMPING	3.00	EACH
0935	15012	S ENCASEMENT CONCRETE	38.00	LF
0940	15025	S ENCASEMENT STEEL OPEN CUT RANGE 6	321.00	LF
0945	15092	S MANHOLE	6.00	EACH
0950	15093	S MANHOLE ABANDON/REMOVE	7.00	EACH
0955	15094	S MANHOLE ADJUST TO GRADE	5.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0960	15099	S MANHOLE TAP EXISTING	4.00	EACH
0965	15112	S PIPE PVC 08 INCH	107.00	LF
0970	15117	S PIPE PVC 24 INCH	298.00	LF
0975	15118	S PIPE SPECIAL	371.00	LF
0980	23610NC	CORED HOLE DRAINAGE BOX CON	1.00	EACH
0985	02568	MOBILIZATION	1.00	LS
0990	02569	DEMOBILIZATION	1.00	LS

CONTRACT ID: 221055 **121GR22D055** **DE09330842255**

OLD HENRY ROAD(KY-3084) CONSTRUCT 3-LANE ROADWAY FROM KY-3084 MP 0.00 TO MP 0.32 TO ASH AVENUE GRADE, DRAIN & SURFACE WITH BRIDGE, A DISTANCE OF 2.27 MILES.

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
0995	00003	CRUSHED STONE BASE	9,262.00	TON
1000	00100	ASPHALT SEAL AGGREGATE	4.35	TON
1005	00103	ASPHALT SEAL COAT	.53	TON
1010	00214	CL3 ASPH BASE 1.00D PG64-22	2,778.00	TON
1015	02101	CEM CONC ENT PAVEMENT-8 IN	475.00	SQYD
1020	22906ES403	CL3 ASPH SURF 0.38A PG64-22	1,663.00	TON
1025	24970EC	ASPHALT MATERIAL FOR TACK NON-TRACKING	7.12	TON
1030	00078	CRUSHED AGGREGATE SIZE NO 2	3,400.00	TON
1035	01810	STANDARD CURB AND GUTTER	3,007.00	LF
1040	01812	REMOVE CURB AND GUTTER	206.00	LF
1045	01875	STANDARD HEADER CURB	230.00	LF
1050	01904	REMOVE CURB	230.00	LF
1055	01982	DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL WHITE	6.00	EACH
1060	02014	BARRICADE-TYPE III	5.00	EACH
1065	02091	REMOVE PAVEMENT	2,272.00	SQYD
1070	02159	TEMP DITCH	1,190.00	LF
1075	02160	CLEAN TEMP DITCH	595.00	LF
1080	02200	ROADWAY EXCAVATION	75,096.00	CUYD
1085	02242	WATER	376.00	MGAL
1090	02367	GUARDRAIL END TREATMENT TYPE 1	1.00	EACH
1095	02391	GUARDRAIL END TREATMENT TYPE 4A	2.00	EACH
1100	02429	RIGHT-OF-WAY MONUMENT TYPE 1	18.00	EACH
1105	02432	WITNESS POST	18.00	EACH
1110	02483	CHANNEL LINING CLASS II	16.00	TON
1115	02484	CHANNEL LINING CLASS III	154.00	TON
1120	02545	CLEARING AND GRUBBING - 7.54 ACRES- OLDHAM	1.00	LS
1125	02562	TEMPORARY SIGNS	255.00	SQFT
1130	02585	EDGE KEY	18.00	LF
1135	02602	FABRIC-GEOTEXTILE CLASS 1	22,361.00	SQYD
1140	02650	MAINTAIN & CONTROL TRAFFIC - OLDHAM	1.00	LS
1145	02651	DIVERSIONS (BY-PASS DETOURS) - OLDHAM	1.00	LS
1150	02671	PORTABLE CHANGEABLE MESSAGE SIGN	2.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
1155	02701	TEMP SILT FENCE	1,190.00	LF
1160	02703	SILT TRAP TYPE A	5.00	EACH
1165	02704	SILT TRAP TYPE B	5.00	EACH
1170	02705	SILT TRAP TYPE C	5.00	EACH
1175	02706	CLEAN SILT TRAP TYPE A	5.00	EACH
1180	02707	CLEAN SILT TRAP TYPE B	5.00	EACH
1185	02708	CLEAN SILT TRAP TYPE C	5.00	EACH
1190	02720	SIDEWALK-4 IN CONCRETE	860.00	SQYD
1195	02723	SIDEWALK-6 IN CONCRETE	1,451.00	SQYD
1200	02726	STAKING - OLDHAM	1.00	LS
1205	02775	ARROW PANEL	1.00	EACH
1210	05950	EROSION CONTROL BLANKET	9,755.00	SQYD
1215	05952	TEMP MULCH	17,553.00	SQYD
1220	05953	TEMP SEEDING AND PROTECTION	13,165.00	SQYD
1225	05963	INITIAL FERTILIZER	2.00	TON
1230	05964	MAINTENANCE FERTILIZER	1.00	TON
1235	05985	SEEDING AND PROTECTION	24,183.00	SQYD
1240	05990	SODDING	2,337.00	SQYD
1245	05992	AGRICULTURAL LIMESTONE	25.00	TON
1250	06511	PAVE STRIPING-TEMP PAINT-6 IN	5,000.00	LF
1255	06515	PAVE STRIPING-PERM PAINT-6 IN	6,593.00	LF
1260	06568	PAVE MARKING-THERMO STOP BAR-24IN	43.00	LF
1265	06574	PAVE MARKING-THERMO CURV ARROW	12.00	EACH
1270	06610	INLAID PAVEMENT MARKER-MW	15.00	EACH
1275	06612	INLAID PAVEMENT MARKER-BY	57.00	EACH
1280	10020NS	FUEL ADJUSTMENT	16,551.00	DOLL
1285	10030NS	ASPHALT ADJUSTMENT	12,352.00	DOLL
1290	20071EC	JOINT ADHESIVE	137.00	LF
1295	20166ES810	TEMPORARY PIPE	127.00	LF
1300	20191ED	OBJECT MARKER TY 3	1.00	EACH
1305	20550ND	SAWCUT PAVEMENT	691.00	LF
1310	21289ED	LONGITUDINAL EDGE KEY	137.00	LF
1315	21802EN	G/R STEEL W BEAM-S FACE (7 FT POST)	275.00	LF
1320	22664EN	WATER BLASTING EXISTING STRIPE	1,700.00	LF
1325	23158ES505	DETECTABLE WARNINGS	206.00	SQFT
1330	23274EN11F	TURF REINFORCEMENT MAT 1	191.00	SQYD
1335	24845EC	UTILITY COORDINATION - OLDHAM	1.00	LS
1340	25079ED	THRIE BEAM GUARDRAIL TRANSITION TL-2	4.00	EACH
1345	00440	ENTRANCE PIPE-15 IN	86.00	LF
1350	00521	STORM SEWER PIPE-15 IN	165.00	LF
1355	00522	STORM SEWER PIPE-18 IN	1,020.00	LF
1360	00524	STORM SEWER PIPE-24 IN	341.00	LF
1365	01000	PERFORATED PIPE-4 IN	3,844.00	LF
1370	01010	NON-PERFORATED PIPE-4 IN	958.00	LF
1375	01015	INSPECT & CERTIFY EDGE DRAIN SYSTEM - OLDHAM	1.00	LS
1380	01204	PIPE CULVERT HEADWALL-18 IN	1.00	EACH
1385	01432	SLOPED BOX OUTLET TYPE 1-15 IN	4.00	EACH
1390	01456	CURB BOX INLET TYPE A	10.00	EACH
1395	01480	CURB BOX INLET TYPE B	5.00	EACH
1400	01496	DROP BOX INLET TYPE 3	3.00	EACH

MATERIAL SUMMARY

Project Line No	Bid Code	DESCRIPTION	Quantity	Unit
1405	01740	CORED HOLE DRAINAGE BOX CON-4 IN	27.00	EACH
1410	02607	FABRIC-GEOTEXTILE CLASS 2 FOR PIPE	2,381.00	SQYD
1415	24814EC	PIPELINE INSPECTION	1,612.00	LF
1420	03299	ARMORED EDGE FOR CONCRETE	78.00	LF
1425	08001	STRUCTURE EXCAVATION-COMMON	787.00	CUYD
1430	08002	STRUCTURE EXCAV-SOLID ROCK	261.00	CUYD
1435	08100	CONCRETE-CLASS A	501.70	CUYD
1440	08104	CONCRETE-CLASS AA	568.80	CUYD
1445	08150	STEEL REINFORCEMENT	50,888.00	LB
1450	08151	STEEL REINFORCEMENT-EPOXY COATED	134,253.00	LB
1455	08633	PRECAST PC I BEAM TYPE 3	1,661.70	LF
1460	23378EC	CONCRETE SEALING	21,170.00	SQFT
1465	23813EC	DECK DRAIN	16.00	EACH
1470	06406	SBM ALUM SHEET SIGNS .080 IN	152.00	SQFT
1475	06411	STEEL POST TYPE 2	360.00	LF
1480	20418ED	REMOVE & RELOCATE SIGNS	1.00	EACH
1485	21134ND	REMOVE-STORE AND REINSTALL SIGN	2.00	EACH
1490	24631EC	BARCODE SIGN INVENTORY	38.00	EACH
1495	14000	W AIR RELEASE VALVE 1 INCH	1.00	EACH
1500	14016	W ENCASEMENT STEEL OPEN CUT RANGE 5	88.00	LF
1505	14019	W FIRE HYDRANT ASSEMBLY	1.00	EACH
1510	14028	W METER 3/4 INCH	5.00	EACH
1515	14036	W PIPE DUCTILE IRON 06 INCH	38.00	LF
1520	14039	W PIPE DUCTILE IRON 12 INCH	842.00	LF
1525	14097	W TIE-IN 12 INCH	2.00	EACH
1530	14105	W VALVE 06 INCH	1.00	EACH
1535	14108	W VALVE 12 INCH	5.00	EACH
1540	14566	W SERV PE/PLST LONG SIDE 3/4 IN INST	4.00	EACH
1545	14571	W SERV PE/PLST SHORT SIDE 3/4 IN INST	1.00	EACH
1550	02568	MOBILIZATION	1.00	LS
1555	02569	DEMOBILIZATION	1.00	LS

GUARDRAIL DELIVERY VERIFICATION SHEET

Contract Id: _____ **Contractor: _____**

Section Engineer: _____ **District & County: _____**

DESCRIPTION	UNIT	QTY LEAVING PROJECT	QTY RECEIVED@BB YARD
GUARDRAIL (Includes End treatments & crash cushions)	LF	_____	_____
STEEL POSTS	EACH	_____	_____
STEEL BLOCKS	EACH	_____	_____
WOOD OFFSET BLOCKS	EACH	_____	_____
BACK UP PLATES	EACH	_____	_____
CRASH CUSHION	EACH	_____	_____
NUTS, BOLTS, WASHERS	BAG/BCKT	_____	_____
DAMAGED RAIL TO MAINT. FACILITY	LF	_____	_____
DAMAGED POSTS TO MAINT. FACILITY	EACH	_____	_____

****Required Signatures before Leaving Project Site***

Printed Section Engineer's Representative_____ & Date_____

Signature Section Engineer's Representative_____& Date_____

Printed Contractor's Representative_____& Date_____

Signature Contractor's Representative_____& Date_____

****Required Signatures after Arrival at Bailey Bridge Yard (All material on truck must be counted & the quantity received column completed before signatures)***

Printed Bailey Bridge Yard Representative_____ & Date_____

Signature Bailey Bridge Yard Representative_____& Date_____

Printed Contractor's Representative_____& Date_____

Signature Contractor's Representative_____& Date_____

**Payment for the bid item remove guardrail will be based upon the quantities shown in the Bailey Bridge Yard received column. Payment will not be made for guardrail removal until the guardrail verification sheets are electronically submitted to the Section Engineer by the Bailey Bridge Yard Representative.

Completed Form Submitted to Section Engineer Date: _____ By: _____

PART II

SPECIFICATIONS AND STANDARD DRAWINGS

SPECIFICATIONS REFERENCE

Any reference in the plans or proposal to previous editions of the *Standard Specifications for Road and Bridge Construction* and *Standard Drawings* are superseded by *Standard Specifications for Road and Bridge Construction, Edition of 2019* and *Standard Drawings, Edition of 2020.*

SUPPLEMENTAL SPECIFICATIONS

The contractor shall use the Supplemental Specifications that are effective at the time of letting. The Supplemental Specifications can be found at the following link:

http://transportation.ky.gov/Construction/Pages/Kentucky-Standard-Specifications.aspx

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SPECIAL NOTE FOR PORTABLE CHANGEABLE MESSAGE SIGNS

This Special Note will apply when indicated on the plans or in the proposal.

1.0 DESCRIPTION. Furnish, install, operate, and maintain variable message signs at the locations shown on the plans or designated by the Engineer. Remove and retain possession of variable message signs when they are no longer needed on the project.

2.0 MATERIALS.

2.1 General. Use LED Variable Message Signs Class I, II, or III, as appropriate, from the Department's List of Approved Materials.

Unclassified signs may be submitted for approval by the Engineer. The Engineer may require a daytime and nighttime demonstration. The Engineer will make a final decision within 30 days after all required information is received.

2.2 Sign and Controls. All signs must:

1) Provide 3-line messages with each line being 8 characters long and at least 18 inches tall. Each character comprises 35 pixels.
2) Provide at least 40 preprogrammed messages available for use at any time. Provide for quick and easy change of the displayed message; editing of the message; and additions of new messages.
3) Provide a controller consisting of:
   a) Keyboard or keypad.
   b) Readout that mimics the actual sign display. (When LCD or LCD type readout is used, include backlighting and heating or otherwise arrange for viewing in cold temperatures.)
   c) Non-volatile memory or suitable memory with battery backup for storing pre-programmed messages.
   d) Logic circuitry to control the sequence of messages and flash rate.
4) Provide a serial interface that is capable of supporting complete remote control ability through land line and cellular telephone operation. Include communication software capable of immediately updating the message, providing complete sign status, and allowing message library queries and updates.
5) Allow a single person easily to raise the sign to a satisfactory height above the pavement during use, and lower the sign during travel.
6) Be Highway Orange on all exterior surfaces of the trailer, supports, and controller cabinet.
7) Provide operation in ambient temperatures from -30 to + 120 degrees Fahrenheit during snow, rain and other inclement weather.
8) Provide the driver board as part of a module. All modules are interchangeable, and have plug and socket arrangements for disconnection and reconnection. Printed circuit boards associated with driver boards have a conformable coating to protect against moisture.
9) Provide a sign case sealed against rain, snow, dust, insects, etc. The lens is UV stabilized clear plastic (polycarbonate, acrylic, or other approved material) angled to prevent glare.
10) Provide a flat black UV protected coating on the sign hardware, character PCB, and appropriate lens areas.
11) Provide a photocell control to provide automatic dimming.

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12) Allow an on-off flashing sequence at an adjustable rate.
13) Provide a sight to aim the message.
14) Provide a LED display color of approximately 590 nm amber.
15) Provide a controller that is password protected.
16) Provide a security device that prevents unauthorized individuals from accessing the controller.
17) Provide the following 3-line messages preprogrammed and available for use when the sign unit begins operation:

/KEEP/RIGHT/⇒⇒⇒/
/KEEP/LEFT/⇐⇐⇐/
/LOOSE/GRAVEL/AHEAD/
/RD WORK/NEXT/**MILES/
/TWO WAY/TRAFFIC/AHEAD/
/PAINT/CREW/AHEAD/
/REDUCE/SPEED/**MPH/
/BRIDGE/WORK/***0 FT/
/MAX/SPEED/**MPH/
/SURVEY/PARTY/AHEAD/
/MIN/SPEED/**MPH/
/ICY/BRIDGE/AHEAD/ /ONE LANE/BRIDGE/AHEAD/
/ROUGH/ROAD/AHEAD/
/MERGING/TRAFFIC/AHEAD/
/NEXT/***/MILES/
/HEAVY/TRAFFIC/AHEAD/
/SPEED/LIMIT/**MPH/
/BUMP/AHEAD/
/TWO/WAY/TRAFFIC/

*Insert numerals as directed by the Engineer.
Add other messages during the project when required by the Engineer.

2.3 Power.

1) Design solar panels to yield 10 percent or greater additional charge than sign consumption. Provide direct wiring for operation of the sign or arrow board from an external power source to provide energy backup for 21 days without sunlight and an on-board system charger with the ability to recharge completely discharged batteries in 24 hours.

3.0 CONSTRUCTION. Furnish and operate the variable message signs as designated on the plans or by the Engineer. Ensure the bottom of the message panel is a minimum of 7 feet above the roadway in urban areas and 5 feet above in rural areas when operating. Use Class I, II, or III signs on roads with a speed limit less than 55 mph. Use Class I or II signs on roads with speed limits 55 mph or greater.

Maintain the sign in proper working order, including repair of any damage done by others, until completion of the project. When the sign becomes inoperative, immediately repair or replace the sign. Repetitive problems with the same unit will be cause for rejection and replacement.

Use only project related messages and messages directed by the Engineer, unnecessary messages lessen the impact of the sign. Ensure the message is displayed in either one or 2 phases with each phase having no more than 3 lines of text. When no message is needed, but it is necessary to know if the sign is operable, flash only a pixel.

When the sign is not needed, move it outside the clear zone or where the Engineer directs. Variable Message Signs are the property of the Contractor and shall be removed from the project when no longer needed. The Department will not assume ownership of these signs.

4.0 MEASUREMENT. The final quantity of Variable Message Sign will be

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the actual number of individual signs acceptably furnished and operated during the project. The Department will not measure signs replaced due to damage or rejection.

5.0 PAYMENT. The Department will pay for the Variable Message Signs at the unit price each. The Department will not pay for signs replaced due to damage or rejection. Payment is full compensation for furnishing all materials, labor, equipment, and service necessary to, operate, move, repair, and maintain or replace the variable message signs. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02671	Portable Changeable Message Sign	Each

Effective June 15, 2012

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SPECIAL NOTE FOR ROCK BLASTING

This Special Note will apply when indicated on the plans or in the proposal. Section references herein are to the Department's Current Standard Specifications for Road and Bridge Construction.

1.0 DESCRIPTION. This work consists of fracturing rock and constructing stable final rock cut faces using presplit blasting and production blasting techniques.

2.0 MATERIALS. Deliver, store, and use explosives according to the manufacturer's recommendations and applicable laws. Do not use explosives outside their recommended use date. Verify date of manufacture and provide copies of the technical data sheets (TDS) and material safety data sheets (MSDS) to the Engineer. Explosives and initiating devices include, but are not necessarily limited to, dynamite and other high explosives, slurries, water gels, emulsions, blasting agents, initiating explosives, detonators, blasting caps, and detonating cord.

3.0 CONSTRUCTION. Furnish copies or other proof of all-applicable permits and licenses. Comply with Federal, State, and local regulations on the purchase, transportation, storage, and use of explosive material. Regulations include but are not limited to the following:

1) KRS 351.310 through 351.9901.
2) 805 KAR 4:005 through 4:165
3) Applicable rules and regulations issued by the Office of Mine Safety and Licensing.
4) Safety and health. OSHA, 29 CFR Part 1926, Subpart U.
5) Storage, security, and accountability. Bureau of Alcohol, Tobacco, and Firearms (BATF), 27 CFR Part 181.
6) Shipment. DOT, 49 CFR Parts 171-179, 390-397.

3.1 Blaster-in-Charge. Designate in writing a blaster-in-charge and any proposed alternates for the position. Submit documentation showing the blaster-in-charge, and alternates, have a valid Kentucky blaster's license. Ensure the blaster-in-charge or approved alternate is present at all times during blasting operations.

3.2 **Blasting Plans.** Blasting plans and reports are for quality control and record keeping purposes. Blasting reports are to be signed by the blaster-in-charge or the alternate blaster-in-charge. The general review and acceptance of blasting plans does not relieve the Contractor of the responsibility whatsoever for conformance to regulations or for obtaining the required results. All blasting plans shall be submitted to the Engineer. The Engineer will be responsible for submitting the plan to the Central Office Division of Construction and the Division of Mine Reclamation and Enforcement, Explosives and Blasting Branch at the following address: 2 Hudson Hollow, Frankfort, Kentucky, 40601.

A) General Blasting Plan. Submit a general blasting plan for acceptance at least 15 working days before drilling operations begin. Include, as a minimum, the following safety and procedural details:

1) Working procedures and safety precautions for storing, transporting, handling, detonating explosives. Include direction on pre and post blast audible procedures, methods of addressing misfires, and methods of addressing inclement weather, including lightning.
2) Proposed product selection for both dry and wet holes. Furnish Manufacturer's TDS and MSDS for all explosives, primers, initiators, and other blasting devices.
3) Proposed initiation and delay methods.
4) Proposed format for providing all the required information for the site specific blasting shot reports.

B) Preblast Meeting. Prior to drilling operations, conduct a preblast meeting to discuss safety and traffic control issues and any site specific conditions that will need to be addressed. Ensure, at a minimum, that the Engineer or lead inspector, Superintendent, blaster-in-charge, and all personnel involved in the blasting operation are present. Site specific conditions include blast techniques; communication procedures; contingency plans and equipment for dealing with errant blast material. The conditions of the General Blasting plan will be discussed at this meeting. Record all revisions and additions made to the blasting plan and obtain written concurrence by the blaster-in-charge. Provide a copy of the signed blast plan to the Engineer along with the sign in sheet from the preblast meeting.

3.3 Preblast Condition Survey and Vibration Monitoring and Control. Before blasting, arrange for a preblast condition survey of nearby buildings, structures, or utilities, within 500 feet of the blast or that could be at risk from blasting damage. Provide the Engineer a listing of all properties surveyed and any owners denying entry or failing to respond. Notify the Engineer and occupants of buildings at risk at least 24 hours before blasting.

Limit ground vibrations and airblast to levels that will not exceed limits of 805 KAR 4:005 through 4:165. More restrictive levels may be specified in the Contract.

Size all blast designs based on vibration, distance to nearest building or utility, blast site geometry, atmospheric conditions and other factors. Ground vibrations are to be controlled according to the blasting standards and scaled distance formulas in 805 KAR 4:020 or by the use of seismographs as allowed in 805 KAR 4:030. The Department will require seismographs at the nearest allowable location to the protected site when blasting occurs within 500 feet of buildings, structures, or utilities.

3.4 Blasting. Drill and blast at the designated slope lines according to the blasting plan. Perform presplitting to obtain smooth faces in the rock and shale formations. Perform the presplitting before blasting and excavating the interior portion of the specified cross section at any location. The Department may allow blasting for fall benches and haul roads prior to presplitting when blasting is a sufficient distance from the final slope and results are satisfactory to the Engineer. Use the types of explosives and blasting accessories necessary to obtain the required results.

Free blast holes of obstructions for their entire depth. Place charges without caving the blast hole walls. Stem the upper portion of all blast holes with dry sand or other granular material passing the 3/8-inch sieve. Dry drill cuttings are acceptable for stemming when blasts are more than 800 feet from the nearest dwelling.

Stop traffic during blasting operations when blasting near any road and ensure traffic does not pass through the Danger Zone. The blaster-in-charge will define the Danger Zone prior to each blast. Ensure traffic is stopped outside the Danger Zone, and in no case within 800 feet of the blast location.

Following a blast, stop work in the entire blast area, and check for misfires before allowing worker to return to excavate the rock.

Remove or stabilize all cut face rock that is loose, hanging, or potentially dangerous. Leave minor irregularities or surface variations in place if they do not create a hazard. Drill the next lift only after the cleanup work and stabilization work is complete.

When blasting operations cause fracturing of the final rock face, repair or stabilize it in an approved manner at no cost to the Department.

Halt blasting operations in areas where any of the following occur:

1) Slopes are unstable;
2) Slopes exceed tolerances or overhangs are created;
3) Backslope damage occurs;
4) Safety of the public is jeopardized;
5) Property or natural features are endangered;
6) Fly rock is generated; or
7) Excessive ground or airblast vibrations occur in an area where damage to buildings, structures, or utilities is possible.
8) The Engineer determines that materials have become unsuitable for blasting

Blasting operations may continue at a reasonable distance from the problem area or in areas where the problems do not exist. Make the necessary modifications to the blasting operations and perform a test blast to demonstrate resolution of the problem.

A) Drill Logs. Maintain a layout drawing designating hole numbers with corresponding drill logs and provide a copy of this information to the blaster prior to loading the hole. Ensure the individual hole logs completed by the driller(s) show their name; date drilled; total depth drilled; and depths and descriptions of significant conditions encountered during drilling that may affect loading such as water, voids, changes in rock type.

B) Presplitting. Conduct presplitting operations in conformance with Subsection 204.03.04 of the Standard Specifications for Road and Bridge Construction.

3.5 Shot Report. Maintain all shot reports on site for review by the Department. Within one day after a blast, complete a shot report according to the record keeping requirements of 805 KAR 4:050. Include all results from airblast and seismograph monitoring.

3.6 Unacceptable Blasting. When unacceptable blasting occurs, the Department will halt all blasting operations. Blasting will not resume until the Department completes its investigation and all concerns are addressed. A blast is unacceptable when it results in fragmentation beyond the final rock face, fly rock, excessive vibration or airblast, overbreak, damage to the final rock face or overhang. Assume the cost for all resulting damages to private and public property and hold the Department harmless.

When an errant blast or fly rock causes damage to or blocks a road or conveyance adjacent to the roadway, remove all debris from the roadway as quickly as practicable and perform any necessary repairs. Additionally, when specified in the Contract, the Department will apply a penalty.

Report all blasting accidents to the Division of Mine Reclamation and Enforcement, Explosives and Blasting Branch at 502-564-2340.

4.0 MEASUREMENT AND PAYMENT. The Department will not measure this work for payment and will consider all items contained in this note to be incidental to either Roadway Excavation or Embankment-in-Place, as applicable. However, if the Engineer directs in writing slope changes, then the Department will pay for the second presplitting operation as Extra Work.

The Department will measure for payment material lying outside the typical section due to seams, broken formations, or earth pockets, including any earth overburden removed with this material, only when the work is performed under authorized adjustments.

The Department will not measure for payment any extra material excavated because of the drill holes being offset outside the designated slope lines.

The Department will not measure for payment any material necessary to be removed due to the inefficient or faulty blasting practices.

July 1, 2022

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SPECIAL NOTE FOR TURF REINFORCING MAT

1.0 DESCRIPTION. Install turf reinforcement mat at locations specified in the Contract or as the Engineer directs. Section references herein are to the Department's current Standard Specifications for Road and Bridge Construction.

2.0 MATERIALS.

2.1 Turf Reinforcement Mat (TRM). Use a Turf Reinforcement Mat defined as permanent rolled erosion control product composed of non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a three-dimensional matrix of sufficient thickness and from the Department's List of Approved Materials. Mats must be 100% UV stabilized materials. For TRMs containing degradable components, all physical property values must be obtained on the non-degradable portion of the matting exclusively. Ensure product labels clearly show the manufacturer or supplier name, style name, and roll number. Ensure labeling, shipment and storage follows ASTM D-4873. The Department will require manufacturer to provide TRMs that are machine constructed web of mechanically or melt bonded nondegradable fibers entangled to form a three dimensional matrix. The Department will require all long term performance property values in table below to be based on non degradable portion of the matting alone. Approved methods include polymer welding, thermal or polymer fusion, or placement of fibers between two high strength biaxially oriented nets mechanically bound by parallel stitching with polyolefin thread. Ensure that mats designated in the plans as Type 4 mats, are not to be manufactured from discontinuous or loosely held together by stitching or glued netting or composites. Type 4 mats shall be composed of geosynthetic matrix that exhibits a very high interlock and reinforcement capacities with both soil and root systems and with high tensile modulus. The Department will require manufacturer to use materials chemically and biologically inert to the natural soil environments conditions. Ensure the blanket is smolder resistant without the use of chemical additives. When stored, maintain the protective wrapping and elevate the mats off the ground to protect them from damage. The Department will not specify these materials for use in heavily acidic coal seam areas or other areas with soil problems that would severally limit vegetation growth.

A) Dimensions. Ensure TRMs are furnished in strips with a minimum width of 4 feet and length of 50 feet.
B) Weight. Ensure that all mat types have a minimum mass per unit area of 7 ounces per square yard according to ASTM D 6566.
C) Performance Testing: The Department will require AASHTO's NTPEP index testing. The Department will also require the manufacturer to perform internal MARV testing at a Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP) accredited laboratory for tensile strength, tensile elongation, mass per unit area, and thickness once every 24,000 yds of production or whatever rate is required to ensure 97.7% confidence under ASTM D4439& 4354. The Department will require Full scale testing for slope and channel applications shear stress shall be done under ASTM D 6459, ASTM D 6460-07 procedures.

2.2 Classifications

The basis for selection of the type of mat required will be based on the long term shear stress level of the mat of the channel in question or the degree of slope to protect and will be designated in the contract. The Type 4 mats are to be used at structural backfills protecting critical

structures, utility cuts, areas where vehicles may be expected to traverse the mat, channels with large heavy drift, and where higher factors of safety, very steep slopes and/or durability concerns are needed as determined by project team and designer and will be specified in the plans by designer.

Turf Reinforcement Matting					
Properties[1]	Type 1	Type 2	Type 3	Type 4	Test Method
Minimum tensile Strength lbs/ft	125	150	175	3000 by 1500	ASTM D6818[2]
UV stability (minimum % tensile retention)	80	80	80	90	ASTM D4355[3] (1000-hr exposure)
Minimum thickness (inches)	0.25	0.25	0.25	0.40	ASTM D6525
Slopes applications	2H:1V or flatter	1.5H:1V or flatter	1H:1V or flatter	1 H: 1V or greater	
Shear stress lbs/ft^2 Channel applications	6.0[4]	8.0[4]	10.0[4]	12.0[4]	ASTM D6459 ASTM D6460-07

[1] For TRMs containing degradable components, all physical property values must be obtained on the non-degradable portion of the matting alone.
[2]Minimum Average Roll Values for tensile strength of sample material machine direction.
[3]Tensile Strength percentage retained after stated 1000 hr duration of exposure under ASTM D4355 testing. Based on nondegradable components exclusively.
[4]Maximum permissible shear design values based on short-term (0.5 hr) vegetated data obtained by full scale flume testing ASTM D6459, D6460-07. Based on nondegradable components exclusively. Testing will be done at Independent Hydraulics Facility such as Colorado State University hydraulics laboratory, Utah State University hydraulics laboratory, Texas Transportation Institute (TTI) hydraulics and erosion control laboratory.

2.3 Quality Assurance Sampling, Testing, and Acceptance

A) Provide TRM listed on the Department's List of Approved Materials. Prior to inclusion on the LAM, the manufacturer of TRM must meet the physical and performance criteria as outlined in the specification and submit a Letter Certifying compliance of the product under the above ASTM testing procedures and including a copy of report from Full Scale Independent Hydraulics Facility that Fully Vegetated Shear Stress meets shear stress requirements tested under D6459 and D6460-07.

B) Contractors will provide a Letter of Certification from Manufacturer stating the product name, manufacturer, and that the product MARV product unit testing results meets Department criteria. Provide Letters once per project and for each product.

C) Acceptance shall be in accordance with ASTM D-4759 based on testing performed by a Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP) accredited laboratory using Procedure A of ASTM D-4354.

Current mats meeting the above criteria are shown on the Department's List of Approved Materials.

2.4 Fasteners. When the mat manufacturer does not specify a specific fastener, use steel wire U-shaped staples with a minimum diameter of 0.09 inches (11 gauge), a minimum width of one inch and a minimum length of 12 inches. Use a heavier gauge when working in rocky or clay soils and longer lengths in sandy soils as directed by Engineer or Manufacturer's Representative. Provide staples with colored tops when requested by the Engineer.

3.0 CONSTRUCTION. When requested by the Engineer, provide a Manufacturer's Representative on-site to oversee and approve the initial installation of the mat. When requested by the Engineer, provide a letter from the Manufacturer approving the installation. When there is a conflict between the Department's criteria and the Manufacturer's criteria, construct using the more restrictive. The Engineer and Manufacturer's Representative must approve all alternate installation methods prior to execution. Construct according to the Manufacturer's recommendations and the following as minimum installation technique:

3.1 Site Preparation. Grade areas to be treated with matting and compact. Remove large rocks, soil clods, vegetation, roots, and other sharp objects that could keep the mat from intimate contact with subgrade. Prepare seedbed by loosening the top 2 to 3 inch of soil.

3.2 Installation. Install mats according to Standard Drawing Sepias "Turf Mat Channel Installation" and "Turf Mat Slope Installation." Install mats at the specified elevation and alignment. Anchor the mats with staples with a minimum length of 12 inches. Use longer anchors for installations in sandy, loose, or wet soils as directed by the Engineer or Manufacturer's Representative. The mat should be in direct contact with the soil surface.

4.0 MEASUREMENT. The Department will measure the quantity of Turf Reinforcement Mat by the square yard of surface covered. The Department will not measure preparation of the bed, providing a Manufacturer's Representative, topsoil, or seeding for payment and will consider them incidental to the Turf Reinforcement Mat. The Department will not measure any reworking of slopes or channels for payment as it is considered corrective work and incidental to the Turf Reinforcement Mat. Seeding and protection will be an incidental item.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
23274EN11F	Turf Reinforcement Mat 1	Square Yard
23275EN11F	Turf Reinforcement Mat 2	Square Yard
23276EN11F	Turf Reinforcement Mat 3	Square Yard
23277EN11F	Turf Reinforcement Mat 4	Square Yard

SPECIAL NOTE FOR BARCODE LABEL ON PERMANENT SIGNS

1.0 DESCRIPTION. Install barcode label on sheeting signs. Section references herein are to the Department's Standard Specifications for Road and Bridge Construction, current edition.

2.0 MATERIALS. The Department will provide the Contractor with a 2 inch x 1 inch foil barcode label for each permanent sheeting sign. A unique number will be assigned to each barcode label.

The Contractor shall contact the Operations and Pavement Management Branch in the Division of Maintenance at (502) 564-4556 to obtain the barcode labels.

3.0 CONSTRUCTION. Apply foil barcode label in the lower right quadrant of the sign back. Signs where the bottom edge is not parallel to the ground, the lowest corner of the sign shall serve as the location to place the barcode label. The barcode label shall be placed no less than one-inch and no more than three inches from any edge of the sign. The barcode must be placed so that the sign post does not cover the barcode label.

Barcodes shall be applied in an indoor setting with a minimum air temperature of 50°F or higher. Prior to application of the barcode label, the back of the sign must be clean and free of dust, oil, etc. If the sign is not clean, an alcohol swab shall be used to clean the area. The area must be allowed to dry prior to placement of the barcode label.

Data for each sign shall include the barcode number, MUTCD reference number, sheeting manufacturer, sheeting type, manufacture date, color of primary reflective surface, installation date, latitude and longitude using the North American Datum of 1983 (NAD83) or the State Plane Coordinates using an x and y ordinate of the installed location.

Data should be provided electronically on the TC 71-229 Sign Details Information and TC 71-230 Sign Assembly Information forms. The Contractor may choose to present the data in a different format provided that the information submitted to the Department is equivalent to the information required on the Department TC forms. The forms must be submitted in electronic format regardless of which type of form is used. The Department will not accept PDF or handwritten forms. These completed forms must be submitted to the Department prior to final inspection of the signs. The Department will not issue formal acceptance for the project until the TC 71-229 and TC-230 electronic forms are completed for all signs and sign assemblies on the project.

4.0 MEASUREMENT. The Department will measure all work required for the installation of the barcode label and all work associated with completion and submission of the sign inventory data (TC 71-229 and TC 71-230).

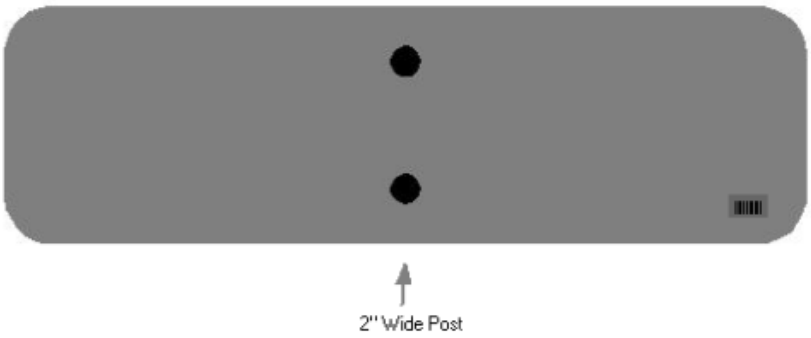
The installation of the permanent sign will be measured in accordance to Section 715.

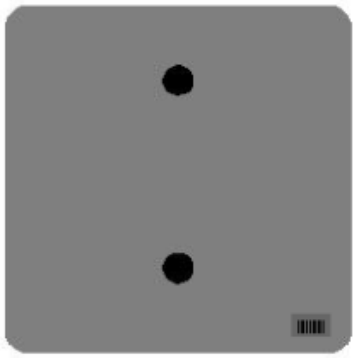
5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
24631EC	Barcode Sign Inventory	Each

The Department will not make payment for this item until all barcodes are installed and sign inventory is complete on every permanent sign installed on the project. The Department will make payment for installation of the permanent sign in accordance to Section 715. The Department will consider payment as full compensation for all work required under this special note.

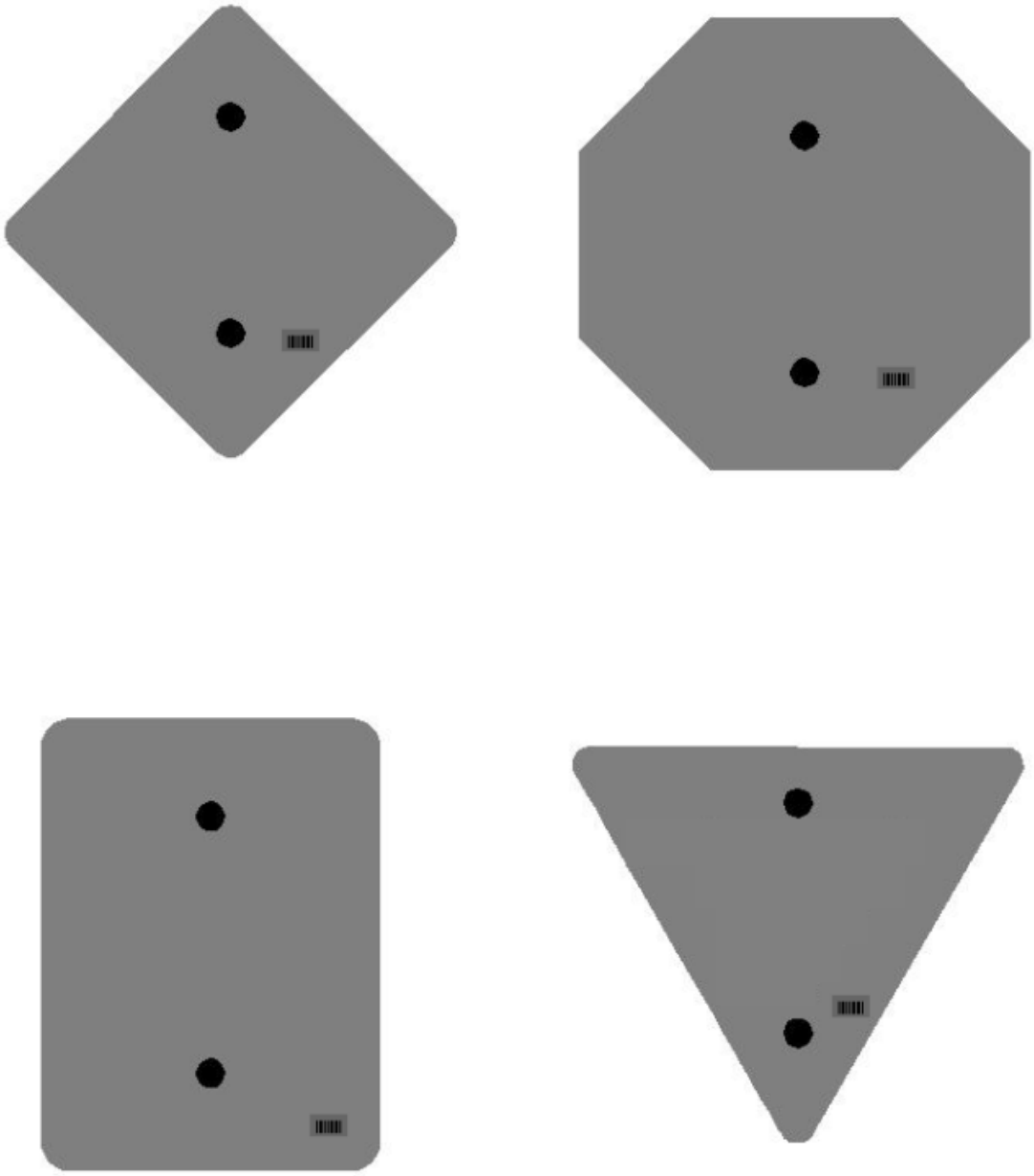
One Sign Post



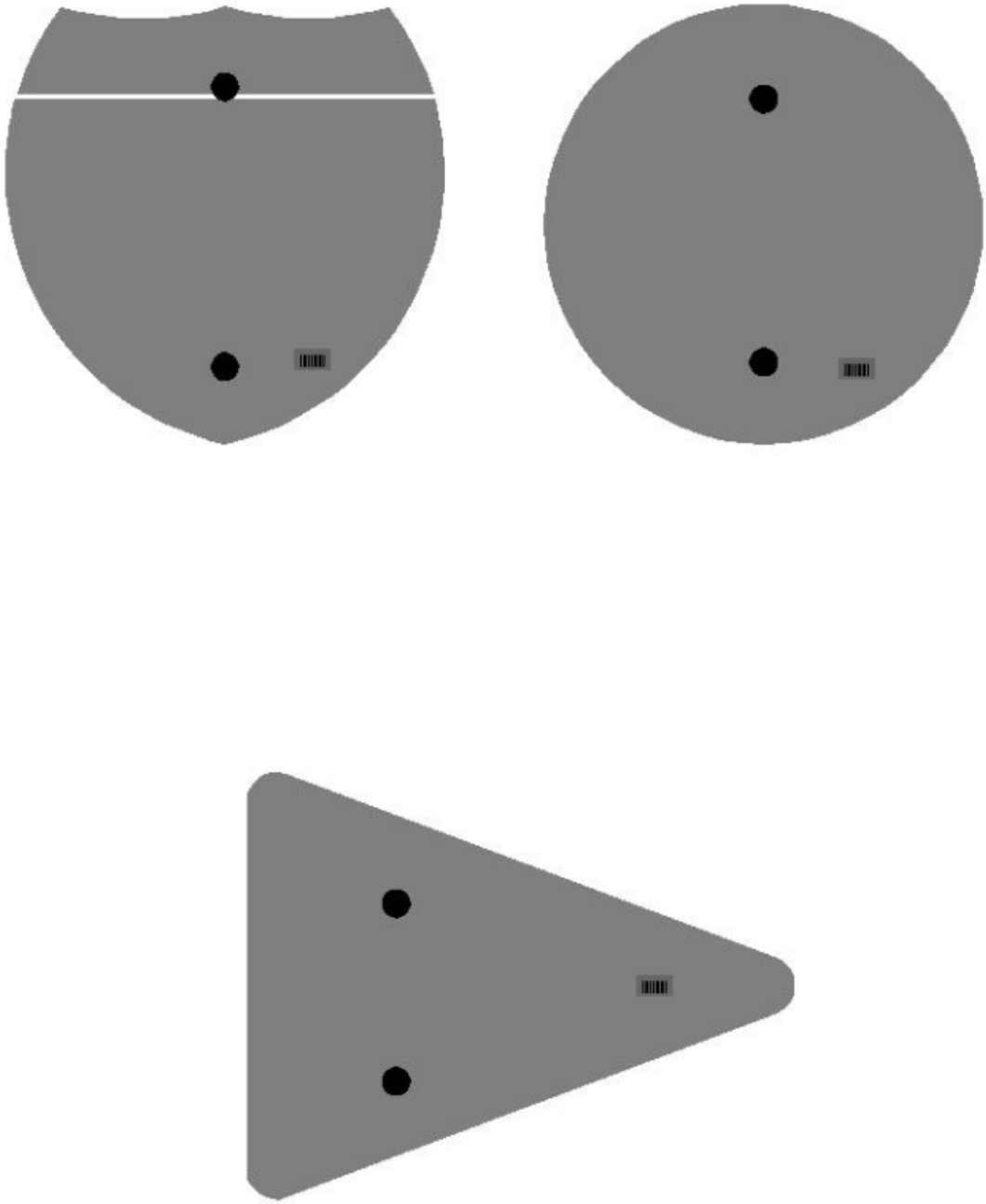




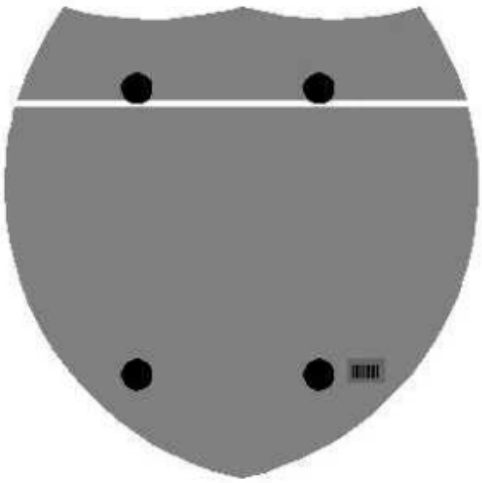
One Sign Post



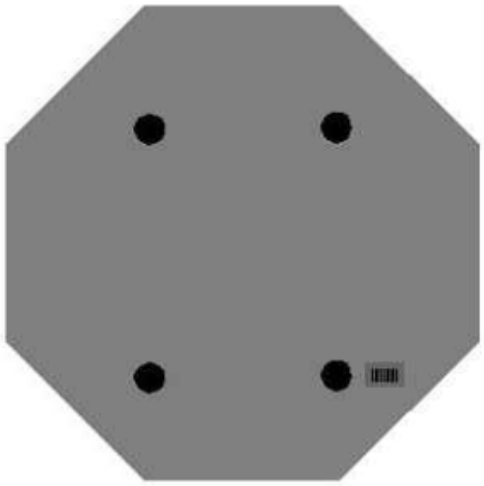
One Sign Post



Double Sign Post



Interstate
Shield

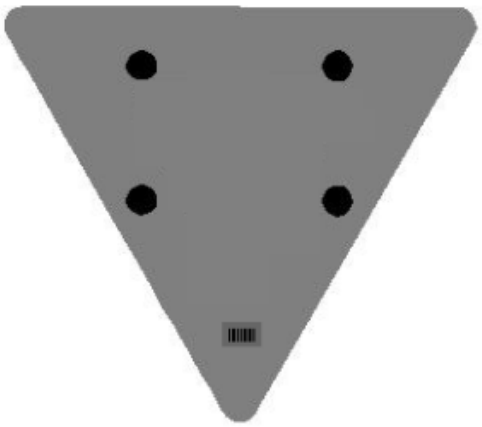


48" Stop

2 Post Signs







11N

SPECIAL NOTE FOR LONGITUDINAL PAVEMENT JOINT ADHESIVE

1. DESCRIPTION. This specification covers the requirements and practices for applying an asphalt adhesive material to the longitudinal joint of the surface course of an asphalt pavement. Apply the adhesive to the face of longitudinal joint between driving lanes for the first lane paved. Then, place and compact the adjacent lane against the treated face to produce a strong, durable, waterproof longitudinal joint.

2. MATERIALS, EQUIPMENT, AND PERSONNEL.

2.1 Joint Adhesive. Provide material conforming to Subsection 2.1.1.

2.1.1 Provide an adhesive conforming to the following requirements:

Property	Specification	Test Procedure
Viscosity, 400 ° F (Pa·s)	4.0 – 10.0	ASTM D 4402
Cone Penetration, 77 ° F	60 – 100	ASTM D 5329
Flow, 140 ° F (mm)	5.0 max.	ASTM D 5329
Resilience, 77 ° F (%)	30 min.	ASTM D 5329
Ductility, 77 ° F (cm)	30.0 min.	ASTM D 113
Ductility, 39 ° F (cm)	30.0 min.	ASTM D 113
Tensile Adhesion, 77 ° F (%)	500 min.	ASTM D 5329, Type II
Softening Point, ° F	171 min.	AASHTO T 53
Asphalt Compatibility	Pass	ASTM D 5329

Ensure the temperature of the pavement joint adhesive is between 380 and 410 °F when the material is extruded in a 0.125-inch-thick band over the entire face of the longitudinal joint.

2.2. Equipment.

2.2.1 Melter Kettle. Provide an oil-jacketed, double-boiler, melter kettle equipped with any needed agitation and recirculating systems.

2.2.2 Applicator System. Provide a pressure-feed-wand applicator system with an applicator shoe attached.

2.3 Personnel. Ensure a technical representative from the manufacturer of the pavement joint adhesive is present during the initial construction activities and available upon the request of the Engineer.

3. CONSTRUCTION.

3.1 Surface Preparation. Prior to the application of the pavement joint adhesive, ensure the face of the longitudinal joint is thoroughly dry and free from dust or any other debris that would inhibit adhesion. Clean the joint face by the use of compressed air.

Ensure this preparation process occurs shortly before application to prevent the return of debris on the joint face.

3.2 Pavement Joint Adhesive Application. Ensure the ambient temperature is a minimum of 40 ^{o} F during the application of the pavement joint adhesive. Prior to applying the adhesive, demonstrate competence in applying the adhesive according to this note to the satisfaction of the Engineer. Heat the adhesive in the melter kettle to the specified temperature range. Pump the adhesive from the melter kettle through the wand onto the vertical face of the cold joint. Apply the adhesive in a continuous band over the entire face of the longitudinal joint. Do not use excessive material in either thickness or location. Ensure the edge of the extruded adhesive material is flush with the surface of the pavement. Then, place and compact the adjacent lane against the joint face. Remove any excessive material extruded from the joint after compaction (a small line of material may remain).

3.3 Pavement Joint Adhesive Certification. Furnish the joint adhesive's certification to the Engineer stating the material conforms to all requirements herein prior to use.

3.4 Sampling and Testing. The Department will require a random sample of pavement joint adhesive from each manufacturer's lot of material. Extrude two 5 lb. samples of the heated material and forward the sample to the Division of Materials for testing. Reynolds oven bags, turkey size, placed inside small cardboard boxes or cement cylinder molds have been found suitable. Ensure the product temperature is 400°F or below at the time of sampling.

4. MEASUREMENT. The Department will measure the quantity of Pavement Joint Adhesive in linear feet. The Department will not measure for payment any extra materials, labor, methods, equipment, or construction techniques used to satisfy the requirements of this note. The Department will not measure for payment any trial applications of Pavement Joint Adhesive, the cleaning of the joint face, or furnishing and placing the adhesive. The Department will consider all such items incidental to the Pavement Joint Adhesive.

5. PAYMENT. The Department will pay for the Pavement Joint Adhesive at the Contract unit bid price and apply an adjustment for each manufacturer's lot of material based on the degree of compliance as defined in the following schedule. When a sample fails on two or more tests, the Department may add the deductions, but the total deduction will not exceed 100 percent.

11N

Pavement Joint Adhesive Price Adjustment Schedule						
Test	Specification	100% Pay	90% Pay	80% Pay	50% Pay	0% Pay
Joint Adhesive Referenced in Subsection 2.1.1						
Viscosity, 400 º F (Pa•s)			3.0-3.4	2.5-2.9	2.0-2.4	≤1.9
ASTM D 3236	4.0-10.0	3.5-10.5	10.6-11.0	11.1-11.5	11.6-12.0	≥ 12.1
Cone Penetration, 77 º F			54-56	51-53	48-50	≤ 47
ASTM D 5329	60-100	57-103	104-106	107-109	110-112	≥ 113
Flow, 140 º F (mm) ASTM D 5329	≤ 5.0	≤ 5.5	5.6-6.0	6.1-6.5	6.6-7.0	≥ 7.1
Resilience, 77 º F (%) ASTM D 5329	≥ 30	≥ 28	26-27	24-25	22-23	≤ 21
Tensile Adhesion, 77 º F (%) ASTM D 5329	≥ 500	≥ 490	480-489	470-479	460-469	≤ 459
Softening Point, º F AASHTO T 53	≥ 171	≥ 169	166-168	163-165	160-162	≤ 159
Ductility, 77 º F (cm) ASTM D 113	≥ 30.0	≥ 29.0	28.0-28.9	27.0-27.9	26.0-26.9	≤ 25.9
Ductility, 39 º F (cm) ASTM D 113	≥ 30.0	≥ 29.0	28.0-28.9	27.0-27.9	26.0-26.9	≤ 25.9

Code	Pay Item	Pay Unit
20071EC	Joint Adhesive	Linear Foot

May 7, 2014

SPECIAL PROVISION FOR EMBANKMENT AT BRIDGE END BENT STRUCTURES

This Special Provision will apply when indicated on the plans or in the proposal. Section references herein are to the Department's Standard Specifications for Road and Bridge Construction, Current Edition.

1.0 DESCRIPTION. Construct a soil, granular, or rock embankment with soil, granular or cohesive pile core and place structure granular backfill, as the Plans require. Construct the embankment according to the requirements of this Special Provision, the Plans, Standard Drawing RGX 100 and 105, and the Standard Specifications, Current Edition.

2.0 MATERIALS.

2.1 Granular Embankment. Conform to Subsection 805.10. When Granular Embankment materials are erodible or unstable according to Subsection 805.03.04, use the Special Construction Methods found in 3.2 of the Special Provision.

2.2 Rock Embankment. Provide durable rock from roadway excavation that consists principally of Unweathered Limestone, Durable Shale (SDI equal to or greater than 95 according to KM 64-513), or Durable Sandstone.

2.3 Pile Core. Provide a pile core in the area of the embankments where deep foundations are to be installed unless otherwise specified. The Pile Core is the zone indicated on Standard Drawings RGX 100 and 105 designated as Pile Core. Material control of the pile core area during embankment construction is always required. Proper Pile Core construction is required for installation of foundation elements such as drilled or driven piles or drilled shafts. The type of material used to construct the pile core is as directed in the plans or below. Typically, the pile core area will be constructed from the same material used to construct the surrounding embankment. Pile Core can be classified as one of three types:

A) Pile Core - Conform to Section 206 of the Standard Specifications. Provide pile core material consisting of the same material as the adjacent embankment except the material in the pile core area shall be free of boulders or particle sizes larger than 4 inches in any dimension or any other obstructions that may hinder pile driving operations. If the pile core material hinders pile driving operations, take the appropriate means necessary to reach the required pile tip elevation, at no expense to the Department.

B) Granular Pile Core. Granular pile core is required only when specified in the plans. Select a gradation of durable rock to facilitate pile driving that conforms to Subsection 805.11. If granular pile core material hinders pile driving operations, take appropriate means necessary to reach the required pile tip elevation, at no expense to the Department.

C) Cohesive Pile Core. Cohesive Pile Core is required only when specified in the plans. Conform to Section 206 of the Standard Specifications and use soil with at least 50 percent passing a No. 4 sieve having a minimum Plasticity Index (PI) of 10. In addition, keep the cohesive pile core free of boulders, larger than 4 inches in any dimension, or any other obstructions, which would interfere with drilling operations. If cohesive pile core material interferes with drilling operations, take appropriate means necessary to maintain

excavation stability, at no expense to the Department.

2.4 Structure Granular Backfill. Conform to Subsection 805.11

2.5 Geotextile Fabric. Conform to Type I or Type IV in Section 214 and 843.

3.0 CONSTRUCTION.

3.1 General. Construct roadway embankments at end bents according to Section 206 and in accordance with the Special Provision, the Plans, and Standard Drawings for the full embankment section. In some instances, granular or rock embankment will be required for embankment construction for stability purposes, but this special provision does not prevent the use of soil when appropriate. Refer to the plans for specific details regarding material requirements for embankment construction.

Place and compact the pile core and structure granular backfill according to the applicable density requirements for the project. If the embankment and pile core are dissimilar materials (i.e., a granular pile core is used with a soil embankment or a cohesive pile core is used with a granular embankment), a Geotextile Fabric, Type IV, will be required between the pile core and embankment in accordance with Sections 214 and 843 of the Standard Specifications.

When granular or rock embankment is required for embankment construction, conform to the general requirements of Subsection 206.03.02 B. In addition, place the material in no greater than 2-foot loose lifts and compact with a vibrating smooth wheel roller capable of producing a minimum centrifugal force of 15 tons. Apply these requirements to the full width of the embankment for a distance of half the embankment height or 50 feet, whichever is greater, as shown on Standard Drawing RGX-105.

When using granular pile core, install 8-inch perforated underdrain pipe at or near the elevation of the original ground in the approximate locations depicted on the standard drawing, and as the Engineer directs, to ensure positive drainage of the embankment. Wrap the perforated pipe with a fabric of a type recommended by the pipe manufacturer.

After constructing the embankment, excavate for the end bent cap, drive piling, install shafts or other foundation elements, place the mortar bed, construct the end bent, and complete the embankment to finish grade according to the construction sequence shown on the Plans or Standard Drawings and as specified hereinafter.

Certain projects may require widening of existing embankments and the removal of substructures. Construct embankment according to the plans. Substructure removal shall be completed according to the plans and Section 203. Excavation may be required at the existing embankment in order to place the structure granular backfill as shown in the Standard Drawings.

After piles are driven or shafts installed (see design drawings), slope the bottom of the excavation towards the ends of the trench as noted on the plans for drainage. Using a separate pour, place concrete mortar, or any class concrete, to provide a base for forming and placing the cap. Place side forms for the end bent after the mortar has set sufficiently to support workmen and forms without being disturbed.

Install 4-inch perforated pipe in accordance with the plans and Standard Drawings. In the event slope protection extends above the elevation of the perforated pipe, extend the pipe through the slope protection.

After placing the end bent cap and achieving required concrete cylinder strengths, remove adjacent forms and fill the excavation with compacted structure granular backfill material (maximum 1’ loose lifts) to the level of the berm prior to placing beams for the bridge. Place Type IV geotextile fabric between embankment material and structure granular backfill. After completing the end bent backwall, or after completing the span end

wall, place the compacted structure granular backfill (maximum 1' loose lifts) to subgrade elevation. If the original excavation is enlarged, fill the entire volume with compacted structure granular backfill (maximum 1' loose lifts) at no expense to the Department. Do not place backfill before removing adjacent form work. Place structure granular backfill material in trench ditches at the ends of the excavation. Place Geotextile Fabric, Type IV over the surface of the compacted structure granular backfill prior to placing aggregate base course.

Tamp the backfill with hand tampers, pneumatic tampers, or other means approved by the Engineer. Thoroughly compact the backfill under the overhanging portions of the structure to ensure that the backfill is in intimate contact with the sides of the structure.

Do not apply seeding, sodding, or other vegetation to the exposed granular embankment.

3.2 Special Construction Methods. Erodible or unstable materials may erode even when protected by riprap or channel lining; use the special construction method described below when using these materials.

Use fine aggregates or friable sandstone granular embankment at "dry land" structures only. Do not use them at stream crossings or locations subject to flood waters.

For erodible or unstable materials having 50 percent or more passing the No. 4 sieve, protect with geotextile fabric. Extend the fabric from the original ground to the top of slope over the entire area of the embankment slopes on each side of, and in front of, the end bent. Cover the fabric with at least 12 inches of non-erodible material.

For erodible or unstable materials having less than 50 percent passing a No. 4 sieve, cover with at least 12 inches of non-erodible material.

Where erodible or unstable granular embankment will be protected by riprap or channel lining, place Type IV geotextile fabric between the embankment and the specified slope protection.

4.0 MEASUREMENT.

4.1 Granular Embankment. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure for payment any Granular Embankment that is not called for in the plans.

The Department will not measure for payment any special construction caused by using erodible or unstable materials and will consider it incidental to the Granular Embankment regardless of whether the erodible or unstable material was specified or permitted.

4.2 Rock Embankment. The Department will not measure for payment any rock embankment and will consider it incidental to roadway excavation or embankment in place, as applicable. Rock embankments will be constructed using granular embankment on projects where there is no available rock present within the excavation limits of the project.

4.3 Pile Core. Pile core will be measured and paid under roadway excavation or embankment in place, as applicable. The Department will not measure the pile core for separate payment. The Department will not measure for payment the 8-inch perforated underdrain pipe and will consider it incidental to the Pile Core.

4.4 Structure Granular Backfill. The Department will measure the quantity in cubic yards using the plan quantity, increased or decreased by authorized adjustments as specified in Section 204. The Department will not measure any additional material required for backfill outside the limits shown on the Plans and Standard Drawings for payment and will

consider it incidental to the work.

The Department will not measure for payment the 4-inch perforated underdrain pipe and will consider it incidental to the Structure Granular Backfill.

4.5 Geotextile Fabric. The Department will not measure the quantity of fabric used for separating dissimilar materials when constructing the embankment and pile core and will consider it incidental to embankment construction.

The Department will not measure for payment the Geotextile Fabric used to separate the Structure Granular Backfill from the embankment and aggregate base course and will consider it incidental to Structure Granular Backfill.

The Department will not measure for payment the Geotextile Fabric required for construction with erodible or unstable materials and will consider it incidental to embankment construction.

4.6 End Bent. The Department will measure the quantities according to the Contract. The Department will not measure furnishing and placing the 2-inch mortar or concrete bed for payment and will consider it incidental to the end bent construction.

4.7 Structure Excavation. The Department will not measure structure excavation on new embankments for payment and will consider it incidental to the Structure Granular Backfill or Concrete as applicable.

5.0 PAYMENT. The Department will make payment for the completed and accepted quantities under the following:

Code	Pay Item	Pay Unit
02223	Granular Embankment	Cubic Yards
02231	Structure Granular Backfill	Cubic Yards

The Department will consider payment as full compensation for all work required in this provision.

September 16, 2016

PART III

EMPLOYMENT, WAGE AND RECORD REQUIREMENTS

FHWA-1273 -- Revised July 5, 2022

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. General
II. Nondiscrimination
III. Non-segregated Facilities
IV. Davis-Bacon and Related Act Provisions
V. Contract Work Hours and Safety Standards Act Provisions
VI. Subletting or Assigning the Contract
VII. Safety: Accident Prevention
VIII. False Statements Concerning Highway Projects
IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
XI. Certification Regarding Use of Contract Funds for Lobbying
XII. Use of United States-Flag Vessels:

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (*see* 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:
(1) Withholding monthly progress payments;
(2) Assessing sanctions;
(3) Liquidated damages; and/or
(4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than $10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding (29 CFR 5.5)

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records (29 CFR 5.5)

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or

subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees (29 CFR 5.5)

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility (29 CFR 5.5)

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1 of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 of this section. 29 CFR 5.5.

* $27 as of January 23, 2019 (See 84 FR 213-01, 218) as may be adjusted annually by the Department of Labor; pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990).

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this section. 29 CFR 5.5.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section. 29 CFR 5.5.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance

with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of $150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.326.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.326.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1**. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. “First Tier Covered Transactions” refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant

who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (https://www.sam.gov/). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is

submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (https://www.sam.gov/), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(a) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(b) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(c) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier

subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)
This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

KENTUCKY TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

EMPLOYMENT REQUIREMENTS
RELATING TO
NONDISCRIMINATION OF EMPLOYEES
(APPLICABLE TO FEDERAL-AID SYSTEM CONTRACTS)

AN ACT OF THE KENTUCKY GENERAL ASSEMBLY TO PREVENT DISCRIMINATION IN EMPLOYMENT

KRS CHAPTER 344
EFFECTIVE JUNE 16, 1972

The contract on this project, in accordance with KRS Chapter 344, provides that during the performance of this contract, the contractor agrees as follows:

1. The contractor shall not fail or refuse to hire, or shall not discharge any individual, or otherwise discriminate against an individual with respect to his compensation, terms, conditions, or privileges of employment, because of such individual's race, color, religion, national origin, sex, disability or age (forty and above); or limit, segregate, or classify his employees in any way which would deprive or tend to deprive an individual of employment opportunities or otherwise adversely affect his status as an employee, because of such individual's race, color, religion, national origin, sex, disability or age forty (40) and over. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2. The contractor shall not print or publish or cause to be printed or published a notice or advertisement relating to employment by such an employer or membership in or any classification or referral for employment by the employment agency, indicating any preference, limitation, specification, or discrimination, based on race, color, religion, national origin, sex, or age forty (40) and over, or because the person is a qualified individual with a disability, except that such a notice or advertisement may indicate a preference, limitation, or specification based on religion, national origin, sex, or age forty (40) and over, or because the person is a qualified individual with a disability, when religion, national origin, sex, or age forty (40) and over, or because the person is a qualified individual with a disability, is a bona fide occupational qualification for employment.

3. If the contractor is in control of apprenticeship or other training or retraining, including on-the-job training programs, he shall not discriminate against an individual because of his race, color, religion, national origin, sex, disability or age forty (40) and over, in admission to, or employment in any program established to provide apprenticeship or other training.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. The contractor will take such action with respect to any subcontract or purchase order as the administrating agency may direct as a means of enforcing such provisions, including sanctions for non-compliance.

Revised: January 25, 2017

Standard Title VI/Non-Discrimination Assurances

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. **Compliance with Regulations:** The contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, **Federal Highway Administration**, as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

2. **Non-discrimination:** The contractor, with regard to the work performed by it during the contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Non-discrimination on the grounds of race, color, or national origin.

4. **Information and Reports:** The contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the **Federal Highway Administration** to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor will so certify to the Recipient or the **Federal Highway Administration**, as appropriate, and will set forth what efforts it has made to obtain the information.

5. **Sanctions for Noncompliance:** In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it or the **Federal Highway Administration** may determine to be appropriate, including, but not limited to:

    a. withholding payments to the contractor under the contract until the contractor complies; and/or
    b. cancelling, terminating, or suspending a contract, in whole or in part.

6. **Incorporation of Provisions:** The contractor will include the provisions of paragraphs one through six in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor will take action with respect to any subcontract or procurement as the Recipient or the **Federal Highway Administration** may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

Standard Title VI/Non-Discrimination Statutes and Authorities

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees to comply with the following non-discrimination statutes and authorities; including but not limited to:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d *et seq.*, 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21;
- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 *et seq.*), (prohibits discrimination on the basis of sex);
- Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 *et seq.*), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;
- The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 *et seq.*), (prohibits discrimination on the basis of age);
- Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);
- Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131 -- 12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
- The Federal Aviation Administration's Non-discrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures non-discrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
- Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
- Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).

EXECUTIVE BRANCH CODE OF ETHICS

In the 1992 regular legislative session, the General Assembly passed and Governor Brereton Jones signed Senate Bill 63 (codified as KRS 11A), the Executive Branch Code of Ethics, which states, in part:

KRS 11A.040 (7) provides:

No present or former public servant shall, within six (6) months following termination of his office or employment, accept employment, compensation, or other economic benefit from any person or business that contracts or does business with, or is regulated by, the state in matters in which he was directly involved during the last thirty-six (36) months of his tenure. This provision shall not prohibit an individual from returning to the same business, firm, occupation, or profession in which he was involved prior to taking office or beginning his term of employment, or for which he received, prior to his state employment, a professional degree or license, provided that, for a period of six (6) months, he personally refrains from working on any matter in which he was directly involved during the last thirty-six (36) months of his tenure in state government. This subsection shall not prohibit the performance of ministerial functions, including but not limited to filing tax returns, filing applications for permits or licenses, or filing incorporation papers, nor shall it prohibit the former officer or public servant from receiving public funds disbursed through entitlement programs.

KRS 11A.040 (9) states:

A former public servant shall not represent a person or business before a state agency in a matter in which the former public servant was directly involved during the last thirty-six (36) months of his tenure, for a period of one (1) year after the latter of:

a) The date of leaving office or termination of employment; or
b) The date the term of office expires to which the public servant was elected.

This law is intended to promote public confidence in the integrity of state government and to declare as public policy the idea that state employees should view their work as a public trust and not as a way to obtain private benefits.

If you have worked for the executive branch of state government within the past six months, you may be subject to the law's prohibitions. The law's applicability may be different if you hold elected office or are contemplating representation of another before a state agency.

Also, if you are affiliated with a firm which does business with the state and which employs former state executive-branch employees, you should be aware that the law may apply to them.

In case of doubt, the law permits you to request an advisory opinion from the Executive Branch Ethics Commission, 1025 Capital Center Drive, Suite 104, Frankfort, Kentucky 40601; telephone (502) 564-7954.

Revised: May 23, 2022

"General Decision Number: KY20220038 08/12/2022

Superseded General Decision Number: KY20210038

State: Kentucky

Construction Type: Highway

Counties: Anderson, Bath, Bourbon, Boyd, Boyle, Bracken, Breckinridge, Bullitt, Carroll, Carter, Clark, Elliott, Fayette, Fleming, Franklin, Gallatin, Grant, Grayson, Greenup, Hardin, Harrison, Henry, Jefferson, Jessamine, Larue, Lewis, Madison, Marion, Mason, Meade, Mercer, Montgomery, Nelson, Nicholas, Oldham, Owen, Robertson, Rowan, Scott, Shelby, Spencer, Trimble, Washington and Woodford Counties in Kentucky.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a

conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://www.dol.gov/agencies/whd/government-contracts.

Modification Number	Publication Date
0	01/07/2022
1	02/11/2022
2	02/18/2022
3	02/25/2022
4	05/06/2022
5	06/10/2022
6	06/24/2022
7	07/01/2022
8	08/05/2022
9	08/12/2022

BRIN0004-003 06/01/2021

BRECKENRIDGE COUNTY

	Rates	Fringes
BRICKLAYER	$ 29.57	14.75

BRKY0001-005 06/01/2021

BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, & TRIMBLE COUNTIES:

	Rates	Fringes
BRICKLAYER	$ 29.57	15.10

BRKY0002-006 06/01/2021

BRACKEN, GALLATIN, GRANT, MASON & ROBERTSON COUNTIES:

	Rates	Fringes
BRICKLAYER	$ 30.87	15.87

BRKY0007-004 06/01/2021

BOYD, CARTER, ELLIOT, FLEMING, GREENUP, LEWIS & ROWAN COUNTIES:

	Rates	Fringes
BRICKLAYER	$ 36.19	19.54

BRKY0017-004 06/01/2021

ANDERSON, BATH, BOURBON, BOYLE, CLARK, FAYETTE, FRANKLIN, HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS, OWEN, SCOTT, WASHINGTON & WOODFORD COUNTIES:

	Rates	Fringes
BRICKLAYER	$ 30.87	15.87

CARP0064-001 04/01/2022

	Rates	Fringes
CARPENTER	$ 30.84	22.19
Diver	$ 46.64	22.19
PILEDRIVERMAN	$ 31.09	22.19

ELEC0212-008 06/07/2022

BRACKEN, GALLATIN and GRANT COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 33.29	20.05

ELEC0212-014 11/25/2019

BRACKEN, GALLATIN & GRANT COUNTIES:

	Rates	Fringes
Sound & Communication Technician	$ 24.35	12.09

ELEC0317-012 05/30/2022

BOYD, CARTER, ELLIOT & ROWAN COUNTIES:

	Rates	Fringes
ELECTRICIAN (Wiremen)	$ 35.85	28.25

ELEC0369-007 06/01/2022

ANDERSON, BATH, BOURBON, BOYLE, BRECKINRIDGE, BULLITT, CARROLL, CLARK, FAYETTE, FRAONKLIN, GRAYSON, HARDIN, HARRISON, HENRY, JEFFERSON, JESSAMINE, LARUE, MADISON, MARION, MEADE, MERCER, MONTGOMERY, NELSON, NICHOLAS, OLDHAM, OWEN, ROBERTSON, SCOTT, SHELBY, SPENCER, TRIMBLE, WASHINGTON, & WOODFORD COUNTIES:

	Rates	Fringes
ELECTRICIAN	$ 34.60	19.57

ELEC0575-002 11/29/2021

FLEMING, GREENUP, LEWIS & MASON COUNTIES:

	Rates	Fringes
ELECTRICIAN	$ 35.00	19.76

ENGI0181-018 07/01/2021

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1	$ 34.80	17.85
GROUP 2	$ 31.94	17.85
GROUP 3	$ 32.39	17.85
GROUP 4	$ 31.62	17.85

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - A-Frame Winch Truck; Auto Patrol; Backfiller; Batcher Plant; Bituminous Paver; Bituminous Transfer Machine; Boom Cat; Bulldozer; Mechanic; Cableway; Carry-All Scoop; Carry Deck Crane; Central Compressor Plant; Cherry Picker; Clamshell; Concrete Mixer (21 cu. ft. or Over); Concrete Paver; Truck-Mounted Concrete Pump; Core Drill; Crane; Crusher Plant; Derrick; Derrick Boat; Ditching & Trenching Machine; Dragline; Dredge Operator; Dredge Engineer; Elevating Grader & Loaders; Grade-All; Gurries; Heavy Equipment Robotics Operator/Mechanic; High Lift; Hoe-Type Machine; Hoist (Two or More Drums); Hoisting Engine (Two or More Drums); Horizontal Directional Drill Operator; Hydrocrane; Hyster; KeCal Loader; LeTourneau; Locomotive; Mechanic; Mechanically Operated Laser Screed; Mechanic Welder; Mucking Machine; Motor Scraper; Orangepeel Bucket; Overhead Crane; Piledriver; Power Blade; Pumpcrete; Push Dozer; Rock Spreader, attached to equipment; Rotary Drill; Roller (Bituminous); Rough Terrain Crane; Scarifier; Scoopmobile; Shovel; Side Boom; Subgrader; Tailboom; Telescoping Type Forklift; Tow or Push Boat; Tower Crane (French, German & other types); Tractor Shovel; Truck Crane; Tunnel Mining Machines, including Moles, Shields or similar types of Tunnel Mining Equipment

GROUP 2 - Air Compressor (Over 900 cu. ft. per min.); Bituminous Mixer; Boom Type Tamping Machine; Bull Float; Concrete Mixer (Under 21 cu. ft.); Dredge Engineer; Electric Vibrator; Compactor/Self-Propelled Compactor; Elevator (One Drum or Buck Hoist); Elevator (When used to Hoist Building Material); Finish Machine; Firemen & Hoist (One Drum); Flexplane; Forklift (Regardless of Lift Height); Form Grader; Joint Sealing Machine; Outboard Motor Boat; Power Sweeper (Riding Type); Roller (Rock); Ross Carrier; Skid Mounted or Trailer Mounted Conrete Pump; Skid Steer Machine with all Attachments; Switchman or Brakeman; Throttle Valve Person; Tractair & Road Widening Trencher; Tractor (50 H.P. or Over); Truck Crane Oiler; Tugger; Welding Machine; Well Points; & Whirley Oiler

GROUP 3 - All Off Road Material Handling Equipment, including Articulating Dump Trucks; Greaser on Grease Facilities servicing Heavy Equipment

GROUP 4 - Bituminous Distributor; Burlap & Curing Machine; Cement Gun; Concrete Saw; Conveyor; Deckhand Oiler; Grout Pump; Hydraulic Post Driver; Hydro Seeder; Mud Jack; Oiler; Paving Joint Machine; Power Form Handling Equipment; Pump; Roller (Earth); Steerman; Tamping Machine; Tractor (Under 50 H.P.); & Vibrator

CRANES - with booms 150 ft. & Over (Including JIB), and where the length of the boom in combination with the length of the piling leads equals or exceeds 150 ft. - $1.00 over Group 1 rate

EMPLOYEES ASSIGNED TO WORK BELOW GROUND LEVEL ARE TO BE PAID 10%
ABOVE BASIC WAGE RATE. THIS DOES NOT APPLY TO OPEN CUT WORK.

IRON0044-009 06/01/2022

BRACKEN, GALLATIN, GRANT, HARRISON, ROBERTSON,
BOURBON (Northern third, including Townships of Jackson,

Millersburg, Ruddel Mills & Shawhan);
CARROLL (Eastern third, including the Township of Ghent);
FLEMING (Western part, excluding Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford);
MASON (Western two-thirds, including Townships of Dover, Lewisburg, Mays Lick, Maysville, Minerva, Moranburg, Murphysville, Ripley, Sardis, Shannon, South Ripley & Washington);
NICHOLAS (Townships of Barefoot, Barterville, Carlisle, Ellisville, Headquarters, Henryville, Morningglory, Myers & Oakland Mills);
OWEN (Townships of Beechwood, Bromley, Fairbanks, Holbrook, Jonesville, Long Ridge, Lusby's Mill, New, New Columbus, New Liberty, Owenton, Poplar Grove, Rockdale, Sanders, Teresita & Wheatley);
SCOTT (Northern two-thirds, including Townships of Biddle, Davis, Delaplain, Elmville, Longlick, Muddy Ford, Oxford, Rogers Gap, Sadieville, Skinnersburg & Stonewall)

	Rates	Fringes
IRONWORKER		
Fence Erector	$ 30.28	22.30
Structural	$ 31.87	22.30

IRON0070-006 06/01/2022

ANDERSON, BOYLE, BRECKINRIDGE, BULLITT, FAYETTE, FRANKLIN, GRAYSON, HARDIN, HENRY, JEFFERSON, JESSAMINE, LARUE, MADISON, MARION, MEADE, MERCER, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE, WASHINGTON & WOODFORD
BOURBON (Southern two-thirds, including Townships of Austerlity, Centerville, Clintonville, Elizabeth, Hutchison, Littlerock, North Middletown & Paris);
CARROLL (Western two-thirds, including Townships of Carrollton, Easterday, English, Locust, Louis, Prestonville & Worthville);
CLARK (Western two-thirds, including Townships of Becknerville, Flanagan, Ford, Pine Grove, Winchester & Wyandotte);
OWEN (Eastern eighth, including Townships of Glenmary, Gratz, Monterey, Perry Park & Tacketts Mill);
SCOTT (Southern third, including Townships of Georgetown, Great Crossing, Newtown, Stampling Ground & Woodlake);

	Rates	Fringes
IRONWORKER	$ 31.79	24.30

IRON0769-007 06/01/2022

BATH, BOYD, CARTER, ELLIOTT, GREENUP, LEWIS, MONTGOMERY & ROWAN
CLARK (Eastern third, including townships of Bloomingdale, Hunt, Indian Fields, Kiddville, Loglick, Rightangele & Thomson);
FLEMING (Townships of Beechburg, Colfax, Elizaville, Flemingsburg, Flemingsburg Junction, Foxport, Grange City, Hillsboro, Hilltop, Mount Carmel, Muses Mills, Nepton, Pecksridge, Plummers Landing, Plummers Mill, Poplar Plains, Ringos Mills, Tilton & Wallingford);
MASON (Eastern third, including Townships of Helena, Marshall, Orangeburg, Plumville & Springdale);
NICHOLAS (Eastern eighth, including the Township of Moorefield

Sprout)

	Rates	Fringes
IRONWORKER		
ZONE 1	$ 33.71	27.69
ZONE 2	$ 34.11	27.69
ZONE 3	$ 35.71	27.69

ZONE 1 - (no base rate increase) Up to 10 mile radius of Union Hall, 1643 Greenup Ave, Ashland, KY.

ZONE 2 - (add $0.40 per hour to base rate) 10 to 50 mile radius of Union Hall, 1643 Greenup Ave, Ashland, KY.

ZONE 3 - (add $2.00 per hour to base rate) 50 mile radius & over of Union Hall, 1643 Greenup Ave, Ashland, KY.

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* LABO0189-003 07/01/2022

BATH, BOURBON, BOYD, BOYLE, BRACKEN, CARTER, CLARK, ELLIOTT, FAYETTE, FLEMING, FRANKLIN, GALLATIN, GRANT, GREENUP, HARRISON, JESSAMINE, LEWIS, MADISON, MASON, MERCER, MONTGOMERY, NICHOLAS, OWEN, ROBERTSON, ROWAN, SCOTT, & WOOLFORD COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1	$ 23.76	17.12
GROUP 2	$ 24.01	17.12
GROUP 3	$ 24.06	17.12
GROUP 4	$ 24.66	17.12

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; Wrecking of Concrete Forms; General Cleanup

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Scaffold Builder; Burner & Welder; Bushammer; Chain Saw Operator; Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level C; Forklift Operator for Masonary; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; Wagon Driller

GROUP 3 - Asphalt Luteman & Raker; Gunnite Nozzleman;

Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditches; Screw Operator; Tunnel (Free Air); Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Drillers (All Types); Powdermen & Blasters; Troxler & Concrete Tester if Laborer is Utilized

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* LABO0189-008 07/01/2022

ANDERSON, BULLITT, CARROLL, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1	$ 23.76	17.12
GROUP 2	$ 24.01	17.12
GROUP 3	$ 24.06	17.12
GROUP 4	$ 24.66	17.12

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; Wrecking of Concrete Forms; General Cleanup

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Scaffold Builder; Burner & Welder; Bushammer; Chain Saw Operator; Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level C; Forklift Operator for Masonary; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; Wagon Driller

GROUP 3 - Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditches; Screw Operator; Tunnel (Free Air); Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Drillers (All Types); Powdermen &

Blasters; Troxler & Concrete Tester if Laborer is Utilized

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* LABO0189-009 07/01/2022

BRECKINRIDGE & GRAYSON COUNTIES

	Rates	Fringes
Laborers:		
GROUP 1	$ 23.76	17.12
GROUP 2	$ 24.01	17.12
GROUP 3	$ 24.06	17.12
GROUP 4	$ 24.66	17.12

LABORERS CLASSIFICATIONS

GROUP 1 - Aging & Curing of Concrete; Asbestos Abatement Worker; Asphalt Plant; Asphalt; Batch Truck Dump; Carpenter Tender; Cement Mason Tender; Cleaning of Machines; Concrete; Demolition; Dredging; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level D; Flagperson; Grade Checker; Hand Digging & Hand Back Filling; Highway Marker Placer; Landscaping, Mesh Handler & Placer; Puddler; Railroad; Rip-rap & Grouter; Right-of-Way; Sign, Guard Rail & Fence Installer; Signal Person; Sound Barrier Installer; Storm & Sanitary Sewer; Swamper; Truck Spotter & Dumper; Wrecking of Concrete Forms; General Cleanup

GROUP 2 - Batter Board Man (Sanitary & Storm Sewer); Brickmason Tender; Mortar Mixer Operator; Scaffold Builder; Burner & Welder; Bushammer; Chain Saw Operator; Concrete Saw Operator; Deckhand Scow Man; Dry Cement Handler; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Level C; Forklift Operator for Masonary; Form Setter; Green Concrete Cutting; Hand Operated Grouter & Grinder Machine Operator; Jackhammer; Pavement Breaker; Paving Joint Machine; Pipelayer; Plastic Pipe Fusion; Power Driven Georgia Buggy & Wheel Barrow; Power Post Hole Digger; Precast Manhole Setter; Walk-Behind Tamper; Walk-Behind Trencher; Sand Blaster; Concrete Chipper; Surface Grinder; Vibrator Operator; Wagon Driller

GROUP 3 - Asphalt Luteman & Raker; Gunnite Nozzleman; Gunnite Operator & Mixer; Grout Pump Operator; Side Rail Setter; Rail Paved Ditches; Screw Operator; Tunnel (Free Air); Water Blaster

GROUP 4 - Caisson Worker (Free Air); Cement Finisher; Environmental - Nuclear, Radiation, Toxic & Hazardous Waste - Levels A & B; Miner & Driller (Free Air); Tunnel Blaster; & Tunnel Mucker (Free Air); Directional & Horizontal Boring; Air Track Drillers (All Types); Powdermen & Blasters; Troxler & Concrete Tester if Laborer is Utilized

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PAIN0012-005 06/11/2005

BATH, BOURBON, BOYLE, CLARK, FAYETTE, FLEMING, FRANKLIN, HARRISON, JESSAMINE, MADISON, MERCER, MONTGOMERY, NICHOLAS, ROBERTSON, SCOTT & WOODFORD COUNTIES:

	Rates	Fringes

PAINTER
Bridge/Equipment Tender
and/or Containment Builder..$ 18.90 5.90
Brush & Roller.....$ 21.30 5.90
Elevated Tanks;
Steeplejack Work; Bridge &
Lead Abatement.....$ 22.30 5.90
Sandblasting &
Waterblasting.....$ 22.05 5.90
Spray.....$ 21.80 5.90

PAIN0012-017 05/01/2015

BRACKEN, GALLATIN, GRANT, MASON & OWEN COUNTIES:

	Rates	Fringes
PAINTER (Heavy & Highway Bridges - Guardrails - Lightpoles - Striping)		
Bridge Equipment Tender and Containment Builder.....$	20.73	9.06
Brush & Roller.....$	23.39	9.06
Elevated Tanks; Steeplejack Work; Bridge & Lead Abatement.....$	24.39	9.06
Sandblasting & Water Blasting.....$	24.14	9.06
Spray.....$	23.89	9.06

PAIN0118-004 06/01/2018

ANDERSON, BRECKINRIDGE, BULLITT, CARROLL, GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES:

	Rates	Fringes
PAINTER		
Brush & Roller.....$	22.00	12.52
Spray, Sandblast, Power Tools, Waterblast & Steam Cleaning.....$	23.00	12.52

PAIN1072-003 12/01/2021

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS and ROWAN COUNTIES

	Rates	Fringes
Painters:		
Bridges; Locks; Dams; Tension Towers & Energized Substations.....$	35.06	21.15
Power Generating Facilities.$	31.82	21.15

PLUM0248-003 06/01/2022

BOYD, CARTER, ELLIOTT, GREENUP, LEWIS & ROWAN COUNTIES:

	Rates	Fringes
Plumber and Steamfitter.....$	38.50	22.40

PLUM0392-007 06/01/2018

BRACKEN, CARROLL (Eastern Half), GALLATIN, GRANT, MASON, OWEN & ROBERTSON COUNTIES:

	Rates	Fringes
Plumbers and Pipefitters	$ 32.01	19.67

PLUM0502-003 08/01/2021

BRECKINRIDGE, BULLITT, CARROLL (Western Half), FRANKLIN (Western three-fourths), GRAYSON, HARDIN, HENRY, JEFFERSON, LARUE, MARION, MEADE, NELSON, OLDHAM, SHELBY, SPENCER, TRIMBLE & WASHINGTON COUNTIES

	Rates	Fringes
PLUMBER	$ 38.07	20.78

SUKY2010-160 10/08/2001

	Rates	Fringes
Truck drivers:		
GROUP 1	$ 16.57	7.34
GROUP 2	$ 16.68	7.34
GROUP 3	$ 16.86	7.34
GROUP 4	$ 16.96	7.34

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Mobile Batch Truck Tender

GROUP 2 - Greaser; Tire Changer; & Mechanic Tender

GROUP 3 - Single Axle Dump; Flatbed; Semi-trailer or Pole Trailer when used to pull building materials and equipment; Tandem Axle Dump; Distributor; Mixer; & Truck Mechanic

GROUP 4 - Euclid & Other Heavy Earthmoving Equipment & Lowboy; Articulator Cat; 5-Axle Vehicle; Winch & A-Frame when used in transporting materials; Ross Carrier; Forklift when used to transport building materials; & Pavement Breaker

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is

like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a

new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"

Fringe benefit amounts are applicable for all hours worked except when otherwise noted.

No laborer, workman or mechanic shall be paid at a rate less than that of a Journeyman except those classified as bona fide apprentices.

Apprentices or trainees shall be permitted to work as such subject to Administrative Regulations adopted by the Commissioner of Workplace Standards. Copies of these regulations will be furnished upon request from any interested person.

Before using apprentices on the job the contractor shall present to the Contracting Officer written evidence of registration of such employees in a program of a State apprenticeship and training agency approved and recognized by the U. S. Bureau of Apprenticeship and Training. In the absence of such a State agency, the contractor shall submit evidence of approval and registration by the U. S. Bureau of Apprenticeship and Training.

The contractor shall submit to the Contracting Officer, written evidence of the established apprenticeship-journeyman ratios and wage rates in the project area, which will be the basis for establishing such ratios and rates for the project under the applicable contract provisions.

TO: EMPLOYERS/EMPLOYEES

PREVAILING WAGE SCHEDULE:

The wages indicated on this wage schedule are the least permitted to be paid for the occupations indicated. When an employee works in more than one classification, the employer must record the number of hours worked in each classification at the prescribed hourly base rate.

OVERTIME:

Overtime is to be paid to an employee at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty (40) hours in such workweek. Wage violations or questions should be directed to the designated Engineer or the undersigned.

Director
Division of Construction Procurement
Frankfort, Kentucky 40622
502-564-3500

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (Executive Order 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

GOALS FOR MINORITY PARTICIPATION IN EACH TRADE	GOALS FOR FEMALE PARTICIPATION IN EACH TRADE
11.2%	6.9%

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4, 3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of $10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed. The notification shall be mailed to:

Evelyn Teague, Regional Director
Office of Federal Contract Compliance Programs
61 Forsyth Street, SW, Suite 7B75
Atlanta, Georgia 30303-8609

4. As used in this Notice, and in the contract resulting from this solicitation, the **"covered area"** is Jefferson County.

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (Executive Order 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

GOALS FOR MINORITY PARTICIPATION IN EACH TRADE	GOALS FOR FEMALE PARTICIPATION IN EACH TRADE
11.2%	6.9%

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally-assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4, 3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within ten (10) working days of award of any construction subcontract in excess of $10,000.00 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed. The notification shall be mailed to:

Evelyn Teague, Regional Director
Office of Federal Contract Compliance Programs
61 Forsyth Street, SW, Suite 7B75
Atlanta, Georgia 30303-8609

4. As used in this Notice, and in the contract resulting from this solicitation, the **"covered area"** is Oldham County.

PART IV

INSURANCE

Refer to
Kentucky Standard Specifications for Road and Bridge Construction,
current edition

PART V

BID ITEMS

221055

PROPOSAL BID ITEMS

Report Date 9/21/22

Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	58,527.00	TON		$	
0020	00100		ASPHALT SEAL AGGREGATE	13.34	TON		$	
0030	00103		ASPHALT SEAL COAT	1.63	TON		$	
0040	00190		LEVELING & WEDGING PG64-22	101.00	TON		$	
0050	00214		CL3 ASPH BASE 1.00D PG64-22	24,214.00	TON		$	
0060	02101		CEM CONC ENT PAVEMENT-8 IN	1,887.00	SQYD		$	
0070	22906ES403		CL3 ASPH SURF 0.38A PG64-22	5,769.00	TON		$	
0080	24970EC		ASPHALT MATERIAL FOR TACK NON-TRACKING	47.31	TON		$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0090	00078		CRUSHED AGGREGATE SIZE NO 2	20,000.00	TON		$	
0100	01810		STANDARD CURB AND GUTTER	19,441.00	LF		$	
0110	01812		REMOVE CURB AND GUTTER	2,685.00	LF		$	
0120	01830		STANDARD INTEGRAL CURB	1,250.00	LF		$	
0130	01875		STANDARD HEADER CURB	581.00	LF		$	
0140	01904		REMOVE CURB	2,713.00	LF		$	
0150	01923		STANDARD BARRIER MEDIAN TYPE 5	719.00	SQYD		$	
0160	01982		DELINEATOR FOR GUARDRAIL MONO DIRECTIONAL WHITE	15.00	EACH		$	
0170	02014		BARRICADE-TYPE III	30.00	EACH		$	
0180	02058		REMOVE PCC PAVEMENT	15,423.00	SQYD		$	
0190	02091		REMOVE PAVEMENT	22,305.00	SQYD		$	
0200	02159		TEMP DITCH	7,000.00	LF		$	
0210	02160		CLEAN TEMP DITCH	3,500.00	LF		$	
0220	02165		REMOVE PAVED DITCH	103.00	SQYD		$	
0230	02200		ROADWAY EXCAVATION	191,372.00	CUYD		$	
0240	02242		WATER	2,210.00	MGAL		$	
0250	02360		GUARDRAIL TERMINAL SECTION NO 1	2.00	EACH		$	
0260	02367		GUARDRAIL END TREATMENT TYPE 1	3.00	EACH		$	
0270	02381		REMOVE GUARDRAIL	505.00	LF		$	
0280	02391		GUARDRAIL END TREATMENT TYPE 4A	2.00	EACH		$	
0290	02396		REMOVE GUARDRAIL END TREATMENT	2.00	EACH		$	
0300	02429		RIGHT-OF-WAY MONUMENT TYPE 1	53.00	EACH		$	
0310	02432		WITNESS POST	53.00	EACH		$	
0320	02471		FILL AND CAP SINKHOLE	1.00	EACH		$	
0330	02483		CHANNEL LINING CLASS II	1,154.00	TON		$	
0340	02484		CHANNEL LINING CLASS III	7,318.00	TON		$	
0350	02545		CLEARING AND GRUBBING 24.07 ACRES- JEFFERSON	1.00	LS		$	
0360	02545		CLEARING AND GRUBBING 7.54 ACRES- OLDHAM	1.00	LS		$	
0370	02562		TEMPORARY SIGNS	1,500.00	SQFT		$	
0380	02585		EDGE KEY	146.00	LF		$	
0390	02602		FABRIC-GEOTEXTILE CLASS 1	136,713.00	SQYD		$	

PROPOSAL BID ITEMS

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Report Date 9/21/22

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0400	02650		MAINTAIN & CONTROL TRAFFIC JEFFERSON	1.00	LS		$	
0410	02650		MAINTAIN & CONTROL TRAFFIC OLDHAM	1.00	LS		$	
0420	02651		DIVERSIONS (BY-PASS DETOURS) JEFFERSON	1.00	LS		$	
0430	02651		DIVERSIONS (BY-PASS DETOURS) OLDHAM	1.00	LS		$	
0440	02671		PORTABLE CHANGEABLE MESSAGE SIGN	15.00	EACH		$	
0450	02676		MOBILIZATION FOR MILL & TEXT JEFFERSON	1.00	LS		$	
0460	02690		SAFELOADING	59.00	CUYD		$	
0470	02701		TEMP SILT FENCE	7,000.00	LF		$	
0480	02703		SILT TRAP TYPE A	32.00	EACH		$	
0490	02704		SILT TRAP TYPE B	32.00	EACH		$	
0500	02705		SILT TRAP TYPE C	32.00	EACH		$	
0510	02706		CLEAN SILT TRAP TYPE A	32.00	EACH		$	
0520	02707		CLEAN SILT TRAP TYPE B	32.00	EACH		$	
0530	02708		CLEAN SILT TRAP TYPE C	32.00	EACH		$	
0540	02720		SIDEWALK-4 IN CONCRETE	4,966.00	SQYD		$	
0550	02721		REMOVE CONCRETE SIDEWALK	590.00	SQYD		$	
0560	02723		SIDEWALK-6 IN CONCRETE	8,488.00	SQYD		$	
0570	02726		STAKING	1.00	LS		$	
0580	02726		STAKING OLDHAM	1.00	LS		$	
0590	02731		REMOVE STRUCTURE JEFFERSON	1.00	LS		$	
0600	02775		ARROW PANEL	6.00	EACH		$	
0610	05950		EROSION CONTROL BLANKET	45,018.00	SQYD		$	
0620	05952		TEMP MULCH	103,253.00	SQYD		$	
0630	05953		TEMP SEEDING AND PROTECTION	77,440.00	SQYD		$	
0640	05963		INITIAL FERTILIZER	13.00	TON		$	
0650	05964		MAINTENANCE FERTILIZER	8.00	TON		$	
0660	05985		SEEDING AND PROTECTION	118,303.00	SQYD		$	
0670	05990		SODDING	14,159.00	SQYD		$	
0680	05992		AGRICULTURAL LIMESTONE	145.00	TON		$	
0690	06511		PAVE STRIPING-TEMP PAINT-6 IN	30,000.00	LF		$	
0700	06515		PAVE STRIPING-PERM PAINT-6 IN	44,172.00	LF		$	
0710	06517		PAVE STRIPING-PERM PAINT-12 IN	350.00	LF		$	
0720	06547		PAVE STRIPING-THERMO-12 IN Y	39.00	LF		$	
0730	06565		PAVE MARKING-THERMO X-WALK-6 IN	536.00	LF		$	
0740	06568		PAVE MARKING-THERMO STOP BAR-24IN	502.00	LF		$	
0750	06572		PAVE MARKING-DOTTED LANE EXTEN	135.00	LF		$	
0760	06574		PAVE MARKING-THERMO CURV ARROW	78.00	EACH		$	
0770	06575		PAVE MARKING-THERMO COMB ARROW	5.00	EACH		$	
0780	06576		PAVE MARKING-THERMO ONLY	2.00	EACH		$	
0790	06610		INLAID PAVEMENT MARKER-MW	89.00	EACH		$	
0800	06612		INLAID PAVEMENT MARKER-BY	336.00	EACH		$	
0810	10020NS		FUEL ADJUSTMENT	97,356.00	DOLL	$1.00	$	$97,356.00
0820	10030NS		ASPHALT ADJUSTMENT	72,657.00	DOLL	$1.00	$	$72,657.00
0830	20071EC		JOINT ADHESIVE	1,733.00	LF		$	

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PROPOSAL BID ITEMS

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LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0840	20166ES810		TEMPORARY PIPE	750.00	LF		$	
0850	20191ED		OBJECT MARKER TY 3	5.00	EACH		$	
0860	20550ND		SAWCUT PAVEMENT	4,133.00	LF		$	
0870	21289ED		LONGITUDINAL EDGE KEY	1,733.00	LF		$	
0880	21802EN		G/R STEEL W BEAM-S FACE (7 FT POST)	625.00	LF		$	
0890	22664EN		WATER BLASTING EXISTING STRIPE	10,000.00	LF		$	
0900	23158ES505		DETECTABLE WARNINGS	946.00	SQFT		$	
0910	23274EN11F		TURF REINFORCEMENT MAT 1	813.00	SQYD		$	
0920	23379EC		STAMPED CONCRETE	825.00	SQYD		$	
0930	23839EC		REMOVE CONCRETE MEDIAN	1,164.00	SQYD		$	
0940	24845EC		UTILITY COORDINATION JEFFERSON	1.00	LS		$	
0950	24845EC		UTILITY COORDINATION OLDHAM	1.00	LS		$	
0960	25079ED		THRIE BEAM GUARDRAIL TRANSITION TL-2	8.00	EACH		$	

Section: 0003 - DRAINAGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0970	00078		CRUSHED AGGREGATE SIZE NO 2	8.00	TON		$	
0980	00440		ENTRANCE PIPE-15 IN	86.00	LF		$	
0990	00520		STORM SEWER PIPE-12 IN	15.00	LF		$	
1000	00521		STORM SEWER PIPE-15 IN	2,640.00	LF		$	
1010	00522		STORM SEWER PIPE-18 IN	4,273.00	LF		$	
1020	00524		STORM SEWER PIPE-24 IN	2,117.00	LF		$	
1030	00526		STORM SEWER PIPE-30 IN	760.00	LF		$	
1040	00528		STORM SEWER PIPE-36 IN	264.00	LF		$	
1050	00530		STORM SEWER PIPE-48 IN	410.00	LF		$	
1060	01000		PERFORATED PIPE-4 IN	24,469.00	LF		$	
1070	01010		NON-PERFORATED PIPE-4 IN	5,756.00	LF		$	
1080	01015		INSPECT & CERTIFY EDGE DRAIN SYSTEM JEFFERSON	1.00	LS		$	
1090	01015		INSPECT & CERTIFY EDGE DRAIN SYSTEM OLDHAM	1.00	LS		$	
1100	01028		PERF PIPE HEADWALL TY 3-4 IN	4.00	EACH		$	
1110	01204		PIPE CULVERT HEADWALL-18 IN	1.00	EACH		$	
1120	01204		PIPE CULVERT HEADWALL-18 IN	1.00	EACH		$	
1130	01216		PIPE CULVERT HEADWALL-48 IN	1.00	EACH		$	
1140	01390		METAL END SECTION TY 3-15 IN	1.00	EACH		$	
1150	01432		SLOPED BOX OUTLET TYPE 1-15 IN	4.00	EACH		$	
1160	01433		SLOPED BOX OUTLET TYPE 1-18 IN	1.00	EACH		$	
1170	01451		S & F BOX INLET-OUTLET-24 IN	1.00	EACH		$	
1180	01452		S & F BOX INLET-OUTLET-30 IN	1.00	EACH		$	
1190	01456		CURB BOX INLET TYPE A	64.00	EACH		$	
1200	01480		CURB BOX INLET TYPE B	30.00	EACH		$	
1210	01496		DROP BOX INLET TYPE 3	5.00	EACH		$	
1220	01499		DROP BOX INLET TYPE 4	2.00	EACH		$	
1230	01559		DROP BOX INLET TYPE 13G	16.00	EACH		$	
1240	01568		DROP BOX INLET TYPE 13S	1.00	EACH		$	

PROPOSAL BID ITEMS

221055

Report Date 9/21/22

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1250	01642		JUNCTION BOX-18 IN	1.00	EACH		$	
1260	01720		RECONSTRUCT INLET	2.00	EACH		$	
1270	01740		CORED HOLE DRAINAGE BOX CON-4 IN	189.00	EACH		$	
1280	01756		MANHOLE TYPE A	2.00	EACH		$	
1290	02607		FABRIC-GEOTEXTILE CLASS 2 FOR PIPE	16,593.00	SQYD	$2.00	$	$33,186.00
1300	08100		CONCRETE-CLASS A	23.55	CUYD		$	
1310	24814EC		PIPELINE INSPECTION	10,527.00	LF		$	

Section: 0004 - BRIDGE- #27410

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1320	02625		REMOVE HEADWALL	2.00	EACH		$	
1330	08002		STRUCTURE EXCAV-SOLID ROCK	46.60	CUYD		$	
1340	08003		FOUNDATION PREPARATION	1.00	LS		$	
1350	08100		CONCRETE-CLASS A	209.30	CUYD		$	
1360	08150		STEEL REINFORCEMENT	27,143.00	LB		$	

Section: 0005 - BRIDGE- #27413

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1370	03299		ARMORED EDGE FOR CONCRETE	78.00	LF		$	
1380	08001		STRUCTURE EXCAVATION-COMMON	787.00	CUYD		$	
1390	08002		STRUCTURE EXCAV-SOLID ROCK	261.00	CUYD		$	
1400	08100		CONCRETE-CLASS A	501.70	CUYD		$	
1410	08104		CONCRETE-CLASS AA	568.80	CUYD		$	
1420	08150		STEEL REINFORCEMENT	50,888.00	LB		$	
1430	08151		STEEL REINFORCEMENT-EPOXY COATED	134,253.00	LB		$	
1440	08633		PRECAST PC I BEAM TYPE 3	1,661.70	LF		$	
1450	23378EC		CONCRETE SEALING	21,170.00	SQFT		$	
1460	23813EC		DECK DRAIN	16.00	EACH		$	

Section: 0006 - BRIDGE- #27411

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1470	08002		STRUCTURE EXCAV-SOLID ROCK	380.00	CUYD		$	
1480	08003		FOUNDATION PREPARATION	1.00	LS		$	
1490	08100		CONCRETE-CLASS A	239.60	CUYD		$	
1500	08150		STEEL REINFORCEMENT	25,494.00	LB		$	

Section: 0007 - BRIDGE- #27412

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1510	03299		ARMORED EDGE FOR CONCRETE	80.80	LF		$	
1520	08001		STRUCTURE EXCAVATION-COMMON	511.00	CUYD		$	
1530	08002		STRUCTURE EXCAV-SOLID ROCK	135.00	CUYD		$	

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PROPOSAL BID ITEMS

Report Date 9/21/22

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1540	08019		CYCLOPEAN STONE RIP RAP	367.00	TON		$	
1550	08100		CONCRETE-CLASS A	460.30	CUYD		$	
1560	08104		CONCRETE-CLASS AA	116.80	CUYD		$	
1570	08150		STEEL REINFORCEMENT	53,982.00	LB		$	
1580	08151		STEEL REINFORCEMENT-EPOXY COATED	21,774.00	LB		$	
1590	23085EN		RAIL SYSTEM TYPE 10	55.10	LF		$	
1600	23378EC		CONCRETE SEALING	6,406.00	SQFT		$	

Section: 0008 - UTILITY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1610	02223		GRANULAR EMBANKMENT	.40	CUYD		$	
1620	02602		FABRIC-GEOTEXTILE CLASS 1	4.00	SQYD		$	
1630	14000		W AIR RELEASE VALVE 1 INCH	2.00	EACH		$	
1640	14005		W ENCASEMENT CONCRETE	26.00	LF		$	
1650	14015		W ENCASEMENT STEEL OPEN CUT RANGE 4	217.00	LF		$	
1660	14016		W ENCASEMENT STEEL OPEN CUT RANGE 5	285.00	LF		$	
1670	14019		W FIRE HYDRANT ASSEMBLY	6.00	EACH		$	
1680	14028		W METER 3/4 INCH	21.00	EACH		$	
1690	14036		W PIPE DUCTILE IRON 06 INCH	144.00	LF		$	
1700	14037		W PIPE DUCTILE IRON 08 INCH	583.00	LF		$	
1710	14039		W PIPE DUCTILE IRON 12 INCH	5,109.00	LF		$	
1720	14056		W PIPE PVC 02 INCH	100.00	LF		$	
1730	14094		W TIE-IN 06 INCH	1.00	EACH		$	
1740	14095		W TIE-IN 08 INCH	6.00	EACH		$	
1750	14097		W TIE-IN 12 INCH	3.00	EACH		$	
1760	14106		W VALVE 08 INCH	14.00	EACH		$	
1770	14108		W VALVE 12 INCH	21.00	EACH		$	
1780	14125		W VAULT SPECIAL	1.00	EACH		$	
1790	14136		W PRESSURE REDUCING VALVE 08 INCH	2.00	EACH		$	
1800	14566		W SERV PE/PLST LONG SIDE 3/4 IN INST	7.00	EACH		$	
1810	14571		W SERV PE/PLST SHORT SIDE 3/4 IN INST	14.00	EACH		$	
1820	15000		S BYPASS PUMPING	3.00	EACH		$	
1830	15012		S ENCASEMENT CONCRETE	38.00	LF		$	
1840	15025		S ENCASEMENT STEEL OPEN CUT RANGE 6	321.00	LF		$	
1850	15092		S MANHOLE	6.00	EACH		$	
1860	15093		S MANHOLE ABANDON/REMOVE	7.00	EACH		$	
1870	15094		S MANHOLE ADJUST TO GRADE	5.00	EACH		$	
1880	15099		S MANHOLE TAP EXISTING	4.00	EACH		$	
1890	15112		S PIPE PVC 08 INCH	107.00	LF		$	
1900	15117		S PIPE PVC 24 INCH	298.00	LF		$	
1910	15118		S PIPE SPECIAL	371.00	LF		$	
1920	23610NC		CORED HOLE DRAINAGE BOX CON	1.00	EACH		$	

Section: 0009 - SIGNING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT

221055

PROPOSAL BID ITEMS

Report Date 9/21/22

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1930	06406		SBM ALUM SHEET SIGNS .080 IN	446.00	SQFT		$	
1940	06411		STEEL POST TYPE 2	1,290.00	LF		$	
1950	20418ED		REMOVE & RELOCATE SIGNS	9.00	EACH		$	
1960	21134ND		REMOVE-STORE AND REINSTALL SIGN	6.00	EACH		$	
1970	24631EC		BARCODE SIGN INVENTORY	110.00	EACH		$	

Section: 0010 - SIGNALIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1980	04820		TRENCHING AND BACKFILLING	120.00	LF		$	
1990	04845		CABLE-NO. 14/7C	2,900.00	LF		$	
2000	04886		MESSENGER-15400 LB	530.00	LF		$	
2010	04932		INSTALL STEEL STRAIN POLE	4.00	EACH		$	
2020	04953		TEMP RELOCATION OF SIGNAL HEAD	12.00	EACH		$	
2030	20093NS835		INSTALL PEDESTRIAN HEAD-LED	8.00	EACH		$	
2040	20188NS835		INSTALL LED SIGNAL-3 SECTION	6.00	EACH		$	
2050	20189NS835		INSTALL LED SIGNAL-5 SECTION	1.00	EACH		$	
2060	20266ES835		INSTALL LED SIGNAL- 4 SECTION	4.00	EACH		$	
2070	20390NS835		INSTALL COORDINATING UNIT	1.00	EACH		$	
2080	21743NN		INSTALL PEDESTRIAN DETECTOR	8.00	EACH		$	
2090	23157EN		TRAFFIC SIGNAL POLE BASE	18.00	CUYD		$	
2100	23222EC		INSTALL SIGNAL PEDESTAL	2.00	EACH		$	
2110	24900EC		PVC CONDUIT-1 1/4 IN-SCHEDULE 80	60.00	LF		$	
2120	24901EC		PVC CONDUIT-2 IN-SCHEDULE 80	80.00	LF		$	
2130	24908EC		INSTALL SIGNAL CONTROLLER-TY ATC	1.00	EACH		$	
2140	24955ED		REMOVE SIGNAL EQUIPMENT	1.00	EACH		$	
2150	26119EC		INSTALL RADAR PRESENCE DETECTOR TYPE A	4.00	EACH		$	
2160	26120EC		INSTALL RADAR ADVANCE DETECTOR TYPE B	1.00	EACH		$	

Section: 0011 - WATERLINE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2170	14000		W AIR RELEASE VALVE 1 INCH	1.00	EACH		$	
2180	14016		W ENCASEMENT STEEL OPEN CUT RANGE 5	88.00	LF		$	
2190	14019		W FIRE HYDRANT ASSEMBLY	1.00	EACH		$	
2200	14028		W METER 3/4 INCH	5.00	EACH		$	
2210	14036		W PIPE DUCTILE IRON 06 INCH	38.00	LF		$	
2220	14039		W PIPE DUCTILE IRON 12 INCH	842.00	LF		$	
2230	14097		W TIE-IN 12 INCH	2.00	EACH		$	
2240	14105		W VALVE 06 INCH	1.00	EACH		$	
2250	14108		W VALVE 12 INCH	5.00	EACH		$	
2260	14566		W SERV PE/PLST LONG SIDE 3/4 IN INST	4.00	EACH		$	
2270	14571		W SERV PE/PLST SHORT SIDE 3/4 IN INST	1.00	EACH		$	

Section: 0012 - REMOBILIZATION & /OR MOBILIZATION

PROPOSAL BID ITEMS

221055

Report Date 9/21/22

Section: 0012 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
2280	02568		MOBILIZATION	1.00	LS		$	
2290	02569		DEMOBILIZATION	1.00	LS		$	