



TRANSPORTATION CABINET

Frankfort, Kentucky 40622
www.transportation.ky.gov/

Steven L. Beshear
Governor

Michael W. Hancock, P.E.
Secretary

November 12, 2015

CALL NO. 326
CONTRACT ID NO. 151086
ADDENDUM # 1

Subject: Jessamine County, FD04 SPP 057 1486 000-002
Letting November 20, 2015

- (1) Revised - Plan Sheets
- (2) Revised - Front Sheet
- (3) Revised - Completion Date - Page 4 of 178
- (4) Added - Notes - Pages 1-121 of 121
- (5) Revised - Bid Items - Pages 175-178(a) of 178

Proposal revisions are available at <http://transportation.ky.gov/Construction-Procurement/>.

Plan revisions are available at <http://www.lynnimaging.com/kytransportation/>.

If you have any questions, please contact us at 502-564-3500.

Sincerely,

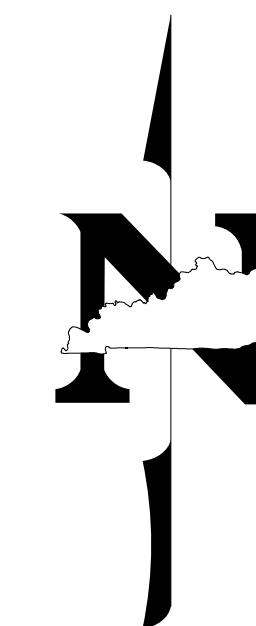
A handwritten signature in cursive script that reads "Rachel Mills".

Rachel Mills, P.E.
Director
Division of Construction Procurement

RM:ks
Enclosures



An Equal Opportunity Employer M/F/D



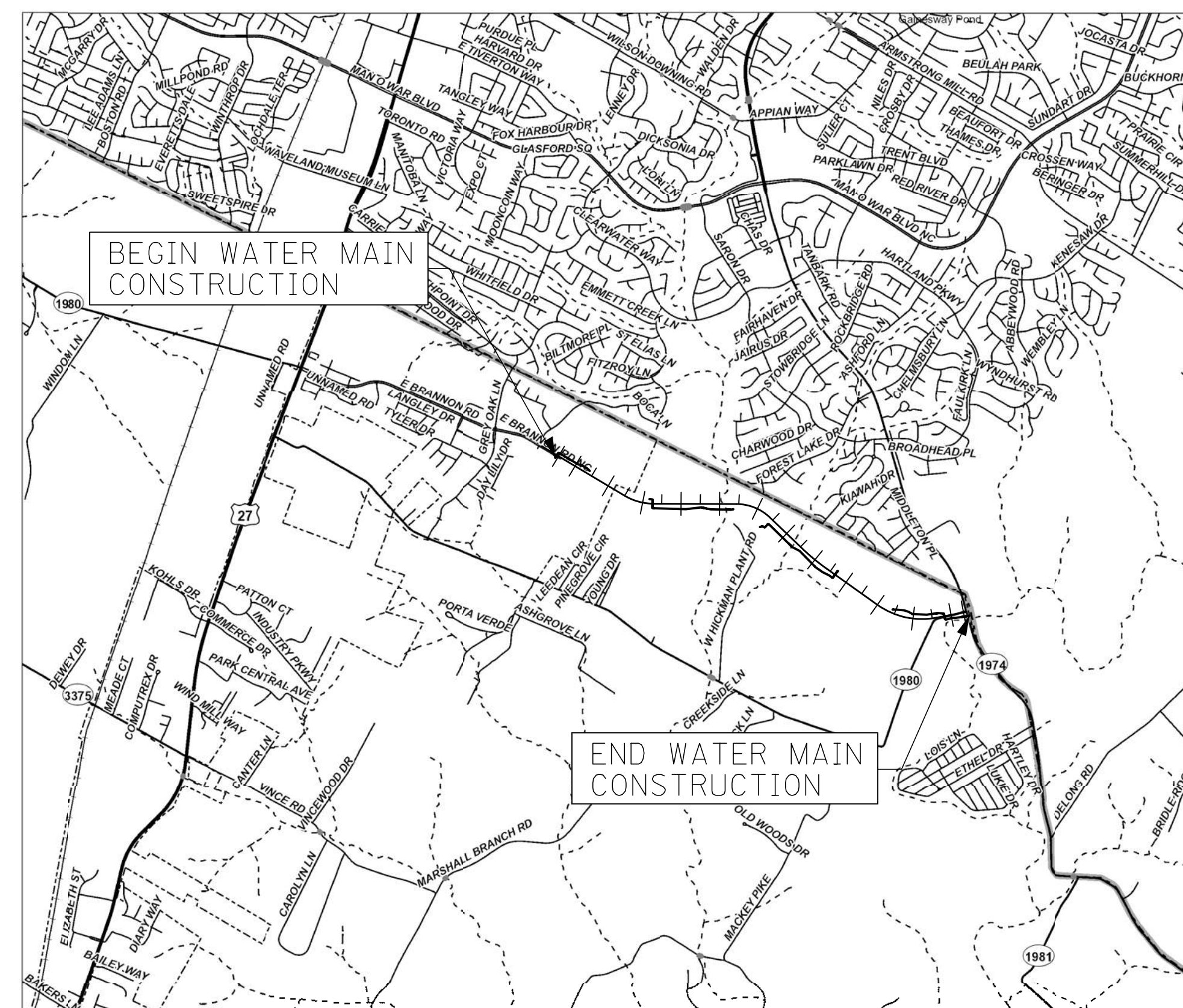
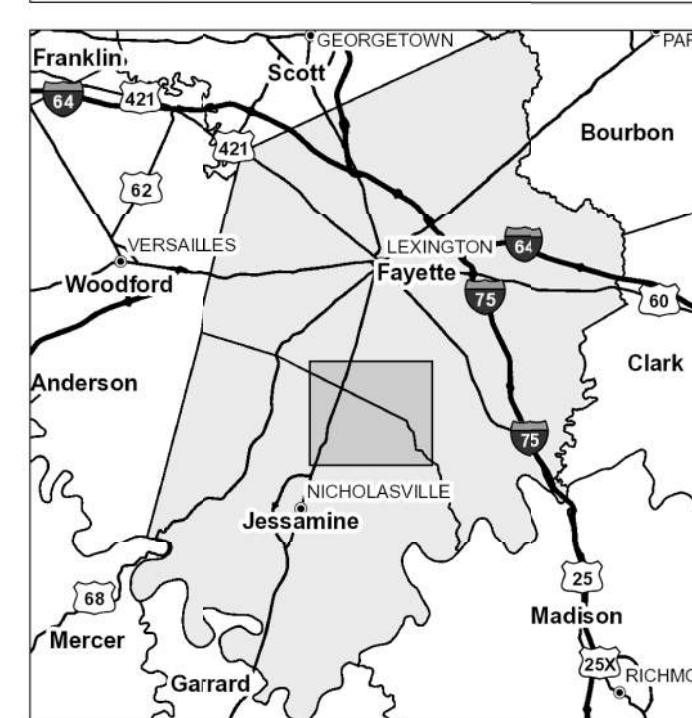
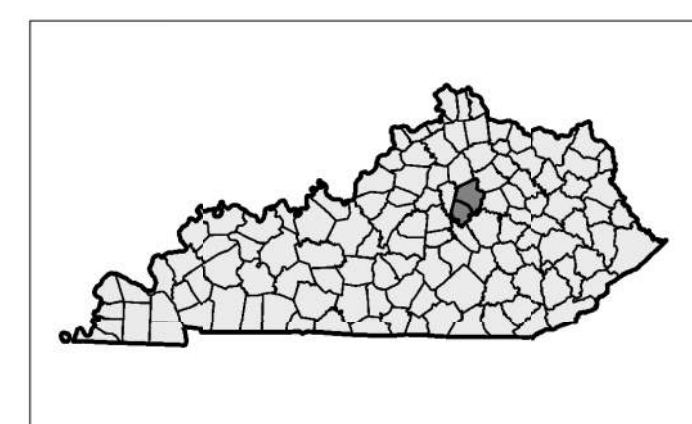
Commonwealth of Kentucky DEPARTMENT OF HIGHWAYS

PLANS OF PROPOSED PROJECT JESSAMINE COUNTY EAST BRANNON ROAD (CS-1486A) WATER TRANSMISSION MAIN RELOCATION

SHEET NO.	DESCRIPTION
U8	LAYOUT SHEET
U9	GENERAL SUMMARY AND NOTES
U10-U27	PLAN AND PROFILE SHEETS
U28	DETAIL SHEET

SHEETS NOT INCLUDED IN TOTAL SHEETS

CROSS SECTION SHEETS (TO BE ADDED LATER)



FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\U00100LS.DGN

USER: benf
DATE PLOTTED: November 11, 2015

E-SHEET NAME: U00100LS

Power InRoads v8.11.7.443

DESIGN CRITERIA

CLASS OF HIGHWAY _____

TYPE OF TERRAIN _____

DESIGN SPEED _____

REQUIRED NPSD _____

REQUIRED PSD _____

LEVEL OF SERVICE _____

ADT PRESENT () _____

ADT FUTURE () _____

DHV _____

D % _____

T % _____

GEOGRAPHIC COORDINATES

LATITUDE 37 DEGREES 56 MINUTES 38 SECONDS NORTH

LONGITUDE 84 DEGREES 29 MINUTES 55 SECONDS WEST

DESIGNED

% RESTRICTED SD _____

LEVEL OF SERVICE _____

MAX. DISTANCE W/O PASSING _____

LENGTH	LIN. FT.	MILES	LENGTH	LIN. FT.	MILES	LENGTH	LIN. FT.	MILES	LENGTH	LIN. FT.	MILES
ADDED			ADDED			ADDED			ADDED		
DEDUCTED			DEDUCTED			DEDUCTED			DEDUCTED		
FOR EQUALITIES			FOR EQUALITIES			FOR EQUALITIES			FOR EQUALITIES		
NOT INCLUDED			NOT INCLUDED			NOT INCLUDED			NOT INCLUDED		
RAILROAD CROSSINGS NO.			RAILROAD CROSSINGS NO.			RAILROAD CROSSINGS NO.			RAILROAD CROSSINGS NO.		
BRIDGES			BRIDGES			BRIDGES			BRIDGES		

LAYOUT MAP



BID SET
(NOT FOR CONSTRUCTION)

**Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS
COUNTY OF
JESSAMINE**

ITEM NO. 07-376.00

PROJECT NUMBER: FD04 SPP 057 1486 000-002

LETTING DATE: NOVEMBER 20, 2015

RECOMMENDED BY: RYAN D. TINSLEY, P.E. DATE: 11/11/2015
PROJECT MANAGER

PLAN APPROVED BY: _____ DATE: _____
STATE HIGHWAY ENGINEER

BID SET (NOT FOR CONSTRUCTION)

GENERAL SUMMARY

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	09

ITEM	DESCRIPTION	UNIT	Project Total
01314	PLUG PIPE	EACH	7
14011	W ENCASUREMENT STEEL BORED RANGE 6	LF	680
14017	W ENCASUREMENT STEEL OPEN CUT RANGE 6	LF	735
14021	W FIRE HYDRANT REMOVE	EACH	2
14500	W AIR RELEASE VALVE 1 INCH INST ①	EACH	4
14510	W FIRE HYDRANT ASSEMBLY INST	EACH	4
14514	W METER 1 INCH INST	EACH	2
14529	W PIPE DUCTILE IRON 24 INCH INST	LF	8,580
14561	W PLUG EXISTING MAIN INST	EACH	1
14584	W TIE-IN 24 INCH INST	EACH	8
14595	W VALVE 24 INCH INST	EACH	13

NOTE:

- ① CONTRACTOR TO PROVIDE MANHOLE AND ACCESS CASTING

GENERAL NOTES:

01. WATER MAIN TO MAINTAIN A MINIMUM COVER OF 36" IN EASEMENTS AND 42" IN RIGHT OF WAY AS MEASURED FROM FINISHED GRADE TO THE OUTSIDE SURFACE OF THE PIPE. CONTRACTOR SHALL REFER TO HIGHWAY CROSS SECTIONS TO VERIFY DEPTHS BELOW EXISTING AND PROPOSED SURFACES AND ENTRANCES. WATER MAIN CROSS SECTIONS WILL BE PROVIDED TO CONTRACTOR PRIOR TO CONSTRUCTION.
02. ALL PROPOSED WATER MAINS LOCATED WITHIN THE LIMITS OF THE EXISTING HIGHWAY R.O.W. SHALL BE INSTALLED WITH 42" (MIN.) OF COVER ABOVE THE PROPOSED WATER MAIN. THE DIMENSION OF COVER WILL BE MEASURED FROM THE TOP EXTERIOR SURFACE OF THE PROPOSED WATER MAIN AT THE POINT OF MAXIMUM DIAMETER OF THE PROPOSED WATER MAIN (JOINT, BELL, FITTING, ETC.) TO THE INVERT OF THE HIGHWAY DITCH LINE AFTER THE SAID DITCH LINE HAS BEEN DRESSED TO FINAL GRADE. SEE DETAIL THIS SHEET FOR ADDITIONAL INFORMATION.
03. THE CONTRACTOR SHALL NOTE THAT THE LENGTH OF BORES AND CASINGS REFERRED TO ON THE CONTRACT DRAWINGS IS APPROXIMATE AND MAY BE INCREASED OR DECREASED BY THE OWNER AND/OR THE ENGINEER AS REQUIRED BY FIELD REQUIREMENTS DURING CONSTRUCTION OF THIS CONTRACT.
04. THE CONTRACTOR SHALL NOTE THAT MANY WATERWAY CROSSINGS (CREEKS, STREAMS, DRAINS, ETC.) REQUIRE PROTECTION BY PLACEMENT OF EITHER A CRUSHED ROCK OR CONCRETE CAP ABOVE THE PROPOSED WATERMAIN. MOST OF THESE CROSSINGS HAVE BEEN IDENTIFIED, HOWEVER ADDITIONAL CAPS MAY BE REQUIRED AS ACTUAL FIELD CONSTRUCTION DICTATES. FURTHER, THE LENGTH AND MATERIAL (STONE OR CONCRETE) MAY BE CHANGED AS REQUIRED BY ACTUAL FIELD CONDITIONS DURING CONSTRUCTION OF THIS CONTRACT. ALL CHANGES SHALL BE PAID FOR AT THE UNIT PRICE BID FOR SAID WATERWAY CROSSINGS UNDER THIS CONTRACT AND SHALL BE APPROVED BY OR DIRECTED BY THE OWNER AND/OR THE ENGINEER PRIOR TO INSTALLATION.
05. ALL PAVED SURFACES CROSSED BY THE PROPOSED WATER MAIN SHALL BE SAW CUT TO PROVIDE A CLEAN, TRUE EDGE FOR PAVEMENT REPLACEMENT.
06. THE CONTRACTOR SHALL NOTE THAT SOME PROPERTIES ALONG THE PROPOSED WATER MAIN ROUTE MAY HAVE EXISTING ON-SITE SEWAGE DISPOSAL SYSTEMS (SEPTIC TANKS, LEACH FIELDS, ETC.). THE CONTRACTOR SHALL ASSESS FIELD CONDITIONS AHEAD OF HIS EXCAVATION AS REQUIRED TO AVOID DISTURBING ALL SUCH SYSTEMS. HOWEVER IF DISTURBANCE IS UNAVOIDABLE OR ACCIDENTAL, THE CONTRACTOR SHALL HAVE ON CALL A LICENSED PLUMBER TO REPAIR ANY AND ALL DAMAGE CAUSED DIRECTLY OR INDIRECTLY BY THE CONTRACTOR. FURTHERMORE, THE CONTRACTOR SHALL CONTACT THE OWNER AND/OR THE ENGINEER PRIOR TO BACK FILLING THE PURPOSED WATERMAIN TO ALLOW ASSESSMENT OF FIELD CONDITIONS WHICH MAY REQUIRE FURTHER PROTECTION OF THE PROPOSED WATER MAIN. ANY REPAIRS MADE TO EXISTING SEPTIC SYSTEMS SHALL BE PERMANENT, IN ACCORDANCE WITH ALL GOVERNING CODES, AND SHALL BE COMPLETED THE SAME DAY.
07. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY TEMPORARY EASEMENTS REQUIRED FOR CONSTRUCTION ACTIVITIES OR STORAGE.
08. THE NEW WATER MAIN SHALL BE LOCATED IN ROW OR PERMANENT EASEMENT. TEMPORARY EASEMENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
09. ALL EASEMENTS AS SHOWN ARE ACQUIRED AS SPECIFIED ON THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL REQUEST TO RECEIVE A COPY OF ACQUIRED EASEMENTS AND PERMITS PRIOR TO CONSTRUCTION.
10. THE CONTRACTOR SHALL FIELD LOCATE THE FINAL LOCATIONS OF ALL VALVES, HYDRANTS, TEES, AND BLOWOFFS WITH THE RESIDENT PROJECT REPRESENTATIVE PRIOR TO CONSTRUCTION.
11. THE CONTRACTOR SHALL PAINT ALL HYDRANTS AND PROTECTIVE STEEL BOLLARDS (TWO PER HYDRANT) YELLOW PER THE PROJECT SPECIFICATIONS.
12. CONTRACTOR SHALL BACKFILL 6 INCHES OF GRANULAR BACKFILL AROUND ALL AREAS OF THE WATER MAIN WHEN INSTALLING PRIOR TO BACKFILLING WITH NATIVE MATERIAL AT LOCATIONS SPECIFIED BY OWNER DURING CONSTRUCTION.

CONSTRUCTION ON RIGHT-OF-WAY NOTES:

- 01 - WATER LINES TO BE CONSTRUCTED WITHIN THE KENTUCKY DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY:
Trenches shall be of a depth sufficient to provide a minimum cover of 42" from the existing ground surface to the top of the pipe and be located approximately 5 feet from the edge of the pavement or on the back side of ditch line, unless otherwise noted. Trench shall be backfilled with flowable fill when located within 3 feet from edge of pavement. See individual sheets for details.
- 02 - ALL BORES UNDER STATE HIGHWAYS RIGHT-OF-WAY:
Shall be a minimum of 42" depth under bottom of ditch line to top of the proposed bore and/or casing pipe on both sides of the highway.
- 03 - ROCK BLASTING:
There shall be NO blasting within State Right-of-Way without written consent from the Department of Transportation.
- 04 - PROTECTION OF EXISTING PAVING:
Care shall be taken by the CONTRACTOR to avoid cracking or breaking the bituminous paving. All damage to the existing paving caused by the CONTRACTOR'S operation shall be repaired by the CONTRACTOR at no cost to the owner. Paving protection shall be accomplished by the use of rubber-tired and street padded machinery or other approved equipment well suited for this type of construction.
- 05 - BANK AND DITCH PROTECTION EXCAVATION:
During construction, dlembankments, refills and excavations shall be kept shaped and drained by the CONTRACTOR. Ditches and drains along the highways shall be maintained in such a manner as to drain effectively at all times.
- 06 - PRIVATE ENTRANCE ROAD:
All roadways and driveways within the work limits of state Right-of-Ways shall be refilled to the natural surface of the ground with approved material. The material shall be placed and compacted to a smoothness suitable for traffic. The CONTRACTOR shall be totally responsible for maintaining these roadways until the restoration is approved by the ENGINEER. The CONTRACTOR shall note that all private businesses and residences along the route of the proposed water main must have access to their properties at all times during construction.
- 07 - PROTECTION OF EXISTING DRAINAGE CULVERTS:
At locations where the proposed water main is parallel with or crossing an existing storm sewer, the cost of relaying existing culvert pipes or the extra depth required to avoid the existing culvert is considered incidental to the construction and is not a pay item.
- 08 - EXISTING UTILITIES HAVE NOT BEEN SHOWN:
THE CONTRACTOR shall be responsible for locating all existing utilities. THE CONTRACTOR shall coordinate with the representatives of the various utilities when working near any existing utility. No additional payment to the CONTRACTOR will be made for extra depth required to avoid any existing utility.
- 09 - FITTINGS:
Unless otherwise noted, a separate bid item has not been established for fittings. The fittings involved are, but not limited to, the following: tees, bends, plugs, reducers, couplings, saddles, crosses, etc. THE CONTRACTOR shall include the cost of these items in the unit price for the pipe. All tees and bends shall be thrust blocked as shown on the detail sheets of the contract drawings.
- 10 - CONSTRUCTION LIMITS:
The CONTRACTOR shall confine all construction activity to the area within existing easements and construction limits, unless otherwise approved in writing by the OWNER.
- 11 - ROCK SOUNDINGS:
Rock soundings were not performed by the ENGINEER. THE CONTRACTOR shall take appropriate action to determine subsurface conditions.
- 12 - FINAL LOCATIONS OF APPURTENANCES:
The final location of services, line valves, air release valves, blowoffs, hydrants (location and orientation) shall be field located during construction and approved by the ENGINEER. All meters, valves, air releases, blowoffs and hydrants shall only be located on the backside of the ditch line.

LOCATION CONDITION "A"
WHENEVER POSSIBLE, THE PROPOSED WATER MAIN SHALL BE LOCATED ADJACENT TO THE EXISTING RIGHT-OF-WAY FENCE LINE AND AS CLOSE TO SAID FENCE LINE AS PRACTICABLY CONSTRUCTABLE. PROVIDE 36" (min.) OF COVER.

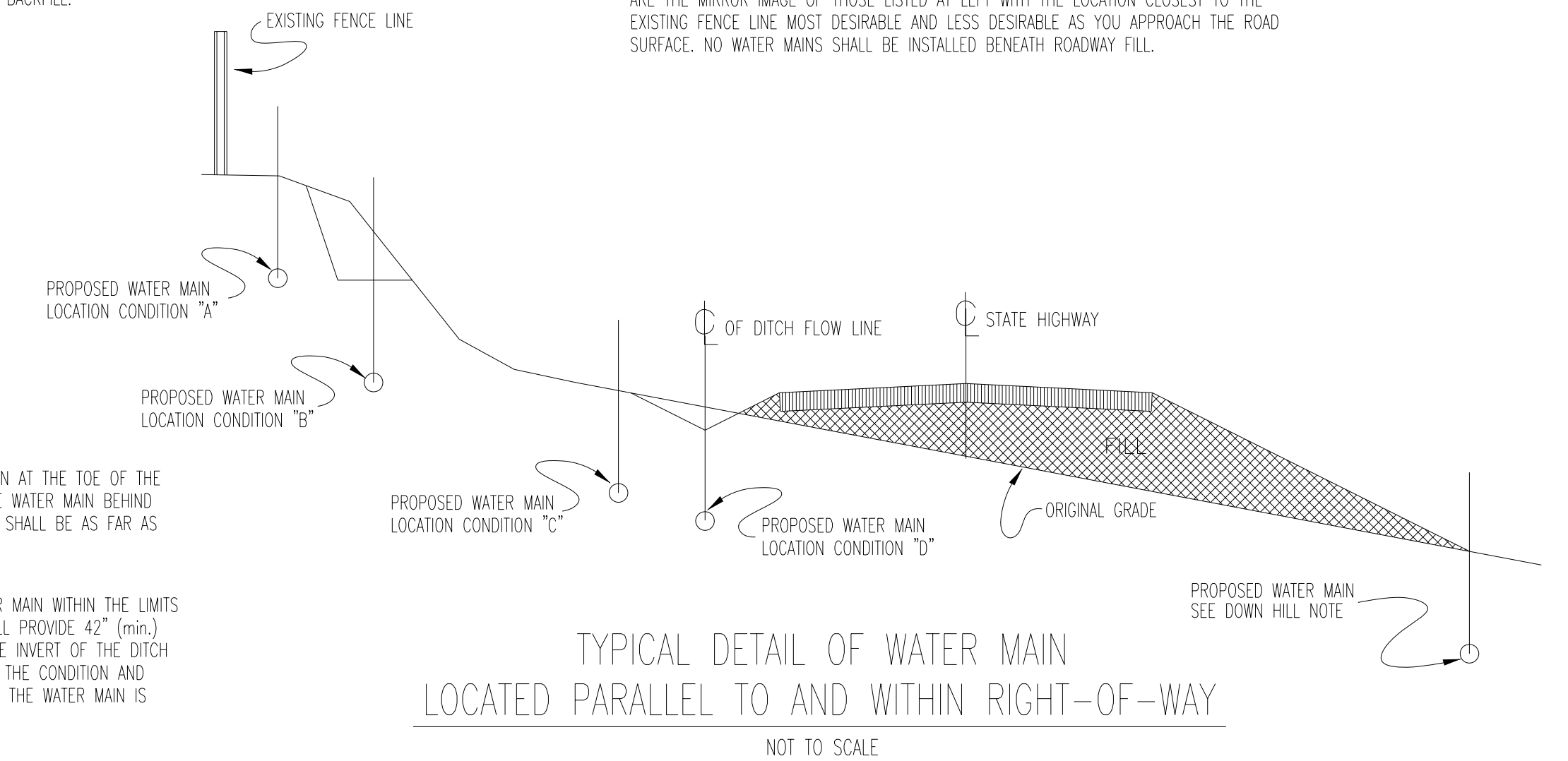
LOCATION CONDITION "B"
WHENEVER IT IS NECESSARY TO INSTALL PROPOSED WATER MAIN ON EXISTING SLOPE, THE CONTRACTOR SHALL CUT A TEMPORARY BENCH IN SAID SLOPE AND INSTALL THE WATER MAIN WITH 36" (min.) COVER. COVER WILL BE AS MEASURED FROM THE TOP OF THE INSTALLED PIPE TO DIRECTLY ABOVE THE PIPE MID POINT BETWEEN THE UP HILL AND DOWN HILL DITCH BANKS. ALL BACKFILL MATERIAL SHALL BE MECHANICALLY COMPACTED, AND EROSION CONTROL PROVIDED AS NECESSARY TO MAINTAIN BACKFILL.

LOCATION CONDITION "C"
WHENEVER IT IS NECESSARY TO INSTALL PROPOSED WATER MAIN AT THE TOE OF THE EXISTING UP HILL SLOPE, THE CONTRACTOR SHALL LOCATE THE WATER MAIN BEHIND THE EXISTING DITCH WITH 36" (min.) COVER. THE WATER MAIN SHALL BE AS FAR AS POSSIBLE BEHIND THE EXISTING DITCH.

LOCATION CONDITION "D"
WHENEVER IT IS NECESSARY TO INSTALL THE PROPOSED WATER MAIN WITHIN THE LIMITS OF THE EXISTING ROADWAY DITCH LINE, THE CONTRACTOR SHALL PROVIDE 42" (min.) COVER OVER THE PROPOSED WATER MAIN MEASURED FROM THE INVERT OF THE DITCH LINE AFTER FINAL GRADING, TO THE TOP OF THE WATER MAIN. THE CONDITION AND GRADE OF THE DITCH SHALL BE CONTINUOUSLY MAINTAINED AS THE WATER MAIN IS INSTALLED.

LOCATION CONDITION TYPICAL INFORMATION:
WHENEVER THE WATER MAIN IS SHOWN TO BE WITHIN THE RIGHT-OF-WAY THE LOCATION OF SAID WATER MAIN WILL BE AS CLOSE TO THE EXISTING FENCE, AND AS FAR AS POSSIBLE BEHIND THE EXISTING DITCH AS REASONABLY CONSTRUCTABLE, WITH CONDITION "A" BEING MOST DESIRABLE AND CONDITION "D" BEING LEAST DESIRABLE. THE CONTRACTOR SHOULD NOTE THAT CONSTRUCTION WITHIN THE DOT RIGHT-OF-WAY WILL BE SUBJECT TO APPROVAL BY THE DOT AND SHOULD MAKE EVERY REASONABLE EFFORT TO MAINTAIN THE CONDITION OF THE RIGHT-OF-WAY.

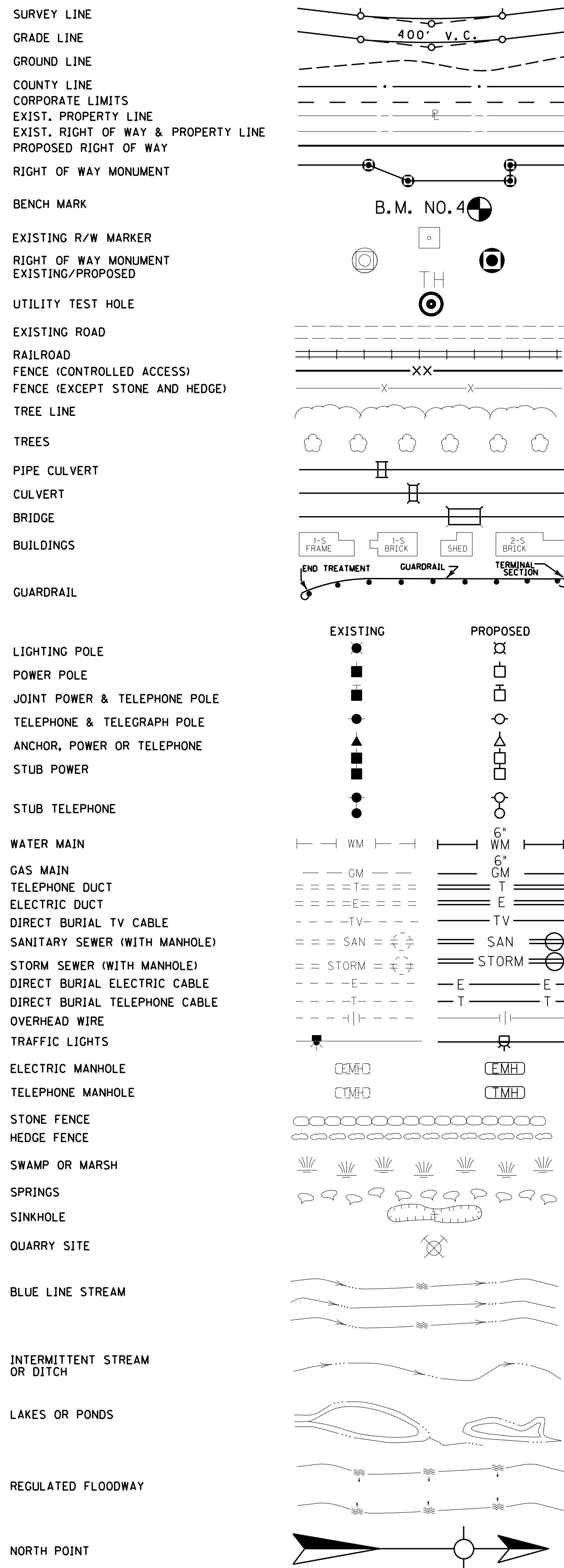
DOWN HILL LOCATION NOTE:
WATER MAIN LOCATION CONDITIONS ON THE DOWN HILL PORTION OF THE RIGHT-OF-WAY ARE THE MIRROR IMAGE OF THOSE LISTED AT LEFT WITH THE LOCATION CLOSEST TO THE EXISTING FENCE LINE MOST DESIRABLE AND LESS DESIRABLE AS YOU APPROACH THE ROAD SURFACE. NO WATER MAINS SHALL BE INSTALLED BENEATH ROADWAY FILL.



BID SET (NOT FOR CONSTRUCTION)

UTILITY OWNER INFORMATION

CONVENTIONAL SIGNS



KENTUCKY AMERICAN WATER
2300 RICHMOND ROAD
LEXINGTON, KY 40502

COLE MITCHAM
(859)269-2386

LEXINGTON-FAYETTE COUNTY URBAN COUNTY GOVERNMENT
200 EAST MAIN STREET
LEXINGTON, KY 40507

BOB BAYERT
(859)258-3410

COLUMBIA GAS OF KENTUCKY
2001 MERCER ROAD
LEXINGTON, KY 40512

BRYAN SLONE
(859)288-0215

TIME-WARNER CABLE
2544 PALUMBO DRIVE
LEXINGTON, KY 40509

RALPH MCDONIE
(859)268-1123

MARATHON PIPE LINE LLC
539 SOUTH MAIN STREET
FINDLAY, OH 45840

DAVE WISNER
(419)421-2211

WINDSTREAM COMMUNICATIONS
130 WEST NEW CIRCLE ROAD
SUITE 170
LEXINGTON, KY 40505

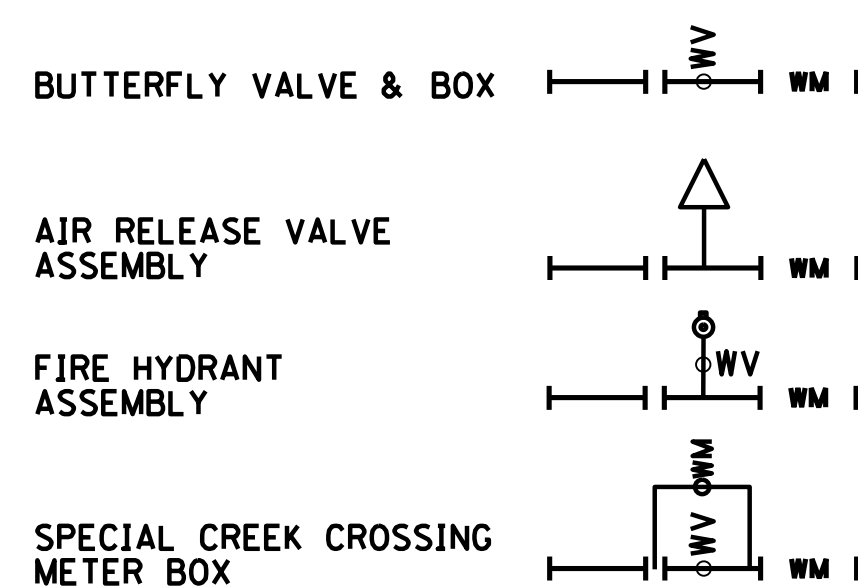
STEVE JOHNSON
(859)357-6209

KENTUCKY UTILITIES COMPNAY
DISTRIBUTION AND TRANSMISSION
820 WEST BROADWAY
LOUISVILLE, KY 40232

GREG GEISER
(520)627-3708

THE LOCATION OF UTILITIES PROVIDED IN THE CONTRACT DOCUMENTS HAS BEEN FURNISHED BY THE FACILITY OWNERS AND/OR BY REVIEWING RECORD DRAWINGS. THE INFORMATION MAY NOT BE EXACT NOR COMPLETE. IT WILL BE THE ROAD CONTRACTORS RESPONSIBILITY TO LOCATE UTILITIES BEFORE EXCAVATING BY CALLING THE VARIOUS UTILITY OWNERS AND BY EXAMINING ANY SUPPLEMENTAL INFORMATION PROVIDED BY THE CABINET AND/OR UTILITY OWNER. THE ROAD CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF UTILITIES BY HAND DIGGING TO EXPOSE UTILITIES BEFORE HE EXCAVATES IN THE AREA OF A UTILITY. THE COST FOR REPAIR AND ANY OTHER ASSOCIATED COSTS FOR ANY DAMAGE TO UTILITIES CAUSED BY THE ROAD CONTRACTORS OPERATIONS SHALL BE BORNE BY THE ROAD CONTRACTOR.

THE CONTRACTOR IS ADVISED TO CONTACT THE B.U.D. ONE-CALL SYSTEM; HOWEVER, THE CONTRACTOR SHOULD BE AWARE THAT THE OWNERS OF THE UNDERGROUND FACILITIES ARE NOT REQUIRED TO BE MEMBERS OF THE B.U.D. ONE-CALL SYSTEM. IT MAY BE NECESSARY FOR THE CONTRACTOR TO CONTACT THE COUNTY COURT CLERK TO DETERMINE WHAT UTILITY COMPANIES HAVE FACILITIES IN THE PROJECT AREA.



BEFORE YOU DIG

The contractor is instructed to call 1-800-752-6007 to reach KY 811, the one-call system for information on the location of existing underground utilities. The call is to be placed a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor should be aware that owners of underground facilities are not required to be members of the KY 811 one-call Before-U-Dig (BUD) service. The contractor must coordinate excavation with the utility owners, including those whom do not subscribe to KY 811. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area.

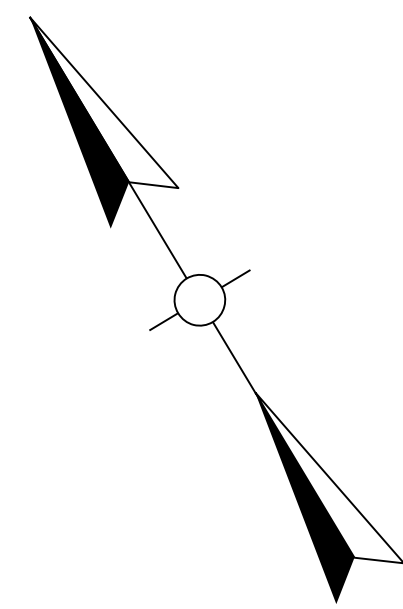
SCALE: 1"= 20'

DESIGNED BY: RYAN D. TINSLEY, P.E.	
DATE SUBMITTED:	
Commonwealth of Kentucky DEPARTMENT OF HIGHWAYS COUNTY OF JESSAMINE	
PROJECT: FD04 SPP 057 1486 000-002	
NUMBERS:	
EAST BRANNON ROAD UTILITY OWNER INFORMATION	

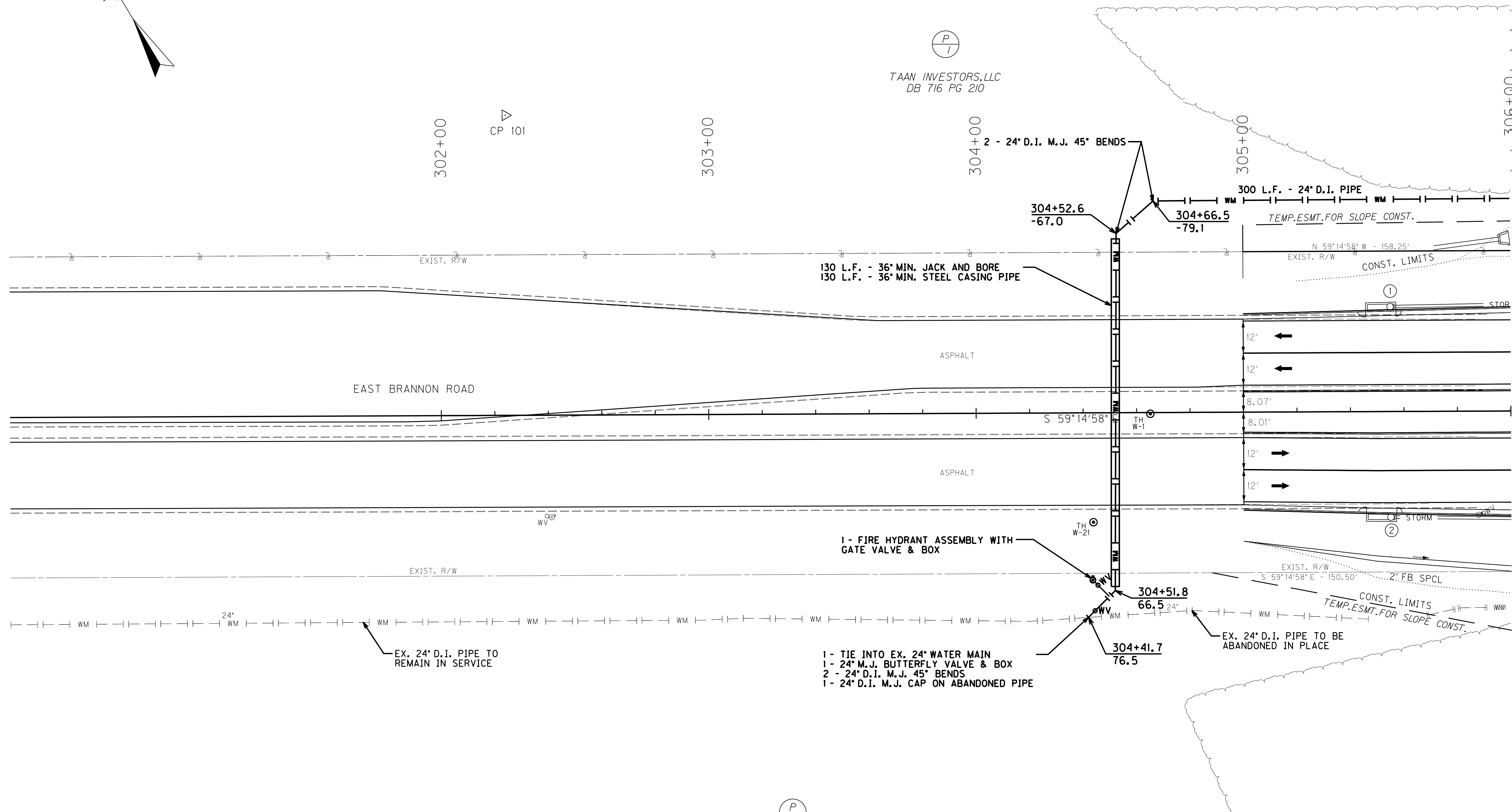
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 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U00300UR
 Power InRoads v8.11.7.443

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	111

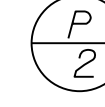
BID SET (NOT FOR CONSTRUCTION)




 TAAN INVESTORS, LLC
 DB 716 PG 210



- 1 - TIE INTO EX. 24" WATER MAIN
- 1 - 24" M.J. BUTTERFLY VALVE & BOX
- 2 - 24" D.I. M.J. 45° BENDS
- 1 - 24" D.I. M.J. CAP ON ABANDONED PIPE


 TRINITY CHRISTIAN ACADEMY OF LEXINGTON, LLC
 COWEN FAMILY HOLDINGS, LLC
 DB 689 PG 214



SCALE: 1"= 20'

EAST BRANNON ROAD
 STA. 305+00 TO STA. 306+00
 WATER MAIN PLAN SHEET

- NOTES:**
1. EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 2. 160 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U00400PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U00400PL
 Power InRoads v8.11.7.443

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U12

BID SET (NOT FOR CONSTRUCTION)

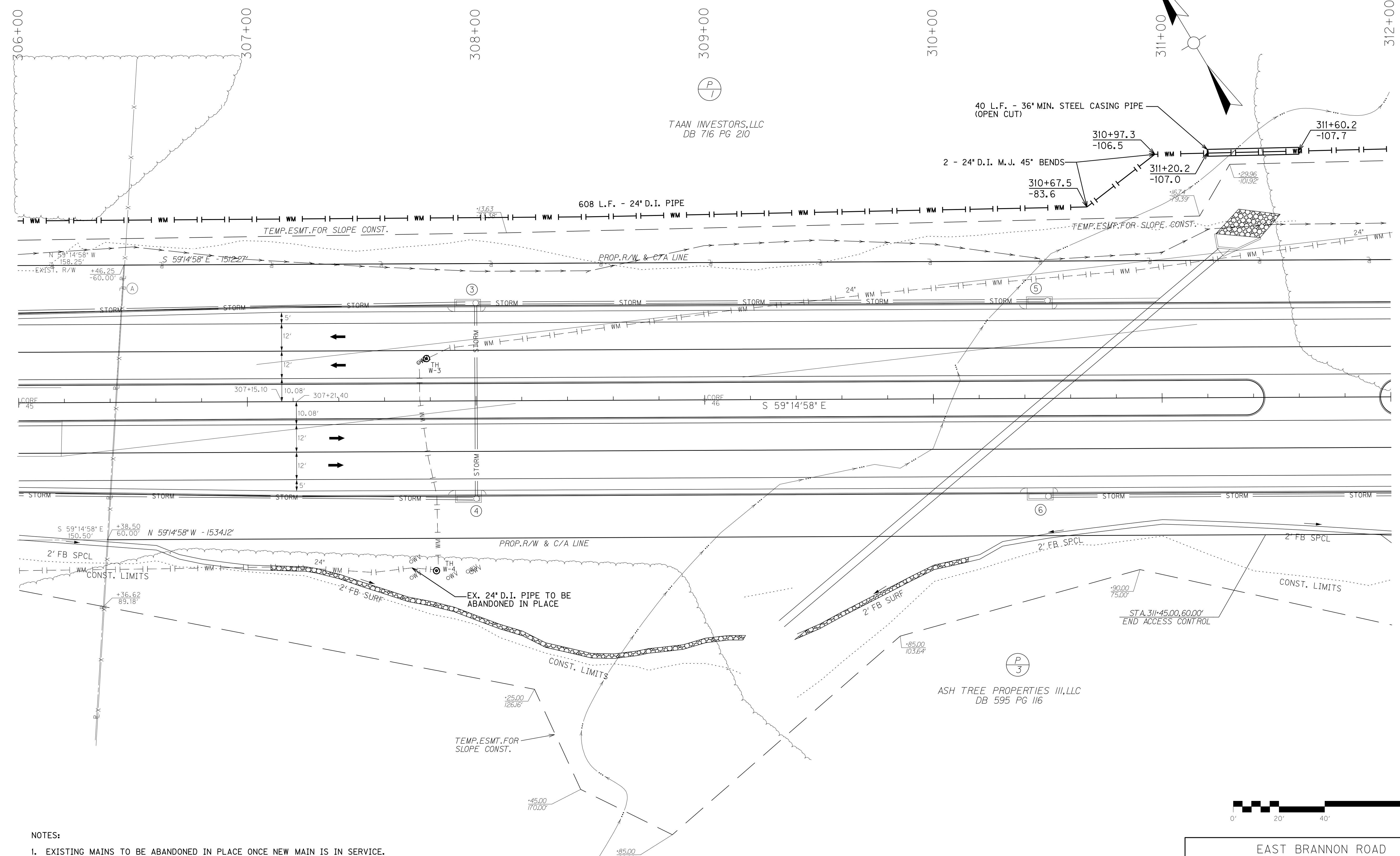
Ⓐ N 34°26'42" E - 120.25'

TAAN INVESTORS, LLC
DB 716 PG 210

40 L.F. - 36" MIN. STEEL CASING PIPE
(OPEN CUT)

2 - 24" D.I. M.J. 45° BENDS

608 L.F. - 24" D.I. PIPE



NOTES:

1. EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
2. 704 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.



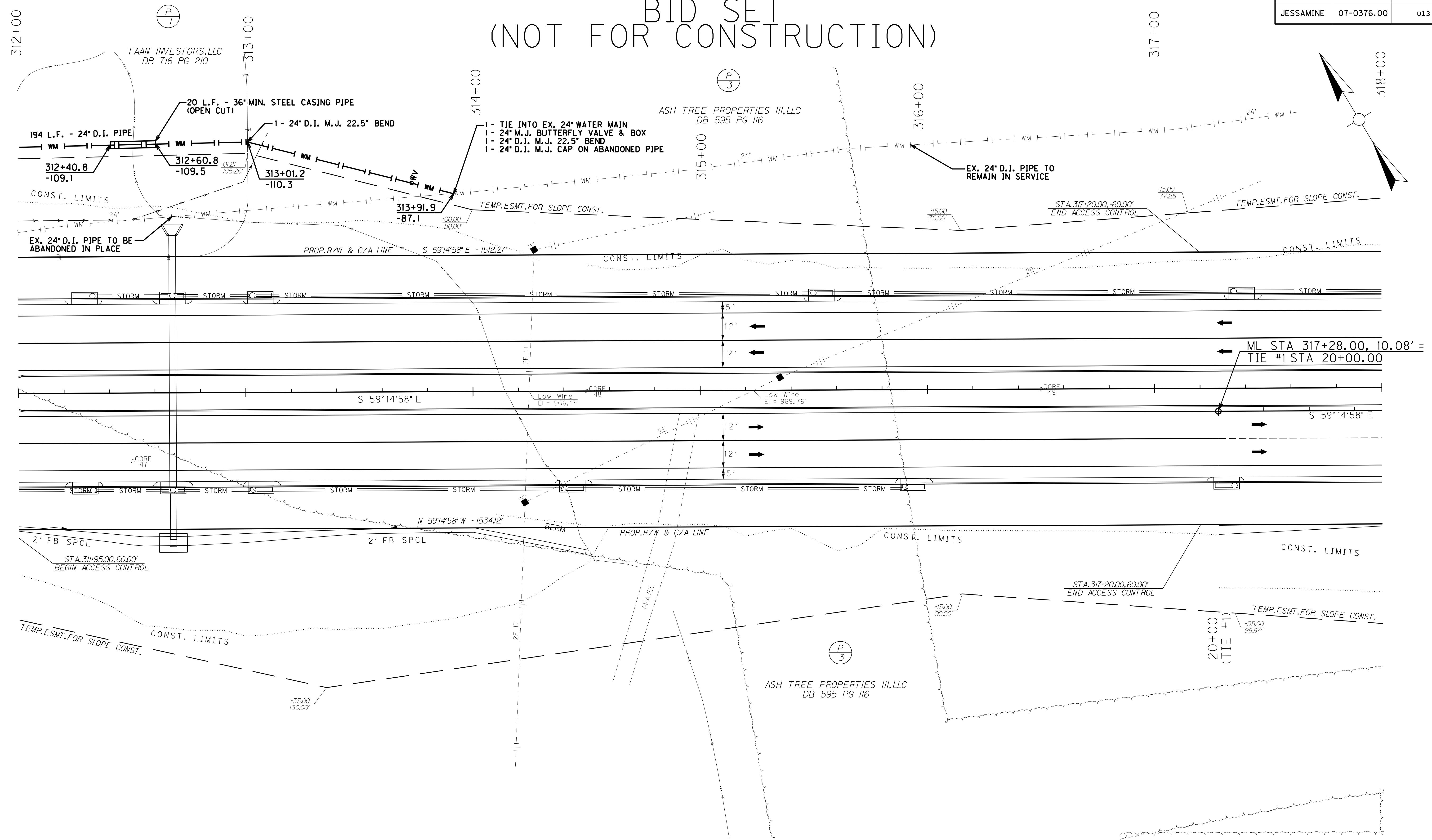
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EAST BRANNON ROAD
STA. 306+00 TO STA. 312+00
WATER MAIN PLAN SHEET

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U00600PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U00600PL
 Power InRoads v8.11.7.443

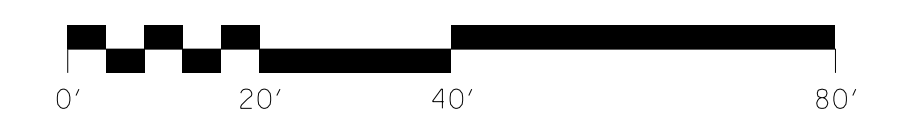
COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	013

BID SET (NOT FOR CONSTRUCTION)



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 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U00800PL
 Power InRoads v8.11.7.443

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 193 L.F. OF EX. 24\"/>

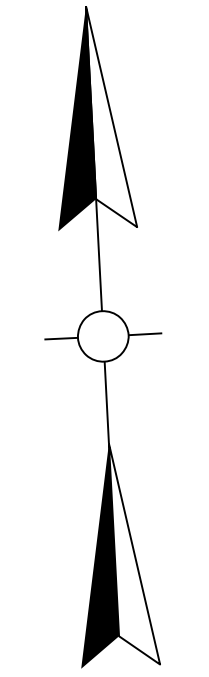


EAST BRANNON ROAD
 STA. 312+00 TO STA. 318+00
 WATER MAIN PLAN SHEET
 SCALE: 1"= 20'

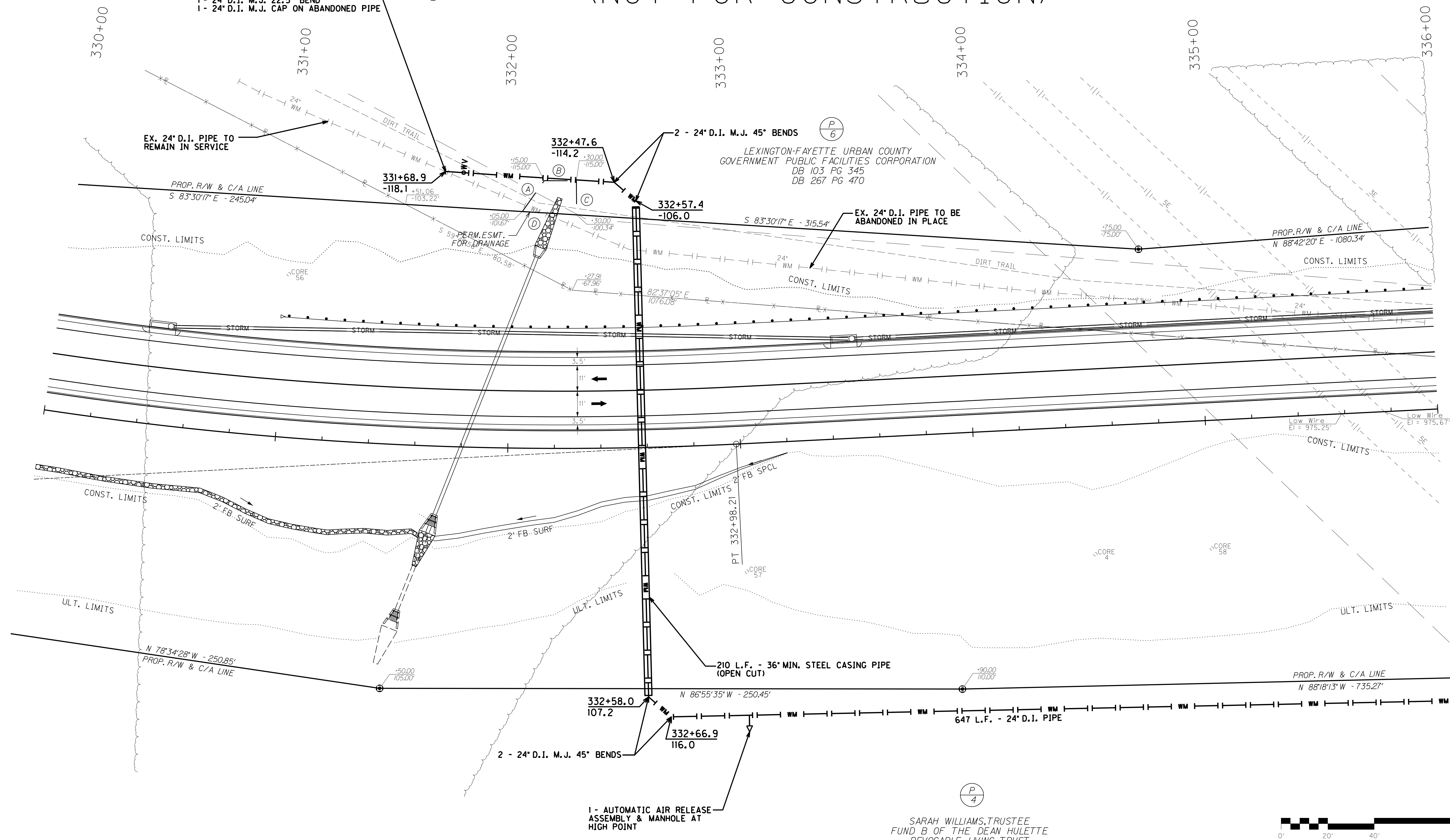
BID SET (NOT FOR CONSTRUCTION)

- (A) N 38°21'12" E - 16.24'
- (B) S 86°58'14" E - 13.85'
- (C) S 2°44'35" W - 14.66'
- (D) N 83°30'17" W - 23.33'

- 1- TIE INTO EX. 24" WATER MAIN
- 1- 24" M.J. BUTTERFLY VALVE & BOX
- 1- 24" D.I. M.J. 22.5° BEND
- 1- 24" D.I. M.J. CAP ON ABANDONED PIPE

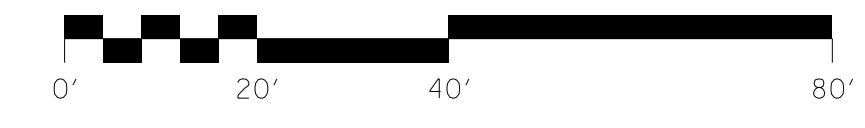


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 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U01400PL
 Power InRoads v8.11.7.443



- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 431 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

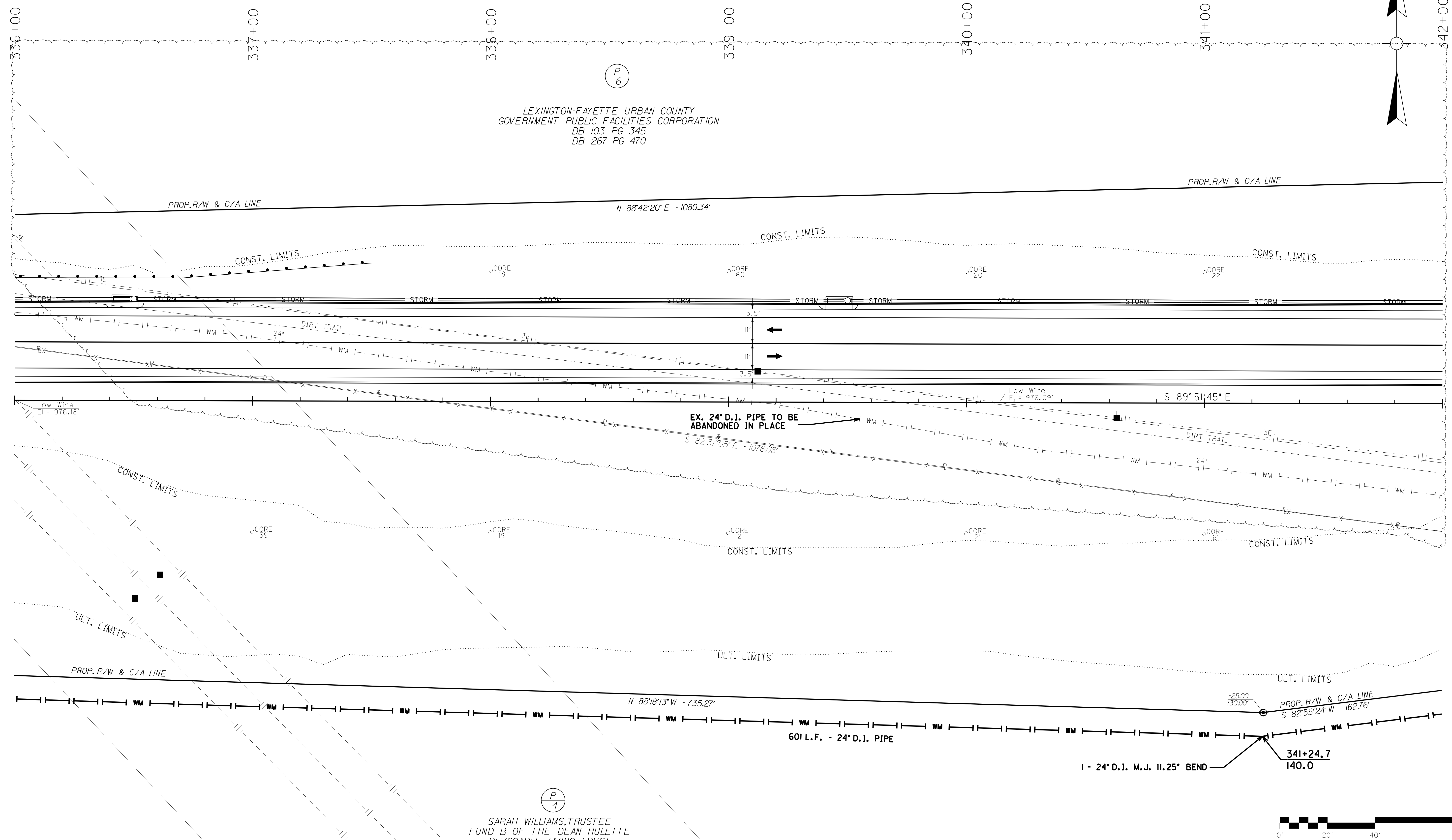
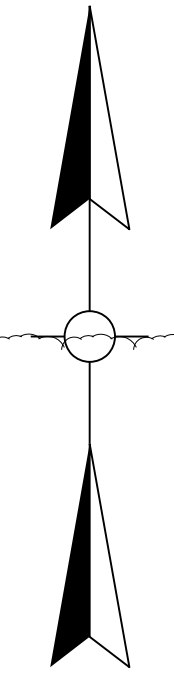
SARAH WILLIAMS, TRUSTEE
 FUND B OF THE DEAN HULETTE
 REVOCABLE LIVING TRUST
 DB 504 PG 141

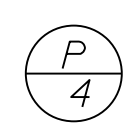


SCALE: 1" = 20'

EAST BRANNON ROAD
 STA. 330+00 TO STA. 336+00
 WATER MAIN PLAN SHEET

BID SET (NOT FOR CONSTRUCTION)




 SARAH WILLIAMS, TRUSTEE
 FUND B OF THE DEAN HULETTE
 REVOCABLE LIVING TRUST
 DB 504 PG 141

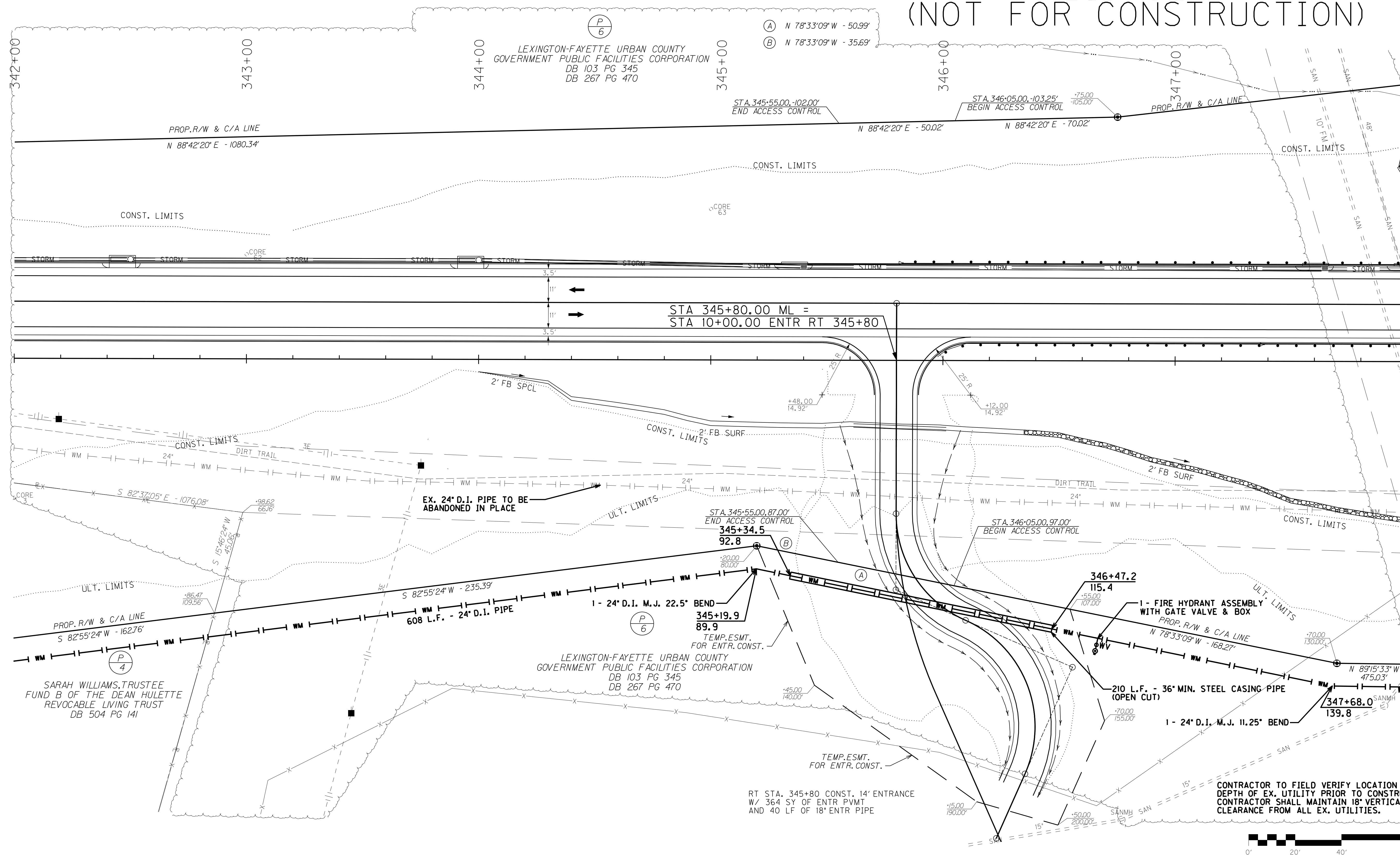
- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 605 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

SCALE: 1" = 20'

EAST BRANNON ROAD
 STA. 336+00 TO STA. 342+00
 WATER MAIN PLAN SHEET

FILE NAME: S:\LOUIS4400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U0600PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U0600PL
 Power InRoads v8.11.7.443

BID SET (NOT FOR CONSTRUCTION)



FILE NAME: S:\LOUIS\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U01800PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U01800PL
 Power InRoads v8.11.7.443

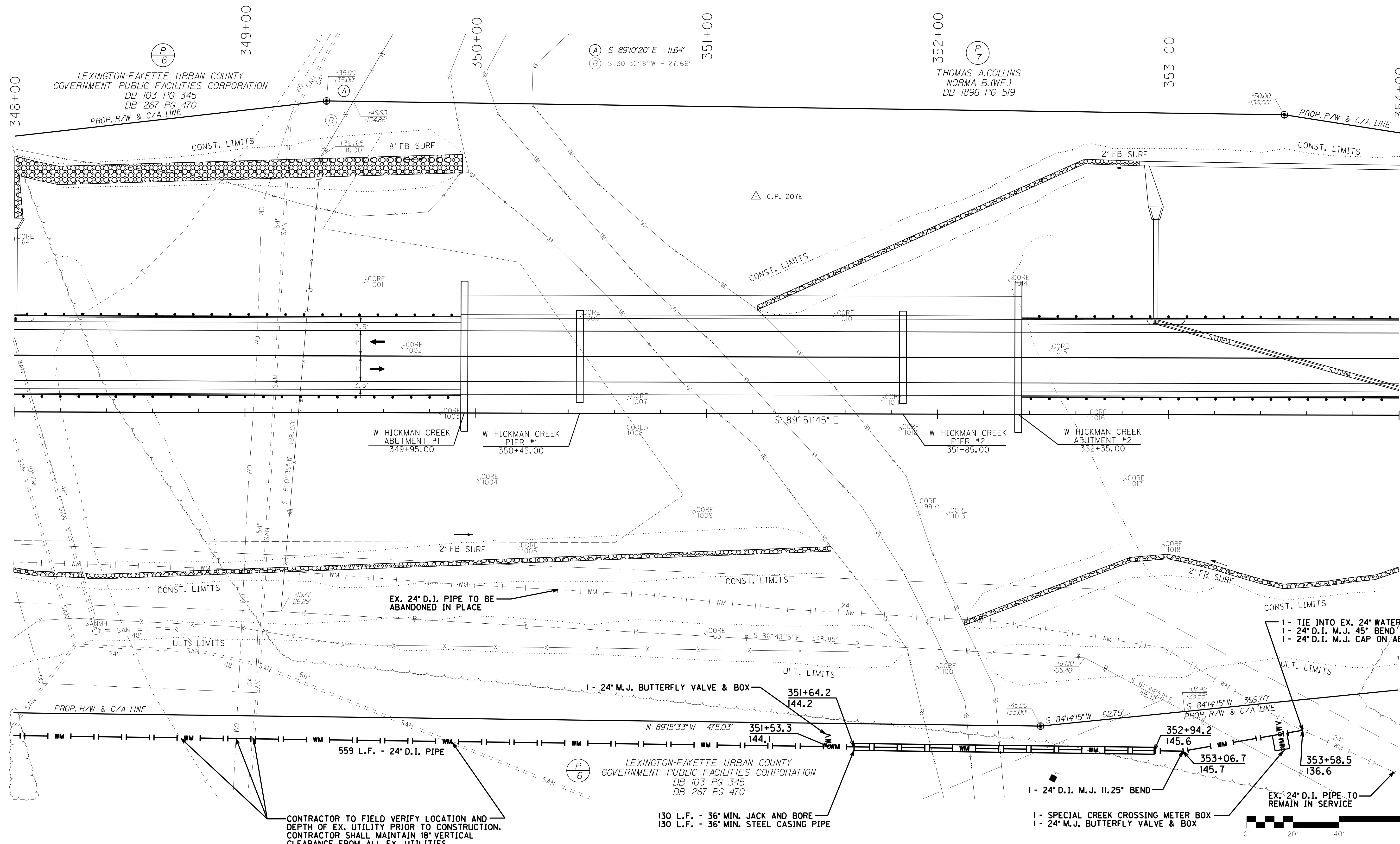
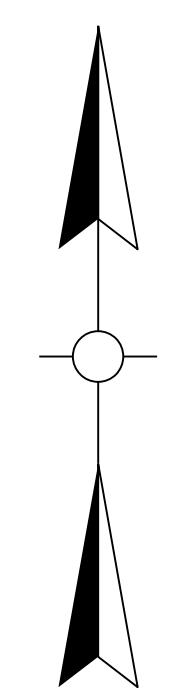
- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 601 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

SCALE: 1" = 20'

EAST BRANNON ROAD
STA. 342+00 TO STA. 348+00
WATER MAIN PLAN SHEET

BID SET (NOT FOR CONSTRUCTION)

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	117



FILE NAME: S:\LOUIS\400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U02000PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U02000PL
 Power InRoads v8.11.7.443

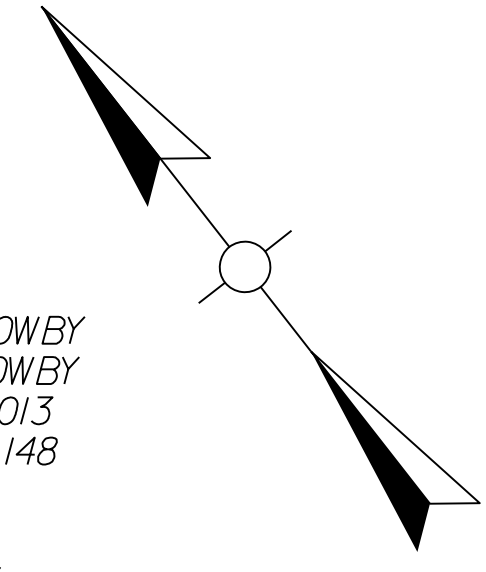
- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 616 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

EAST BRANNON ROAD
 STA. 348+00 TO STA. 354+00
 WATER MAIN PLAN SHEET
 SCALE: 1" = 20'

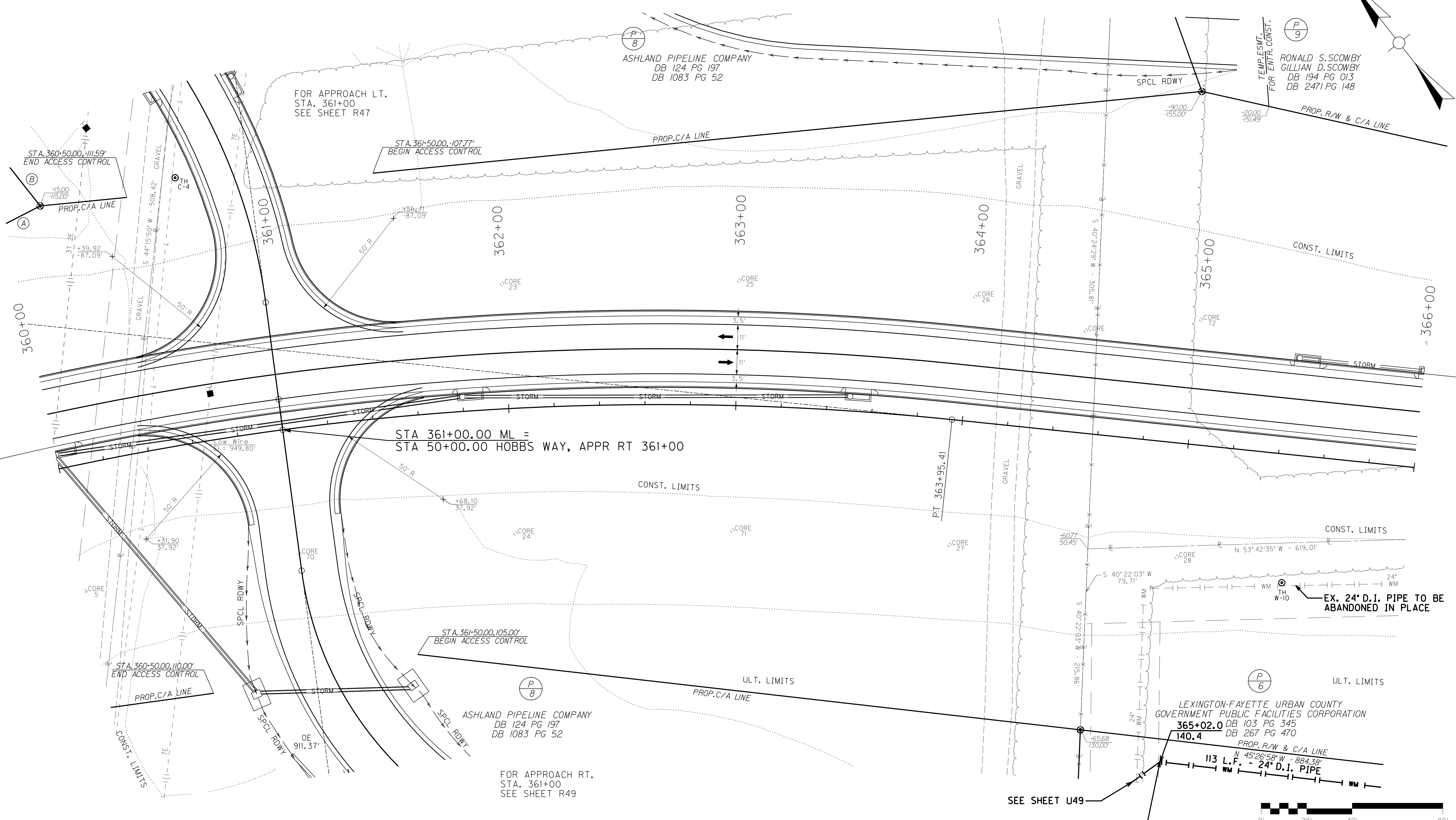
BID SET (NOT FOR CONSTRUCTION)

(A) S 79°12'42" E - 245.45'
(B) N 0°21'16" W - 174.24'

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U18



FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U02400PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U02400PL
 Power InRoads v8.11.7.443



- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 199 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

SEE SHEET U49

1 - 24" D.I. M.J. 45° BEND

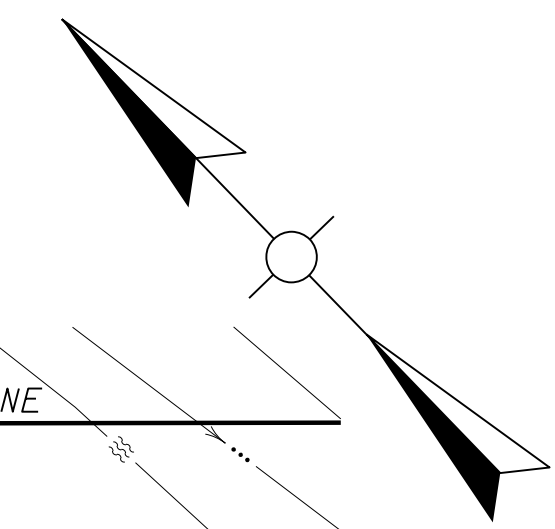
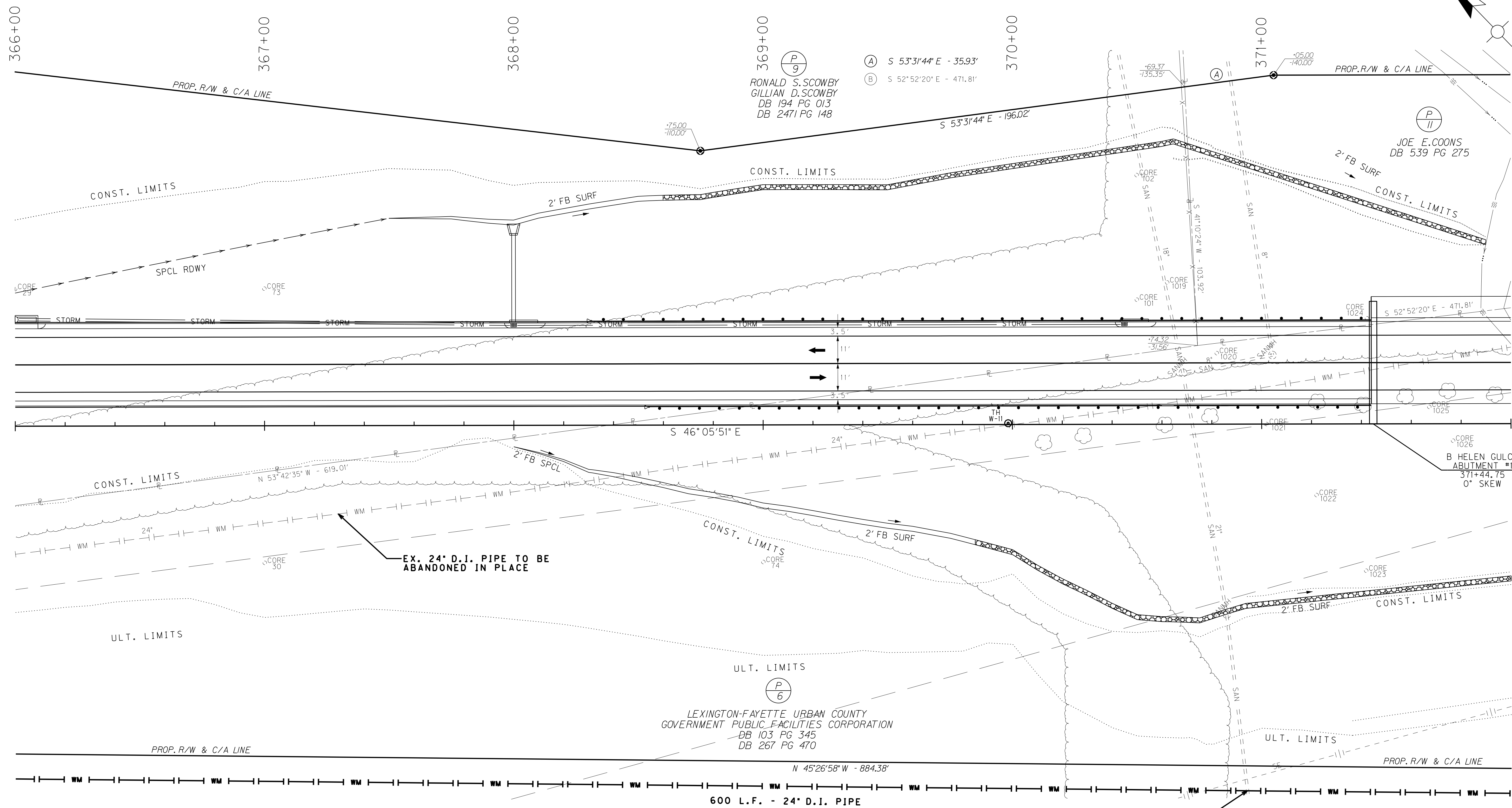


SCALE: 1" = 20'

EAST BRANNON ROAD
STA. 360+00 TO STA. 366+00
WATER MAIN PLAN SHEET

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	019

BID SET (NOT FOR CONSTRUCTION)



SCALE: 1"= 20'

EAST BRANNON ROAD
STA. 366+00 TO STA. 372+00
WATER MAIN PLAN SHEET

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 606 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF EX. UTILITY PRIOR TO CONSTRUCTION. CONTRACTOR SHALL MAINTAIN 18" VERTICAL CLEARANCE FROM ALL EX. UTILITIES.

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U02600PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U02600PL
 Power InRoads v8.11.7.443

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	020

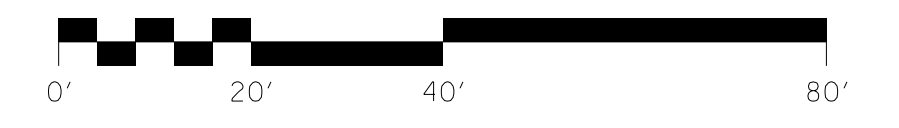
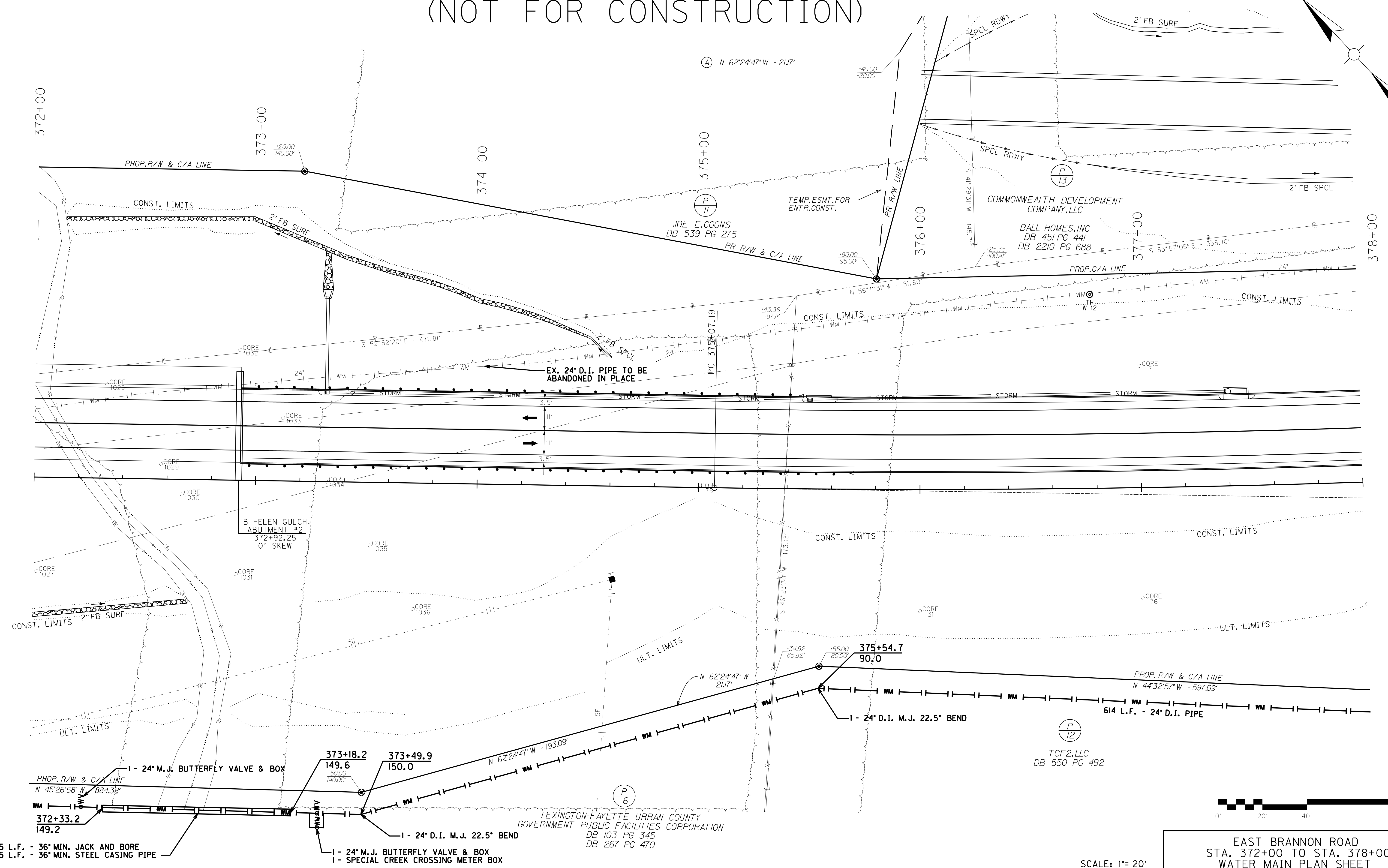
NOTES:

- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
- 600 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

BID SET (NOT FOR CONSTRUCTION)

FOR APPROACH LT.
STA. 379+25
SEE SHEET R51

FILE NAME: S:\LOUIS400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U02800PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U02800PL
 Power InRoads v8.11.7.443



EAST BRANNON ROAD
STA. 372+00 TO STA. 378+00
WATER MAIN PLAN SHEET

SCALE: 1" = 20'

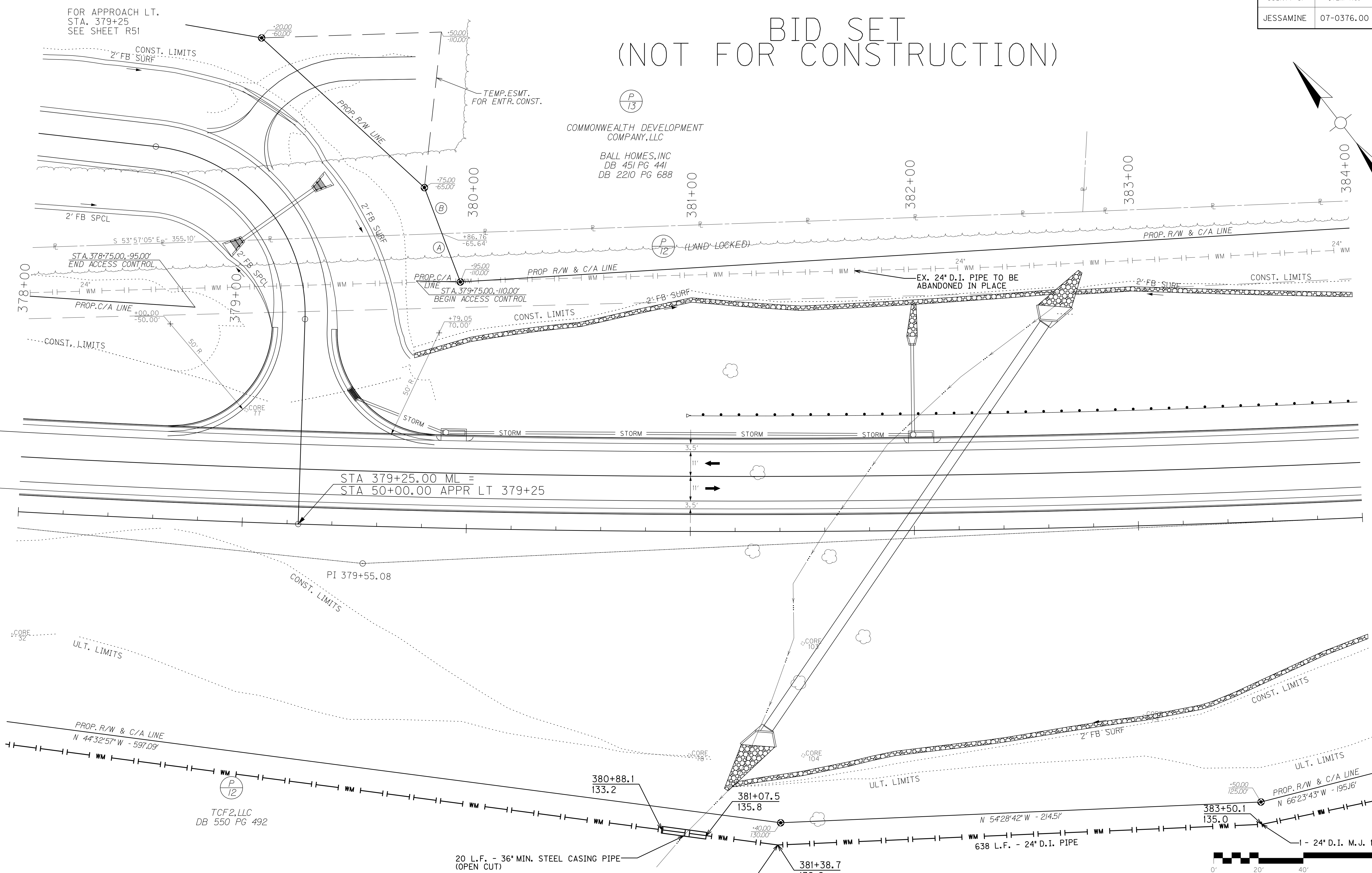
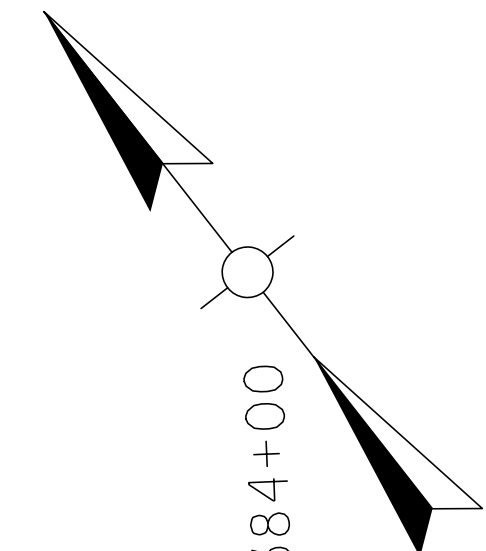
LEXINGTON-FAYETTE, URBAN COUNTY
GOVERNMENT PUBLIC FACILITIES CORPORATION
DB 103 PG 345
DB 267 PG 470

TCF2, LLC
DB 550 PG 492

COMMONWEALTH DEVELOPMENT
COMPANY, LLC
BALL HOMES, INC
DB 451 PG 441
DB 2210 PG 688

JOE E. COONS
DB 539 PG 275

BID SET (NOT FOR CONSTRUCTION)



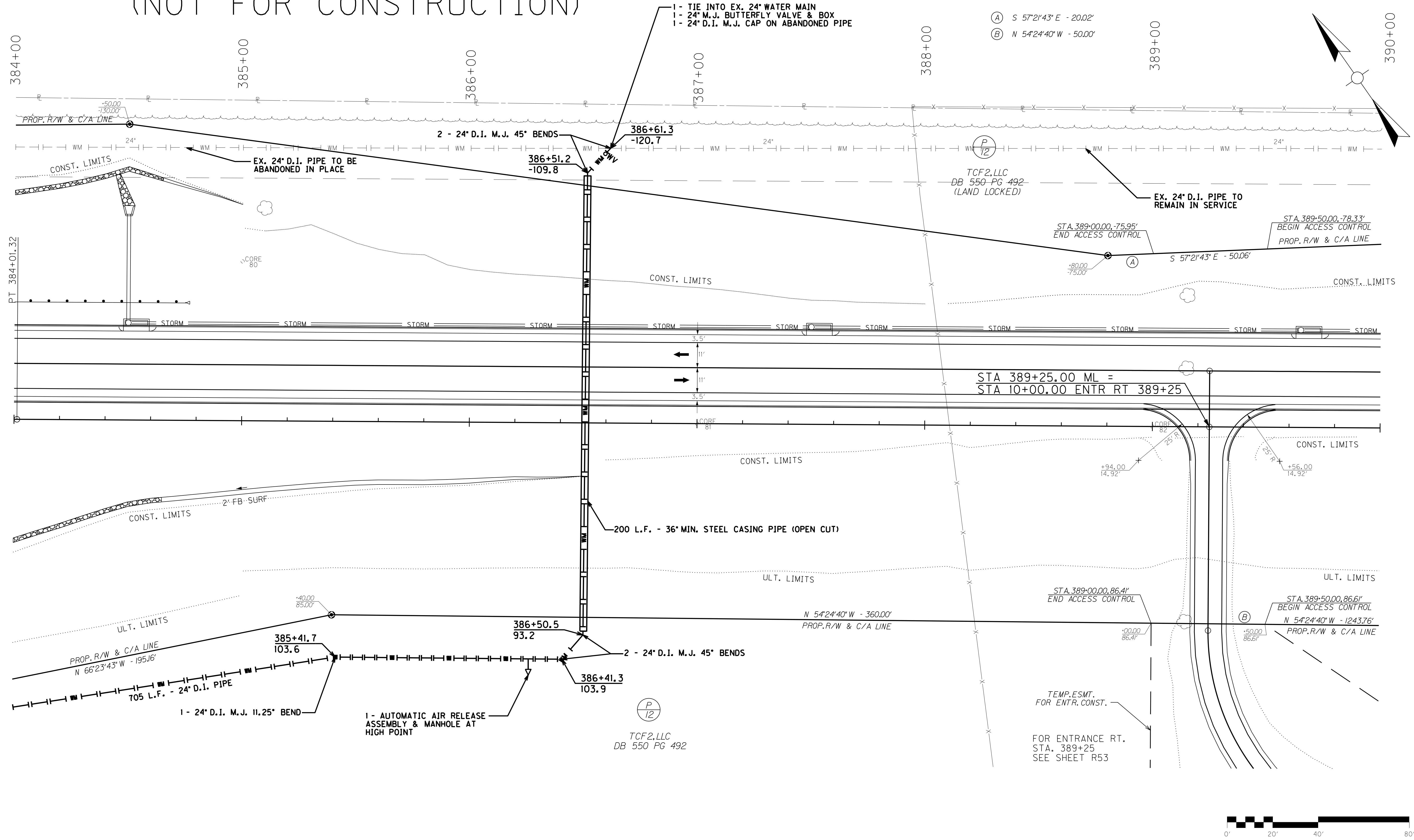
COMMONWEALTH DEVELOPMENT
COMPANY, LLC
BALL HOMES, INC
DB 451 PG 441
DB 2210 PG 688

FILE NAME: S:\ALOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U03000PL.DGN
USER: benf
DATE PLOTTED: November 11, 2015
E-SHEET NAME: U03000PL
Power InRoads v8.11.7.443

- NOTES:
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 589 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

SCALE: 1" = 20'
EAST BRANNON ROAD
STA. 378+00 TO STA. 384+00
WATER MAIN PLAN SHEET

BID SET (NOT FOR CONSTRUCTION)



FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U03200PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U03200PL
 Power InRoads v8.11.7.443

NOTES:

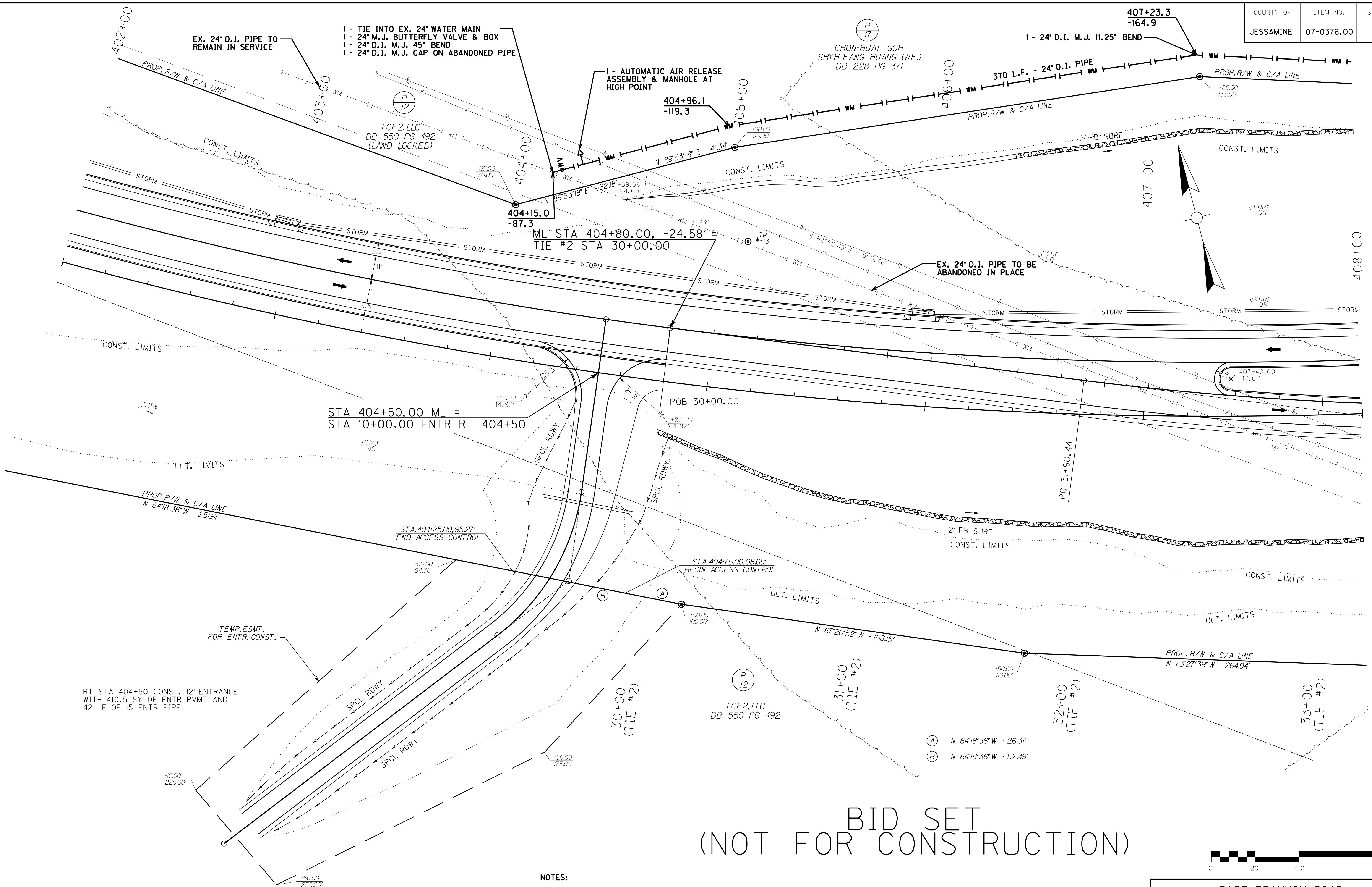
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
- 261 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

RT STA. 389+25 CONST. 12' ENTRANCE
 WITH 504 SY OF ENTR PYMT
 AND 94 LF OF 18" ENTR PIPE

SCALE: 1" = 20'

EAST BRANNON ROAD
 STA. 384+00 TO STA. 390+00
 WATER MAIN PLAN SHEET

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U03800PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U03800PL
 Power InRoads v8.11.7.443



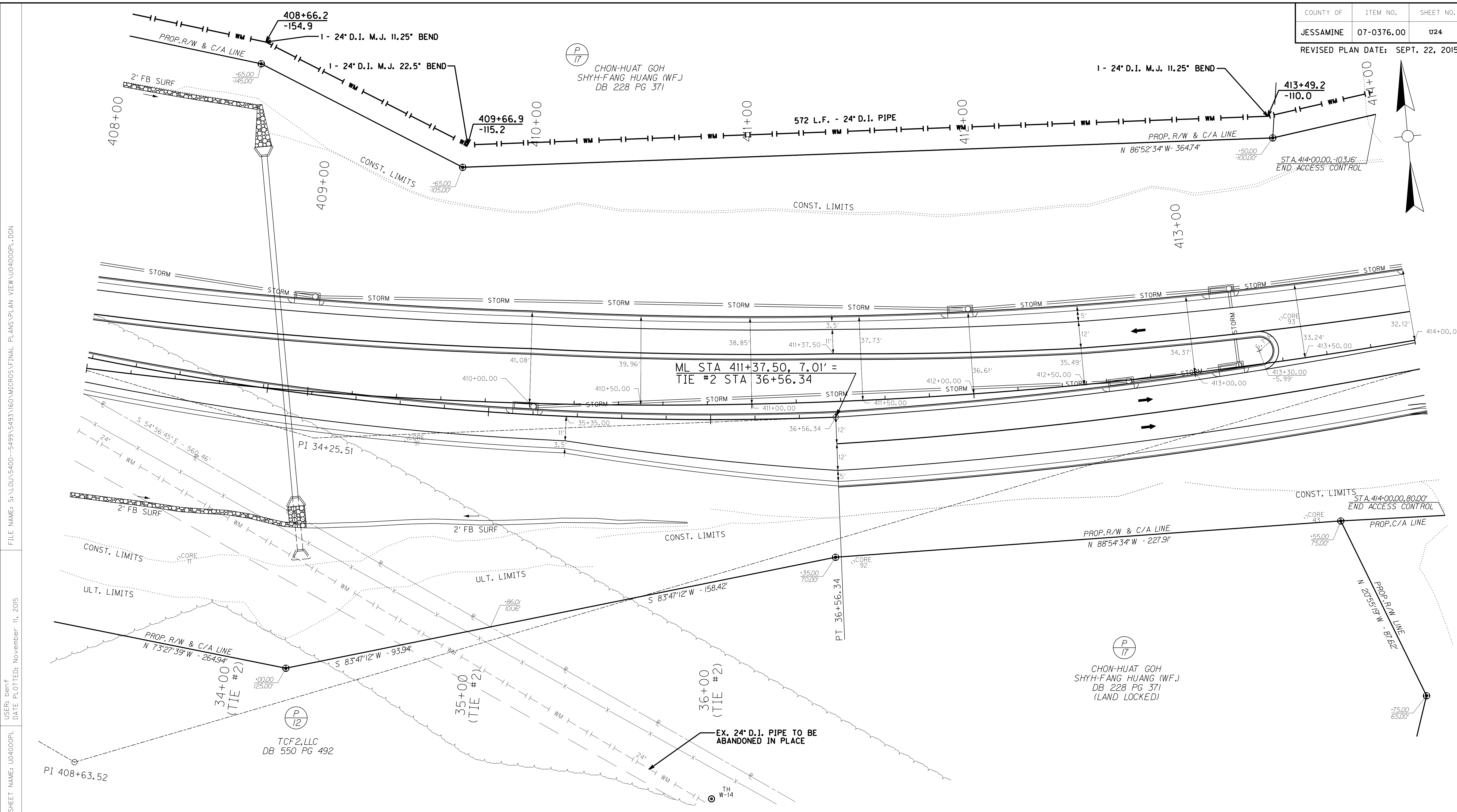
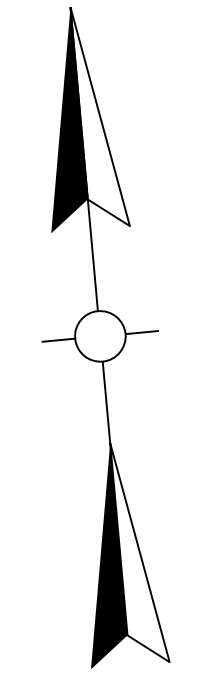
BID SET (NOT FOR CONSTRUCTION)

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 394 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.



SCALE: 1"= 20'

EAST BRANNON ROAD
 STA. 402+00 TO STA. 408+00
 WATER MAIN PLAN SHEET



BID SET
(NOT FOR CONSTRUCTION)



SCALE: 1"= 20'

EAST BRANNON ROAD
STA. 408+00 TO STA. 414+00
WATER MAIN PLAN SHEET

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U04000PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U04000PL
 Power InRoads v8.11.7.443

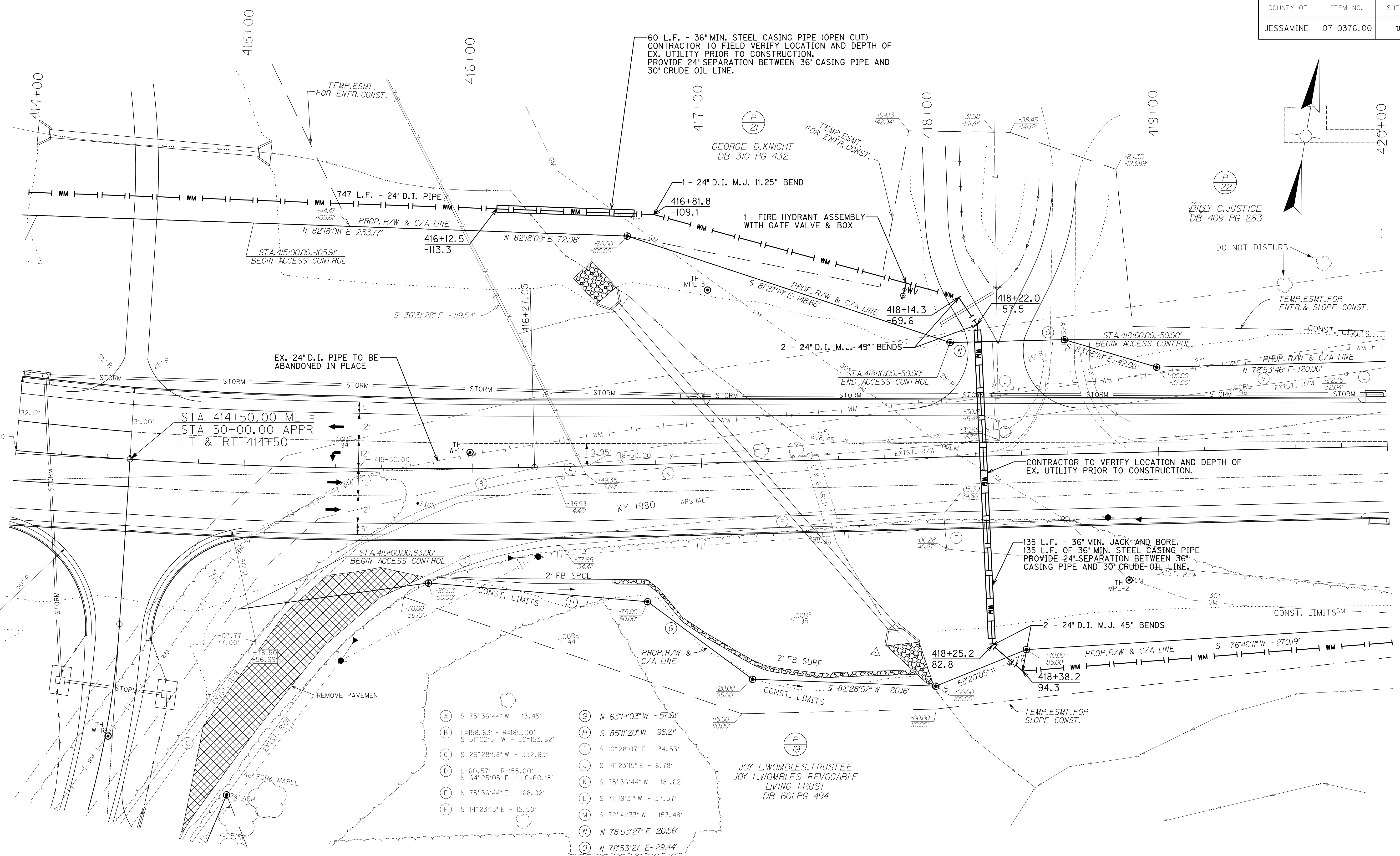
- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 330 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U04200PL.DGN

USER: benf
DATE PLOTTED: November 11, 2015

E-SHEET NAME: U04200PL

Power InRoads v8.11.7.443

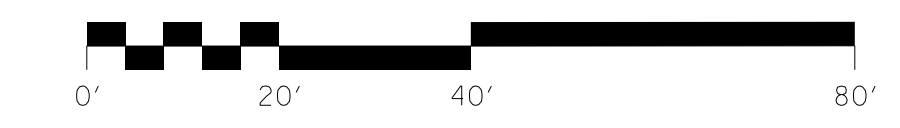


- (A) S 75°36'44\" W - 13.45'
- (B) L=158.63' - R=185.00'
S 51°02'51\" W - LC=153.82'
- (C) S 26°28'58\" W - 332.63'
- (D) L=60.57' - R=155.00'
N 64°25'05\" E - LC=60.18'
- (E) N 75°36'44\" E - 168.02'
- (F) S 14°23'15\" E - 15.50'
- (G) N 63°14'03\" W - 57.00'
- (H) S 85°11'20\" W - 96.21'
- (I) S 10°28'07\" E - 34.53'
- (J) S 14°23'15\" E - 8.78'
- (K) S 75°36'44\" W - 181.62'
- (L) S 71°19'31\" W - 37.57'
- (M) S 72°41'33\" W - 153.48'
- (N) N 78°53'27\" E - 20.56'
- (O) N 78°53'27\" E - 29.44'

BID SET (NOT FOR CONSTRUCTION)

NOTES:
 1. EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 2. 653 L.F. OF EX. 24\" D.I. PIPE TO BE ABANDONED IN PLACE.

SCALE: 1\" = 20'

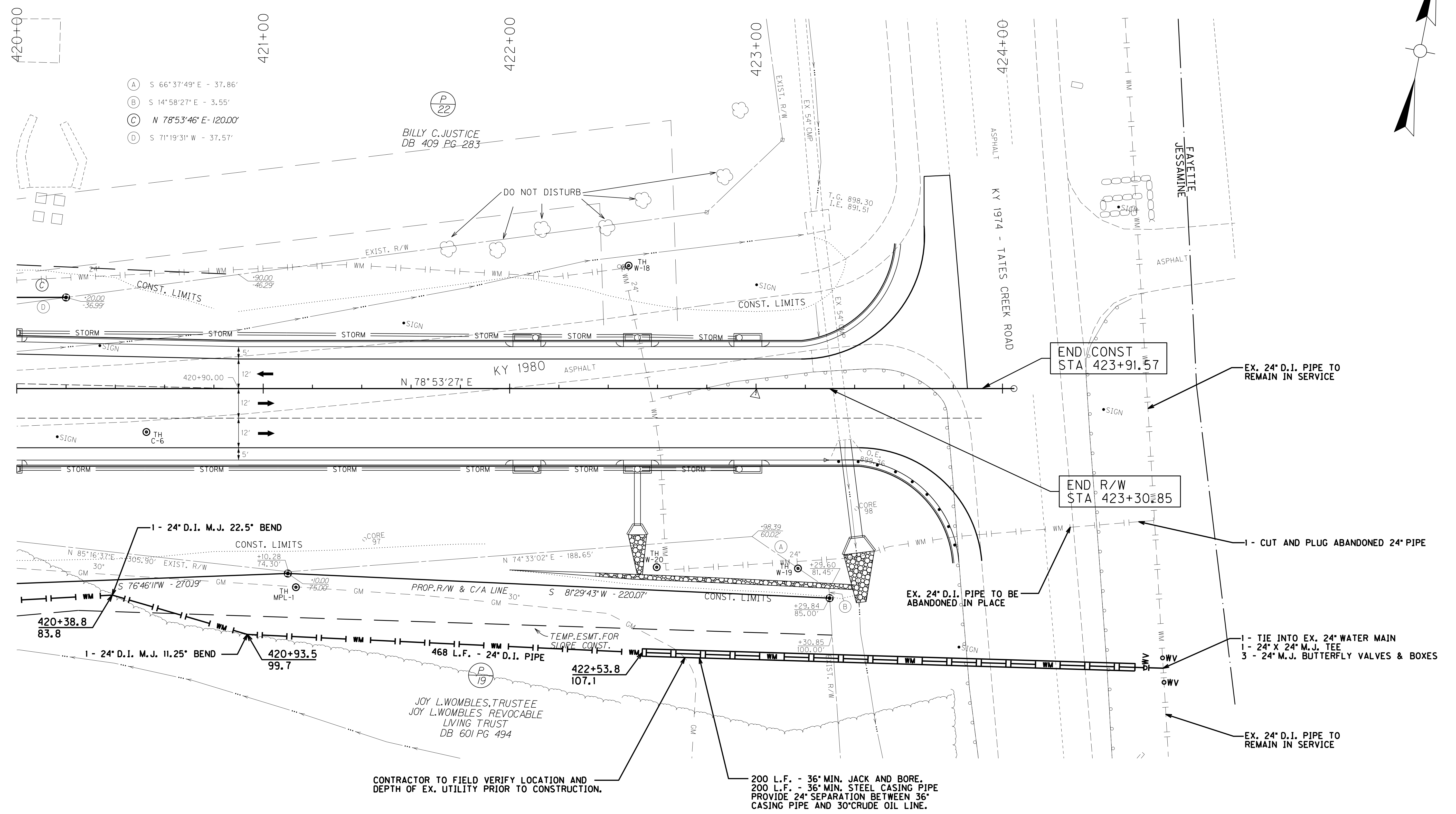
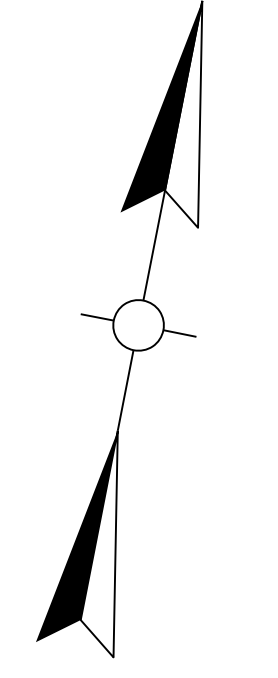


EAST BRANNON ROAD
 STA. 414+00 TO STA. 420+00
 WATER MAIN PLAN SHEET

(NOT FOR CONSTRUCTION)

(NOT FOR CONSTRUCTION)

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	026



FILE NAME: S:\LOUIS5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U04400PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U04400PL
 Power InRoads v8.11.7.443

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 548 L.F. OF EX. 24\"/>

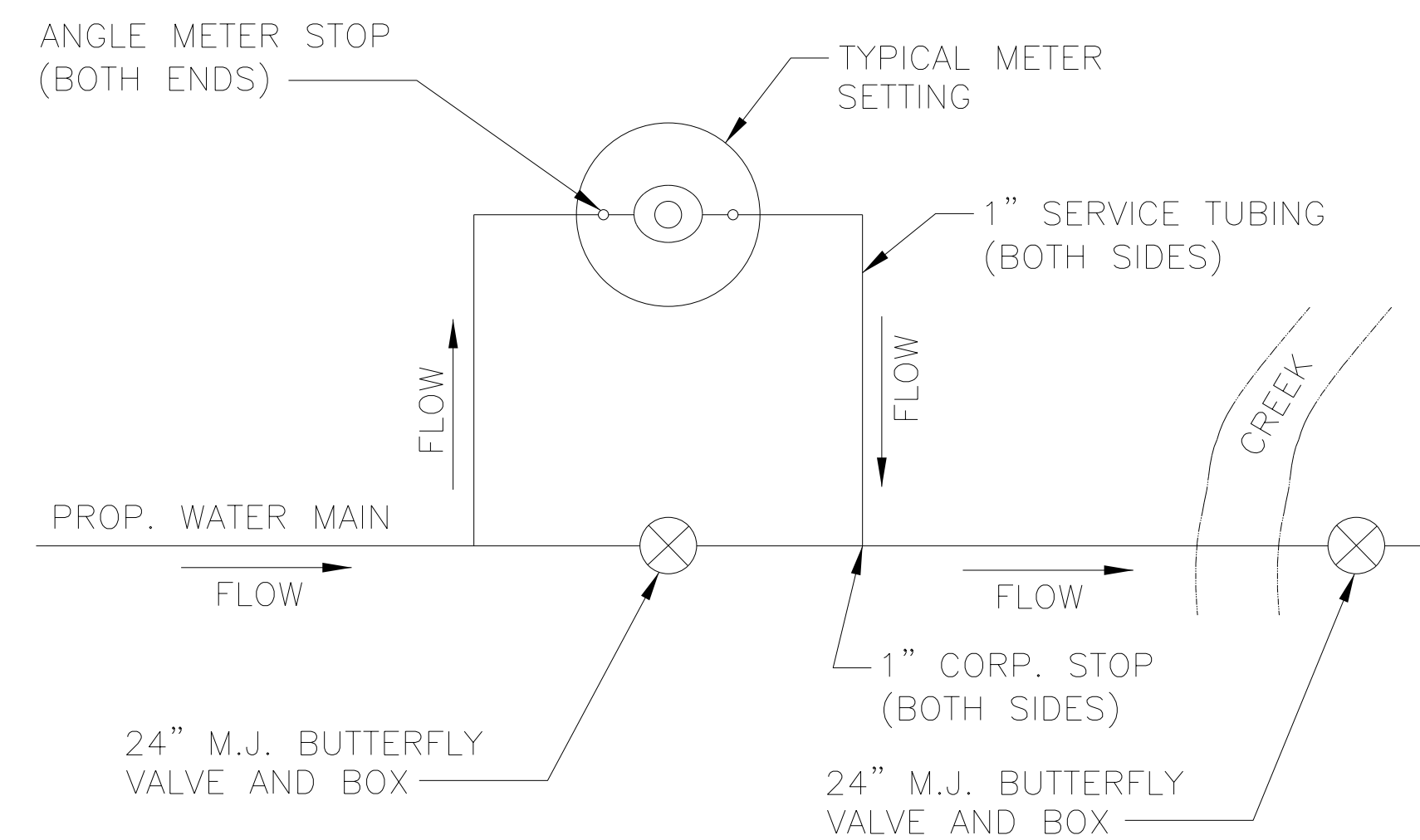


EAST BRANNON ROAD
 STA. 420+00 TO STA. 423+91.57
 WATER MAIN PLAN SHEET

SCALE: 1"= 20'

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U28

BID SET (NOT FOR CONSTRUCTION)



SPECIAL CREEK CROSSING METER BOX DETAIL

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\U088000E.DGN

USER: benf
DATE PLOTTED: November 11, 2015

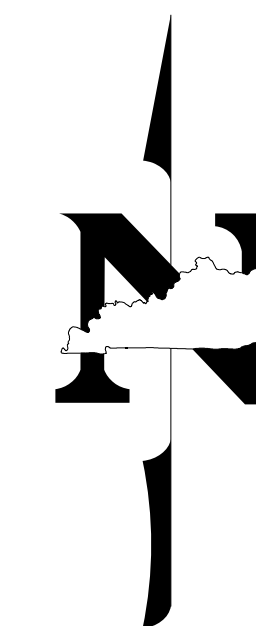
E-SHEET NAME: U088000E

Power InRoads v8.11.7.443

DETAIL SHEET

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U8

ADDED 11-12-15



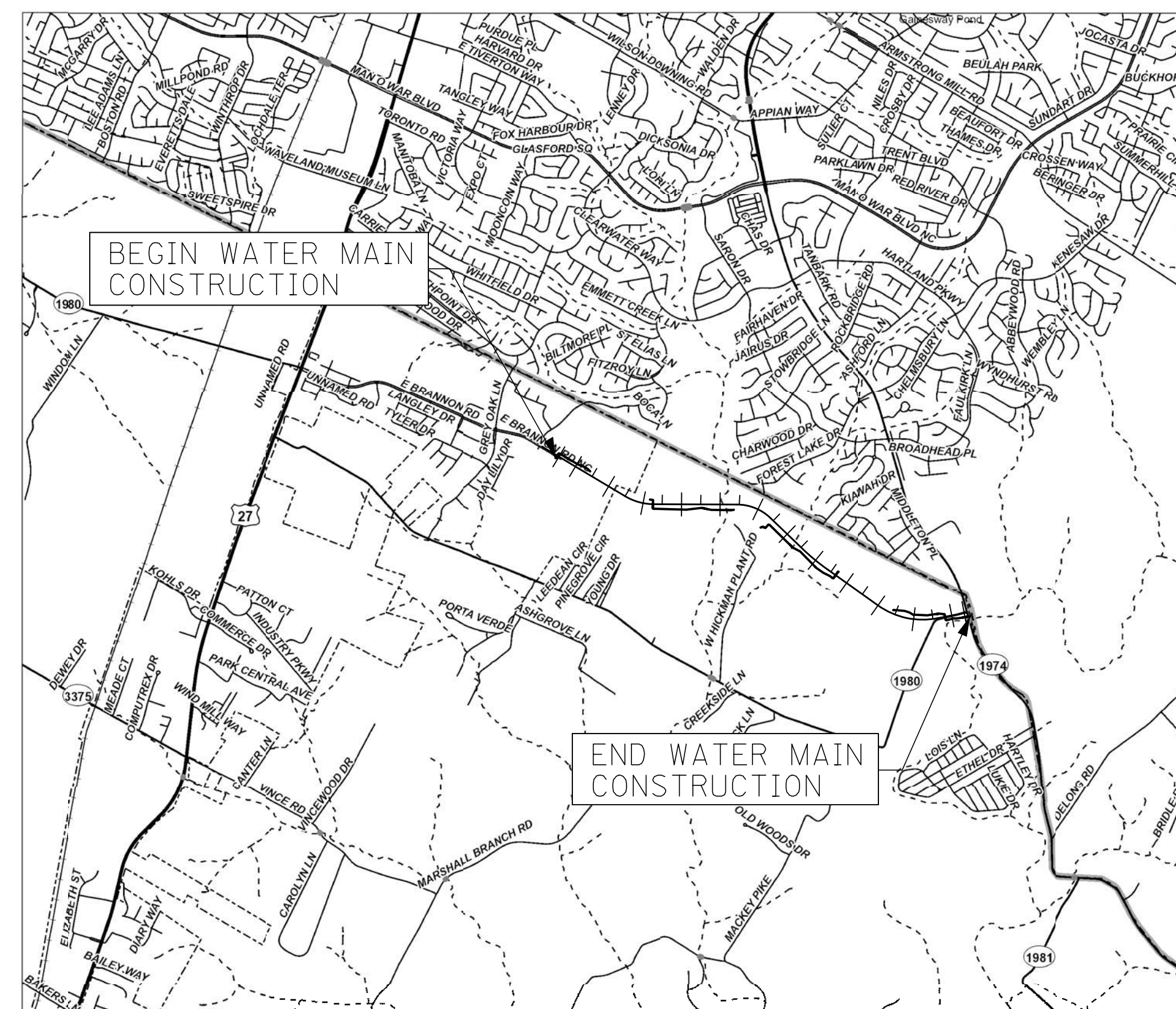
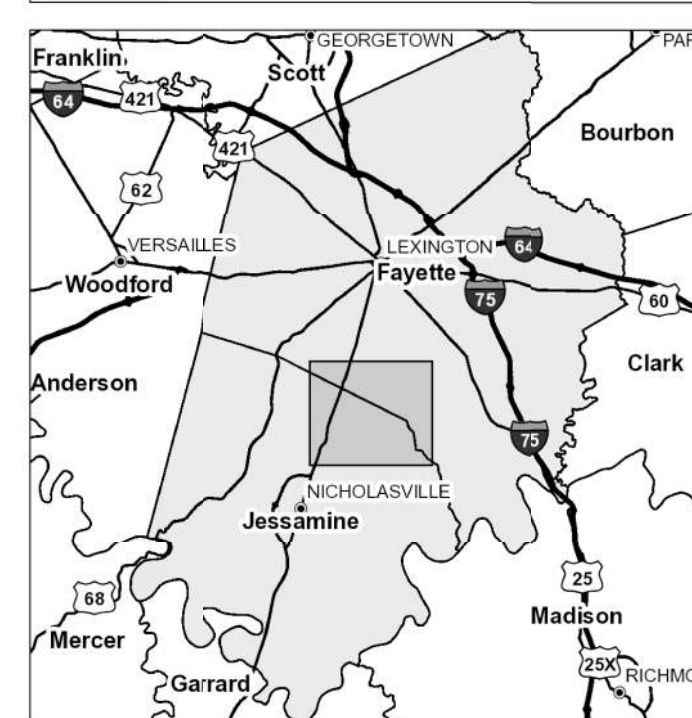
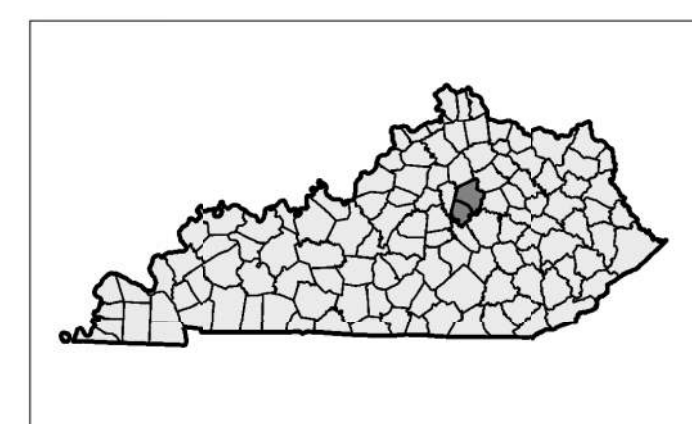
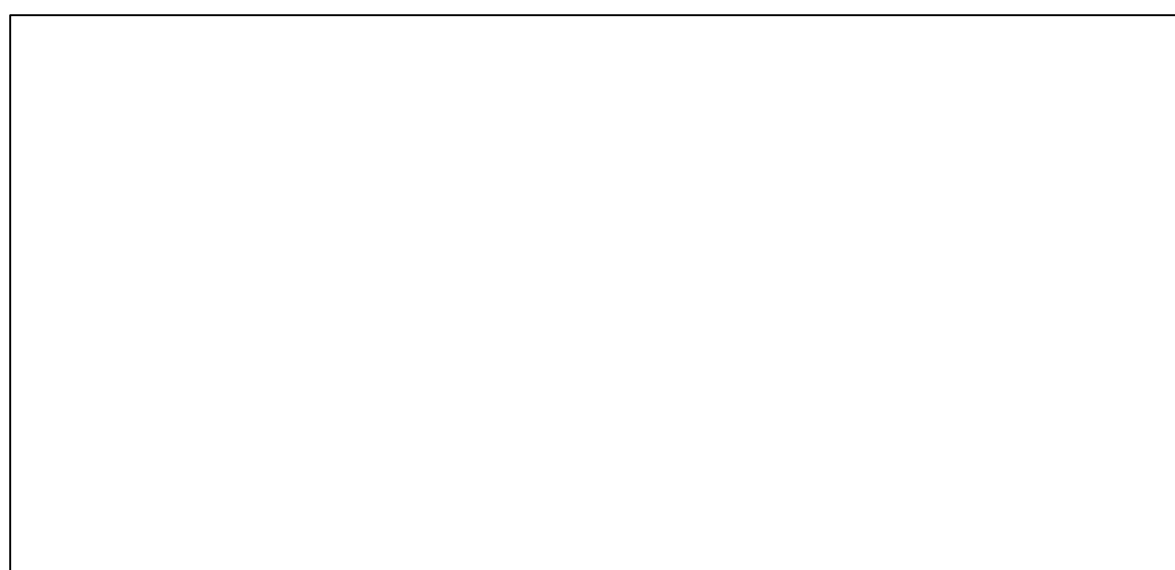
Commonwealth of Kentucky DEPARTMENT OF HIGHWAYS

PLANS OF PROPOSED PROJECT JESSAMINE COUNTY EAST BRANNON ROAD (CS-1486A) WATER TRANSMISSION MAIN RELOCATION

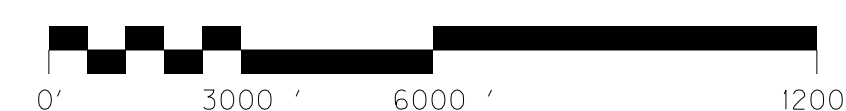
INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
U8	LAYOUT SHEET
U9	GENERAL SUMMARY AND NOTES
U10-U27	PLAN AND PROFILE SHEETS
U28	DETAIL SHEET

SHEETS NOT INCLUDED IN TOTAL SHEETS

CROSS SECTION SHEETS (TO BE ADDED LATER)



LAYOUT MAP



BID SET
(NOT FOR CONSTRUCTION)

**Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS
COUNTY OF
JESSAMINE**

ITEM NO. 07-376.00
 PROJECT NUMBER: FD04 SPP 057 1486 000-002
 LETTING DATE: NOVEMBER 20, 2015
 RECOMMENDED BY: RYAN D. TINSLEY, P.E. PROJECT MANAGER DATE: 11/11/2015
 PLAN APPROVED BY: STATE HIGHWAY ENGINEER DATE:

DESIGN CRITERIA

CLASS OF HIGHWAY _____
 TYPE OF TERRAIN _____
 DESIGN SPEED _____
 REQUIRED NPSD _____
 REQUIRED PSD _____
 LEVEL OF SERVICE _____
 ADT PRESENT () _____
 ADT FUTURE () _____
 DHV _____
 D % _____
 T % _____

GEOGRAPHIC COORDINATES

LATITUDE 37 DEGREES 56 MINUTES 38 SECONDS NORTH
 LONGITUDE 84 DEGREES 29 MINUTES 55 SECONDS WEST

DESIGNED

% RESTRICTED SD _____
 LEVEL OF SERVICE _____
 MAX. DISTANCE W/O PASSING _____

LENGTH	LIN. FT.	MILES	LENGTH	LIN. FT.	MILES	LENGTH	LIN. FT.	MILES	LENGTH	LIN. FT.	MILES
ADDED			ADDED			ADDED			ADDED		
DEDUCTED			DEDUCTED			DEDUCTED			DEDUCTED		
FOR EQUALITIES			FOR EQUALITIES			FOR EQUALITIES			FOR EQUALITIES		
NOT INCLUDED			NOT INCLUDED			NOT INCLUDED			NOT INCLUDED		
RAILROAD CROSSINGS NO.			RAILROAD CROSSINGS NO.			RAILROAD CROSSINGS NO.			RAILROAD CROSSINGS NO.		
BRIDGES			BRIDGES			BRIDGES			BRIDGES		

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\U00100LS.DGN

USER: benf DATE PLOTTED: November 11, 2015

E-SHEET NAME: U00100LS Power InRoads v8.11.7.43

BID SET (NOT FOR CONSTRUCTION)

GENERAL SUMMARY

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	09

ADDED 11-12-15

ITEM	DESCRIPTION	UNIT	Project Total
01314	PLUG PIPE	EACH	7
14011	W ENCASMENT STEEL BORED RANGE 6	LF	680
14017	W ENCASMENT STEEL OPEN CUT RANGE 6	LF	735
14021	W FIRE HYDRANT REMOVE	EACH	2
14500	W AIR RELEASE VALVE 1 INCH INST ①	EACH	4
14510	W FIRE HYDRANT ASSEMBLY INST	EACH	4
14514	W METER 1 INCH INST	EACH	2
14529	W PIPE DUCTILE IRON 24 INCH INST	LF	8,580
14561	W PLUG EXISTING MAIN INST	EACH	1
14584	W TIE-IN 24 INCH INST	EACH	8
14595	W VALVE 24 INCH INST	EACH	13

NOTE:

- ① CONTRACTOR TO PROVIDE MANHOLE AND ACCESS CASTING

GENERAL NOTES:

01. WATER MAIN TO MAINTAIN A MINIMUM COVER OF 36" IN EASEMENTS AND 42" IN RIGHT OF WAY AS MEASURED FROM FINISHED GRADE TO THE OUTSIDE SURFACE OF THE PIPE. CONTRACTOR SHALL REFER TO HIGHWAY CROSS SECTIONS TO VERIFY DEPTHS BELOW EXISTING AND PROPOSED SURFACES AND ENTRANCES. WATER MAIN CROSS SECTIONS WILL BE PROVIDED TO CONTRACTOR PRIOR TO CONSTRUCTION.
02. ALL PROPOSED WATER MAINS LOCATED WITHIN THE LIMITS OF THE EXISTING HIGHWAY R.O.W. SHALL BE INSTALLED WITH 42" (MIN.) OF COVER ABOVE THE PROPOSED WATER MAIN. THE DIMENSION OF COVER WILL BE MEASURED FROM THE TOP EXTERIOR SURFACE OF THE PROPOSED WATER MAIN AT THE POINT OF MAXIMUM DIAMETER OF THE PROPOSED WATER MAIN (JOINT, BELL, FITTING, ETC.) TO THE INVERT OF THE HIGHWAY DITCH LINE AFTER THE SAID DITCH LINE HAS BEEN DRESSED TO FINAL GRADE. SEE DETAIL THIS SHEET FOR ADDITIONAL INFORMATION.
03. THE CONTRACTOR SHALL NOTE THAT THE LENGTH OF BORES AND CASINGS REFERRED TO ON THE CONTRACT DRAWINGS IS APPROXIMATE AND MAY BE INCREASED OR DECREASED BY THE OWNER AND/OR THE ENGINEER AS REQUIRED BY FIELD REQUIREMENTS DURING CONSTRUCTION OF THIS CONTRACT.
04. THE CONTRACTOR SHALL NOTE THAT MANY WATERWAY CROSSINGS (CREEKS, STREAMS, DRAINS, ETC.) REQUIRE PROTECTION BY PLACEMENT OF EITHER A CRUSHED ROCK OR CONCRETE CAP ABOVE THE PROPOSED WATERMAIN. MOST OF THESE CROSSINGS HAVE BEEN IDENTIFIED, HOWEVER ADDITIONAL CAPS MAY BE REQUIRED AS ACTUAL FIELD CONSTRUCTION DICTATES. FURTHER, THE LENGTH AND MATERIAL (STONE OR CONCRETE) MAY BE CHANGED AS REQUIRED BY ACTUAL FIELD CONDITIONS DURING CONSTRUCTION OF THIS CONTRACT. ALL CHANGES SHALL BE PAID FOR AT THE UNIT PRICE BID FOR SAID WATERWAY CROSSINGS UNDER THIS CONTRACT AND SHALL BE APPROVED BY OR DIRECTED BY THE OWNER AND/OR THE ENGINEER PRIOR TO INSTALLATION.
05. ALL PAVED SURFACES CROSSED BY THE PROPOSED WATER MAIN SHALL BE SAW CUT TO PROVIDE A CLEAN, TRUE EDGE FOR PAVEMENT REPLACEMENT.
06. THE CONTRACTOR SHALL NOTE THAT SOME PROPERTIES ALONG THE PROPOSED WATER MAIN ROUTE MAY HAVE EXISTING ON-SITE SEWAGE DISPOSAL SYSTEMS (SEPTIC TANKS, LEACH FIELDS, ETC.). THE CONTRACTOR SHALL ASSESS FIELD CONDITIONS AHEAD OF HIS EXCAVATION AS REQUIRED TO AVOID DISTURBING ALL SUCH SYSTEMS. HOWEVER IF DISTURBANCE IS UNAVOIDABLE OR ACCIDENTAL, THE CONTRACTOR SHALL HAVE ON CALL A LICENSED PLUMBER TO REPAIR ANY AND ALL DAMAGE CAUSED DIRECTLY OR INDIRECTLY BY THE CONTRACTOR. FURTHERMORE, THE CONTRACTOR SHALL CONTACT THE OWNER AND/OR THE ENGINEER PRIOR TO BACK FILLING THE PURPOSED WATERMAIN TO ALLOW ASSESSMENT OF FIELD CONDITIONS WHICH MAY REQUIRE FURTHER PROTECTION OF THE PROPOSED WATER MAIN. ANY REPAIRS MADE TO EXISTING SEPTIC SYSTEMS SHALL BE PERMANENT, IN ACCORDANCE WITH ALL GOVERNING CODES, AND SHALL BE COMPLETED THE SAME DAY.
07. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY TEMPORARY EASEMENTS REQUIRED FOR CONSTRUCTION ACTIVITIES OR STORAGE.
08. THE NEW WATER MAIN SHALL BE LOCATED IN ROW OR PERMANENT EASEMENT. TEMPORARY EASEMENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
09. ALL EASEMENTS AS SHOWN ARE ACQUIRED AS SPECIFIED ON THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL REQUEST TO RECEIVE A COPY OF ACQUIRED EASEMENTS AND PERMITS PRIOR TO CONSTRUCTION.
10. THE CONTRACTOR SHALL FIELD LOCATE THE FINAL LOCATIONS OF ALL VALVES, HYDRANTS, TEES, AND BLOWOFFS WITH THE RESIDENT PROJECT REPRESENTATIVE PRIOR TO CONSTRUCTION.
11. THE CONTRACTOR SHALL PAINT ALL HYDRANTS AND PROTECTIVE STEEL BOLLARDS (TWO PER HYDRANT) YELLOW PER THE PROJECT SPECIFICATIONS.
12. CONTRACTOR SHALL BACKFILL 6 INCHES OF GRANULAR BACKFILL AROUND ALL AREAS OF THE WATER MAIN WHEN INSTALLING PRIOR TO BACKFILLING WITH NATIVE MATERIAL AT LOCATIONS SPECIFIED BY OWNER DURING CONSTRUCTION.

CONSTRUCTION ON RIGHT-OF-WAY NOTES:

- 01 - WATER LINES TO BE CONSTRUCTED WITHIN THE KENTUCKY DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAY:
Trenches shall be of a depth sufficient to provide a minimum cover of 42" from the existing ground surface to the top of the pipe and be located approximately 5 feet from the edge of the pavement or on the back side of ditch line, unless otherwise noted. Trench shall be backfilled with flowable fill when located within 3 feet from edge of pavement. See individual sheets for details.
- 02 - ALL BORES UNDER STATE HIGHWAYS RIGHT-OF-WAY:
Shall be a minimum of 42" depth under bottom of ditch line to top of the proposed bore and/or casing pipe on both sides of the highway.
- 03 - ROCK BLASTING:
There shall be NO blasting within State Right-of-Way without written consent from the Department of Transportation.
- 04 - PROTECTION OF EXISTING PAVING:
Care shall be taken by the CONTRACTOR to avoid cracking or breaking the bituminous paving. All damage to the existing paving caused by the CONTRACTOR'S operation shall be repaired by the CONTRACTOR at no cost to the owner. Paving protection shall be accomplished by the use of rubber-tired and street padded machinery or other approved equipment well suited for this type of construction.
- 05 - BANK AND DITCH PROTECTION EXCAVATION:
During construction, dlembankments, refills and excavations shall be kept shaped and drained by the CONTRACTOR. Ditches and drains along the highways shall be maintained in such a manner as to drain effectively at all times.
- 06 - PRIVATE ENTRANCE ROAD:
All roadways and driveways within the work limits of state Right-of-Ways shall be refilled to the natural surface of the ground with approved material. The material shall be placed and compacted to a smoothness suitable for traffic. The CONTRACTOR shall be totally responsible for maintaining these roadways until the restoration is approved by the ENGINEER. The CONTRACTOR shall note that all private businesses and residences along the route of the proposed water main must have access to their properties at all times during construction.
- 07 - PROTECTION OF EXISTING DRAINAGE CULVERTS:
At locations where the proposed water main is parallel with or crossing an existing storm sewer, the cost of relaying existing culvert pipes or the extra depth required to avoid the existing culvert is considered incidental to the construction and is not a pay item.
- 08 - EXISTING UTILITIES HAVE NOT BEEN SHOWN:
THE CONTRACTOR shall be responsible for locating all existing utilities. The CONTRACTOR shall coordinate with the representatives of the various utilities when working near any existing utility. No additional payment to the CONTRACTOR will be made for extra depth required to avoid any existing utility.
- 09 - FITTINGS:
Unless otherwise noted, a separate bid item has not been established for fittings. The fittings involved are, but not limited to, the following: tees, bends, plugs, reducers, couplings, saddles, crosses, etc. The CONTRACTOR shall include the cost of these items in the unit price for the pipe. All tees and bends shall be thrust blocked as shown on the detail sheets of the contract drawings.
- 10 - CONSTRUCTION LIMITS:
The CONTRACTOR shall confine all construction activity to the area within existing easements and construction limits, unless otherwise approved in writing by the OWNER.
- 11 - ROCK SOUNDINGS:
Rock soundings were not performed by the ENGINEER. The CONTRACTOR shall take appropriate action to determine subsurface conditions.
- 12 - FINAL LOCATIONS OF APPURTENANCES:
The final location of services, line valves, air release valves, blowoffs, hydrants (location and orientation) shall be field located during construction and approved by the ENGINEER. All meters, valves, air releases, blowoffs and hydrants shall only be located on the backside of the ditch line.

LOCATION CONDITION "A"
WHENEVER POSSIBLE, THE PROPOSED WATER MAIN SHALL BE LOCATED ADJACENT TO THE EXISTING RIGHT-OF-WAY FENCE LINE AND AS CLOSE TO SAID FENCE LINE AS PRACTICABLY CONSTRUCTABLE. PROVIDE 36" (min.) OF COVER.

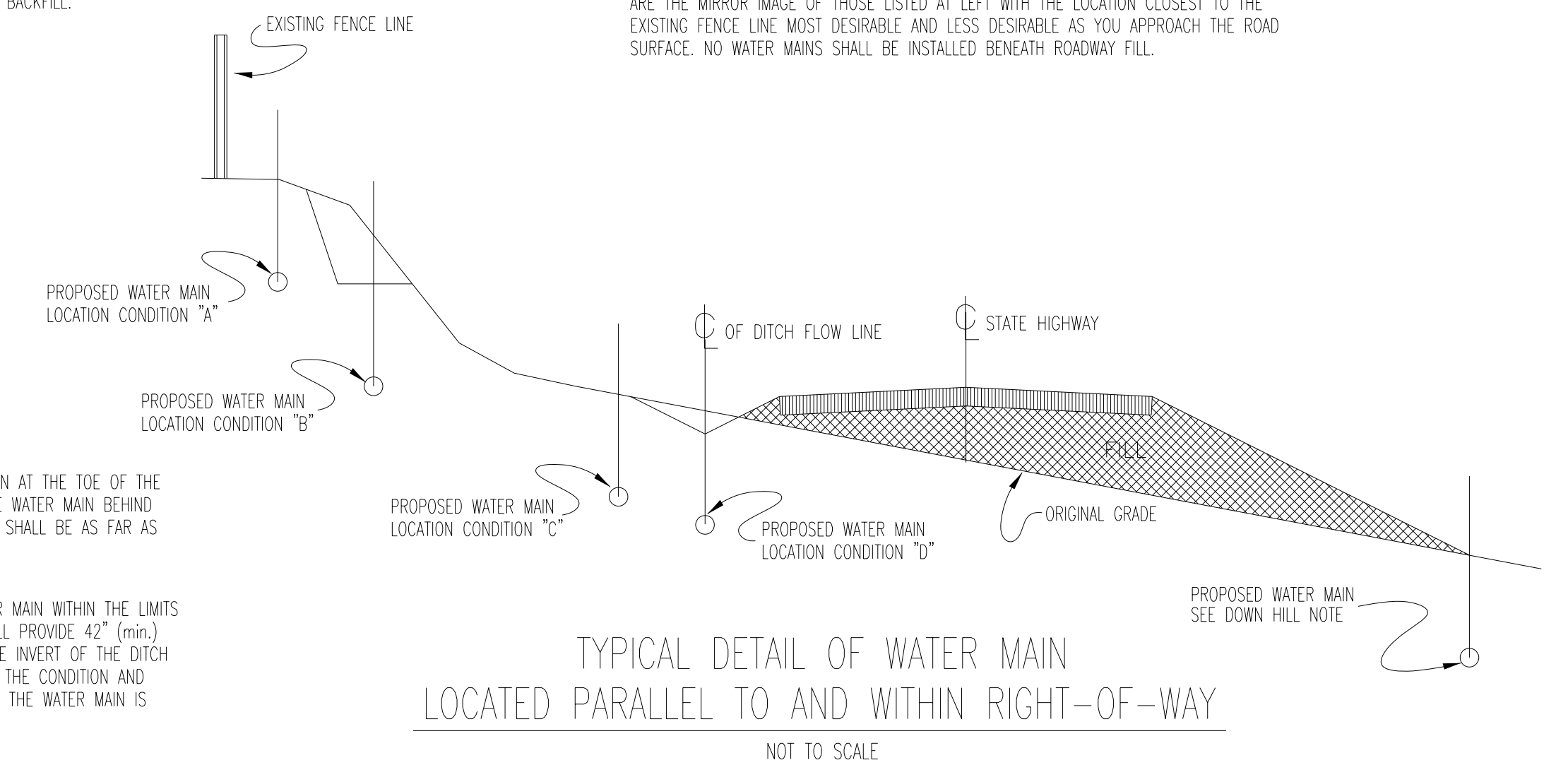
LOCATION CONDITION "B"
WHENEVER IT IS NECESSARY TO INSTALL PROPOSED WATER MAIN ON EXISTING SLOPE, THE CONTRACTOR SHALL CUT A TEMPORARY BENCH IN SAID SLOPE AND INSTALL THE WATER MAIN WITH 36" (min.) COVER. COVER WILL BE AS MEASURED FROM THE TOP OF THE INSTALLED PIPE TO DIRECTLY ABOVE THE PIPE MID POINT BETWEEN THE UP HILL AND DOWN HILL DITCH BANKS. ALL BACKFILL MATERIAL SHALL BE MECHANICALLY COMPACTED, AND EROSION CONTROL PROVIDED AS NECESSARY TO MAINTAIN BACKFILL.

LOCATION CONDITION "C"
WHENEVER IT IS NECESSARY TO INSTALL PROPOSED WATER MAIN AT THE TOE OF THE EXISTING UP HILL SLOPE, THE CONTRACTOR SHALL LOCATE THE WATER MAIN BEHIND THE EXISTING DITCH WITH 36" (min.) COVER. THE WATER MAIN SHALL BE AS FAR AS POSSIBLE BEHIND THE EXISTING DITCH.

LOCATION CONDITION "D"
WHENEVER IT IS NECESSARY TO INSTALL THE PROPOSED WATER MAIN WITHIN THE LIMITS OF THE EXISTING ROADWAY DITCH LINE, THE CONTRACTOR SHALL PROVIDE 42" (min.) COVER OVER THE PROPOSED WATER MAIN MEASURED FROM THE INVERT OF THE DITCH LINE AFTER FINAL GRADING, TO THE TOP OF THE WATER MAIN. THE CONDITION AND GRADE OF THE DITCH SHALL BE CONTINUOUSLY MAINTAINED AS THE WATER MAIN IS INSTALLED.

LOCATION CONDITION TYPICAL INFORMATION:
WHENEVER THE WATER MAIN IS SHOWN TO BE WITHIN THE RIGHT-OF-WAY THE LOCATION OF SAID WATER MAIN WILL BE AS CLOSE TO THE EXISTING FENCE, AND AS FAR AS POSSIBLE BEHIND THE EXISTING DITCH AS REASONABLY CONSTRUCTABLE, WITH CONDITION "A" BEING MOST DESIRABLE AND CONDITION "D" BEING LEAST DESIRABLE. THE CONTRACTOR SHOULD NOTE THAT CONSTRUCTION WITHIN THE DOT RIGHT-OF-WAY WILL BE SUBJECT TO APPROVAL BY THE DOT AND SHOULD MAKE EVERY REASONABLE EFFORT TO MAINTAIN THE CONDITION OF THE RIGHT-OF-WAY.

DOWN HILL LOCATION NOTE:
WATER MAIN LOCATION CONDITIONS ON THE DOWN HILL PORTION OF THE RIGHT-OF-WAY ARE THE MIRROR IMAGE OF THOSE LISTED AT LEFT WITH THE LOCATION CLOSEST TO THE EXISTING FENCE LINE MOST DESIRABLE AND LESS DESIRABLE AS YOU APPROACH THE ROAD SURFACE. NO WATER MAINS SHALL BE INSTALLED BENEATH ROADWAY FILL.



GENERAL SUMMARY AND NOTES

FILE NAME: S:\L\00154400--5499\5493\160\MICROS\FINAL PLANS\U002015L.DGN

USER: benf
DATE PLOTTED: November 11, 2015

E-SHEET NAME: U002015U

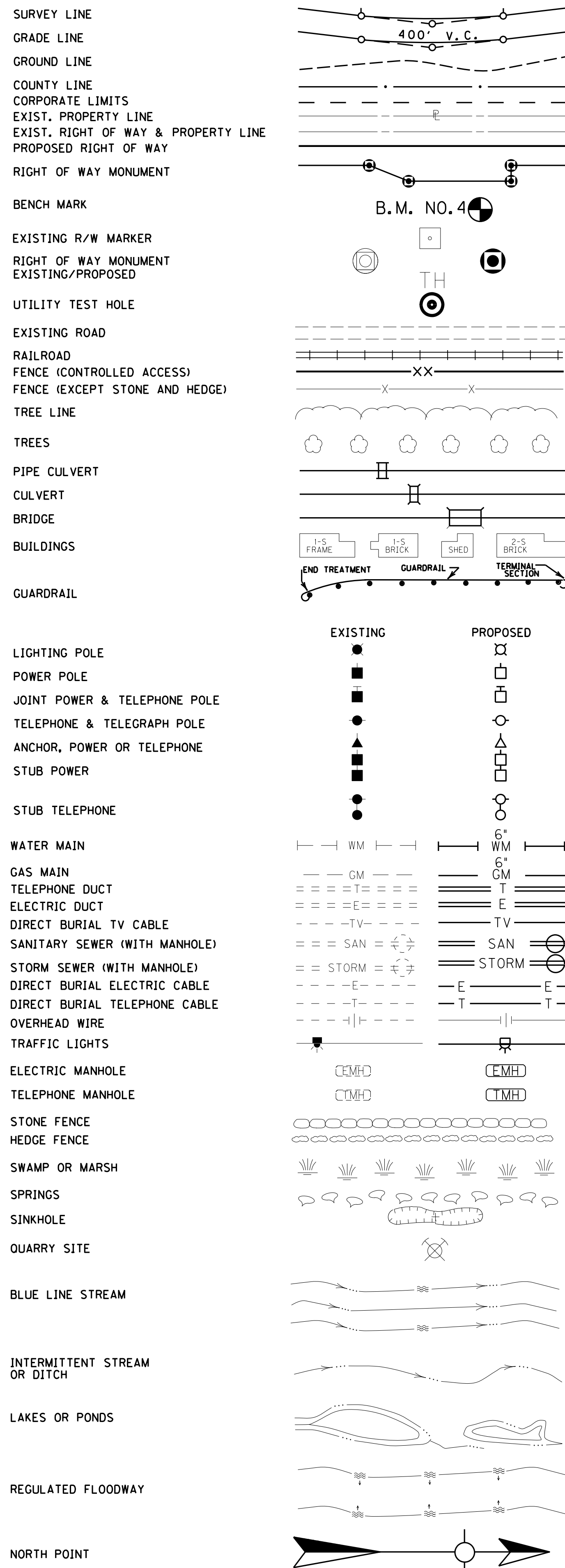
Power InRoads v8.11.7.443

ADDED 11-12-15

BID SET (NOT FOR CONSTRUCTION)

UTILITY OWNER INFORMATION

CONVENTIONAL SIGNS



KENTUCKY AMERICAN WATER
2300 RICHMOND ROAD
LEXINGTON, KY 40502

COLE MITCHAM
(859)269-2386

LEXINGTON-FAYETTE COUNTY URBAN COUNTY GOVERNMENT
200 EAST MAIN STREET
LEXINGTON, KY 40507

BOB BAYERT
(859)258-3410

COLUMBIA GAS OF KENTUCKY
2001 MERCER ROAD
LEXINGTON, KY 40512

BRYAN SLONE
(859)288-0215

TIME-WARNER CABLE
2544 PALUMBO DRIVE
LEXINGTON, KY 40509

RALPH MCDONIE
(859)268-1123

MARATHON PIPE LINE LLC
539 SOUTH MAIN STREET
FINDLAY, OH 45840

DAVE WISNER
(419)421-2211

WINDSTREAM COMMUNICATIONS
130 WEST NEW CIRCLE ROAD
SUITE 170
LEXINGTON, KY 40505

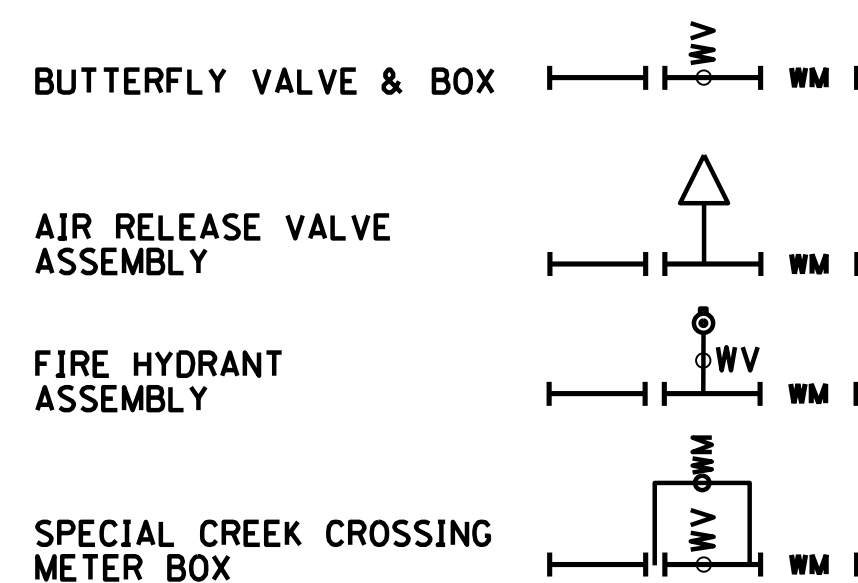
STEVE JOHNSON
(859)357-6209

KENTUCKY UTILITIES COMPNAY
DISTRIBUTION AND TRANSMISSION
820 WEST BROADWAY
LOUISVILLE, KY 40232

GREG GEISER
(520)627-3708

THE LOCATION OF UTILITIES PROVIDED IN THE CONTRACT DOCUMENTS HAS BEEN FURNISHED BY THE FACILITY OWNERS AND/OR BY REVIEWING RECORD DRAWINGS. THE INFORMATION MAY NOT BE EXACT NOR COMPLETE. IT WILL BE THE ROAD CONTRACTORS RESPONSIBILITY TO LOCATE UTILITIES BEFORE EXCAVATING BY CALLING THE VARIOUS UTILITY OWNERS AND BY EXAMINING ANY SUPPLEMENTAL INFORMATION PROVIDED BY THE CABINET AND/OR UTILITY OWNER. THE ROAD CONTRACTOR SHALL DETERMINE THE EXACT LOCATION AND ELEVATION OF UTILITIES BY HAND DIGGING TO EXPOSE UTILITIES BEFORE HE EXCAVATES IN THE AREA OF A UTILITY. THE COST FOR REPAIR AND ANY OTHER ASSOCIATED COSTS FOR ANY DAMAGE TO UTILITIES CAUSED BY THE ROAD CONTRACTORS OPERATIONS SHALL BE BORNE BY THE ROAD CONTRACTOR.

THE CONTRACTOR IS ADVISED TO CONTACT THE B.U.D. ONE-CALL SYSTEM; HOWEVER, THE CONTRACTOR SHOULD BE AWARE THAT THE OWNERS OF THE UNDERGROUND FACILITIES ARE NOT REQUIRED TO BE MEMBERS OF THE B.U.D. ONE-CALL SYSTEM. IT MAY BE NECESSARY FOR THE CONTRACTOR TO CONTACT THE COUNTY COURT CLERK TO DETERMINE WHAT UTILITY COMPANIES HAVE FACILITIES IN THE PROJECT AREA.



BEFORE YOU DIG

The contractor is instructed to call 1-800-752-6007 to reach KY 811, the one-call system for information on the location of existing underground utilities. The call is to be placed a minimum of two (2) and no more than ten (10) business days prior to excavation. The contractor should be aware that owners of underground facilities are not required to be members of the KY 811 one-call Before-U-Dig (BUD) service. The contractor must coordinate excavation with the utility owners, including those whom do not subscribe to KY 811. It may be necessary for the contractor to contact the County Court Clerk to determine what utility companies have facilities in the area.

SCALE: 1"= 20'

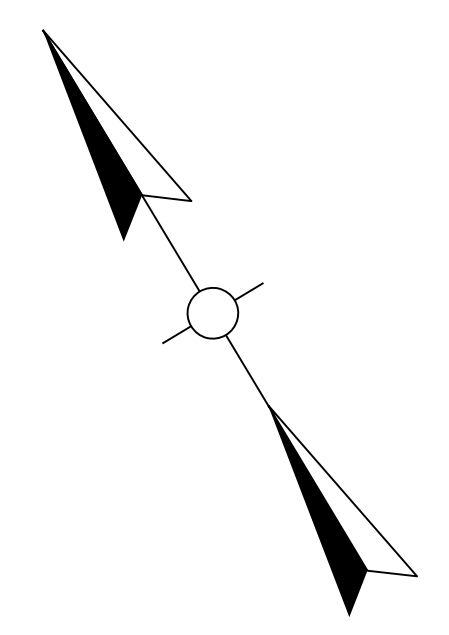
DESIGNED BY: RYAN D. TINSLEY, P.E.	
DATE SUBMITTED:	
Commonwealth of Kentucky	
DEPARTMENT OF HIGHWAYS	
COUNTY OF	
JESSAMINE	
PROJECT: FD04 SPP 057 1486 000-002	
NUMBERS:	
EAST BRANNON ROAD UTILITY OWNER INFORMATION	

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\U00300PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U00300UR
 Power InRoads v8.11.7.443

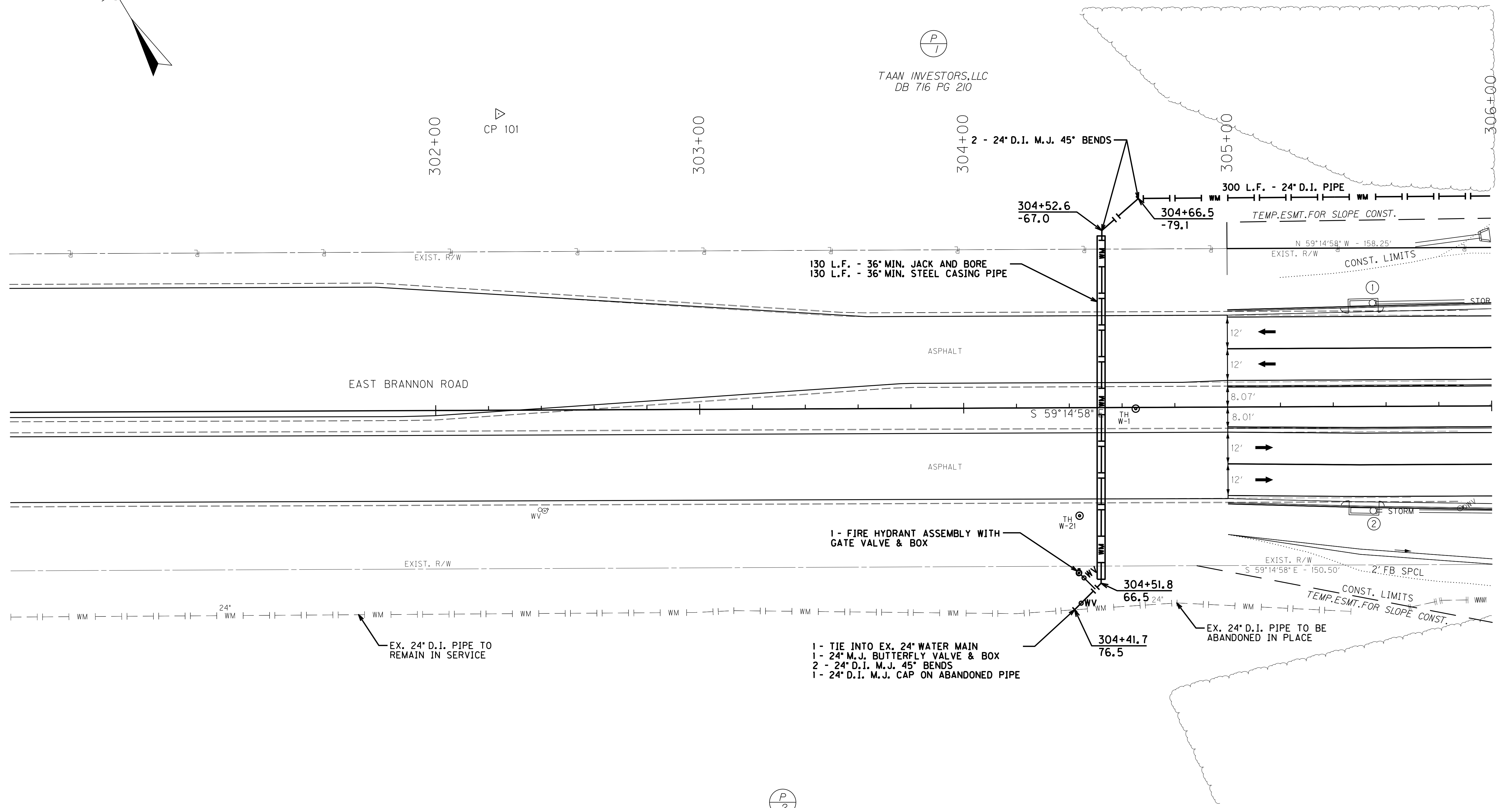
COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	111

ADDED 11-12-15

BID SET (NOT FOR CONSTRUCTION)



(P/1)
TAAAN INVESTORS, LLC
DB 716 PG 210



- 1 - TIE INTO EX. 24" WATER MAIN
- 1 - 24" M.J. BUTTERFLY VALVE & BOX
- 2 - 24" D.I. M.J. 45° BENDS
- 1 - 24" D.I. M.J. CAP ON ABANDONED PIPE

(P/2)
TRINITY CHRISTIAN ACADEMY OF LEXINGTON, LLC
COWEN FAMILY HOLDINGS, LLC
DB 689 PG 214



SCALE: 1"= 20'

EAST BRANNON ROAD
STA. 305+00 TO STA. 306+00
WATER MAIN PLAN SHEET

- NOTES:**
1. EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 2. 160 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U00400PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U00400PL
 Power InRoads v8.11.7.443

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U12

ADDED 11-12-15

BID SET (NOT FOR CONSTRUCTION)

Ⓐ N 34°26'42" E - 120.25'

TAAN INVESTORS, LLC
DB 716 PG 210

40 L.F. - 36" MIN. STEEL CASING PIPE
(OPEN CUT)

2 - 24" D.I. M.J. 45° BENDS

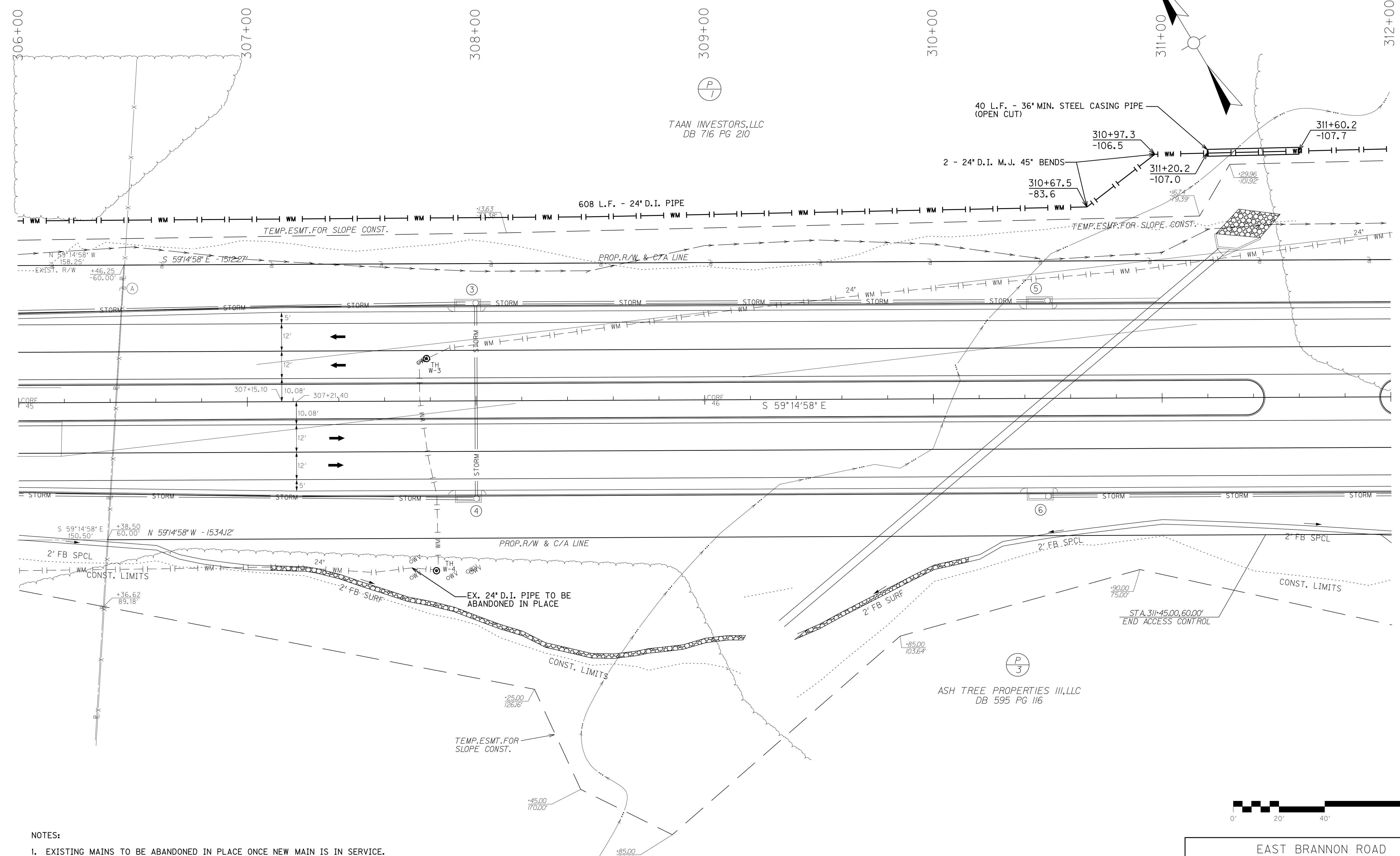
608 L.F. - 24" D.I. PIPE

311+60.2
-107.7

310+97.3
-106.5

310+67.5
-83.6

311+20.2
-107.0



NOTES:

1. EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
2. 704 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.



SCALE: 1" = 20'

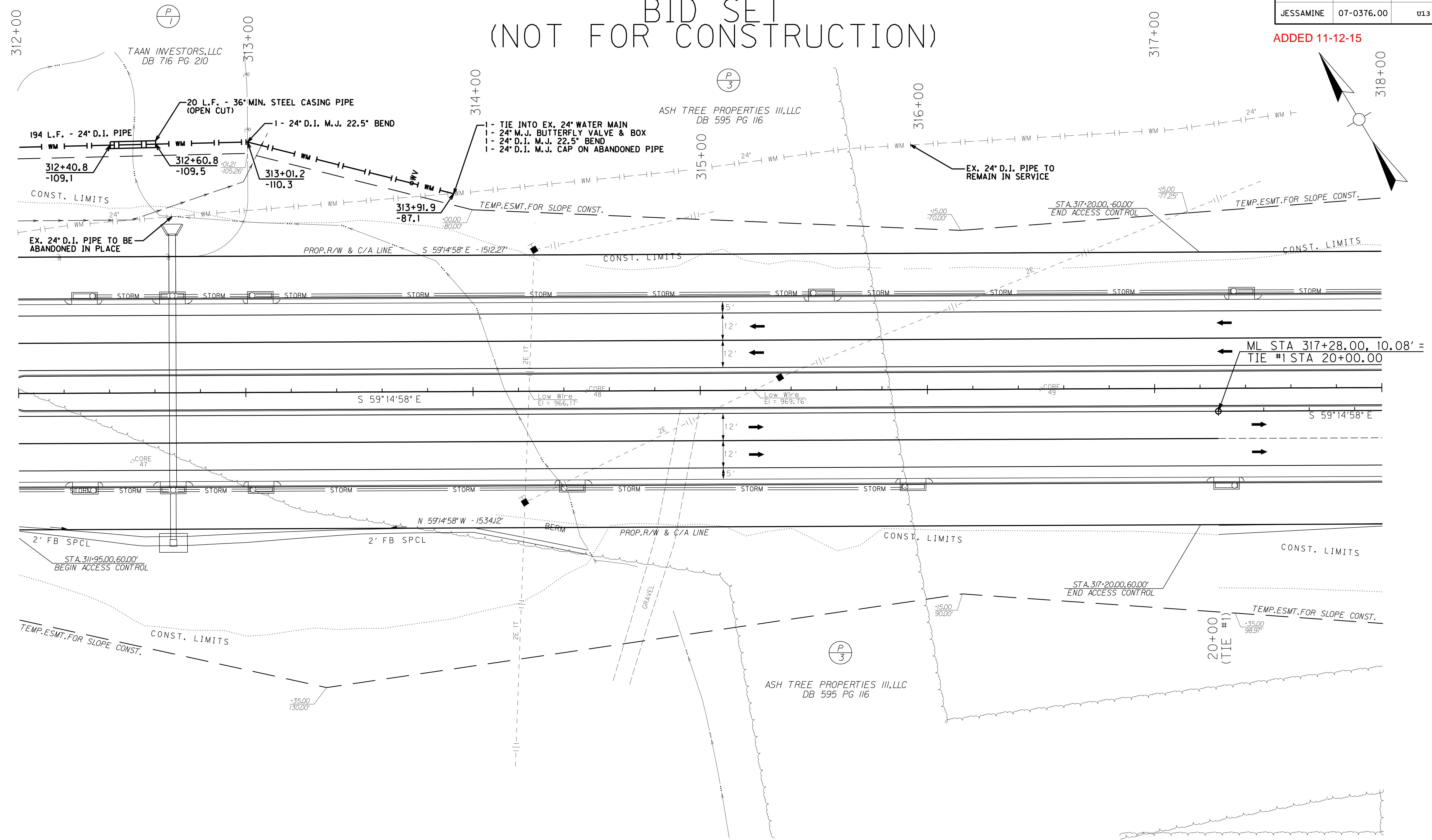
EAST BRANNON ROAD
STA. 306+00 TO STA. 312+00
WATER MAIN PLAN SHEET

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U00600PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U00600PL
 Power InRoads v8.11.7.443

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U13

BID SET (NOT FOR CONSTRUCTION)

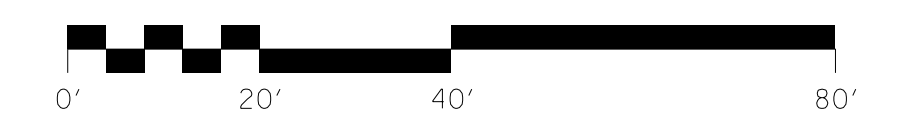
ADDED 11-12-15



FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U00800PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U00800PL
 Power InRoads v8.11.7.443

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 193 L.F. OF EX. 24\"/>

SCALE: 1"= 20'



EAST BRANNON ROAD
 STA. 312+00 TO STA. 318+00
 WATER MAIN PLAN SHEET

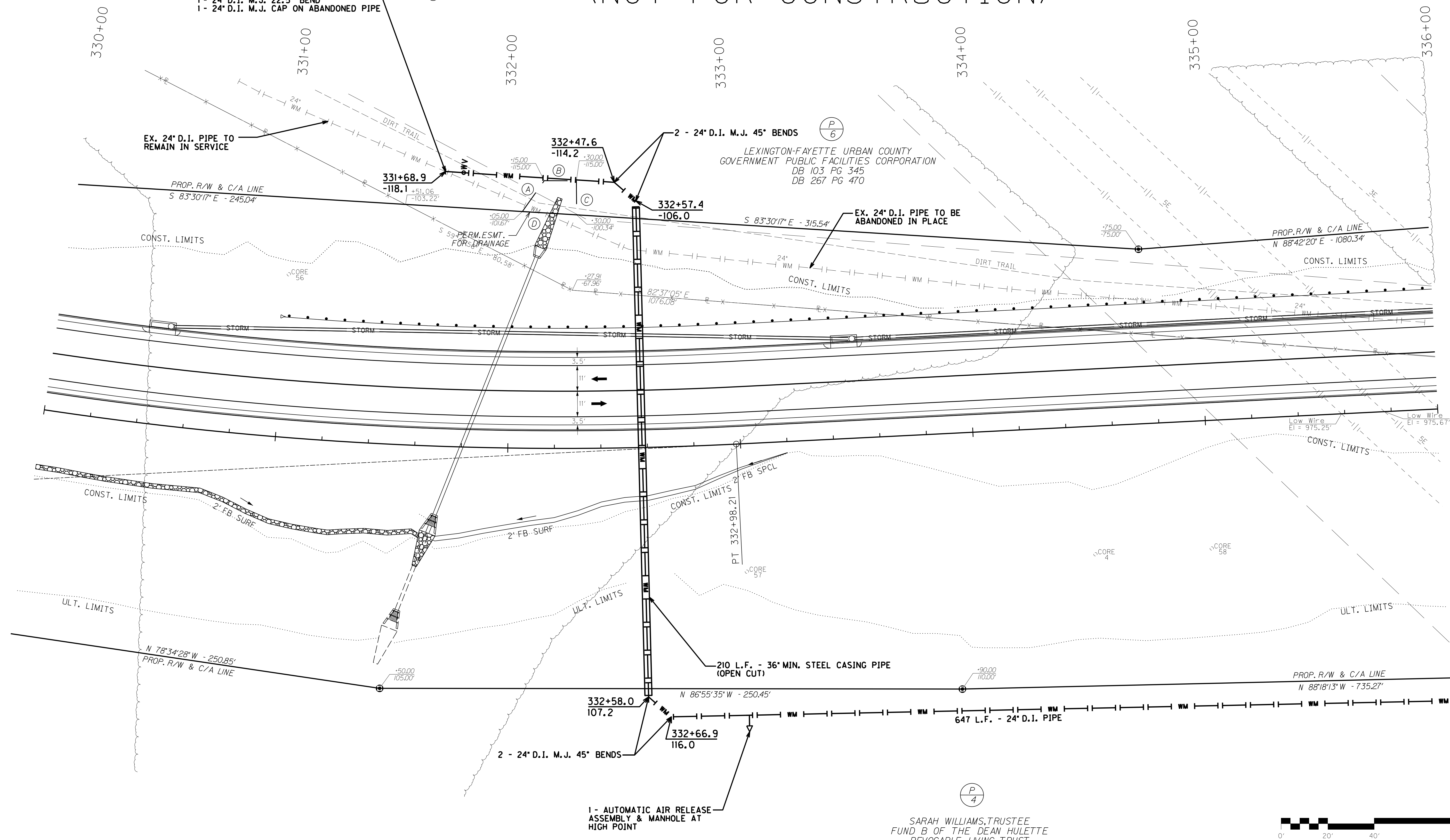
ADDED 11-12-15

BID SET (NOT FOR CONSTRUCTION)

- (A) N 38°21'12" E - 16.24'
- (B) S 86°58'14" E - 13.85'
- (C) S 2°44'35" W - 14.66'
- (D) N 83°30'17" W - 23.33'

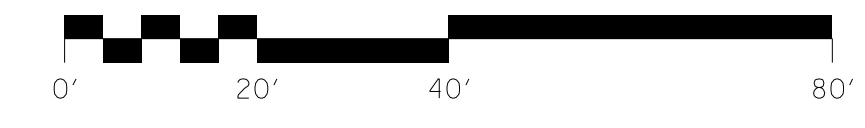
- 1- TIE INTO EX. 24" WATER MAIN
- 1- 24" M.J. BUTTERFLY VALVE & BOX
- 1- 24" D.I. M.J. 22.5° BEND
- 1- 24" D.I. M.J. CAP ON ABANDONED PIPE

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U01400PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U01400PL
 Power InRoads v8.11.7.443



- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 431 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

SARAH WILLIAMS, TRUSTEE
 FUND B OF THE DEAN HULETTE
 REVOCABLE LIVING TRUST
 DB 504 PG 141



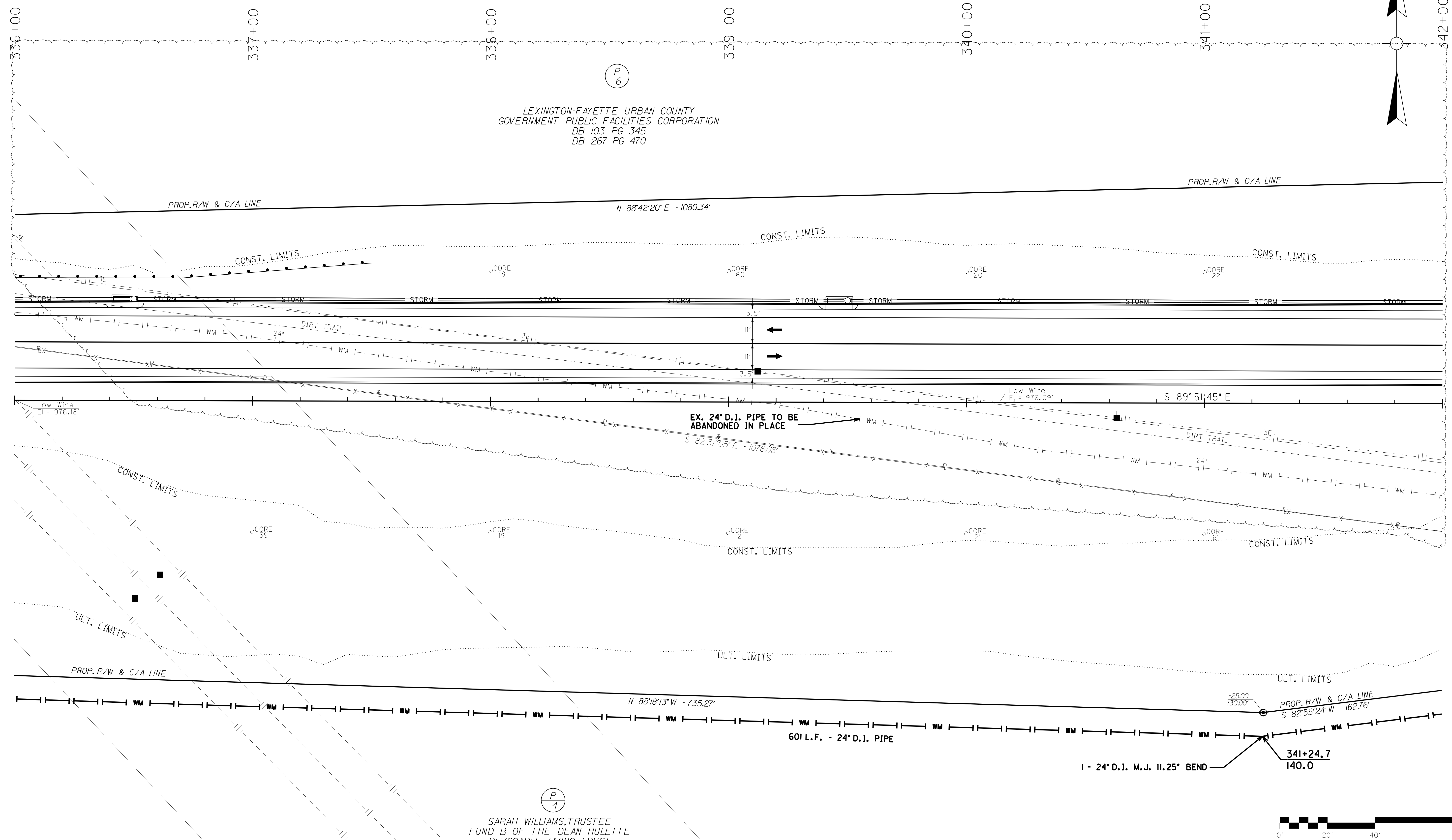
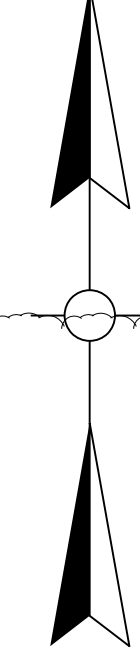
SCALE: 1" = 20'

EAST BRANNON ROAD
 STA. 330+00 TO STA. 336+00
 WATER MAIN PLAN SHEET

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U15

BID SET (NOT FOR CONSTRUCTION)

ADDED 11-12-15



LEXINGTON-FAYETTE URBAN COUNTY
GOVERNMENT PUBLIC FACILITIES CORPORATION
DB 103 PG 345
DB 267 PG 470

SARAH WILLIAMS, TRUSTEE
FUND B OF THE DEAN HULETTE
REVOCABLE LIVING TRUST
DB 504 PG 141

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 605 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

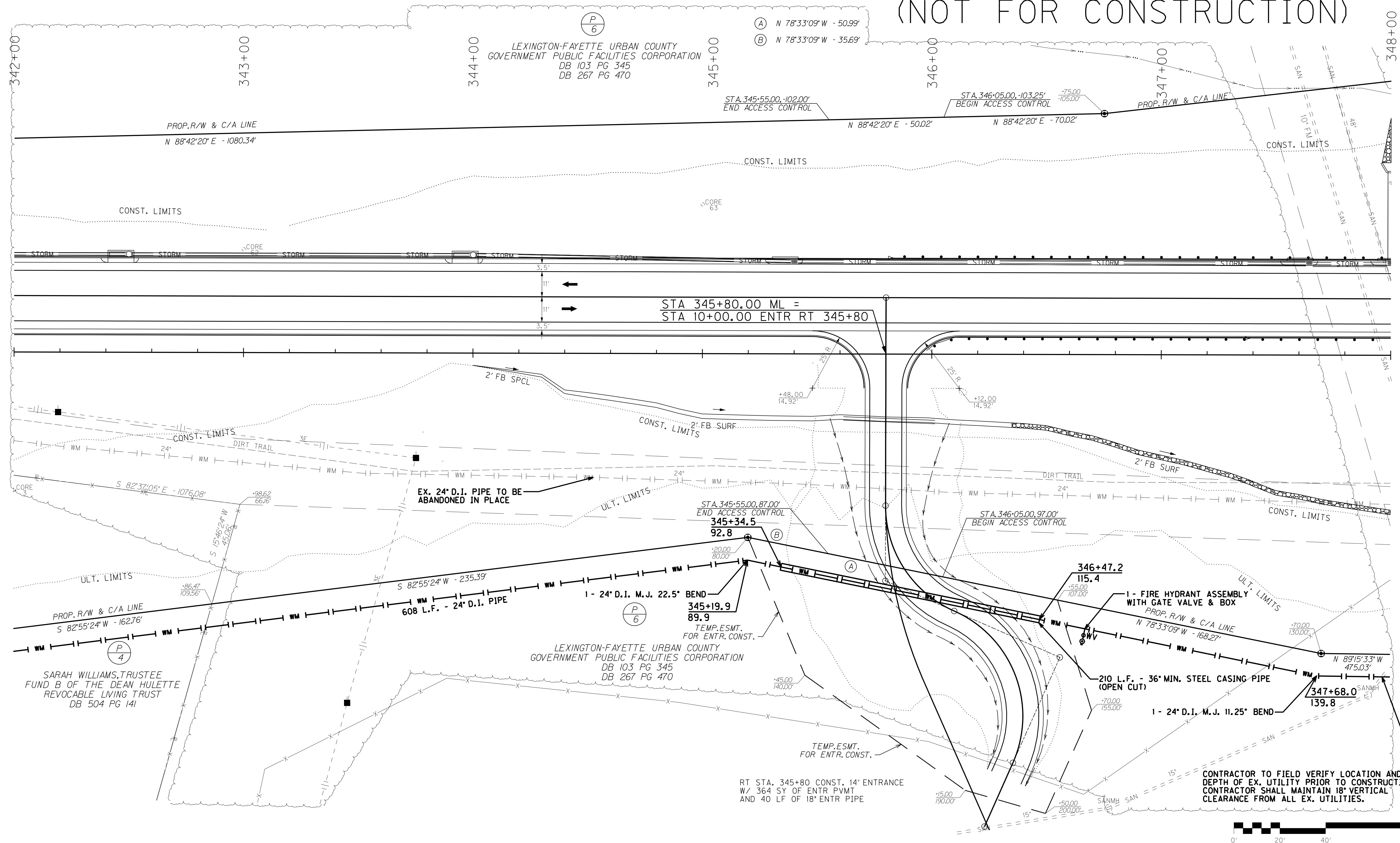
SCALE: 1" = 20'

EAST BRANNON ROAD
STA. 336+00 TO STA. 342+00
WATER MAIN PLAN SHEET

FILE NAME: S:\LOUIS4400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U0600PL.DGN
USER: benf
DATE PLOTTED: November 11, 2015
E-SHEET NAME: U0600PL
Power InRoads v8.11.7.443

BID SET (NOT FOR CONSTRUCTION)

ADDED 11-12-15



FILE NAME: S:\LOUIS\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U01800PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U01800PL
 Power InRoads v8.11.7.443

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 601 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

EAST BRANNON ROAD
 STA. 342+00 TO STA. 348+00
 WATER MAIN PLAN SHEET

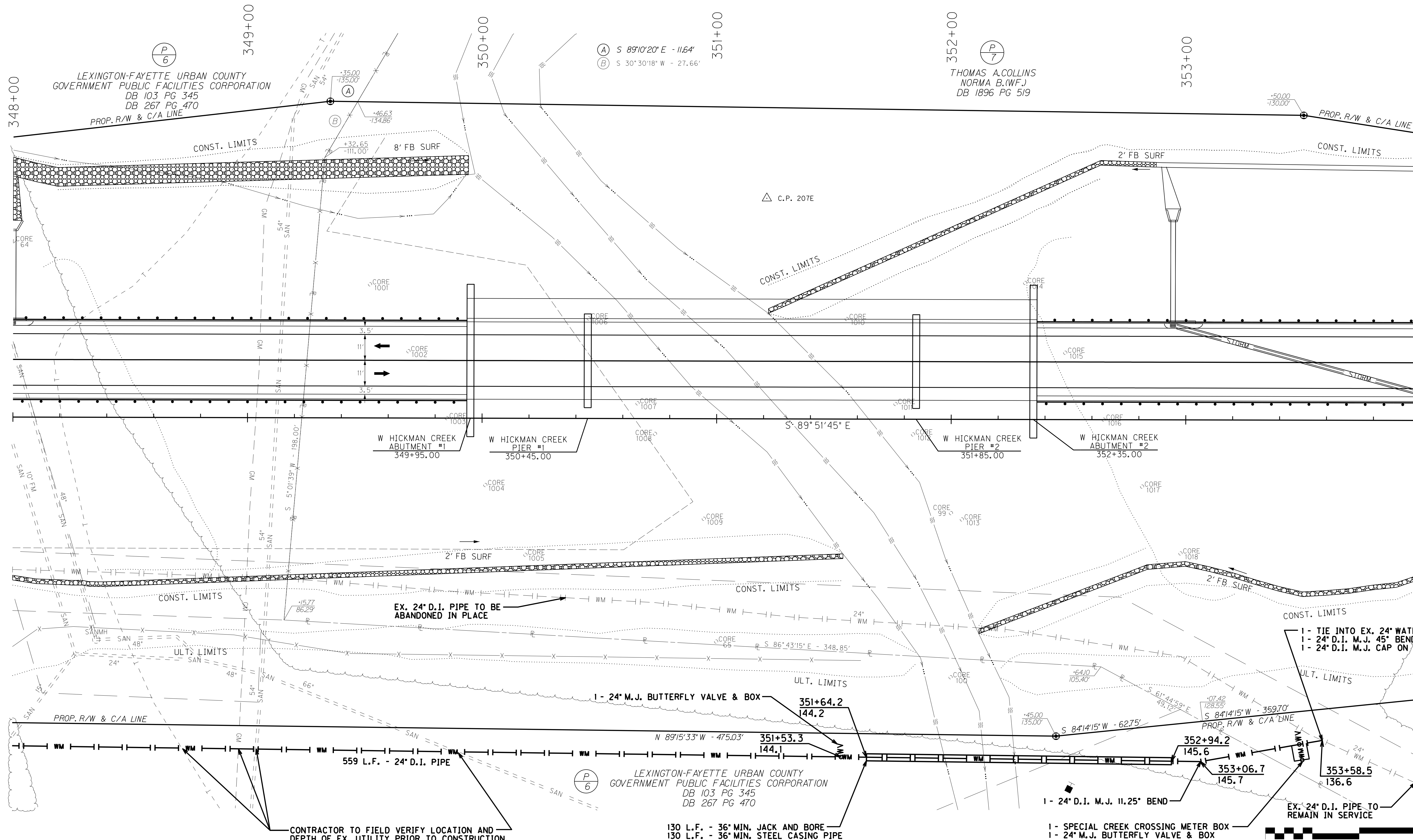
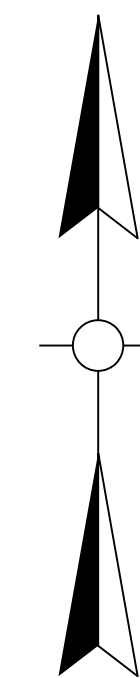
SCALE: 1" = 20'



BID SET (NOT FOR CONSTRUCTION)

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	117

ADDED 11-12-15

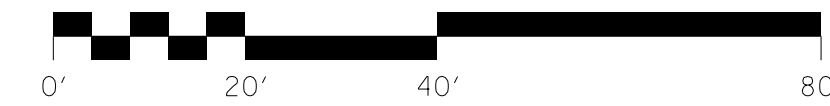


FILE NAME: S:\LOUIS400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U02000PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U02000PL
 Power InRoads v8.11.7.443

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 616 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF EX. UTILITY PRIOR TO CONSTRUCTION. CONTRACTOR SHALL MAINTAIN 18" VERTICAL CLEARANCE FROM ALL EX. UTILITIES.

130 L.F. - 36" MIN. JACK AND BORE
130 L.F. - 36" MIN. STEEL CASING PIPE



EAST BRANNON ROAD
STA. 348+00 TO STA. 354+00
WATER MAIN PLAN SHEET

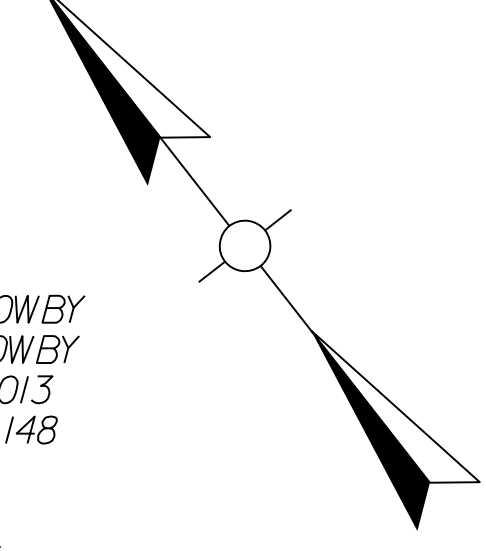
SCALE: 1" = 20'

BID SET (NOT FOR CONSTRUCTION)

(A) S 79°12'42" E - 245.45'
(B) N 0°21'16" W - 174.24'

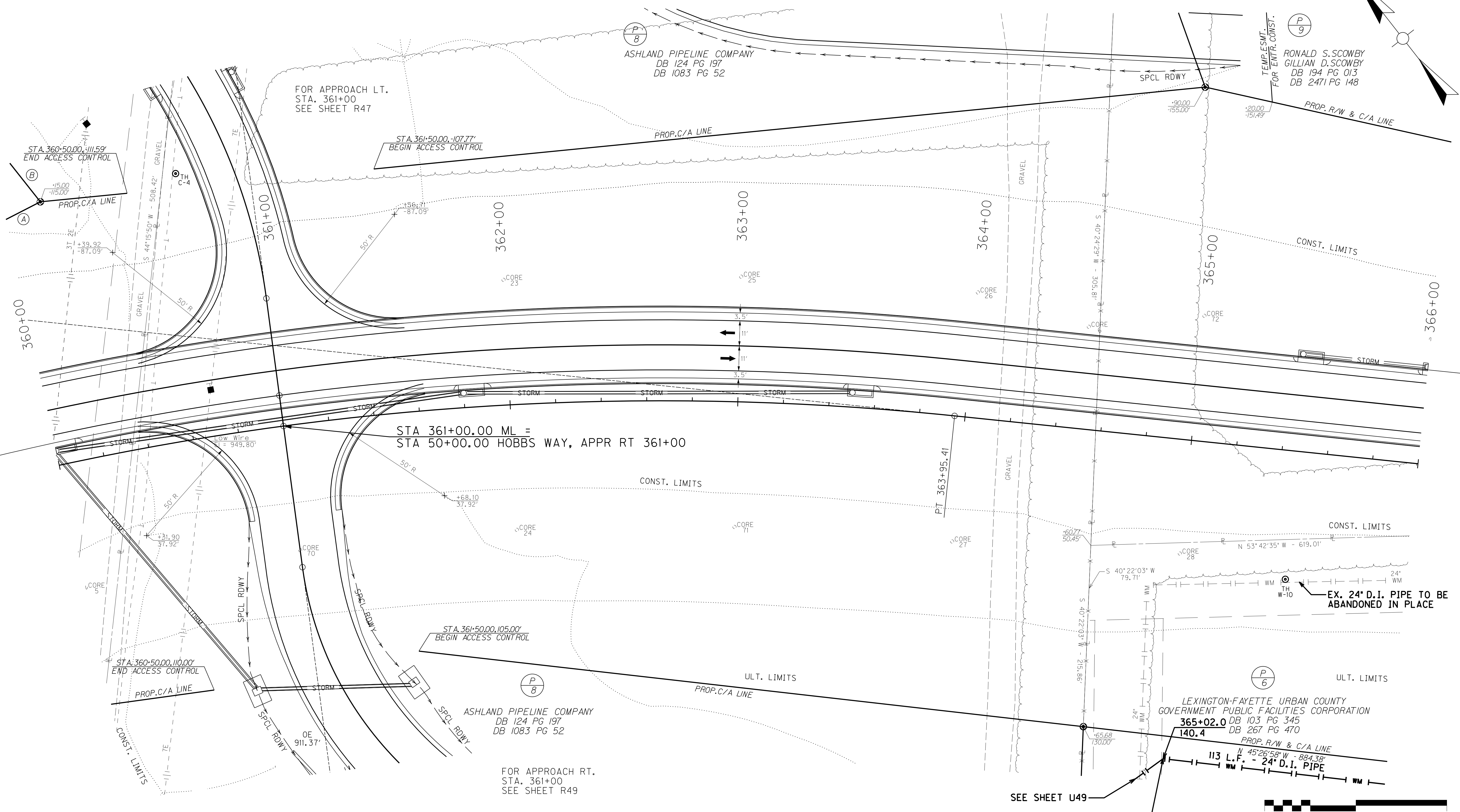
COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U18

ADDED 11-12-15



(P 9)
RONALD S. SCOWBY
GILLIAN D. SCOWBY
DB 194 PG 013
DB 2471 PG 148

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U02400PL.DGN
USER: benf
DATE PLOTTED: November 11, 2015
E-SHEET NAME: U02400PL
Power InRoads v8.11.7.443



- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 199 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

SEE SHEET U49

1 - 24" D.I. M.J. 45° BEND



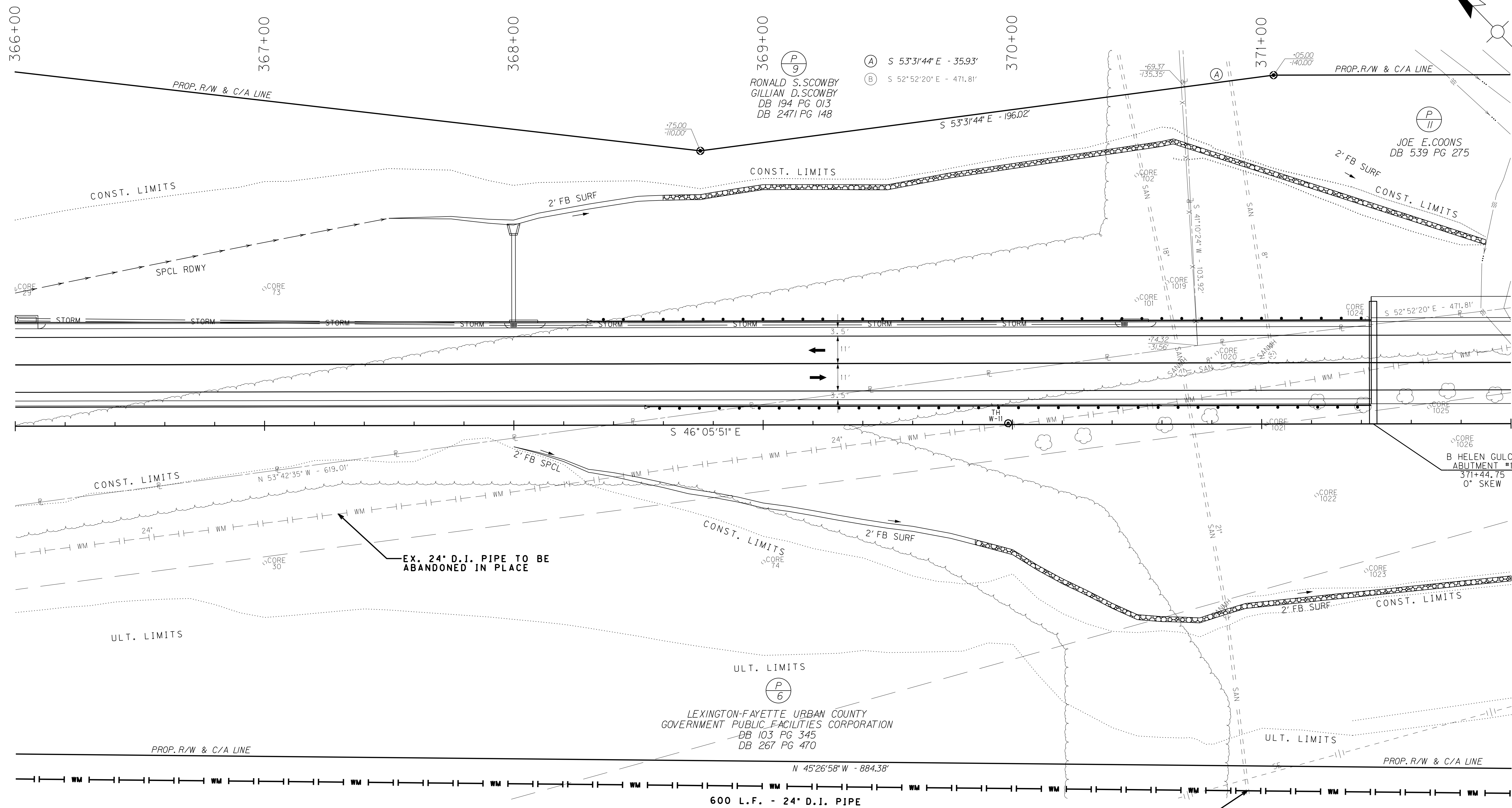
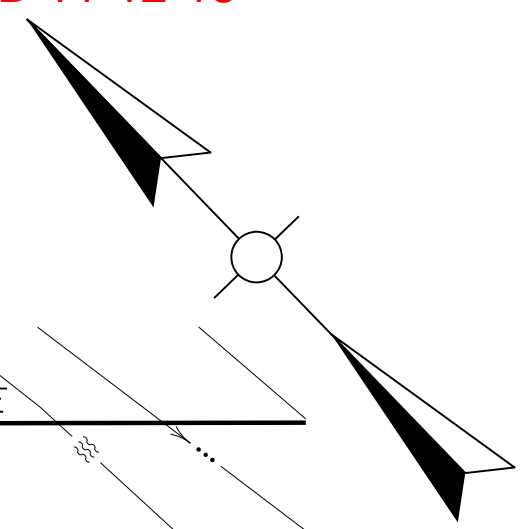
SCALE: 1" = 20'

EAST BRANNON ROAD
STA. 360+00 TO STA. 366+00
WATER MAIN PLAN SHEET

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	019

BID SET (NOT FOR CONSTRUCTION)

ADDED 11-12-15

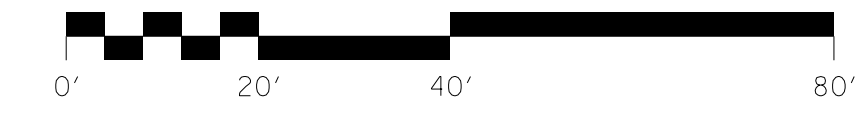


(P 9)
 RONALD S. SCOWBY
 GILLIAN D. SCOWBY
 DB 194 PG 013
 DB 2471 PG 148

(P 11)
 JOE E. COONS
 DB 539 PG 275

(P 6)
 LEXINGTON-FAYETTE URBAN COUNTY
 GOVERNMENT PUBLIC FACILITIES CORPORATION
 DB 103 PG 345
 DB 267 PG 470

CONTRACTOR TO FIELD VERIFY LOCATION AND
 DEPTH OF EX. UTILITY PRIOR TO CONSTRUCTION.
 CONTRACTOR SHALL MAINTAIN 18' VERTICAL
 CLEARANCE FROM ALL EX. UTILITIES.



SCALE: 1"= 20'

EAST BRANNON ROAD
 STA. 366+00 TO STA. 372+00
 WATER MAIN PLAN SHEET

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U02600PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U02600PL
 Power InRoads v8.11.7.443

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 606 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	020

ADDED 11-12-15

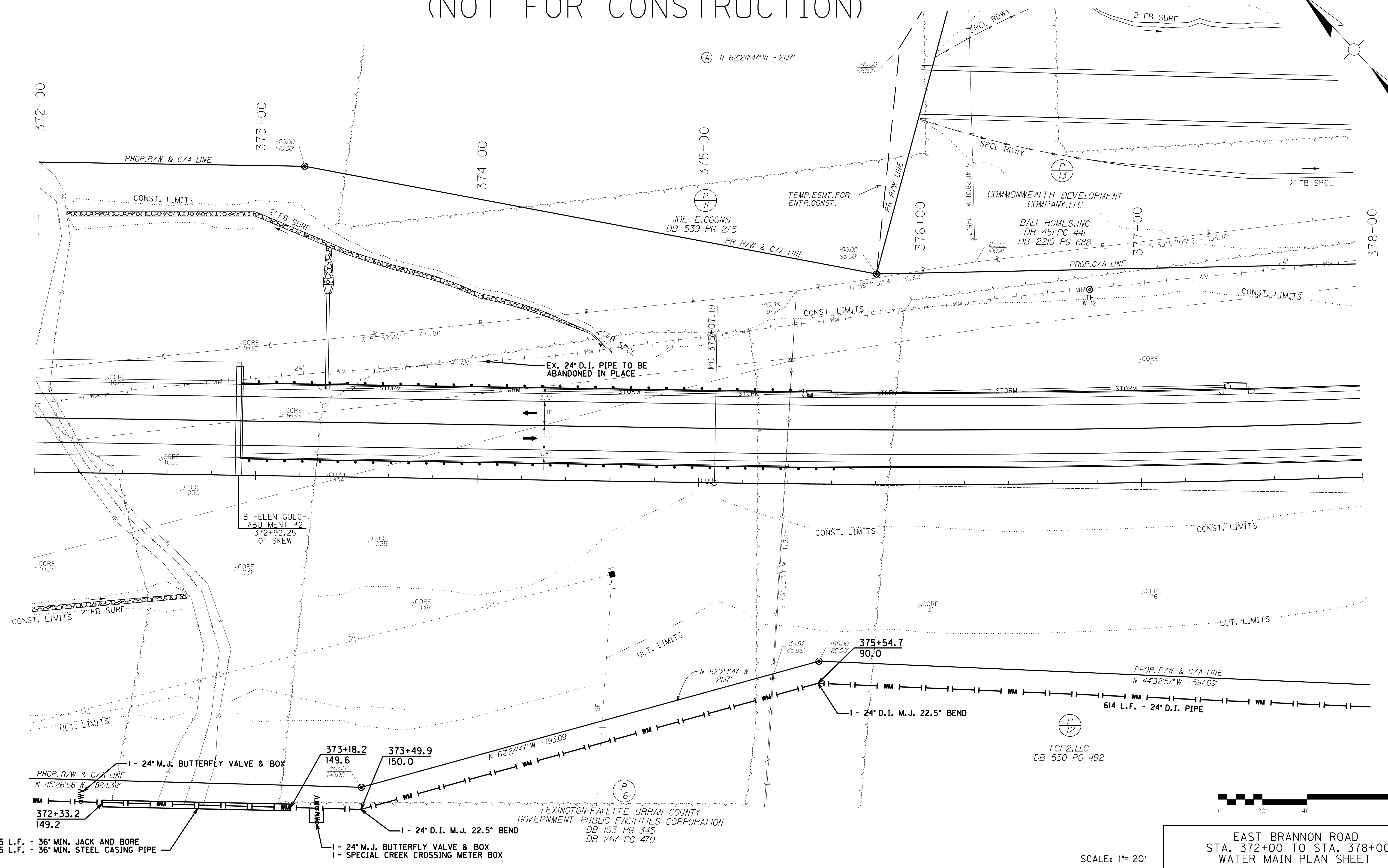
FOR APPROACH LT.
STA. 379+25
SEE SHEET R51

BID SET (NOT FOR CONSTRUCTION)

NOTES:

- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
- 600 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

FILE NAME: S:\LOUIS400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U02800PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U02800PL
 Power InRoads v8.11.7.443



85 L.F. - 36" MIN. JACK AND BORE
85 L.F. - 36" MIN. STEEL CASING PIPE

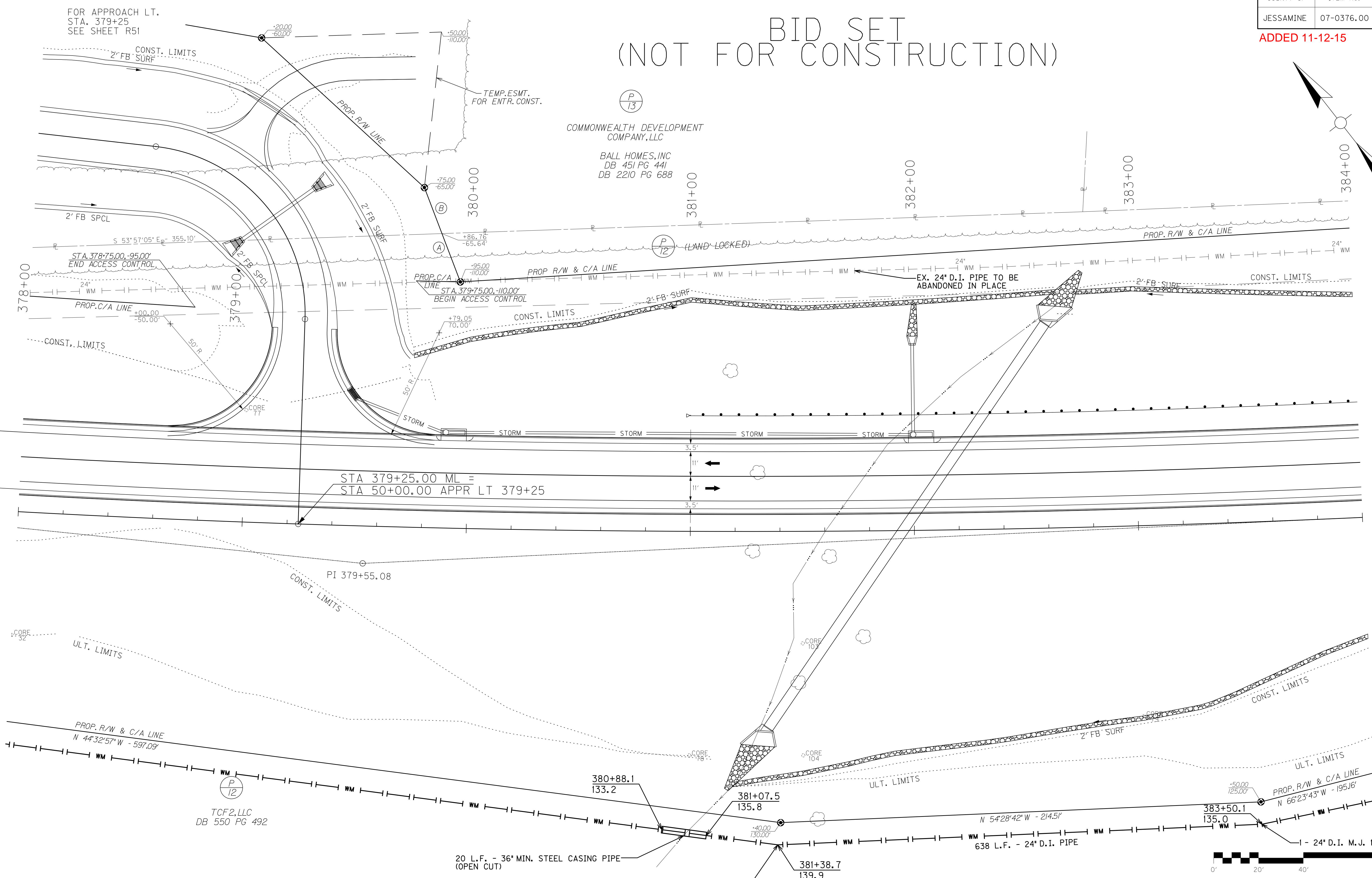
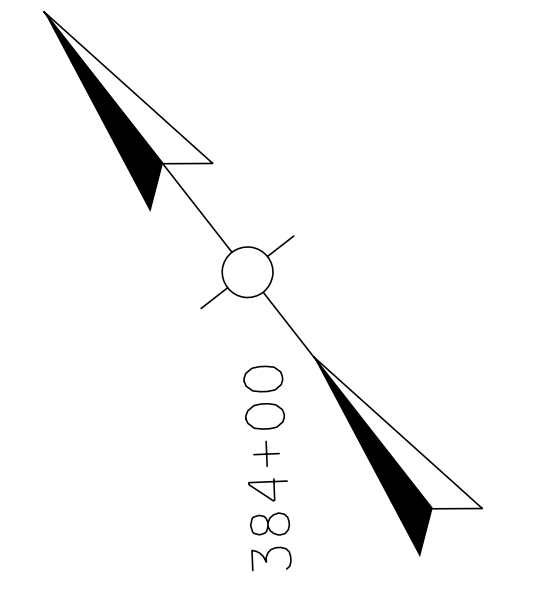
LEXINGTON-FAYETTE, URBAN COUNTY
GOVERNMENT PUBLIC FACILITIES CORPORATION
DB 103 PG 345
DB 267 PG 470

SCALE: 1" = 20'

EAST BRANNON ROAD
STA. 372+00 TO STA. 378+00
WATER MAIN PLAN SHEET

ADDED 11-12-15

BID SET (NOT FOR CONSTRUCTION)



FILE NAME: S:\ALOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U03000PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U03000PL
 Power InRoads v8.11.7.443

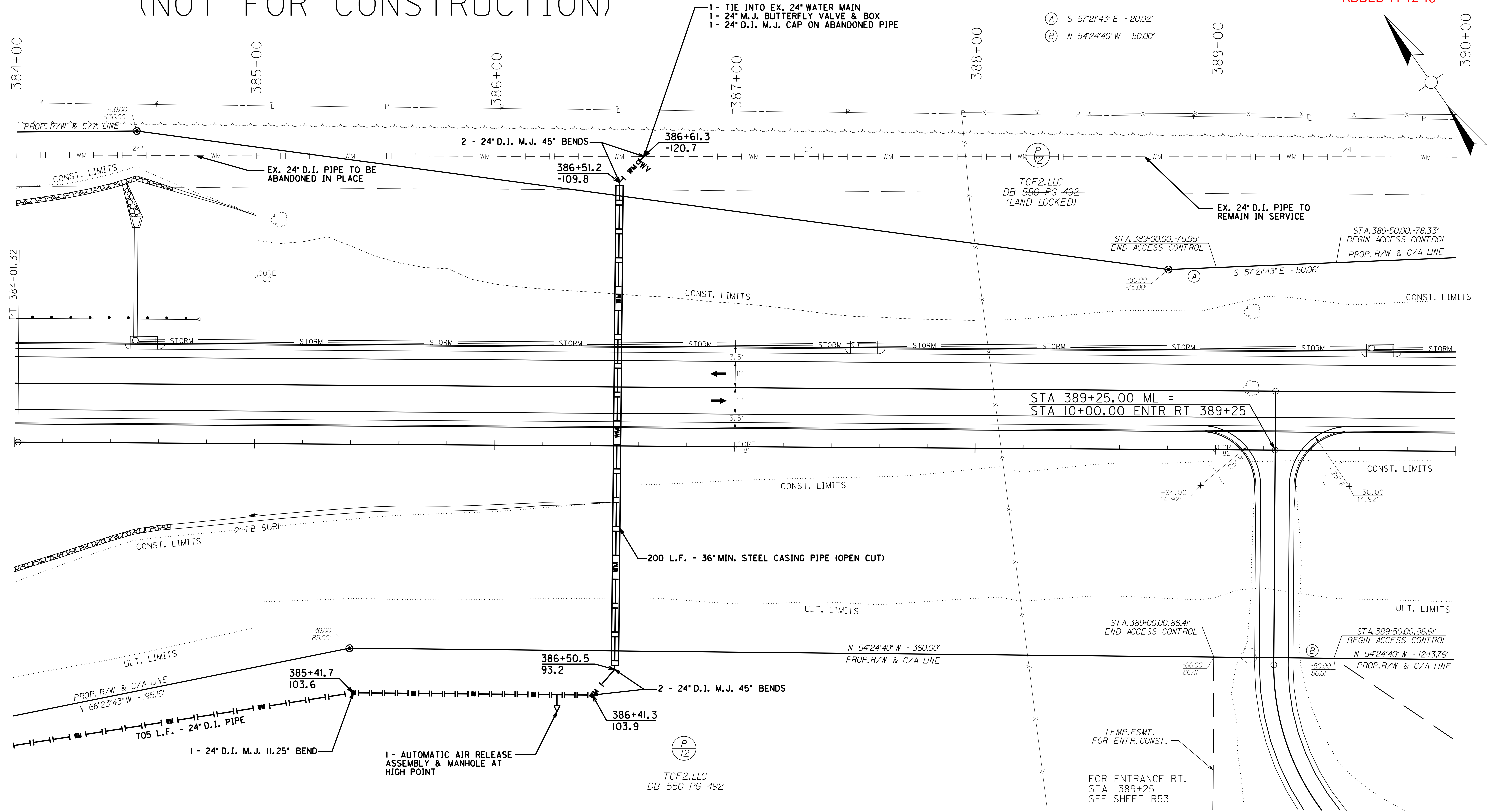
- NOTES:
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 589 L.F. OF EX. 24\"/>

SCALE: 1" = 20'

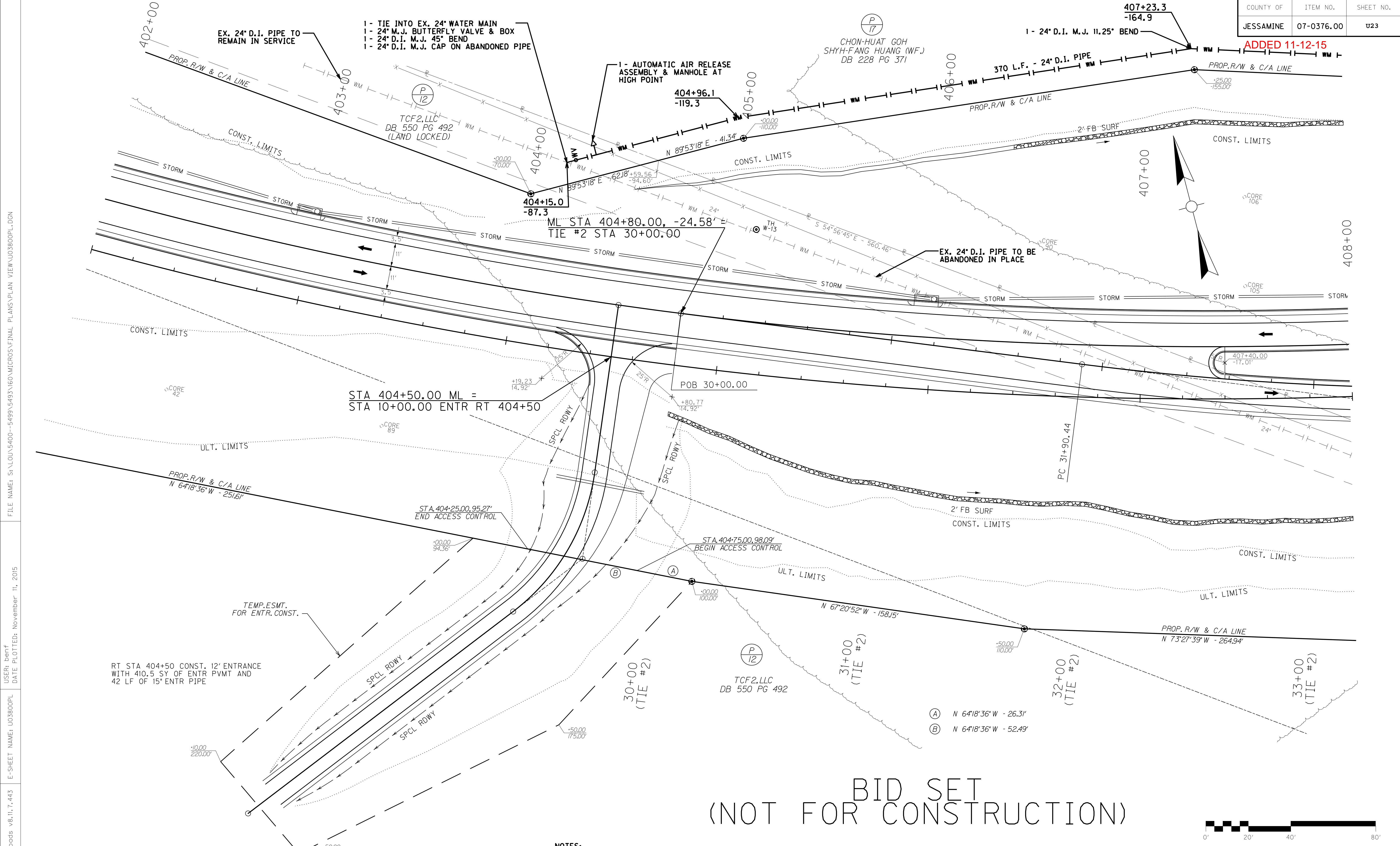
EAST BRANNON ROAD
 STA. 378+00 TO STA. 384+00
 WATER MAIN PLAN SHEET

BID SET (NOT FOR CONSTRUCTION)

ADDED 11-12-15



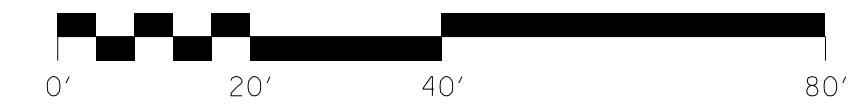
ADDED 11-12-15



FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U03800PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U03800PL
 Power InRoads v8.11.7.443

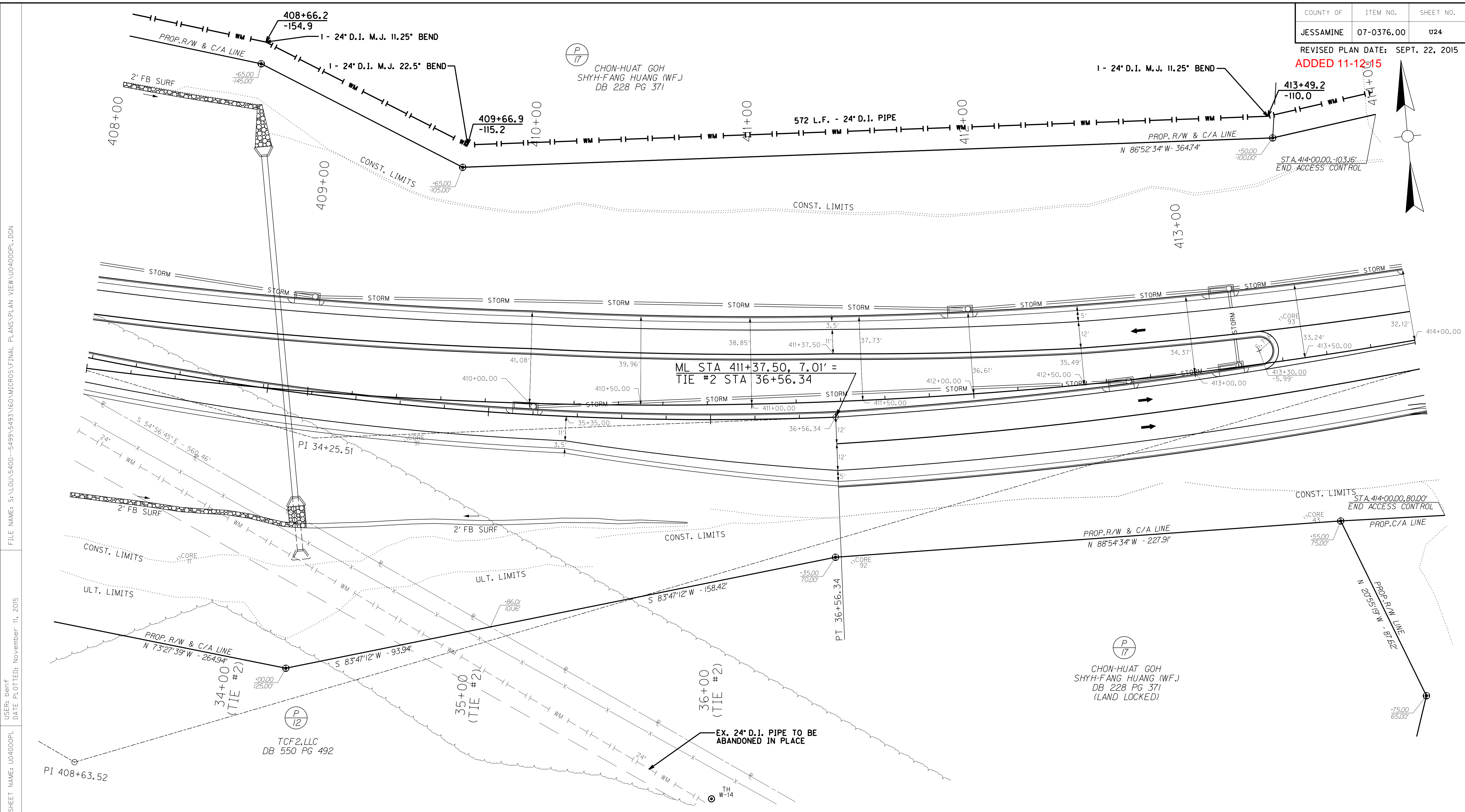
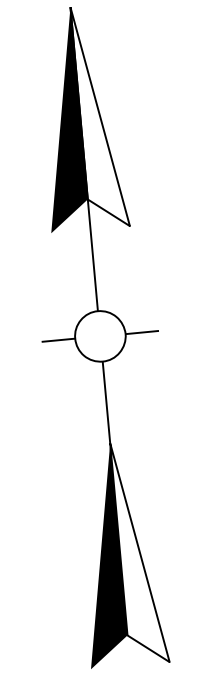
BID SET (NOT FOR CONSTRUCTION)

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 394 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.



SCALE: 1"= 20'

EAST BRANNON ROAD
 STA. 402+00 TO STA. 408+00
 WATER MAIN PLAN SHEET



BID SET
 (NOT FOR CONSTRUCTION)



SCALE: 1"= 20'

EAST BRANNON ROAD
 STA. 408+00 TO STA. 414+00
 WATER MAIN PLAN SHEET

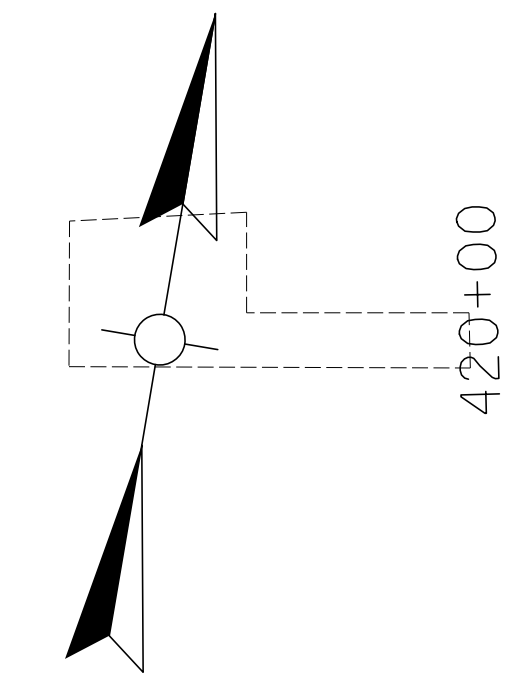
FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U040000PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U040000PL
 Power InRoads v8.11.7.443

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 330 L.F. OF EX. 24\"/>

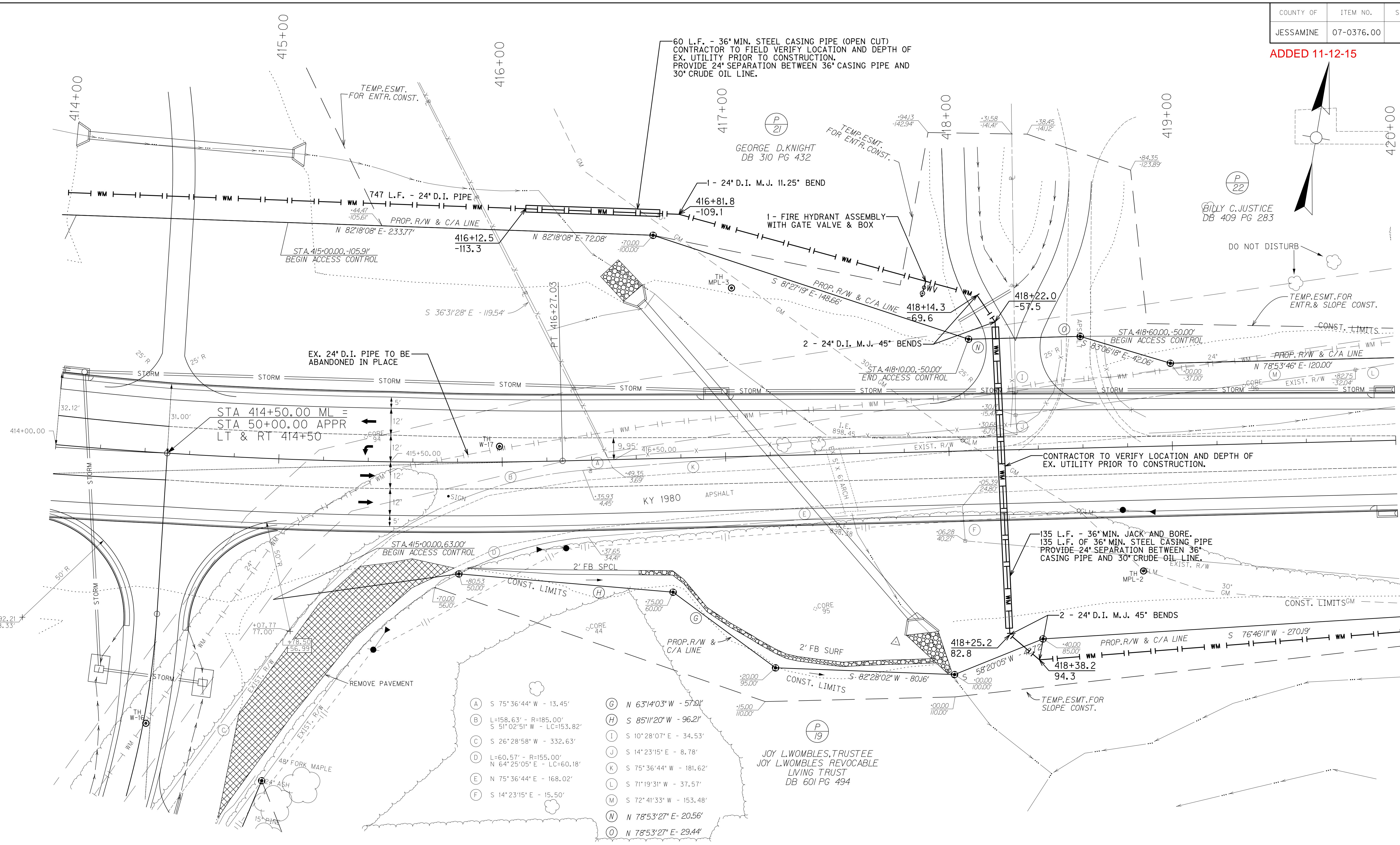
TCF2,LLC
 DB 550 PG 492

CHON-HUAT GOH
 SHYH-FANG HUANG (WF.)
 DB 228 PG 371
 (LAND LOCKED)

ADDED 11-12-15



FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U04200PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U04200PL
 Power InRoads v8.11.7.443



- | | |
|--|------------------------------|
| (A) S 75°36'44\" W - 13.45' | (G) N 63°14'03\" W - 57.01' |
| (B) L=158.63' - R=185.00'
S 51°02'51\" W - LC=153.82' | (H) S 85°11'20\" W - 96.21' |
| (C) S 26°28'58\" W - 332.63' | (I) S 10°28'07\" E - 34.53' |
| (D) L=60.57' - R=155.00'
N 64°25'05\" E - LC=60.18' | (J) S 14°23'15\" E - 8.78' |
| (E) N 75°36'44\" E - 168.02' | (K) S 75°36'44\" W - 181.62' |
| (F) S 14°23'15\" E - 15.50' | (L) S 71°19'31\" W - 37.57' |
| | (M) S 72°41'33\" W - 153.48' |
| | (N) N 78°53'27\" E - 20.56' |
| | (O) N 78°53'27\" E - 29.44' |

NOTES:
 1. EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 2. 653 L.F. OF EX. 24\" D.I. PIPE TO BE ABANDONED IN PLACE.

BID SET (NOT FOR CONSTRUCTION)

SCALE: 1" = 20'

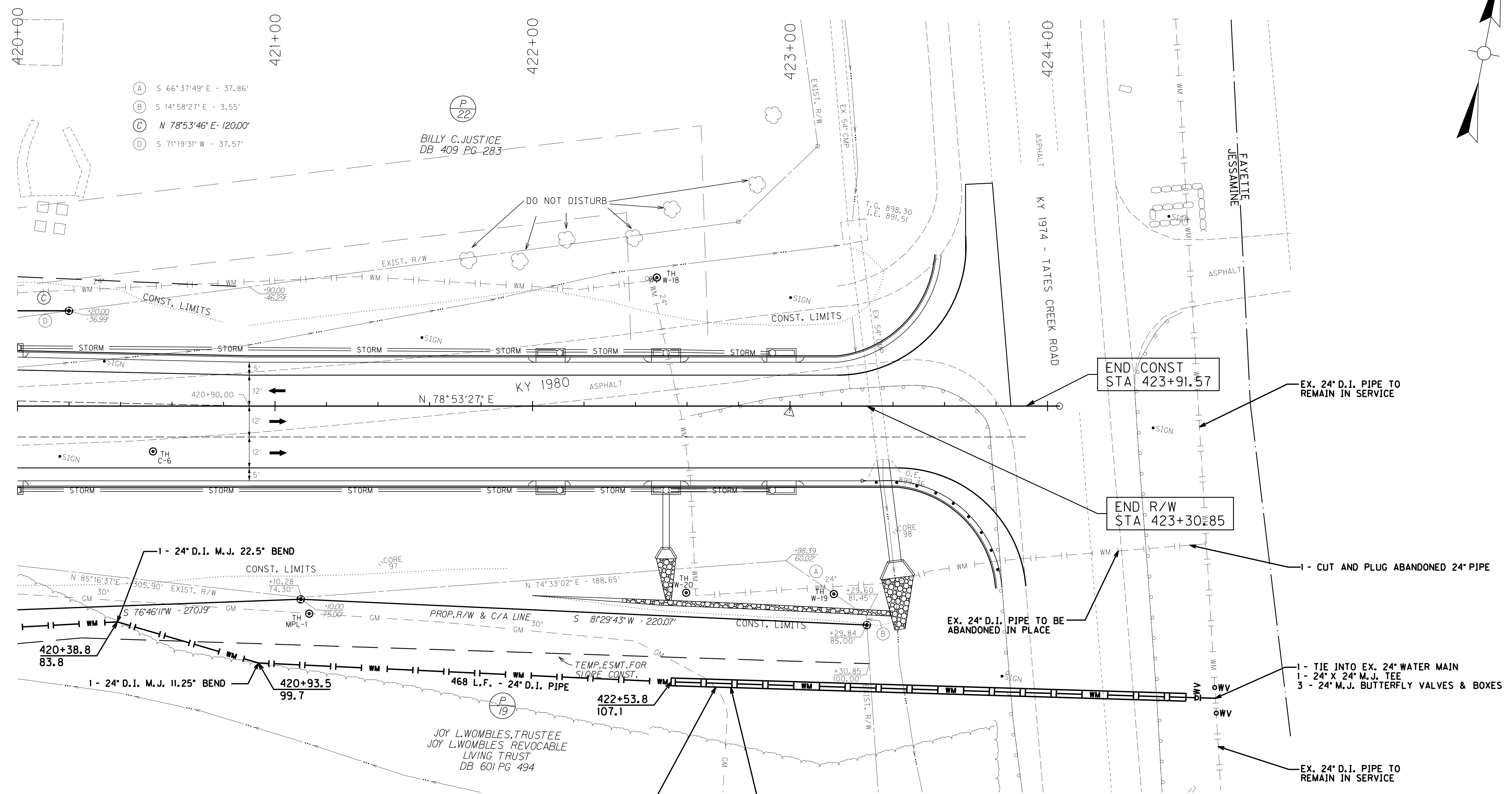
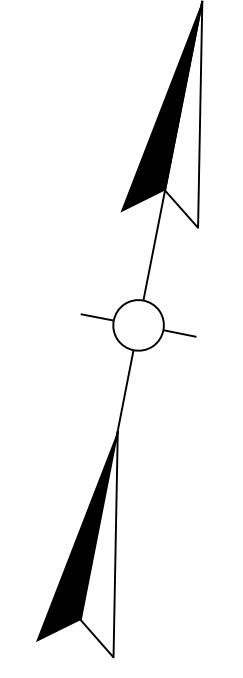
EAST BRANNON ROAD
 STA. 414+00 TO STA. 420+00
 WATER MAIN PLAN SHEET

(NOT FOR CONSTRUCTION)

(NOT FOR CONSTRUCTION)

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	026

ADDED 11-12-15



- (A) S 66°37'49" E - 37.86'
- (B) S 14°58'27" E - 3.55'
- (C) N 78°53'46" E - 120.00'
- (D) S 71°19'31" W - 37.57'

(P 22)
BILLY C. JUSTICE
DB 409 PG 283

(P 19)
JOY L. WOMBLES, TRUSTEE
JOY L. WOMBLES REVOCABLE
LIVING TRUST
DB 601 PG 494

END CONST
STA 423+91.57

END R/W
STA 423+30.85

1 - 24" D.I. M.J. 22.5° BEND

1 - 24" D.I. M.J. 11.25° BEND

CONTRACTOR TO FIELD VERIFY LOCATION AND DEPTH OF EX. UTILITY PRIOR TO CONSTRUCTION.

200 L.F. - 36" MIN. JACK AND BORE.
200 L.F. - 36" MIN. STEEL CASING PIPE
PROVIDE 24" SEPARATION BETWEEN 36" CASING PIPE AND 30" CRUDE OIL LINE.

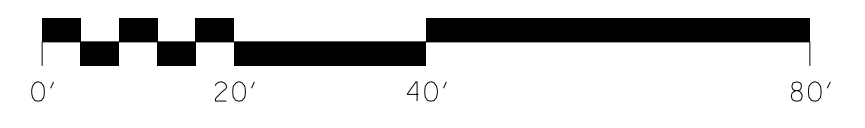
EX. 24" D.I. PIPE TO REMAIN IN SERVICE

EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE

1 - CUT AND PLUG ABANDONED 24" PIPE

1 - TIE INTO EX. 24" WATER MAIN
1 - 24" X 24" M.J. TEE
3 - 24" M.J. BUTTERFLY VALVES & BOXES

EX. 24" D.I. PIPE TO REMAIN IN SERVICE



FILE NAME: S:\LOUIS\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U04400PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U04400PL
 Power InRoads v8.11.7.443

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 548 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.

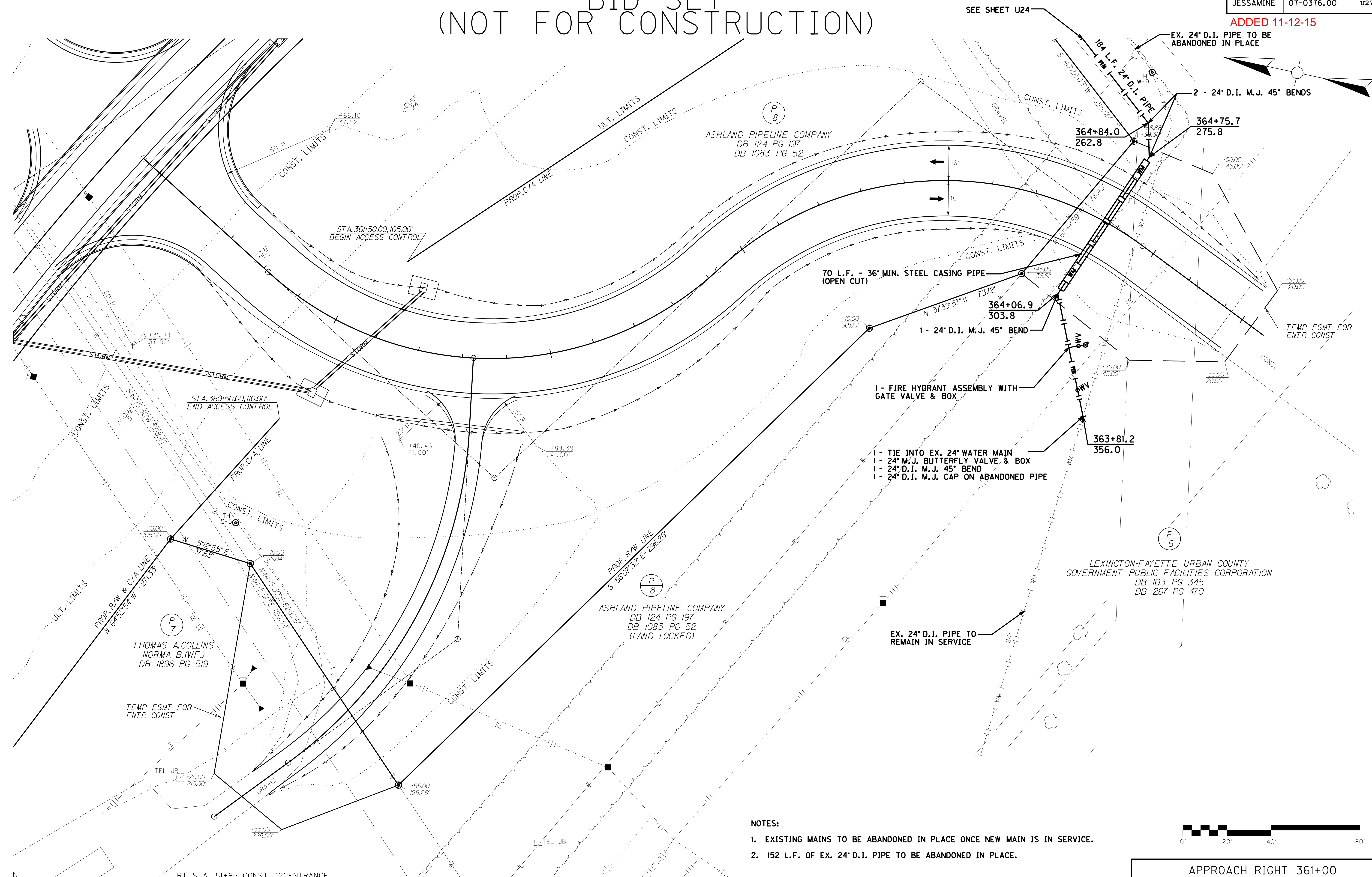
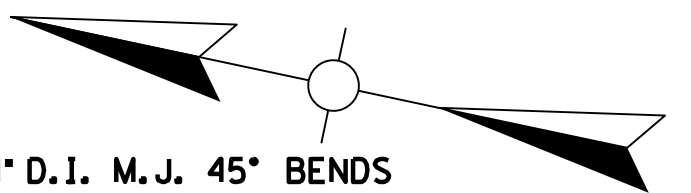
EAST BRANNON ROAD
 STA. 420+00 TO STA. 423+91.57
 WATER MAIN PLAN SHEET

SCALE: 1" = 20'

BID SET (NOT FOR CONSTRUCTION)

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U27

ADDED 11-12-15



FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\PLAN VIEW\U04900PL.DGN
 USER: benf
 DATE PLOTTED: November 11, 2015
 E-SHEET NAME: U04900PL
 Power InRoads v8.11.7.443

- NOTES:**
- EXISTING MAINS TO BE ABANDONED IN PLACE ONCE NEW MAIN IS IN SERVICE.
 - 152 L.F. OF EX. 24" D.I. PIPE TO BE ABANDONED IN PLACE.



SCALE: 1"= 20'

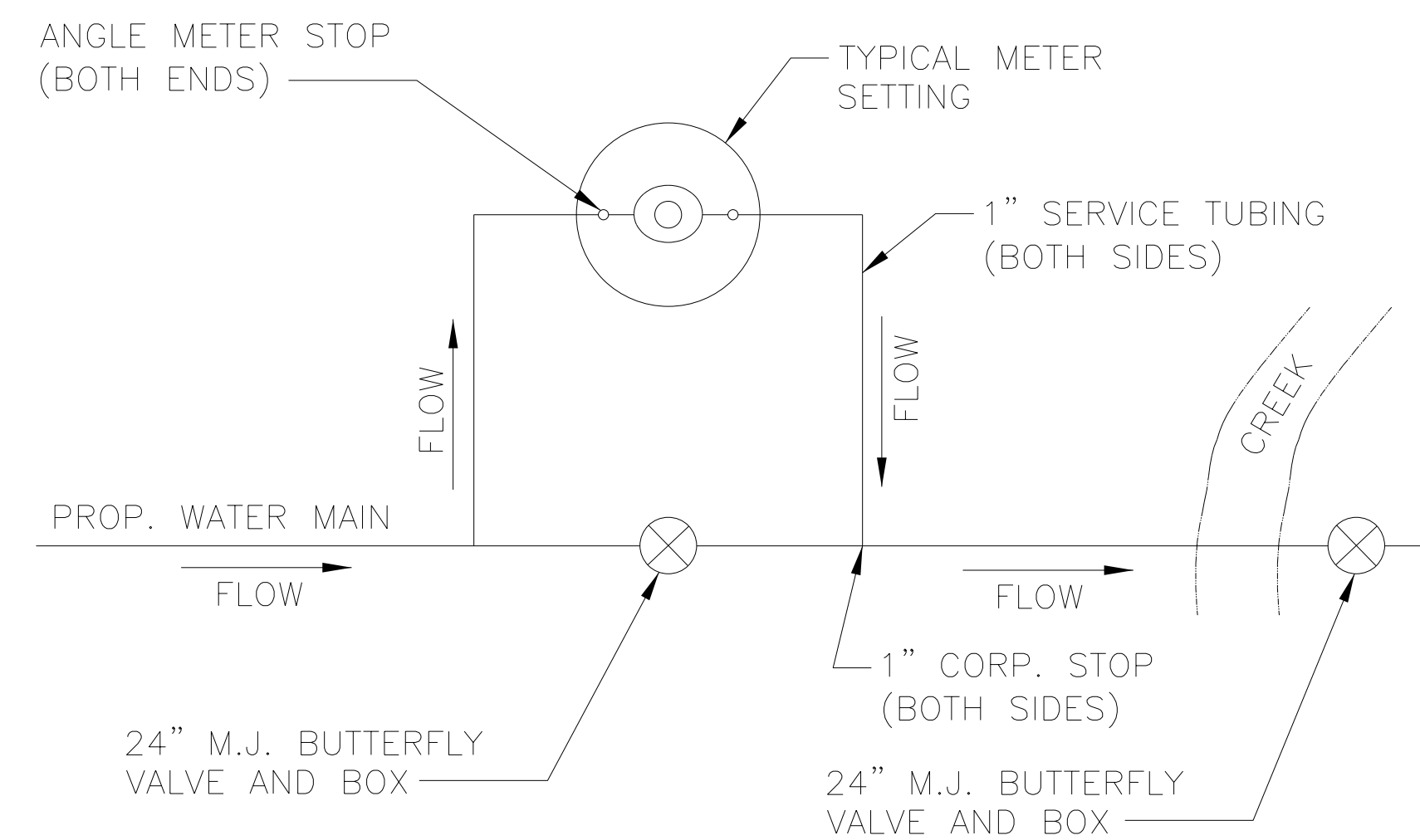
APPROACH RIGHT 361+00
STA. 49+89.79 TO STA. 55+50
WATER MAIN PLAN SHEET

RT STA. 51+65 CONST. 12' ENTRANCE
W/ 307 SY OF ENTR PVMT
AND 67 LF OF 15" ENTR PIPE

COUNTY OF	ITEM NO.	SHEET NO.
JESSAMINE	07-0376.00	U28

ADDED 11-12-15

BID SET (NOT FOR CONSTRUCTION)



SPECIAL CREEK CROSSING METER BOX DETAIL

FILE NAME: S:\LOU\5400--5499\5493\160\MICROS\FINAL PLANS\U088000E.DGN

USER: benf
DATE PLOTTED: November 11, 2015

E-SHEET NAME: U088000E

Power InRoads v8.11.7.443

DETAIL SHEET

PAVING AREAS

ITEM	S		Q		U		A		R		E		Y		A		R		D		S	
	MAINLINE	TIE #1	TIE #2	APPR LT 361+00	APPR RT 361+00	APPR LT 379+25	APPR LT 414+50	APPR RT 414+50	APPR LT 47+90	ENTRANCES	TOTAL PROJECT	MAINLINE	TIE #1	TIE #2	APPR LT 361+00	APPR RT 361+00	APPR LT 379+25	APPR LT 414+50	APPR RT 414+50	APPR LT 47+90	ENTRANCES	TOTAL PROJECT
1.25" CL2 ASPH SURE 0.38D PG64-22	45,882.4	1,624.6	1,307.5	1,304.4	2,134.0	1,046.5	1,091.7	1,084.0	1,255.9	5,095.5	61,826.5	45,882.4	1,624.6	1,307.5	1,304.4	2,134.0	1,046.5	1,091.7	1,084.0	1,255.9	5,095.5	61,826.5
3.25" CL2 ASPH BASE 1.00D PG64-22	42,304.4	1,634.7	1,315.1	1,304.4	2,145.8	1,054.9	1,101.9	1,093.1	1,266.3	5,139.3	58,359.9	42,304.4	1,634.7	1,315.1	1,304.4	2,145.8	1,054.9	1,101.9	1,093.1	1,266.3	5,139.3	58,359.9
3.50" CL2 ASPH BASE 1.00D PG64-22	42,304.4	1,661.0	1,335.1	1,304.4	2,176.9	1,075.9	1,126.1	1,114.6	1,291.9	5,256.7	58,647.0	42,304.4	1,661.0	1,335.1	1,304.4	2,176.9	1,075.9	1,126.1	1,114.6	1,291.9	5,256.7	58,647.0
4" CRUSHED STONE BASE	59,247.6	1,713.5	1,375.0	1,658.0	2,215.4	1,109.3	1,168.5	1,157.1	1,353.7	5,835.9	76,834.0	59,247.6	1,713.5	1,375.0	1,658.0	2,215.4	1,109.3	1,168.5	1,157.1	1,353.7	5,835.9	76,834.0
12" LIME STABILIZED ROADBED	46,539.0	3,107.0	1,720.0								51,366.0	46,539.0	3,107.0	1,720.0								51,366.0
ASPHALT CURING SEAL @ 2LBS/SQYD	46,539.0	3,107.0	1,720.0								51,366.0	46,539.0	3,107.0	1,720.0								51,366.0
SAND FOR BLOTTER @ 5LBS/SQYD	46,539.0	3,107.0	1,720.0								51,366.0	46,539.0	3,107.0	1,720.0								51,366.0

PAVING SUMMARY

ITEM CODE	ITEM	UNIT	MAINLINE	APPROACHES	ENTRANCES	MOT	TOTAL PROJECT
00301	CL2 ASPH SURF 0.38D PG64-22	TONS	3,154	746	350		4,250
00212	CL2 ASPH BASE 1.00D PG64-22	TONS	15,706	4,085	1,931		21,722
00003	CRUSHED STONE BASE	TONS	13,627	2,703	1,342		17,672
00013	LIME STABILIZED ROADBED	SQYD	46,539	4,827			51,366
00014	LIME	TON	1,244	129			1,373
00358	ASPHALT CURING SEAL	TON	47	5			52
02702	SAND FOR BLOTTER	TON	116	12			128
002599	GEOTEXTILE FABRIC TYPE III (FOR ROCK ROADBED)	SQYD	7,595				7,595
24779EC	Intelligent Compaction for Soil	CUYD					247356
24780EC	Intelligent Compaction for Aggregate Base	TON					17672
24781EC	Intelligent Compaction for Asphalt	TON					25972

NOTES

ALL ASPHALT MIXTURES SHALL BE ESTIMATED AT 110 LBS. PER SQ. YD. PER INCH OF DEPTH, UNLESS NOTED OTHERWISE.

- ① ESTIMATED AT 115 LBS. PER SQ. YD. PER INCH OF DEPTH.
- ② ESTIMATED AT 100 LBS. PER SQ. YD. PER INCH OF DEPTH.
- ③ ESTIMATED AT 95 LBS. PER SQ. YD. PER INCH OF DEPTH.

PAVING AREAS

ITEM	S		Q		U		A		R		E		Y		A		R		D		S	
	MAINLINE	TIE #1	TIE #2	APPR LT 361+00	APPR RT 361+00	APPR LT 379+25	APPR LT 414+50	APPR RT 414+50	APPR LT 47+90	ENTRANCES	TOTAL PROJECT											
1.25" CL2 ASPH SURE 0.38D PG64-22	45,882.4	1,624.6	1,307.5	1,304.4	2,134.0	1,046.5	1,091.7	1,084.0	1,255.9	5,095.5	61,826.5											
3.25" CL2 ASPH BASE 1.00D PG64-22	42,304.4	1,634.7	1,315.1	1,304.4	2,145.8	1,054.9	1,101.9	1,093.1	1,266.3	5,139.3	58,359.9											
3.50" CL2 ASPH BASE 1.00D PG64-22	42,304.4	1,661.0	1,335.1	1,304.4	2,176.9	1,075.9	1,126.1	1,114.6	1,291.9	5,256.7	58,647.0											
4" CRUSHED STONE BASE	59,247.6	1,713.5	1,375.0	1,658.0	2,215.4	1,109.3	1,168.5	1,157.1	1,353.7	5,835.9	76,834.0											
12" LIME STABILIZED ROADBED	46,539.0	3,107.0	1,720.0								51,366.0											
ASPHALT CURING SEAL @ 2LBS/SQYD	46,539.0	3,107.0	1,720.0								51,366.0											
SAND FOR BLOTTER @ 5LBS/SQYD	46,539.0	3,107.0	1,720.0								51,366.0											

PAVING SUMMARY

ITEM CODE	ITEM	UNIT	MAINLINE	APPROACHES	ENTRANCES	MOT	TOTAL PROJECT
00301	CL2 ASPH SURF 0.38D PG64-22	TONS	3,154	746	350		4,250
00212	CL2 ASPH BASE 1.00D PG64-22	TONS	15,706	4,085	1,931		21,722
00003	CRUSHED STONE BASE	TONS	13,627	2,703	1,342		17,672
00013	LIME STABILIZED ROADBED	SQYD	46,539	4,827			51,366
00014	LIME	TON	1,244	129			1,373
00358	ASPHALT CURING SEAL	TON	47	5			52
02702	SAND FOR BLOTTER	TON	116	12			128
002599	GEOTEXTILE FABRIC TYPE III (FOR ROCK ROADBED)	SQYD	7,595				7,595
24779EC	Intelligent Compaction for Soil	CUYD					247356
24780EC	Intelligent Compaction for Aggregate Base	TON					17672
24781EC	Intelligent Compaction for Asphalt	TON					25972

NOTES

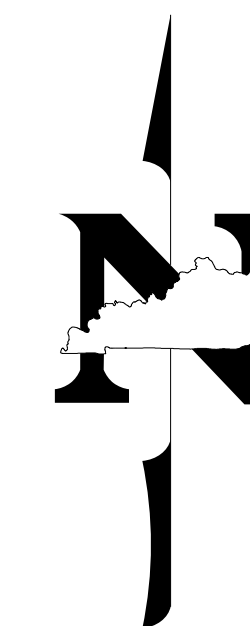
ALL ASPHALT MIXTURES SHALL BE ESTIMATED AT 110 LBS. PER SQ. YD. PER INCH OF DEPTH, UNLESS NOTED OTHERWISE.

- ① ESTIMATED AT 115 LBS. PER SQ. YD. PER INCH OF DEPTH.
- ② ESTIMATED AT 100 LBS. PER SQ. YD. PER INCH OF DEPTH.
- ③ ESTIMATED AT 95 LBS. PER SQ. YD. PER INCH OF DEPTH.

REVISED 11-9-15

Commonwealth of Kentucky DEPARTMENT OF HIGHWAYS

PLANS OF PROPOSED PROJECT JESSAMINE COUNTY EAST BRANNON ROAD (CS-1486A) GRADE, DRAIN AND SURFACING PLANS FD04 SPP 057 1486 000-002



SHEET NO.	DESCRIPTION
RI	LAYOUT SHEET
R2-R2R	TYPICAL SECTIONS-SUMMARY OF QUANTITIES
R3-R45	PLAN AND PROFILE SHEETS
R46	NOT USED
R47-R72	PLAN AND PROFILE SHEETS
R73	RIGHT OF WAY SUMMARY SHEETS
R74-R78	RIGHT OF WAY STRIP MAP SHEETS
R79-R87	COORDINATE CONTROL SHEETS
R88-R105	DETAIL SHEETS
R106-R124	TRAFFIC CONTROL SHEETS
R125-R126	NOT USED
R127-R132	EROSION CONTROL SHEETS
R133-R147	SOIL PROFILE SHEETS
R148-R150	NOT USED
R151-R166	PIPE DRAINAGE SHEETS
R167	NOT USED
R168-R203	PIPE DRAINAGE SHEETS
SI-S25	STRUCTURE PLANS DRAWING #27633
SI-S25	STRUCTURE PLANS DRAWING #27634
TI-T15	SIGNING PLANS
UI-UT	UTILITY RELOCATION PLANS
U8-U28	UTILITY RELOCATION PLANS
XI-X108	CROSS SECTION SHEETS

SHEETS NOT INCLUDED IN TOTAL SHEETS
R2A-R2R, R96A-R96C, T6A-T6C

STANDARD DRAWINGS

NUMBER	DESCRIPTION	NUMBER	DESCRIPTION
RBB-001-07	RDB-400-04	RDX-215	RPX-001-03
RBC-001-10	RDB-410-05	RDX-220-04	RPX-010-04
RBD-002-02	RDB-420-04	RDX-225-06	RPX-015-03
RBE-001-10	RDB-430-04	RDX-230-06	RPX-020-05
RBF-002-04	RDB-440-04	RDX-235-06	RPX-025-06
RBG-003-04	RDB-450-04	RDX-240-06	RPX-030-06
RBH-004-04	RDB-460-04	RDX-245-06	RPX-035-06
RBI-005-04	RDB-470-04	RDX-250-06	RPX-040-06
RBJ-006-04	RDB-480-04	RDX-255-06	RPX-045-06
RBK-007-04	RDB-490-04	RDX-260-06	RPX-050-06
RBL-008-04	RDB-500-04	RDX-265-06	RPX-055-06
RBM-009-04	RDB-510-04	RDX-270-06	RPX-060-06
RBN-010-04	RDB-520-04	RDX-275-06	RPX-065-06
RBO-011-04	RDB-530-04	RDX-280-06	RPX-070-06
RBP-012-04	RDB-540-04	RDX-285-06	RPX-075-06
RBQ-013-04	RDB-550-04	RDX-290-06	RPX-080-06
RBR-014-04	RDB-560-04	RDX-295-06	RPX-085-06
RBS-015-04	RDB-570-04	RDX-300-06	RPX-090-06
RBT-016-04	RDB-580-04	RDX-305-06	RPX-095-06
RBU-017-04	RDB-590-04	RDX-310-06	RPX-100-06
RBV-018-04	RDB-600-04	RDX-315-06	RPX-105-06
RBW-019-04	RDB-610-04	RDX-320-06	RPX-110-06
RBX-020-04	RDB-620-04	RDX-325-06	RPX-115-06
RBY-021-04	RDB-630-04	RDX-330-06	RPX-120-06
RBZ-022-04	RDB-640-04	RDX-335-06	RPX-125-06
RCA-023-04	RDB-650-04	RDX-340-06	RPX-130-06
RCC-024-04	RDB-660-04	RDX-345-06	RPX-135-06
RCD-025-04	RDB-670-04	RDX-350-06	RPX-140-06
RCE-026-04	RDB-680-04	RDX-355-06	RPX-145-06
RCF-027-04	RDB-690-04	RDX-360-06	RPX-150-06
RCG-028-04	RDB-700-04	RDX-365-06	RPX-155-06
RCH-029-04	RDB-710-04	RDX-370-06	RPX-160-06
RCI-030-04	RDB-720-04	RDX-375-06	RPX-165-06
RCJ-031-04	RDB-730-04	RDX-380-06	RPX-170-06
RCK-032-04	RDB-740-04	RDX-385-06	RPX-175-06
RCL-033-04	RDB-750-04	RDX-390-06	RPX-180-06
RCM-034-04	RDB-760-04	RDX-395-06	RPX-185-06
RCN-035-04	RDB-770-04	RDX-400-06	RPX-190-06
RCO-036-04	RDB-780-04	RDX-405-06	RPX-195-06
RCP-037-04	RDB-790-04	RDX-410-06	RPX-200-06
RCQ-038-04	RDB-800-04	RDX-415-06	RPX-205-06
RCR-039-04	RDB-810-04	RDX-420-06	RPX-210-06
RCS-040-04	RDB-820-04	RDX-425-06	RPX-215-06
RCT-041-04	RDB-830-04	RDX-430-06	RPX-220-06
RCU-042-04	RDB-840-04	RDX-435-06	RPX-225-06
RCV-043-04	RDB-850-04	RDX-440-06	RPX-230-06
RCW-044-04	RDB-860-04	RDX-445-06	RPX-235-06
RCX-045-04	RDB-870-04	RDX-450-06	RPX-240-06
RCY-046-04	RDB-880-04	RDX-455-06	RPX-245-06
RCZ-047-04	RDB-890-04	RDX-460-06	RPX-250-06
RDA-048-04	RDB-900-04	RDX-465-06	RPX-255-06
RDB-049-04	RDB-910-04	RDX-470-06	RPX-260-06
RDC-050-04	RDB-920-04	RDX-475-06	RPX-265-06
RDD-051-04	RDB-930-04	RDX-480-06	RPX-270-06
RDE-052-04	RDB-940-04	RDX-485-06	RPX-275-06
RDF-053-04	RDB-950-04	RDX-490-06	RPX-280-06
RDG-054-04	RDB-960-04	RDX-495-06	RPX-285-06
RDH-055-04	RDB-970-04	RDX-500-06	RPX-290-06
RDI-056-04	RDB-980-04	RDX-505-06	RPX-295-06
RDJ-057-04	RDB-990-04	RDX-510-06	RPX-300-06
RDK-058-04	RDB-1000-04	RDX-515-06	RPX-305-06
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RDX-168-04	RDB-2100-04	RDX-1065-06	RPX-855-06
RDX-169-04	RDB-2110-		



CALL NO. 326

CONTRACT ID. 151086

JESSAMINE COUNTY

FED/STATE PROJECT NUMBER FD04 SPP 057 1486 000-002

DESCRIPTION EAST BRANNON ROAD(CS-1486A)

WORK TYPE BRIDGE WITH GRADE, DRAIN & SURFACE

PRIMARY COMPLETION DATE 5/1/2018

LETTING DATE: November 20,2015

Sealed Bids will be received electronically through the Bid Express bidding service until 10:00 AM EASTERN STANDARD TIME November 20,2015. Bids will be publicly announced at 10:00 AM EASTERN STANDARD TIME.

PLANS AVAILABLE FOR THIS PROJECT.

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

ADMINISTRATIVE DISTRICT - 07

REVISED ADDEDNUM #1: 11-12-15

CONTRACT ID - 151086

FD04 SPP 057 1486 000-002

COUNTY - JESSAMINE

PCN - DE05714861586

FD04 SPP 057 1486 000-002

EAST BRANNON ROAD(CS-1486A) EXTEND EAST BRANNON ROAD FROM END OF EXISTING ROAD FROM EAST OF LAUDERDALE DRIVE(CS-1501) TO TATES CREEK ROAD(KY-1974).BRIDGE WITH GRADE, DRAIN & SURFACE SYP NO. 07-00376.00.

GEOGRAPHIC COORDINATES LATITUDE 37:56:38.00 LONGITUDE 84:29:55.00

COMPLETION DATE(S):

COMPLETED BY 05/01/2018

APPLIES TO ENTIRE CONTRACT

Professional

Engineering

Services

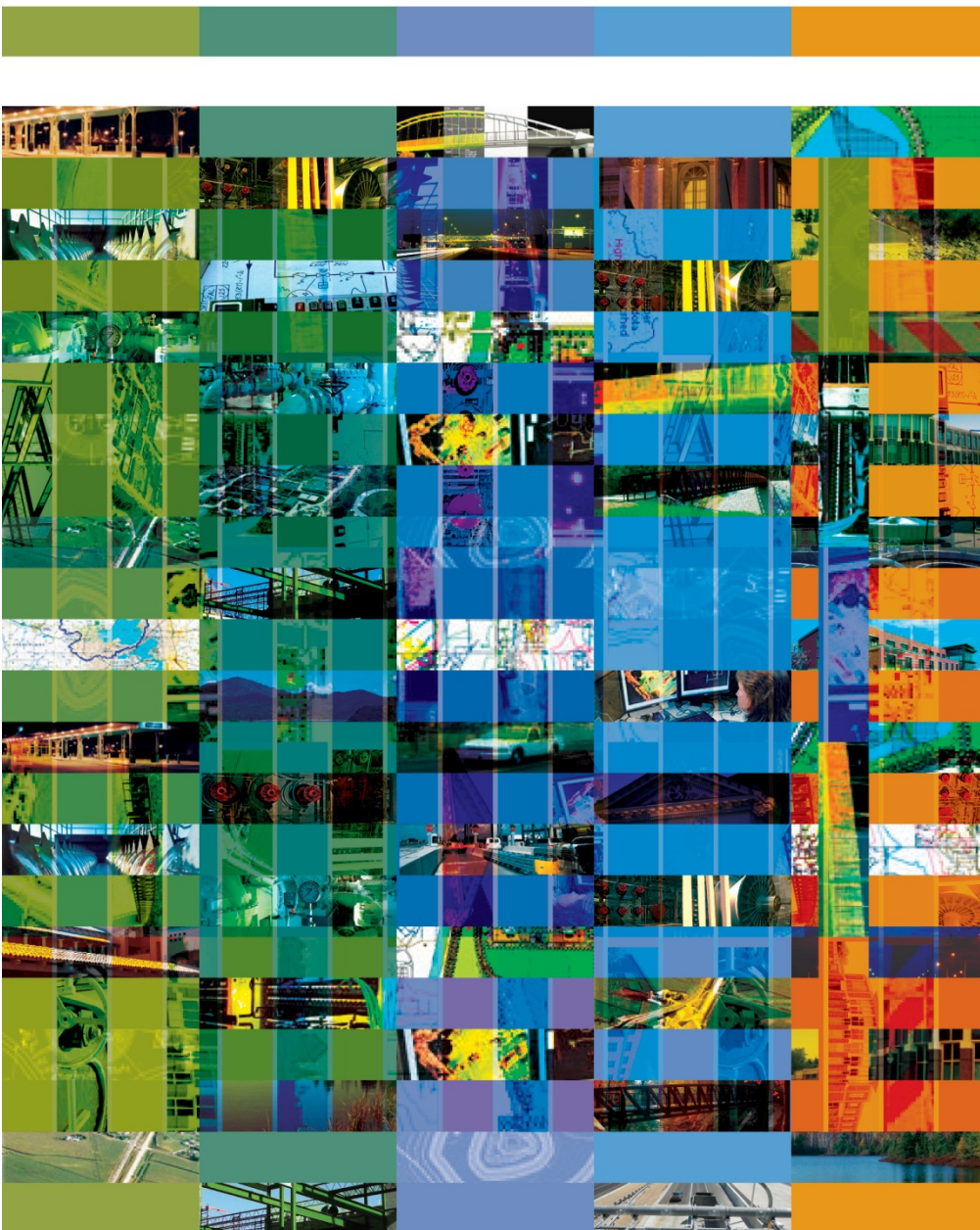
Brannon Road
Water
Transmission
Main Relocation,
Item No. 07-
376.00,
Jessamine
County

Project Manual

Kentucky American Water

Issued for Bid

November 6, 2015

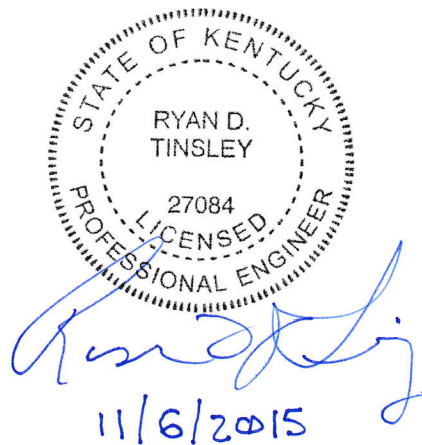


PLAN HOLDER: _____

Set No.: _____

PROJECT MANUAL

BRANNON ROAD WATER TRANSMISSION MAIN RELOCATION,
ITEM NO. 07-376.00, JESSAMINE COUNTY
KENTUCKY AMERICAN WATER



RYAN D.
TINSLEY
27084
LICENSED
PROFESSIONAL ENGINEER

11/6/2015

Prepared by:

STRAND ASSOCIATES, INC.®
325 West Main Street, Suite 710
Louisville, KY 40202
www.strand.com

Issued for Bid
November 6, 2015



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ITEM NO. 07-376.00, JESSAMINE COUNTY
KENTUCKY AMERICAN WATER

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SPECIFICATIONS

SECTION 01010

SUMMARY OF WORK

PART 1–GENERAL

1.01 DIVISION ONE

- A. The requirements of Division 1 apply to all sections of the Contract(s).

1.02 PROJECT SCOPE

- A. CONTRACTOR shall provide all items, articles, materials, operations or methods mentioned or scheduled on the Drawings or herein specified: including all labor, supervision, equipment, incidentals, taxes and permits necessary to complete the Work as described within the Contract Documents. CONTRACTOR shall install all items provided by OWNER as mentioned or scheduled on the Drawings or herein specified.
- B. The utility water transmission main relocation is a part of the Kentucky Transportation Cabinet, Department of Highways Project No. FD04 057 1486 000-002, Item No. 07-376.00. Therefore, the Contract will be administered by the Department of Highways and the CONTRACTOR shall comply with all Department of Highway's requirements, including wage rates. All references to Project in these Supplemental Specifications and related Drawings shall mean the utility water main relocation.
- C. These Supplemental Specifications and related Drawings describe the work to be done and materials to be furnished to perform the utility water transmission main relocation. Major components of this Project include:
 - 1. Ductile iron water main.
 - 2. Roadway and stream crossing bores with steel casing pipe.
 - 3. Other required water transmission main appurtenances.

1.03 CONTRACT DOCUMENTS–INTENT AND USE

- A. Intent of Documents:
 - 1. Singular notations and specifications shall be considered plural where application is reasonably inferred.
 - 2. Mention or indication of extent of work under any division or Specification section is done only for convenience of CONTRACTOR and shall not be construed as describing all work required under that division or section.
 - 3. Some individual sections may contain a list of related sections. The list of related sections in individual sections is provided for the convenience of CONTRACTOR and is not necessarily all-inclusive. CONTRACTOR may not rely upon this listing for determination of scope of work. Other sections of the Specifications, not referenced in individual sections shall apply as required for proper performance of the Work.
 - 4. Command type sentences may be used in the Contract Documents. These sentences refer to and are directed to CONTRACTOR.
 - 5. Symbols for various elements and systems are shown on the Drawings. Should there be any doubt regarding the meaning or intent of the symbols used, a written interpretation shall be obtained from ENGINEER.

- B. Use of Documents:
1. CONTRACTOR shall examine all Specifications and Drawings for the Work, including those that may pertain to Work CONTRACTOR does not normally perform with its own forces.
 2. CONTRACTOR shall use all of the Project Drawings and Specifications:
 - a. For a complete understanding of the Project.
 - b. To determine the type of construction and systems required.
 - c. For coordination with other contractors.
 - d. To determine what other work may be involved in various parts or phases.
 - e. To anticipate and notify others when work by others will be required.
 - f. And all other relevant matters related to the project.
 3. CONTRACTOR is also bound by all requirements of the Contract Documents which are applicable to, pertain to, or affect its Work, as may be shown or inferred by the entire set of Project Drawings and Specifications.

1.04 GOVERNING SPECIFICATIONS

- A. The Supplemental Specifications set forth herein shall serve to apprise CONTRACTOR of the specifics of the project. CONTRACTOR is cautioned, however, that all applicable portions of the Standard Specifications are to be followed and strict compliance therewith will be required.
- B. These Specifications are meant to supplement the Standard Specifications. The CONTRACTOR is advised that it must comply with all Department of Highways requirements. In the event there is a conflict with these Supplemental Specifications and the Department of Highways Specifications, the most stringent specification shall govern.
- C. The Drawings and Specifications are intended to be explanatory to each other, but should any discrepancy appear or any misunderstanding arise as to the intent of anything contained in either, ENGINEER shall be immediately notified and shall make the necessary interpretation. Corrections of errors or omissions in the Drawings or Specifications may be made by ENGINEER when such corrections are necessary for the proper fulfillment to their intention as construed by him.
- D. All work or materials shown on the Drawings and not mentioned in the Specifications, or any work specified and not shown on the Drawings, shall be furnished, performed and done by CONTRACTOR as if the same were both mentioned in the Specifications and shown on the Drawings.
- E. It is intended that the work covered by the Contract Documents be done so as to cause the minimum interference with the normal operation of the existing distribution system of OWNER. CONTRACTOR shall be required to organize and schedule his work so as to keep the distribution system in full operation during the construction period insofar as is consistent with the nature of the construction work to be performed.
- F. The manner in which shutdowns shall be made and the schedule of work shall be subject to the approval of the Kentucky American Water. Although every effort will be made to cause minimum interference with CONTRACTOR's work, the interest of OWNER in regard to water service shall take precedence over CONTRACTOR's work. Therefore, OWNER reserves the right to put any line or other facilities that may be shut down for the construction work back into service if and when an emergency arises.

1.05 CONSTRUCTION REQUIREMENTS

- A. The Department of Highways 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. Any rock excavation required to complete the utility construction work is unclassified/incidental to the items indicated on the summary sheet. No separate payment shall be made for rock excavation. CONTRACTOR is advised to make rock soundings or investigations as he may see fit. 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.
- B. All references to OWNER in these Supplemental Specifications and related Drawings shall mean the Kentucky American Water Company.
- C. All references to ENGINEER in these Supplemental Specifications and Drawings shall mean the Kentucky Transportation Cabinet, Section Engineer or designated representative and the utility owner's design engineer (Strand Associates, Inc.[®]), or designated representative jointly. Nothing in these Specifications shall be construed to imply the utility owner's design engineer or its designated representative has the authority to stop work. Both engineers must mutually agree upon all decisions made with regard to the utility construction. The Kentucky Transportation Cabinet, Section Engineer shall make all final decisions in all disputes.
- D. CONTRACTOR is advised that OWNER or their authorized representative shall have the right to observe lines as constructed, the right to observe testing of lines, and the right to reject any work not conforming to these Supplemental Specifications.
- E. The following is a list of approved contractors, as provided by OWNER, to perform the water transmission main relocation. Each of these contractors has satisfactorily completed projects on behalf of OWNER.
 - 1. CJ Hughes Construction Company, Inc.
75 West 3rd Avenue
Huntington, WV 25701
 - 2. Dix and Associates Pipeline Contractors, Inc.
210 Industry Road
Nicholasville, KY 40356
 - 3. Edward Hall Trucking and Excavating
110 Northland Estates
Corbin, KY 40701
 - 4. Garney Construction
200 Crutchfield Avenue
Nashville, TN 37210
- F. CONTRACTOR is advised OWNER will require a preconstruction conference pertaining to utility construction for this Project prior to the start of construction. OWNER will also require monthly progress meetings.

1.06 CONTRACTOR USE OF SITE

- A. General:
 - 1. The "area of the site" referred to in these Specifications shall be as shown on the Drawings. If the "area of the site" is not shown, OWNER's property lines, the Project

right-of-way and/or any easements obtained for the Project shall be considered the "area of the site."

2. Construction activities shall be confined within the "area of the site" limits.
3. From the start of work to completion CONTRACTOR is responsible for the care of the site and the premises which are affected by operations of Work of this Contract.
4. Except for permanent site improvements provided under the Contract, CONTRACTOR shall restore property disturbed during the Work, to the conditions which previously existed.
5. Work in occupied spaces shall be restricted to specified Work and essential activities, such as making necessary connections and extending services or constructing temporary access ways. Such work shall be scheduled in advance with OWNER.

1.07 OWNER-FURNISHED PRODUCTS

- A. OWNER is responsible for the following items when supplying material or equipment to CONTRACTOR for installation.
 1. Arrange for delivery of shop drawings, product data, samples, manufacturer's instructions, and certificates to CONTRACTOR.
 2. Deliver supplier's bill of material to CONTRACTOR.
 3. Arrange and pay for delivery to site.
 4. Inspect deliveries jointly with CONTRACTOR.
 5. Submit claims for transportation damage and arrange for replacement of damaged, defective, or missing items.
- B. CONTRACTOR's responsibilities for OWNER-furnished products are:
 1. Receive and unload products at the site.
 2. Inspect deliveries jointly with OWNER and record shortage and damaged or defective items. Any materials and equipment furnished by OWNER and found to be defective shall be clearly marked and set aside to be removed by OWNER. Any materials and equipment furnished by OWNER and installed by CONTRACTOR, without discovery of such defects will be replaced with sound materials and equipment by OWNER. CONTRACTOR, however, shall at its own expense, furnish all equipment, labor and facilities necessary to remove the defective materials and equipment and install the sound materials and equipment.
 3. Handle products at the site, including uncrating and storage.
 4. Protect products from damage and from exposure to the elements.
 5. Assemble, install, correct, adjust, and finish products in accordance with the appropriate technical section of these specifications.
 6. Repair or replace items damaged by CONTRACTOR at no additional cost to OWNER.
 7. CONTRACTOR's responsibility for materials and equipment furnished by OWNER shall begin at the point of delivery to CONTRACTOR. Materials and equipment already on the site shall become CONTRACTOR's responsibility on date of Notice to Proceed with Contract.
- C. OWNER-Purchased Equipment and Materials: OWNER has purchased materials and equipment as identified on the Summary Sheet. It is the intent of the Contract Documents for CONTRACTOR to use the provided materials as part of the construction and install the provided equipment. CONTRACTOR shall also furnish and install any additional materials and equipment required to provide a complete working system as shown on the Drawings and as specified in this Contract Document.

1.08 AVAILABILITY OF LANDS

- A. Easements will be obtained for this Project. CONTRACTOR shall confine its operations, equipment and storage areas to the easements, lands and rights-of-way in which the Project is to be located. CONTRACTOR may enter into written agreements with property owners for use of other lands during construction. Copies of such agreements shall be provided to OWNER.

PART 2-PRODUCTS

2.01 OWNER-FURNISHED PRODUCTS

- A. The following is a reference list of the OWNER-furnished equipment, materials and agreements with reference to sections of the Contract Documents for detailed information.
1. List of OWNER-Furnished Materials:
 - a. Piping and fittings.
 - b. Valves and valve boxes.
 - c. Fire hydrants and blowoff assemblies.
 - d. Special creek crossing meters and meter boxes.
 - e. Air release valves.

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01039

COORDINATION, FIELD ENGINEERING, AND MEETINGS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Coordination.
 - 2. Field engineering.
 - 3. Progress meetings.

1.02 COORDINATION

- A. CONTRACTOR shall coordinate scheduling, submittals, and work of the various sections of the work to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. CONTRACTOR shall verify utility requirements and characteristics of operating equipment are compatible with building utilities and coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. CONTRACTOR shall coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on the Drawings and shall follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, CONTRACTOR shall conceal pipes, ducts, and wiring within the construction and coordinate locations of fixtures and outlets with finish elements.
- E. CONTRACTOR shall coordinate completion and clean up of Work of separate sections in preparation for substantial completion and for portions of Work designated for OWNER's occupancy.
- F. After OWNER occupancy of premises, CONTRACTOR shall coordinate access to Site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of OWNER's activities.

1.03 FIELD ENGINEERING

- A. CONTRACTOR shall locate and protect property stakes, legal survey monuments, benchmarks, and survey control and reference points. CONTRACTOR shall pay for replacement of disturbed property stakes and legal survey monuments by a Registered Land Surveyor acceptable to OWNER and for replacement of benchmarks and survey control and reference points provided by ENGINEER.
- B. CONTRACTOR shall provide field engineering services as required to establish elevations, lines, and levels, utilizing recognized engineering survey practices.

- C. CONTRACTOR shall furnish all required plummets and graduated poles to check all Work.
- D. If stakes and boards have to be reset because of negligence of CONTRACTOR, CONTRACTOR shall bear the cost of such work.
- E. If laser beam is used, CONTRACTOR shall check its Work against intermediate grade stakes provided between manholes. Prior to initial use of the laser, CONTRACTOR shall set up laser on ground surface and check line and gradient controls. Lasers not functioning properly shall be immediately removed.
- F. If existing property stakes, not within the limits of the trench, are removed or damaged by CONTRACTOR, CONTRACTOR shall bear the cost of replacement. Replacement shall be made by a legal survey performed by a licensed Land Surveyor hired by OWNER. Cost for survey shall be deducted from the Contract Price.
- G. CONTRACTOR shall be responsible for all lines, elevations, and measurements of buildings, structures, piping, utilities, and other work executed by CONTRACTOR under the Contract. CONTRACTOR must exercise proper precaution to verify figures before laying out the Work, and will be held responsible for any error resulting from its failure to exercise such precaution.

1.04 PROGRESS MEETINGS

- A. Progress meetings will be held throughout progress of the Work at intervals agreed to by OWNER, ENGINEER, and CONTRACTOR. Interval will generally be monthly.
- B. CONTRACTOR's project manager, job superintendent, major subcontractors and suppliers shall attend as appropriate to address agenda topics for each meeting. CONTRACTOR's representatives shall have authority to bind CONTRACTOR to decisions at the meetings.
- C. The project schedule shall be updated monthly and shall be reviewed at each progress meeting. CONTRACTOR shall provide the following information in written form at each meeting.
 - 1. Construction progress, including:
 - a. Activities completed this reporting period.
 - b. Activities in progress this reporting period.
 - c. Activities scheduled to commence this reporting period.
 - 2. Description of problem areas.
 - 3. Current and anticipated delays.
 - a. Cause of the delay.
 - b. Corrective action and schedule adjustments to correct the delay.
 - c. Impact of the delay on other activities, on milestones, and on completion dates.
 - 4. Changes in construction sequence.
- D. ENGINEER will prepare and distribute minutes to all attending parties.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01060
REGULATORY REQUIREMENTS

PART 1–GENERAL

1.01 SUMMARY

- A. Work Included: Permits.

1.02 PERMITS

- A. The following permits will be obtained by OWNER:
 - 1. Kentucky Division of Water (KDOW) Construction Permit.
 - 2. KYTC Encroachment Permit.
- B. The following permits will be obtained by the Department of Highways:
 - 1. KDOW Steam Crossing Permit.
 - 2. KDOW Water Quality Certification.
 - 3. USACE Department of the Army Permit.
- C. Permits will be provided by addendum or change order. CONTRACTOR shall comply with all provisions of these permits and shall be responsible for notifications as required by these permits. CONTRACTOR shall obtain all other permits required for the Work. Where the requirements of any permit is more restrictive than the Drawings or the Specifications, the permit requirements shall govern.
- D. Any permits required for dewatering operations shall be obtained and paid for by CONTRACTOR.

PART 2–PRODUCTS

NOT APPLICABLE

PART 3–EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Whenever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or by reference to recognized industry standards.
 - 2. To facilitate CONTRACTOR's understanding of the design intent, procedures have been established for advance submittal of design data and for its review or rejection by ENGINEER.
 - 3. The type of submittal requirements specified in this section include progress schedule, shop drawings, product data, samples, and other miscellaneous work related submittals.
- B. Definitions: "Electronic Submittal" is defined as any submittal transmitted electronically to ENGINEER for review.

1.02 IDENTIFICATION OF SUBMITTALS

- A. CONTRACTOR shall completely identify each submittal and resubmittal by showing at least the following information:
 - 1. Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.
 - 2. Name and location of project and identification number.
 - 3. Drawing number and specifications section number to which the submittal applies.
 - 4. Include the date of each submittal or resubmittal.

1.03 GROUPING OF SUBMITTALS

- A. Unless otherwise specifically permitted by ENGINEER, CONTRACTOR shall make all submittals in groups containing all associated items so that information is available for checking each item when it is received.
- B. Partial submittals may be rejected as not complying with the provisions of the Contract Documents.

1.04 TIMING OF SUBMITTALS

- A. CONTRACTOR shall make all submittals far enough in advance of scheduled dates of installation to provide required time for reviews, for securing necessary approval, for possible revision and resubmittal, and for placing orders and securing delivery.
- B. The review period for submittals that are received after 3 P.M. shall commence on the following business day.

1.05 CONSTRUCTION PROGRESS SCHEDULE

- A. Submit initial schedule in duplicate within 10 days after date of OWNER-CONTRACTOR Agreement.
- B. Revise and resubmit as required.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Submit a horizontal bar chart with separate line for each major portion of Work or operation, identifying first workday of each week.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of Work at each submission.
- G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates.

1.06 SHOP DRAWINGS

- A. Shop drawings shall include specially prepared technical data for this project including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements, and similar information not in standard printed form for general application to a range of similar projects. Shop drawings shall be submitted for all manufactured or fabricated items. See individual technical sections for special requirements.
- B. CONTRACTOR shall make all shop drawings accurately to scale and sufficiently large to show all pertinent aspects of the item and its method of connection to the work.
- C. Shop drawings shall be checked, approved, and stamped by CONTRACTOR before transmittal to ENGINEER for review and approval.
- D. Complete shop drawings and descriptive data shall be submitted on all manufactured or fabricated items prior to 25% completion of the Work. Applications for payment beyond 25% of the Contract amount will not be recommended for payment until all shop drawings are submitted or a revised schedule for any remaining submittals is agreed to by OWNER and ENGINEER.
- E. CONTRACTOR shall submit shop drawings following the procedure described below. Except as noted, six color copies of shop drawings and descriptive data shall be submitted to ENGINEER for approval. Three copies of these will be returned to CONTRACTOR if approved. If shop drawings are not approved or if they are stamped "Approved as Noted-Resubmit," two corrected copies will be returned to CONTRACTOR for use in resubmittal. If CONTRACTOR desires more than three approved copies, submitted quantity shall be increased accordingly.

- F. Shop drawings submitted to ENGINEER will be reviewed and stamped "Approved," "Approved as Noted," "Approved as Noted-Resubmit," or "Not Approved." CONTRACTOR shall resubmit the above number of corrected shop drawings for all shop drawings stamped "Approved as Noted-Resubmit" and "Not Approved" and will continue this process until shop drawings are stamped "Approved" or "Approved as Noted." If drawings are stamped "Approved as Noted-Resubmit," fabrication may proceed in accordance with the marked-up shop drawings. Installation shall not proceed until shop drawings have been resubmitted and stamped "Approved" or "Approved as Noted."
- G. If shop drawings are stamped "Approved as Noted" or "Approved as Noted-Resubmit" and CONTRACTOR does not agree with revisions or cannot conform with revisions, fabrication shall not proceed and shop drawings shall be resubmitted with explanation of CONTRACTOR's position.
- H. All shop drawings used for construction site activities shall bear the "Approved" or "Approved as Noted" stamp of ENGINEER.
- I. Arrangements may be made between CONTRACTOR and ENGINEER to provide additional copies of "Approved" shop drawings for field activity purposes.

1.07 SAMPLES AND FIELD MOCKUPS

- A. CONTRACTOR shall provide samples and field mockups where noted or specified.
- B. Samples are physical examples which illustrate materials, equipment, or workmanship and establish standards by which the work will be judged.
- C. Samples shall be of sufficient size and quantity to clearly illustrate the functional characteristics of the product and full range of color, texture, and pattern.
- D. Samples shall have labels firmly attached, bearing the following information:
 - 1. Name of project.
 - 2. Description of product and finish.
 - 3. Name of CONTRACTOR.
 - 4. Trade name and number of product.
 - 5. Standards met by the product.
- E. Approval of samples must be obtained prior to proceeding with any work affected by material requiring sample approval.
- F. Samples, unless otherwise noted, become the property of OWNER.
- G. In situations specifically approved by ENGINEER, the retained sample may be used in the construction as one of the installed items.
- H. Field Mockups:
 - 1. CONTRACTOR shall erect field mockups at the project site in a location acceptable to ENGINEER and OWNER.
 - 2. When accepted by ENGINEER, the mockup will become the basis for comparison of the actual work.
 - 3. Remove mockup at conclusion of the work if it was not incorporated into the work.

1.08 PRODUCT DATA

- A. CONTRACTOR shall provide product data as required to supplement shop drawings.
- B. Product data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by CONTRACTOR to illustrate a material, product, or system for some portion of the work.
- C. CONTRACTOR shall collect required product data into one submittal for each unit of work or system.
- D. CONTRACTOR shall include manufacturer's standard printed recommendations for application and use, compliance with standards, performance characteristics, wiring and piping diagrams and controls, component parts, finishes, dimensions, required clearances, and other special coordination requirements.
- E. CONTRACTOR shall mark each copy of standard printed data to identify pertinent products, models, options, and other data.
- F. CONTRACTOR shall supplement manufacturer's standard data to provide information unique to the work.

1.09 RESUBMISSION REQUIREMENTS

- A. Make any corrections or changes in the submittals required by ENGINEER.
- B. Shop Drawings and Product Data:
 - 1. Revise initial drawings or data and resubmit as specified for initial submittal.
 - 2. Itemize in a cover letter any changes which have been made other than those requested by ENGINEER.

1.10 MANUFACTURER'S DIRECTIONS

- A. Manufactured articles, materials, and equipment shall be stored, commissioned, operated, applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer, unless specified to the contrary.
- B. Wherever specifications call for work to be performed or materials to be installed in accordance with the manufacturer's printed instructions or directions, CONTRACTOR shall furnish copies as required for shop drawings of those instructions or directions to ENGINEER before installing the material or performing the work.

1.11 MAINTENANCE MANUAL

- A. Prior to 50% completion of the Contract or at a minimum of 45 days prior to the scheduled start-up date of any individual item of equipment, whichever is earlier, CONTRACTOR shall furnish to ENGINEER four complete copies of a maintenance manual for all equipment furnished. Applications for payment beyond 50% of the contract amount will not be recommended for payment until all maintenance manuals are submitted or a revised schedule for remaining maintenance manuals is agreed to by OWNER and ENGINEER.

- B. The manuals shall include manufacturer's instructions for maintenance and operation for each item of mechanical and electrical equipment. Manuals shall be specific for the equipment as installed; provide project specific inserts as required. Manuals shall contain: operation instructions, lubrication schedules, types and quantities, preventative maintenance program, spare parts list, parts lists, I.D. No. and exploded views, assembly instructions, parts supplier location, trouble shooting and startup procedures and, where applicable, test data and curves.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: CONTRACTOR shall be responsible for the delivery, handling, storage and protection of all material and equipment required to complete the Work as specified herein.
- B. Related Sections and Divisions: Specific requirements for the handling and storage of material and equipment are described in other sections of these Specifications.

1.02 PRODUCTS

- A. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.
- B. When any construction deviations from the Drawings and/or Specifications necessary to accommodate equipment supplied by CONTRACTOR, result in additional costs to CONTRACTOR or other contractors, such additional costs shall be borne by CONTRACTOR. CONTRACTOR shall also pay any additional costs necessary for revisions of Drawings and/or Specifications by ENGINEER.
- C. Each major component of equipment shall bear a nameplate giving the name and address of the manufacturer and the catalogue number or designation.

1.03 TRANSPORTATION AND HANDLING

- A. Materials, products and equipment shall be properly containerized, packaged, boxed, and protected to prevent damage during transportation and handling.
- B. CONTRACTOR shall not overload any portion of the structure in the transporting or storage of materials.
- C. CONTRACTOR shall not damage other construction by careless transportation, handling, spillage, staining or impact of materials.
- D. CONTRACTOR shall provide equipment and personnel to handle products, including those provided by OWNER, by methods to prevent soiling and damage.
- E. CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.
- F. CONTRACTOR shall handle product by methods to avoid bending or overstressing. Lift large and heavy components only at designated lift points.

1.04 DELIVERY AND RECEIVING

- A. CONTRACTOR shall arrange deliveries of products in accordance with the Progress Schedule, allowing time for observation prior to installation.
- B. CONTRACTOR shall coordinate deliveries to avoid conflict with the Work and conditions at the Site; work activities of other contractors or OWNER; limitations on storage space; availability of personnel and handling equipment and OWNER's use of premises.
- C. CONTRACTOR shall deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible.
- D. CONTRACTOR shall clearly mark partial deliveries of component parts of equipment to identify equipment and contents to permit easy accumulation of parts and to facilitate assembly.
- E. Immediately on delivery, CONTRACTOR shall inspect shipment to assure:
 - 1. Product complies with requirements of Contract Documents and reviewed submittals.
 - 2. Quantities are correct.
 - 3. Accessories and installation hardware are correct.
 - 4. Containers and packages are intact and labels legible.
 - 5. Products are protected and undamaged.

1.05 STORAGE AND PROTECTION

- A. General:
 - 1. CONTRACTOR shall store products, immediately on delivery, in accordance with manufacturer's instructions, with all seals and labels intact and legible.
 - 2. Available storage space at the Site is limited. Any additional off-site space required shall be arranged by CONTRACTOR.
 - 3. CONTRACTOR shall allocate the available storage areas and coordinate their use by the trades on the job.
 - 4. CONTRACTOR shall arrange storage in a manner to provide access for maintenance of stored items and for observation.
- B. In enclosed storage, CONTRACTOR shall:
 - 1. Provide suitable temporary weather tight storage facilities as may be required for materials that will be damaged by storage in the open.
 - 2. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
 - 3. Provide ventilation for sensitive products as required by manufacturer's instructions.
 - 4. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
 - 5. Store solid materials such as insulation, tile, mechanical and electrical equipment, fittings, and fixtures under shelter, in original packages, away from dampness and other hazards.
 - 6. Store liquid materials away from fire or intense heat and protect from freezing.
- C. At exterior storage, CONTRACTOR shall:
 - 1. Store unit materials such as concrete block, brick, steel, pipe, conduit, door frames, and lumber off ground, out of reach of dirt, water, mud and splashing.
 - 2. Store tools or equipment that carry dirt outside.
 - 3. Store large equipment so as not to damage the Work or present a fire hazard.

4. Cover products subject to discoloration or deterioration from exposure to the elements, with impervious sheet material and provide ventilation to avoid condensation.
5. Completely cover and protect any equipment or material which is prime coated or finish painted with secured plastic or cloth tarps. Store out of reach of dirt, water, mud and splashing.
6. Store loose granular materials on clean, solid surfaces such as pavement, or on rigid sheet materials, to prevent mixing with foreign matter.
7. Provide surface drainage to prevent erosion and ponding of water.
8. Prevent mixing of refuse or chemically injurious materials or liquids.
9. Cover aggregates such as sand and gravel in cold wet weather.
10. Remove all traces of piled bulk materials at completion of work and return site to original or indicated condition.

1.06 MAINTENANCE OF STORAGE

- A. CONTRACTOR shall periodically inspect stored products on a scheduled basis.
- B. CONTRACTOR shall verify that storage facilities comply with manufacturer's product storage requirements, and verify that manufacturer required environmental conditions are maintained continually.
- C. CONTRACTOR shall verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes is acceptable under requirements of Contract Documents.
- D. CONTRACTOR shall perform scheduled maintenance of equipment in storage as recommended by the manufacturer. A record of the maintenance shall be kept and turned over to ENGINEER when the equipment is installed.

1.07 INSTALLATION REQUIREMENTS

- A. Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the respective manufacturers, unless otherwise specified.
- B. After installation, CONTRACTOR shall protect all materials and equipment against weather, dust, moisture, and mechanical damage.
- C. CONTRACTOR shall be responsible for all damages that occur in connection with the care and protection of all materials and equipment until completion and final acceptance of the Work by OWNER. Damaged material and equipment shall be immediately removed from the Site.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Final cleaning.
 - 2. Adjusting.
 - 3. Project record documents.
 - 4. Warranties.

1.02 FINAL CLEANING

- A. It is CONTRACTOR's responsibility to completely clean up the construction site at the completion of the Work.
- B. CONTRACTOR shall clean areas in which painting and finishing work is to be performed just prior to the start of this work, and maintain these areas in satisfactory condition for painting and finishing. This cleaning includes:
 - 1. Removal of trash and rubbish from these areas.
 - 2. Broom cleaning of floors.
 - 3. Removal of any plaster, mortar, dust, and other extraneous materials from finish surfaces, including but not limited to exposed structural steel, miscellaneous metal, masonry, concrete, mechanical equipment, piping, and electrical equipment.

1.03 ADJUSTING

- A. CONTRACTOR shall adjust operating products and equipment to ensure smooth and unhindered operation.

1.04 PROJECT RECORD DOCUMENTS

- A. CONTRACTOR shall maintain on Site, one set of the following record documents to record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. CONTRACTOR shall ensure entries are complete and accurate, enabling future reference by OWNER.
- C. CONTRACTOR shall store record documents separate from documents used for construction.
- D. CONTRACTOR shall record information concurrent with construction progress.

- E. Specifications: CONTRACTOR shall legibly mark and record at each Product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by addenda and modifications.

- F. Record Drawings: CONTRACTOR shall legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.

1.05 WARRANTIES

- A. CONTRACTOR shall provide warranties beyond project one year warranty as required by technical sections and as follows.

- B. Submit warranty information as follows:
 - 1. Provide notarized copies.
 - 2. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers, and provide Table of Contents and assemble in three ring binder with durable cover.
 - 3. Submit with request for certificate of Substantial Completion.
 - 4. For items of work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

DIVISION 20
STANDARD SPECIFICATIONS FOR UTILITY AND STREET CONSTRUCTION
IN
KENTUCKY

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SECTION 1–MATERIALS AND EQUIPMENT

1.1 GENERAL

Materials provided shall be suitable for the conditions in which they are being installed and used. CONTRACTOR shall review installation requirements of the Contract with material suppliers and incorporate any additional installation requirements necessary to meet the required use within the price bid for the Work.

All material shall conform to the type, size, and shape shown on the Drawings and as specified.

All material in contact with potable water shall meet NSF Standards 60 and 61.

All pipe and materials used in performance of the Work shall be clearly marked as to strength, class, or grade. Pipe and materials not so marked shall be subject to rejection.

When requested by ENGINEER, material suppliers shall furnish certificates of compliance indicating that all tests required by the various Standards have been conducted and that the test results comply with the Standards.

1.1.1 REFERENCED SPECIFICATIONS

Unless the text indicates otherwise (e.g., see Materials Standards), Standard Specifications shall refer to Division 20 Standard Specifications for Utility and Street Construction in Kentucky.

KYDOH Specifications in the Standard Specifications shall refer to the *State of Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction, Latest Edition*.

Best Management Practices in the Standard Specifications shall refer to *Kentucky's Best Management Practices for Construction Activities*.

1.1.2 MATERIAL STANDARDS

This listing of Material Standards is provided for convenience only and may not be all inclusive.

AASHTO	M36	Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.
	M148	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
	M167	Standard Specifications for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches.
	M252	Standard Specifications for Corrugated Polyethylene Drainage Pipe.
	M294	Standard Specifications for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in) Diameter.

ACI	211.1	Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
	305.1	Specification for Hot Weather Concreting.
	306.1	Standard Specification for Cold Weather Concreting.
ANSI	Z60.1	American Standard for Nursery Stock.
ASME	B16.1	Cast Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250.
ASTM	A48	Standard Specification for Gray Iron Castings.
	A126	Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
	A240	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
	A479	Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels.
	A536	Standard Specification for Ductile Iron Castings
	A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
	B62	Standard Specification for Composition Bronze or Ounce Metal Castings.
	B88	Standard Specification for Seamless Copper Water Tube.
	C14	Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe.
	C32	Standard Specification for Sewer and Manhole Brick (Made From Clay or Shale).
	C33	Standard Specification for Concrete Aggregates.
	C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
	C90	Standard Specification for Loadbearing Concrete Masonry Units.
	C139	Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.
	C140	Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
	C150	Standard Specification for Portland Cement.
	C270	Standard Specification for Mortar for Unit Masonry.

C301	Standard Test Methods for Vitrified Clay Pipe.
C425	Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings.
C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
C470	Standard Specification for Molds for Forming Concrete Test Cylinder Vertically.
C478	Standard Specification for Precast Reinforced Concrete Manhole Sections.
C497	Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe.
C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe.
C700	Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
C828	Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines.
C913	Standard Specification for Precast Concrete Water and Wastewater Structures.
C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
C924	Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
C1214	Standard Test Method for Concrete Pipe Sewerlines by Negative Air Pressure (Vacuum) Test Method.
C1244	Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill.
C1433	Standard Specifications for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers.
C1628	Standard Specification for Joints for Concrete Gravity Flow Sewer Pipe, Using Rubber Gaskets.
C1677	Standard Specification for Joints for Concrete Box, Using Rubber Gaskets.
D698	Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³ (600 kN-m/m ³)).
D1557	Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³ (2,700 kN-m/m ³)).
D1784	Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

D1785	Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
D2152	Standard Test Method for Adequacy of Fusion of Extruded Poly (Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion.
D2240	Standard Test Method for Rubber Property—Durometer Hardness.
D2241	Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
D2321	Standard Practice for Underground Installation of Flexible Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
D2339	Standard Test Method for Strength Properties of Adhesives in Two-Ply Wood Construction in Shear by Tension Loading.
D2412	Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
D2464	Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
D2466	Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
D2467	Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
D2564	Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
D2672	Standard Specification for Joints for IBS PVC Pipe Using Solvent Cement.
D2680	Standard Specification for Acrylonitrile Butadiene Styrene (ABS) and Poly (Vinyl Chloride) (PVC) Composite Sewer Piping.
D2855	Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
D3139	Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
D3965	Standard Classification System and Basis for Specifications for Rigid Acrylonitrile Butadiene Styrene (ABS) Materials for Pipe and Fittings.
D4101	Standard Specification for Polypropylene Injection and Extrusion Materials.
D4475	Standard Test Method for Apparent Horizontal Shear Strength of Pultruded Reinforced Plastic Rods By The Short-Beam Method.
F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

	F593	Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
	F594	Standard Specification for Stainless Steel Nuts.
	F679	Standard Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings.
	F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
	F1417	Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air.
AWWA	C104	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
	C105	Polyethylene Encasement for Ductile-Iron Pipe Systems.
	C110	Ductile-Iron and Gray-Iron Fittings.
	C111	Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
	C115	Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges.
	C150	Thickness Design of Ductile-Iron Pipe.
	C151	Ductile-Iron Pipe, Centrifugally Cast, for Water.
	C153	Ductile-Iron Compact Fittings.
	C300	Reinforced Concrete Pressure Pipe, Steel Cylinder Type.
	C301	Prestressed Reinforced Concrete Pressure Pipe, Steel Cylinder Type.
	C302	Reinforced Concrete Pressure Pipe, Noncylinder Type.
	C500	Metal-Seated Gate Valves for Water Supply Service.
	C502	Dry-Barrel Fire Hydrants.
	C504	Rubber-Seated Butterfly Valves.
	C507	Ball Valves, 6 Inches Through 48 Inches (150 mm Through 1,200 mm).
	C508	Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS
	C509	Resilient-Seated Gate Valves for Water Supply Service.

	C600	Installation of Ductile-Iron Water Mains and Their Appurtenances.
	C605	Underground Installation of PVC Pressure Pipe and Fittings for Water.
	C651	Disinfecting Water Mains.
	C800	Underground Service Line Valves and Fittings.
	C900	PVC Pipe and Fabricated Fittings, 4 Inches Through 12 Inches (100 mm through 300 mm), for Water.
	C901	Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. (13 mm) Through 3 in. (76 mm), for Water Service.
	C905	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 Inches through 48 Inches (350 mm through 1,200 mm).
	C906	Polyethylene (PE) Pressure Pipe and Fittings, 4 In. (100 mm) Through 63 In. (1575 mm) for Water Distribution and Transmission.
	C907	Injection-Molded Polyvinyl Chloride (PVC) Pressure Fittings, 4 IN. through 12 IN. (100 mm through 300 mm), for Water, Wastewater, and Reclaimed Water Service.
	M55	PE Pipe-Design and Installation.

1.2 PIPE

The type of pipe to be used in the Project shall be as specified in the Standard Applications table in the **SPECIAL PROVISIONS** or as shown on the Drawings.

Rigid pipes are defined as pipe manufactured of such materials as concrete or clay.

Thermoplastic pipe shall be defined as pipe manufactured of such materials as PVC or other plastics.

1.2.1 REINFORCED CONCRETE PIPE

Reinforced concrete pipe shall meet ASTM C76 for circular pipe, ASTM C507 for elliptical pipe, ASTM C655 for D-load pipe, or ASTM C1433 for box culvert pipe.

Not more than one lift hole per length of pipe shall be used in storm sewer. Lift holes will not be permitted in sanitary sewers.

Reinforced concrete pipe shall be of the class as shown on the Drawings or in the **SPECIAL PROVISIONS**, but shall be at least Class III minimum and shall have a minimum "B" wall construction. All reinforced concrete pipe used in the Work shall be of adequate strength to support the construction and trench loads applied. All reinforcing cages shall be circular; elliptical reinforcement will not be permitted. Reinforcing cage shall extend to the full width into the bell end of the pipe and to within 1 inch of the spigot end of the pipe.

All reinforced concrete pipe and fittings shall be provided with joints and gaskets which meet ASTM C1628 for sanitary sewer and ASTM C443 for storm sewer. Joints for sanitary sewer shall be sealed with rubber gaskets of either continuous O-ring or profile cross section. Joints for storm sewer

shall be sealed with rubber gaskets having a continuous O-ring cross section. Joints for elliptical pipe shall be sealed with an application of a trowelable bitumastic joint sealant on the inside of the joint. All pipe shall be specifically built to fit the gasket used.

Nonstandard pipe lengths may be used at manholes and structures as necessary to allow them to be located at the locations identified on the Drawings. Reinforced concrete bends, tees, and reducers shall be manufactured to provide for the required transitions as shown on the Drawings. Sufficient additional reinforcement shall be added at the spring lines and top and bottom of the pipe to prevent shearing after installation. Repairs to complete fabricated pipe fittings shall be such that the completed unit shall have the same strength as that of the remainder of the pipe barrel and the concrete used to complete the section shall not spall or separate.

All pipe shall have smooth interior wall. Sanitary sewer pipe shall be provided with either a smooth exterior wall (i.e., no bell), or with an R-4 big bell joint.

Joints for all smooth exterior wall reinforced concrete sanitary sewer pipe (except where open cut is not allowed) shall be provided with an external bitumastic wrap, Mac Wrap, or equal. Wrap shall be minimum 12 inches wide and shall be secured on the pipe with a minimum of one stainless steel band seal connector on each side of the joint.

Acceptance of reinforced concrete pipe shall be on the basis of plant load-bearing tests, material tests, and inspection of manufactured pipe for visual defects and imperfections.

All reinforced concrete pipe used for sanitary sewer shall be vacuum tested from end to end at the factory in accordance with ASTM C1214. Test result, date, pipe class, date of manufacture, and individualized pipe i.d. shall be clearly marked on each pipe. Written vacuum test results for each pipe i.d. shall be kept and submitted to ENGINEER. ENGINEER shall be provided an opportunity to observe all tests.

Cement used in the manufacture of reinforced concrete pipe shall meet the requirements of ASTM C150 Standard Specification for Portland Cement for Type II cement.

A three-edge bearing test shall be conducted by the manufacturer according to ASTM C497 as proof of design by determining the ultimate load capacity of the pipe. One segment of pipe from each pipe class must pass the three-edge bearing test such that the load required to produce the ultimate load exceeds the load rating of the pipe. The test results shall be maintained in a log and provided to OWNER. Manufacturer shall also maintain concrete cylinder testing data and quality control records to verify that pipe meets the required ASTM standards.

An alkalinity test shall be conducted on the concrete mixture used for each type and class of reinforced concrete pipe used in the project. The alkalinity test shall be conducted according to ASTM C497 and the alkalinity of all concrete mixtures shall be equal to or greater than 0.2 grams of CaCO₃ equivalent reactivity per gram of concrete. The manufacturer shall complete the alkalinity tests.

The costs of the tests shall be incidental to the pipe cost. CONTRACTOR shall include all such costs in the price bid for the Work. CONTRACTOR shall submit a signed, dated, and certified copy of the test data to OWNER (in a format acceptable to OWNER) for review prior to delivering any pipe to the project site. No additional compensation will be made to CONTRACTOR for the required testing.

The pipe leakage shall not exceed 150 gallons/day/inch inside diameter/mile of pipe. The manufacturer shall provide a written and signed statement indicating the pipe meets this criterion.

CONTRACTOR shall provide written certification that pipe meets the standards herein.

1.2.2 CLAY PIPE

Vitrified clay pipe and fittings shall conform to ASTM C700. Pipe and fittings shall be extra strength. Joints shall be compression type joints conforming to ASTM C425.

1.2.3 COMPOSITE PIPE (PVC AND ABS)

Composite pipe shall meet the requirements of ASTM D2680. Resin used in the manufacture of PVC composite sewer pipe and fittings shall have cell classification 12454 as defined in ASTM D1784. Resin used in the manufacturer of ABS composite pipe and fittings shall have cell classification of 1-0-2-2-3 of ASTM D3965.

Acceptance of piping shall be subject to tests conducted by an approved testing agency.

Attachment of couplings and saddle fittings and field joining of pipe sections and fittings shall be accomplished by solvent welding or rubber gaskets in accordance with the recommendations of the pipe manufacturer. All exposed filler material shall be field-coated with ABS or PVC Solvent Cement. Approved adapters shall be provided for transitions to other types of pipe.

Pipe shall be subject to rejection for failure to conform to material requirements of ASTM D2680 or for any of the following reasons:

- a. Distortion or puncture of the inner plastic shell. Distortion or punctures of the outer shell shall not be reasons for rejection if the inner shell is unaffected and such exterior distortion or puncture is suitably repaired with a solvent-welded patch.
- b. Voids in the concrete filler at pipe ends, exceeding 1 inch in depth as measured from the pipe end and exceeding 10% of the pipe circumference. However, this pipe may be used if the faulty pipe end is sawed off and field-coated.
- c. Through cracks in coupling.

1.2.4 SOLID WALL PVC

Polyvinyl Chloride (PVC) pipe shall meet the requirements of ASTM D3034 for pipe sizes 4 inches through 15 inches and ASTM F679 for pipe sizes 18 inches through 60 inches.

PVC material for ASTM D3034 pipe shall have cell classification 12454 or 12364 as defined in ASTM D1784 with a modulus of elasticity of 400,000 psi or 440,000 psi respectively. Pipe stiffness shall be minimum 46 psi when tested in accordance with ASTM D2412. Pipe shall have a maximum standard dimension ratio (SDR) of 35.

PVC material for ASTM F679 pipe shall have cell classification 12454 or 12364 as defined in ASTM D1784. Pipe stiffness shall be a minimum 115 psi when tested in accordance with ASTM D2412.

Pipe and fittings shall be the product of one manufacturer and the manufacturer shall have experience records substantiating acceptable performance of the pipe and fittings to be furnished. The minimum wall thickness of fittings shall be the same as the pipe to which it connects.

Acceptance of piping and fittings shall be subject to tests conducted by an approved testing agency in accordance with ASTM D3034 and/or ASTM F679.

Fittings such as saddles, elbows, tees, wyes, and others shall be of material and construction corresponding to and have a joint design compatible with the adjacent pipe. Approved adapters shall be provided for transitions to other types of pipe.

Joints shall be of the elastomeric type for pipes 4 inches or larger and elastomeric or solvent cement for pipes less than 4 inches.

Elastomeric joints shall be a bell and spigot joint conforming to ASTM D3212 sealed by a rubber gasket conforming to ASTM F477 so that the assembly will remain watertight under all conditions of service, including the movements resulting from the expansion, contraction, settlement, and deformation of the pipe. Bells shall be formed integrally with the pipe and shall contain a factory-installed positively restrained gasket.

Solvent cement joints shall be assembled using solvent cement obtained from the pipe manufacturer, which conforms to the requirements of ASTM D2564.

The assembled joint shall pass the performance tests as required in ASTM D3212.

1.2.5 OPEN PROFILE WALL PVC (18 INCHES AND LARGER PIPE ONLY)

Open profile PVC pipe and fittings shall meet the requirements of ASTM F794. Fittings shall also conform to ASTM D3034 SDR 35. Pipe shall have smooth interior with a ribbed exterior. Exterior ribs shall be perpendicular to the axis of the pipe to allow placement of gaskets without additional cutting or matching. Pipe shall have solid wall cross-section; no voids between inner and outer surfaces of pipe wall.

PVC materials shall have cell classification 12454 as defined in ASTM D1784 with minimum modulus of elasticity of 400,000 psi. Pipe stiffness shall be minimum 46 psi when tested in accordance with ASTM D2412. Impact strength shall equal or exceed values given in ASTM D3034 or F679.

Pipe and fittings shall be the product of one manufacturer and the manufacturer shall have an experience record substantiating acceptable performance of the pipe to be furnished. Fittings shall be injection molded.

All joints shall be of the flexible elastomeric type with bells and spigots conforming to ASTM D3212. Gaskets shall conform to ASTM F477. All bells shall be formed integrally with the pipe. Elastomeric gasket shall be positively restrained in ribs on spigot of pipe.

Acceptance of piping shall be subject to tests conducted by an approved testing agency in accordance with ASTM F794.

Fittings such as saddles, elbows, tees, wyes, and others shall be of material and construction corresponding to, and have a joint design compatible with the adjacent pipe. Approved adapters shall be provided for transitions to other types of pipe. Fittings shall be molded.

Joints shall be sealed with elastomeric gaskets meeting the requirements of ASTM F477. Solvent cement shall not be used to join pipe lengths or fittings to pipe lengths. The assembled joint shall pass the performance tests as required in ASTM D3212.

The pipe wall will be homogeneous and contain no seams. Minimum pipe stiffness per ASTM D2412 shall be 60 psi for 18 inches and 46 psi for 21 inches and larger pipe sizes. Pipe shall withstand impact of 210-foot-pounds for 8 inches and 220-foot-pounds on larger sizes. Standard lengths shall be 13-foot

or 20-foot lengths. Pipe shall withstand flattening up to 60% without cracking, splitting, or breaking and pass acetone immersion in accordance with ASTM D2152.

1.2.6 GRAVITY SANITARY SEWER SERVICE BRANCHES AND LATERALS

Branches (tees and wyes) shall be of the same material as the main except for reinforced concrete pipe used for sanitary sewer. For reinforced concrete pipe, special branches shall be furnished and installed to accept the lateral. Such special branches are subject to review by ENGINEER.

If a different thermoplastic material is specified in the **SPECIAL PROVISIONS** for laterals than for the main line, appropriate solvent welds, fittings, transition couplings, and other appurtenances shall be provided to effect a watertight seal.

Fittings for laterals shall be of the same material as the lateral pipe unless special fittings are needed for transition between material types or sizes or standard fittings are not manufactured.

Where the wye or tee branches and laterals are of dissimilar materials, CONTRACTOR shall provide a transition coupling for the connection.

All fittings used, including type of jointing, are subject to review by ENGINEER. See **SPECIAL PROVISIONS** for any additional requirements.

1.2.7 STEEL OR ALUMINUM CORRUGATED PIPE

Corrugated pipe composed of corrosion-protected steel or of aluminum shall meet the requirements of AASHTO M36 and of structural steel plate shall meet the requirements of M167. Pipe provided shall be new and free of defects and scale. Pipe and fittings that are dented, deformed, or have damaged coatings shall be removed from the site at CONTRACTOR's expense.

The average inside diameter of circular pipe shall not vary more than 1/2 inch or 1%, whichever is greater, from the nominal diameter.

The span and rise dimensions shall not vary more than 1 inch or 2% of the equivalent circular diameter, whichever is greater.

Coupling bands shall conform to AASHTO M36 and shall be made of the same base metal as the pipe. The bands shall not be less than 7 inches wide for diameters of 8 inches to 30 inches, inclusive; not less than 12 inches wide for pipe with diameters 36 inches to 60 inches, inclusive; and not less than 24 inches wide for pipe with diameters greater than 60 inches. Such bands shall be so constructed as to lap on an equal portion of each of the pipe sections to be connected and preferably shall be connected at the ends by galvanized angles having minimum dimensions of 2 by 2 by 3/16 inches.

All connections shall be shop fabricated where possible.

All cuts in corrugated pipe and pipe arch shall be saw cut. Connections cut in the field shall be saw cut with a saddle connection of 16-gauge material bolted on the corrugated pipe with 1/2-inch diameter galvanized bolts.

1.2.8 HIGH DENSITY POLYETHYLENE (HDPE) CORRUGATED PIPE

Corrugated pipe composed of high density polyethylene shall meet the requirements of AASHTO M252 and M294. Pipe and fittings shall be made from virgin polyethylene compounds conforming to ASTM D3350.

Pipe shall have interior smooth inner wall of full circular cross section with an integrally formed outer corrugated wall AASHTO Type S designation.

Fittings may be molded or fabricated and shall not impair the integrity or function of the pipe. Only fittings supplied or recommended by pipe manufacturer shall be used. Where elastomeric gaskets are required they shall conform to ASTM F477.

1.2.9 IRON PIPE AND FITTINGS

General: Iron pipe shall be ductile iron conforming to AWWA C151. Fittings shall be ductile or cast iron conforming to the standards herein. Iron pipe and fittings shall be American-made: American, Clow, Griffin, Tyler, U.S. Pipe, or equal.

Ductile iron pipe shall consist of pipe centrifugally cast in metal or sand-lined molds. Pipe wall shall be homogeneous from inside to outside and shall be completely free of laminations, blisters, or other imperfections. Defects may be removed at the factory only.

Each pipe and fitting shall have the weight, class or nominal thickness, country where cast, casting period, manufacturer's mark, the year in which the pipe was produced, and the letters DI or DUCTILE cast or stamped thereon. Improper or incomplete marking will be cause for rejection of the pipe or fitting.

CONTRACTOR shall furnish certification data representing each class of pipe or fitting furnished. The certification report shall clearly state that all pipe and fittings furnished meet the appropriate AWWA specification.

Exterior Pipe: Ductile iron pipe shall be provided with mechanical joints or push-on joints where buried. Provide flanged joints inside manholes, wet wells or other such structures, and elsewhere exterior as shown on the Drawings or as specified.

Unless otherwise shown on the Drawings or specified in the **SPECIAL PROVISIONS**, buried pipe shall be minimum Pressure Class 350 with a water hammer allowance of 100 psi. Additional pipe wall thickness shall be furnished as required by AWWA C150 for the depth of cover as shown on the Drawings when using Laying Condition 4 of AWWA C600 or the Class C Bedding Detail as shown on Drawing 01-975-43A.

Flange jointed pipe to be used elsewhere as shown on the Drawings or as specified, shall be minimum Special Thickness Class 53 conforming to AWWA C115 with a minimum rated working pressure of 250 psi and with a water hammer allowance of 100 psi. All flanged pipe shall be made up in strict accordance with AWWA C115 specifications. No field make-up flanges will be allowed unless strictly conforming to AWWA C115 with facing done after turning pipe through flange. Manufacturers of flanged pipe and fittings shall be certified to NSF 61 by an ANSI-accredited third-party certification organization.

Linings and Coatings: Buried pipe and pipe in manholes, wet wells, and other structures shall be cement-mortar lined and asphaltic coated inside and asphaltic coated outside. Inside lining and coating shall comply with AWWA C104. Outside coating shall comply with AWWA C151. Lining and coatings shall be suitable for use with potable water systems. The asphaltic coating shall be applied over the cement lining on the inside of the pipe and directly on the outside of the pipe. The coatings shall be smooth and impervious to water without any tendency to scale off.

Exterior aboveground pipe and pipe in manholes, wet wells, and other structures shall comply with the above unless specified otherwise in the **SPECIAL PROVISIONS**.

Polyethylene Encasement: Where required on the Drawings or specified in the **SPECIAL PROVISIONS**, CONTRACTOR shall provide polyethylene encasement conforming to AWWA C105. Film shall be Class C–Carbon Black, with a minimum thickness of 0.008 inches (8 mils). Tape for securing the film shall be a thermoplastic material with a pressure sensitive adhesive face capable of bonding to metal, asphaltic coating, and polyethylene. Tape shall have a minimum thickness of 8 mils and a minimum width of 1 inch.

The polyethylene film envelope shall be as free as is commercially possible of gels, streaks, pinholes, particles of foreign matter, and undispersed raw materials. There shall be no other visible defect such as holes, tears, blisters, or thinning out at folds.

Tapping and Bonding: In cases where corporation stops are to be tapped into mains, pipe wall thickness shall be furnished as specified in AWWA C151 to provide four threads or pipe saddles shall be furnished as approved by manufacturer.

Cable bond conductor or electrobond conductivity straps shall be installed on all ductile iron piping to maintain electrical continuity across joints. Continuity across valves and fittings shall be made with multiple conductivity straps connected in series. Lead-tipped gaskets or bronze wedges will not be allowed.

Cutting-in and Repair Tees and Sleeves and Tapping Tees: Cutting-in and repair tees and sleeves and tapping tees shall be of ductile or cast iron with the same rated working pressure of the pipe in which they are installed but no less than 150 psi.

Exterior Joints, Fittings, and Gaskets: Joints, fittings, and gaskets shall have the same rated working pressure of the pipe in which they are installed but no less than a minimum rated working pressure of 150 psi. Fittings shall be cement-mortar lined and asphaltic coated inside and shall be shop primed or asphaltic coated outside as specified above for the piping in which they are being installed.

Joints, fittings, and gaskets for buried piping shall be mechanical joint or push-on joint conforming to AWWA C110 and AWWA C111, as well as AWWA C153 (compact), with vulcanized styrene butadiene rubber gaskets conforming to AWWA C111.

Bolts on mechanical joints shall be high-strength low-alloy steel (Corten, or equal) conforming to AWWA C111; a certificate to that effect shall be provided.

Flange joints, fittings, and gaskets to be used elsewhere as shown on the Drawings or as specified shall conform to AWWA C110, AWWA C111, and to ANSI B16.1. Gaskets for flanged piping shall be full face, minimum 1/8-inch-thick, synthetic rubber gaskets with factory-made holes for flange bolts. Thicker gaskets shall be provided as needed to accommodate allowed tolerances in flange manufacturing.

Gaskets shall be furnished in sufficient number for all joints. Sufficient joint lubricant shall be furnished by the manufacturer with the gaskets.

1.2.10 PVC PIPE (AWWA)

AWWA PVC pressure rated pipe shall conform to the requirements of AWWA C900 for pipe from 4 inches through 12 inches and AWWA C905 for pipe from 14 inches through 36 inches. Pipe shall be furnished with integral elastomeric bell and spigot joints.

PVC pipe outside diameter shall conform to ductile iron pipe sizes (DIPS). The type of PVC material, nominal pipe size, standard dimension ratio, and pressure rating shall be not less than pressure class 235 and not greater than dimension ratio 18.

Markings on the pipe shall include the following: Nominal pipe size, type of plastic pipe material, DR number, AWWA Designation with which the pipe complies, manufacturer's name, and the seal or mark of the laboratory making the evaluation of the suitability of the pipe for the transport of potable water.

1.2.11 PVC PIPE (SDR-PR)

Standard dimension ratio PVC pressure rated pipe shall conform to the requirements of ASTM D2241 (SDR-PR) for pipe from 4 inches through 12 inches. Pipe shall be furnished with integral elastomeric bell and spigot joints. Spigot end shall conform to ASTM D2241. Bell end shall conform to ASTM D3139. Gaskets shall meet ASTM F477.

PVC pipe outside diameter shall conform to galvanized iron or steel pipe sizes (IPS). The type of PVC material, nominal pipe size, standard dimension ratio, and pressure rating shall be not less than pressure class 200 and not greater than standard dimension ratio (SDR) 21.

Markings on the pipe shall include the following: Nominal pipe size, type of plastic pipe material, SDR number, pressure class rating, manufacturer's name, and the seal or mark of the laboratory making the evaluation of the suitability of the pipe for the transport of potable water.

1.2.12 PVC PIPE (SCHEDULE PIPE)–4 INCHES OR LESS

PVC Schedule pipe 4 inches or less shall conform to the requirements of ASTM D1785 for Schedules 40, 80, or 120. Pipe shall be solvent weld type conforming to ASTM D2855 with bell conforming to ASTM D2672. Pressure rating for pipe supplied shall be minimum 150 psi. PVC pipe diameter shall conform to galvanized iron or steel pipe sizes (IPS).

1.2.13 HIGH DENSITY POLYETHYLENE PRESSURE (HDPE) PIPE AND FITTINGS

HDPE pressure rated pipe shall conform to the requirements of AWWA C906 for pipe from 4 inches through 63 inches. HDPE pipe shall be manufactured from material conforming to PE Code PE3608.

HDPE pipe outside diameter shall conform to ductile iron pipe sizes (DIPS). The type of HDPE material, nominal pipe size, standard dimension ratio, and pressure rating shall be not less than pressure class 200 and not greater than a dimension ratio (DR) 9.

Markings on the pipe shall include the following: Nominal pipe size, type of plastic pipe material, DR number, pressure class rating, manufacturer's name, and the seal or mark of the laboratory making the evaluation of the suitability of the pipe for the transport of potable water.

Fittings for HDPE pipe shall conform to AWWA C906 and shall have the same pressure rating as the pipe in which they are installed.

1.2.14 PVC PRESSURE PIPE FITTINGS (4 INCHES AND LARGER)

Unless otherwise specified in the **SPECIAL PROVISIONS** or shown on the Drawings, fittings for PVC pressure pipe shall be iron pipe fittings as specified herein.

1.2.15 GRINDER PUMP PRESSURE SEWER PIPE AND FITTINGS (LESS THAN 4 INCHES)

Grinder pump pressure sewer pipe and laterals, shall be constructed of PVC conforming to ASTM D1785 for Schedules 40, 80, or 120 or to ASTM D2241, Class 250, SDR 17 with solvent weld joints.

All fittings shall be solvent weld, 1120 PVC, Schedule 40 conforming to ASTM D2466 or Schedule 80 in accordance with ASTM D2467. Threaded fittings shall be Schedule 80 minimum conforming to ASTM D2464.

All fittings and joints shall have a working pressure rating at least equal to the pipe to which they are attached. Fittings shall be compatible with the above-specified SDR-PR or Schedule Pipe. All PVC fittings outside of manholes shall have socket or bell ends. Transitions to curb stops shall be socket type on the PVC side and threaded on the curb stop side. Fittings inside manholes shall be as shown on the Drawings. All PVC pipe and fittings shall be approved by the National Sanitation Foundation and shall bear their mark of approval.

1.2.16 PIPE RESTRAINT

Pipe restraint fittings shall be provided as follows:

- a. For ductile iron pipe with ductile iron mechanical joints MEGALUG® Series 1100 or 1100SD, by EBAA Iron Sales, Inc., Series 3000 or 3000S by Star Pipe Products, or equal.
- b. For ductile iron pipe with ductile iron push-on joints MEGALUG® Series 1100HD or 1700, by EBAA Iron Sales, Inc., Series 3100P or 3100S by Star Pipe Products; Flex-Ring, or Lok-Ring by American Cast Iron Pipe Company, TR Flex by U.S. Pipe Company, or equal.
- c. For PVC pipe with ductile iron mechanical joint fittings–MEGALUG® Series 2000 PV or 2000SV, by EBAA Iron Sales, Inc., Series 1000C or 4000 by Star Pipe Products, or equal.
- d. For PVC pipe with PVC push-on joints (not solvent welded)–MEGALUG® Series 1900 or 2800, by EBAA Iron Sales, Inc., Series 4100P by Star Pipe Products, or equal.

Gland body, wedges, and wedge actuating components shall be ductile iron conforming to ASTM A536 Grade 65-45-12. Bolts and tie rods shall be high-strength low-alloy steel conforming to AWWA C111.

Gaskets that include metal locking segments vulcanized into the gasket to grip the pipe to provide joint restraint are not acceptable.

1.2.17 COPPER WATER TUBING

Copper tubing installed within trenches shall be Type K soft annealed seamless copper tubing and shall conform to the Specifications of ASTM B88. All other copper shall be Type K hard copper conforming to ASTM B88.

The name or trademark of the manufacturer and a mark indicating the type shall be permanently and plainly marked on tubing.

Fittings for copper tubing shall be copper alloy meeting the requirements of AWWA C800-14. The maximum lead content shall be 0.25%. They shall have uniformity in wall thickness and strength and shall be free from any defect that may affect their serviceability.

Fittings shall be of the flared or compression-type. Unions shall be extra heavy 3-part unions only.

Each fitting shall be permanently and plainly marked with the name or trademark of the manufacturer.

1.2.18 SURFACE WATER CROSSINGS

Unless indicated otherwise on the Drawings or in the **SPECIAL PROVISIONS**, pipe for water crossings shall be ductile iron, Flex-Ring, or Lok-Ring by American Cast Iron Pipe Company, TR Flex by U.S. Pipe Company, or equal. Type of joint is subject to the review of ENGINEER and approval of OWNER. Mechanical joints with retainer glands will not be allowed.

1.2.19 TRANSITION COUPLINGS FOR GRAVITY SEWER SERVICE

Transition couplings shall be provided to join dissimilar pipe materials or to connect pipe where a standard pipe joint cannot be provided. Couplings shall be designed to join the pipe materials matching flow line elevations. Transition couplings for gravity sewer service shall be Fernco 5000 RC Strongback, Mission Flex-Seal ARC Shielded, or equal. Shear rings shall be provided to minimize differential settlement. All bands, clamps, shear rings and other metal components shall be stainless steel. Bushings or transitions shall be provided to accommodate pipe size differences.

1.2.20 MISCELLANEOUS PIPE

Piping needed for repair or reconstruction of existing utilities and appurtenances shall be of the same type and strength as the existing. The type of jointing used in repair and reconstruction shall be reviewed by ENGINEER. Special fittings shall be furnished and installed as necessary for repair, reconstruction, or connection of existing facilities.

All special fittings on or for connection to utilities shall be specifically built for the type of gasket used. Special fittings shall have joints of the same type as the utility to which the connection is being made.

When sanitary sewer construction is within 50 feet of a potable well, 200 feet of a municipal well, or as requested by ENGINEER, a water main equivalent pipe shall be used. To transition from water main equivalent pipe to pipe normally supplied, a transition pipe with suitable joints to mate the two different pipes shall be supplied. No field-constructed transitions will be allowed unless reviewed by ENGINEER and approved by OWNER. Construction shall not proceed until proper transition pipe is supplied.

1.3 VALVES

The type of valves to be used in the Project shall be as specified in the Standard Applications table in the **SPECIAL PROVISIONS** or as shown on the Drawings.

1.3.1 GATE VALVES

Solid wedge and double disk gate valves and resilient wedge gate valves shall conform to AWWA C500 and C509, respectively. Double disk valves shall not be used for wastewater applications. Valves shall close clockwise.

Valve stem seals shall be O-rings. The compound shall be of Buna-N or NBR rubber and have a durometer hardness of 70 degrees when tested in accordance with ASTM D2240.

Markings shall be cast on the bonnet or body of each valve and shall show the manufacturer's name or mark, the year and location valve casting was made, the size of the valve, and the designation of working water pressure.

Valves on water distribution systems and force main shall be suitable for direct burial, be provided with nonrising stems, and be equipped with a standard 2-inch-square operating nut with cast-on directional arrow.

Valves in structures as shown on the Drawings or as specified in the **SPECIAL PROVISIONS** shall be provided with nonrising stems and handwheels.

Buried or submerged valves shall be fusion bonded epoxy coated.

1.3.2 BUTTERFLY VALVES

Butterfly valves shall conform to AWWA C504.

Valves shall be Class 150B with ductile iron valve body.

Shaft seals shall be the self-adjusting split-V type or standard O-ring seals.

Valves shall be suitable for direct burial-type installation on water distribution mains. Valves shall close in a clockwise direction.

All valves 30 inches and larger shall be furnished with a seat, adjustable, removable, and replaceable from the interior of the pipeline. The seat shall be removable and replaceable without removing the body from the pipeline.

Valves shall be furnished with a standard AWWA 2-inch-square nut for manual wrench operation which shall be positively secured to the operator input shaft (in conformance with AWWA C500).

A self-draining, self-aligning base 4 3/4-inch- to 5-inch-diameter concentric with the input shaft shall be provided to accept a circular valve box base.

The operator shall be self-locking with a permanent factory set stop at each end of its travel. The disc shall not creep or flutter under service conditions. The valve shall seat closed at an angle of 90 degrees from full open.

The operator shall be designed for the output torque according to AWWA C504. Maximum input torque required to develop the rated output torque shall not exceed 150-foot pounds for any size valve.

The operator case shall be completely watertight, sealed by means of approved gaskets, gasket compounds, O-rings, or threaded plugs. Operators shall be filled with a suitable oil lubricant or thoroughly coated with an approved grease at the factory. If the operator lubricant is oil, suitable fill and drain plugs shall be provided.

Buried or submerged valves shall be fusion bonded epoxy coated.

1.3.3 PLUG VALVES

Plug valves shall be DeZURIK Series PEC, ValMatic, or equal.

Valves shall be of the nonlubricated eccentric type with resilient faced plugs and end connections as shown on the Drawings or as needed to mate with main. Plugs and upper and lower shafts shall be cast in one piece. The plug profile shall be of a cylindrical eccentric shape so that the vertical face of the plug is straight and the horizontal face is eccentrically curved in relation to the plug shafts.

Segmented ball valves with spherical plugs shall not be acceptable. Port areas shall be at least 80% of full pipe area. Valve bodies shall be of ASTM A126, Class B cast iron. Resilient plug facings shall be of chloroprene, suitable for use with wastewater.

Valves shall be furnished with corrosion-resistant seats and replaceable oil-impregnated permanently lubricated stainless steel sleeve-type bearings, which comply with the latest edition of AWWA Standards C507 and C504. Valves shall be furnished with a 1/8-inch machined smooth welded overlay seat of not less than 90% nickel. Seat area shall be raised surface completely covered with weld to ensure that the plug face contacts only nickel. Screwed-in seats are not acceptable. Valve shaft seals shall be of the type utilizing a stuffing box and pulldown packing gland. Shaft seals shall be designed for replacement with the line pressurized at design pressure with the plug in both the open and closed position. Standard Alemite No. 1610-BL grease fittings shall be installed in the upper and lower journals of the plug valves.

The design of the valve and stuffing box assembly shall be such that the packing can be adjusted or completely replaced without disturbing any part of the valve or operator assembly except the packing gland follower. Stuffing boxes shall have a depth sufficient to accept at least four rings of v-type packing. Valve seating adjustment shall be accomplished without removing the valve from the pipe line and with pressure in the line.

Valve pressure ratings shall be 175 psi for valves through 12 inches and 150 psi for valves in sizes 14 inches through 24 inches. Valves shall provide driptight shutoff up to the full pressure rating in both seating and unseating head conditions. Valves and all accessories shall be suitable for buried and submerged water service.

All underground valves shall be equipped with cast iron telescopic adjustable valve boxes and covers. Provide 4- and 6-inch valves with valve key and stainless steel extended stems.

Plug valves 8 inches and larger shall be mounted in the horizontal, and when open, valve plugs shall be at top of valve out of flow stream. Plug valves installed in the horizontal shall have worm gear actuators. Provide same full pressure rating for gearbox as for valve. All gearing shall be enclosed in a cast iron housing of same quality as plug valve and be suitable for running in a lubricant with seals provided on all shafts to prevent entry of dirt and water into the actuator. The actuator shaft and the quadrant shall be supported on permanently lubricated bronze bearings. Actuators shall indicate valve position. Buried and submerged actuators shall be suitable for direct burial or submergence and shall be mounted on a gasketed and totally enclosed actuator mounting bracket and shall have a totally enclosed and gasketed cover. Actuator shall be filled with grease. Provide OWNER with number of revolutions to open and close valves.

Extension stems shall be provided. Extension stems for submerged gear-operated valves shall be fabricated from stainless steel rod. Stems shall be provided with 2-inch operating nut.

Buried or submerged valves shall be fusion-bonded epoxy-coated.

Valves shall be equipped with open/close rotation indicator at top of extended stem. All valves shall open when the operating shaft is rotated counterclockwise.

See **SPECIAL PROVISIONS** for any additional valve requirements.

1.3.4 CHECK VALVES

Swing Check Valves: Swing check valves in lines carrying liquid shall be M&H Style 259, Pratt, DeZURIK, American, Dresser, (lever and weight) for sizes 2 inches to 30 inches, or equal, conforming

to AWWA C508, minimum 150 psi, iron body with disk to be bronze trimmed and neoprene rubber faced. Additional weights shall be used if necessary to stop slamming.

Air Cushion Swing Check Valves: Air cushion swing check valves in lines carrying liquid shall be GA Industries 250D, or equal. The swing check valves shall be constructed with a heavy cast iron or cast steel body, a bronze or stainless steel seat ring, an extra heavy noncorrosive shaft for attachment of lever and necessary weights to close valve, and a complete noncorrosive air cushion chamber. The valve shall be tight seating and shockless in operation. The seal ring shall be renewable and shall be securely held in place by a threaded joint. The air cushion chamber shall be attached to the side of the valve body externally and so constructed with a piston operating in a chamber that will effectively permit the valve to be operated without any hammering action. Shock absorption shall be by air, and the chamber shall be so arranged that the closing speed can be adjusted to meet the service requirements. The valve disk shall be of cast iron or cast steel and shall be suspended from a noncorrosive shaft that shall pass through a stuffing box to be connected to the chamber on the outside of the valve.

1.3.5 GRINDER PUMP PRESSURE SEWER SHUTOFF VALVES

All shutoff valves in valve and air release manholes for low pressure grinder pump sewers shall be PVC ball valves, ASAH1, True Union, 150 psi, Plastic Systems, Cartridge Type 342, or equal.

Ball valves shall be 1120 PVC body, union nuts, stem, handle, and end connectors. Balls shall be made of either CPVC or PVC. Valves shall be equipped with replaceable Teflon seats and EPDM O-ring seals. Ball valves shall be compatible with pipe and fittings as specified herein.

1.3.6 CORPORATION STOPS, CURB STOPS, AND TAPPING SADDLES

Corporation stops from 1/2 inch to 1 1/2 inches and curb stops from 1/2 inch to 2 inches shall be copper alloy and shall be manufactured in accordance with AWWA C800-14 and ASTM B62. The maximum lead content shall be 0.25%. Unless otherwise specified in the **SPECIAL PROVISIONS**, manufacturer shall be Mueller, Ford, or equal, minimum 150 psi working pressure.

With PVC main and for ductile iron main with 2-inch taps, tapping saddles shall be provided for all corporation stops. Tapping saddles shall be Mueller, Ford, or equal, brass or bronze, minimum 150 psi working pressure with stainless steel bands, nuts, and bolts.

1.3.7 FIRE HYDRANTS

Fire hydrants provided under these Specifications shall conform to AWWA C502 for Dry-Barrel Fire Hydrants. Hydrants shall have the following features:

Bury Length	Approximately 3 feet to traffic flange.
Nozzle Size	One 4 1/2-inch- and two 2 1/2-inch-diameter openings.
Nozzle Threads	National standard fire hose coupling screw threads.
Drain Port	Drain port at base of hydrant barrel. Plug drain port when hydrant installed in area where ground water level may rise above drain port.
Size of Main Valve Opening	5 1/4-inch diameter minimum. The hydrant lead connection shall be minimum 6 inches diameter mechanical joint.
Torque Requirements	Hydrant shall comply with AWWA C502 even if greater than 5-foot bury.

Lubrication	Nontoxic and providing proper lubrication for a temperature range of -30° to +120° Fahrenheit.
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Hydrants shall have permanent markings identifying the manufacturer by name, initials, insignia, or abbreviations in common usage, and designating the size of the main valve opening and the year of manufacture. Markings shall be so placed as to be readily discernible and legible after hydrants have been installed.

CONTRACTOR shall furnish certification to ENGINEER that the hydrant and all material used in its construction conform to the applicable requirements of AWWA C502 and the supplementary requirements thereto.

All joints on fire hydrant leads shall be made using pipe restraint specified herein. Approximately 1/2 cubic yard of clear stone shall be placed from the bottom of the trench around the hydrant elbow and up the hydrant barrel. Clear stone shall be wrapped completely in filter fabric to prevent the in-migration of fine materials.

CONTRACTOR shall furnish all necessary fittings in the fire hydrant lead to install the fire hydrant in a plumb condition at locations shown on the Drawings and at the specified depth of bury. The pumper nozzle of all fire hydrants shall be installed with the nozzle pointing toward the street. ENGINEER reserves the right to alter the location of fire hydrants from that shown on the Drawings.

1.3.8 VALVE BOXES

A valve box shall be provided for fire hydrant auxiliary valves and for valves in the main. The valve box shall be centered and plumb over the wrench nut of the valve with the box cover flush with the finished ground elevation. Solid 4-inch concrete blocks shall be placed under the base of valve boxes so that the bottom of the base is about 2 inches away from contact with the valve bonnet. Unless otherwise indicated in the **SPECIAL PROVISIONS**, a Gate Valve Adaptor by Adapter, Inc., or equal, may be used in lieu of blocks. The valve box shall not transmit shock or stress to the valve.

Valve boxes shall be made of cast iron conforming to ASTM A48, Class 20. The castings shall be free from blowholes, porosity, hard spots, shrinkage defects or cracks, or other injurious defects and shall have a normal smooth casting finish. The castings shall be thoroughly coated with a 1 mil minimum thickness bituminous coating. Valve boxes shall be 5 1/4 inches in diameter. Valve boxes shall have a maximum length of 5 feet when extended without extension sections. Extensions shall be provided for deeper mains.

Valve boxes shall consist of a base section, tubular mid and top sections, both with cast threads by which one can be telescoped on the other, extension sections if required, and a circular drop cover.

1.3.9 CURB BOXES

Curb boxes shall be of the *Arch or Minneapolis Pattern*, Ford, Mueller, or equal made with cast iron conforming to ASTM A48, Class 20. The castings shall be free from blowholes, porosity, hard spots, shrinkage defects or cracks, or other injurious defects and shall have a normal smooth casting finish. The pentagon head bolt shall be brass.

The castings shall be thoroughly coated with a 1 mil thickness bituminous coating.

A 2 1/2-inch-diameter box shall be provided for 3/4-inch and 1-inch service stops.

A 3-inch-diameter box with the enlarged base shall be provided for 1 1/4, 1 1/2, and 2-inch service stops.

All curb boxes shall have a maximum length of 5 feet when extended without the use of extension section. Extensions shall be provided for deeper mains.

1.3.10 MISCELLANEOUS VALVES

Shutoff valves in pipe taps and potable and nonpotable water lines smaller than 1 inch shall be Milwaukee 1131T (threaded), Milwaukee 1169 (solder joint), Nibco T-134 (threaded), Nibco S-134 (solder joint), or equal, bronze 300 psi gate valves. Provide unions for ease of valve removal

Shutoff valves in pipe taps and potable and nonpotable lines, pump vent, and drain lines 1 inch through 2 1/2 inches shall be gate valves, 150 psi, bronze or iron body bronze mounted, solid wedge disk, threaded, rising stem Nibco T-131, Milwaukee 1150, or equal. Provide unions for ease of valve removal.

1.4 PRECAST REINFORCED CONCRETE MANHOLES

Unless otherwise required in the **SPECIAL PROVISIONS**, all manhole sections including risers, flat slab tops, conical tops, base sections, steps, and adjusting rings shall be precast reinforced concrete. Reinforced concrete manhole sections shall conform to ASTM C478. Manhole construction shall conform to Drawing 01-975-43A.

Lengths of manhole riser (barrel) shall be furnished in such combinations as to conveniently make up the depth of the manhole. A maximum of two handling holes per length of riser will be permitted.

Standard sewer and water manholes shall be constructed with eccentric cone top section and water main valve manholes shall be constructed with a concentric cone top section for 48-inch-diameter barrel sections. For other diameters the top section shall be a cone section, if available, or flat slab. Concrete adjusting rings shall be furnished to set the manhole casting to established grade. Valves and cleanout piping connections shall be centered below the casting.

Drop entrances to sanitary sewer manholes shall be installed where indicated on the Drawings and as shown on Drawing 01-975-43A. Drop entrances shall be of the same diameter as the sewer main from sizes 8 inches through 18 inches. For larger diameters, the drop shall be 18 inches unless otherwise specified in the **SPECIAL PROVISIONS** or shown on the Drawings. Drop entrances for storm sewer manholes are not required.

The interior bottom of sanitary sewer and storm sewer manholes shall be constructed of concrete benches which shall be precast or poured-in-place in the field. Benches shall extend to the top of each pipe to a maximum height of 42 inches. Flow lines shall be made smooth with uniform curves to promote flow through the manhole.

All joints between manhole pipe sections and top shall be tongue-and-groove conforming to ASTM C443. Manhole joints shall be sealed with circular O-ring or preformed flexible joint sealant as specified herein.

Manhole connections for sanitary sewer mains shall be made using flexible, watertight connections, PSX Press Seal, Kor-N-Seal, or equal, for sewers up through 18-inch diameter. All other sanitary sewer manhole connections shall be made with A-Lok, PSX Press Seal, Kor-N-Seal, or equal. Manhole connections for all other piping shall be made with A-Lok, PSX Press Seal, Kor-N-Seal, or concrete grout.

Manhole bottoms for sanitary sewer shall be monolithically precast with the bottom section for manholes up through 6-foot diameter. Bottoms for larger diameter manholes shall be precast but need not be monolithically cast with the bottom section. All other manhole bottoms shall be either poured-in-place or precast concrete.

Manhole bottoms for air release manholes, force main cleanout manholes and water system valve manholes shall have an 18-inch-diameter sump hole. Sump hole shall have a solid concrete bottom where groundwater is above the bottom of the manhole.

Manholes shall be furnished of minimum diameters as shown on Drawing 01-975-43A. Manholes shall be furnished large enough to provide a minimum distance, between adjacent pipe, measured tangentially along the inside face of the manhole, equal to one-half the outside diameter of the intersecting sewer pipe. In any event, manholes shall be furnished in the diameter necessary to accommodate intersecting sewer pipe and the pipe to manhole connection as proposed for use.

Steps shall be installed in all sewer manholes by the manufacturer as shown on Drawing 01-975-43A and shall be cast iron conforming to ASTM A48, Class 30B or steel reinforced plastic conforming to ASTM A615, Grade 60 and ASTM D4101, Type II, Grade 49108 as shown on the Drawings. Manhole steps shall be spaced at 16 inches on center with an allowable tolerance of ± 1 inch. Steps shall be embedded into the riser or conical top section wall a minimum of 3 inches.

Precast reinforced concrete manhole risers and tops shall be tested in accordance with ASTM C497. Precast reinforced concrete manhole risers and tops meeting the strength requirements will be considered acceptable and shall be stamped with an appropriate monogram. When requested, copies of test reports shall be submitted to ENGINEER before the manhole sections are installed in the Project. Final acceptance will be made after field inspection upon delivery to the jobsite.

Precast reinforced concrete manhole sections shall be subject to rejection for failure to conform to any of the Specification requirements. In addition, individual sections of manhole risers and tops may be rejected because of any of the following reasons:

- a. Fracture or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.
- b. Defects that indicate imperfect proportioning, mixing, and molding.
- c. Surface defects indicating honey-combed or open texture.
- d. Damaged ends, where such damage would prevent making a satisfactory joint.
- e. Manhole steps out of line, or not properly spaced.
- f. Noticeable infiltration into manhole.
- g. Variation in diameter of the manhole section of more than 1% from the nominal diameter.
- h. Any continuous crack having a surface width of 0.01 inch or more and extending for a length of 12 inches or more regardless of position in the section wall.

Each precast reinforced concrete manhole riser and top section shall be clearly marked with the name or trademark of the manufacturer and the date of manufacture. This marking shall be indented into the manhole section or shall be painted thereon with waterproof paint.

Precast concrete adjusting rings for standard manholes shall have an inside diameter of 26 inches, be not less than 2 inches nor more than 6 inches high, and shall have a wall thickness of 6 inches unless otherwise specified. The rings shall contain a minimum of one No. 2 reinforcing rod centered within the ring. The joints between rings and between rings and castings shall be sealed with preformed flexible joint sealant as specified herein.

1.5 STORM SEWER INLETS

All inlets shall meet the requirements of ASTM C913. Construction shall conform to Drawing 01-975-41A. Inlets, in general, shall be rectangular in shape and shall be constructed of precast or poured-in-place concrete.

1.6 MASONRY

Concrete block shall meet the requirements of ASTM C139.

The face size of stretcher units shall be 7 5/8 inches by 15 5/8 inches. Variations in the face size shall be within the limits permitted by the above standards. Special shapes and sizes shall be furnished and installed as necessary.

Sewer brick shall conform to ASTM C32. All sewer brick shall be grade SS and manhole brick shall be grade MS. Sewer brick shall be installed as shown on the Drawings furnished by ENGINEER and as required in the construction of sewer appurtenances.

1.7 MANHOLE AND INLET CASTINGS

All manhole and inlet castings shall be gray iron and meet the requirements of ASTM A48. Unless otherwise shown on the Drawings or specified in the **SPECIAL PROVISIONS**, standard manhole castings shall be Neenah R1550 with machined frame, Type B solid lid, concealed pick holes and self-sealing gaskets, East Jordan Iron Works, or equal. Floodproof castings shall be Neenah R1916 C with machined frame, type B solid lid, concealed pick holes and self-sealing gaskets, East Jordan Iron Works, or equal.

Inlet castings for locations with curb and gutter shall be Neenah R3067 with type L grates on slopes and type R grates at low points, East Jordan Iron Works, or equal. For driveway areas, inlet castings shall be Neenah R3290 with Type A grates, East Jordan Iron Works, or equal.

1.8 FRAME/CHIMNEY SEAL

Where required by the **SPECIAL PROVISIONS** or shown on the Drawings, CONTRACTOR shall provide internal manhole frame chimney seal. The seal shall be made of a rubber type product, with a minimum thickness of 3/16 inches, a minimum unstretched width of 8 inches and be extruded or molded from a high grade rubber compound conforming to the applicable requirements of ASTM C923. The bands used for compressing the sleeve against the manhole shall be fabricated from stainless steel conforming to ASTM A240, Type 304, for sheet and ASTM A479, Type 304, for rods. Any screws, bolts, or nuts used on these bands shall be stainless steel conforming to ASTM F593 and F594, Type 304. The internal seal or its appurtenances shall not extend far enough into the manhole opening to restrict entry into or exit from the manhole.

Manhole frame-chimney seals shall be designed to prevent the leakage of water into the manhole at the area of the joint between the manhole frame and chimney continuously throughout a 20-year design life. The seal shall remain flexible, allowing repeated vertical movements of the frame because of frost

lift, ground movement, or other causes of up to 2 inches and/or repeated horizontal movements of the frame because of thermal movement of the pavement or other causes of up to 1/2 inch, both rates of movement occurring at rates not less than 0.10 inch per minute. If the seal is an internal seal, it and its appurtenances shall not extend far enough into the manhole opening to restrict entry or exit from the manhole.

The seal shall be made of only materials that have been successfully used in sanitary sewer construction for at least ten years and have proven to be resistant to sanitary sewage; corrosion or rotting under wet or dry conditions; the gaseous environment in sanitary sewers and at road surfaces including common levels of ozone, carbon monoxide and other trace gases at the sites of installations; the biological environment in soils and sanitary sewers; chemical attacks by road salts, road oil and common street spillages or solvents used in street construction or maintenance; the temperature ranges, variations and gradients in and between manhole frames and chimneys in the climate of the location of construction; variations in moisture conditions and humidity; fatigue failure caused by a minimum of 30 freeze-thaw cycles per year; or vibrations because of traffic loadings; fatigue failure because of repeated variations of tensile, compressive and shear stresses and repeated elongation and compression; and any combination of the foregoing. The materials used shall be compatible with each other and the manhole materials.

1.9 JOINT SEALING FOR MANHOLES AND APPURTENANCES

Unless modified by the **SPECIAL PROVISIONS**, the type of material to be used to seal joints between manhole barrels, cone sections, tops, adjusting rings, castings, and other appurtenances shall be as specified in the Standard Specifications or as shown on the Drawings.

1.9.1 MORTAR

Mortar shall meet the requirements of ASTM C270. Mortar shall be one part Portland cement and 2 1/4 parts washed mortar sand.

1.9.2 PREFORMED FLEXIBLE JOINT SEALANT

Prefomed flexible joint sealant shall be EZ Stik, Kent Seal, Ram Nek, or equal, meeting the requirements of ASTM C990.

1.9.3 O-RINGS

O-rings shall meet the requirements of ASTM C443.

1.10 AGGREGATE SLURRY (FLOWABLE) BACKFILL

Aggregate slurry (flowable) backfill shall consist of fine and coarse aggregate conforming to ASTM C33. Coarse aggregate shall be size number 67 and fine aggregate shall be size number 4. The material shall be mixed with water to provide an approximate 3-inch slump. The mix shall be deposited in the trench from ready mix concrete transit mix trucks and shall be consolidated using concrete vibrators or vibratory plate compactors.

1.11 EROSION CONTROL

Erosion and pollution control components such as silt fences, rock bags, straw bales, trash receptors, etc. shall meet the requirements of Best Management Practices and the Stormwater Pollution Prevention Plan established for this Project.

1.12 BEDDING DIKE

Where shown on the Drawings or requested by ENGINEER in the field, CONTRACTOR shall install clay bedding dikes to prevent groundwater from flowing continuously through the bedding material installed for the sanitary sewer. Bedding dikes shall be 4 feet long and shall extend from the bottom of the trench excavation to within 2 feet of the ground surface and 1 foot beyond the trench width on both sides of the trench.

1.13 SPECIAL MATERIALS AND EQUIPMENT

See **SPECIAL PROVISIONS** for items of material and equipment specific to the Project.

SECTION 2—ALIGNMENT AND GRADE

2.1 GENERAL

Utility lines shall be laid and installed to the lines and grades specified with valves, fittings, manholes, and other appurtenances at the specified locations; spigots centered in bells; and all manholes and riser pipes plumb.

Water main and force main shall maintain a minimum of 36 inches of cover. Gravity sewer mains and laterals shall maintain a minimum 36 inches of cover but shall be deep enough to provide service to buildings.

Water main, force main, and other pressure mains shall be installed to within ± 0.1 feet of designed grades. Sanitary and storm sewer and laterals shall be installed to within ± 0.03 feet of designed grades.

Unless otherwise noted in the **SPECIAL PROVISIONS** or on the Drawings, service lines shown on the Drawings are approximate. ENGINEER will assist CONTRACTOR in staking the actual locations in the field.

Staking shall be completed in conformance with Division 1 of the Specifications.

2.2 DEVIATIONS OCCASIONED BY UNDERGROUND FACILITIES

Wherever significant obstructions not shown on the Drawings are encountered during the progress of the Work, CONTRACTOR shall proceed in accordance with the General Conditions to notify owners and protect the facilities. Existing items unnecessarily damaged during the performance of the Work shall be repaired and replaced at the expense of CONTRACTOR.

2.3 CAUTION IN EXCAVATION

CONTRACTOR shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures may be determined and shall be held responsible for the repair of such structures when broken or otherwise damaged because of carelessness on its part.

2.4 SUBSURFACE EXPLORATION

Whenever, in the opinion of ENGINEER, it is necessary to explore and excavate to determine the location of existing underground facilities, CONTRACTOR shall make explorations and excavations for such purposes. If CONTRACTOR is asked to perform additional Work in making the explorations and excavations, extra compensation will be allowed as specified in the General Conditions.

SECTION 3—EXCAVATION AND PREPARATION OF TRENCH

3.1 GENERAL EXCAVATION

The trench shall be dug so that the utilities can be laid to the alignment and depth specified. Unless otherwise allowed by ENGINEER, trenches shall not be excavated more than 100 feet in advance of pipe laying. Earth excavation shall include all excavation except rock as hereinafter defined. Included in earth excavation shall be removal of street paving of all types, existing structures, existing improvements and trees smaller than 4 inches in diameter measured 4 feet above the ground, all as necessary to complete the pipe installation.

3.2 EXCAVATION TO GRADE

The trench shall be finished to the depth necessary to provide a uniform and continuous bearing and support for the pipe on the bedding material provided at every point between bell holes. Any part of the bottom of trench excavated below the specified grade shall be corrected with bedding material, thoroughly compacted in place. The bedding shall be shaped and finished with hand tools to fit the bottom quadrant to the pipe.

If, in the opinion of ENGINEER, unstable soil conditions are encountered at subgrade, CONTRACTOR shall replace the unstable soil with special bedding. CONTRACTOR shall be allowed extra compensation for the special bedding, unless the unstable soil conditions are caused by CONTRACTOR's failure to adequately dewater the trench, in which case CONTRACTOR shall bear the entire cost.

All excavated material shall be piled in a manner that will not endanger the Work. Stockpiles not for immediate backfilling shall have silt fences placed around their perimeter for erosion control. The Work shall be conducted in such a manner that pedestrian and motor traffic is not unnecessarily disrupted. Fire hydrants, valve boxes and manholes shall be left unobstructed. Gutters shall be kept clear or other satisfactory provisions made for street drainage, and natural water courses shall not be obstructed.

Excavated material designated by ENGINEER as being undesirable for backfilling and all surplus excavated material shall be immediately removed as excavation progresses. All such material shall be disposed of in an environmentally safe manner in accordance with local, state, and federal regulations. No such materials shall be disposed of in wetlands, floodplains, or other environmentally sensitive areas. Disposal sites are also subject to approval of OWNER. All undesirable and surplus material disposed of must be leveled off and graded to rough elevations as determined by OWNER. Appropriate erosion control measures shall be provided and maintained at disposal sites until disposal is complete and the disposal site is permanently stabilized.

CONTRACTOR shall remove bituminous pavement and road surface as a part of the trench excavation. The width of pavement removed shall be the minimum possible, and acceptable, for convenient and safe installation of utilities and appurtenances.

All bituminous pavement shall be cut on neat, straight lines and shall not be damaged beyond the limits of the trench.

Where it is necessary to trench through concrete pavement, a strip shall be sawed and removed in such a manner as not to disturb the remainder of the pavement. Paving and undermining of existing concrete pavement shall be prevented by CONTRACTOR. If CONTRACTOR unnecessarily removes or damages pavement or surfaces beyond limits acceptable to ENGINEER, such pavement and surfaces shall be replaced or repaired at the expense of CONTRACTOR.

3.3 DEWATERING

CONTRACTOR shall, at its own expense, keep the excavation clear of water while structures and appurtenances are being built, utilities are being installed, and fill and backfill is being compacted. CONTRACTOR shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies, including power outages, and shall have available at all times competent workers for the operation of the pumping equipment. The dewatering systems shall not be shut down between shifts, on holidays or weekends, or during Work stoppages.

All dewatering shall be done in accordance with applicable federal, state, and local code requirements.

Under no conditions shall the Work be laid in or under water. No water shall flow over the Work until the joints are complete or the concrete has set. Wherever necessary, CONTRACTOR shall excavate in advance of the completed Work, lead the water into sumps or pump wells, and provide erosion control measures to prevent water or sediment damage.

The expense for making all extra excavations necessary to prevent water from interfering with the proper construction of the Work and for forming of all dams, digging sumps or pump wells, bailing and pumping, and erosion control shall be borne by CONTRACTOR. Any permits necessary for the dewatering operations shall be obtained and paid for by CONTRACTOR. No extra payment will be made for dewatering of the trench whether accomplished by the use of sumps and pumps, well point systems, or deep wells.

CONTRACTOR's dewatering system shall ensure that soils within the trench will not be destabilized by hydrostatic uplift pressures from adjacent groundwater. If conditions warrant, CONTRACTOR shall furnish and install well point systems or deep wells. Spacing and depth of well points or wells shall be adequate to lower the piezometric level to at least 2 feet below the bottom of the excavation. Additional lowering shall be provided as necessary to create a stable subgrade. The control of groundwater shall be such that softening or heaving of the bottom of excavations or formation of quick conditions or boils shall be prevented. Dewatering systems shall be designed and operated to prevent the migration or removal of soils. In areas where rock is encountered, the water level shall be kept at or below top of rock but at least 6 inches below bottom of concrete. Additional rock shall be removed as needed to provide clearances.

CONTRACTOR shall take all necessary precautions during the dewatering operation to protect adjacent structures against subsidence, flooding, or other damage. The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property. Any such facilities and structures damaged shall be repaired or replaced to the satisfaction of their owner.

Prior to dewatering, CONTRACTOR shall take into account the effect of its proposed dewatering operation on existing private water supply systems and shall make arrangements with property owners for protecting their supplies or providing alternative supply. If CONTRACTOR's dewatering operation adversely affects private water supply systems, CONTRACTOR shall provide property owners with alternative potable and nonpotable supplies until dewatering operations are ceased and groundwater levels return to normal. If the water in private water supply wells is contaminated through no fault of CONTRACTOR after restoration of original groundwater levels, OWNER will provide measures to restore water potability. CONTRACTOR is responsible for restoration of the water supply, not its potability after restoration.

In areas where continuous operation of dewatering pumps is necessary, CONTRACTOR shall avoid noise disturbance to nearby residences and businesses to the greatest extent possible by using electric driven pumps, intake and exhaust silencers, or housing to minimize noise.

The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted fill or backfill, and prevent floatation or movement of all structures and pipelines.

3.4 WIDTH OF TRENCH

CONTRACTOR shall be responsible for determining and providing the minimum width necessary to provide a safe trench in accordance with current OSHA standards and all other applicable standards. The top width of trench excavation shall be kept as narrow as is reasonably possible and acceptable to minimize pavement damage. Pay items related to maximum trench widths shall not limit CONTRACTOR's responsibility to provide safe trench conditions.

Width of Trench–Rigid Pipe: The width of trench below the outside top of the pipe shall be as shown in the following table for the sizes listed. A minimum clearance of 8 inches between the outside of the pipe barrel and the trench wall at the pipe spring line shall be maintained to allow for bedding and haunching. If sheeting is used and is going to remain in place, the trench width shall be measured as the clear distance between inside faces of the sheeting. Otherwise, the trench width shall be based on the width between stable trench walls after sheeting is removed.

MAXIMUM WIDTH OF TRENCH BELOW TOP OF PIPE

Nominal Pipe Diameter (Inches)	Trench Width (Inches)
4	30
6	30
8	36
10	36
12	36
15	36
18 and larger	SEE SPECIAL PROVISIONS

Where the width of trench below the outside top of the pipe barrel cannot be otherwise maintained within the limits shown above, CONTRACTOR, at its own expense, shall furnish an adequate pipe installation for the actual trench width which will meet design conditions. This may be accomplished by furnishing higher class bedding, a stronger pipe, concrete cradle, cap or envelope or by driving sheeting prior to excavation to subgrade. Removal of sheeting below the top of the pipe, if allowed by ENGINEER, shall be gradual during backfilling.

If the maximum trench width is exceeded for any reason other than by request of ENGINEER, the concrete cradle, cap, sheeting, bedding or the stronger pipe shall be placed by CONTRACTOR at its own expense. Where the maximum trench width is exceeded at the written request of ENGINEER, the concrete cradle, cap, sheeting, bedding or stronger pipe will be paid for on the basis of the price bid.

Width of Trench–Thermoplastic and Ductile Iron Pipe: The trench width for flexible pipe shall be minimum three times the pipe outside diameter or the maximum trench width specified for rigid pipe, whichever is greater. A minimum clearance of 8 inches between the outside of the pipe barrel and the trench wall at the pipe spring line shall be maintained to allow for bedding and haunching.

3.5 ROCK EXCAVATION, UTILITIES

Rock excavation for utilities shall include all hard, solid rock ledges, bedded deposits and unstratified masses and all conglomerate deposits or any other material so firmly cemented that in the opinion of ENGINEER it is not practical to excavate and remove same with a 225-net flywheel horsepower trench backhoe or equal, except after continuous drilling and blasting. Soft or disintegrated rock which can be removed with a pick, loose, shaken or previously broken rock, or rock which may fall into the excavation from outside the limits of excavation will not be classified as rock excavation. Rock excavation shall also include all rock boulders necessary to be removed having a volume of 2 cubic yards or more.

When rock is encountered, it shall be stripped of earth and ENGINEER or OWNER's representative notified and given proper time to evaluate same before removal. Any rock removed which has not been measured by ENGINEER or OWNER's representative will not be classified as rock excavation.

The depth of trench in rock shall be 6 inches below the lowest outside bottom of the pipe.

All rock excavated from the trench shall be classified as undesirable backfill material and shall be disposed of as specified in the Excavation to Grade section. All trenches in rock shall be backfilled with bedding, cover, and backfill material furnished by CONTRACTOR.

3.6 BLASTING

Blasting for rock excavation will be permitted only after securing the written approval of OWNER and only after proper precautions are taken for the protection of persons or property. The hours of blasting will be fixed by OWNER. Any damage caused by blasting shall be repaired by CONTRACTOR at its expense. CONTRACTOR's method and procedure of blasting shall conform to state laws and municipal ordinances.

CONTRACTOR shall provide a copy of Blaster License as required by the licensing agencies to OWNER prior to commencement of blasting.

3.7 SPECIAL BEDDING

Special bedding shall consist of stone material and filter fabric as described herein. Where the bottom of the trench at subgrade is found to be unstable or of unsuitable material, which in the opinion of ENGINEER should be removed, CONTRACTOR shall excavate and remove such unstable or unsuitable material to the trench width and to a depth of 2 feet. The excavated area shall be lined with filter fabric, Mirafi 140 N, US Fabrics US 120NW, Propex Geotex 401, or equal, and backfilled with bedding material in maximum 12-inch layers. At subgrade the filter fabric shall be wrapped over the special bedding with an 18-inch overlap. Bedding material shall then be placed over the special bedding to support the piping. See Dewatering and Excavation to Subgrade sections for additional conditions.

3.8 CONCRETE CRADLE

If soil conditions require it, concrete cradle or encasement shall be placed around the pipe as shown on Drawing 01-975-43A. Excavation shall be carried below the grade line to a depth requested by ENGINEER and concrete cradle or encasement placed. Before the concrete is placed, the pipe shall be laid to line and grade, blocked and braced, and the joint made. The cradle shall then be placed, taking care not to disturb the pipe. Concrete shall have a minimum 28-day compressive strength of 4,000 psi. Concrete cradle shall not be used for thermoplastic piping. See Trench Width section for additional conditions.

3.9 BRACED AND SHEETED TRENCHES

Open-cut trenches shall be sheeted and braced as required by any governing federal regulations including OSHA, state laws, and municipal ordinances; and as may be necessary to protect life, property, improvements or the Work. Underground or aboveground improvements to be left in place shall be protected and, if damaged, shall be repaired or replaced at the expense of CONTRACTOR.

Sheeting and bracing which is to be left in place must be removed for a distance of 4 feet below the present or proposed final grade of the street, road, or land, whichever is lower. Trench bracing, except that which shall be left in place, may be removed after backfilling has been completed or has been brought up to such an elevation as to permit its safe removal.

3.10 TUNNELING, BORING, JACKING, OR BORING AND JACKING

Where shown on the Drawings or specified in the **SPECIAL PROVISIONS**, the sewer, water main or force main (carrier pipe) shall be placed inside a casing pipe that is installed by tunneling, boring, jacking, or boring and jacking or other acceptable methods not using open-cut construction techniques. Installation shall be accomplished in accordance with State Laws, municipal ordinances, and any permit requirements. Casing pipe used shall be of adequate diameter and thickness to support all loads imposed and to permit installation of the carrier pipe to plan line and grade. Type and minimum size of casing pipe shall be as called for on the Drawings or as specified. Steel casing pipe joints shall be continuous circumferential welds of strength equal to pipe walls.

Casing pipe shall be installed using equipment and material that cases the hole as earth is removed to eliminate cavities at the lead end of the casing pipe. Grouting between casing pipe and soil opening shall be performed when needed to secure casing pipe, to prevent soil collapse, and to fill voids between the casing pipe and native soil.

Installation of casing and carrier pipe shall proceed in such a manner as to minimize disruption of traffic and to avoid damage to adjacent streets. No equipment shall work off the pavement or shoulder of the street being crossed during the course of construction. Signs, barricades, flagmen and lighting shall be provided to strictly comply with the Traffic Control section of the Standard Specifications as may be modified by any permit requirements. Stricter requirements shall govern in case of differences.

The carrier pipe shall be placed inside the casing pipe using hardwood blocks or stainless steel casing spacers, which are shaped to fit both the casing pipe and carrier pipe. At least three blocks or spacers shall be provided for each length of carrier pipe. They shall be banded or fixed to the barrel of the carrier pipe so they are parallel to the longitudinal centerline. The annular space between the casing pipe and carrier pipe shall be filled with sand or concrete grout. Sand fill shall be thoroughly tamped and rammed in place.

All carrier pipe within the limits of jacking pits shall be installed at CONTRACTOR's expense to resist all loads imposed including, if necessary, the use of special pipe.

Other tunneling methods shall be as specified in the **SPECIAL PROVISIONS**.

SECTION 4-PIPE AND MANHOLE INSTALLATION

4.1 GENERAL

Prior to commencing pipe laying, CONTRACTOR shall notify ENGINEER of the intended date for starting Work. ENGINEER may request at CONTRACTOR's expense the removal and relaying of pipe which was installed prior to notification of ENGINEER.

Proper implements, tools, and facilities shall be provided and used by CONTRACTOR for the safe and convenient prosecution of the Work. All pipe, fittings, and appurtenances shall be carefully lowered into the trench, piece by piece, with a crane, rope or other suitable tools or equipment, in such manner as to prevent damage to materials. Under no circumstance shall pipe be dropped or rolled into the trench.

Materials shall be as shown on the Drawings or as specified herein.

4.2 MATERIAL INSPECTION

CONTRACTOR shall inspect the pipe, fittings, and appurtenances for defects when delivered to the jobsite and prior to lowering into the trench. Defective material shall be removed from the jobsite. All material shall be clean and free of deleterious substances prior to use in the Work.

4.3 BEDDING AND COVER

Immediately prior to placing the pipe, the trench bottom shall be shaped by hand to fit the entire bottom quadrant of the pipe. If pipe is of the bell and spigot type, bell holes shall be provided to prevent the bell from supporting the backfill load. Bell holes shall be large enough to permit proper making of the joint but not larger than necessary to make the joint. All adjustments to line and grade must be done by scraping away or filling in bedding material under the body of the pipe. Any fill used must be bedding material. If necessary to obtain uniform contact of the pipe with the subgrade, a template shall be used to shape the bedding material. All pipe shall be bedded in bedding material at least 4 inches thick. CONTRACTOR shall perform all necessary excavation and shall furnish all necessary material to provide this bedding.

Bedding material shall be hard and durable and shall be made by crushing sound limestone or dolomite ledge rock, or crushed gravel aggregate. Bedding material shall conform to the requirements of ASTM C33.

PERCENTAGE BY WEIGHT PASSING INDICATED SIEVE

Size	2 1/2 IN	2 IN	1 1/2 IN	1 IN	3/4 IN	1/2 IN	3/8 IN	No. 4	No. 8	No. 16	No. 30	No. 100	No. 200
57			100	95-100		25-60		0-10	0-5				
8						100	85-100	10-30	0-10	0-5			
9						100	75-100	0-25	0-5				
10							100	85-100				10-30	

All rigid sanitary sewer pipe and related appurtenances shall be bedded and covered in accordance with the Class B bedding detail as shown on Drawing 01-975-43A. Bedding material shall conform to Size No. 8 or No. 9. With pipes greater than 15 inches, Size No. 57 may be used.

Concrete and other rigid pipe used in non-sanitary sewer applications (sanitary sewer applications, if allowed by the **SPECIAL PROVISIONS**) may be bedded using the Class C bedding detail as shown on Drawing 01-975-43A. Bedding material shall conform to the above for rigid sanitary sewer pipe.

Ductile and cast iron pipe shall be bedded in accordance with Class C bedding detail as shown on Drawing 01-975-43A or the Type 3 laying condition of AWWA C600. Bedding material shall conform to Size No. 8, or No. 9. Where ductile iron pipe is polyethylene encased, bedding material shall conform to Size No. 10 or cover material as specified below.

Thermoplastic sanitary sewer pipe and related appurtenances shall be bedded and covered in accordance with the Thermoplastic Pipe Bedding Detail on Drawing 01-975-43A. Bedding material shall conform to Size No. 8 or No. 9. With pipes greater than 15 inches, Size No. 57 may be used.

All other sanitary sewer pipe and related appurtenances shall be bedded and covered in accordance with the Class B bedding detail as shown on Drawing 01-975-43A. Bedding material shall conform to Size No. 8 or No. 9. With pipes greater than 15 inches, Size No. 57 may be used.

PVC and HDPE water main or force main shall be bedded and covered in accordance with the Thermoplastic Pipe Bedding Detail on Drawing 01-975-43A. Bedding material shall conform to Size No. 8 or No. 9. With pipes greater than 15 inches, Size No. 57 may be used.

Bedding material for copper water services shall conform to Size No. 9 or No. 10.

No material native to the trench shall be used for bedding material.

CONTRACTOR shall provide ENGINEER with a sieve analysis of the bedding material for review prior to starting construction.

Material which is to be placed from the bedding material to 1 foot above the top of the pipe shall be termed cover material. All trenches shall be backfilled by hand to 1 foot above the top of the pipe with cover material. Cover material shall be deposited in the trench for its full width on each side of the pipe, fittings and appurtenances simultaneously in 6-inch layers and shall be compacted using hand tamping bars and/or mechanical tampers. CONTRACTOR shall use special care in placing cover material to avoid injury to or movement of the pipe. Cover material shall consist of durable granular particles ranging in size from fine to a maximum size of 3/4 inches. Unwashed bank run sand and crushed bank run gravel will be considered generally acceptable cover material. Cover material shall generally conform to the following gradation specifications:

COVER MATERIAL GRADATION

Sieve Size	Percentage by Weight Passing
1 inch	100
3/4 inches	85 to 100
3/8 inches	50 to 80
No. 4	35 to 65
No. 30	--
No. 40	15 to 30
No. 200	5 to 15

Native trench materials may be used for cover material if they substantially conform to the above gradation specifications and a suitable credit is extended to OWNER.

All bedding materials may be substituted for cover material when requested by CONTRACTOR except where polyethylene encasement is used. In such case, only those bedding materials specifically noted for polyethylene encasement may be used.

4.4 PIPE LAYING

All pipe shall be laid accurately to the line and grade as designated. Preparatory to making pipe joints, all surfaces of the portions of the pipe to be joined or of the factory-made jointing material shall be clean and dry. Lubricants, primers, adhesives, and other joint material shall be used and installed as recommended by the pipe or joint manufacturer's specifications. The jointing materials or factory fabricated joints shall then be placed, fitted, joined, and adjusted in such a workmanlike manner as to obtain the degree of watertightness specified. Pertinent specifications from the joint and pipe

manufacturer which outline procedures to be followed in making the joint shall be furnished to ENGINEER.

Wyes, tees, and special fittings shall be installed as called for on the Drawings or as requested by ENGINEER. Wyes, tees, and special fittings shall, in general, be jointed with the same type of joint as used in the pipe.

In joining two dissimilar types of pipe, manufactured adapters and fittings shall be used. Adapters and fittings shall be configured to maintain invert elevations at same level.

Joint deflections shall not exceed the limits established by the pipe manufacturer for the pipe and joint being used.

Joints that are damaged because of carelessness, improper handling, or failure to prevent imperfections in manufacture shall be subject to rejection and gaskets shall be subject to rejection whenever they show surface cracking, tears, or splice separation.

At times when pipe laying is not in progress, the open ends of pipe shall be closed with plugs to prevent the entry of foreign material. All foreign material shall be removed from the pipe prior to acceptance.

After placing a length of pipe in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with specified backfill material tamped around it except at the bells. Trenches shall be kept water-free during bedding, laying, and jointing and for as long a period as necessary to permit proper execution of the Work.

Pipe shall be brought home by using a cross member and levers or jacks. It will not be permissible to push pipe home with motor-powered excavation equipment.

Force main and water main shall be installed in accordance with AWWA C600 for iron pipe, AWWA C605 for PVC pipe, and AWWA M55 for HDPE pipe. All plugs, caps, tees, hydrants, bends, and other fittings for water mains and force mains shall be provided with restrained joints.

The minimum length of pipe to be restrained shall be as shown in the following table:

REQUIRED LENGTH OF RESTRAINED PIPE BEYOND FITTING IN FEET

Fitting	Minimum Length--Ft
90 Degree Bend (4 inches)	36
90 Degree Bend (6 inches to 8 inches)	54
90 Degree Bend (10 inches to 12 inches)	72
90 Degree Bend (14 inches)	84
45 Degree Bend (≤ 6 inches)	18
45 Degree Bend (8 inches to 14 inches)	36
22 1/2 Degree Bend ≤ 14 inches	18
11 1/4 Degree Bend ≤ 14 inches	9
Fire Hydrant Leads	All Joints
End of Line Tees (4 inches)*	18 (Along Branch)
End of Line Tees (6 inches to 8 inches)*	36 (Along Branch)
End of Line Tees (10 inches to 12 inches)	54 (Along Branch)
End of Line Tees (14 inches)*	66 (Along Branch)

*Restrained run length on tees assumed 18 feet on each side of fitting

This table assumes horizontal orientation of fittings, 150 psi test pressure plus a 100 psi water hammer allowance, ductile iron pipe, and a 3-foot bury. Lengths shall be adjusted for other conditions and fittings. For other fittings and for more specific requirements, see the Drawings or **SPECIAL PROVISIONS**.

4.5 SEWER SERVICE BRANCH AND LATERAL INSTALLATION

General: CONTRACTOR shall furnish and install sanitary sewer and storm sewer branches, laterals, and leads as shown on the Drawings or requested by ENGINEER. Under normal circumstances, service laterals will be installed within the right-of-way or easement to serve all existing buildings and all platted lots. In certain cases, only wye or tee branches will be installed to vacant lots. Service laterals shall consist of a branch fitting at the main and extension of the specified lateral pipe to the end of lateral as called for and requested. All necessary fittings shall be furnished and installed to complete the installation as shown on Drawing 01-975-75A. All necessary fittings shall be furnished and installed to complete installation of for storm sewer leads as shown on Drawing 01-975-41A.

Wye or Tee Branches: Wherever shown on the Drawings or requested by ENGINEER, wye or tee branches shall be provided for use in making sanitary sewer service and storm sewer inlet connections. Unless specified otherwise in the **SPECIAL PROVISIONS** or as shown on the Drawings, wye or tee branches for sanitary sewer service lateral connections to single-family residences shall be 4-inch diameter. All other sanitary sewer service lateral connections shall be 6 inches. Wye or tee branches for storm sewer inlet connections shall be of the size called for on the Drawings, 12 inch minimum.

Sanitary sewer service branches shall be turned so that the branch is at an angle of 30 degrees or 45 degrees with the horizontal.

Sanitary Sewer Service Laterals: Under normal conditions and unless otherwise specified in the **SPECIAL PROVISIONS**, shown on the Drawings, or requested by ENGINEER, all service laterals shall be Standard Laterals, Type 1, as shown on Drawing 01-975-75A. Service laterals of Types 2 through 6 may be requested by ENGINEER to meet field conditions.

It is the general intent to install Modified Laterals, Type 2, 4, or 5 for service to homes that presently have shallow or no basements or where the depth to groundwater at the end of lateral is shallow. Type 3 and 6 risers are only to be provided where shown on the Drawings or specified in the **SPECIAL PROVISIONS**.

Installation and Testing Requirements: Except for those branches that are to be used on storm sewers or for extending sanitary sewer service laterals, wye and tee branches shall be closed with airtight stoppers blocked to withstand air test pressures.

The ends of all laterals shall be plugged and blocked to resist air test pressures. All plugs shall be manufactured to fit the pipe used and shall be watertight. The ends of all laterals shall be marked as shown on Drawing 01-975-75A using flagging tape and 2 by 4 markers.

A complete and accurate tabulation of length, depth, and location of all branches, risers, and laterals shall be kept by CONTRACTOR on cards available from ENGINEER. Measurements shall be made from the nearest downstream manhole. Lateral installation to meet these Specifications and field conditions are the responsibility of CONTRACTOR. Problems occurring because of failure to provide proper installation or proper records shall be corrected by CONTRACTOR at its expense.

No installed lateral shall be backfilled until ENGINEER has been notified that the lateral is complete and reasonable time is allowed for observation of the Work.

4.6 WATER SERVICE LATERAL INSTALLATION

Water service laterals requiring reconstruction and new service laterals shall be installed in accordance with AWWA C600. CONTRACTOR shall perform all excavation, backfill, and other Work necessary for a complete installation. The service tubing shall be continuous and shall be placed at a minimum depth of 30 inches. Each service shall include a corporation stop at the main, copper service tubing, curb stop, curb box, couplings, and all other appurtenances necessary for a complete installation. Where existing services in the street are being reconstructed, the new service shall be connected to the existing service at the property line unless otherwise shown or specified. Taps in the main shall be at an angle of 45 degrees above the horizontal.

OWNER reserves the right to make taps and connections to the new mains prior to backfilling by CONTRACTOR. CONTRACTOR shall delay backfilling until OWNER has completed its Work.

All curb boxes on new services shall be marked by placing a 4-foot-long 2 by 4 adjacent to it. The 2 by 4 shall project 1 foot above existing ground and shall be painted blue. All services shall be extended to the street property line, unless otherwise shown or specified.

4.7 PORTABLE TRENCH BOX

Whenever a portable trench box or shield is used, special precautions shall be taken so as not to pull already jointed pipe apart or leave voids around the pipe wall. Whenever possible, the bottom edge of the box shall be kept at a level approximately even with the top of pipe. Cover material shall be placed to at least the top of pipe before moving the box ahead.

4.8 MANHOLES

Manholes shall be installed in accordance with Drawing 01-975-41A for storm sewer, Drawing 01-975-42A for water main, and Drawing 01-975-43A for sanitary sewer. Manholes shall be plumb with any steps aligned and openings located over steps. For sanitary sewers, openings shall be located over the bench and not the sewer flow line itself.

All manholes shall be made watertight and shall show no visible signs of leakage at the time of final review and within the correction period. Any leakage shall be sealed from the exterior of the manhole.

4.9 STORM SEWER INLETS

Storm sewer inlets shall be installed in accordance with Drawing 01-975-41A. Inlets shall be set to the line and grade as furnished by ENGINEER. The outside end of the lift hole shall be covered with filter fabric to prevent the entrance of fines into the inlet.

Inlets shall be connected to the storm sewer main either at manholes, at wye branches in the main, or to other inlets, all as shown on the Drawings. Minimum size of inlet lead pipe shall be 12 inches.

Storm inlets shall be backfilled to undisturbed soil and at least 2 feet along connecting piping with bedding material.

4.10 MASONRY

No masonry shall be laid when the temperature of the outside air is below 40°F unless all masonry materials are heated and protected against freezing.

Only enough mortar shall be mixed that can be conveniently used before it reaches initial set. Retempering of mortar will not be permitted.

4.11 ABANDONING UTILITIES

Utilities to be abandoned shall, unless otherwise noted on the Drawings or in the **SPECIAL PROVISIONS**, be abandoned in place. Open ends of pipes shall be plugged with 12 inches of concrete. Manhole barrels, valve boxes and other such structures shall be removed to a point 3 feet below existing or final ground surface, whichever is lower, and shall then be filled with backfill material compacted to that of the trench backfill. An approximate 9-inch-diameter opening shall be made in the bottom of the structure to allow for groundwater movement.

4.12 CONNECTIONS TO AND MODIFICATIONS OF STRUCTURES AND MAINS

Unless otherwise noted on the Drawings or in the **SPECIAL PROVISIONS**, openings in existing structures to allow for connection of mains shall be core drilled, and the mains themselves shall be connected by use of watertight connections as specified in the Standard Specifications. Flow channels in the bottoms of existing structures shall be modified as necessary to provide smooth transition for incoming flow and/or orientation of mains. These modifications may include breaking out and reforming flow channels. See **SPECIAL PROVISIONS** for any additional requirements.

Where mains, new and existing, are to intersect, dog house manholes shall be provided to facilitate connection and to gain access to the intersecting mains. Manholes shall be provided at the manufacturing plant with arched openings in lower barrel section to span each of the intersecting mains. Reinforcing shall be cut and bent back. In the field, manhole shall be set on concrete blocks, with reinforcing provided according to Drawing 01-975-41A, 42A, or 43A for the bottom slab. Concrete shall be poured under and around the manhole to seal all openings, cover and adhere to the slab and bent reinforcement, and provide for benches or fillets in the manhole. Sanitary and storm sewer mains shall be kept intact until the bench or fillet is poured. Then the top of pipe to springline shall be removed to provide access. See **SPECIAL PROVISIONS** for any additional requirements.

SECTION 5-BACKFILLING

5.1 BACKFILL MATERIAL

Backfill shall be that material placed between the top of cover material to the subgrade for placement of restoration materials. Backfill for storm inlets shall be bedding material.

When the type of backfill material is not otherwise specified or shown on the Drawings, CONTRACTOR may backfill with the excavated material, provided that such material consists of loam clay, sand, gravel, or other materials which in the opinion of ENGINEER are suitable for backfilling.

All backfill material shall exceed 35°F and be free from frost, cinders, ashes, refuse, vegetable or organic matter, boulders, rocks, or stone, frozen lumps, or other material which in the opinion of ENGINEER is unsuitable. From 1 foot above the top of the pipe to the trench subgrade, well-graded material containing stones up to 8 inches in their greatest dimension may be used, unless otherwise specified in the **SPECIAL PROVISIONS**. Care should be taken in backfilling so as not to damage the installed pipe.

In refilling the trench, if there is not sufficient material excavated therefrom suitable for refilling, CONTRACTOR shall, without extra compensation, furnish the deficiency. Where indicated on the Drawings, fill shall be provided over projecting conduits. Such fill shall be free of large boulders, and the top 6 inches shall be of suitable material to fit the adjoining ground.

5.2 GRANULAR BACKFILL

When called for on the Drawings, in the **SPECIAL PROVISIONS**, or requested by ENGINEER, backfill material shall be granular and shall consist of durable particles ranging in size from fine to coarse in a substantially uniform combination. Sufficient fine material shall be present to fill all the voids in the coarse material. No stones over 3 inches or clay lumps shall be present. Unless otherwise allowed by ENGINEER, granular backfill shall generally conform to the following gradation specification:

GRANULAR BACKFILL

Sieve Size	Percentage by Weight Passing
3 inches	100
2 inches	95 to 100
No. 4	35 to 60
No. 200	5 to 10

5.3 PLACEMENT

All trenches shall be backfilled using specified material so that excessive lengths of trench are not left open. In general the backfilling operation shall proceed so that no more than 100 feet of trench is open behind the pipe laying operation.

Backfill shall be left below the original surface to allow for placement of restoration materials including pavement, base course, concrete, topsoil, sod, plus any pavement replacement specified in accordance with the Asphaltic Paving section herein. When settlement occurs, CONTRACTOR shall restore the surface improvements at its expense, to maintain the finished surface.

5.4 BACKFILL CONSOLIDATION

Unless specifically deleted in the **SPECIAL PROVISIONS**, all trenches shall be consolidated as specified in this section for the entire depth and width of the trench.

Consolidation shall be achieved by use of smooth surface vibratory compactors or backhoe-operated hydraulic compactors for granular materials and rotating sheepsfoot type mechanisms for loam/clay soils. The lift height shall not exceed 8 inches for walk-behind hand-operated vibratory compactors and sheepsfoot. Lift height shall not exceed 24 inches for self-propelled vibratory drum or backhoe-operated hydraulic compactors. Smaller lift heights shall be provided as necessary to achieve the degree of compaction specified.

Unless specified otherwise in the **SPECIAL PROVISIONS**, backfill material beneath paved areas or future paved areas and within 5 feet of paved areas or future paved areas shall be consolidated as follows: Within 3 feet of the surface 95% of maximum dry density, below 3 feet from the surface to 1 foot above the pipe 90% of maximum dry density, as determined by the modified Proctor Test (ASTM D1557).

Unless otherwise specified in the **SPECIAL PROVISIONS**, backfill material placed in all other areas shall be compacted to the point where no additional consolidation can be observed from the compaction and backfill equipment being used.

Backfill material not meeting the compaction specification shall be recompacted by CONTRACTOR at no cost to OWNER. Cost for additional testing on recompacted material shall be at CONTRACTOR's expense.

5.5 MAINTENANCE OF SURFACE

CONTRACTOR shall maintain all backfilling, resurfacing, repaving, and other surface improvements constructed under this Contract. CONTRACTOR shall, upon proper notice from OWNER, make all repairs in surfaces of trenches and excavations. All expenses incurred by OWNER and/or CONTRACTOR in making repairs and all expenses in maintaining trench and excavation surfaces shall be at the expense of CONTRACTOR regardless of the material used in backfilling trench excavations. OWNER reserves the right to make all emergency repairs necessary to make safe all streets and walks at the expense of CONTRACTOR regardless of the material used in backfilling trench excavations. A maintenance guarantee fund, if specified in the **SPECIAL PROVISIONS**, will be withheld from the final amount due CONTRACTOR for a period of six months after acceptance of the Work to assure such maintenance.

CONTRACTOR shall be responsible for controlling dust dispersion during utility and street construction. Remedial actions required as a result of inadequate dust control shall be CONTRACTOR's responsibility. To control dust, CONTRACTOR shall apply calcium chloride or ammonium lignin sulfonate in 12 to 14% solution. Prior to application of dust palliative, the street shall be graded smooth.

SECTION 6—ROADWAY AND DRAINAGE EXCAVATION, GRADING AND BASE COURSE

6.1 GENERAL

The Work under this section includes all clearing, grubbing, excavation, grading, base course, and other miscellaneous items of Work required for restoration of utility construction Work and for street construction as shown on the Drawings and included in the Specifications.

Unless otherwise specified, all street construction Work shall conform to the KYDOH Specifications as amended herein. Street construction shall mean street, roadway, parking lot, driveway, and similar type construction.

See **SPECIAL PROVISIONS** for availability of water for use in street construction.

6.2 CLEARING AND GRUBBING

In general, allowable tree removals shall be those trees which are necessary to remove for utility and street construction within the right-of-way or easement areas. Actual allowable tree removals will be determined in the field by ENGINEER. All trees and brush outside the right-of-way or easement areas shall be protected by CONTRACTOR, unless otherwise allowed by ENGINEER.

For utility construction, trees and brush to be removed outside the immediate trench area shall be cut flush with the ground surface or pushed over for all brush and for all trees 12-inch Diameter Breast Height (DBH) or less measured 4.5 feet aboveground. Trees in excess of 12-inch DBH shall be cut to within 6 inches of the ground surface. A basal application of herbicide shall be applied to all remaining stumps to prevent the development of suckers. Trees that are pushed over shall have their stumps removed and disposed of off-site.

Trees and brush, including stumps, within the trench area and within areas of street, sidewalk, bike path, and driveway construction shall be removed from the site and disposed of.

6.3 COMMON EXCAVATION

All street excavation shall be performed as called for in Section 204 of the KYDOH Specifications and as herein modified.

The following items of Work shall be included in common excavation:

- a. The excavation to subgrade elevations as detailed in the Drawings including road bed areas, terraces, sidewalks, bike paths, driveways, and other miscellaneous surface improvements.
- b. Removal (and stockpiling, if the use of salvaged topsoil is required) of topsoil from all cut areas and fill areas within a 1:1 slope of finished street, sidewalks, bike paths, driveways, and other miscellaneous surface improvements.
- c. The preparation, grading, compaction, and proof-rolling of subgrade areas for roadbed, sidewalks, bike paths, driveways, and other miscellaneous surface improvements to the elevations detailed on the Drawings.
- d. Excavation and grading required to realign and/or create ditch lines and drainage ways to route drainage to or from storm facilities as shown on the Drawings, or as necessary to maintain positive drainage.
- e. Removal of temporary backfill placed in new utility trenches above the subgrade.
- f. The removal and disposal of all undesirable and surplus materials.

Common excavation may be completed as part of utility construction prior to initiating general street excavation activities.

All subgrade areas in streets and parking lots, including utility trench restoration areas, shall be proof-rolled with a heavily loaded triaxle dump truck or other similar equipment requested by ENGINEER prior to the placement of any fill materials or base course. ENGINEER must be present during proof-rolling to review the Work necessary for the stabilization of any unstable areas identified.

Saw cuts shall be made in existing pavement, driveways, curb and gutter, and sidewalks to allow restoration to neat straight lines. Saw cuts damaged during construction shall be recut prior to beginning restoration.

6.4 ROCK EXCAVATION, STREETS

Rock excavation for streets shall include removal of rock to subgrade elevations. Rock for excavation purposes shall be as defined in the Rock Excavation, Utilities section. Such rock shall be classified as undesirable backfill and disposed of in accordance with the Excavation to Grade section.

6.5 BORROW EXCAVATION

CONTRACTOR shall salvage suitable materials from utility and street construction activities to provide fill for street construction. Where sufficient quantities of materials suitable for street construction are not

available from areas of the site, CONTRACTOR shall perform borrow excavation to make up the deficit in accordance with Section 205 of the KYDOH Specifications.

6.6 EXCAVATION BELOW SUBGRADE

ENGINEER may request the excavation of unsuitable materials in areas of unstable subgrade. The excavation of such materials, except in areas where CONTRACTOR has completed utility construction or placed street fill, shall be measured by ENGINEER for payment.

The excavation and replacement of unstable utility trench backfill and/or street fill placed by CONTRACTOR shall be at CONTRACTOR's expense.

Base course placed on unstable foundation shall be removed and replaced at CONTRACTOR's cost following excavation of the affected area.

Where requested by ENGINEER in the field, excavation below subgrade areas shall be lined with geotextile material and backfilled with Size No. 2 crushed stone base course as specified herein.

6.7 GEOTEXTILES

Geotextile shall be placed as requested by ENGINEER to stabilize street subgrade areas. Construction fabric shall be Mirafi 600X, Propex 2006, or equal. Any alternate fabric must have ENGINEER's approval prior to use. Construction fabric shall be installed in accordance with the manufacturer's recommendations. Vibratory compaction shall not be used in the compaction of base course in areas where construction fabrics are used.

6.8 PREPARATION OF FOUNDATION

The subgrade shall be graded and rolled to provide uniform density and shall comply with the profile and cross sections contained in the Drawings. All Work shall comply with Section 207 of the KYDOH Specifications.

6.9 CRUSHED AGGREGATE BASE COURSE

Crushed aggregate base course shall consist of crushed stone or crushed gravel and be furnished in accordance with Section 302 of the KYDOH Specifications. Crushed aggregate base course shall be placed directly on subgrade areas or on top of salvaged asphaltic millings. CONTRACTOR shall supply ENGINEER with a current sieve analysis of the material prior to use. The material furnished shall be uniformly graded and shall conform to ASTM C33.

For street construction, base course shall be placed to the thickness shown on the standard sections. Where standard sections are not provided, a minimum of 9 inches of base course shall be provided. Base course thickness for utility trench patches in street areas shall match existing base course thickness with 12 inch minimum. The top 3 inches of base course shall be DGA. The remaining base course shall be Size No. 2. Base course shall be wetted and rolled with a self-propelled hydrostatic-drive vibratory roller. Unless otherwise requested by ENGINEER in the field, excavation below subgrade backfill shall be Size No. 2.

The finished new base course shall be fine-graded, rolled, and compacted in preparation for placement of new pavement. CONTRACTOR shall maintain the finished surface until pavement is placed.

6.10 SALVAGED ASPHALT PAVEMENT BASE

Where required on the Drawings or in the **SPECIAL PROVISIONS**, CONTRACTOR shall salvage existing asphaltic pavement for use as base course for street construction and/or restoration. Work shall be completed in accordance with Section 408 and 409 of the KYDOH Specifications as amended herein.

Pulverized asphalt millings shall consist of asphalt pavement that has been pulverized in place to the full depth of existing pavement. Pulverized millings shall be graded and compacted to the grades established by ENGINEER prior to placement of new asphaltic pavement. Ninety-five percent (95%) of pulverized millings shall pass a 1 1/4-inch screen with all material less than 4 inches in its longest dimension.

Salvaged asphalt millings shall consist of asphalt pavement that has been milled and transported for use as base course for street construction and/or restoration. Ninety-five percent (95%) of salvaged millings shall pass a 1 1/4-inch screen with all material less than 4 inches in its longest dimension.

SECTION 7—CONCRETE CURB AND GUTTER, SIDEWALK, AND PAVEMENT

7.1 GENERAL

The Work under this division includes the construction or reconstruction of all concrete improvements required for utility or street construction as shown on the Drawings and as specified. CONTRACTOR shall schedule its Work to comply with the Traffic Control section of Division 1.

Unless otherwise specified, all street construction Work shall conform to the KYDOH Specifications as amended herein.

7.2 CONCRETE

All concrete shall conform to the requirements as called for in Section 601 of the KYDOH Specifications, unless otherwise specified. All concrete shall be normal set air-entrained concrete with water reducing agent, Grade A-WR with Type IA cement capable of producing a minimum compressive strength of 3,000 psi in 10 days.

As soon after finishing operations as the free water has disappeared, the concrete surface shall be sealed by spraying on it a uniform coating of curing material to provide a continuous water impermeable film on the entire concrete surface.

Liquid curing compounds shall conform to the requirements of AASHTO Designation M148, Type 2, White Pigmented.

The material shall be applied to form a uniform coverage at the rate of not less than 1/2 gallon per 100 square feet of surface area.

Within 30 minutes after the forms have been removed, the edges of the concrete shall be coated with the curing compound, applied at the same rate as on the finished surface.

CONTRACTOR shall erect and maintain suitable barricades to protect the new concrete. Where it is necessary to provide for pedestrian traffic, CONTRACTOR shall construct adequate crossings. Crossing construction shall be such that no load is transmitted to the new concrete.

Any part of the Work damaged or vandalized prior to final acceptance shall be repaired or replaced at the expense of CONTRACTOR.

Pedestrian traffic shall not be permitted over new concrete prior to 72 hours after application of curing material. Vehicular traffic shall not be permitted over newly placed concrete until a minimum compressive strength of 3,000 psi has been achieved.

When the atmospheric temperature exceeds 80°F during concrete placement, ACI 305.1 shall apply in addition to all other sections of the Specifications.

Cold weather concreting shall conform to the requirements of ACI 306.1 and all other sections of the Specifications. Cold weather is defined as a period when, for more than 3 successive days, the average daily temperature drops below 40°F. The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight. When temperatures above 50°F occur during more than half of any 24-hour period, the period will no longer be regarded as cold weather.

The temperature of the delivered concrete shall not exceed 85°F.

Care shall be exercised to keep mixing time and elapse time between mixing and placement at a minimum. Ready-mix trucks shall be dispatched in a timely manner to avoid delay in concrete placement, and the Work shall be organized to use the concrete promptly after arrival at the jobsite.

The subgrade, forms, and reinforcing shall be sprinkled with cool water just prior to placement of concrete. Prior to placing concrete, there shall be no standing water or puddles on the subgrade.

If approved by ENGINEER, an admixture for retarding the setting of the concrete may be used.

Concrete shall be thoroughly tamped to remove all voids. The exposed surface shall be thoroughly troweled and finished with a brush at right angles to vehicular or pedestrian traffic. All edges shall be rounded with a 1/4-inch-radius edger. Honeycombed areas shall be pointed and rubbed with mortar to provide a void-free surface.

Before final finishing, a 10-foot straight edge shall be used to check the surface. Any areas showing a variation of more than 1/4 inch from the straight edge shall be corrected. Final finishing shall be delayed a sufficient time so that excess water and grout will not be brought to the surface.

7.3 CURB AND GUTTER

Curb and gutter where required for street construction, site Work construction, or for restoration of utility construction shall be placed using forms or a machine to the dimensions and shape shown. Where curb and gutter details are not provided, curb and gutter shape and dimensions shall match existing adjacent curb and gutter. The base course beneath the curb and gutter shall be trimmed or filled as necessary to provide a full depth of curb and gutter as shown on the Detail Drawings. In the absence of Detail Drawings, depth shall be to the adjacent street subgrade with a minimum 4 inches. Prior to placement of concrete, the base shall be thoroughly compacted and moistened.

Where forms are used, they shall be of metal and of sufficient strength to resist distortion or displacement. Forms shall be full depth of the Work. Facing boards, if used, shall be built to obtain the cross section called for on the Detail Drawings. Forms shall be securely staked and held firmly to line and grade. Forms shall be cleaned thoroughly and oiled before reuse.

All curved curb and gutter shall form smooth curves and shall not be a series of chords. Radius forms shall be used for all curved curb and gutter where the radius of curvature is 100 linear feet or less.

Driveway openings in the curb line will be staked by ENGINEER in the field. The details for concrete gutter sections through a driveway are shown on the Detail Drawings.

A 3/4-inch expansion joint filler shall be placed through the curb and gutter at the radius points of all intersection curbs at storm inlets and at a maximum interval of 100 feet. This expansion joint filler shall extend through the entire thickness of concrete and shall be perpendicular to the surface and at right angles to the line of the curb and gutter.

At intervals of not more than 10 feet, a contraction joint shall be tooled to a depth of one-fifth of the total concrete thickness with a 1/4-inch-radius jointer. The contraction joint shall be at right angles to the line of the curb and gutter.

If machine-formed curb and gutter is placed by CONTRACTOR, CONTRACTOR shall create a plane of weakness at all joints that is sufficient to cause contraction cracking at the joints.

CONTRACTOR may saw contraction joints. The depth of cut shall be a minimum of one-fifth of the total concrete thickness. Sawing shall be done as soon as practicable after the concrete has set sufficiently to preclude raveling during the sawing and before any shrinkage cracking takes place in the concrete. If this results in random cracking, CONTRACTOR will be required to tool the contraction joints as specified above.

Steel separator plates of a section conforming to the curb and gutter as shown on the Detail Drawings shall be placed directly opposite all contraction joints in abutting street pavement. After separator plates have been removed, the edges of the joints shall be rounded with a 1/4-inch-radius edge. The use of steel separator plates at other locations will not be allowed.

7.4 CONCRETE SIDEWALK AND DRIVEWAYS

Concrete sidewalk and driveway construction required for a street or site work construction or for restoration of utility construction shall be placed using forms or machines to the dimensions and thicknesses shown. Where details are not provided match existing, but sidewalks shall be no less than 5 inches thick and driveways shall be no less than 7 inches thick.

The subgrade shall be thoroughly compacted and finished to a trim, firm surface. All soft or unsuitable material shall be removed and replaced with suitable material.

A minimum 4-inch-thick layer of sand, sand and gravel, or base course shall be placed under all sidewalks and driveways. This material shall be thoroughly moistened and compacted before the concrete is placed.

Where forms are used, they shall be of metal or wood and shall be of sufficient strength to resist distortion or displacement. They shall be full depth of the Work and shall be securely staked to hold the required line and grade. Where machines are used, concrete mixture shall be controlled to prevent distortion from sloughing.

Concrete sidewalk shall be segmented into 5-foot-long rectangular blocks with tooled joints. Concrete driveways shall be segmented into uniform rectangular blocks with tooled joints at a maximum spacing of 10 feet in each direction. The joint must extend at least one-fifth of the total thickness of concrete. The edges of the sidewalk along forms and joints shall be rounded with an edging tool of 1/4-inch radius. All joints shall be at right angles to the centerline of the sidewalk.

A 1/2-inch-thick asphaltic expansion joint filler shall be placed at sidewalk-driveway intersections, at sidewalk-sidewalk intersections, at the intersection with new or existing curb and gutter, around all castings, and at maximum 40-foot intervals in sidewalks.

Sidewalk cross slope shall be 1/4-inch per foot unless otherwise noted in the Drawings or requested by ENGINEER. Handicap ramps shall have a maximum slope of 1:12 and be provided with a truncated dome patterned surface meeting ADA requirements.

SECTION 8--ASPHALTIC PAVING

8.1 GENERAL

The Work under this division includes asphaltic concrete pavement and other miscellaneous items and Work required for utility or street construction as shown on the Drawings and included in the Specifications for paving.

Unless otherwise specified, all paving shall conform to the KYDOH Specifications as amended by these Specifications and by the **SPECIAL PROVISIONS**.

ENGINEER may request samples of asphaltic concrete for testing. CONTRACTOR shall cut samples from the finished pavement where requested by ENGINEER and patch the sample area. Samples for sieve analysis and asphalt content will be taken by ENGINEER prior to placement.

8.2 ADJUSTING CASTINGS

Where surface course paving is completed in the following construction season, castings shall initially be set to the finished lower course grade before lower course is placed. Where upper course paving and lower course paving are completed in the same construction season, castings shall be adjusted to final grade prior to paving.

Where adjustments are required, they shall not be made more than 48 hours prior to the anticipated time of paving. CONTRACTOR shall furnish Class 1 barricades with flashers on all adjusted castings until paving has been completed.

Internal chimney seals, where required, shall be installed after castings have been adjusted to finished grade.

Valve boxes shall be adjusted by turning the box. The valve box shall be seated on the adjusting threads to prevent future settlement. The box shall be adjusted to conform to the finished pavement and shall be plumb to allow valve operation. OWNER shall be contacted by CONTRACTOR to check operation of valve after box adjustment and prior to paving.

8.3 ASPHALTIC CONCRETE PAVING

This Work shall include the construction of asphaltic concrete surface course for areas to be paved including utility trench restoration and new street construction. All Work shall be performed in accordance with Section 403 of the KYDOH Specifications and as modified by **SPECIAL PROVISIONS**.

Asphaltic concrete pavement shall be ESAL Class 2.

Asphaltic binder for intermediate course and surface course shall be PG 64-22 per Section 806 unless specified otherwise in the **SPECIAL PROVISIONS**.

Aggregate shall comply with Sections 804 and 805.

Prior to the commencement of paving, mix designs and aggregate sieve analysis shall be submitted to ENGINEER.

The pavement structure for street areas and driveways shall be in accordance with the standard sections. Where standard sections are not provided, the minimum pavement structure shall consist of 2 1/4 inches of asphaltic concrete intermediate course material and 1 3/4 inches of asphaltic concrete surface course for street and parking lot construction and 2 1/2 inches of surface course material for bike paths, sidewalks, and asphalt driveways. Pavement thickness for trench restoration shall match adjacent pavement thickness or minimum thickness as specified for street construction, whichever is greater.

8.4 TACK COAT

Unless otherwise specified in the **SPECIAL PROVISIONS** or shown on the Drawings, CONTRACTOR shall provide tack coat between all layers of new asphalt and on existing pavement to be overlaid with new asphalt. Tack coat shall meet the requirements of Section 406 of the KYDOH Specifications.

8.5 PAVEMENT STRIPING

Where required on the Drawings or in the **SPECIAL PROVISIONS**, CONTRACTOR shall provide painted pavement markings.

Two-way traffic shall be maintained at all times.

Centerline marking shall be double 4-inch solid yellow line, placed at the marked centerline.

Traffic lane marking shall be single 4-inch broken white line, placed 12 feet from median curb flange or as shown or requested by ENGINEER. Turning lane markings and crosswalk markings shall be 8 inches and 6 inches solid white, respectively. Stop bars shall be 18 inches solid white.

All markings shall be applied in accordance with Sections 713 and 842 of the KYDOH Specifications and the Manual on Uniform Traffic Control Devices.

Markings shall be placed at locations noted within 1-inch tolerance.

SECTION 9—RESTORATION AND SITE WORK

9.1 SCOPE

The Work under this portion of the Contract includes finished grading, seeding, sodding, miscellaneous restoration, and other miscellaneous items of Work outside of the areas to be paved.

CONTRACTOR shall proceed with restoration of property and cleanup of all disturbed areas concurrently with the installation of utilities and street construction.

Where restoration is included as a portion of a Bid item, the estimated cost of restoration and cleanup, up to a maximum of 15% of each Bid item, may be withheld until final cleanup of the Work in each Bid item.

Unless otherwise specified, all restoration Work shall conform to the KYDOH Specifications and the **SPECIAL PROVISIONS**.

See **SPECIAL PROVISIONS** for availability of water for use in restoration and site Work.

9.2 SEEDING AND SODDING

Seeding and sodding shall be completed in all areas disturbed by construction other than areas with finished gravel, brick, asphalt, concrete, or decorative landscape treatments.

9.2.1 SEED RESTORATION

Unless otherwise shown on the Drawings or specified in the **SPECIAL PROVISIONS**, all areas disturbed by construction shall be restored with seed restoration. Prior to seeding, disturbed areas shall be graded to subgrade for placement of topsoil.

Topsoil shall consist of salvaged topsoil or hauled-in topsoil provided and placed in accordance with Sections 212 and 827 of the KYDOH Specifications. Topsoil shall be placed to a uniform depth of 6 inches in place.

All areas requiring terrace restoration that do not require sod restoration shall be restored by seed restoration. Seed restoration shall consist of placing and grading topsoil, seeding, fertilizing, and mulching.

Seed materials and placement shall conform to Sections 212 and 827 of the KYDOH Specifications unless otherwise requested by ENGINEER. CONTRACTOR shall not be responsible for watering. Fertilizer shall conform to Sections 212 and 827. Mulching shall conform to Sections 213 and 827 for straw mulch.

9.2.2 SOD RESTORATION

Specific areas to be restored with sod shall be shown on the Drawings or specified in the **SPECIAL PROVISIONS**. Sod restoration shall be completed in accordance with the following: Prior to placement of sod, finish grading shall be completed. Finish grading shall consist of placing topsoil to the edge of hard-surfaced areas or to limits established by ENGINEER.

Topsoil shall be of humus-bearing soil, adapted to the sustenance of plant life and commonly known as black dirt, and shall be free of stones, debris, vegetable material, and excesses of peat, sand, or clay. Unless otherwise specified, topsoil shall be placed 4 inches thick and shall be graded and raked. Finished top soiled areas shall be free of stones, road material, or lumps of dirt. The soil in the area to be sodded shall be loosened and brought to a reasonably fine granular texture to a depth of not less than about 1 inch.

A 15-30-15 fertilizer shall be spread uniformly over the areas at the rate of 17 pounds per 1,000 square feet of area unless otherwise specified in the Contract. Fertilizer shall be worked into the soil prior to placing sod.

Sod shall consist of a dense, well-rooted growth of permanent and desirable grasses, indigenous to the general locality where it is to be used, and shall be practically free from weeds or undesirable grasses. At the time the sod is cut, the grass on the sod shall have a length of approximately 2 inches (if longer, the grass shall be cut to approximately this length), and the sod shall have been raked free from debris.

The sod shall be cut in uniform strips approximately 18 inches by 36 inches but no longer than is convenient for handling and transporting.

The thickness of the sod shall be as uniform as possible, approximately 1 1/2 inches or more, depending on the nature of the sod, so that almost all of the dense root system of the grasses will be retained, but exposed, in the sod strip and so that the sod can be handled without undue tearing or breaking.

Sod shall be laid so that the joints caused by abutting ends of sod strips are not continuous. Each sod strip shall be so laid as to abut snugly against the strip previously laid.

As the sod is being laid, it shall be rolled or firmly but lightly tamped with suitable wooden or metal tampers to set or press the sod into the underlying soil.

At points where water will flow over a sodded area, the upper edges of the sod strips shall be turned into the soil below the adjacent area and a layer of earth placed over this juncture, which earth shall be thoroughly compacted to conduct the surface water over the upper edge of the sod.

At the limits of sodded areas, wherever practical or feasible, the end strips shall be placed to effect a broken line, and ends of the strips shall be turned in and treated as above described.

All sodded areas shall be kept thoroughly moist until the sod is established. Sod that dies during correction period shall be replaced at no cost to OWNER.

9.3 MISCELLANEOUS RESTORATION

CONTRACTOR shall be responsible for the proper replacement of all damaged street and highway signs and markers at all times during construction. Repair or replacement of signs shall be subject to review of ENGINEER and applicable local, state, and federal highway departments before final acceptance of the Work.

CONTRACTOR shall restore all culverts removed, damaged, or disturbed during construction to their original condition or they shall be replaced. Mailboxes shall be restored to their original locations and height. Light poles and power poles shall be restored to their original location. Underground improvements, such as water main, gas main, telephone or electric lines or drain tiles shall be restored to original condition. At all locations where utilities cross, compacted backfill shall be used from the bottom of the excavation to the top of the highest conduit. All street improvements, fences, walkways, and home and yard improvements, if destroyed, damaged, or removed shall be replaced to original condition or better.

Where construction interrupts existing private or public sewer and water systems, it shall be CONTRACTOR's responsibility to maintain these systems or provide alternative means until the new system is placed in operation or until final acceptance of the Work, whichever occurs first. No bypassing of untreated wastewater will be allowed.

9.4 RETAINING WALLS

9.4.1 BOULDER WALLS

In areas as generally shown on the Drawings and as specifically noted in the field by ENGINEER, CONTRACTOR shall construct boulder walls.

The boulders shall be round field stone. The stone shall consist of varying sizes and weights. The minimum weight shall be 250 pounds.

The stone shall be placed randomly. The larger stone shall be placed at the bottom; minimum 12 inches deep into the soil. The minimum batter shall be 3 inches in one vertical foot unless otherwise allowed by ENGINEER. Geotextile fabric shall be installed behind the wall to prevent the backfill from eroding through the joints and courses. Backfill shall meet the requirements of the Backfilling section. The layout of the wall shall be reviewed by ENGINEER prior to construction of the wall. A suitable foundation shall be provided to preclude settlement. The wall may be constructed in conjunction with the new embankment. Chinking shall be provided to secure stability of the stones.

9.4.2 CUT BLOCK MODULAR RETAINING WALL

This Work includes construction of interlocking modular concrete retaining wall units and accessories at locations shown on the Drawings and as requested by ENGINEER in the field.

Modular wall units shall be constructed in accordance with ASTM C90, ASTM C140, ASTM D2339, and ASTM D4475.

Masonry units, when delivered to the site, shall be thoroughly cured and shall be dry. When stored on the site, they shall not be in contact with the ground and shall be kept clean.

CONTRACTOR shall submit gradation of base leveling pad material and unit fill material as well as color samples for OWNER's selection.

CONTRACTOR shall provide design calculations verifying the proposed design satisfies the design parameters as shown on the Drawings and as required herein.

Masonry units shall be Keystone Retaining Units, or equal, as manufactured in accordance with ASTM C90 and ASTM C140.

Masonry units shall have a minimum 28-day compressive strength of 3,000 psi. The concrete shall have a maximum moisture absorption of 8%.

Standard units shall be classic straight split face, 8 inches high by 18 inches wide. Top row of units shall have a smooth face. Color of units will be selected by OWNER from manufacturer's standard color selections. A concrete wall cap/sidewalk will be constructed on top of the wall.

Units shall be interlocked with noncorrosive fiberglass pins.

Connecting pins shall be 1/2-inch-diameter thermoset isophthalic polyester resin-pultruded fiberglass reinforcement rods.

Pins shall have a minimum flexural strength of 128,000 psi and short beam shear of 6,400 pounds per ASTM D4475.

Construction adhesive shall be Keystone Kapseal, or equal, and shall meet requirements of ASTM D2339.

Base leveling pad material shall be 6 inches of compacted crushed stone, 3/8 inches to 3/4 inches. Pea gravel shall not be allowed.

Unit fill shall be free-draining, well-graded crushed stone, 3/8 inches to 3/4 inches, with no more than 5% passing the No. 200 sieve. Masonry unit voids shall be capable of accepting a railing post diameter of up to 3 inches. Nonshrink grout shall be used in voids accepting railing posts.

All walls shall be designed for a surcharge of 250 psf and a railing load of 50 plf in addition to the loads imposed by the retained material. The engineered design shall be in accordance with the AASHTO Standard Specifications for Highway Bridges, Section 5.8.

Foundation soil shall be excavated as required for leveling pad dimensions shown on the Drawings.

Subgrade shall be approved by the Project Soils Engineer to confirm that the actual foundation soil conditions meet or exceed assumed design strength. Soils not meeting required strength shall be removed and replaced with acceptable material.

Leveling pad materials shall be placed as shown on the Drawings to a minimum thickness of 6 inches and shall extend laterally a minimum of 6 inches in front of and behind the modular wall.

Materials shall be compacted to provide a level surface on which to place the first course of units. Compaction shall be to 95% of standard proctor for sand or gravel type materials. For crushed rock, material shall be densely compacted.

Leveling pad shall be prepared to ensure complete contact of retaining wall unit with base.

Units shall be installed to conform to elevations shown on the Drawings or as staked in the field to match existing grade.

The first course of concrete wall units shall be placed on the base leveling pad. The units shall be checked for level and alignment. Bottom of wall shall be minimum 12 inches below finished grade.

Units shall be placed side by side for full length of wall alignment. Alignment may be done by a string line or offset from base line.

Units shall be interlocked with fiberglass pins. Pins shall protrude into adjoining courses above a minimum of 1 inch. Two pins required per unit.

All voids inside and between units and drainage zone behind units shall be filled with tamped unit fill material. Automated compaction equipment shall not be used directly over the units. Walk-behind mechanical compaction equipment may be used to compact soils that are placed beyond the drainage zone behind the unit. Mobile mechanical compaction equipment shall not be used within 5 feet of the wall face.

While placing material behind first course of units, the passive soil wedge at the front of these units shall be placed.

All excess material from top of units shall be cleaned prior to installing the next course. Each course is to be completely filled, backfilled, and compacted prior to proceeding to next course.

A permanent mechanical connection of cap units to wall units shall be provided with construction adhesive.

9.4.3 STRUCTURAL GEOGRID

Geogrid shall be a product with a regular grid structure of a select high density polyethylene or polypropylene resin, UX1500MSE, as manufactured by Tensar Corporation, or equal.

Minimum allowable junction strength of the geogrid, per G.R.I.–GG2, shall be equal to or greater than 90% of the ultimate strength of the geogrid, as per G.R.I.–GG1.

The geogrid soil reinforcement shall be laid horizontally on compacted backfill. Place the next course of modular concrete facing units over geogrid. The geogrid shall be pulled taut and anchored prior to backfill placement on the geogrid.

Geogrid reinforcement shall be continuous throughout their embedment length(s). Spliced connections between shorter pieces of geogrid will not be allowed.

9.5 PLANTINGS

Plantings shall be provided as shown on the Drawings or as otherwise specified in the **SPECIAL PROVISIONS**. Plants should be planted on the day of delivery. If this is not possible, protect the stock not planted. Plant material shall be kept in the shade, well-protected with soil, wet moss or other acceptable material and shall be well-watered. Plants shall not be bound with wire or rope at any time to avoid damaging the bark or breaking branches.

Plants shall be lifted and handled from the bottom of the ball only. Plants moved with a ball will not be accepted if the ball is cracked, loose, or broken before or during the planting operations.

Fertilizer shall be delivered to site in original, unopened containers, each bearing manufacturer's guaranteed analysis. Packaged materials shall be stored off ground and protected from moisture.

CONTRACTOR shall coordinate planting Work with installation of sod and the construction of other site features.

CONTRACTOR shall take precautions to ensure that equipment and vehicles do not disturb or damage existing site grading, walks, drives, utilities, plants, etc., and shall replace and/or return to original condition any damage caused by CONTRACTOR's negligence at no cost to OWNER.

CONTRACTOR shall maintain plantings immediately upon installation of plants and continue until acceptance, including watering, weeding, removal of dead material, resetting of plants to proper grade and plumb position, and other necessary operations.

Plants shall be alive and in good, healthy, and flourishing condition of growth at the end of the correction period.

Any plant installed under this Contract that is dead or not in a vigorous, thriving condition shall be removed from the site and replaced at CONTRACTOR's cost as soon as conditions permit during the normal planting season. In case of any questions regarding the condition of a rejected plant, CONTRACTOR may elect to allow such plant to remain through another complete growing season. If at that time, the rejected plant is found to be dead or in an unhealthy or badly impaired condition, it shall be replaced. One replacement after acceptance shall constitute fulfillment of CONTRACTOR's guarantee for the particular plant replaced. All replacements shall be plants of the same kind and size as specified originally. CONTRACTOR shall make all necessary repairs required because of plant replacements. Such repairs shall be done at no extra cost to OWNER. Plants shall be replaced, mulched, wrapped, fertilized, pruned, and restored to original condition at no extra cost to OWNER.

Plant names shall conform to those given in *Standardized Plant Names*, 1942 Edition, American Joint Committee on Horticultural Nomenclature. All plants shall be true to name and legibly tagged as to name and size. Federal or other governmental certificates of inspection shall accompany all shipments as required.

Plant materials, methods, etc. shall conform to the latest edition of ANSI Z60.1.

CONTRACTOR shall have investigated the sources of supply and shall be satisfied that CONTRACTOR can supply the listed plants in the size, variety and quality specified before submitting a Bid. Failure to do so will not relieve CONTRACTOR of the responsibility for furnishing and installing all plant materials in strict accordance with the Contract Documents.

All material shall be the highest quality. Plants shall have typical growth habit for their species. Plants shall be sound, healthy, vigorous, and free from insect pests, plant diseases, and injury. One-sided plants and plants taken from tightly planted nursery rows will be rejected.

All plants shall equal or exceed measurements specified, measured before pruning with branches in normal position. Height and spread refers to main body of plant and not from tip to tip of branches and roots. Trees shall have a well-defined central leader.

Soil excavated from plant pits that is similar in nature to topsoil and is determined to be suitable for planting soil shall be thoroughly mixed with one part of peat to five parts of existing soil. Very poor soils of clay, gumbo, gravel, hard-pan, or other soils injurious to plants shall not be used.

If quantity of soil excavated from planting pits is not adequate for planting, CONTRACTOR shall furnish imported planting soil consisting of partially decomposed vegetable matter of natural occurrence. Such soil shall be black, clean, low in content of mineral or woody material, mildly acidic, fertile and friable. This soil shall be mixed with one part of peat to five parts of soil. Peat shall be a domestic product consisting of partially decomposed vegetable matter of natural occurrence-black, clean, granulated, or shredded.

Fertilizer shall be equal to Milorganite (6-2-0), Louisville Green (5-3-0), or equal uniform in composition and free-flowing. Fertilizer which becomes caked or otherwise damaged making it unsuitable for use will not be accepted. Rate of application shall be as recommended by nursery.

Wood mulch shall be shredded hardwood bark of local origin, similar in physical composition to shredded mulches sold under the brand names of Montaho, Pay-Gro, or equal.

Mulches shall be a minimum of 4 inches thick.

Deciduous trees and shrubs shall be planted from November 1 to April 1. All trees and shrubs shall be planted so as to provide the maximum growing time allowable under the Contract Times. At the option and on full responsibility of CONTRACTOR, planting operations may be conducted under unseasonable conditions without additional compensation or change to warranty.

CONTRACTOR shall stake out on the ground the location of all plants before excavation is begun, and review layout with OWNER. Plants installed at incorrect locations shall be relocated by CONTRACTOR at no expense to OWNER.

CONTRACTOR shall excavate the plant pit, centered at the location stake, cylindrical in shape with vertical sides and flat or saucer-shaped bottom. Planting soil for backfilling shall be kept separate from excavated subsoil. Pit shall be large enough to provide at least 12 inches of planting soil backfill around and beneath the root system. Where surface or subsurface conditions prevent digging a plant pit to specified dimensions, obtain approval from landscape architect to modify location or pit dimensions.

The root ball shall be centered in the plant pit resting on 12 inches of planting soil well-tamped. The plant hole shall be backfilled with planting soil placed in layers around the root ball. Each layer shall be hand-tamped in place in a manner to avoid injury to roots and ball. When approximately two thirds of

the plant hole has been backfilled, the hole shall be filled with water to allow the soil to settle around the roots. Top of root ball shall be 1 inch above surrounding grade. The cord or wire securing burlap at base of tree shall be cut, with the burlap folded back.

Just prior to inspection for acceptance, CONTRACTOR shall prune all plantings. The amount of pruning will be limited to the minimum necessary to remove dead or injured twigs and branches to compensate for loss of roots as a result of transplanting operations. Pruning shall be done in such a manner as not to change the natural habit or shape of the plant.

CONTRACTOR shall promptly remove any soil, peat or similar material that has been brought onto paved areas by planting operations, keeping those areas clean at all times, and shall remove all debris resulting from planting operations from the site.

Replacement plantings shall match existing plant type, with minimum 4-year nursery growth.

SECTION 10–MISCELLANEOUS REQUIREMENTS

10.1 GRADE STAKES AND PROPERTY STAKES

CONTRACTOR shall furnish and place in position all items necessary to control the horizontal and vertical accuracy of the Work including lasers, batterboards, string lines, plummets and graduated poles.

Where lasers are used, CONTRACTOR shall check the Work against intermediate grade stakes. Prior to initial use of the laser, CONTRACTOR shall set up laser on ground surface and check line and gradient controls. Lasers not functioning properly shall be immediately removed.

If existing property stakes, not within the limits of the trench or street slope limits, are removed or damaged by CONTRACTOR, CONTRACTOR shall bear the cost of replacement. Replacement shall be made by a legal survey performed by a licensed Land Surveyor hired by OWNER. Cost for survey shall be deducted from the Contract Price.

10.2 TESTING PIPELINES

10.2.1 GENERAL

CONTRACTOR shall conduct testing on all new pipe lines as specified below.

Utility installations which fail to meet the test limits shall be repaired in a manner acceptable to ENGINEER. In general, defective pipe installations should be uncovered and relaid, with new pipe if necessary, to repair the defect. Under no circumstances shall defects be sealed from the interior of the pipe, and only where specifically allowed by ENGINEER, shall defects be sealed from the exterior of the pipe.

10.2.2 SANITARY SEWER AIR AND LEAKAGE TESTING

All sanitary sewer gravity mains shall be tested for leakage after installation of laterals and placement of backfill. Leakage testing of thermoplastic sanitary sewer gravity mains shall be conducted in accordance with ASTM F1417. Testing of rigid sanitary sewer mains shall be in accordance with ASTM C828 for clay pipe and ASTM C924 for concrete pipe. CONTRACTOR shall keep a record of all tests performed. These records shall show the individual lengths of main tested and test results.

All sanitary sewer gravity mains in groundwater shall also be tested by measuring the infiltration through the use of a weir installed in the manhole at the downstream end of the sewer being tested. Groundwater shall be at least 2 feet above the crown of the sewer at the upstream end for all such tests.

Sewers 18 inches and larger may be tested for leakage by infiltration or exfiltration in lieu of air testing. If groundwater is 2 feet or more above the sewer, measurements will be taken to determine the rate of infiltration into the sewer. If groundwater is below 2 feet above the sewer, the stretch of sewer shall be plugged at its downstream end and water shall be placed inside the sewer to provide a minimum of 4 feet of head above the upstream end.

Measurements will then be taken to determine the rate of leakage out of the sewer. CONTRACTOR shall furnish all labor and materials necessary for making the tests. The allowable leakage shall be as indicated below for final acceptance.

At the conclusion of construction and before final acceptance of the Work, the downstream end of the sewer will be measured for infiltration. Allowable infiltration shall not exceed 100 gallons/inch of pipe diameter/mile/day for that portion of the Work under groundwater. If infiltration is exceeded, the leak or leaks shall be located and repaired.

CONTRACTOR shall prepare all pipeline for testing and shall furnish all equipment, materials, tools, and labor necessary for performance of the tests. Equipment for the low pressure air test of gravity mains shall be equal in all operational aspects to that as furnished by Cherne Industrial, Inc., or United Survey, Inc.

Air and leakage testing of storm sewers will not be required.

10.2.3 MANHOLE TESTING

If required on the Drawings or in the **SPECIAL PROVISIONS**, sanitary sewer manholes shall be vacuum tested in accordance with ASTM C1244. Pipes entering the manhole shall be plugged and the seal inflated in accordance with manufacturer's recommendations.

Vacuum testing of storm sewer and other manholes will not be required.

10.2.4 TELEVISED INSPECTION

Where specified in the **SPECIAL PROVISIONS**, a color televised survey of installed sanitary sewer shall be provided after air testing to confirm branch locations, verify cleanliness of sewer, and confirm presence or absence of sags or deviations in sewer alignment. Sewers shall be cleaned immediately prior to the survey. The survey shall conform to NASCO PACP standards.

Televised inspection of storm sewers will not be required.

10.2.5 DEFLECTION TESTING

All PVC pipe used for sanitary sewer shall be tested for vertical deflection. Maximum deflection after completion of backfilling shall be 5% of the inside pipe diameter. Testing shall not be started until trench backfill has been in place for 30 days. CONTRACTOR shall keep a record of all tests performed. These records shall show the individual lengths of main tested and test results. Deflection shall be measured by pulling a mandrel with a vertical diameter equal to 95% of the pipe inside diameter through the line, after thoroughly flushing the lines to be tested. The testing device shall be controlled using cables at both the upstream and downstream manholes. The testing device must pass freely through the sewer

without the use of unreasonable force on the control cables. Any line that will not pass the test cylinder will not be accepted until the faulty sections have been removed and replaced and the line retested.

Deflection testing of thermoplastic storm sewer shall be provided in accordance with the above requirements.

10.2.6 WATER MAIN DISINFECTION

CONTRACTOR shall furnish all water and other materials, equipment, and labor necessary to disinfect all new water mains and all existing water mains disturbed by construction. Sampling and testing shall conform to AWWA C651 and Section 4 of 401 KAR 8:150. CONTRACTOR shall coordinate and bear cost for necessary testing by a certified laboratory and shall submit the results to the Environmental and Public Protection Cabinet. Sampling and testing shall be scheduled to complete the Work within the Contract Times. A water main shall not be placed in service until satisfactory test results are obtained. Items of material for testing shall be furnished in the size and quantity necessary to properly complete the test. Interruption or delay of CONTRACTOR's Work progress caused by testing and sampling shall not be cause for extra payment under the Contract nor shall they be cause for extension of Contract Time.

10.2.7 WATER MAIN AND FORCE MAIN TESTING

CONTRACTOR shall conduct hydrostatic pressure tests and leakage tests of all joints in accordance with the requirements of AWWA C600 for iron pipe and AWWA C605 for PVC pipe. During performance of the hydrostatic pressure test, water main shall be subjected to a minimum pressure of at least 50% above normal working pressure with a minimum pressure 125 psi. Force main shall be tested to 200% of normal operating pressure in the main, but to no more than the pressure rating of the pipe. All air shall be removed from the main during testing. This shall be done by flushing, by installing corporations at high points, or by releasing air at valves at high points. Test pumping equipment used shall be centrifugal pumps or other pumping equipment that will not place shock pressures on the main. Power plunger pumps will not be permitted for use on closed pipe systems. Pumps shall be disconnected during test periods.

Prior to conducting the pressure and leakage test, CONTRACTOR shall backfill the trench for its full depth. All bends and special connections to the main shall be adequately blocked and tied prior to the test. Any damage caused to the main or its appurtenances during performance of these tests shall be corrected by CONTRACTOR at its expense.

CONTRACTOR shall keep a record of all tests performed. These records shall show the individual lengths of main tested and test results.

Where connections are made to existing mains, it shall be the responsibility of CONTRACTOR to provide the necessary hydrostatic tests on all new mains installed. This may necessitate, but is not limited to, the installation of temporary valves to isolate the new system from the existing system. All materials, Work, and equipment necessary for this Work shall be furnished by CONTRACTOR at its expense.

All testing of pipelines shall proceed concurrently with installation. CONTRACTOR is advised that it may be advantageous to conduct daily preliminary testing of its Work.

Water from disinfection testing shall not be discharged to a stream, creek, river, storm sewer tributary thereto, or to a navigable water without first neutralizing the chlorine residual in the water and complying with local, state, and federal laws thereto.

10.3 TRAFFIC CONTROL

CONTRACTOR shall conduct its Work to minimize disruption of traffic on the jobsite and on adjacent streets and alleys. Where construction is in an area having only one vehicular access, CONTRACTOR shall conduct its Work to avoid or minimize blockage of such access. Blocking of streets or providing detours shall only be done if allowed in the **SPECIAL PROVISIONS**. Safe access shall be provided at all times for local traffic when CONTRACTOR is not working. CONTRACTOR shall keep local police and fire departments informed as to traffic access status as the Work proceeds.

CONTRACTOR shall furnish and install all necessary flagmen, barricades, signs, warning lights, and appurtenances to provide for safe and convenient control of traffic throughout the Project site. Barricading, signing and flagging shall be accomplished in strict accordance with the Manual on Uniform Traffic Control Devices and the KYDOH Specifications.

10.4 EROSION CONTROL

Where land disturbance activities do not exceed one acre, CONTRACTOR shall maintain site conditions where erosion and pollution are controlled.

Unless otherwise specified in the **SPECIAL PROVISIONS**, CONTRACTOR shall, for land disturbance activities exceeding one acre, develop and implement a Storm Water Erosion and Pollution Control Plan in accordance with conditions of federal and state permits, local ordinances, Best Management Practices, and as required by the Notice of Intent (NOI).

The following certification shall be included in the Storm Water Erosion and Pollution Control Plan, which CONTRACTOR and all subcontractors shall sign:

"I certify under penalty of law that I understand the terms and conditions of the General Pollutant Discharge Elimination System (NPDES) Permit that authorizes the storm water discharges associated with industrial activities from the construction site and as may be detailed in the Contract Documents. I agree to indemnify and hold OWNER harmless from any claims, demands, suits, causes of action, settlements, fines, or judgments and the costs of litigation, including, but not limited to, reasonable attorney's fees and costs of investigation and arising from a condition, obligation or requirement assumed or to be performed by CONTRACTOR for storm water pollution and erosion control."

Where land disturbances exceed one acre, CONTRACTOR shall execute a Notice of Intent (NOI) and send to OWNER and the Kentucky Division of Water, KPDES Branch.

Such controls as identified in the Storm Water Erosion and Pollution Control Plan shall be installed prior to disturbing any soil on the site. CONTRACTOR shall construct, maintain, and remove the erosion and pollution controls in accordance with the plan.

CONTRACTOR shall provide a "qualified" inspector to inspect erosion control and pollution controls. Inspector shall have prior experience with erosion and pollution controls and have knowledge of installation and maintenance of erosion and pollution controls as described by the Best Management Practices. Inspector shall be identified in the erosion and pollution control plan. In accordance with the General Pollution Elimination Systems General Permit conditions, the Project site erosion control inspection shall be every seven days and after each 1/2 inch rainfall or greater. CONTRACTOR shall maintain hard copies of the inspection report with Storm Water Erosion and Pollution Control Plan for the duration of the Project.

CONTRACTOR shall respond within 24 hours to all corrective measures noted on the inspection report to address pollution issues. CONTRACTOR shall submit to OWNER a written notice stating the times, dates and actions taken to rectify the defective pollution and erosion controls.

CONTRACTOR shall pay any fines or other fees resulting from failure of CONTRACTOR to comply with the permit requirements or failure to provide a permit.

CONTRACTOR shall submit a "Notice of Termination" (NOT) to KDOW at end of the Project.

10.5 MISCELLANEOUS WORK

CONTRACTOR shall provide miscellaneous Work as specified in the **SPECIAL PROVISIONS**.

SECTION 11—MEASUREMENT AND PAYMENT

11.1 GENERAL

Payment for changes in quantities, as shown in the Bid and Contract, shall be made in accordance with the prices bid. No change of grade, alignment or location shall annul or impair the Contract made and entered into relative to said Work. Payment shall be made for the quantities of each Bid item as actually installed. If a price is not provided in the Bid for an item of Work, the Work shall be considered incidental and included in adjacent items of Work.

11.2 UTILITY CONSTRUCTION

Payment for utility construction including water main, storm sewer, sanitary sewer, and force main will be made as listed in the Bid for furnishing all materials, labor, and equipment for the complete installation of the sewers, mains, and appurtenances as shown and specified.

The prices bid shall include the pipe, excavation, dewatering, bedding, laying, jointing, backfilling, paving, restoration, testing, and maintenance of surface, and all other labor and material necessary for complete compliance with these Specifications. Wye and tee branches shall be included in the prices bid for sewer main unless otherwise listed in the Bid proposal form. The cost of all special connections to existing mains and appurtenances shall be included in the prices bid. Unless otherwise shown on the Drawings or specified in the **SPECIAL PROVISIONS**, the prices bid for utility construction shall include the cost of backfilling with existing materials.

11.3 SERVICES, LATERALS, AND RISERS

Water services, standard sewer laterals, and modified sewer laterals, as listed in the Bid, will be paid for in addition to the prices bid for water main and sanitary sewer. The prices bid for services and laterals shall include the entire cost for all labor, tools, bends, couplings and incidentals to install the services and laterals beyond the tap or wye or tee branches as shown and specified. Lengths of services and laterals for payment will be measured along the centerline of the pipe from the center of the main to the end of service. The cost of tunneling under or removing and replacing existing sidewalk and curb and gutter or other existing improvements shall be included in the prices bid. The cost of connecting existing water services to new water services shall be considered incidental to the Work

Risers will be paid for in addition to the prices bid for sanitary sewer main. The prices bid for risers shall be for the installation of risers constructed of ductile iron complete in place as shown on Drawing 01-975-75A. If included in the Bid, lengths of risers for payment will be measured along the centerline of the riser from the center of the main to the top 90° bend. In the prices bid, CONTRACTOR shall include all labor, equipment, and material necessary to install and support the riser column and to

also provide ductile iron pipe from the riser column to the end of the service. If not included in the Bid, risers shall be paid for the same as for sanitary sewer laterals above.

11.4 INLET LEADS

The prices bid for inlet leads shall include the entire cost of all labor, excavations, backfilling, and material necessary for installation of the pipe from the center of the sewer main to the inlet box. The costs of special pipe fittings necessary to make the connections at the sewer main and at the inlet box shall be included in the prices bid.

The depth of service laterals and inlet leads will vary. The prices bid shall be for pipe installed at depths as shown on the Drawings or as requested by ENGINEER.

11.5 MANHOLES

Where manholes are not included in other Bid items, they will be paid for according to the prices bid. The prices bid for manholes shall include the cost of all material, Work, excavation, and backfilling necessary for construction of manholes as shown on the Drawings. Special bedding or pipe adjacent to manholes to standard trench width shall be included in the manhole price. The prices bid shall include the furnishing and installation of casting, steps, adjusting rings, and eccentric cone or flat slab as shown on the Drawings.

Special manholes will be paid for as shown on the Drawings and as listed in the Bid.

11.6 DROP ENTRANCES

Drop entrances to manholes shall be furnished and installed as shown on the Drawings and as specified. No additional payment will be made for drop entrances to manholes. Drop entrances will vary in depth from a minimum of 2 feet to the maximum as indicated on the Drawings.

11.7 STORM SEWER INLETS

The prices bid for inlets shall include the entire cost of all materials, labor, excavation, and backfilling necessary for complete construction of the inlets as shown and as specified. The cost of inlet lead pipe will be paid for under a separate Bid item. The depth of inlet will vary from the minimum shown on Drawing 01-975-41A to the amount specified. The prices bid shall apply for all inlet depths as actually installed. The cost of concrete encasement at the sewer main, where necessary, shall be included in the prices bid for inlets.

11.8 ROCK EXCAVATION, UTILITIES

Rock excavation for utility trenches shall be paid at the price bid. Such price bid may either be per linear foot regardless of trench depth or on a cubic yard basis as measured in place.

Rock excavation shall include the cost of hauling and disposal of excavated rock and furnishing and placing backfill material and will be in addition to the prices bid for utility or street installations and appurtenances thereto.

11.9 SPECIAL BEDDING AND CONCRETE CRADLE

Where ENGINEER determines that unstable soils are present and are not CONTRACTOR's fault, payment for special bedding will be made. The price bid for special bedding shall include excavation for the bedding and furnishing and placing the bedding material.

The price bid for concrete cradle shall include forming, sheeting, excavation, and all materials for installation as shown on the Drawings. Measurement of concrete cradle will be made within the trench width for the depth as shown on the Drawings or requested by ENGINEER.

Special bedding and concrete cradle, where requested, will be paid for in addition to the prices bid for utility installations.

11.10 GRANULAR BACKFILL

The cost of granular backfill shall be included in the prices bid for utility installations and appurtenances where shown on the Drawings or specified. Where requested in the field by ENGINEER, payment will be made based on the prices bid measured in place following compaction. Costs shall include hauling away and disposing of material replaced by the granular backfill. Volume allowed for payment on a unit price basis shall not exceed an average trench width of 8 feet for the depth of fill placed.

Cover material and material placed within the zone of the trench where restoration materials are to be placed, such as topsoil and base course, shall not be included in the quantity measured for hauled-in granular backfill.

11.11 TRENCH SHEETING

Payment will be made only for sheeting required on the Drawings or **SPECIAL PROVISIONS**. The prices bid shall include the entire cost of furnishing all materials and labor for installation of the sheeting.

11.12 DEWATERING

The cost of removal of ground water and surface water shall be included in the prices bid for utility and street construction. No separate payment will be made for dewatering.

11.13 TUNNELING, BORING, JACKING, OR BORING AND JACKING

Payment for placement of casing pipe and carrier pipe inside the casing pipe shall be for the limits as shown on the Drawings and as listed in the Bid. The prices bid shall include the cost for furnishing the casing and carrier pipes, equipment, and labor necessary for installation including jacking pits, sheeting, special Work to install the casing and carrier pipe, backfilling, and restoration of surface improvements. Placement of the carrier pipe inside the casing pipe, including blocking and filling of the annular space, shall also be included in the prices bid.

11.14 EROSION CONTROL

Erosion control shall be paid at the various prices bid, if listed individually, or shall be included in the price bid for erosion control. If not included in the Bid, erosion control shall be considered incidental and included in the price bid for adjacent Work.

11.15 BEDDING DIKE

Bedding dike shall be paid at the prices bid, if listed separately. If not included in the Bid, it shall be considered incidental and included in the price bid for adjacent Work.

11.16 AGGREGATE SLURRY (FLOWABLE) BACKFILL

Aggregate slurry (flowable) backfill shall be paid at the prices bid, if listed separately. If individual Bid items are not provided in the Bid, it shall be considered incidental and included in the price bid for adjacent Work.

11.17 CLEARING AND GRUBBING

Cost for clearing and grubbing as described shall be paid for according to the Bid items included in the Bid. If individual Bid items are not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

11.18 COMMON EXCAVATION

Common excavation shall be included in the price bid for the Work, if listed separately. If individual Bid items are not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

The cost for utility installations within areas where common excavation is to be performed shall not include the cost for common excavation required in this Contract for street construction.

If listed separately, the price bid shall include excavation of materials and placement and compaction of excavated materials, except topsoil, to subgrade elevations. For lump sum bids, CONTRACTOR shall be responsible to make its own computations for common excavation in compiling the price bid. No changes in payment for common excavation will be allowed unless changes in the Work to be completed have been reviewed by ENGINEER. If not on a unit price basis, payment for any such changes shall be determined by calculating the common excavation quantity related to the change in Work and applying a unit price cost based on the lump sum bid and ENGINEER's original estimated common excavation quantity. For CONTRACTOR's information, ENGINEER's estimated quantity for common excavation will be noted in the Bid.

Saw cutting will be paid for according to the price bid, if listed separately. If individual Bid items are not provided, the cost of this Work shall be considered incidental.

11.19 ROCK EXCAVATION, STREETS

Rock excavation for grading of streets or for site work shall be paid at the price bid, and shall include the hauling and disposal of the excavated rock. Such price bid will be on a cubic yard basis as measured in place by cross sectioning the rock before and after its removal.

11.20 BORROW EXCAVATION

Cost for borrow excavation shall be paid for according to the items included in the Bid. If individual Bid items are not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

11.21 EXCAVATION BELOW SUBGRADE

Payment for excavation below subgrade will only be made if excavation below subgrade is reviewed by ENGINEER and only within the limits as requested. Excavation below subgrade shall be measured in place. The price bid for excavation below subgrade shall include all costs to excavate, remove, and dispose of undesirable material.

Cost for providing geotextile beneath excavation below subgrade shall be paid for in accordance with the price bid, if listed separately. If individual Bid items are not provided in the Bid, it shall be considered incidental and included in the price bid for adjacent Work.

11.22 GEOTEXTILES

Geotextile fabrics shall be paid at the prices bid, if listed separately. If individual Bid items are not provided in the Bid, they shall be considered incidental and included in the price bid for adjacent Work.

11.23 BASE COURSE

Payment for crushed aggregate base course shall be made at the price bid and shall include all labor, materials, and Work necessary for complete installation. Payment will be made based on weight tickets provided to ENGINEER within one week of delivery for each truckload of base course.

Fine grading shall be included in the price bid for fine grading, if listed separately. If a Bid price for fine grading is not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

Placement of base course for driveways, sidewalks, and outside the limits of a 1:1 slope from the bottom pavement or curb edge or top of shoulder edge shall not be eligible for payment unless the limits are extended on the typical section.

11.24 SALVAGED ASPHALT PAVEMENT

Cost for placement of salvaged asphalt pavement as base course shall be included in the price bid, if listed separately. This price shall include grading and compaction. Cost for salvaged asphalt milling shall include the cost of milling and transport. If a Bid price is not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

11.25 CONCRETE

The cost for removal of existing concrete pavement, curb and gutter, sidewalk, driveway, and pavement shall be paid for according to the price bid for these items. If a Bid price is not provided in the Bid, the cost for these removals shall be included in the price bid for adjacent utility and street construction Work.

The costs for meeting both cold and hot weather concrete requirements shall be included in the price bid for the Work, if listed separately. If a Bid price is not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

The cost for protecting newly placed concrete from damage will be considered incidental to the Work.

Concrete pavement shall be included in the price bid for the Work, if listed separately. If a Bid price is not provided in the Bid, the cost of this Work shall be considered incidental to adjacent utility and street construction Work.

11.26 CURB AND GUTTER

The prices bid for concrete curb and gutter, if listed separately, shall apply to both straight and curved curb and gutter (outside of median nose areas), to standard and reject curb and gutter, and to driveway sections at driveways and curb ramps (outside of median nose areas). Curb and gutter will be paid for through all inlets. The cost of base preparation, placing and finishing, jointing, tie bars, and utility

markings, shall be included in the price bid for curb and gutter. The cost of curb and gutter placed in median nose areas shall be included in the price bid for median nose, if listed separately. If Bid prices are not provided in the Bid, the cost for these items shall be included in the cost for adjacent utility and street construction Work.

11.27 CONCRETE SIDEWALK AND DRIVEWAYS

Cost for new or replacement concrete sidewalk and driveway, if listed separately, shall be paid for according to the price bid. Price shall include grading, subgrade preparation, base material, placement, finish, and all other items necessary to complete the Work. If a Bid price is not provided in the Bid, the cost for these items shall be included in the price bid for adjacent utility and street construction Work.

11.28 ASPHALTIC CONCRETE PAVING

The cost for adjusting castings for new utility construction shall be considered incidental to the Work.

If existing castings are being replaced as part of the Work, the cost for adjusting the replacement castings shall be included in the price bid for the replacement castings.

Payment for adjusting new manhole castings from the finished intermediate course surface to finished grade and for adjusting existing castings to intermediate course and/or surface course grades shall be in accordance with the prices bid, if listed separately. If a Bid price is not provided in the Bid, the cost for these adjustments shall be included in the price bid for adjacent utility and street construction Work.

Providing and placing asphaltic tack coat material, if listed separately in the Bid shall include all labor, materials, and equipment necessary to provide the tack coat as specified herein. If not included in the Bid, it shall be considered incidental to the Work.

The price bid for new asphaltic concrete intermediate and surface course pavement, if listed separately, will be based on the price bid for the Work. Payment will only be made for the quantities where weight tickets for each truckload have been delivered to ENGINEER within one week of placement. Price bid shall include all materials, labor, and Work necessary for complete, in-place, asphaltic concrete pavement including fine grading and ramps. Asphaltic material will not be paid for as a separate item. The price bid for asphaltic pavement shall include CONTRACTOR's costs for labor, tools, and materials to cut, excavate, and match the new Work to the existing pavement. Where a unit price is not provided, the cost for paving shall be considered incidental to the Work.

11.29 PAVEMENT STRIPING

Pavement striping, if listed separately in the Bid, shall include all labor, materials, and equipment necessary to provide the markings as specified herein, including traffic control. If not included in the Bid, it shall be considered incidental and included in the price bid for adjacent Work.

11.30 SEEDING AND SODDING

Seeding and sodding (including topsoil), if listed separately, shall be paid for in accordance with the prices bid, which price shall be full compensation for preparing the earth bed including providing, grading, and rolling topsoil; furnishing and placing seed or sod, watering; and for all labor, equipment, tools, and incidentals necessary to complete the Work. Where prices are not provided, the cost for this Work shall be considered incidental to the Work and included in the costs for adjacent utility and street construction Work.

11.31 MISCELLANEOUS RESTORATION

Cost for miscellaneous restoration items shall be paid for according to the prices bid, if listed separately. Where prices are not provided in the Bid, the costs shall be included in the price bid for adjacent utility and street construction Work.

11.32 BOULDER WALLS

Boulder wall will be paid for at the price bid, which price shall be full compensation for furnishing and installing the stone, for selecting the stone, preparation of the foundation, including excavation, backfilling, disposing excess materials, for all labor, tools, and equipment, and transportation necessary to complete the Work. Payment shall include the stone wall face that is buried 12 inches.

11.33 CUT BLOCK MODULAR RETAINING WALLS

Modular retaining wall will be paid for at the price bid, which price shall be full compensation for furnishing and installing the wall; preparation of the foundation, including excavation, backfilling, and disposing excess materials; and for all labor, tools, equipment, and transportation necessary to complete the Work.

11.34 PLANTINGS

Plantings, if listed separately, shall be paid for in accordance with the prices bid. The price bid for plantings shall include all items as specified herein and as shown on the Drawings. Where unit prices are not provided for, they shall be included in the cost for adjacent utility and street construction Work.

11.35 DUST CONTROL

Unless, provided for in the Bid, dust control shall be considered incidental to the Work and included in adjacent or related items of Work.

11.36 SPECIAL ITEMS OF WORK, MATERIAL, AND EQUIPMENT

Payment for special items of Work, material, and equipment will be paid for as specified in the **SPECIAL PROVISIONS**.

11.37 MISCELLANEOUS WORK

Payment for miscellaneous Work will be paid for as specified in the **SPECIAL PROVISIONS**.

SECTION 12–SPECIAL PROVISIONS

The following modifies, expands, or clarifies the Standard Specifications for Utility and Street Construction. Reference is made in this Section 12 to the specific provision of the Standard Specifications being clarified, modified, or expanded. These **SPECIAL PROVISIONS** shall govern whenever there is conflict or discrepancy with the Standard Specifications and the KYDOH Specifications.

12.1 1.2 PIPE

The following pipe materials shall be used on the Project:

Pipe Application	Material
Water Main	Ductile Iron Pressure Class 350
Water Services	Copper or HDPE PE 3408
Piping for Miscellaneous Connections such as to Pressure Gauges	Copper
Fittings for DI Pipe Used in Water Main	Ductile or cast Iron

12.2 1.2.13 HIGH DENSITY POLYETHYLENE PRESSURE (HDPE) PIPE AND FITTINGS

For water services, HDPE pipe may be used in lieu of copper tubing. HDPE pipe shall comply with AWWA C901. Pipe material shall conform to PE 3408. The pipe shall be NSF approved and have a rated working pressure of 200 psi. Stainless steel inserts shall be required at compression joints.

12.3 1.2.18 SURFACE WATER CROSSINGS

Surface water crossings shall be constructed using a bore and jack method with steel casing pipe as noted on the Drawings. The steel casing pipe shall have a minimum of 30 inches of cover (top of pipe to bottom of stream bed) across all surface water channels.

Minor surface water crossings not noted on the Drawings shall be constructed per American Water Standard “Minor Stream Crossing w/ Concrete Encasement” Detail.

All areas disturbed within the floodplain shall be restored as closely as possible to the existing contours. All excess material and debris shall be disposed of outside of the floodplain. Other permit requirements may apply.

12.4 1.3 VALVES

The following valves shall be used on the Project:

Valve Applications	Type
Shutoff Valves in Water Main ≤12 inches	Resilient Wedge Gate Valves
Shutoff Valves in Water Main >12 inches	Butterfly Valves

12.5 1.3.1 GATE VALVES

Valves shall open counterclockwise.

12.6 1.3.6 CORPORATION STOPS, CURB STOPS, AND TAPPING SADDLES

Corporations stops shall be Mueller H-15000 (flair connections), H-15008 (compression connections), or equal. Tapping saddles are required at PVC main installations.

Curb stops shall be Mueller Mark II Oriseal with H-15204 (flair connections), H-15209 (compression connections), or equal. Contractor shall provide all necessary transition fittings to make connections to existing services on the customer side of the curb stop.

12.7 1.13 SPECIAL MATERIALS AND EQUIPMENT

TRACER WIRE—PVC water main shall be provided with No. 12 gauge solid insulated copper tracer wire taped at 5-foot intervals. Wire shall be continuous between and terminate at valve boxes, manholes, and fire hydrants. Any splices shall be soldered and fitted with a Raco, or equal, insulated watertight boot.

AIR RELEASE VALVES—Automatic air release valves shall be installed at locations shown on the Drawings or as indicated below. Automatic air release valves shall be Val-Matic Model 25, APCO, or equal iron body with bronze or stainless steel internals with 1-inch screw connection. Air release valves shall be lever and pin operated, 150 psi working pressure with flanged top plate cover for ease of repair. Valve body shall contain drain and blowoff plugs.

TAPPING SLEEVES AND VALVES—Tapping sleeves shall be A. P. Smith Division of U. S. Pipe or equal, ductile iron, 200 psi working pressure with cadmium plated cast iron nuts and bolts. Provide gaskets for full area of sleeve flanges. Tapping valves shall conform to requirements for gate valves except that one end shall be flanged and the other mechanical joint. Tapping valves shall be provided with oversized openings to permit use of full sized cutters.

WATER METERS AND BOXES—Water meters shall be straight reading, US gallon type, Sensus Technologies Model SR, or equal rated for 150 psi working pressure meeting requirements of AWWA C700. All 5/8-inch by 3/4-inch meters shall be cold water rotating type with hermetically sealed magnetically driven registers with single register, sweep test hand and split case body—bronze bottom with plastic top.

Meters larger than 5/8 inch by 3/4 inch shall be same as above except they shall have all bronze body.

Meter boxes shall be “ultra-rib” boxes Extrusion Technologies, Inc., or equal. They shall be made of PVC material, 18-inch diameter by 2 feet long, with cast iron lids.

Provide Mueller H-15403, or equal compression union for splicing copper.

METER SETTERS—Meter setters for services 1 inch or less shall be copper with plain stop, with appropriate riser. Setters shall be 5/8 inches by 3/4 inches by 7 inches with dual check valves and shall have a 1-inch FML by 1-inch CTS grip. Copper setters shall be Mueller, Ford Model VHH 727W-4F-44G, or equal. Tandem setters with PRVs shall be Mueller, Ford Model TVHH727W-4F-44G, or equal. Custom setters shall be Mueller, Ford, or equal for sizes larger than 1 inch. Where pressure reducing valves are required setter shall accommodate their installation.

SERVICE SADDLES—Saddles for service connections to PVC pipe shall be Dresser Series 194, Ford Model S70 or S90 Series, Mueller, or equal made of bronze or stainless steel.

Saddles for cast iron sized pipe shall be Dresser Industries, Inc. Style 91 or 291, Smith-Blair, Inc. Style 311 or 313, Ford, Mueller, or equal with malleable or ductile iron bodies that extend at least 160 degrees around the circumference of the pipe. Clamps shall have neoprene gaskets cemented to the saddle bodies. Clamps with tap sizes 1 inch and smaller may be single strap design. Clamps with tap sizes larger than 1 inch shall be double strap design.

12.8 2.1 GENERAL

ENGINEER will not assist CONTRACTOR in staking the actual locations of service lines in the field.

12.9 4.4 PIPE LAYING

The minimum length of pipe to be restrained shall be as shown on the following table:

REQUIRED LENGTH OF RESTRAINED PIPE BEYOND FITTING IN FEET

Fitting	Minimum Length-Ft
90 Degree Bend (24 inches)	189
45 Degree Bend (24 inches)	79
22 1/2 Degree Bend (24 inches)	38
11 1/4 Degree Bend (24 inches)	19
Horizontal Offset-Two 45 Degree Bends Separated 10 Feet (24 inches)	152
Vertical Offset-Two 45 Degree Bends Separated 5 Feet (24 inches)	276
End of Line Tees (24 inches)*	322 (Along Branch)
Dead End (24 inches) (for testing purposes)	336

*Restrained run length on tees assumed 18 feet on each side of fitting

12.10 6.1 STREET CONSTRUCTION-GENERAL

The local water utility will install a hydrant meter at the closest hydrant to CONTRACTOR's Work. CONTRACTOR shall be responsible for paying for the meter rental and water used. CONTRACTOR shall be responsible for providing hoses and connections to the hydrant meter.

12.11 8.3 ASPHALTIC CONCRETE PAVING

All pavement and gravel replacement shall be in accordance with the Standard Specifications and as follows.

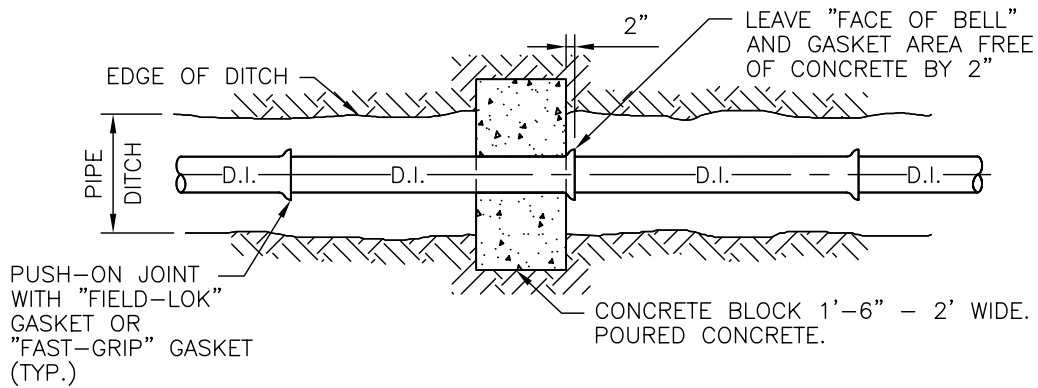
CONTRACTOR shall remove bituminous pavement as a part of the general excavation. The width of pavement removed shall be the minimum possible and acceptable for convenient and safe installation of structures, utilities, and appurtenances. All bituminous pavement shall be cut on neat, straight lines and shall not be damaged beyond the limits of the excavation. Should the cut edge be damaged, a new cut shall be made in neat, straight lines parallel to the original cut encompassing all damaged areas. Pavement removal shall be extended to a seam or joint if seam or joint is within 3 feet of damaged pavement.

12.12 9.1 RESTORATION AND SITE WORK-SCOPE

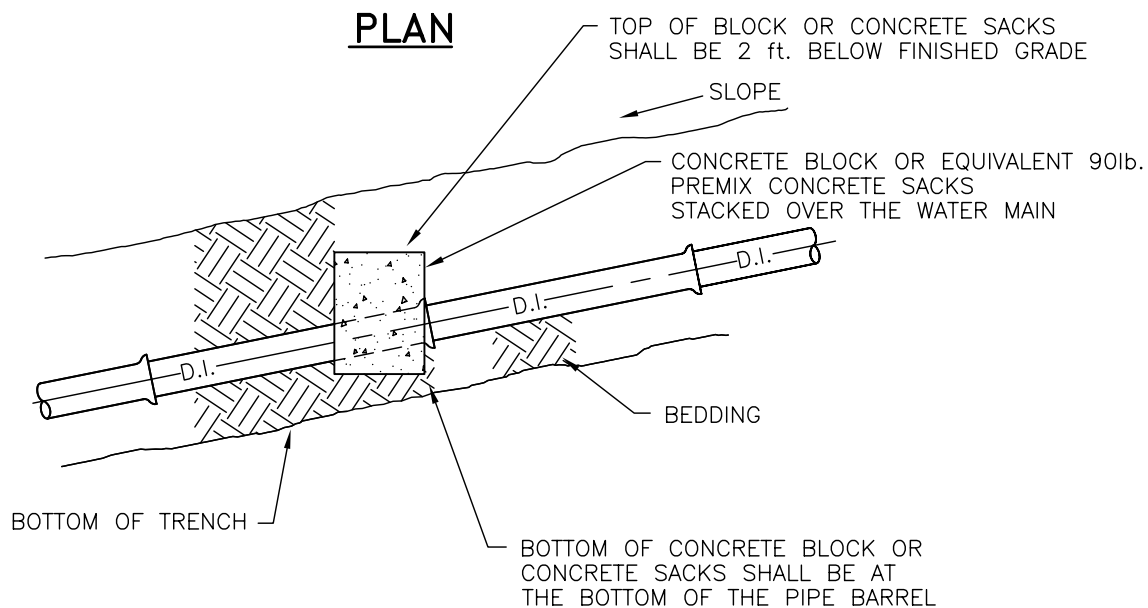
The local water utility will install a hydrant meter at the closest hydrant to CONTRACTOR's Work. CONTRACTOR shall be responsible for paying for the meter rental and water used. CONTRACTOR shall be responsible for providing hoses and connections to the hydrant meter.

END DIVISION 20

DRAWINGS




DITCH CHECK FOR SLOPES
GREATER THAN 3.5:1



ELEVATION

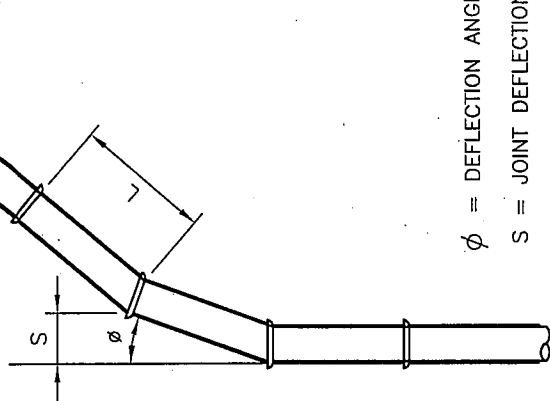
NOTE:

FIELD-LOK GASKET IS THE PREFERRED OPTION OF RESTRAINED JOINT.

	REVISIONS	AMERICAN WATER STANDARD CIVIL DITCH CHECK FOR SLOPES GREATER THAN 3.5:1 - DETAIL	
		AMERICAN WATER VOORHEES, NJ 08043	
		AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELRAN, NJ 08075	
		DRAWN BY RJB PROJECT ENGR APPROVED	DATE 07-31-06 PROJECT IP
		USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD18

NOTE:

- PIPE JOINT DEFLECTION ALLOWED ON DUCTILE IRON PIPE ONLY. PIPE JOINT DEFLECTION NOT ALLOWED ON PVC PIPE.



ϕ = DEFLECTION ANGLE
 S = JOINT DEFLECTION OFFSET
 L = LAYING LENGTH
 R = RADIUS OF CURVE
 $R = \frac{2L}{\tan \frac{\phi}{2}}$

NOTE:

*L-STANDARD LENGTH OF PIPE SECTION.

MAXIMUM JOINT DEFLECTION DUCTILE IRON PUSH ON PIPE

NOMINAL PIPE SIZE Inches	DEFLECTION ANGLE degrees	MAX OFFSET -S inches		APPROX RADIUS OF CURVE - R PRODUCED feet	
		L=18 FT	L=20 FT	L=18 FT	L=20 FT
3	5	19	21	205	230
4	5	19	21	205	230
6	5	19	21	205	230
8	5	19	21	205	230
10	5	19	21	205	230
12	5	19	21	205	230
14	3	11	12	340	380
16	3	11	12	340	380
18	3	11	12	340	380
20	3	11	12	340	380
24	3	11	12	340	380

MAXIMUM JOINT DEFLECTION DUCTILE IRON MJ PIPE

NOMINAL PIPE SIZE Inches	DEFLECTION ANGLE degrees	MAX OFFSET -S inches		APPROX RADIUS OF CURVE - R PRODUCED feet	
		L=18 FT	L=20 FT	L=18 FT	L=20 FT
3	8.3	31.0	35.0	125	140
4	8.3	31.0	35.0	125	140
6	7.1	27.0	30.0	145	160
8	5.4	20.0	22.0	195	220
10	5.4	20.0	22.0	195	220
12	5.4	20.0	22.0	195	220
14	3.6	13.5	15.0	285	320
16	3.6	13.5	15.0	285	320
18	3.0	11.0	12.0	340	380
20	3.0	11.0	12.0	340	380
24	2.4	9.0	10.0	450	500

REVISIONS

AMERICAN WATER STANDARD
 PIPE CURVE GEOMETRY
 DETAIL

AMERICAN WATER
 VOORHEES, NJ 08043

AMERICAN WATER ENG. CENTER
 213 CARRIAGE LAKE
 DELAWARE, NJ 08075

AMERICAN WATER

DRAWN BY RJB
 PROJECT ENG'R
 APPROVED

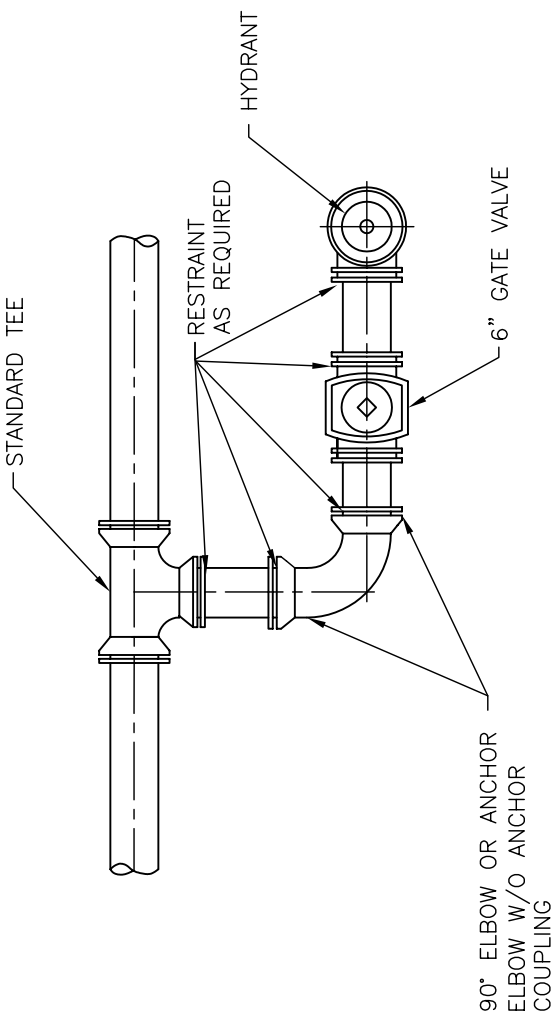
DATE 10-07-07
 PROJECT IF

USE DIMENSIONS ONLY
 SCALE N.T.S.

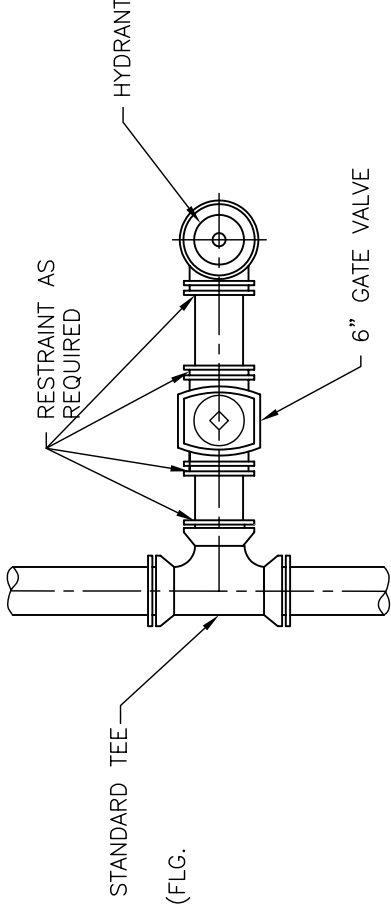
USE APPROVED DRAWINGS ONLY
 FOR CONSTRUCTION PURPOSES

0201-0601-SD32

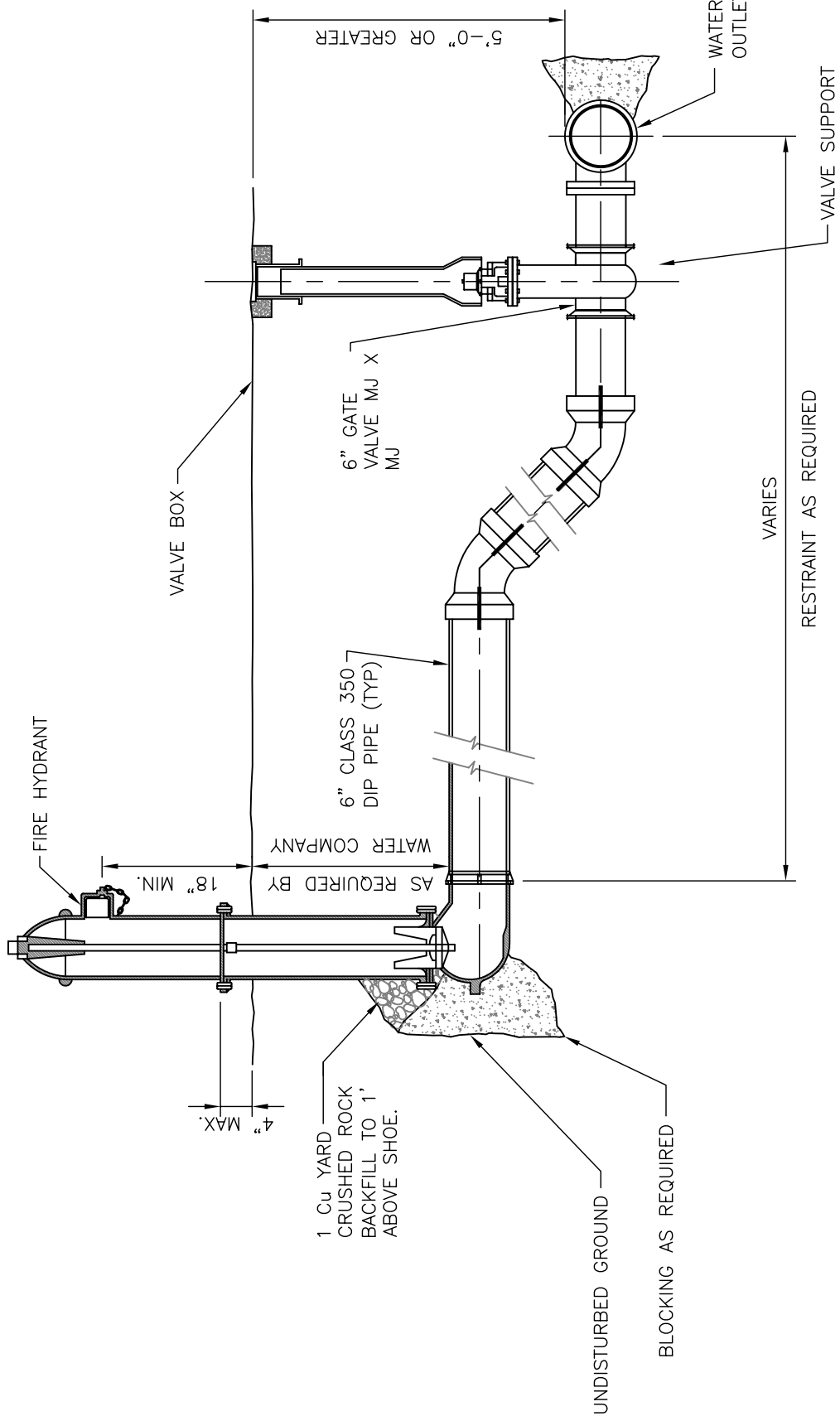
FOR COMMENTS



INSTALLATION PARALLEL TO MAIN



INSTALLATION PERPENDICULAR TO MAIN



DEEP MAIN INSTALLATION

(ALTERNATIVE IS HYDRANT BARREL WITH DEEPER BURY OR BARREL EXTENSIONS PER ENGINEER'S RECOMMENDATIONS.)

NOTES:

1. THESE SCHEMATICS DISPLAY ALTERNATIVE LAYOUTS AND DETAIL OF RESTRAINT HAS NOT BEEN PROVIDED HERE.
2. ALL FITTINGS SHALL BE MJ FOR HYDRANT ALTERNATIVES SHOWN.

REVISIONS

AMERICAN WATER STANDARD
FIRE HYDRANT LAYOUT - ALTERNATIVES
DETAILS

AMERICAN WATER
VOORHEES, NJ 08043

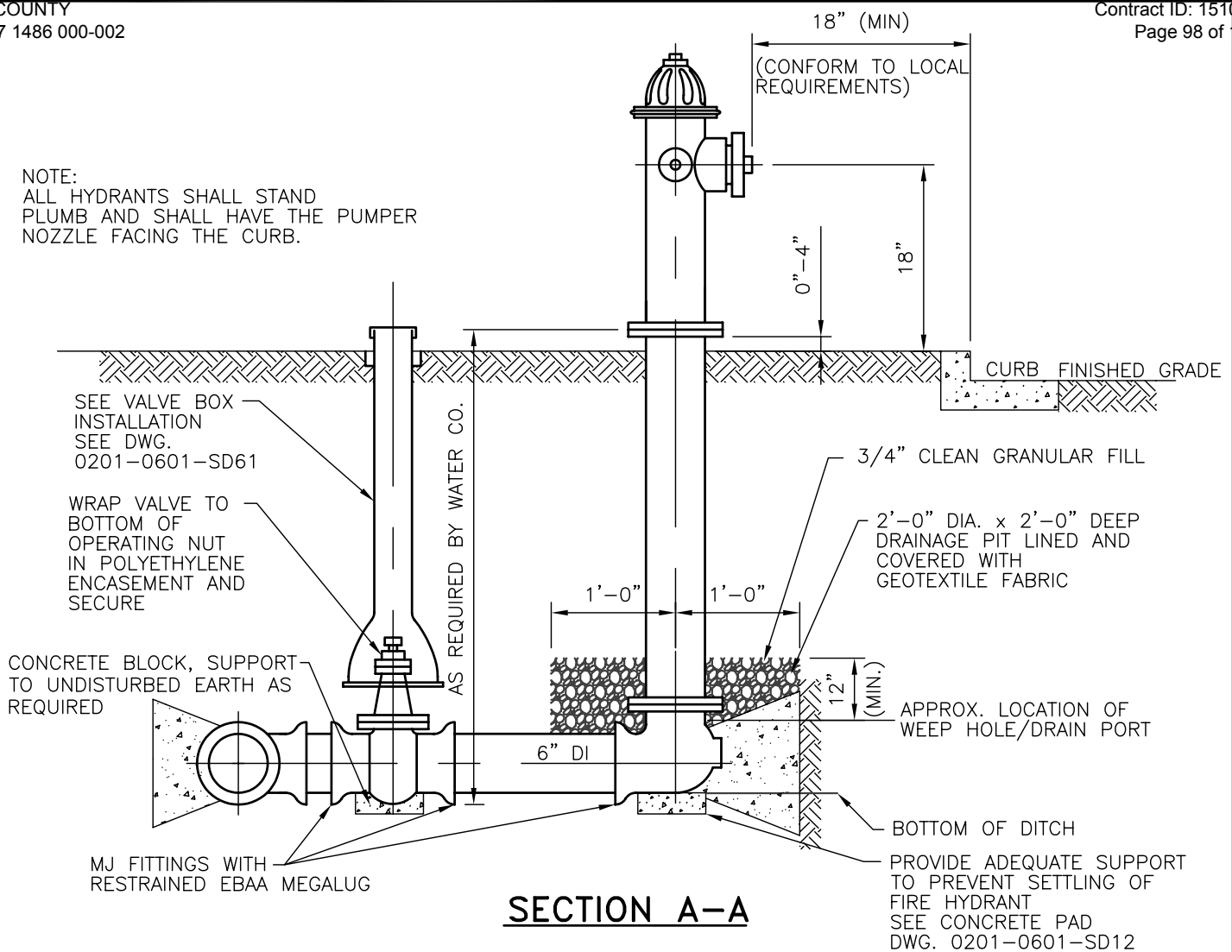


AMERICAN WATER ENG. CENTER
175 GARLAND LANE
DELANO, NJ 08075

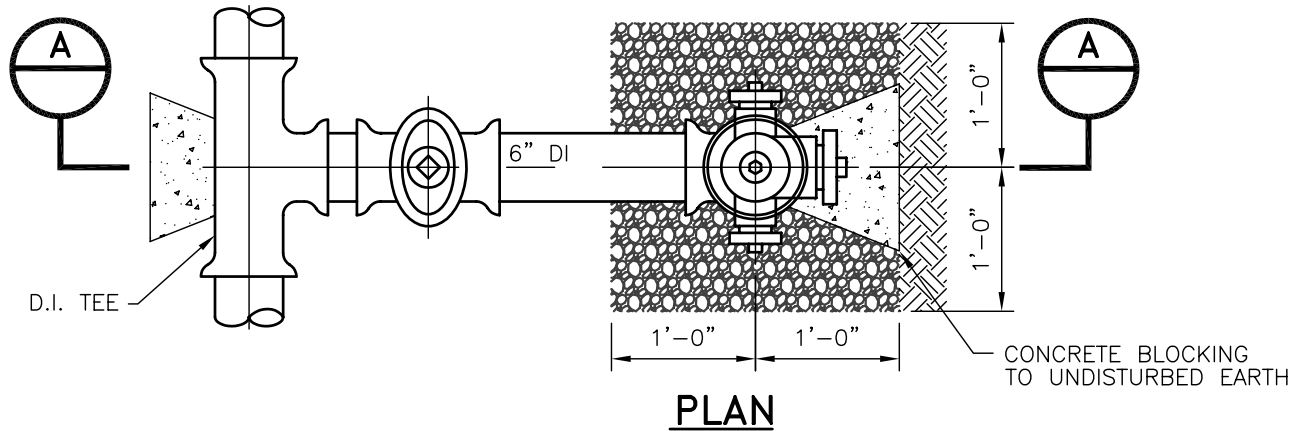
DRAWN BY PJB
PROJECT ENGR APPROVED

DATE 10-17-06
SCALE N.T.S.

NOTE:
ALL HYDRANTS SHALL STAND
PLUMB AND SHALL HAVE THE PUMPER
NOZZLE FACING THE CURB.



SECTION A-A

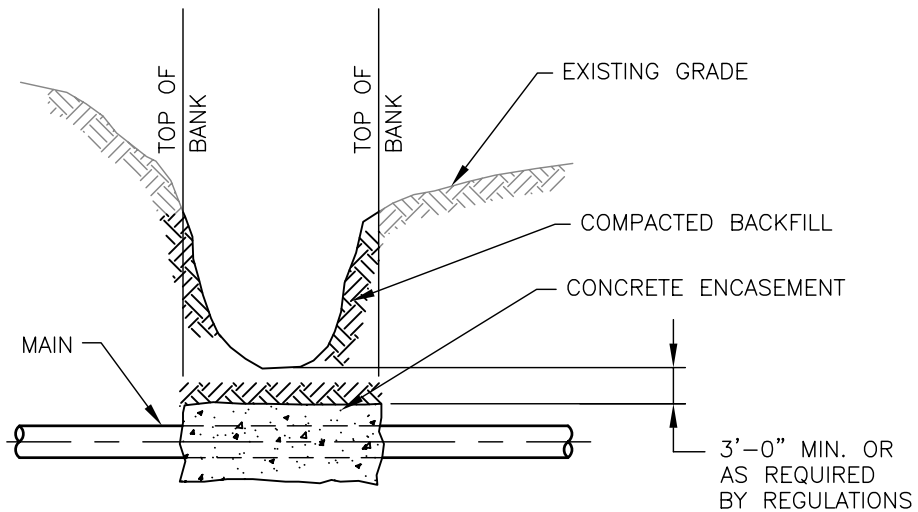


PLAN

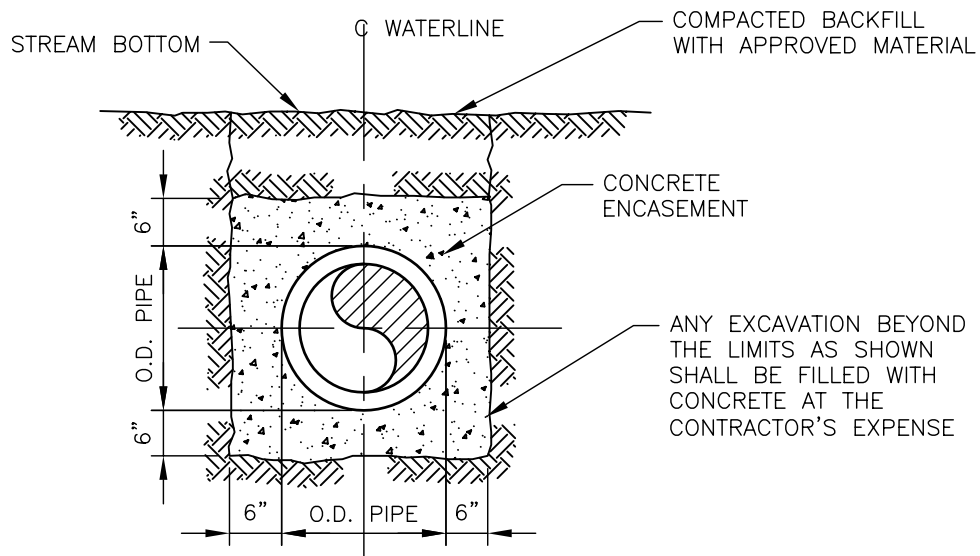
FIRE HYDRANT DETAIL-STANDARD

N.T.S.

	REVISIONS	AMERICAN WATER STANDARD CIVIL OPTIONAL FIRE HYDRANT DETAIL WITH BLOCKING	
		AMERICAN WATER VOORHEES, NJ 08043	
		AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELRAN, NJ 08075	
		DRAWN BY RJB PROJECT ENG'R APPROVED	DATE 10-02-07 PROJECT IP
		USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD35



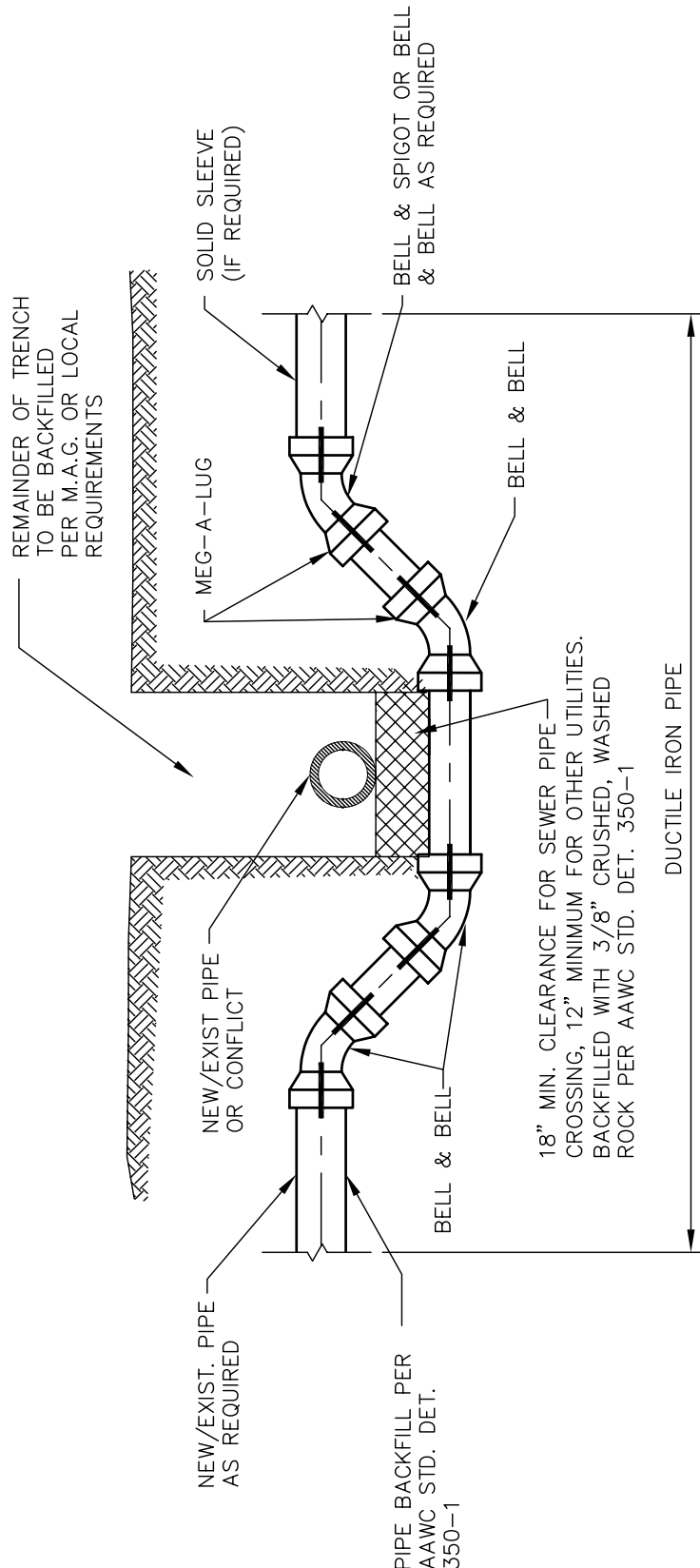
TYPICAL PROFILE



TYPICAL SECTION

NOTE:
 MINIMUM ENCASEMENT LIMITS ARE SHOWN ON THE DRAWINGS. THE ACTUAL LIMITS SHALL BE DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION SUCH THAT THE ENCASEMENT TERMINATES AT A PIPE JOINT. THE JOINT SHALL BE FREE OF CONCRETE SO AS TO PROVIDE A FLEXIBLE JOINT.

	REVISIONS	AMERICAN WATER STANDARD CIVIL MINOR STREAM CROSSING W/CONCRETE ENCASEMENT DETAIL	
		AMERICAN WATER VOORHEES, NJ 08043	
		AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELRAN, NJ 08075	
		DRAWN BY RJB PROJECT ENGR APPROVED	DATE 10-03-07 PROJECT IP
		USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD40



NOTES:

1. ALL PIPE TO BE JOINT RESTRAINED.
2. PIPE IS TO BE DUCTILE IRON, MINIMUM PRESSURE CLASS 350.
3. ALL DUCTILE IRON PIPE SHALL BE POLYETHYLENE WRAPPED FOR THE ENTIRE LENGTH.
4. BEGIN/END RESTRAINED JOINT STATIONING TO BE SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS. ALL BENDS & FITTINGS SHALL HAVE STATIONING AND ELEVATION SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS. THE BOTTOM ELEVATION OF THE CONFLICT AND THE TOP ELEVATION OF THE DUCTILE IRON PIPE AT THE CENTERLINE OF THE CONFLICT SHALL BE SHOWN ON THE APPROVED CONSTRUCTION DRAWINGS.

AMERICAN WATER STANDARD CIVIL VERTICAL REALIGNMENT OF WATER MAINS DETAIL	AMERICAN WATER VOORHEES, NJ 08043
	AMERICAN WATER ENG. CENTER 215 CARRIAGE LANE DELAN, NJ 08075 DRAWN BY RJB PROJECT ENGR RESP. ENGINEER 10-10-06 PROJECT IP APPROVED USE DIMENSIONS ONLY SCALE N.T.S.
REVISIONS	USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES

0201-0601-SD42

FOR COMMENTS

SPECIAL CONSTRUCTION REQUIREMENTS

WHERE REQUIRED WATER MAIN SEPARATION FROM SEWER CANNOT BE MAINTAINED

REQUIRED SEPARATION BETWEEN WATER MAINS AND SANITARY SEWERS

BASIC SEPARATION REQUIREMENTS:

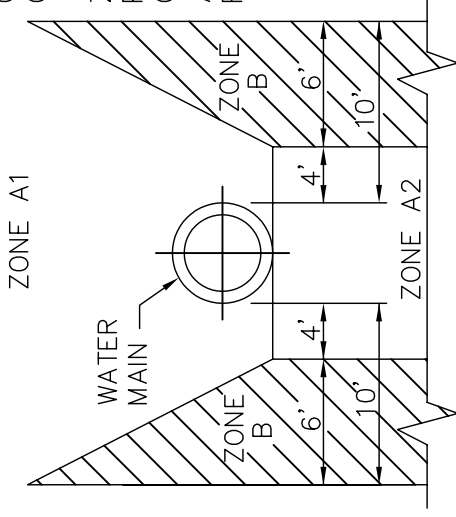
WATER MAINS AND SEWERS SHOULD BE SEPARATED AS FAR AS IS REASONABLE IN BOTH THE HORIZONTAL AND VERTICAL DIRECTIONS WITH SEWERS LOWER THAN WATER MAINS.

PARALLEL CONSTRUCTION: THE HORIZONTAL DISTANCE BETWEEN PRESSURE WATER MAINS AND SEWERS SHALL BE AT LEAST 10 FEET

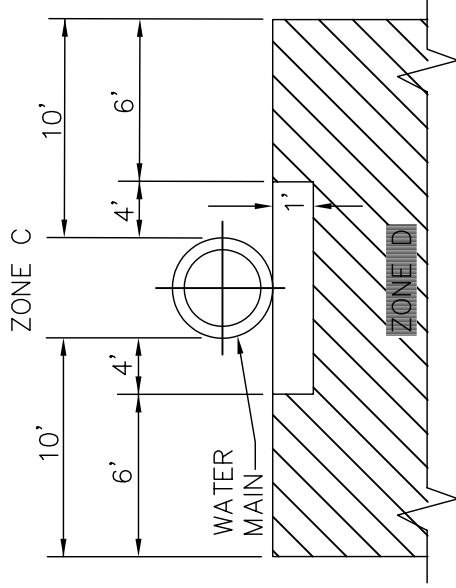
PERPENDICULAR CONSTRUCTION (CROSSING): PRESSURE WATER MAINS SHALL BE AT LEAST 18" ABOVE SANITARY SEWERS WHERE THESE LINES MUST CROSS.

PERPENDICULAR CONSTRUCTION

ZONE A
 PARALLEL CONSTRUCTION CLOSE TO PIPE



ZONE B
 PARALLEL CONSTRUCTION AT LEAST 4' FROM PIPE

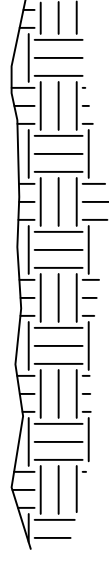
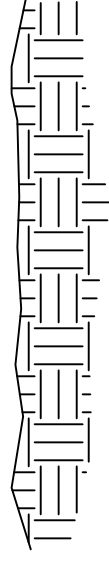


ZONE C PERPENDICULAR ABOVE OR EVEN HORIZONTAL

ZONE D

PERPENDICULAR BELOW HORIZONTAL IF AN EXISTING SEWER IS LOCATED WITHIN THESE LIMITS. THE CONDITIONS REQUIREMENTS MAY APPLY (CONFIRM WITH REGULATOR)

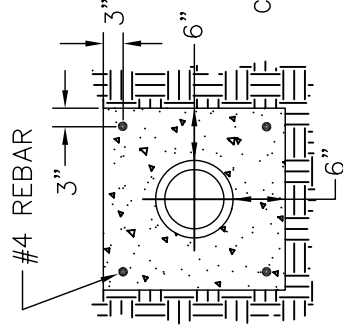
PARALLEL CONSTRUCTION



IF AN EXISTING SEWER IS LOCATED WITHIN ZONES A1, A2, B, C, OR D OF A PROPOSED WATER MAIN, THE FOLLOWING SPECIAL REQUIREMENTS APPLY:

ZONE

- A. NO WATER MAINS SHALL BE CONSTRUCTED WITHOUT SPECIAL PERMISSION FROM THE APPROPRIATE HEALTH OR ENVIRONMENTAL REGULATOR.
- B. IF THE SEWER DOES NOT MEET ZONE B REQUIREMENTS, THE WATER MAIN SHALL BE OF PRESSURE CLASS 200 PIPE FOR PVC AND CLASS 350 FO D.I. PIPE. SEWER SHALL BE CONSTRUCTED EQUAL TO WATER PIPE AND TESTED FOR WATER TIGHTNESS.
- C. NO WATER MAINS SHALL BE CONSTRUCTED WITHOUT SPECIAL PERMISSION FROM THE HEALTH REGULATOR. IF PERMISSION IS GRANTED, THE SEWER PIPE SHALL BE ENCASED WITH REINFORCED CONCRETE AND THE WATER MAIN SHALL BE OF CLASS 200 PIPE OR EQUIVALENT.
- D. THE SEWER SHALL BE ENCASED WITH REINFORCED CONCRETE.



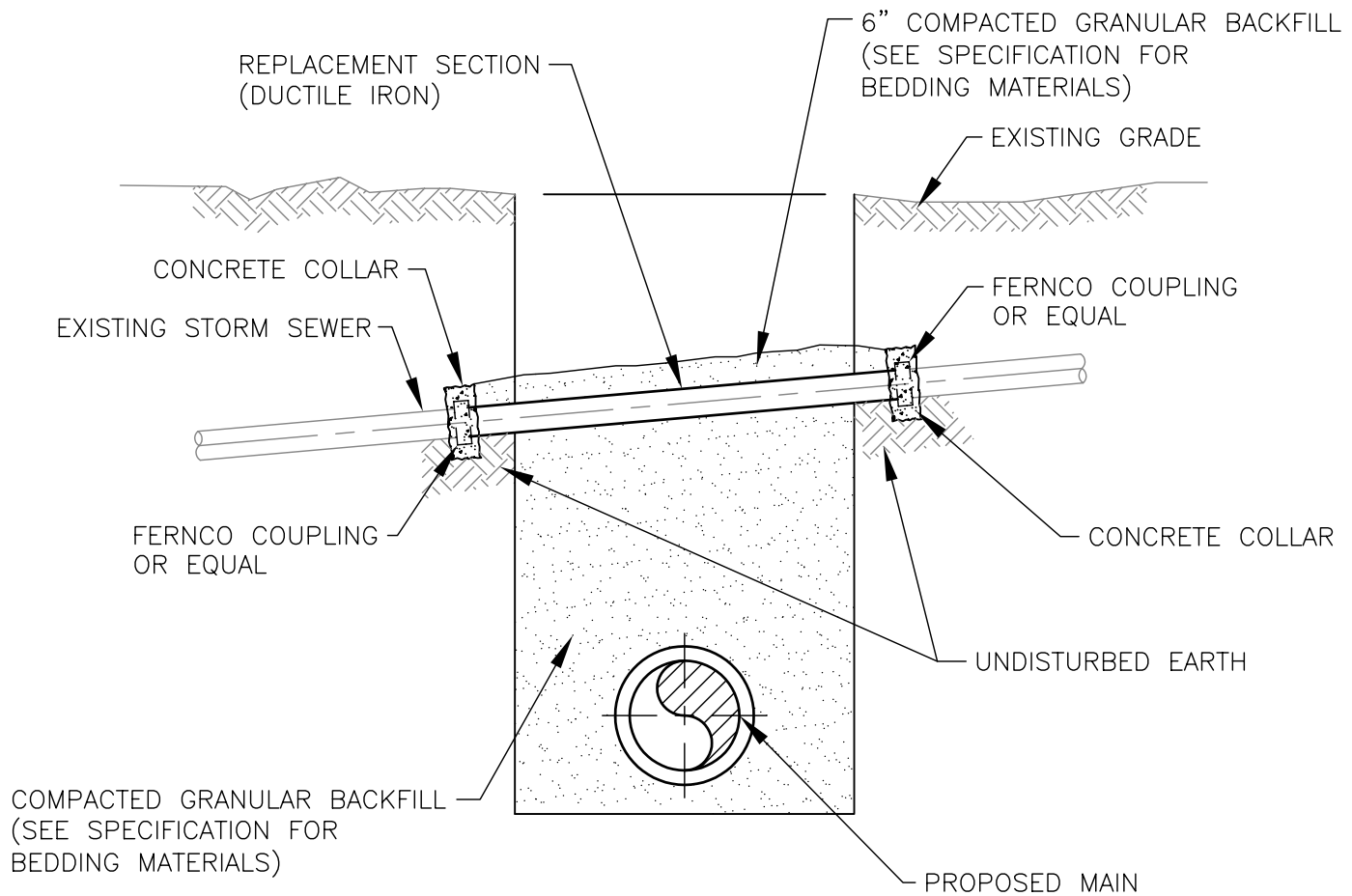
CONCRETE SHALL BE 3000 PSI CONCRETE

REVISIONS	
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AMERICAN WATER STANDARD SPECIAL CONSTRUCTION REQUIREMENTS FOR WATER MAIN - DETAIL	
AMERICAN WATER VOORHEES, NJ 08043	
AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELIAN, NJ 08075	AMERICAN WATER
DRAWN BY RJB CHECKED BY ENG'R APPROVED	DATE: 10-16-06 PROJECT ID: USE DIMENSIONS ONLY SCALE: N.T.S.
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD43

FOR COMMENTS

0201-0601-SD43



1. IF THE EXISTING STORM SEWER IS DAMAGED OR REMOVED DURING CONSTRUCTION IT SHALL BE REPLACED ACROSS THE TRENCH SUCH THAT THE CONCRETE COLLARS ARE SUPPORTED ON UNDISTURBED EARTH.

2. THE CONCRETE COLLAR SHALL BE FORMED AT A JOINT WITH THE EXISTING HOUSE LATERAL USING FERNCOM COUPLINGS.

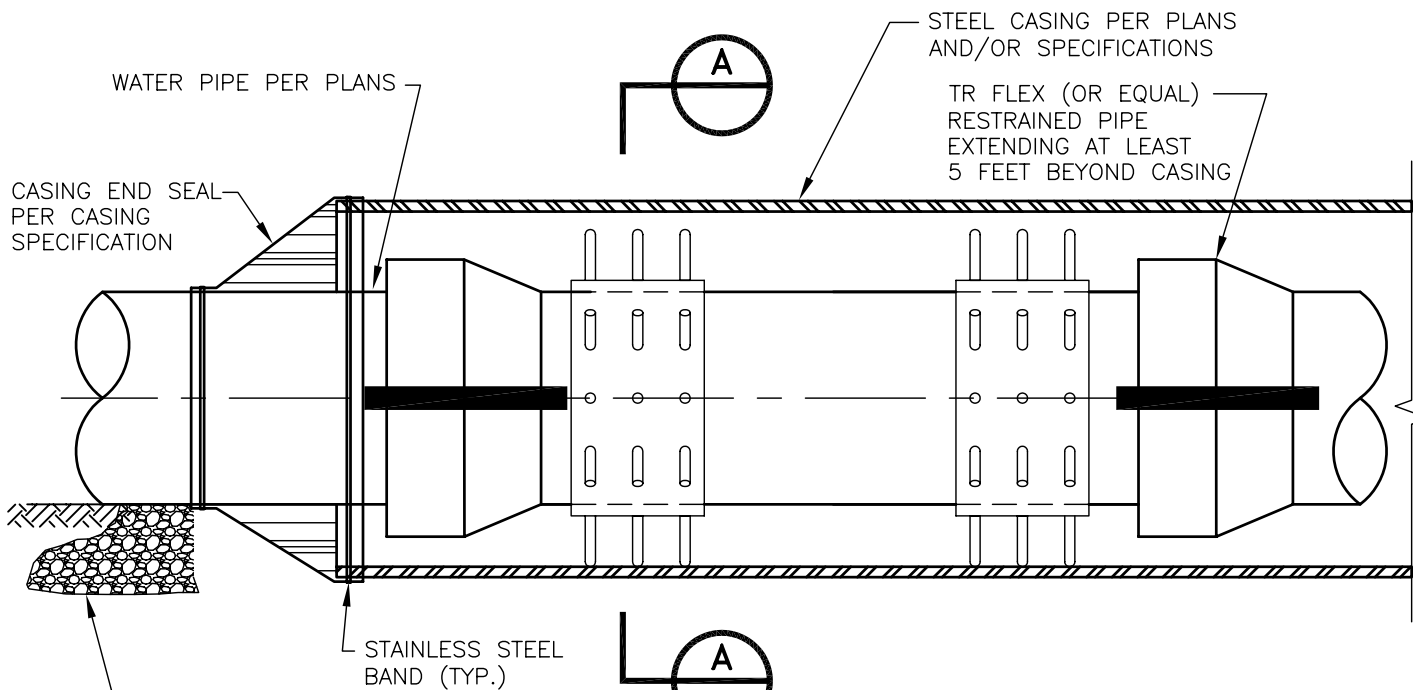
3. THE REPLACEMENT SECTION SHALL BE CLASS 350 DUCTILE IRON PIPE WITH AN INSIDE DIAMETER EQUAL TO THE EXISTING PIPE. ANSI/AWWA C151/A21.51 DUCTILE IRON PIPE SHALL BE USED AS A MINIMUM STANDARD.

4. WHEN THE STORM SEWER OWNER HAS REQUIREMENTS WHICH ARE MORE STRINGENT, THE CONTRACTOR SHALL CONFORM TO THE MORE STRINGENT REQUIREMENTS AND MAKE NO CLAIM FOR ADDITIONAL COMPENSATION OR AN EXTENSION OF TIME BECAUSE OF SUCH REQUIREMENTS.

	REVISIONS	AMERICAN WATER STANDARD CIVIL STORM SEWER REPLACEMENT DETAIL	
		AMERICAN WATER WORKS SERVICE COMPANY SYSTEM ENGINEERING	
		AMERICAN WATER WORKS SERVICE COMPANY, INC. SYSTEM ENGINEERING 1025 LAUREL OAK RD. VOORHEES, N.J. 08043	
		DRAWN BY RJB PROJECT ENGR APPROVED	DATE 03-05-01 PROJECT
		USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD44

NOTES:

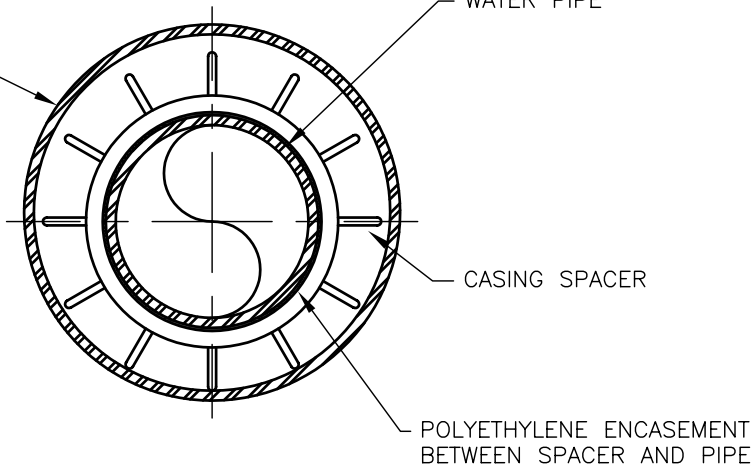
- 1. THIS STANDARD APPLICABLE FOR 4" DIA. AND LARGER PIPE.



SEE CASING SPECIFICATION FOR BEDDING MATERIAL TO BE USED

ELEVATION

STEEL CASING SEE SPECIFICATION



NOTE: RESTRAINT OR EQUALS DEFINED AS REQUIRING NO SPECIAL TOOLS OR SHIMS TO REMOVE PIPE FROM CASING IN THE FUTURE

SECTION A-A

REVISIONS

**AMERICAN WATER STANDARD
CIVIL
CASING INSTALLATION
DETAIL**

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER ENG. CENTER
213 CARRIAGE LANE
DELTRAN, NJ 08075



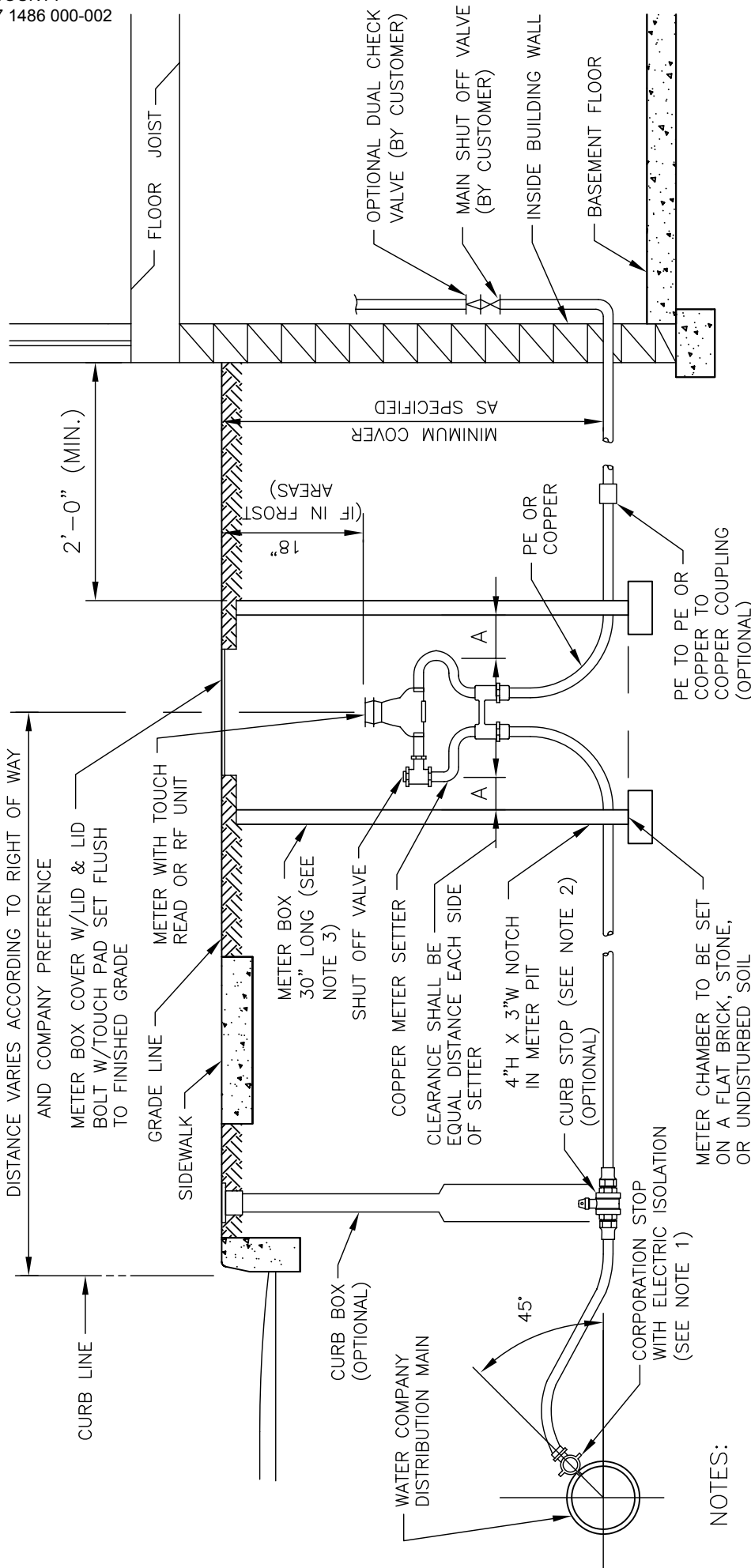
DRAWN BY RJB
PROJECT ENGR
APPROVED

DATE 10-03-07
PROJECT IP

USE DIMENSIONS ONLY
SCALE N.T.S.

USE APPROVED DRAWINGS ONLY
FOR CONSTRUCTION PURPOSES

0201-0601-SD45



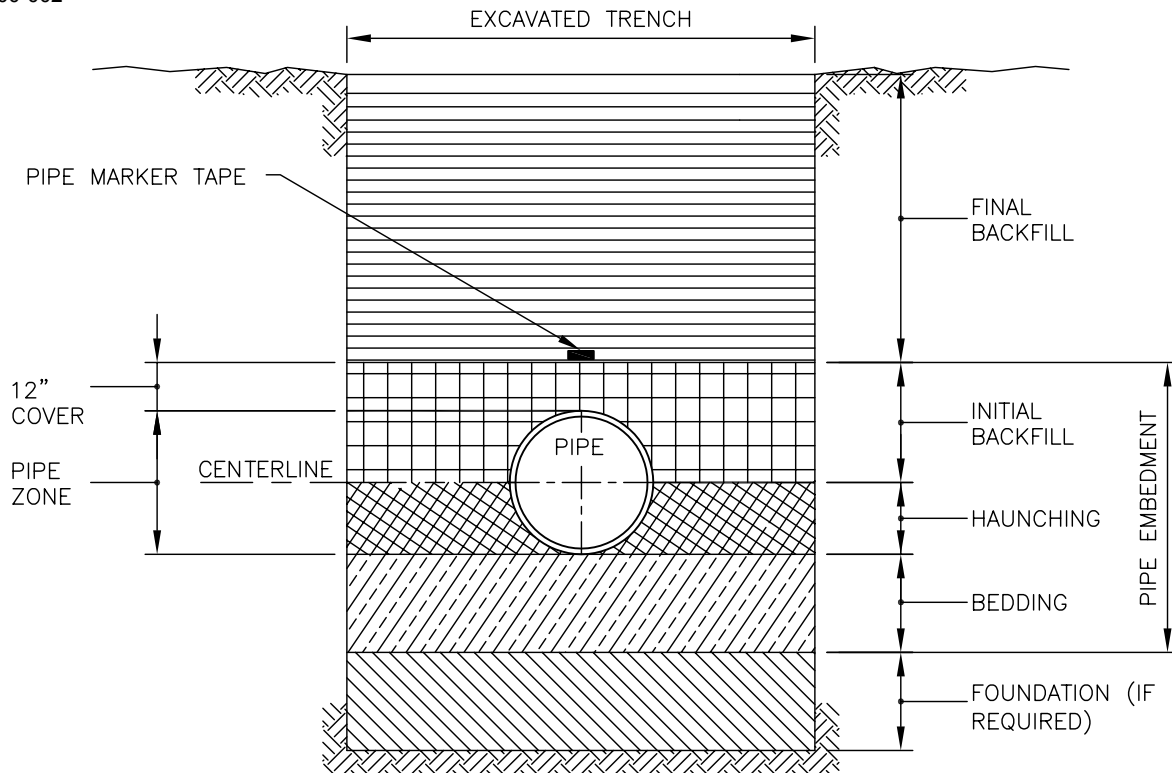
NOTES:

- CORPORATION STOP WITH STRAIGHT COUPLING NUT. SERVICE SADDLES WILL BE USED FOR ALL TAPS IN A/C, PVC OR CONCRETE MAINS.
- MATERIAL UTILIZED SHOULD BE TYPE "K" (OR "L" COPPER IF PERMITTED) WITH A COPPER TO COPPER CURB STOP, BOTH ENDS COMPRESSION FITTING, POLYETHYLENE ENCASE AS REQUIRED.
- 18" I.D. CHAMBER FOR USE WITH 5/8" METER. 20" I.D. CHAMBER FOR USE WITH 1" METER. SQUARE METER PITS MAY BE USED IF LOCAL PREFERENCE EXISTS.
- METER BOX LOCATION TO BE DETERMINED BY LOCAL AUTHORITY AND AWW.
- SERVICE LINE AND METER BOX OWNERSHIP VARIES BY LOCAL TARIFF.
- POLYWRAP SERVICE FROM MAIN TO METER PIT IF SOIL IS CORROSSIVE.
- IN FROST AREAS, A PLASTIC INNER LID AND BLANKET CAN BE USED.

<p>AMERICAN WATER STANDARD CIVIL EXT. 3/4" WATER METER/COPPER SERVICE INSTALLATION - DETAIL</p>	<p>AMERICAN WATER VOORHEES, NJ 08043</p>
<p>AMERICAN WATER ENG. CENTER 215 CARRIAGE LANE DELRAN, NJ 08075</p>	<p>DATE 10-03-07 PROJECT IP</p>
<p>DRAWN BY RJB PROJECT ENGR APPROVED</p>	<p>USE DIMENSIONS ONLY SCALE N.T.S.</p>
<p>USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES</p>	<p>0201-0601-SD47</p>

REVISIONS

FOR COMMENTS




TRENCH TERMINOLOGY

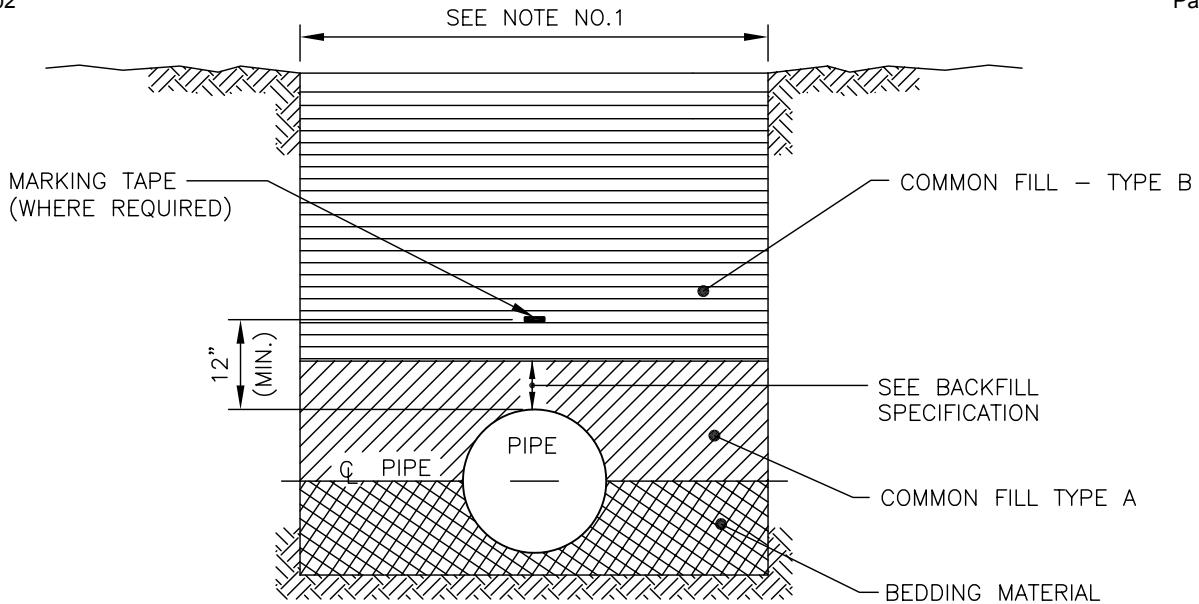
FOUNDATION: A FOUNDATION IS NECESSARY ONLY WHEN NATIVE SOILS ARE UNSTABLE. FOR SUCH CONDITIONS, THE TRENCH IS OVER-EXCAVATED AND A LAYER OF SUPPORTIVE MATERIAL IS PLACED AND COMPACTED TO PROVIDE A FIRM FOUNDATION FOR THE SUBSEQUENT PIPE EMBEDMENT MATERIALS.

EMBEDMENT: THIS ZONE IS THE MOST IMPORTANT IN TERMS OF PIPE PERFORMANCE. IT IS DIVIDED INTO THE FOLLOWING SUB ZONES:

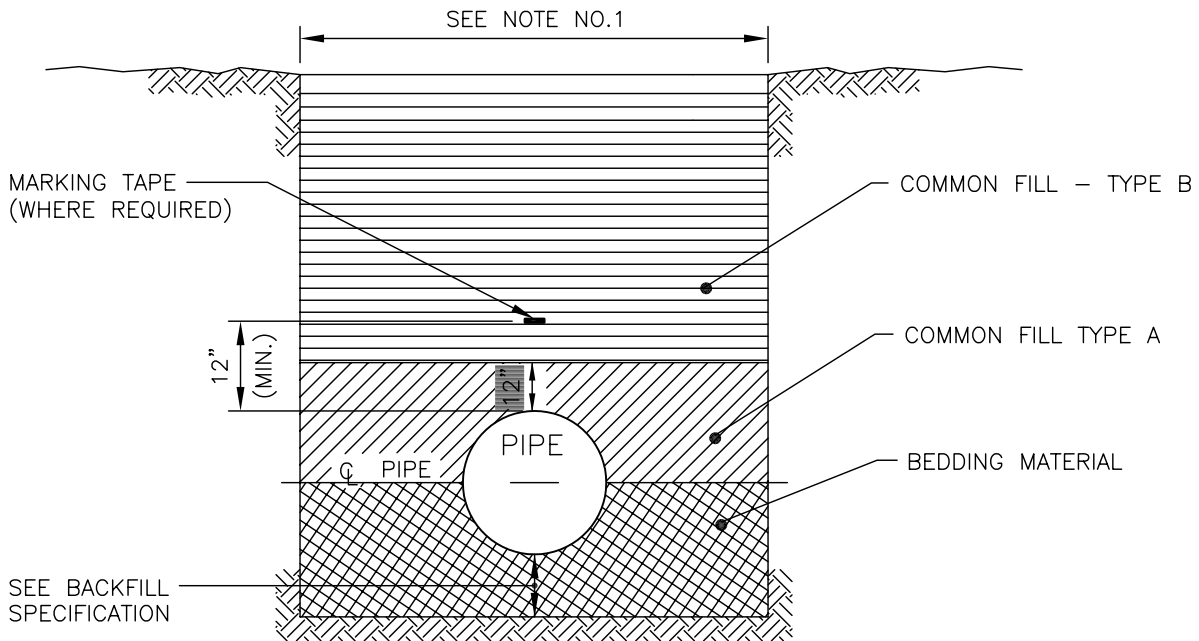
- **BEDDING:** TYPICALLY SIX INCHES OF SUPPORTIVE, COMPACTED MATERIAL. THIS ZONE PROVIDES EVEN SUPPORT FOR THE PIPE AND BRINGS IT TO GRADE.
- **HAUNCHING:** EXTENDS FROM THE BOTTOM OF THE PIPE TO THE CENTERLINE OF THE PIPE. IT PROVIDES THE MOST RESISTANCE TO PIPE DEFLECTION. SPECIFYING PROPER MATERIALS AND COMPACTION ARE MOST IMPORTANT FOR THIS ZONE.
- **INITIAL BACKFILL:** EXTENDS FROM THE SPRINGLINE TO A POINT ABOVE THE TOP OF THE PIPE. THIS ZONE PROVIDES SOME PIPE SUPPORT AND HELPS TO PREVENT DAMAGE TO THE PIPE DURING PLACEMENT OF THE FINAL BACKFILL. THE COVER EXTENDS FROM THE TOP OF THE PIPE TO THE TOP OF THE INITIAL BACKFILL. THE DEPTH OF COVER SHOULD BE AS MUCH AS NECESSARY TO PROTECT THE PIPE DURING PLACEMENT OF THE FINAL BACKFILL. TWELVE INCHES IS A COMMON DEPTH OF COVER.

FINAL BACKFILL: THIS ZONE EXTENDS FROM THE TOP OF THE INITIAL BACKFILL TO THE TOP OF THE TRENCH. THIS ZONE HAS LITTLE INFLUENCE ON PIPE PERFORMANCE, BUT CAN BE IMPORTANT TO THE INTEGRITY OF ROADS AND STRUCTURES.

	REVISIONS	AMERICAN WATER STANDARD CIVIL PIPE TRENCH TERMINOLOGY DETAIL	
		AMERICAN WATER VOORHEES, NJ 08043	
		AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELRAN, NJ 08075	
		DRAWN BY RJB PROJECT ENGR APPROVED	DATE 10-03-07 PROJECT IP
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES		0201-0601-SD53	



SOIL



ROCK

NOTE 1:

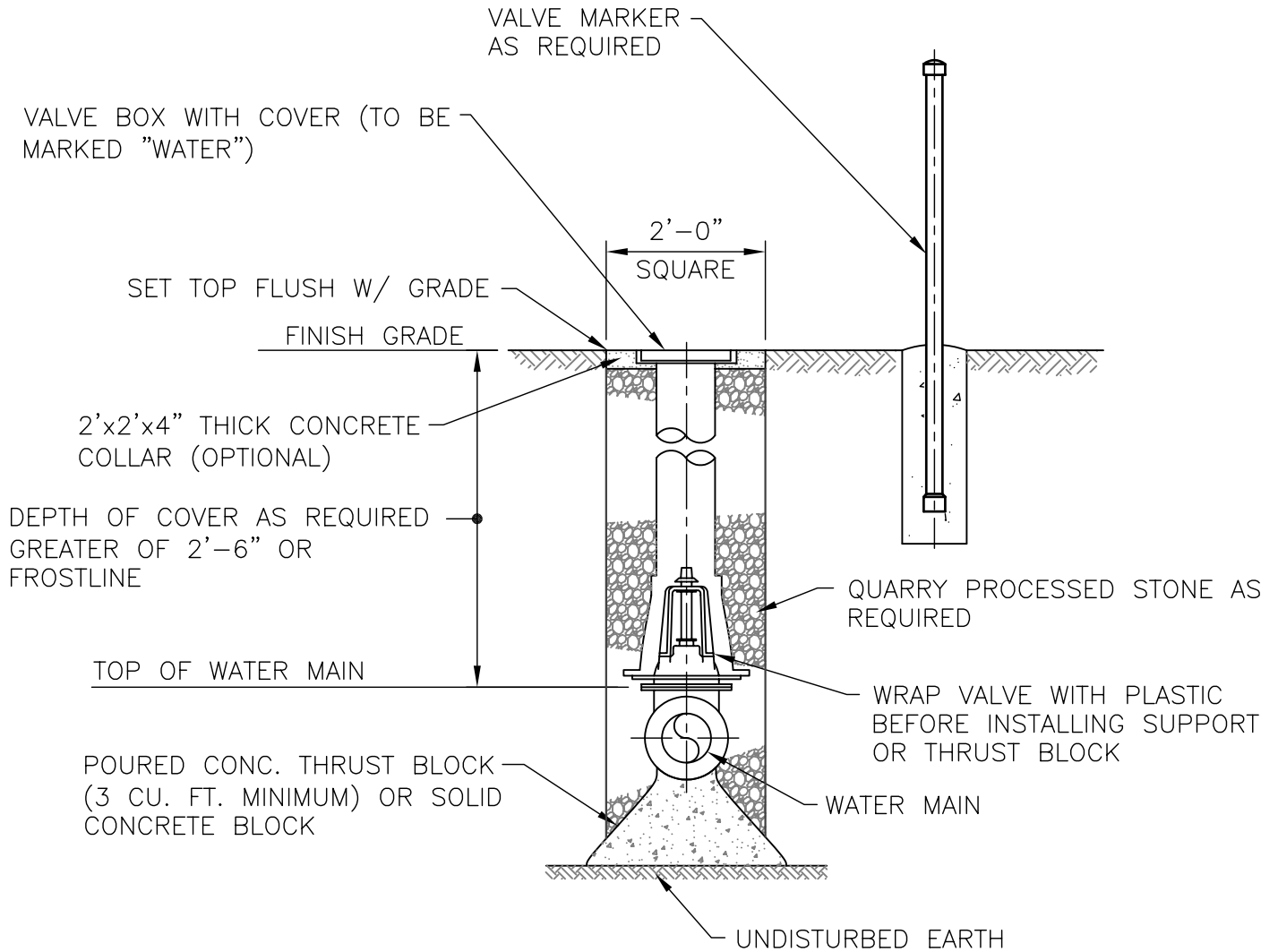
- IN UPLAND AREAS USE 4" TOPSOIL, SEED, MULCH & FERTILIZE PER SPECIFICATIONS.
- IN WETLAND AREAS, TOP 18" TO BE BACKFILLED WITH NATIVE EXCAVATED SOIL AND REPLANTED WITH NATIVE VEGETATION.
- IN STREAM CHANNELS AND ADJACENT STREAM BANKS, TOP 12" RIP-RAP, VOIDS FILL WITH NATIVE SOIL

NOTE:

SEE SPECIFICATION SECTIONS FOR DESCRIPTION OF BACKFILL MATERIAL


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Feb 20, 2007 - 7:50am

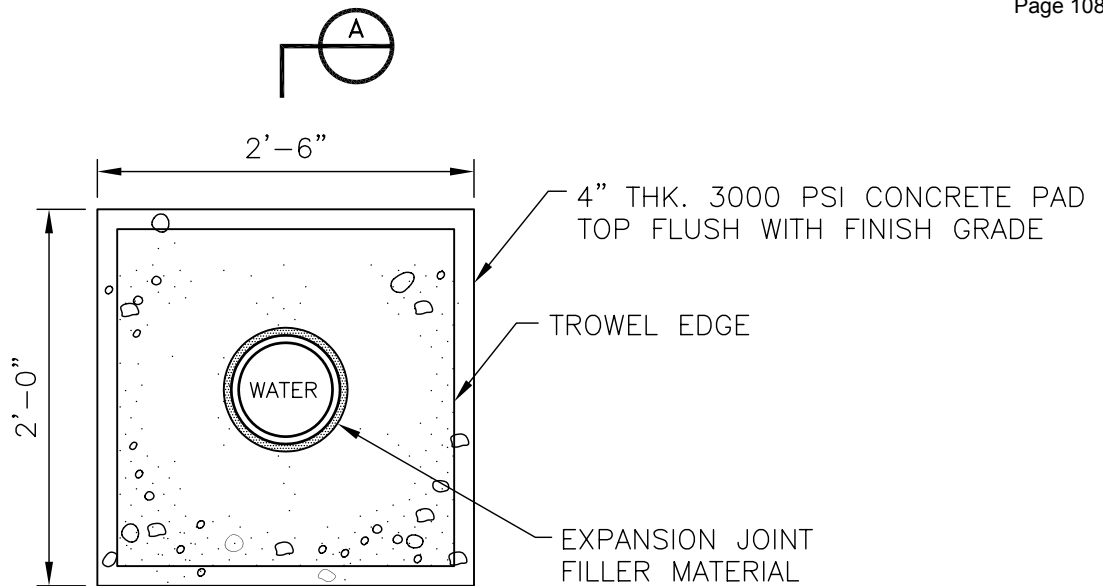
	REVISIONS	AMERICAN WATER STANDARD CIVIL TRENCH BACKFILL MATERIALS UNPAVED AREAS - DETAIL	
		AMERICAN WATER VOORHEES, NJ 08043	
		AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELRAN, NJ 08075	
		DRAWN BY RJB PROJECT ENG'R APPROVED	DATE 07-31-06 PROJECT IP
		USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD57



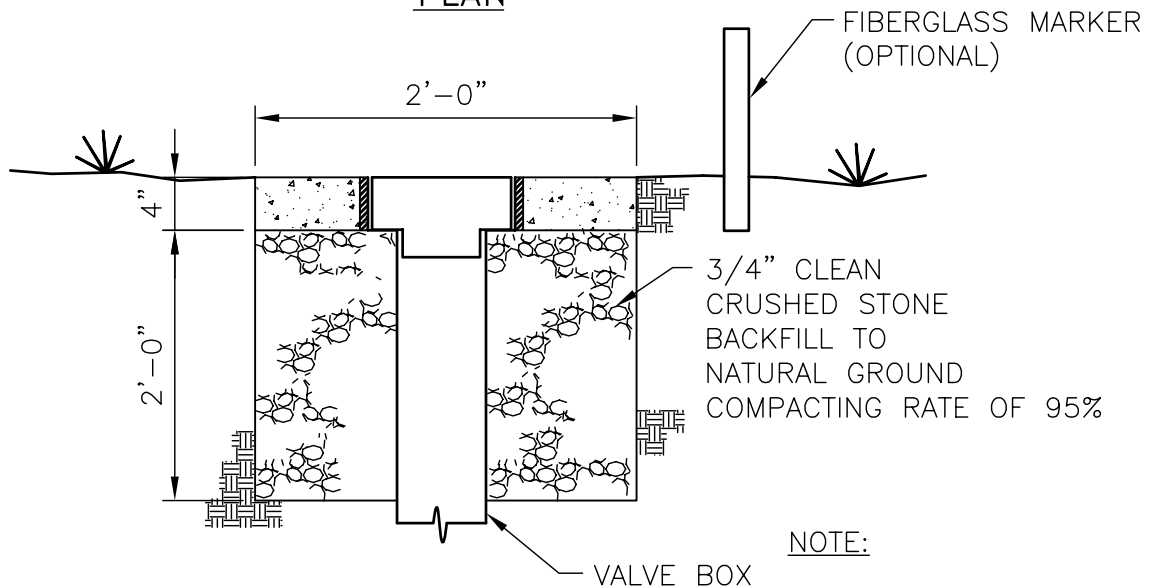
NOTE:
IF PAD IS NOT TO BE POURED IMMEDIATELY AFTER VALVE BOX INSTALLATION, HOLE SHOULD BE BACKFILLED TO GRADE WITH QUARRY PROCESS STONE

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Feb 20, 2007 - 7:50am

REVISIONS	AMERICAN WATER STANDARD CIVIL VALVE BOX INSTALLATION DETAIL	
	AMERICAN WATER VOORHEES, NJ 08043	
	AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELRAN, NJ 08075	
	DRAWN BY RJB PROJECT ENGR APPROVED	DATE 07-31-06 PROJECT IP
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES		0201-0601-SD59



PLAN



SECTION A-A

VALVE BOX DETAIL
IN UNPAVED AREAS

N.T.S.

NOTE:

IF PAD IS NOT TO BE POURED IMMEDIATELY AFTER VALVE BOX INSTALLATION, HOLE SHOULD BE BACKFILLED TO GRADE WITH 3/4" CLEAN CRUSHED STONE BACKFILL

REVISIONS

**AMERICAN WATER STANDARD
CIVIL
CONCRETE VALVE BOX PAD
DETAIL**

AMERICAN WATER
VOORHEES, NJ 08043

AMERICAN WATER ENG. CENTER
213 CARRIAGE LANE
DELRAN, NJ 08075



DRAWN BY RJB
PROJECT ENG'R
APPROVED

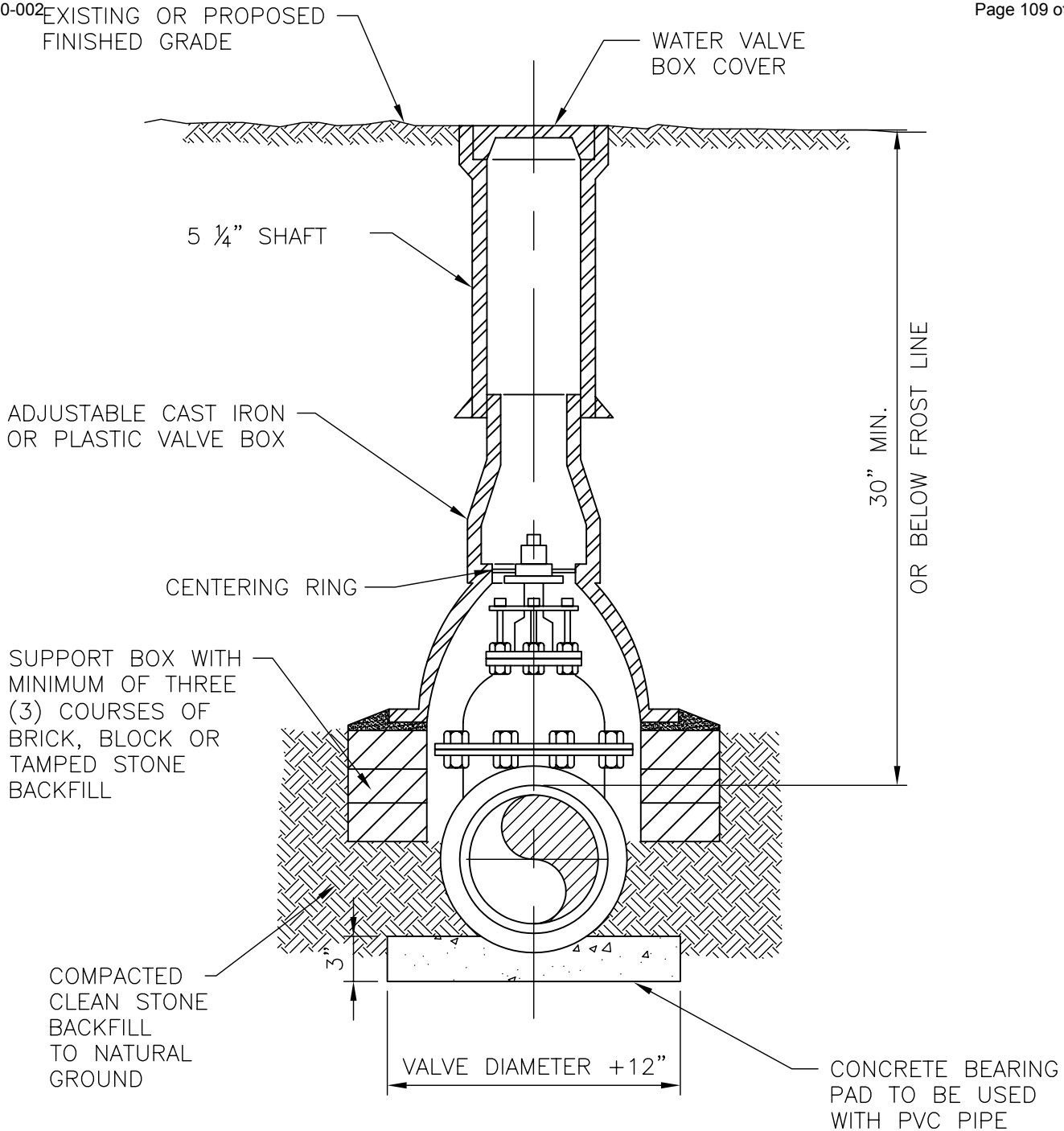
DATE 10-04-07
PROJECT IP

USE DIMENSIONS ONLY
SCALE N.T.S.

USE APPROVED DRAWINGS ONLY
FOR CONSTRUCTION PURPOSES

0201-0601-SD60

FOR COMMENT




SUPPORT BOX WITH
MINIMUM OF THREE
(3) COURSES OF
BRICK, BLOCK OR
TAMPED STONE
BACKFILL

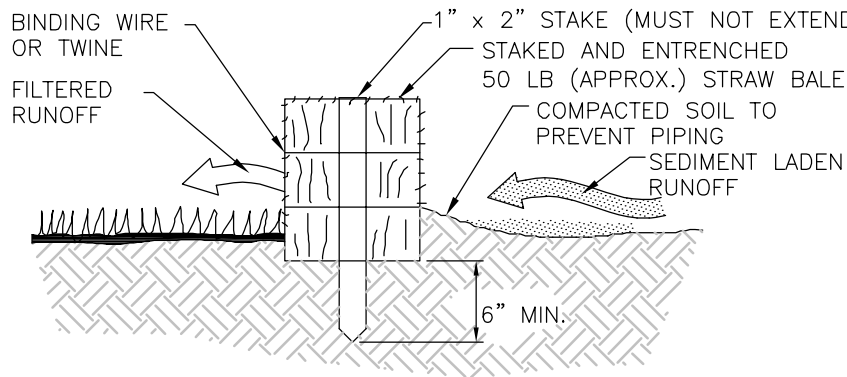
COMPACTED
CLEAN STONE
BACKFILL
TO NATURAL
GROUND

VALVE DIAMETER +12"

CONCRETE BEARING
PAD TO BE USED
WITH PVC PIPE

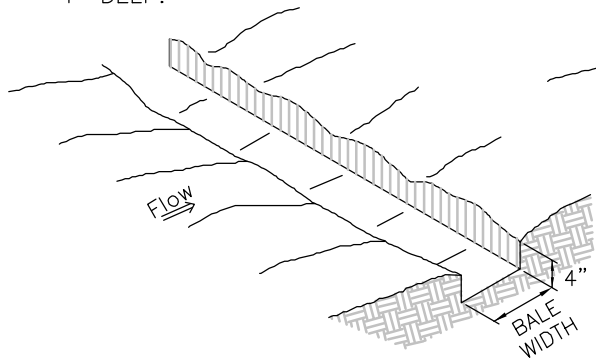
30" MIN.
OR BELOW FROST LINE

	REVISIONS	AMERICAN WATER STANDARD CIVIL OPTIONAL VALVE BOX INSTALLATION DETAIL	
		AMERICAN WATER VOORHEES, NJ 08043	
		AMERICAN WATER ENG. CENTER 213 CARRIAGE LANE DELRAN, NJ 08075	
		DRAWN BY RJB PROJECT ENG'R APPROVED	DATE 10-04-07 PROJECT IP
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES		0201-0601-SD61	

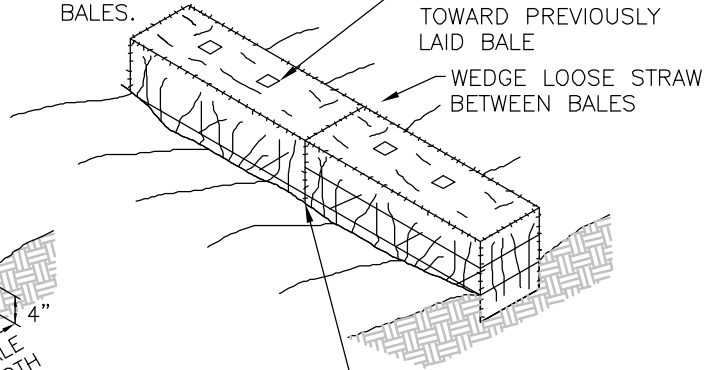


PROPERLY INSTALLED STRAW BALE
(CROSS-SECTION)

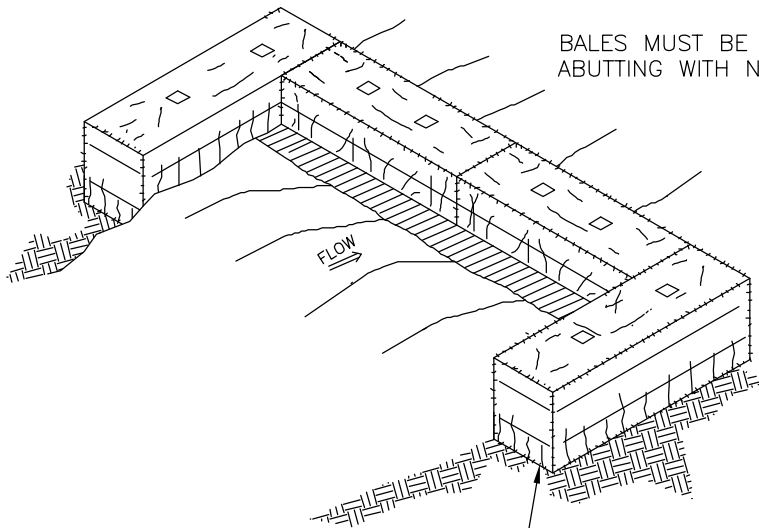
1. EXCAVATE THE TRENCH MIN. 4" DEEP.



2. PLACE AND STAKE STRAW BALES.



3. BACKFILL AND COMPACT THE EXCAVATED SOIL.



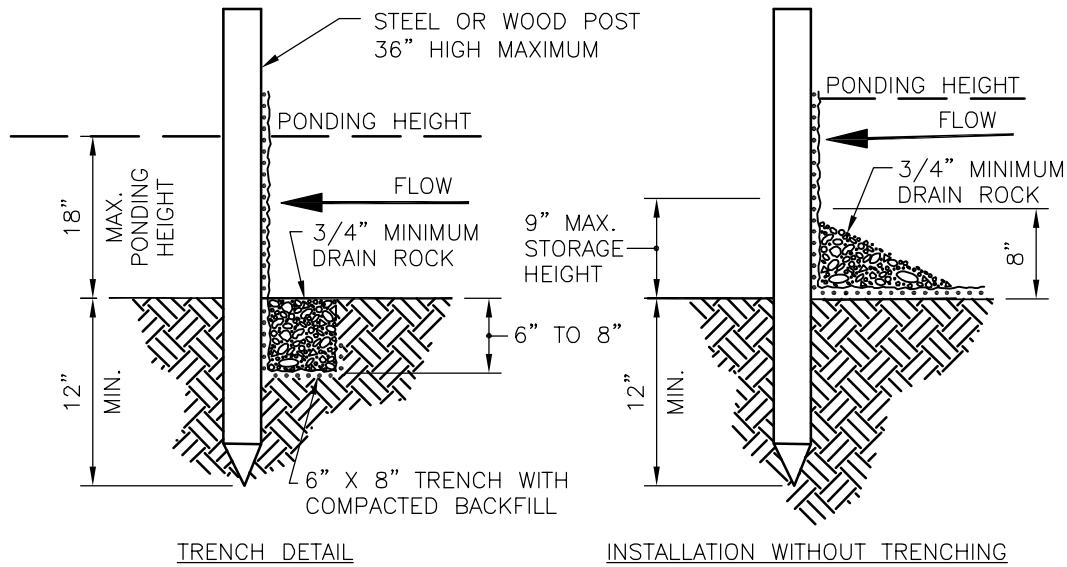
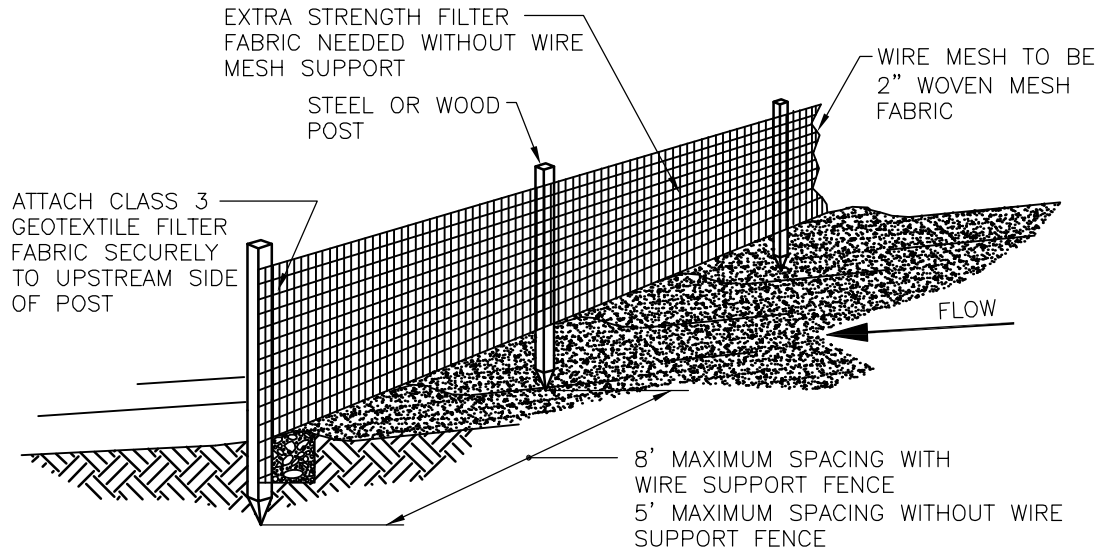
BALES MUST BE TIGHTLY ABUTTING WITH NO GAPS

END BALES WHEN NECESSARY TO PREVENT FLOW AROUND ENDS

NOTES:

1. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 4" ABOVE GROUND HEIGHT.
2. ANY SECTION, WHICH HAS BEEN UNDERMINED OR TOPPED, MUST BE IMMEDIATELY REPLACED.
3. ENDS OF STRAW BALES MUST BE INSTALLED TO PROHIBIT RUNOFF FROM BEING ALLOWED TO FLOW AROUND ENDS.

	REVISIONS	AMERICAN WATER STANDARD CIVIL TEMPORARY STRAW BALE SEDIMENT BARRIER DETAILS	
		AMERICAN WATER VOORHEES, NJ 08043	
		AMERICAN WATER OPERATIONAL SERVICES 3906 CHURCH ROAD MOUNT LAUREL, NJ 08054	
		DRAWN BY RJB PROJECT ENGR APPROVED	DATE 11-07-07 PROJECT IP
		USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	0201-0601-SD67



NOTES:

1. FILTER FABRIC FENCE MUST BE INSTALLED AT LEVEL GRADE. BOTH ENDS OF EACH FENCE SECTION MUST EXTEND AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.
2. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF 9" ABOVE GROUND HEIGHT OF THE FENCE.
3. ANY FENCE SECTION, WHICH HAS BEEN UNDERMINED OR TOPPED, MUST BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET. (SEE ROCK FILTER OUTLET DETAIL).
4. WHERE ENDS OF FILTER FABRIC COME TOGETHER, THEY MUST BE OVERLAPPED, FOLDED AND STAPLED TO PREVENT SEDIMENT BYPASS. THE TOE ANCHOR MUST BE BACKFILLED AND COMPACTED TO A DENSITY EQUAL TO THE SURROUNDING SOILS.

<p style="text-align: center;">REVISIONS</p>	<p>AMERICAN WATER STANDARD CIVIL SILT FENCE DETAIL</p>	
	<p>AMERICAN WATER VOORHEES, NJ 08043</p>	
	<p>AMERICAN WATER OPERATIONAL SERVICES 3906 CHURCH ROAD MOUNT LAUREL, NJ 08054</p>	
	<p>DRAWN BY RJB PROJECT ENGR APPROVED</p>	<p>DATE 11-07-07 PROJECT IP</p>
<p>USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES</p>		<p>0201-0601-SD68</p>

For more location information
please visit www.strand.com

Office Locations

Brenham, TX | 979.836.7937

Cincinnati, Ohio | 513.861.5600

Columbus, Indiana | 812.372.9911

Columbus, Ohio | 614.835.0460

Indianapolis, Indiana | 317.423.0935

Joliet, Illinois | 815.744.4200

Lexington, Kentucky | 859.225.8500

Louisville, Kentucky | 502.583.7020

Madison, Wisconsin* | 608.251.4843

Milwaukee, Wisconsin | 414.271.0771

Phoenix, Arizona | 602.437.3733

*Corporate Headquarters



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 ENCASUREMENT 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 ENCASUREMENT 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 ENCASUREMENT 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 complete 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 complete 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 LINE MARKER This item is for payment for furnishing and installing a ground level 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, 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, 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 where 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.

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Section: 0001 - PAVING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0010	00003		CRUSHED STONE BASE	17,672.00	TON		\$	
0020	00013		LIME STABILIZED ROADBED	51,366.00	SQYD		\$	
0030	00014		LIME	1,373.00	TON		\$	
0040	00212		CL2 ASPH BASE 1.00D PG64-22	21,722.00	TON		\$	
0050	00301		CL2 ASPH SURF 0.38D PG64-22	4,250.00	TON		\$	
0060	00358		ASPHALT CURING SEAL	52.00	TON		\$	
0070	02598		FABRIC-GEOTEXTILE TYPE III	7,595.00	SQYD		\$	
0080	02702		SAND FOR BLOTTER	128.00	TON		\$	
0090	24779EC		INTELLIGENT COMPACTION FOR SOIL (ADDED: 11-12-15)	247,356.00	CUYD		\$	
0100	24780EC		INTELLIGENT COMPACTION FOR AGGREGATE (ADDED: 11-12-15)	17,672.00	TON		\$	
0110	24781EC		INTELLIGENT COMPACTION FOR ASPHALT (ADDED: 11-12-15)	25,972.00	TON		\$	

Section: 0002 - ROADWAY

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0120	01000		PERFORATED PIPE-4 IN	1,140.00	LF		\$	
0130	01010		NON-PERFORATED PIPE-4 IN	76.00	LF		\$	
0140	01020		PERF PIPE HEADWALL TY 1-4 IN	6.00	EACH		\$	
0150	01024		PERF PIPE HEADWALL TY 2-4 IN	7.00	EACH		\$	
0160	01810		STANDARD CURB AND GUTTER (REVISED: 11-12-15)	101.70	LF		\$	
0170	01825		ISLAND CURB AND GUTTER (REVISED: 11-12-15)	26,758.00	LF		\$	
0180	01987		DELINEATOR FOR GUARDRAIL BI DIRECTIONAL WHITE	60.00	EACH		\$	
0190	02014		BARRICADE-TYPE III	18.00	EACH		\$	
0200	02091		REMOVE PAVEMENT	285.00	SQYD		\$	
0210	02159		TEMP DITCH	14,791.00	LF		\$	
0220	02200		ROADWAY EXCAVATION	247,356.00	CUYD		\$	
0230	02242		WATER	10.00	MGAL		\$	
0240	02351		GUARDRAIL-STEEL W BEAM-S FACE	2,375.00	LF		\$	
0250	02363		GUARDRAIL CONNECTOR TO BRIDGE END TY A	8.00	EACH		\$	
0260	02367		GUARDRAIL END TREATMENT TYPE 1	12.00	EACH		\$	
0270	02373		GUARDRAIL END TREATMENT TYPE 3	1.00	EACH		\$	
0280	02429		RIGHT-OF-WAY MONUMENT TYPE 1	115.00	EACH		\$	
0290	02432		WITNESS POST	3.00	EACH		\$	
0300	02483		CHANNEL LINING CLASS II	3,720.00	TON		\$	
0310	02484		CHANNEL LINING CLASS III	1,741.00	TON		\$	
0320	02545		CLEARING AND GRUBBING 66.63 ACRES	1.00	LS		\$	
0330	02555		CONCRETE-CLASS B	9.00	CUYD		\$	
0340	02596		FABRIC-GEOTEXTILE TYPE I	1,538.00	SQYD		\$	
0350	02599		FABRIC-GEOTEXTILE TYPE IV	18,519.00	SQYD		\$	
0360	02650		MAINTAIN & CONTROL TRAFFIC	1.00	LS		\$	

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0370	02701		TEMP SILT FENCE	7,375.00	LF		\$	
0380	02703		SILT TRAP TYPE A	134.00	EACH		\$	
0390	02704		SILT TRAP TYPE B	134.00	EACH		\$	
0400	02705		SILT TRAP TYPE C	67.00	EACH		\$	
0410	02706		CLEAN SILT TRAP TYPE A	402.00	EACH		\$	
0420	02707		CLEAN SILT TRAP TYPE B	402.00	EACH		\$	
0430	02708		CLEAN SILT TRAP TYPE C	201.00	EACH		\$	
0440	02726		STAKING	1.00	LS		\$	
0450	05950		EROSION CONTROL BLANKET	5,813.00	SQYD		\$	
0460	05953		TEMP SEEDING AND PROTECTION	206,250.00	SQYD		\$	
0470	05963		INITIAL FERTILIZER	.53	TON		\$	
0480	05964		20-10-10 FERTILIZER	.88	TON		\$	
0490	05985		SEEDING AND PROTECTION	148,000.00	SQYD		\$	
0500	05992		AGRICULTURAL LIMESTONE	10.59	TON		\$	
0510	06514		PAVE STRIPING-PERM PAINT-4 IN	45,639.00	LF		\$	
0520	06569		PAVE MARKING-THERMO CROSS-HATCH	11,098.00	SQFT		\$	
0530	06574		PAVE MARKING-THERMO CURV ARROW	10.00	EACH		\$	
0540	06576		PAVE MARKING-THERMO ONLY	5.00	EACH		\$	
0550	10020NS		FUEL ADJUSTMENT	129,468.00	DOLL	\$1.00	\$	\$129,468.00
0560	10030NS		ASPHALT ADJUSTMENT	101,540.00	DOLL	\$1.00	\$	\$101,540.00
0570	20166ES810		TEMPORARY PIPE	53.00	LF		\$	
0580	20210EP69		COHESIVE PILE CORE	13,458.00	CUYD		\$	
0590	20782NS714		PAVE MARKING THERMO-BIKE	17.00	EACH		\$	
0600	24386EC		PAVE MARKING THERMO-BIKE LANE ARROW	17.00	EACH		\$	
0610	24814EC		PIPELINE INSPECTION	14,074.00	LF		\$	

Section: 0003 - DRAINAGE

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0620	00440		ENTRANCE PIPE-15 IN	232.00	LF		\$	
0630	00441		ENTRANCE PIPE-18 IN	162.00	LF		\$	
0640	00462		CULVERT PIPE-18 IN	160.00	LF		\$	
0650	00466		CULVERT PIPE-30 IN	155.00	LF		\$	
0660	00469		CULVERT PIPE-42 IN	86.00	LF		\$	
0670	00470		CULVERT PIPE-48 IN	243.00	LF		\$	
0680	00471		CULVERT PIPE-54 IN	269.00	LF		\$	
0690	00472		CULVERT PIPE-60 IN	260.00	LF		\$	
0700	00521		STORM SEWER PIPE-15 IN	7,348.00	LF		\$	
0710	00522		STORM SEWER PIPE-18 IN	2,329.00	LF		\$	
0720	00524		STORM SEWER PIPE-24 IN	2,321.00	LF		\$	
0730	00526		STORM SEWER PIPE-30 IN	202.00	LF		\$	
0740	00528		STORM SEWER PIPE-36 IN	110.00	LF		\$	
0750	01202		PIPE CULVERT HEADWALL-15 IN	2.00	EACH		\$	
0760	01204		PIPE CULVERT HEADWALL-18 IN	5.00	EACH		\$	
0770	01208		PIPE CULVERT HEADWALL-24 IN	1.00	EACH		\$	
0780	01210		PIPE CULVERT HEADWALL-30 IN	4.00	EACH		\$	
0790	01212		PIPE CULVERT HEADWALL-36 IN	1.00	EACH		\$	
0800	01216		PIPE CULVERT HEADWALL-48 IN	2.00	EACH		\$	

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0810	01220		PIPE CULVERT HEADWALL-60 IN	2.00	EACH		\$	
0820	01450		S & F BOX INLET-OUTLET-18 IN	3.00	EACH		\$	
0830	01456		CURB BOX INLET TYPE A	68.00	EACH		\$	
0840	01480		CURB BOX INLET TYPE B	11.00	EACH		\$	
0850	01490		DROP BOX INLET TYPE 1	1.00	EACH		\$	
0860	01493		DROP BOX INLET TYPE 2	1.00	EACH		\$	
0870	01511		DROP BOX INLET TYPE 5D	8.00	EACH		\$	
0880	01568		DROP BOX INLET TYPE 13S	1.00	EACH		\$	
0890	24026EC		PIPE CULVERT HEADWALL-54 IN	3.00	EACH		\$	

Section: 0004 - BRIDGE-27364

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
0900	02231		STRUCTURE GRANULAR BACKFILL	792.60	CUYD		\$	
0910	02998		MASONRY COATING	645.00	SQYD		\$	
0920	03299		ARMORED EDGE FOR CONCRETE	66.00	LF		\$	
0930	08019		CYCLOPEAN STONE RIP RAP	1,686.00	TON		\$	
0940	08033		TEST PILES	61.00	LF		\$	
0950	08046		PILES-STEEL HP12X53	492.00	LF		\$	
0960	08094		PILE POINTS-12 IN	20.00	EACH		\$	
0970	08100		CONCRETE-CLASS A	126.80	CUYD		\$	
0980	08104		CONCRETE-CLASS AA	336.50	CUYD		\$	
0990	08151		STEEL REINFORCEMENT-EPOXY COATED	66,894.00	LB		\$	
1000	23813EC		DECK DRAIN	8.00	EACH		\$	
1010	24804EC		PPC I-BEAM 4N 78 49	745.00	LF		\$	
1020	24808ED		RAIL SYSTEM TYPE 3 MODIFIED-42 IN	150.50	LF		\$	
1030	24809ED		RAIL SYSTEM TYPE 3 MODIFIED-48 IN	150.50	LF		\$	

Section: 0005 - BRIDGE-27363

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1040	02230		EMBANKMENT IN PLACE	374.20	CUYD		\$	
1050	02998		MASONRY COATING	972.00	SQYD		\$	
1060	03299		ARMORED EDGE FOR CONCRETE	66.00	LF		\$	
1070	08001		STRUCTURE EXCAVATION-COMMON	370.00	CUYD		\$	
1080	08002		STRUCTURE EXCAV-SOLID ROCK	46.00	CUYD		\$	
1090	08019		CYCLOPEAN STONE RIP RAP	962.00	TON		\$	
1100	08033		TEST PILES	50.00	LF		\$	
1110	08046		PILES-STEEL HP12X53	303.00	LF		\$	
1120	08094		PILE POINTS-12 IN	16.00	EACH		\$	
1130	08100		CONCRETE-CLASS A	263.00	CUYD		\$	
1140	08104		CONCRETE-CLASS AA	504.40	CUYD		\$	
1150	08150		STEEL REINFORCEMENT	33,153.00	LB		\$	
1160	08151		STEEL REINFORCEMENT-EPOXY COATED	128,623.00	LB		\$	
1170	08637		PRECAST PC I BEAM TYPE 7	1,199.20	LF		\$	
1180	23813EC		DECK DRAIN	10.00	EACH		\$	
1190	24808ED		RAIL SYSTEM TYPE 3 MODIFIED-42 IN	243.00	LF		\$	
1200	24809ED		RAIL SYSTEM TYPE 3 MODIFIED-48 IN	243.00	LF		\$	

PROPOSAL BID ITEMS

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Section: 0006 - SEWER

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1210	02690		SAFELOADING 8 IN PIPE	2.00	CUYD		\$	
1220	02690		SAFELOADING 21 IN PIPE	21.00	CUYD		\$	
1230	05985		SEEDING AND PROTECTION	325.00	SQYD		\$	
1240	14074		W PLUG EXISTING MAIN 8 IN	1.00	EACH		\$	
1250	14074		W PLUG EXISTING MAIN 21 IN	2.00	EACH		\$	
1260	15025		S ENCASEMENT STEEL OPEN CUT RANGE 6	200.00	LF		\$	
1270	15092		S MANHOLE 5 FT DIA	2.00	EACH		\$	
1280	15112		S PIPE PVC 08 INCH	48.00	LF		\$	
1290	21934NN		BYPASS PUMPING 8 IN	40.00	HOURL		\$	
1300	21934NN		BYPASS PUMPING 21 IN	120.00	HOURL		\$	
1310	22801NN		ABANDON AND SAFELOAD MANHOLE	3.00	EACH		\$	
1320	23726EC		SANITARY SEWER MANHOLE-DOGHOUSE	3.00	EACH		\$	
1330	24564EN		PVC PIPE 21 IN	281.00	LF		\$	
1340	24814EC		PIPELINE INSPECTION WITH TV SURVEY	329.00	LF		\$	

Section: 0007 - SIGNING

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1350	06406		SBM ALUM SHEET SIGNS .080 IN	165.20	SQFT		\$	
1360	06407		SBM ALUM SHEET SIGNS .125 IN	178.50	SQFT		\$	
1370	06410		STEEL POST TYPE 1	900.00	LF		\$	
1380	21596ND		GMSS TYPE D	5.00	EACH		\$	
1390	24631EC		BARCODE SIGN INVENTORY	87.00	EACH		\$	

Section: 0008 - WATERLINE - ADDED: 11-12-15

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1400	01314		PLUG PIPE (ADDED: 11-12-15)	7.00	EACH		\$	
1410	14011		W ENCASEMENT STEEL BORED RANGE 6 (ADDED: 11-12-15)	680.00	LF		\$	
1420	14017		W ENCASEMENT STEEL OPEN CUT RANGE 6 (ADDED: 11-12-15)	735.00	LF		\$	
1430	14021		W FIRE HYDRANT REMOVE (ADDED: 11-12-15)	2.00	EACH		\$	
1440	14500		W AIR RELEASE VALVE 1 INCH INST (ADDED: 11-12-15)	4.00	EACH		\$	

PROPOSAL BID ITEMS

Report Date 11/12/15

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1450	14510		W FIRE HYDRANT ASSEMBLY INST (ADDED: 11-12-15)	4.00	EACH		\$	
1460	14514		W METER 1 INCH INST (ADDED: 11-12-15)	2.00	EACH		\$	
1470	14529		W PIPE DUCTILE IRON 24 INCH INST (ADDED: 11-12-15)	8,580.00	LF		\$	
1480	14561		W PLUG EXISTING MAIN INST (ADDED: 11-12-15)	1.00	EACH		\$	
1490	14584		W TIE-IN 24 INCH INST (ADDED: 11-12-15)	8.00	EACH		\$	
1500	14595		W VALVE 24 INCH INST (ADDED: 11-12-15)	13.00	EACH		\$	

Section: 0009 - DEMOBILIZATION &/OR MOBILIZATION

LINE	BID CODE	ALT	DESCRIPTION	QUANTITY	UNIT	UNIT PRIC	FP	AMOUNT
1510	02568		MOBILIZATION	1.00	LS		\$	
1520	02569		DEMOBILIZATION	1.00	LS		\$	