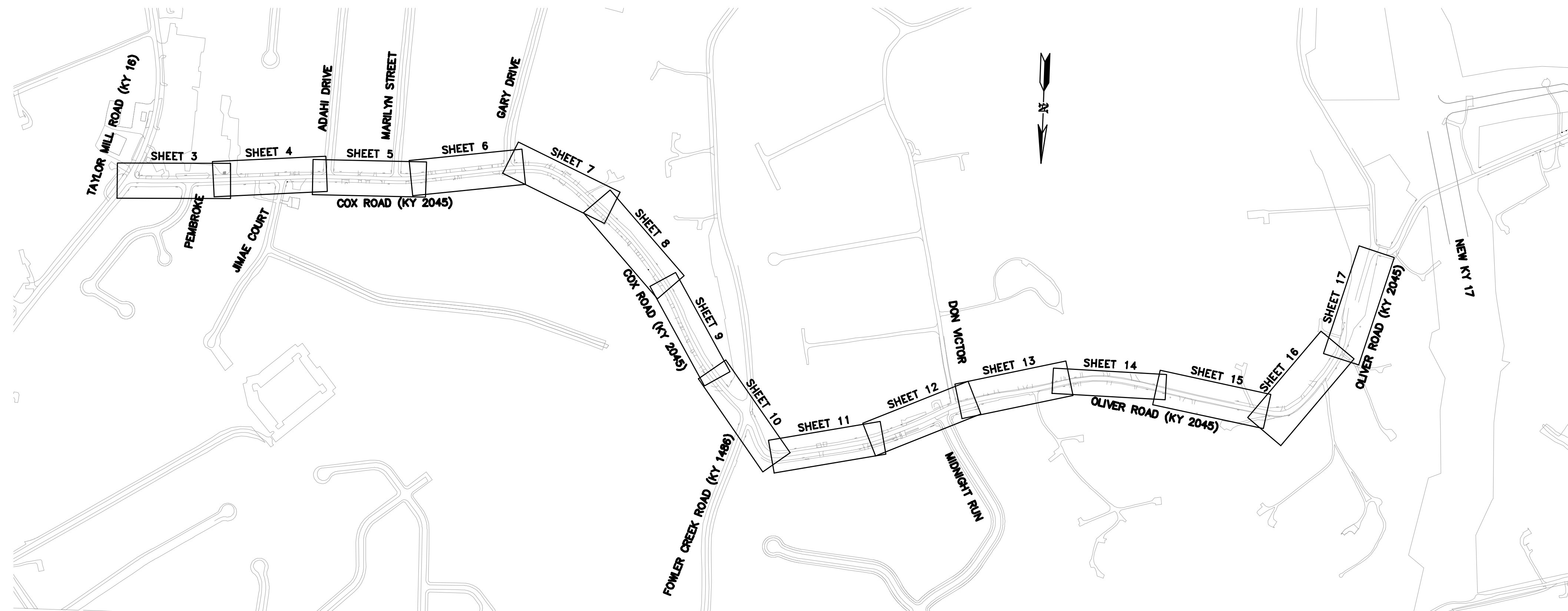


# Northern Kentucky Water District

## COX ROAD AND OLIVER ROAD 12" WATER LINE REPLACEMENT



**SHEET LAYOUT**  
SCALE: N.T.S.

### INDEX OF DRAWINGS

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RON LOVAN, PRESIDENT/CEO

COMMISSIONERS:

CLYDE CUNNINGHAM-CHAIRPERSON  
DOUGLAS C. WAGNER, CDT-VICE CHAIR  
JOSEPH J. KOESTER-TREASURER  
DR. PATRICIA SOMMERKAMP-SECRETARY  
FRED A. MACKE, JR.-COMMISSIONER  
DAVID M. SPAULDING, ESQ.-COMMISSIONER

OCTOBER 2018



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401 West Main Street, Suite 500 Louisville, KY 40202  
PHONE (502)584-4118 FAX (502)589-3009



KENTON COUNTY VICINITY MAP  
NOT TO SCALE

### RECORD DRAWINGS





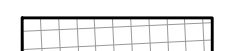

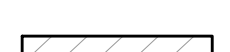

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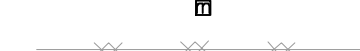






















**GENERAL NOTES**

1. THE INSTALLATION OF WATER MAINS, SERVICES AND APPURTENANCES SHALL BE IN ACCORDANCE WITH NORTHERN KENTUCKY WATER DISTRICT'S (NKWD) 2011 STANDARD SPECIFICATIONS & DRAWINGS.
2. FOR MATERIAL AND WATER MAIN INSTALLATION SPECIFICATIONS SEE NKWD STANDARD DRAWINGS #100-A THROUGH #100-G.
3. WATER MAIN PIPE SHALL BE CLASS 50 DUCTILE IRON PIPE AND CONFORM TO AWWA C151. PUSH-ON SINGLE GASKET TYPE JOINT SHALL CONFORM TO AWWA C-111. PIPE SHALL HAVE A STANDARD THICKNESS CEMENT MORTAR LINING IN CONFORMANCE WITH AWWA C104.
4. ALL FITTINGS AND ACCESSORIES SHALL BE DUCTILE IRON, RATED FOR A MINIMUM OF 200 PSI WORKING PRESSURE. ALL PIPE FITTINGS SHALL BE MECHANICAL JOINT. BOLTS AND NUTS SHALL BE HIGH STRENGTH, CORROSION RESISTANT ALLOY. FITTINGS SHALL BE IN CONFORMANCE WITH AWWA C153 AND C110. ALL DUCTILE IRON FITTINGS SHALL HAVE A BITUMINOUS SEAL COAT AND A CEMENT MORTAR LINING IN ACCORDANCE WITH AWWA C104.
5. ALL DUCTILE IRON PIPE, FITTINGS, VALVES AND FIRE HYDRANT LEADS SHALL BE POLYETHYLENE WRAPPED, INSTALLED IN ACCORDANCE WITH AWWA C105.
6. GATE VALVES SHALL BE RESILIENT SEATED, NON-RISING STEM WITH RUBBER O-RING PACKING SEALS, RATED AT 250 PSI WORKING PRESSURE, AND CONFORM TO AWWA C509.
7. VALVE BOXES SHALL BE STANDARD, ADJUSTABLE, HEAVY DUTY CAST IRON EXTENSION TYPE, TWO PIECE, 5/4 INCH SHAFT, SCREW TYPE, AND OF SUCH LENGTH AS NECESSARY TO EXTEND FROM VALVE TO FINISH GRADE. TYLE #562-S, TYLE #564S OR APPROVED EQUAL. VALVE BOX COVER SHALL BE STAMPED WATER. SEE NKWD STANDARD DRAWING #105.
8. FIRE HYDRANTS SHALL HAVE AUXILIARY VALVES FOR ISOLATING WATER FLOW TO THE HYDRANT. ALL FIRE HYDRANTS AND AUXILIARY VALVES SHALL BE POSITIVELY LOCKED TO THE WATER. SEE NKWD STANDARD DRAWING #109.
9. A MINIMUM 24 HOURS NOTICE SHALL BE GIVEN TO NKWD BY THE CONTRACTOR PRIOR TO THE START OF WATER MAIN WORK.
10. ALL BENDS OVER FIVE (5) DEGREES SHALL BE SECURELY BLOCKED AGAINST MOVEMENT WITH CONCRETE THRUST BLOCKS PLACED AGAINST UNDISTURBED EARTH IN ACCORDANCE WITH STANDARD DRAWING #104 AND #104A.
11. TRENCH BACKFILL IN PAVEMENTS AREAS SUCH AS NON-PUBLIC ROADWAYS AND DRIVEWAYS FROM 12" ABOVE THE PIPE TO SUBGRADE SHALL BE CRUSHED STONE. TRENCH BACKFILL IN EXISTING PUBLIC ROADWAYS (CITY, COUNTY & STATE) SHALL BE FLOWABLE FILL PER ARTICLE 3.20 ON NKWD STANDARD DRAWING #100-F.
12. DISINFECTION AND PRESSURE TESTING OF NEWLY INSTALL WATER MAINS AND SERVICES SHALL BE PER ARTICLES 3.21 AND 3.22 ON NKWD STANDARD DRAWING #100-G. THE COST OF TESTING THE MAIN, TEMPORARY FLUSHING DEVICES, TEMPORARY PLUG AND BLOCKS AND ABANDONING THE EXISTING WATER MAIN SHALL BE INCIDENTAL TO THE PROJECT.
13. EXISTING UNDERGROUND UTILITIES SHOWN ON THESE DRAWINGS HEREON ARE BASED ON AVAILABLE INFORMATION AND ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES BEFORE COMMENCING WORK AND FOR ANY DAMAGES WHICH OCCUR BY HIS FAILURE TO LOCATE OR PRESERVE THESE UNDERGROUND UTILITIES. IF DURING CONSTRUCTION OPERATIONS THE CONTRACTOR SHOULD ENCOUNTER UTILITIES OTHER THAN THOSE SHOWN ON THE PLANS, HE SHALL IMMEDIATELY NOTIFY THE ENGINEER AND TAKE NECESSARY AND PROPER STEPS TO PROTECT THE FACILITY AND ASSURE THE CONTINUANCE OF SERVICES.


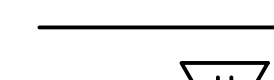


14. PRIOR TO CONSTRUCTION THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE DEPTH AND LOCATION OF CONNECTION POINTS TO THE EXISTING WATER MAIN. ADJUSTMENT OF PIPE ALIGNMENT AND PROFILE AND ADDITIONAL HORIZONTAL AND VERTICAL BENDS MAY BE REQUIRED TO ACCOMMODATE THE TIE-INS.
15. THE CONTRACTOR SHALL SUBMIT FOR NKWD APPROVAL A PHASING PLAN FOR INSTALLING AND PLACING INTO SERVICE, THE NEW WATER MAIN.
16. ALL WORK AND SCHEDULED SHUT-DOWNS FOR TIES SHALL BE COORDINATED WITH AND APPROVED BY NKWD.
17. AFTER THE NEWLY INSTALLED WATER MAIN HAS BEEN TESTED, APPROVED BY NKWD AND PLACED INTO SERVICE, EXISTING SERVICES SHALL BE TRANSFERRED OVER TO THE NEW WATER MAIN. AFTER SERVICES HAVE BEEN TRANSFERRED OVER, THE EXISTING WATER LINE SHALL BE TAKEN OUT OF SERVICE, PLUGGED AND ABANDONED IN PLACE.
18. ALL SERVICE MATERIALS SHALL BE PROVIDED BY NKWD. ALL EXISTING SERVICE LINES AND METER VAULTS AND SETTINGS WILL BE REPLACED WITH THIS PROJECT. SOME METER VAULTS WILL BE RELOCATED FURTHER AWAY FROM THE ROAD AND SOME WILL BE REPLACED AT SAME LOCATION. SEE DRAWING FOR WHICH APPLIES.
19. EXISTING FIRE HYDRANTS ON MAINS TO BE ABANDONED SHALL BE REMOVED AND RETURNED TO NKWD. FOR DEMOLITION OF HYDRANT LEAD VALVE SEE NOTE 20.
20. EXISTING GATE VALVES ON MAINS TO BE ABANDONED OR FIRE HYDRANTS TO BE REMOVED SHALL BE CLOSED. IF THE VALVE BOX IS IN A GRASSY AREA OR AREA THAT WILL BE DUG UP OR DISTURBED THE VALVE BOX SHALL BE REMOVED. IF THE VALVE BOX IS IN AN AREA THAT WILL NOT BE RESTORED, THE LID SHALL BE REMOVED AND THE VALVE BOX SHALL BE FILLED WITH CONCRETE. IF THE VALVE IS REMOVED, THE CONNECTION POINTS TO THE WATER MAIN SHALL BE PLUGGED.
21. MAILBOXES WHETHER SHOWN ON THE DRAWINGS OR NOT, REMOVED OR DAMAGED BY THE NEW WATER MAIN CONSTRUCTION, WHETHER WITHIN OR OUTSIDE OF PUBLIC RIGHT- OF-WAY, SHALL BE REPAIRED OR REPLACED WITH MATERIAL SIMILAR TO THE EXISTING. REPLACEMENT OF MAILBOXES DUE TO THE NEGLIGENCE OF THE CONTRACTOR OR DUE TO THE EXCAVATION SHALL BE INCIDENTAL TO THE PROJECT.
22. WHERE THE NEW WATER MAIN IS INSTALLED A DISTANCE 5 FEET OR LESS FROM THE EXISTING WATER MAIN, NO MORE THAN 20 FEET OF WATER MAIN TRENCH SHALL BE EXCAVATED AND REMAIN OPEN NEXT TO THE EXISTING WATER MAIN. THE NEW WATER MAIN SHALL BE INSTALLED WITHIN 20 FEET TRENCH AND BACKFILLED BEFORE PROCEEDING WITH FURTHER TRENCH EXCAVATION. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO STABILIZE AND MAINTAIN THE EXISTING WATER MAIN DURING CONSTRUCTION.
23. WHERE THE NEW WATER MAIN IS INSTALLED OUTSIDE THE ROADWAY A DISTANCE OF 3 FEET OR LESS FROM THE WATER MAIN CENTERLINE TO THE EDGE OF PAVEMENT OF PUBLIC ROADWAYS, TRENCH BACKFILL SHALL BE FLOWABLE FILL IN ACCORDANCE WITH NKWD AND KYTC STANDARD SPECIFICATIONS.

**LEGEND**

-  PROPOSED WATER LINE
-  PROPOSED WATER METER VAULT AND SETTING
-  PROPOSED GATE VALVE
-  PROPOSED SLEEVE
-  PROPOSED FIRE HYDRANT
-  MILL AND REPAVE
-  RESTORE CONCRETE
-  OPEN CUT AND CONCRETE PAVEMENT OR BITUMINOUS PAVEMENT REPLACEMENT

-  EX. TREE LINE
-  EX. TREE
-  EX. PINE TREE
-  EX. HEDGE
-  EX. SIGN
-  EX. MAILBOX
-  EX. FENCE
-  EX. OVERHEAD UTILITIES
-  EX. POWER POLE
-  EX. LIGHT POLE
-  EX. UNDERGROUND ELECTRIC
-  EX. UNDERGROUND CABLE
-  EX. UNDERGROUND TELEPHONE
-  EX. TELEPHONE MANHOLE
-  EX. WATER LINE
-  EX. WATER METER VAULT AND SETTING
-  EX. WATER VALVE
-  EX. FIRE HYDRANT
-  EX. GAS
-  EX. GAS POST
-  EX. GAS VALVE
-  EX. GAS BOX
-  EX. SANITARY SEWER
-  EX. SANITARY MANHOLE
-  EX. STORM PIPES
-  EX. CATCH BASINS
-  EX. FLOW LINE

**EROSION CONTROL LEGEND**

-  - STONE BAG INLET PROTECTION
-  - SILT FENCE
-  - HEADWALL INLET PROTECTION
-  - STONE BAG SILT/VELOCITY CHECK

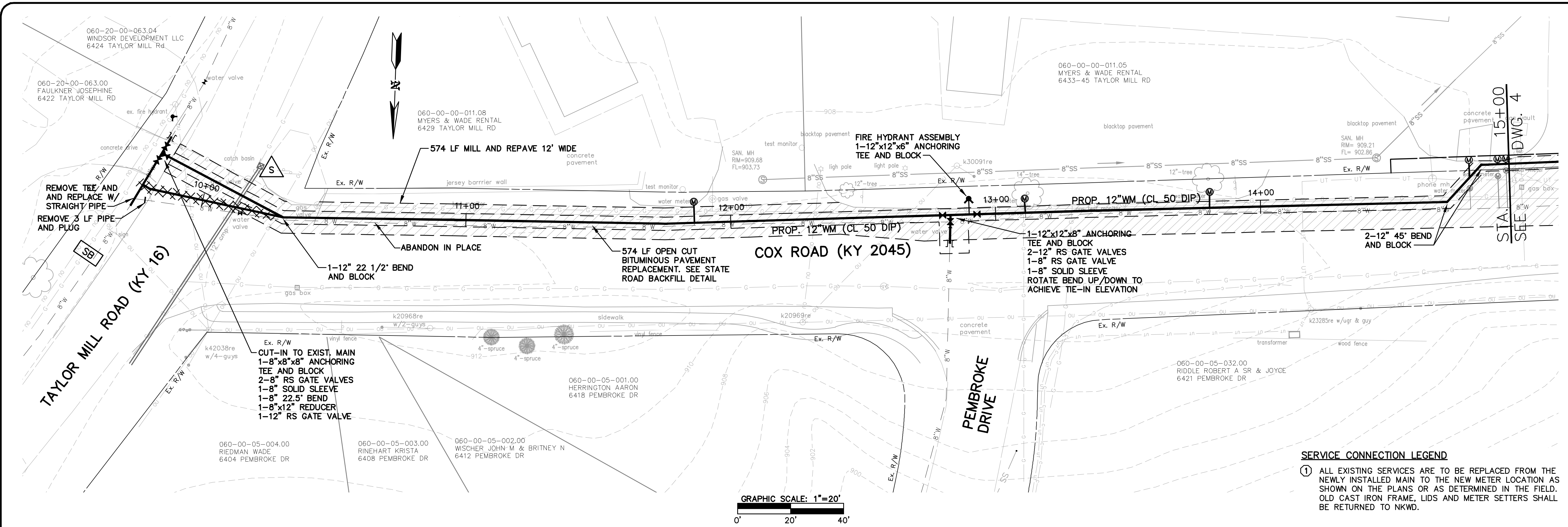
FOR EROSION CONTROL NOTES AND BMP DETAILS, SEE DRAWINGS # 28 & 29

**COX ROAD AND OLIVER ROAD  
WATER MAIN REPLACEMENT**  
NORTHERN KENTUCKY WATER DISTRICT  
KENTON COUNTY, KENTUCKY  
**GENERAL NOTES  
AND LEGEND**

**HDR**  
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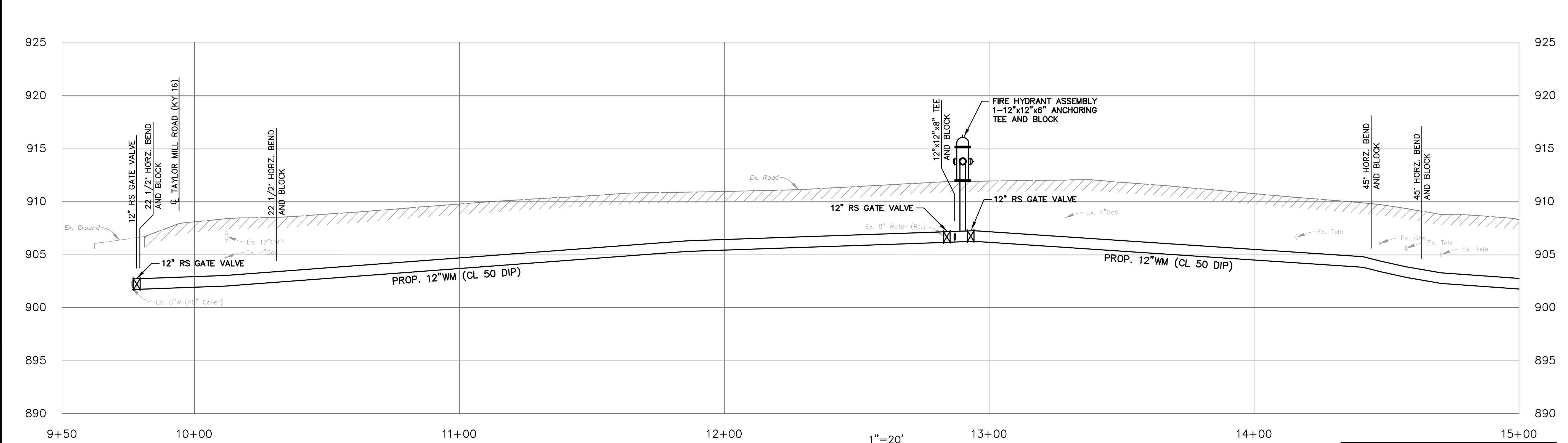
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Q/C:  
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BY:  
TITLE:  
REVISIONS:  
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**SERVICE CONNECTION LEGEND**

① ALL EXISTING SERVICES ARE TO BE REPLACED FROM THE NEWLY INSTALLED MAIN TO THE NEW METER LOCATION AS SHOWN ON THE PLANS OR AS DETERMINED IN THE FIELD. OLD CAST IRON FRAME, LIDS AND METER SETTERS SHALL BE RETURNED TO NKWD.



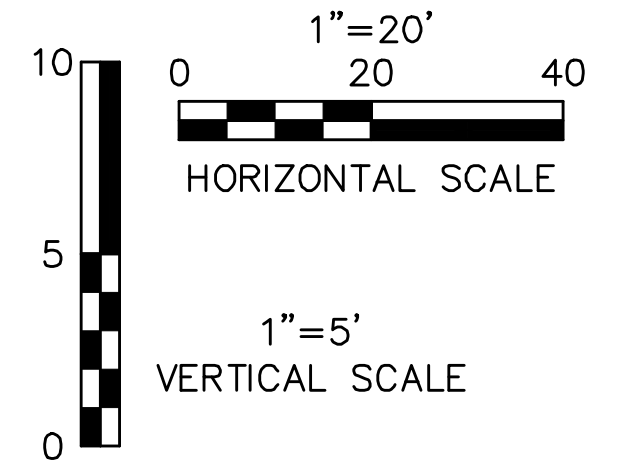
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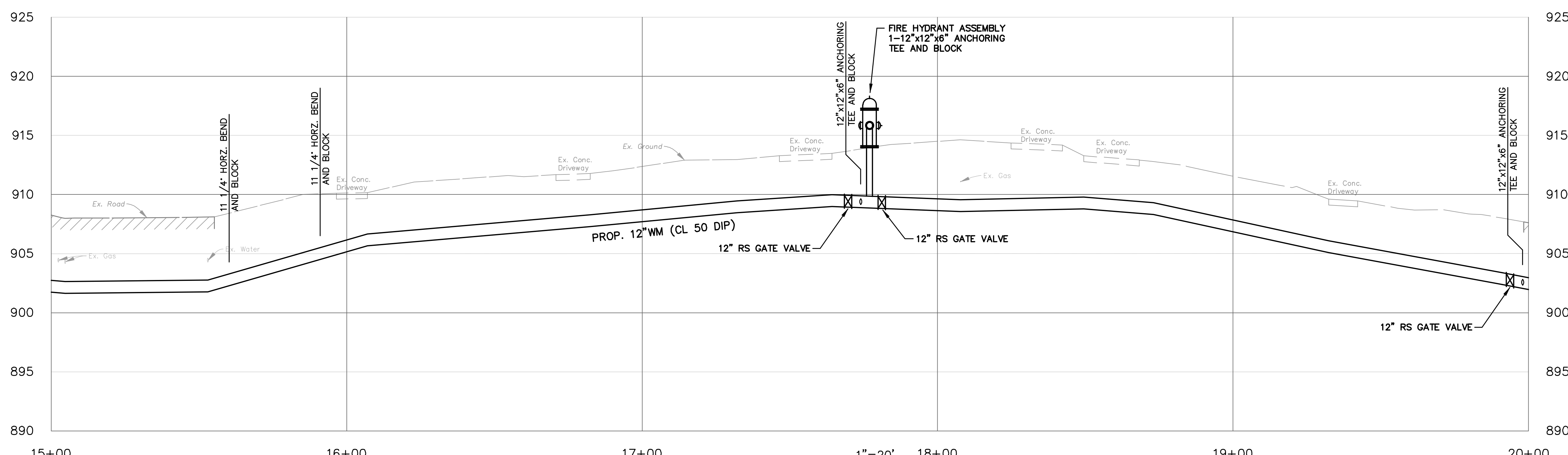
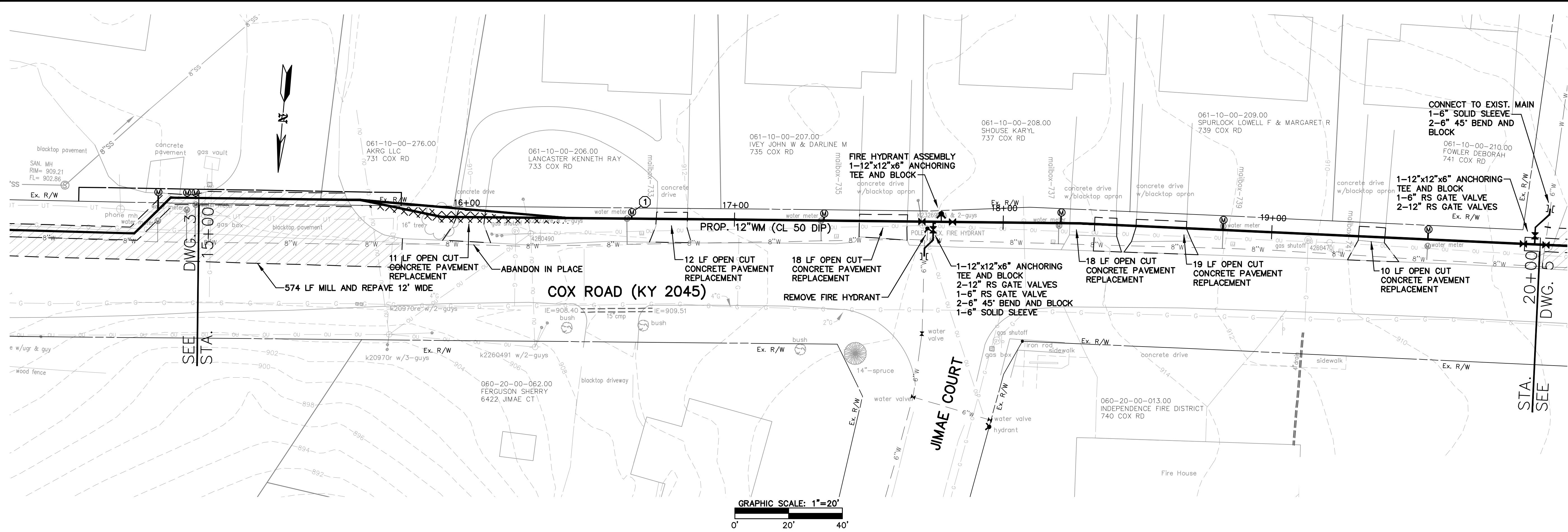
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KENTON COUNTY, KENTUCKY  
**COX ROAD 12" MAIN  
STA. 10+00 TO STA. 15+00**

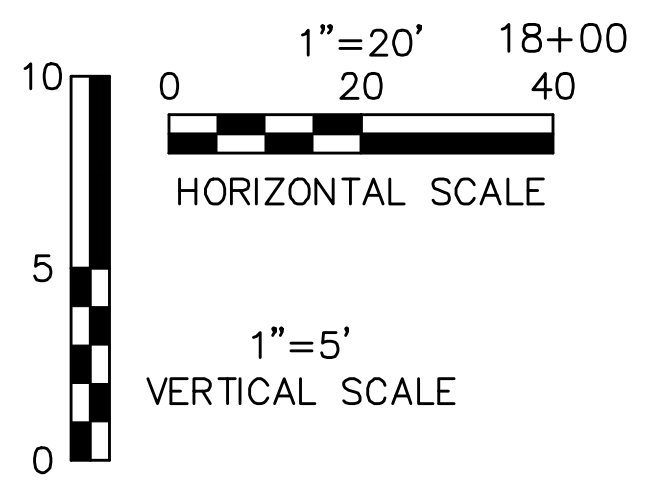
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OWNER APPROVAL:  
BY:  
TITLE:  
REVISIONS:  
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OF 21



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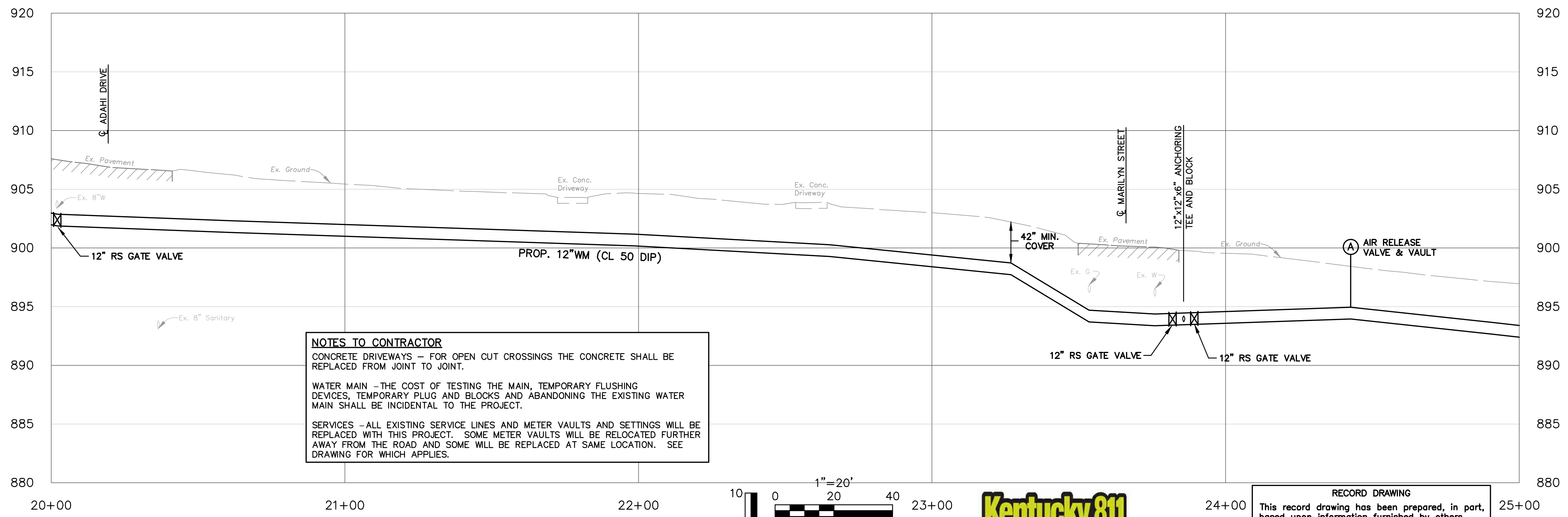
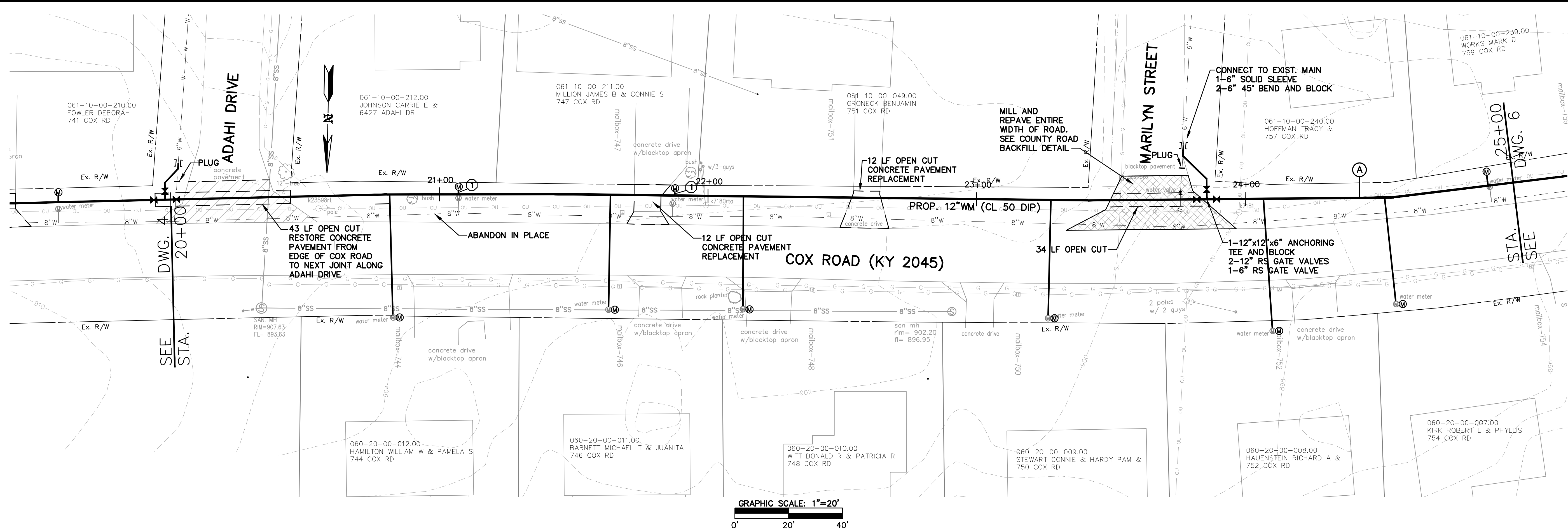
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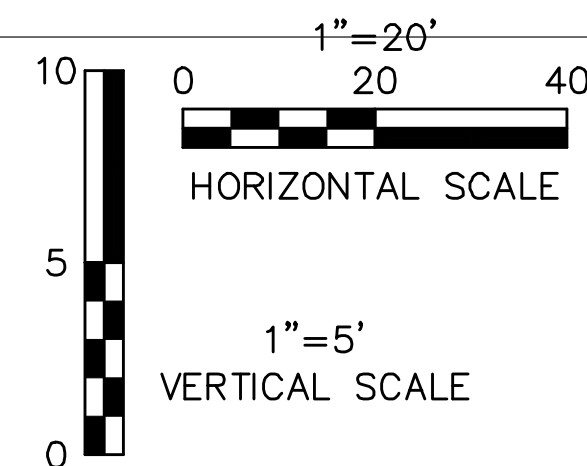
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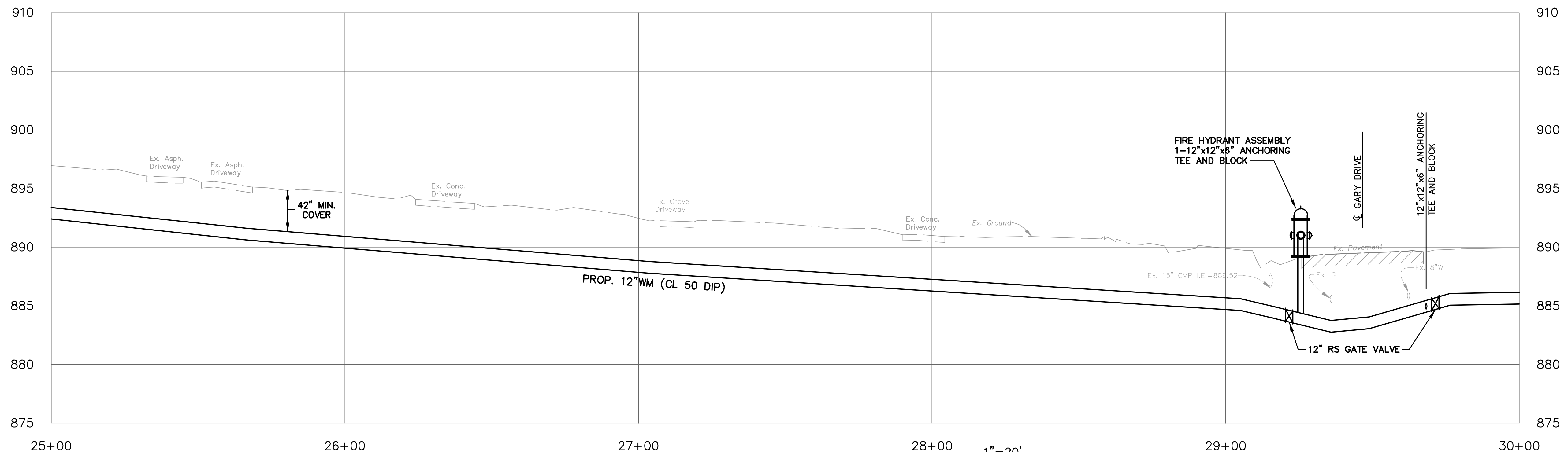
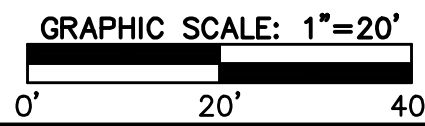
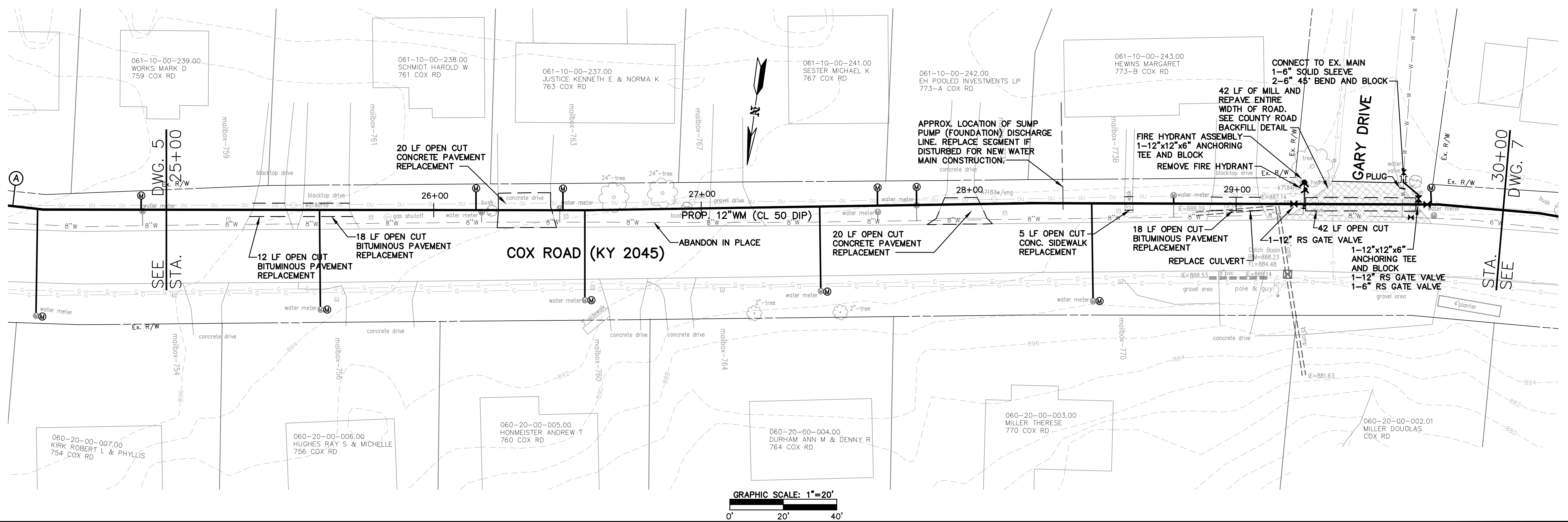
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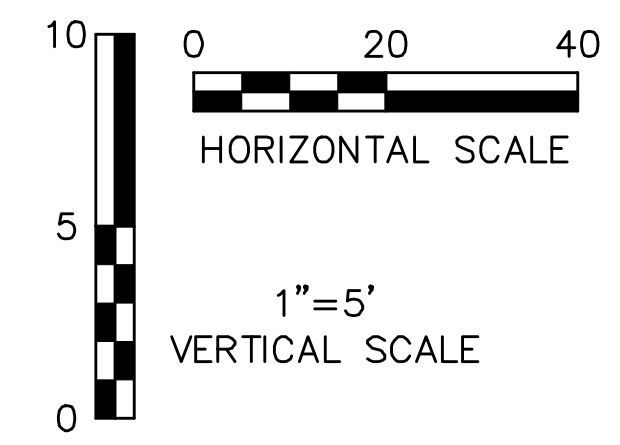
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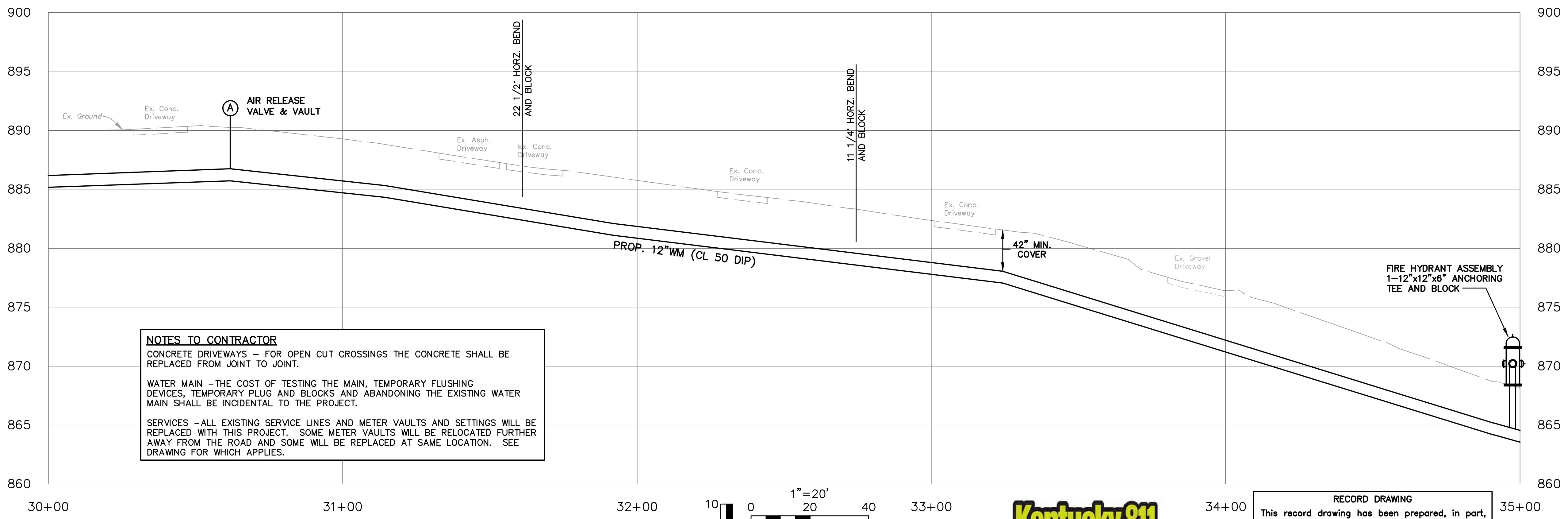
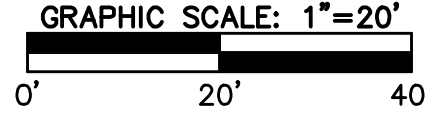
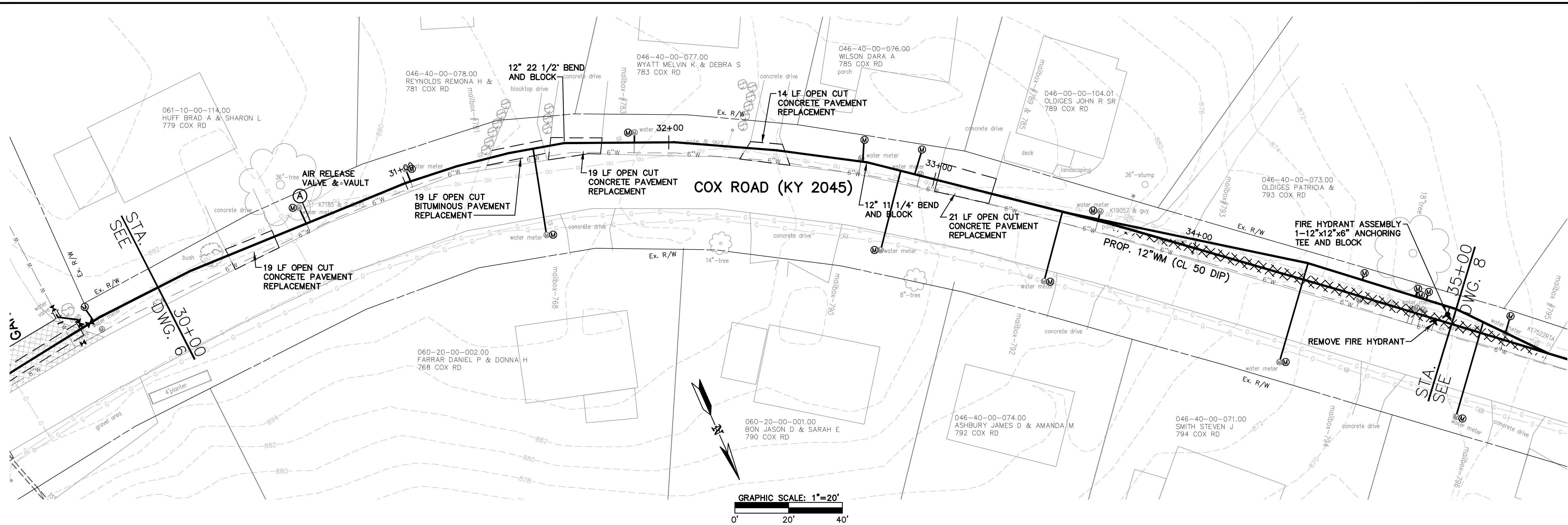
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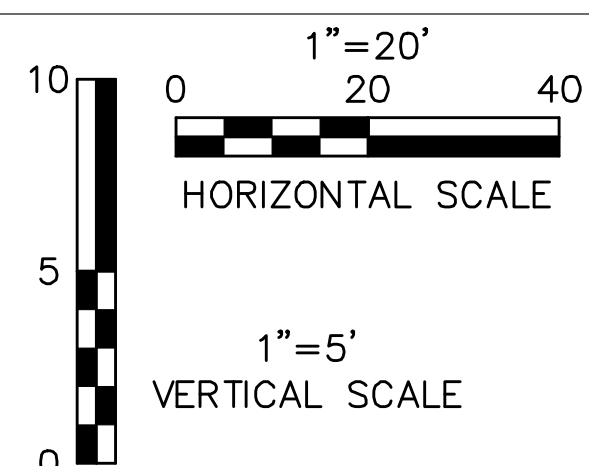
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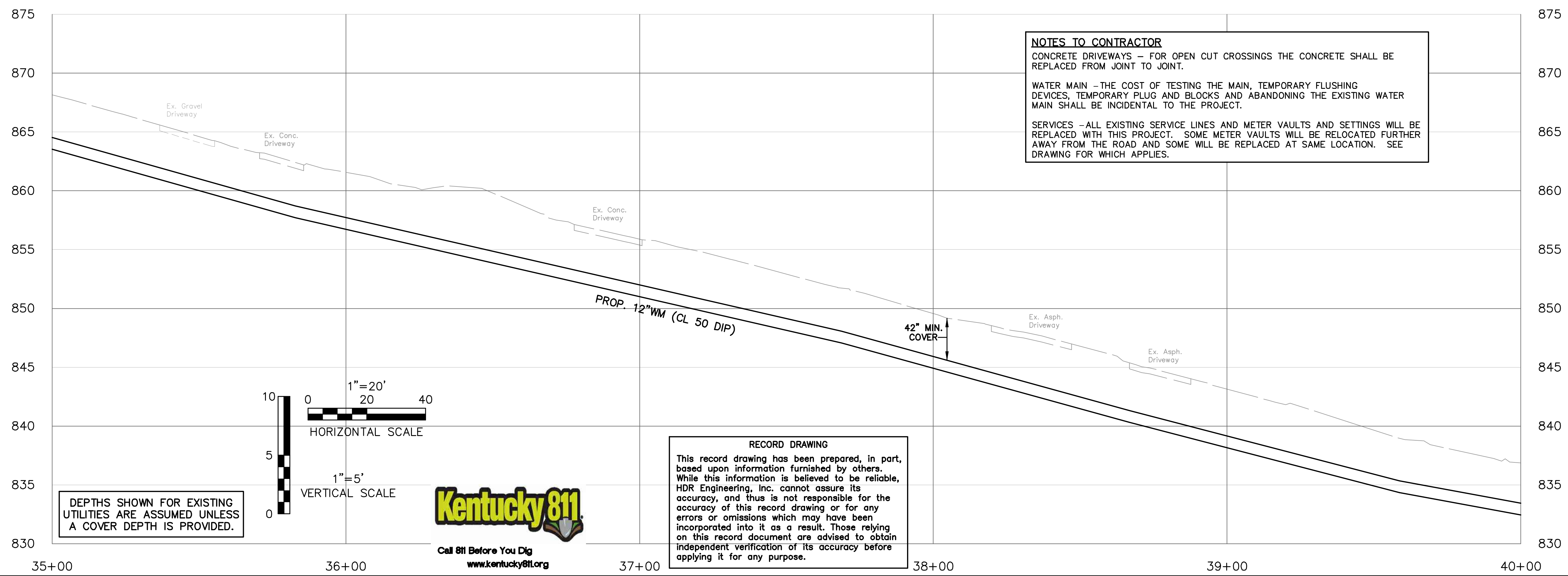
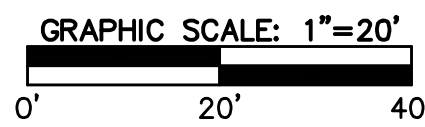
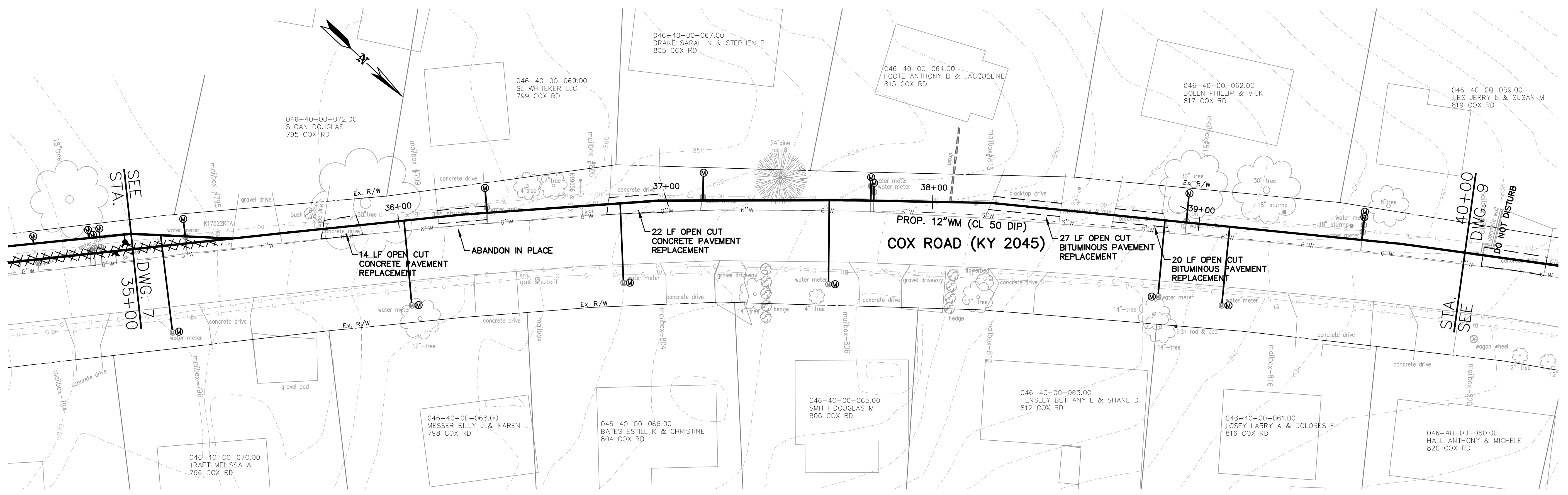
**COX ROAD AND OLIVER ROAD  
 WATER MAIN REPLACEMENT**  
 NORTHERN KENTUCKY WATER DISTRICT  
 KENTON COUNTY, KENTUCKY  
**COX ROAD 12" MAIN  
 STA. 30+00 TO STA. 35+00**

**1"=5' VERT.**  
 SCALE: 1"=20'  
 DATE: OCTOBER 2018  
 JOB NO.: 94-364  
 DESIGNED: KJB  
 DRAWN: WBB  
 CHECKED: NJB  
 Q/C:

**OWNER APPROVAL:**  
 BY:  
 TITLE:

**REVISIONS:**  
 NO.: DATE:

DRAWING:  
 7  
 OF 21



**NOTES TO CONTRACTOR**

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KENTON COUNTY, KENTUCKY  
**COX ROAD 12" MAIN  
STA. 35+00 TO STA. 40+00**

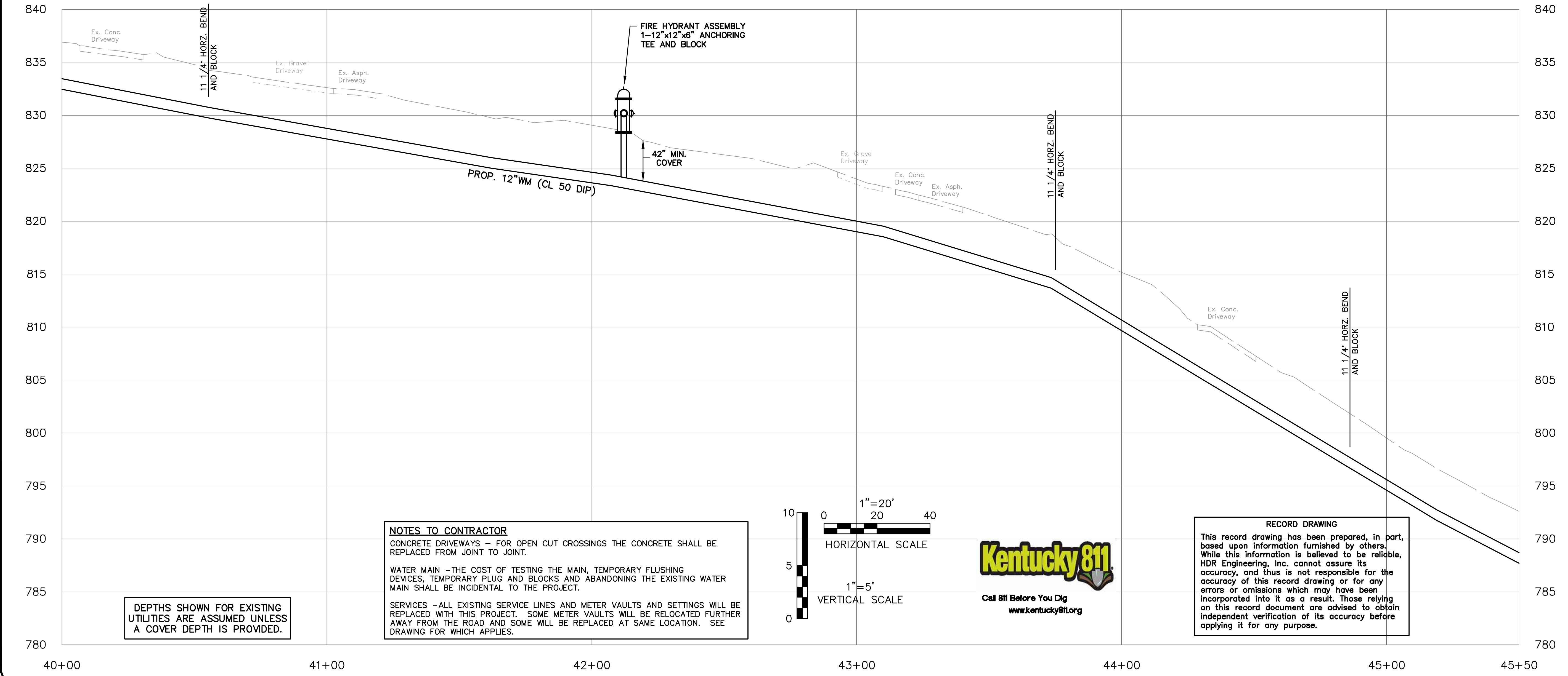
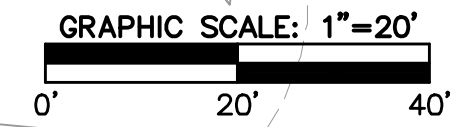
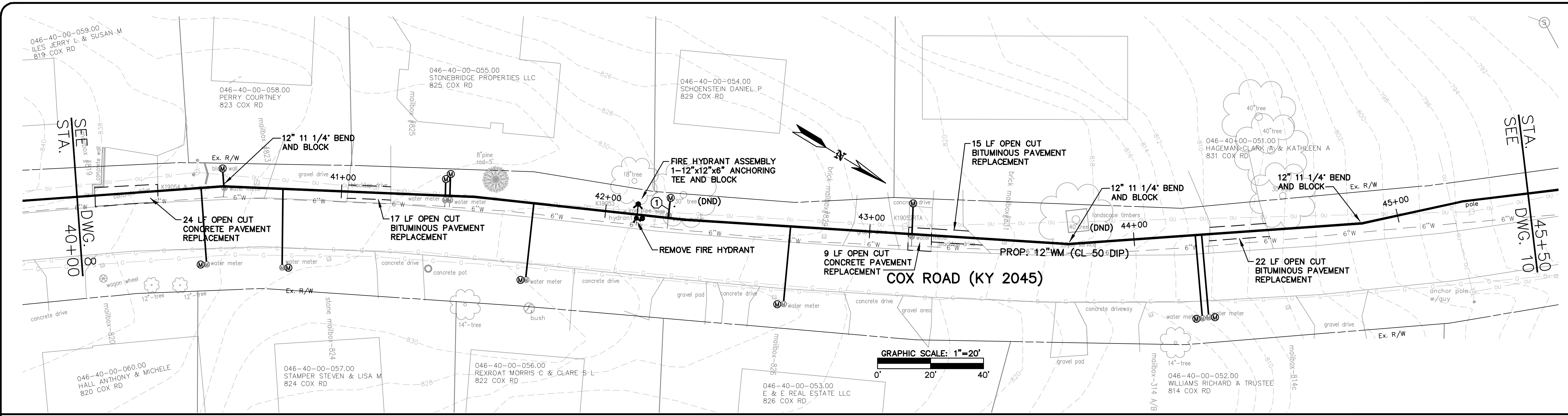
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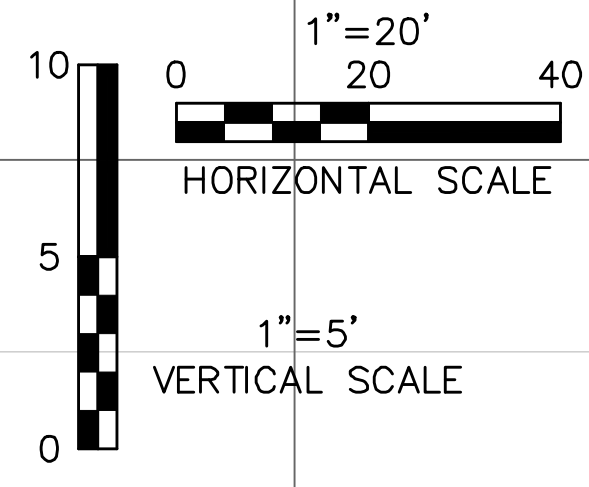
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 KENTON COUNTY, KENTUCKY  
**COX ROAD 12" MAIN  
 STA. 40+00 TO STA. 45+50**

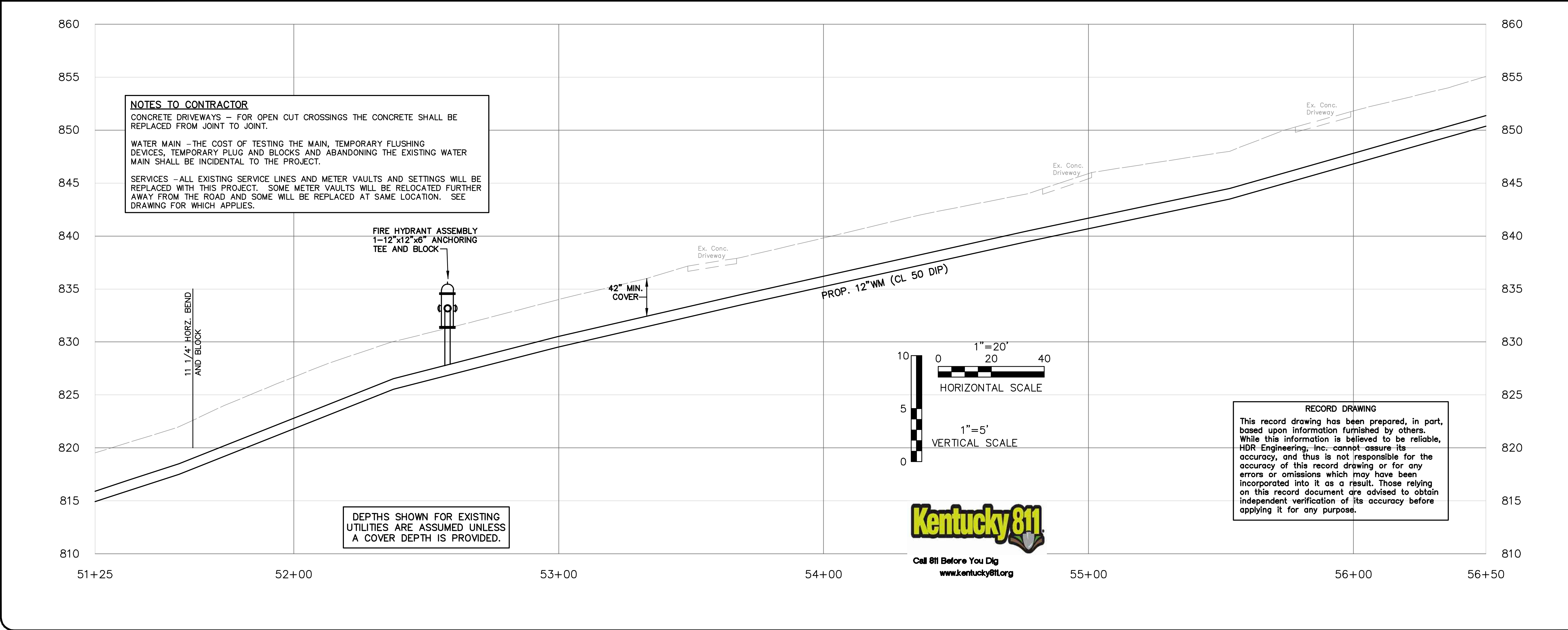
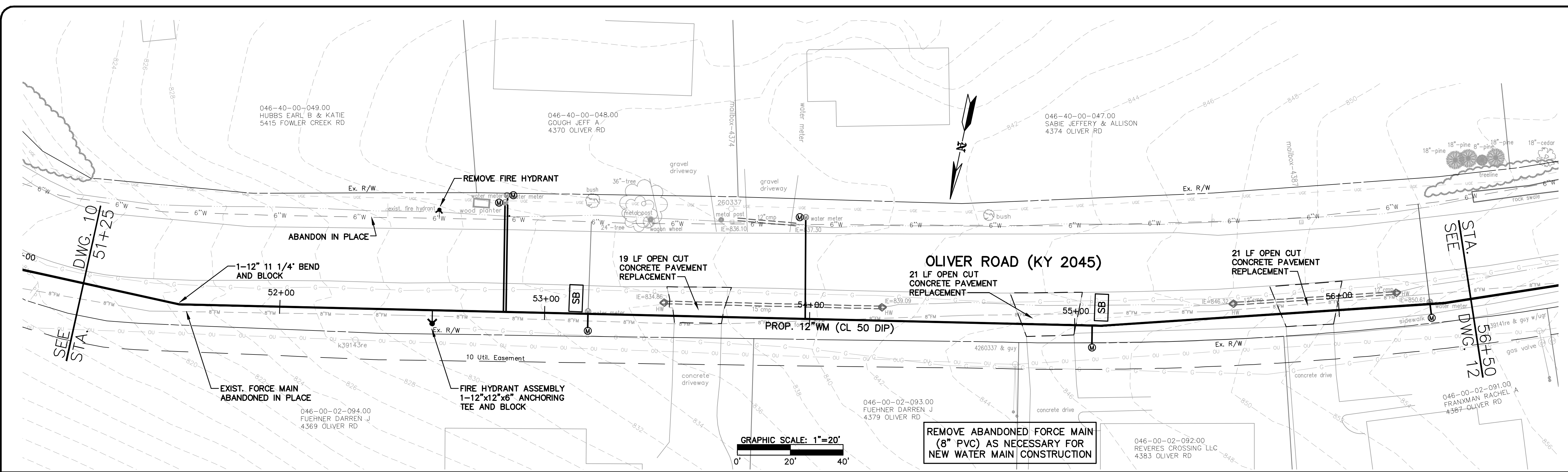
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**OLIVER ROAD 12" MAIN  
STA. 51+25 TO STA. 56+50**

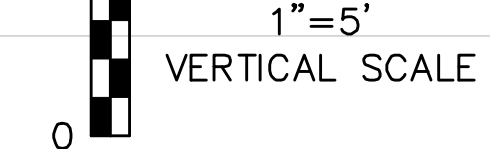
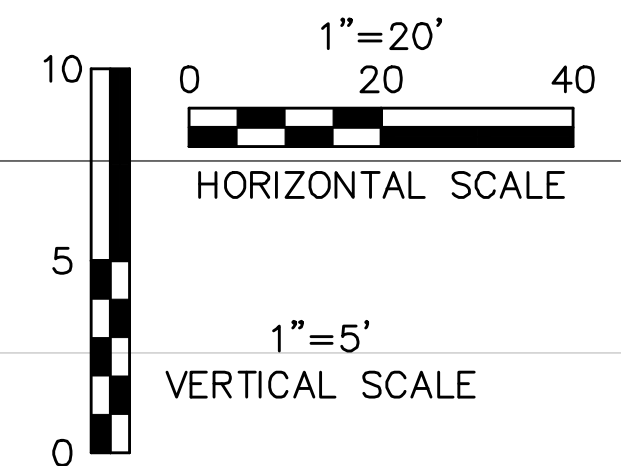
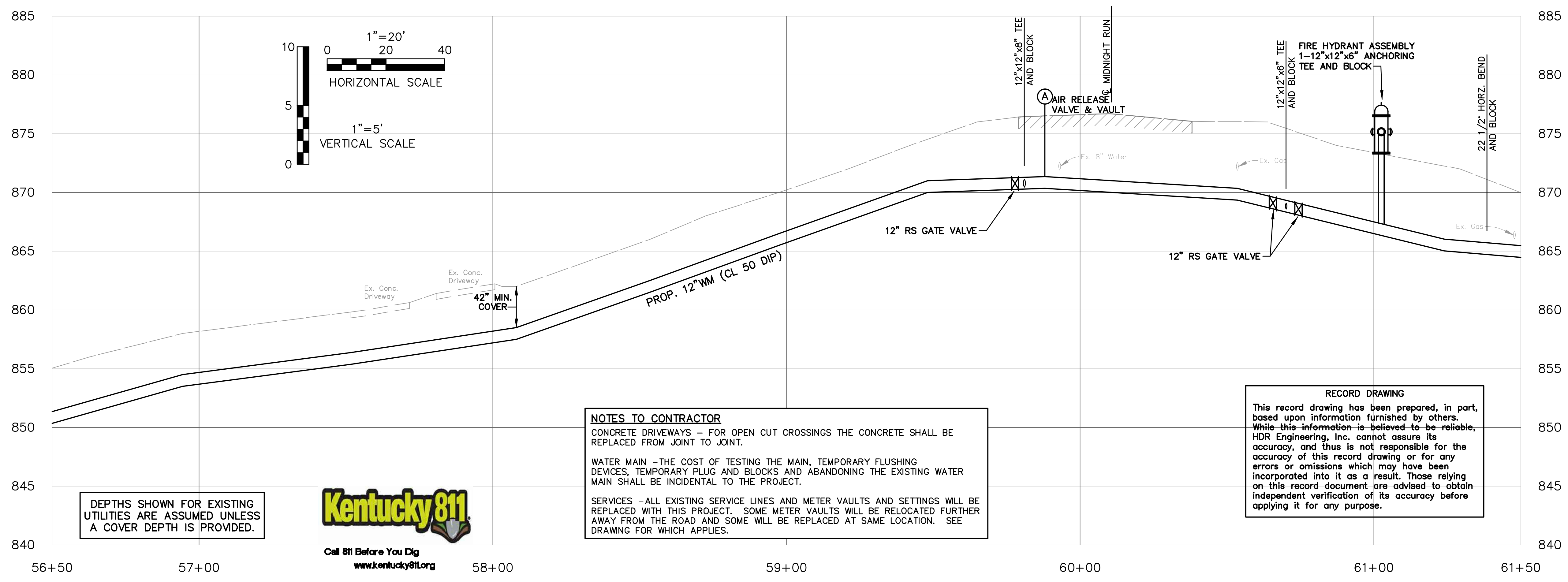
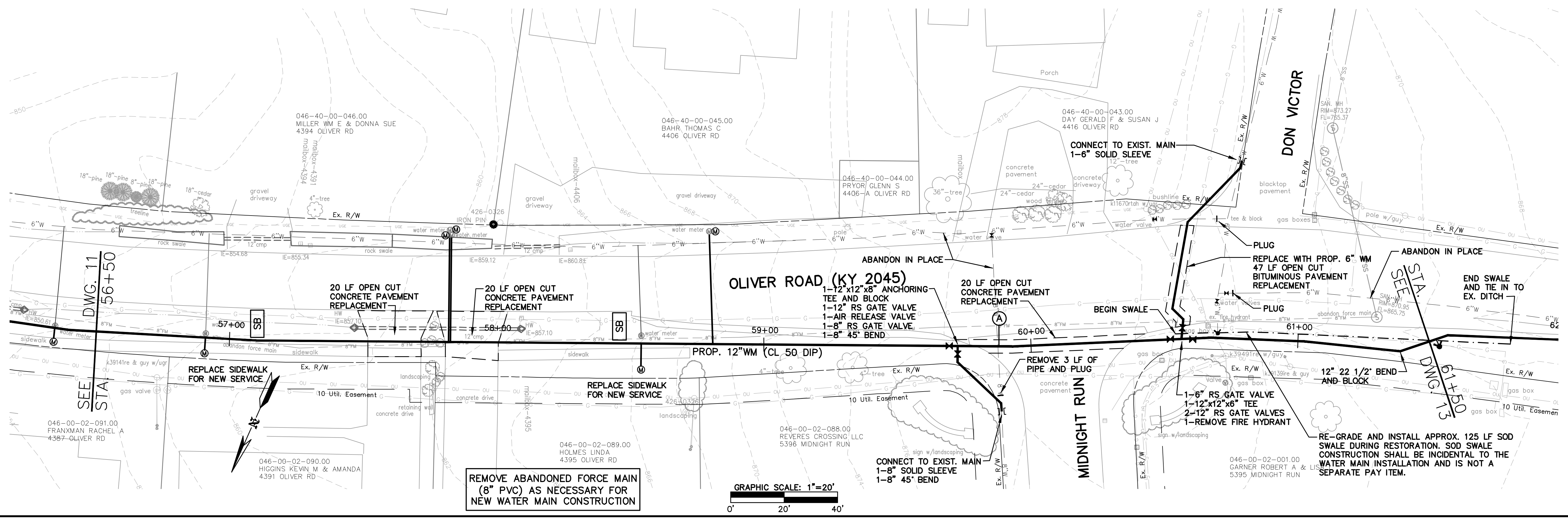
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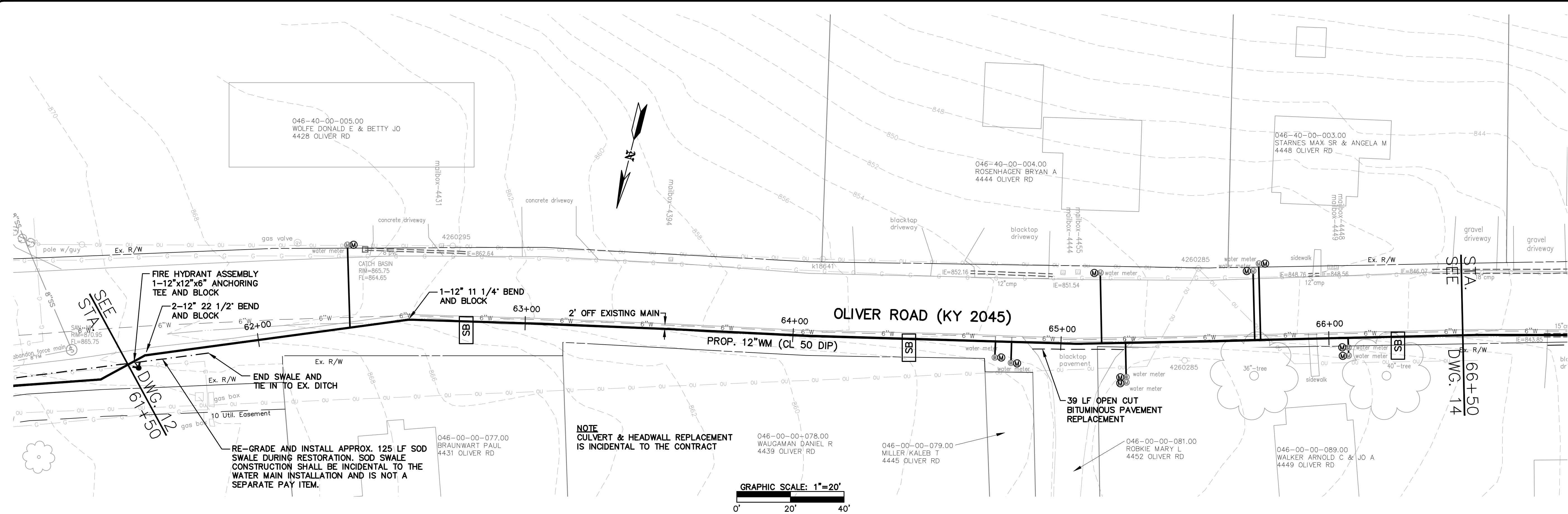
**COX ROAD AND OLIVER ROAD WATER MAIN REPLACEMENT**  
 NORTHERN KENTUCKY WATER DISTRICT  
 KENTON COUNTY, KENTUCKY  
**OLIVER ROAD 12" MAIN**  
**STA. 56+50 TO STA. 61+50**

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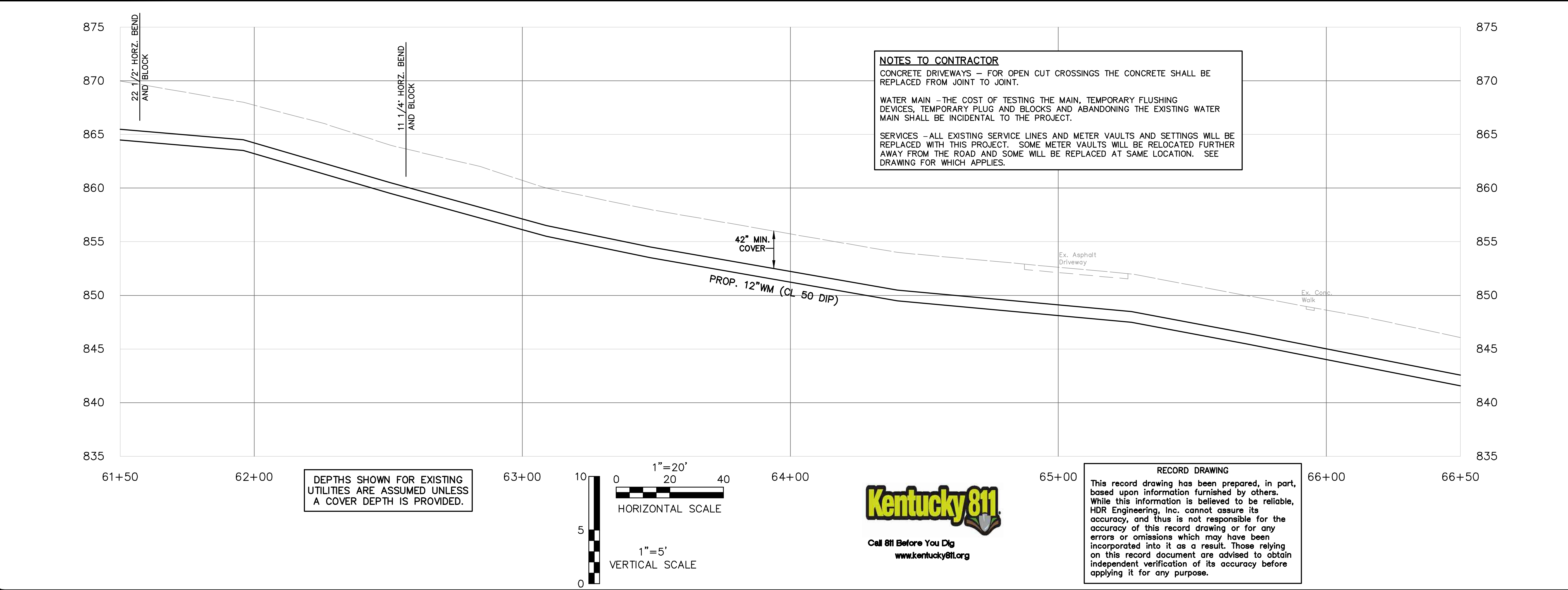
**COX ROAD AND OLIVER ROAD  
WATER MAIN REPLACEMENT**  
NORTHERN KENTUCKY WATER DISTRICT  
KENTON COUNTY, KENTUCKY  
**OLIVER ROAD 12" MAIN  
STA. 61+50 TO STA. 66+50**

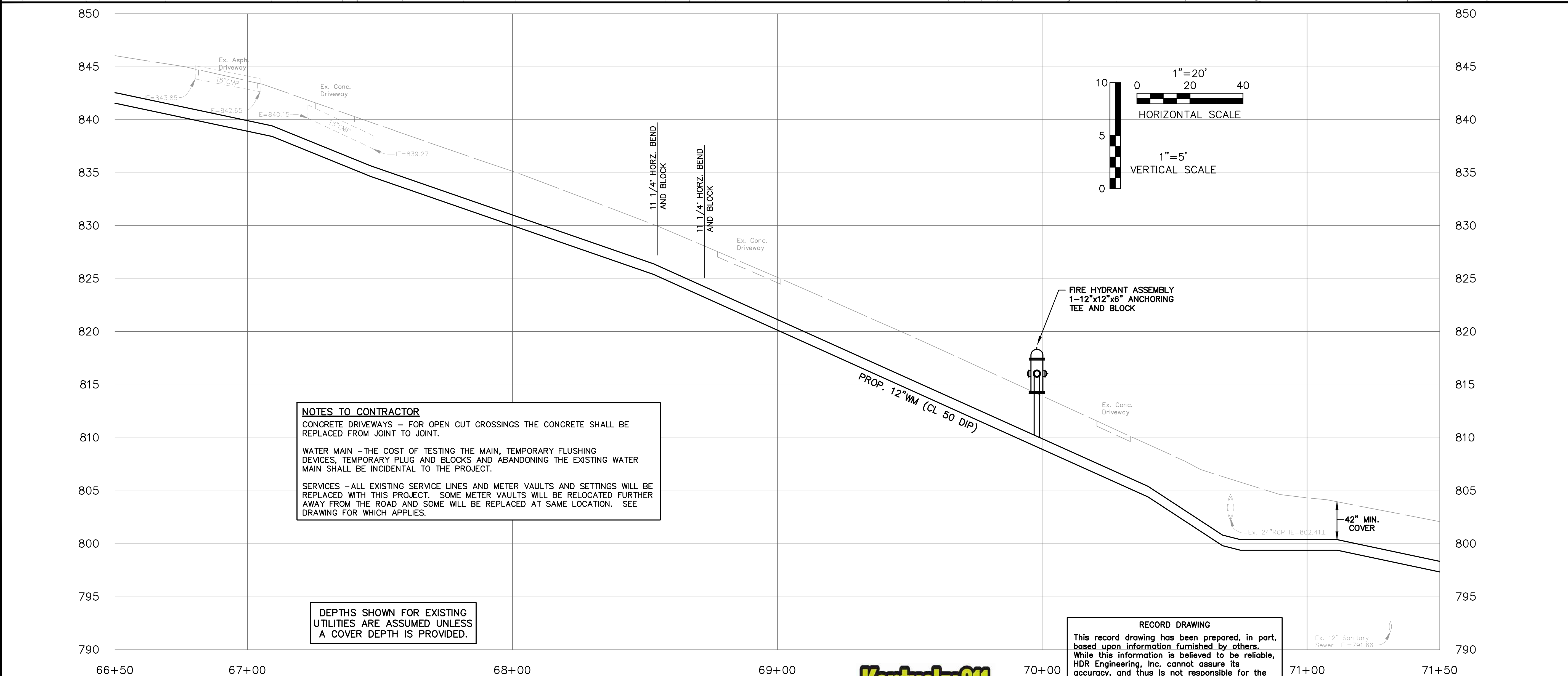
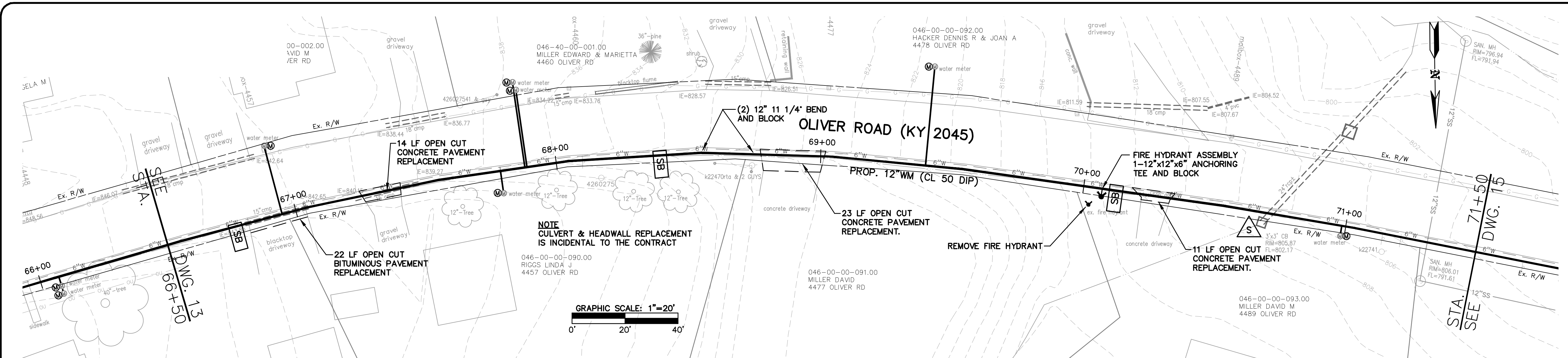
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**OLIVER ROAD 12" MAIN  
 STA. 66+50 TO STA. 71+50**

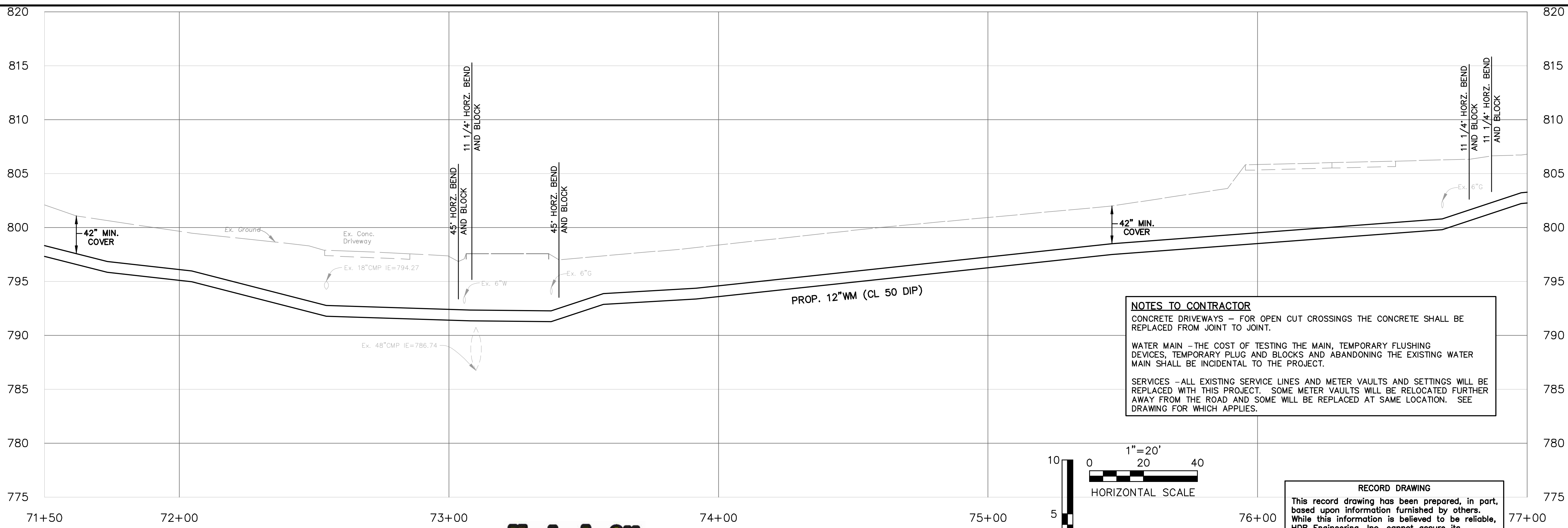
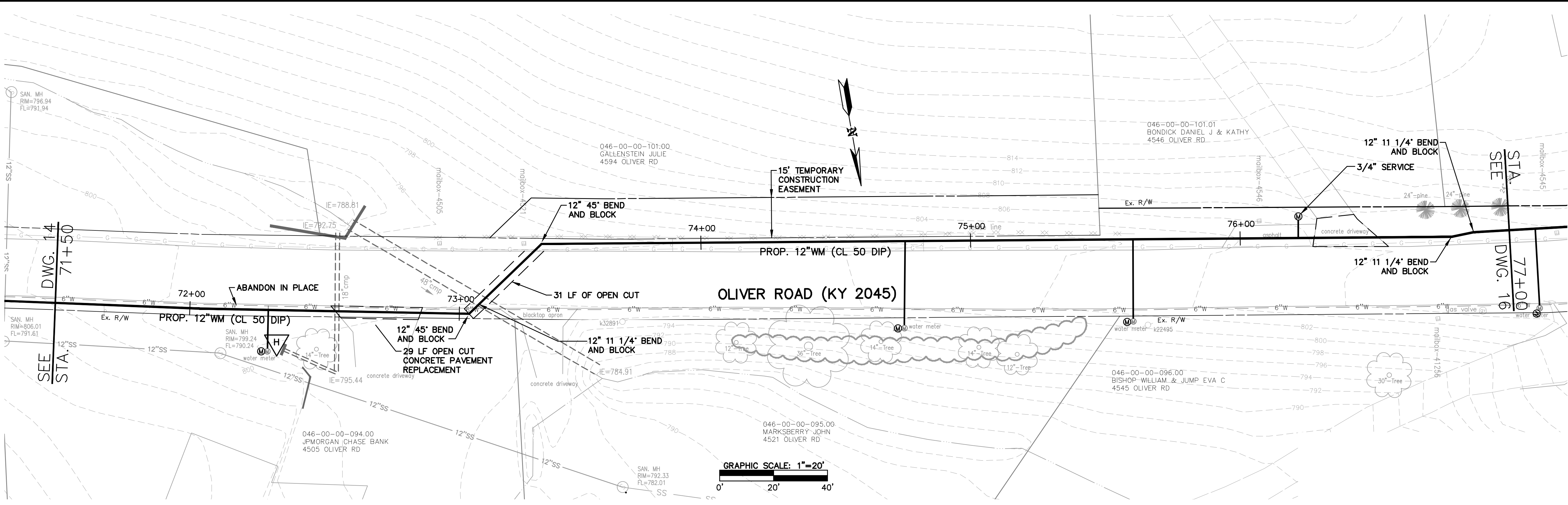
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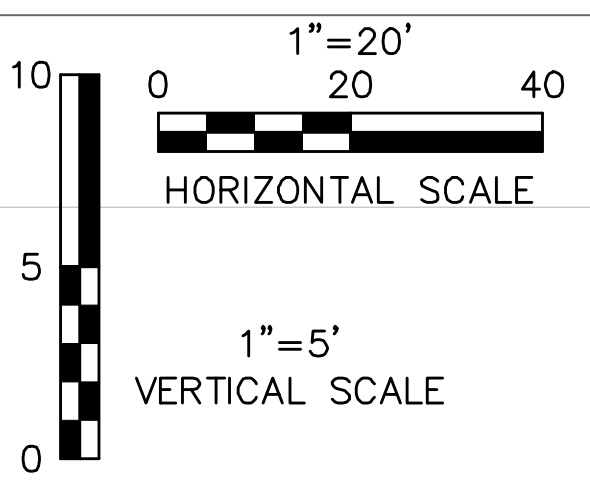


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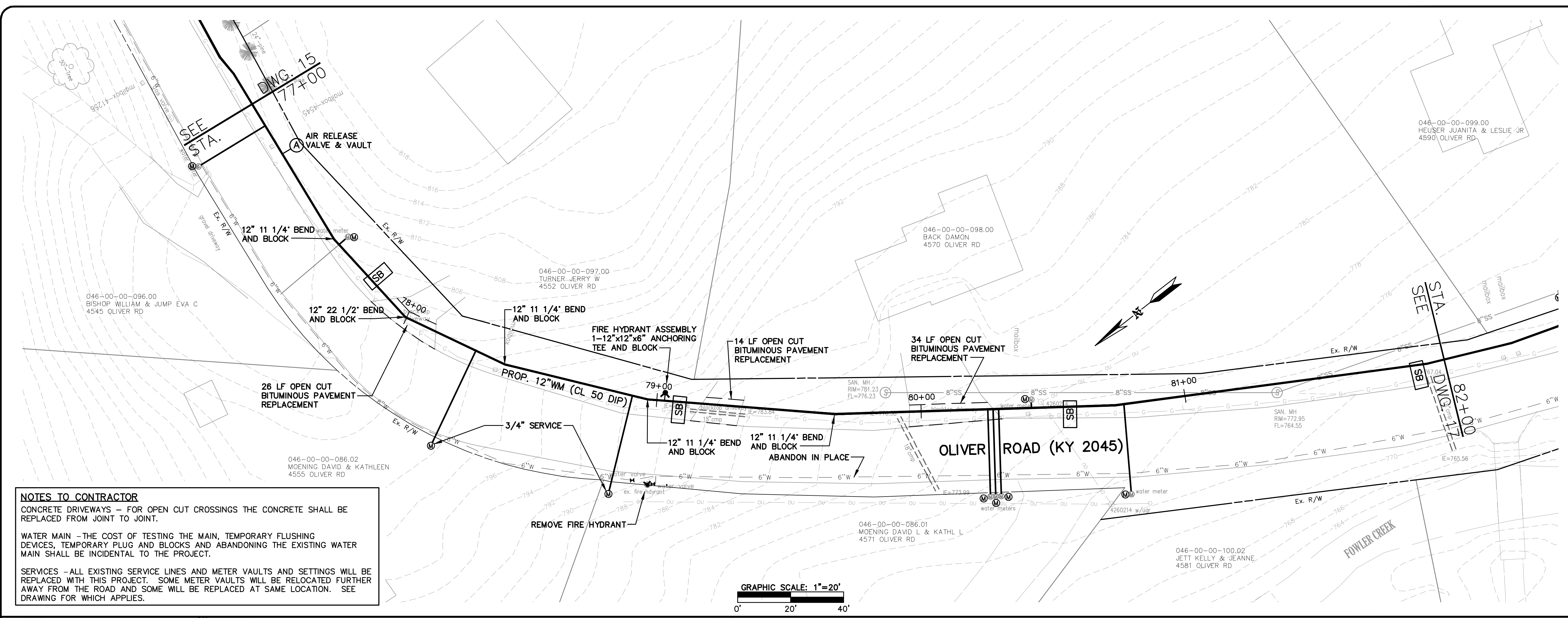
**COX ROAD AND OLIVER ROAD  
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NORTHERN KENTUCKY WATER DISTRICT  
KENTON COUNTY, KENTUCKY  
**OLIVER ROAD 12" MAIN  
STA. 71+50 TO STA. 77+00**

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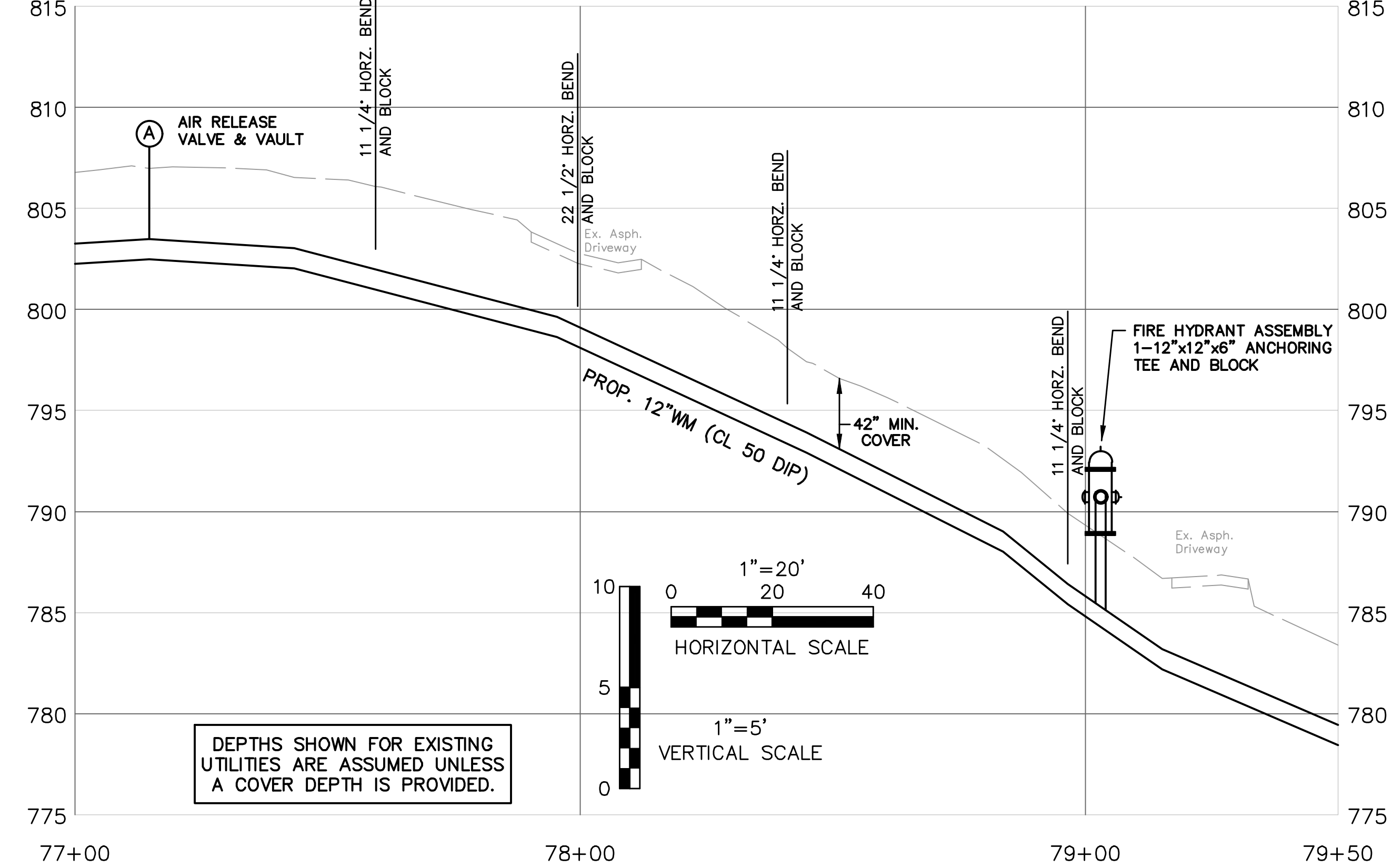
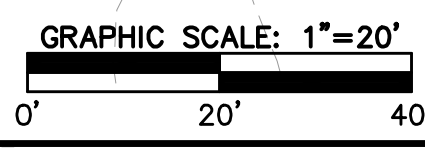


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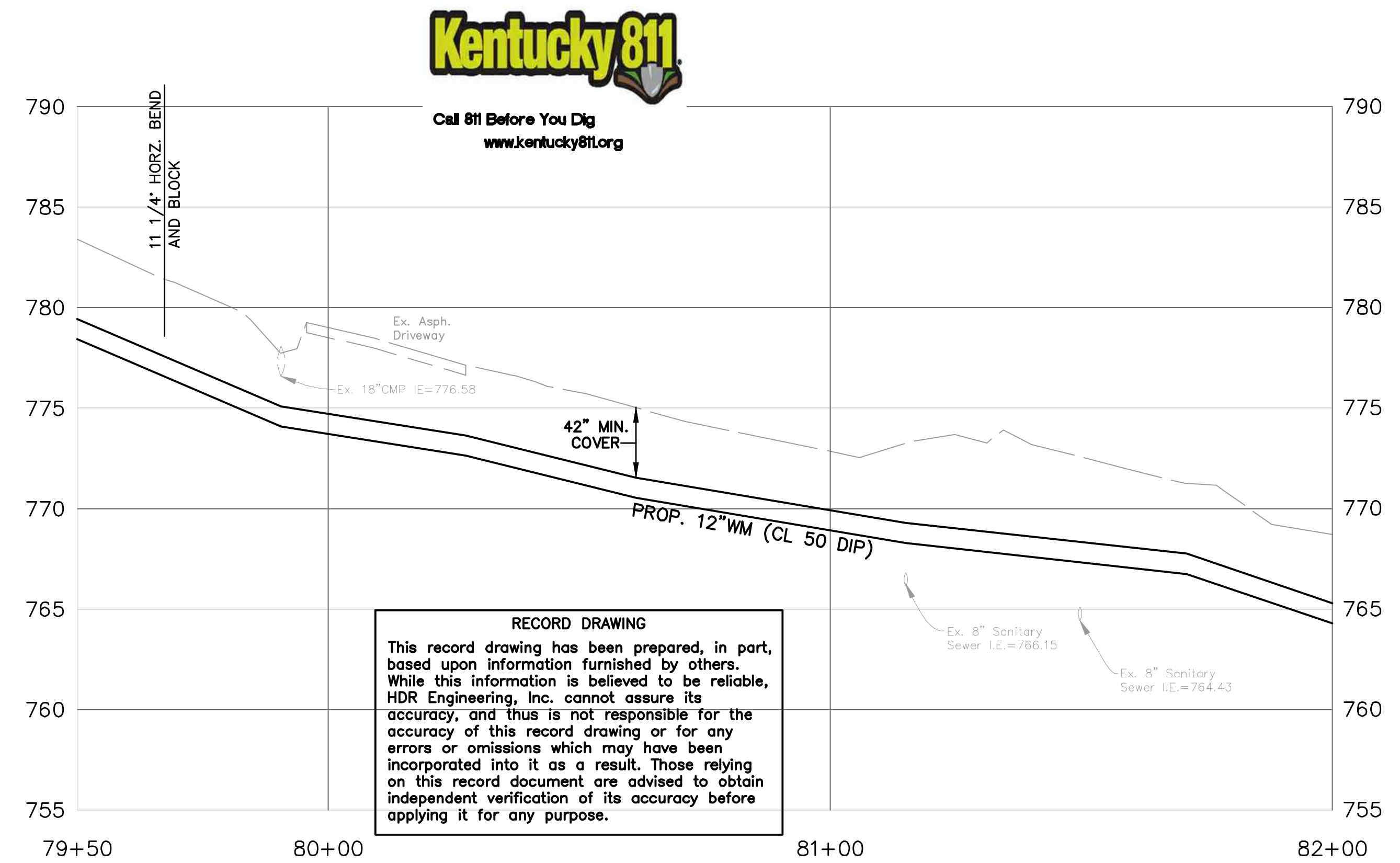
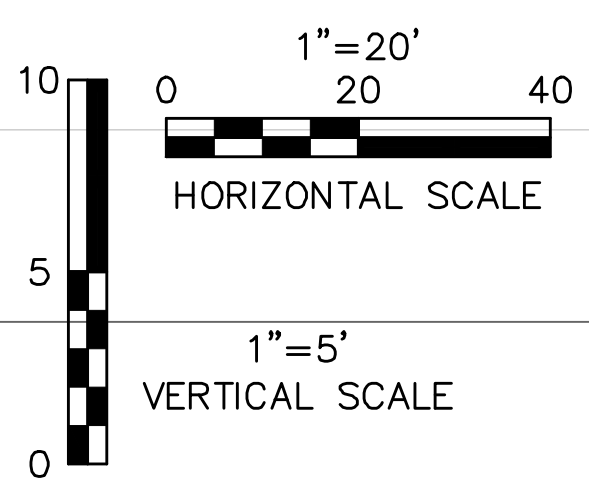
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**OLIVER ROAD 12" MAIN  
STA. 77+00 TO STA. 82+00**

**1" = 5' VERT.**  
SCALE: 1" = 20'

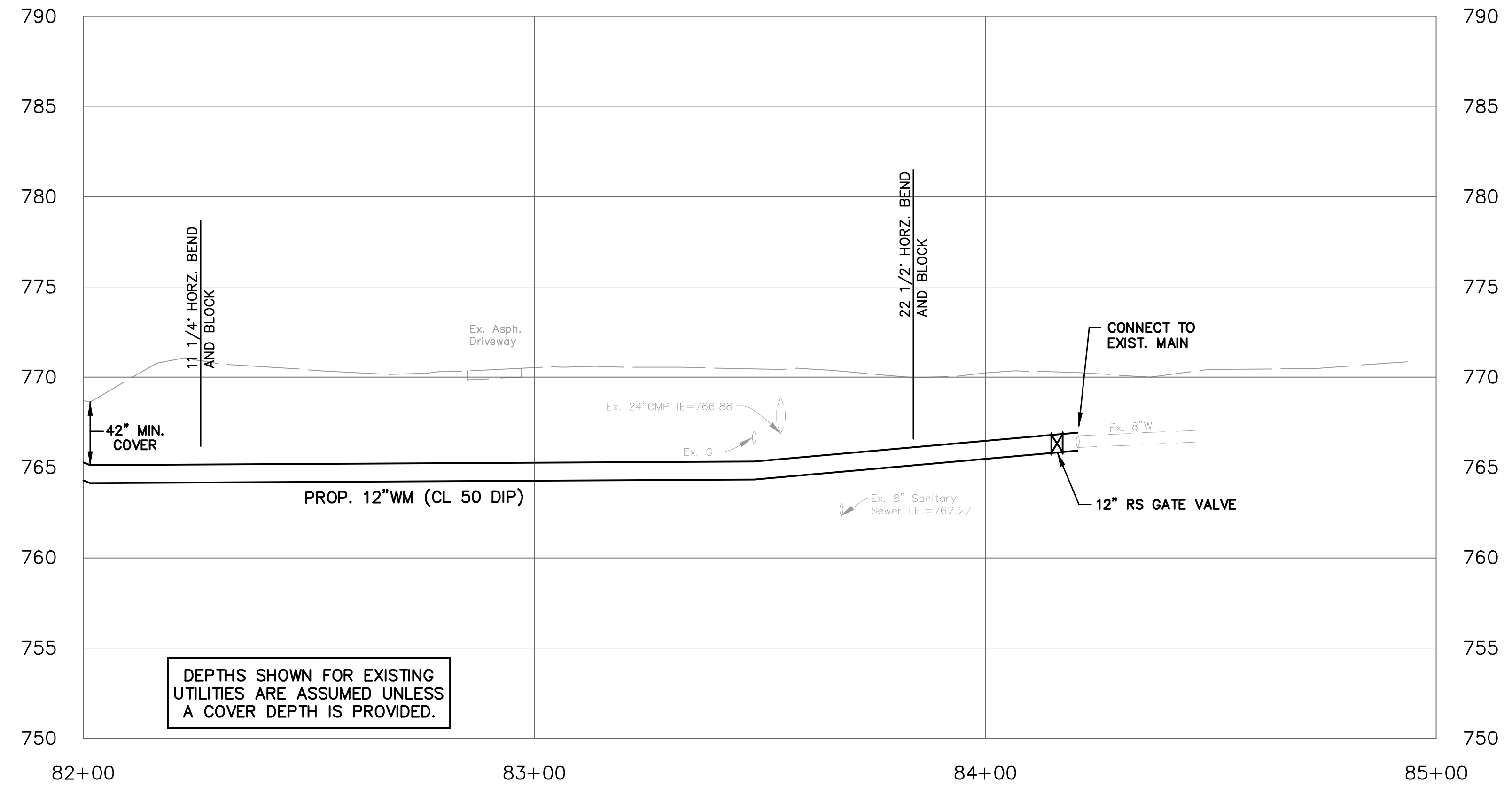
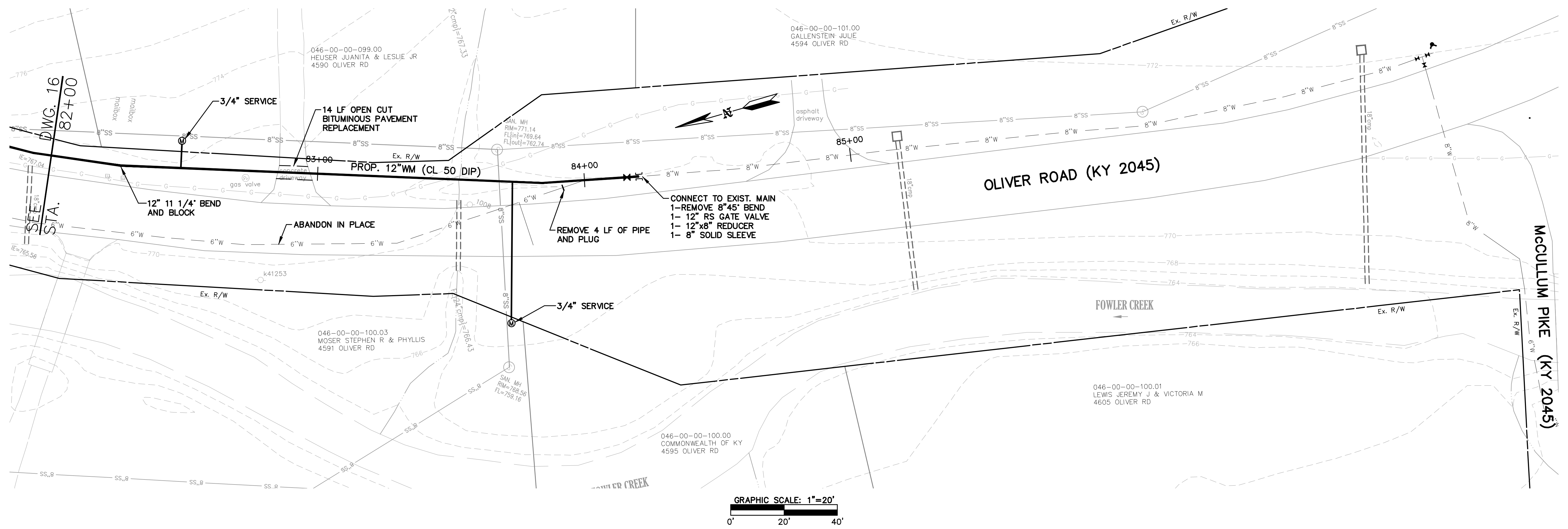
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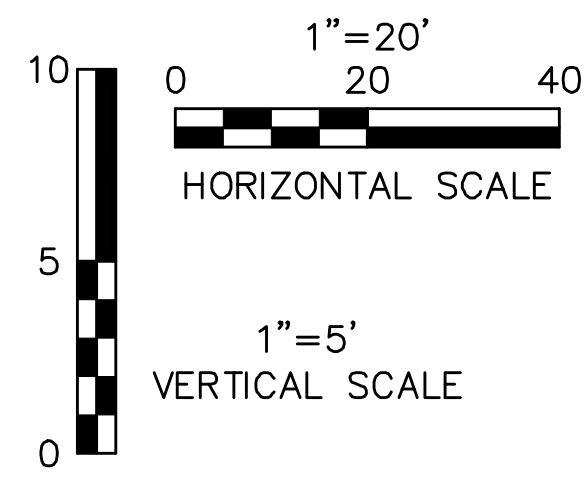


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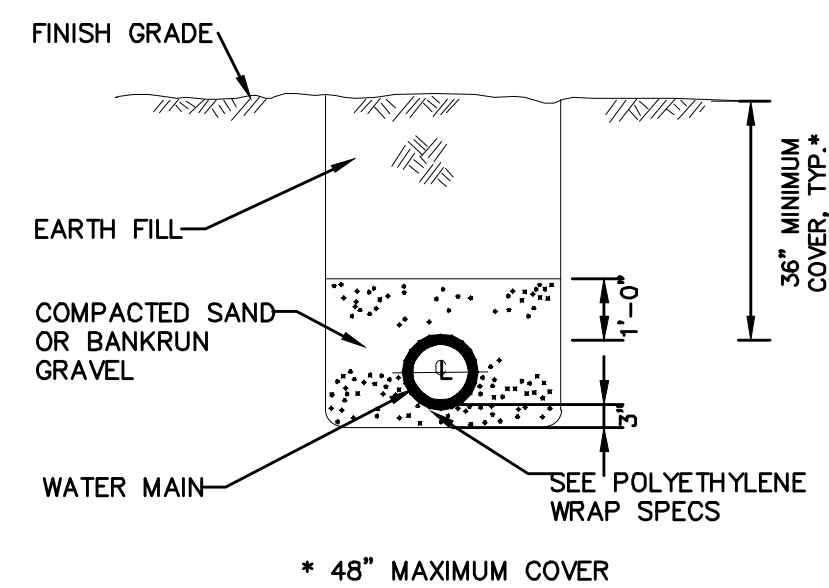
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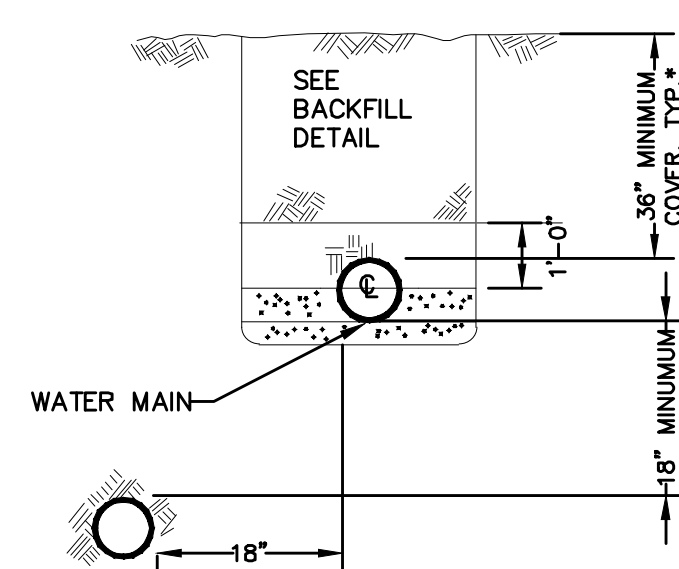
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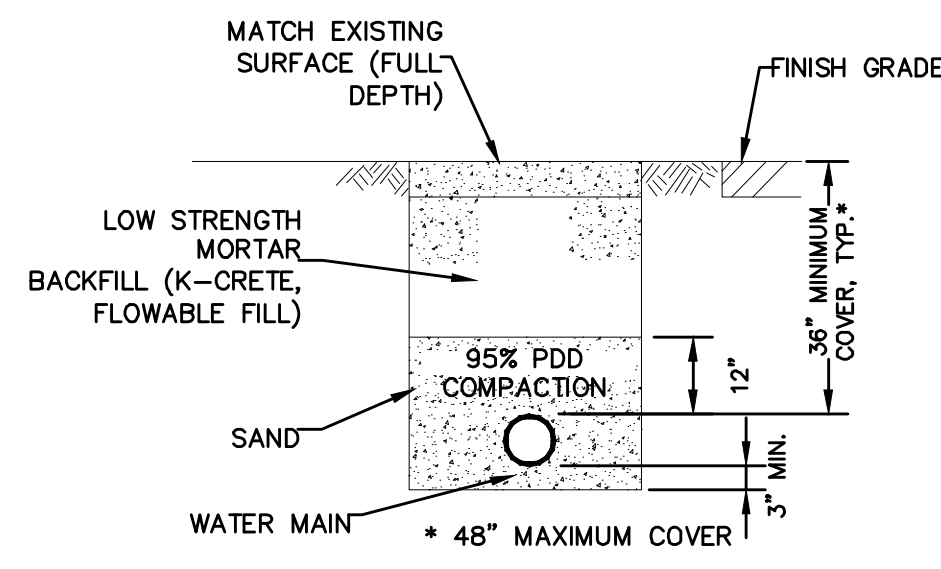
**EARTH CUTS TRENCH DETAIL**

ALTERNATE TO BE USED ONLY ON APPROVAL BY THE DISTRICT



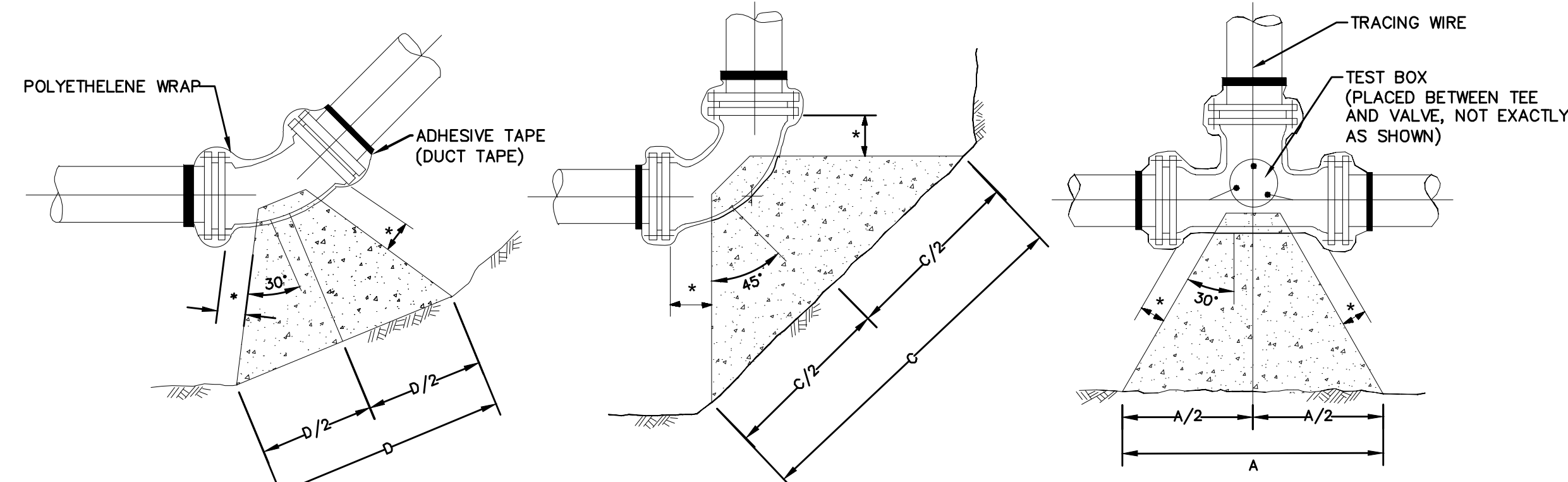
WATER MAIN MUST BE LOCATED A MINIMUM OF 10 FEET LATERAL DISTANCE FROM ANY EXISTING OR FUTURE SEWER LINES OR MANHOLES, OR AS SHOWN IN THE ABOVE ALTERNATE.

**WATER MAIN PARALLELING SEWER MAIN**



FLOWABLE FILL SHALL ALSO BE UTILIZED FOR BACKFILL PER GENERAL NOTE 23 SHOWN ON DWG. 2.

**UNDER SHOULDER OF STATE MAINTAINED STREET**



**45° BEND 90° BEND TEE (DEAD END OR FIRE HYDRANT SIMILAR)**

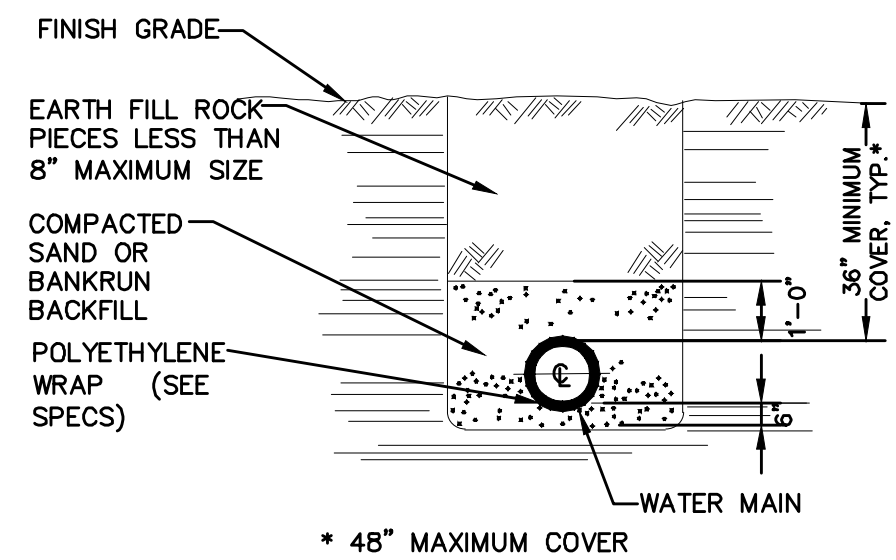
150 PSI/250 PSI

PIPE SIZE	A	B	C	D	E
6"	2'0"/2'6"	1'6"/1'6"	3'0"/3'6"	1'6"/2'0"	1'0"/1'0"
8"	2'6"/3'6"	2'0"/2'0"	3'6"/4'6"	2'0"/2'6"	1'0"/1'6"
10"	3'6"/4'0"	2'6"/2'6"	4'6"/5'6"	2'6"/3'0"	1'6"/1'6"
12"	4'0"/5'0"	3'0"/3'0"	5'6"/6'6"	3'0"/3'6"	1'6"/2'0"
16"	5'0"/6'0"	3'0"/4'0"	7'0"/8'6"	4'0"/4'6"	3'0"/3'0"
20"	6'0"/7'6"	5'0"/5'0"	7'0"/10'6"	4'0"/6'0"	3'0"/3'0"

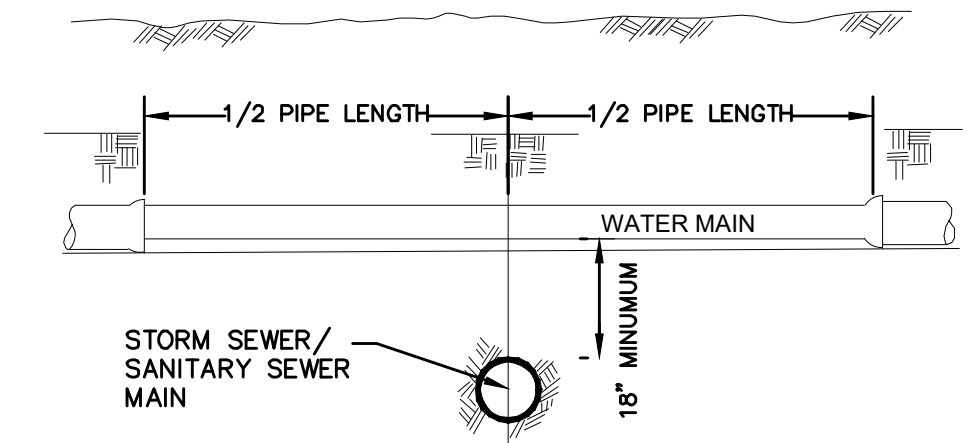
\* DISTANCE TO BE 1/2" LONGER THAN ENTIRE LENGTH OF THE BOLT USED.

**NOTES**

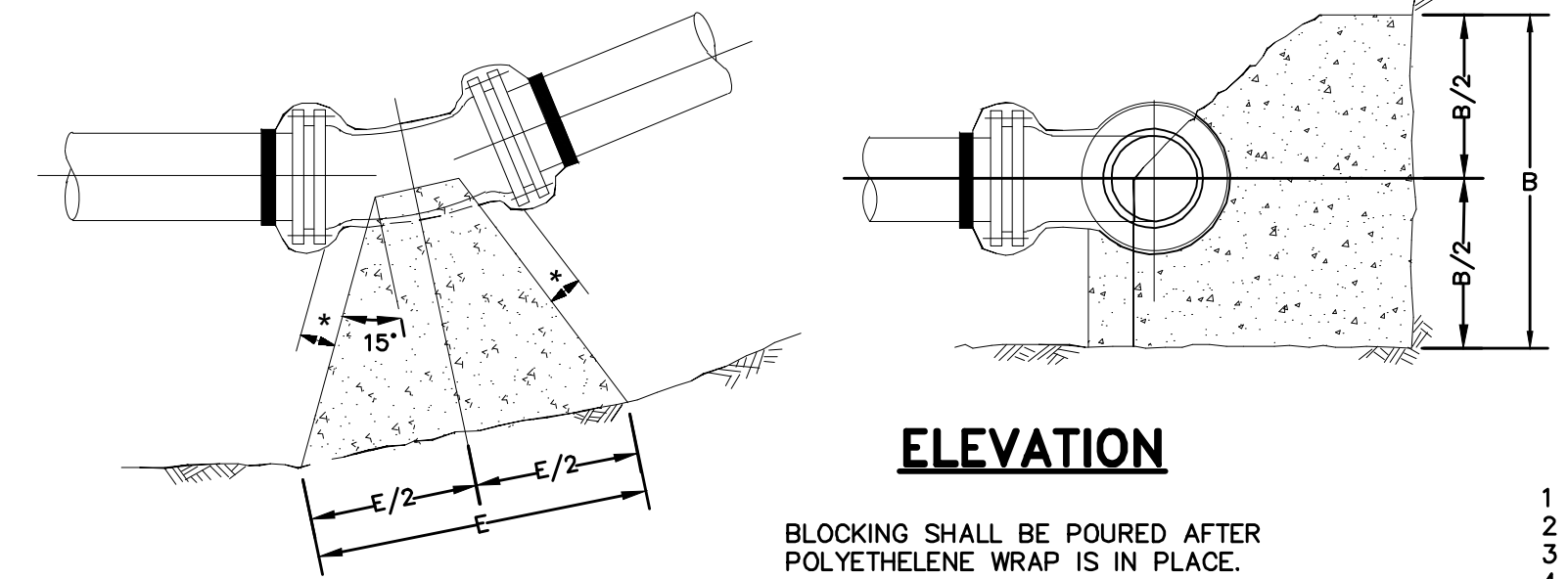
- 1 PVC FITTINGS SHALL BE PER SPECIFICATIONS.
- 2 CONCRETE TO BE 3500 PSI.
- 3 ALL FITTINGS TO BE MECHANICAL JOINT.
- 4 THRUST BLOCKS TO BE PLACED AGAINST UNDISTURBED EARTH - USE ADDITIONAL CONCRETE AS REQUIRED FOR OVER EXCAVATION.
- 5 BLOCKING TO BE PLACED IN A MANNER SO THAT BOLTS CAN BE REMOVED WITHOUT DISTURBING THE BLOCK.



**ROCK CUTS & UNSTABLE SUBGRADE TRENCH DETAIL**



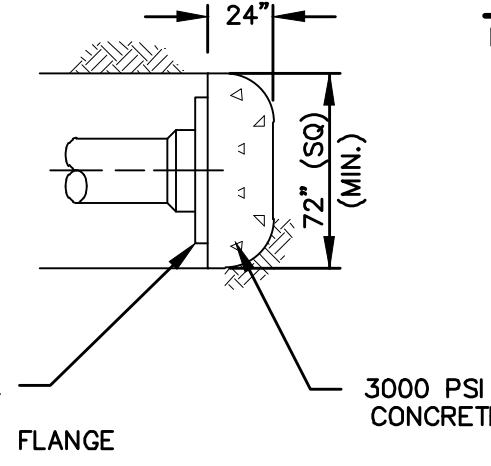
**WATER MAIN CROSSING SEWER**



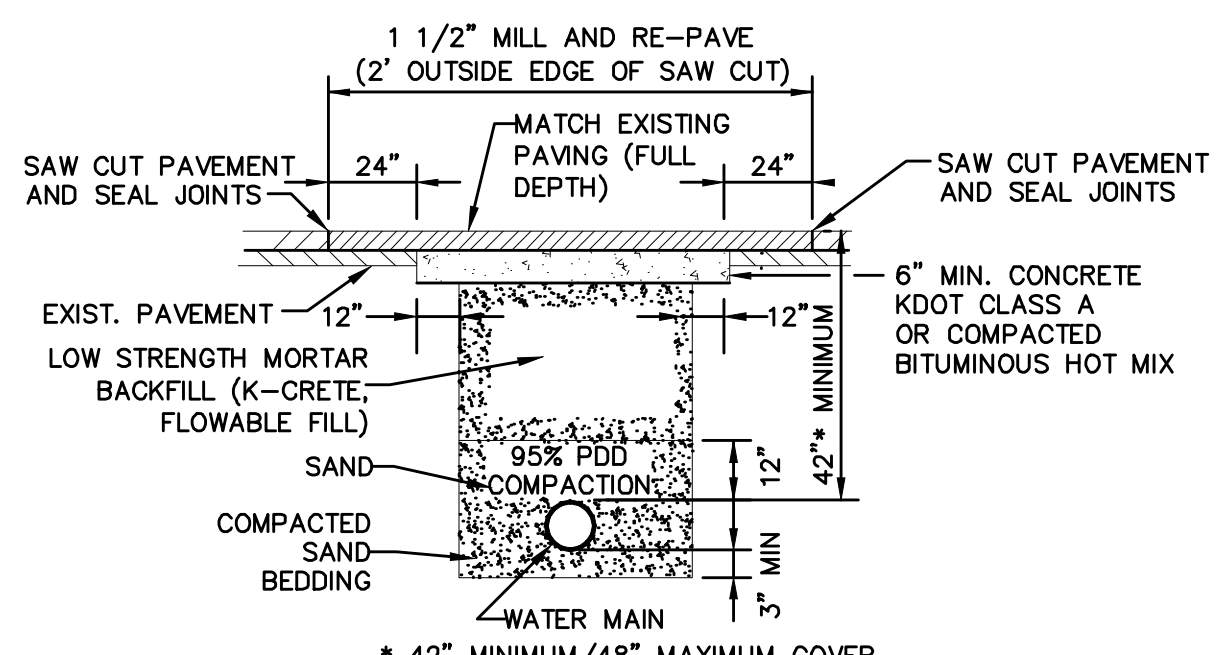
**11 1/4° & 22 1/2° BEND**

BLOCKING SHALL BE POURED AFTER POLYETHYLENE WRAP IS IN PLACE. BLOCKING SHALL BE INSPECTED BY THE DISTRICT PRIOR TO BACKFILLING.

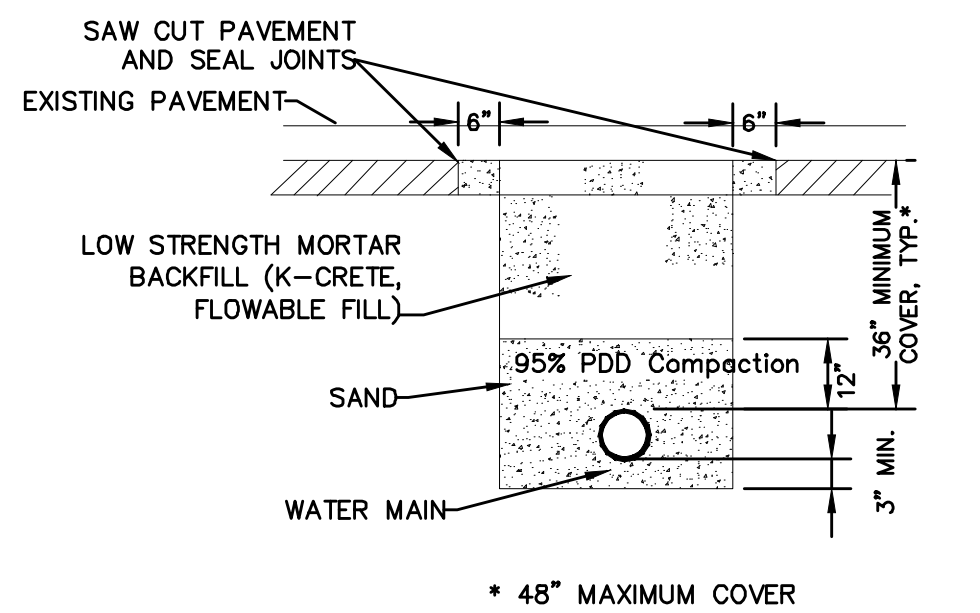
**CONCRETE THRUST BLOCK DETAIL**



**CONCRETE THRUST BLOCK DETAIL**  
NKWD DRG #104

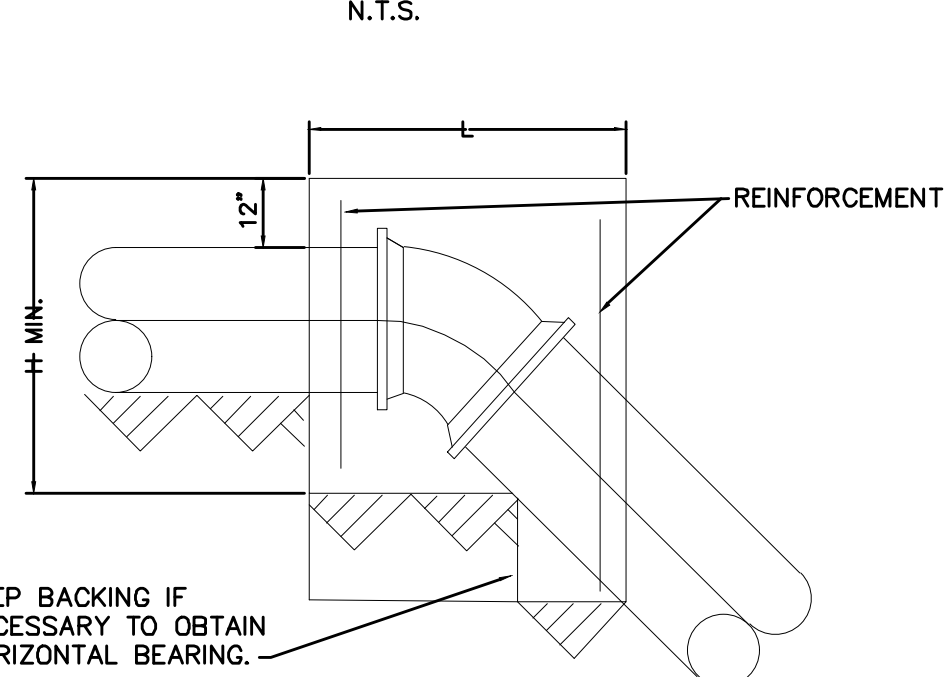


**COUNTY ROAD BACKFILL DETAIL**



**STATE ROAD BACKFILL DETAIL**

**CONCRETE THRUST BLOCK FOR PLUGS**



**SECTION A-A**

1. BACKING DESIGNED FOR 3000 POUNDS PER SQUARE FOOT SOIL BEARING AND 150 POUNDS PER SQUARE INCH INTERNAL PRESSURE.
2. PROVIDE MINIMUM CONCRETE REINFORCEMENT OF 2 PAIR OF TWO 5" "U" BARS @ 12" C.
3. CENTER BACKING ON BEND.

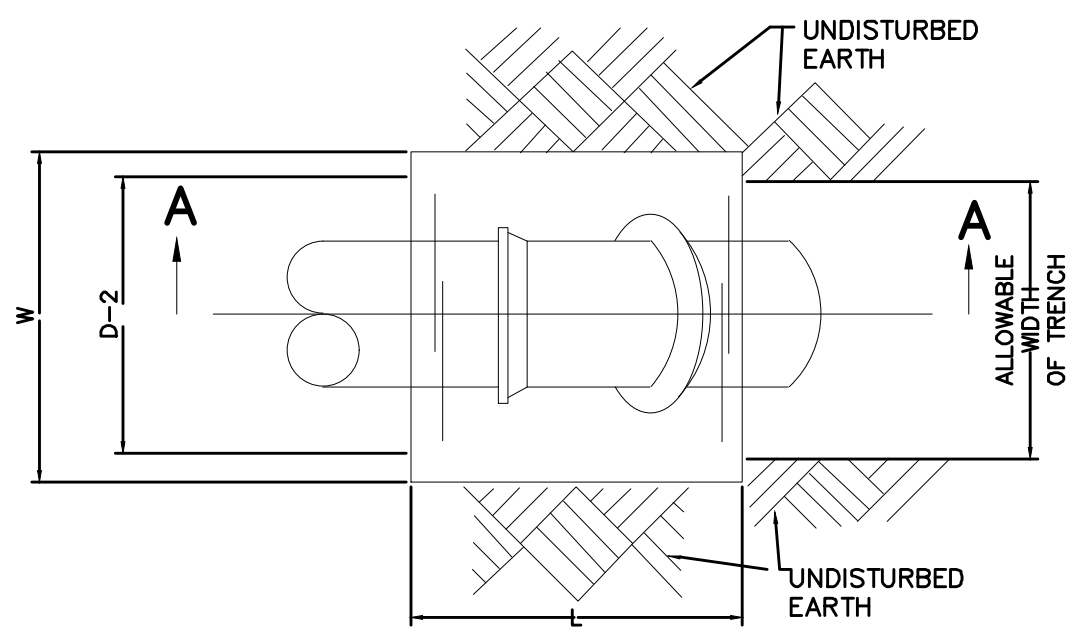
BLOCKING FOR SIZES NOT SHOWN SHALL USE THE NEXT LARGER SIZE.

**CONCRETE BACKING FOR VERTICAL BENDS**

NKWD DRG #104A

SIZE OF PIPE	DEGREE OF BEND												
	11 1/4			22 1/2			45						
	L"	W"	H"	L"	W"	H"	L"	W"	H"	L"	W"	H"	VOL.
4"	12	24	16	2.7	15	30	18	4.7	22	36	24	11.0	
6"	12	43	18	5.4	16	48	34	15.1	30	55	24	22.9	
8"	12	54	24	9.0	18	57	36	21.4	36	57	33	39.2	
12"	20	63	36	26.3	37	62	37	49.2	48	62	51	88.0	
16"	31	65	38	44.4	60	65	39	88.2	65	65	65	159.2	
20"	45	70	40	73.0	56	70	60	136.4	72	76	78	247.5	
24"	47	72	54	106.0	67	74	69	198.4	88	84	84	360.1	

NOTE: VOLUMES GIVEN IN CUBIC FEET



**PLAN**

**TYPICAL PIPELINE TRENCH DETAIL**

NKWD DRG #103 & 103A

WHERE REFERENCE IS MADE FOR THE MINIMUM COVER DEPTH FOR THE WATER MAIN, IN EARTH AND ROADWAYS, THE DEPTH SHALL BE 42" MINIMUM NOT 36" AS SHOWN.

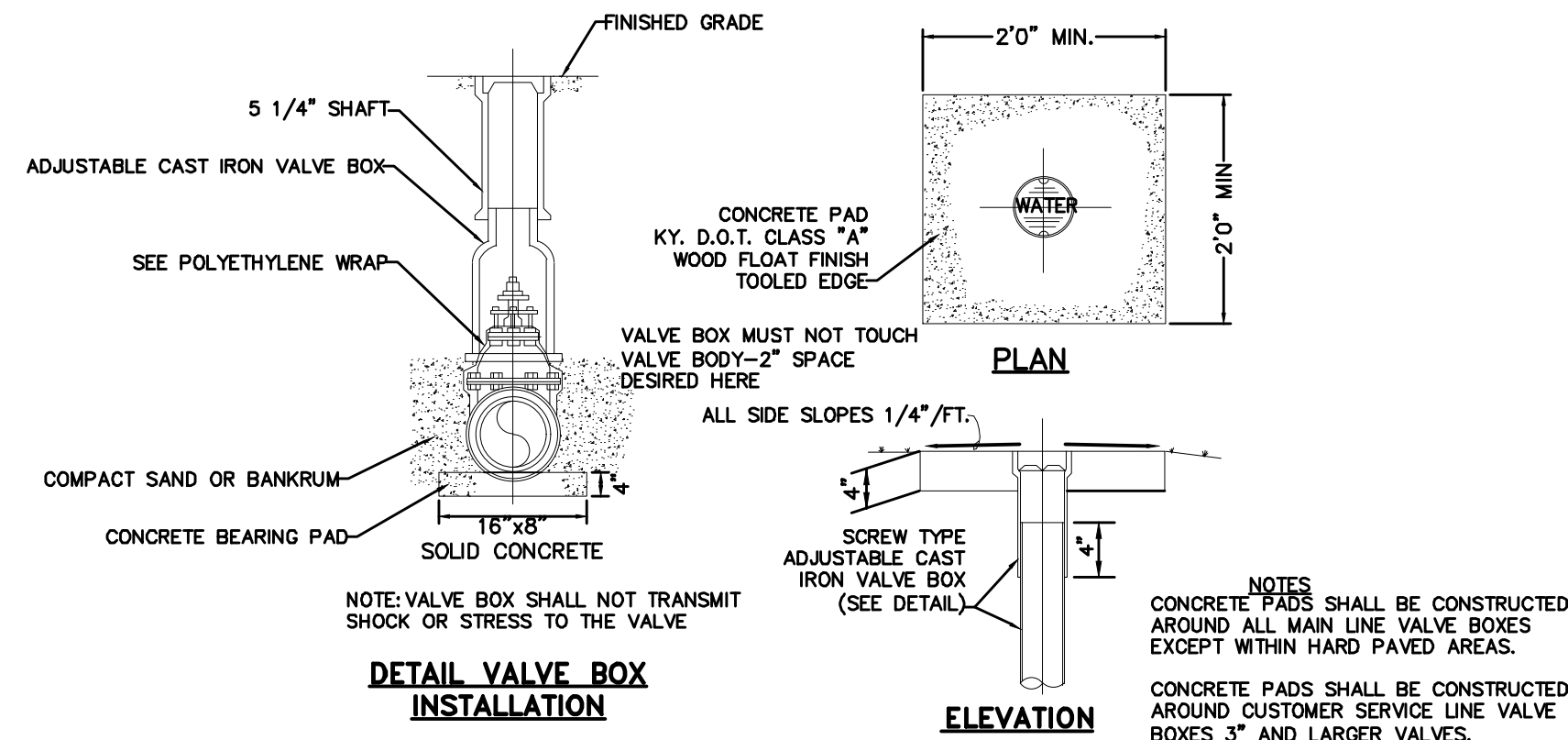
**RECORD DRAWING**  
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**HDR**  
One Riverfront Plaza  
Louisville, KY 40202  
401 West Main Street, Suite 500  
Louisville, KY 40202  
Phone: (502) 969-3654 Fax: (502) 969-3656

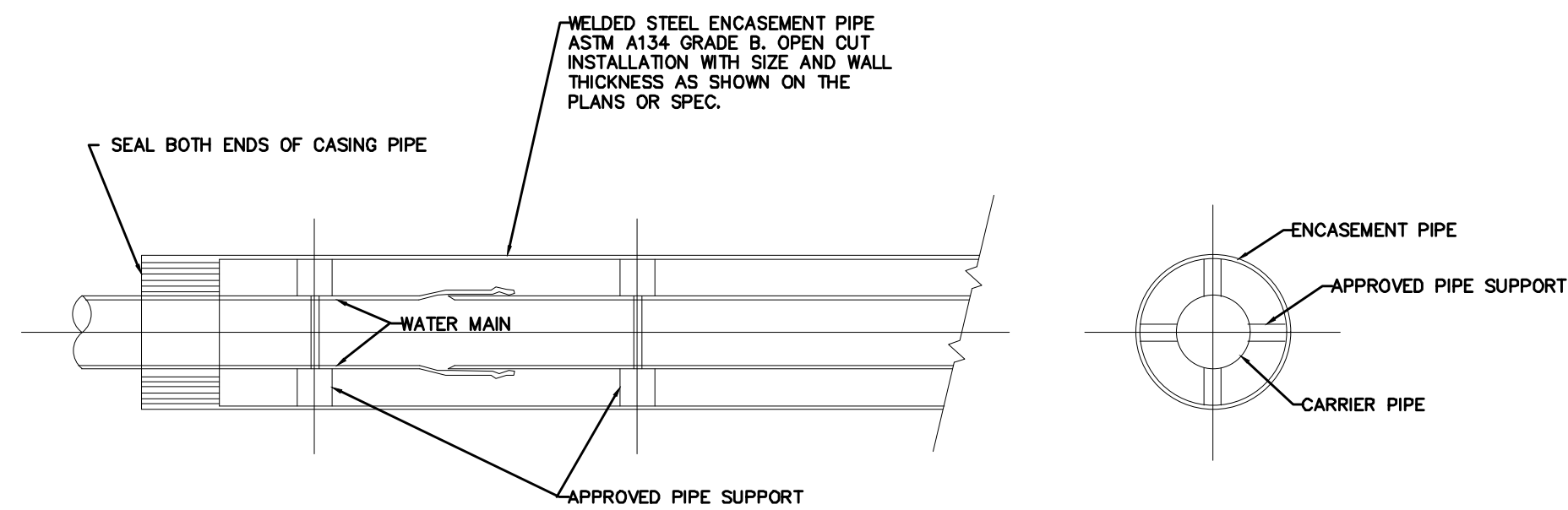
**COX ROAD AND OLIVER ROAD WATER MAIN REPLACEMENT**  
NORTHERN KENTUCKY WATER DISTRICT  
KENTON COUNTY, KENTUCKY  
**WATER LINE DETAILS**

**1"=5' VERT.**  
SCALE: NONE  
DATE: OCTOBER 2018  
JOB NO.: 94-364  
DESIGNED: KJB  
DRAWN: WBB  
CHECKED: NJB  
Q/C:  
OWNER APPROVAL:  
BY:  
TITLE:  
REVISIONS:  
NO.: DATE:

DRAWING: 18 OF 21

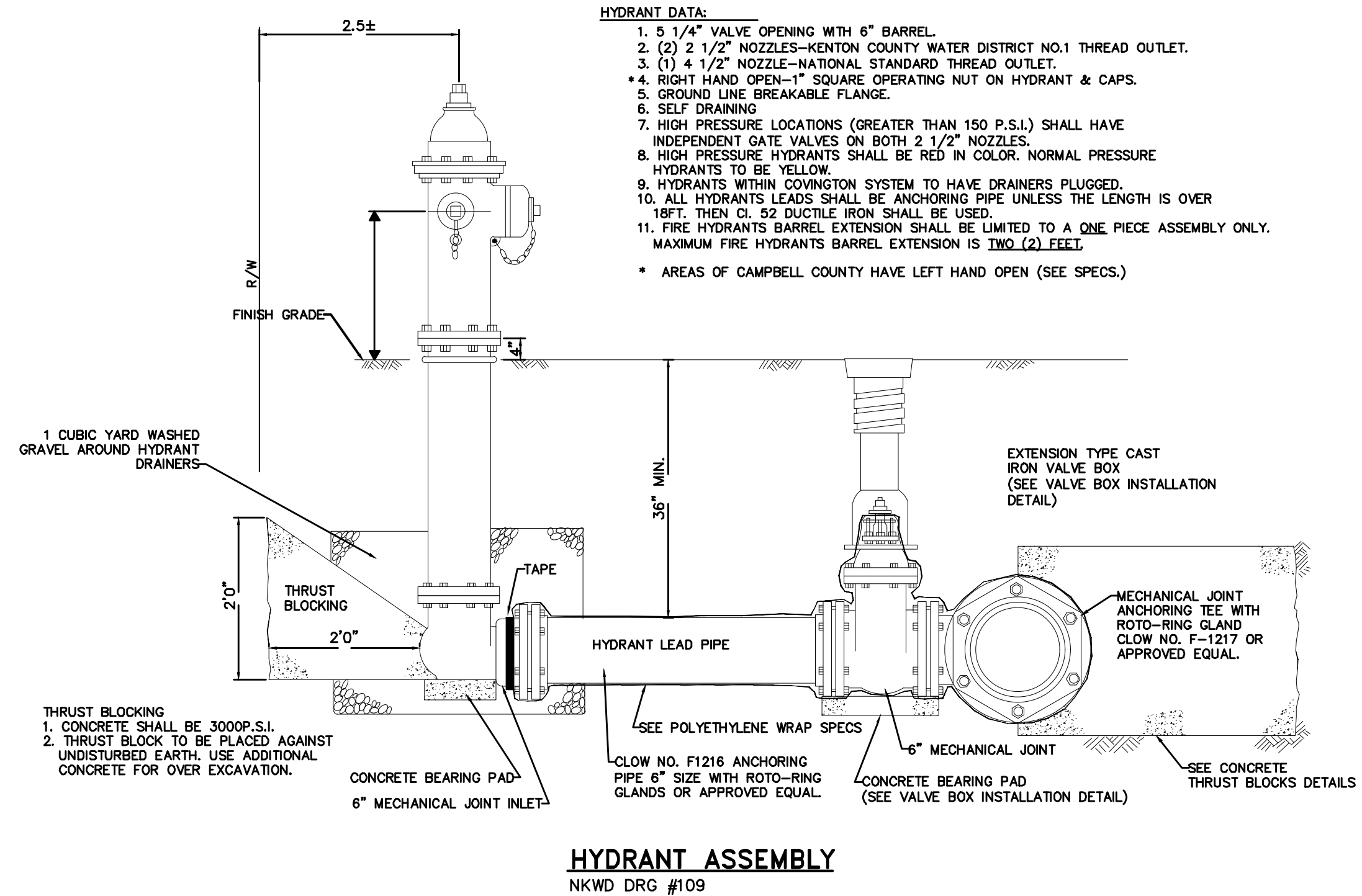


**VALVE BOX AND VALVE PAD DETAIL**  
NKWD DRG #105



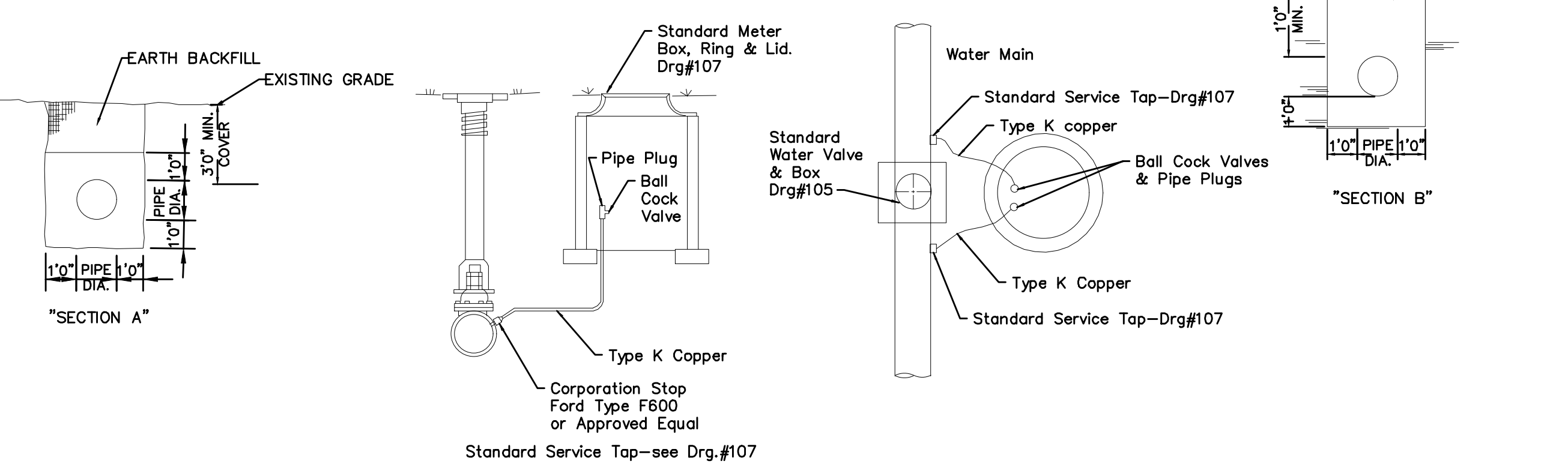
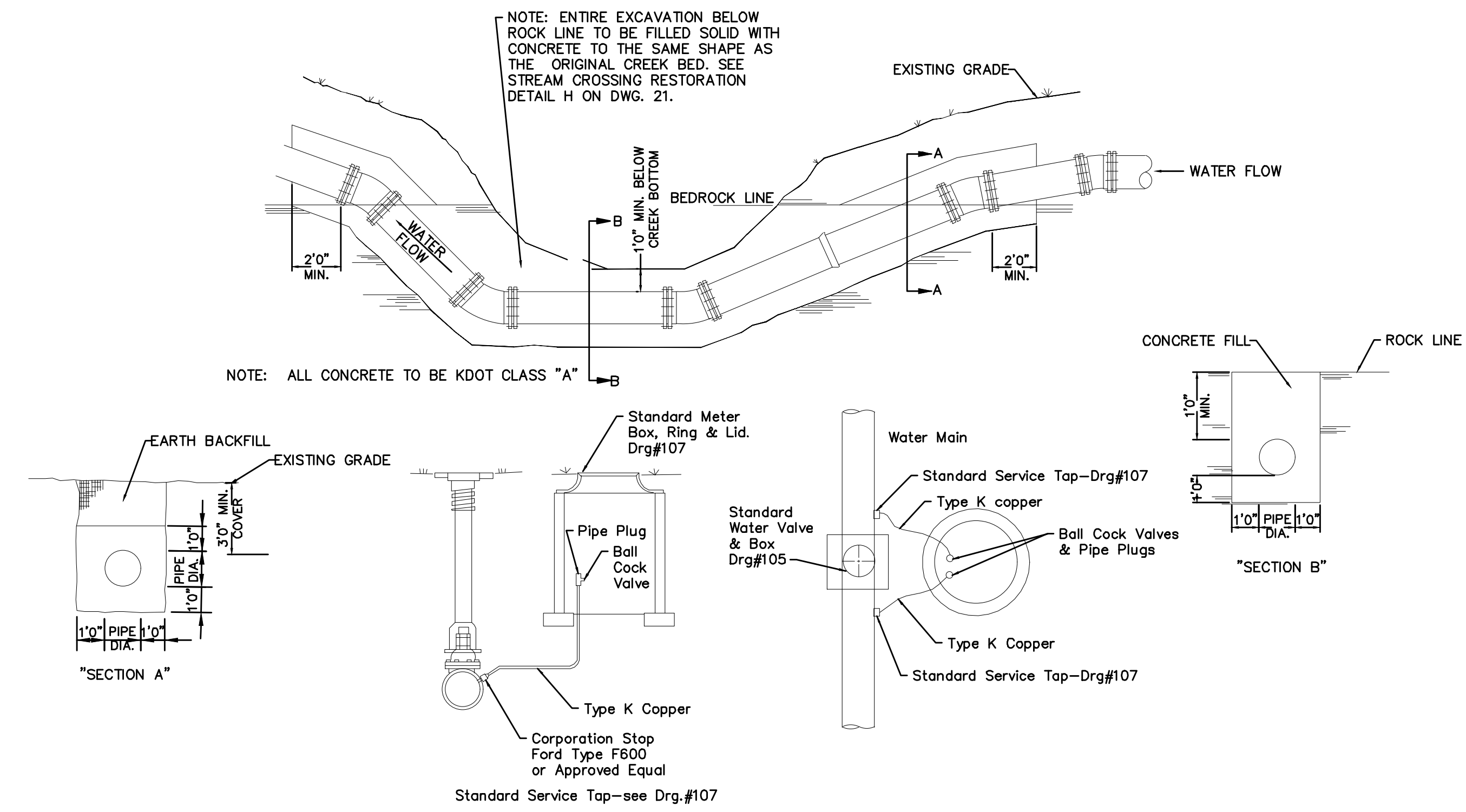
NOTE: CASING PIPE JOINTS SHALL BE SEAM WELDED SO THAT CASING IS WATER TIGHT FROM END TO END.

**ENCASEMENT PIPE DETAIL**  
NKWD DRG #114



- HYDRANT DATA:**
- 5 1/4" VALVE OPENING WITH 6" BARREL.
  - (2) 2 1/2" NOZZLES-KENTON COUNTY WATER DISTRICT NO.1 THREAD OUTLET.
  - (1) 4 1/2" NOZZLE-NATIONAL STANDARD THREAD OUTLET.
  - RIGHT HAND OPEN-1" SQUARE OPERATING NUT ON HYDRANT & CAPS.
  - GROUND LINE BREAKABLE FLANGE.
  - SELF DRAINING
  - HIGH PRESSURE LOCATIONS (GREATER THAN 150 P.S.I.) SHALL HAVE INDEPENDENT GATE VALVES ON BOTH 2 1/2" NOZZLES.
  - HIGH PRESSURE HYDRANTS SHALL BE RED IN COLOR, NORMAL PRESSURE HYDRANTS TO BE YELLOW.
  - HYDRANTS WITHIN CONVINGTON SYSTEM TO HAVE DRAINERS PLUGGED.
  - ALL HYDRANTS LEADS SHALL BE ANCHORING PIPE UNLESS THE LENGTH IS OVER 18FT. THEN CL. 52 DUCTILE IRON SHALL BE USED.
  - FIRE HYDRANTS BARREL EXTENSION SHALL BE LIMITED TO A ONE PIECE ASSEMBLY ONLY. MAXIMUM FIRE HYDRANTS BARREL EXTENSION IS TWO (2) FEET.
- AREAS OF CAMPBELL COUNTY HAVE LEFT HAND OPEN (SEE SPECS.)

**HYDRANT ASSEMBLY**  
NKWD DRG #109



**VALVE & TEST TAP DETAIL**  
Valve shall be installed in areas not subject to flooding  
No services will be tapped between the isolating valve on the creek crossings.

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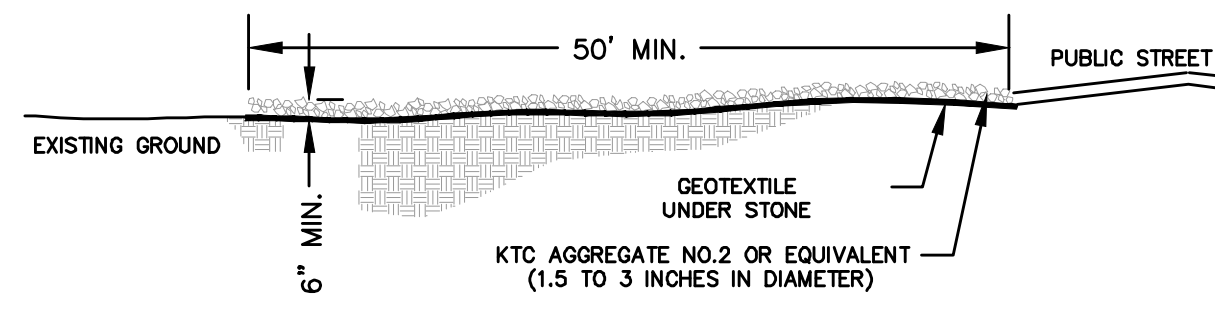
**CONCRETE ENCASEMENT AT CREEK CROSSING**  
NKWD DRG #110

**HDR**  
One Riverfront Plaza  
Louisville, KY 40202  
401 West Main Street, Suite 500  
Louisville, KY 40202  
PHONE (502) 969-3634 FAX (502) 969-3636

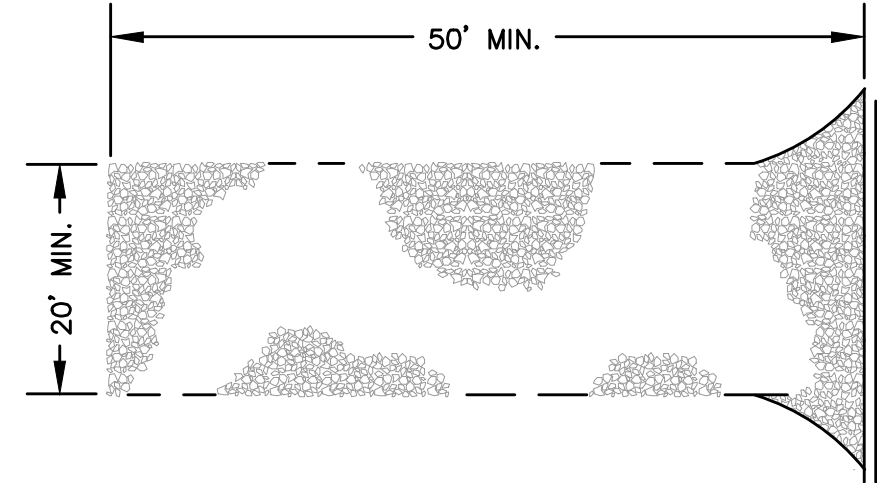
**COX ROAD AND OLIVER ROAD WATER MAIN REPLACEMENT**  
NORTHERN KENTUCKY WATER DISTRICT  
KENTON COUNTY, KENTUCKY  
**WATER LINE DETAILS**

**1"=5' VERT.**

SCALE:	NONE
DATE:	OCTOBER 2018
JOB NO.:	94-364
DESIGNED:	KJB
DRAWN:	WBB
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Q/C:	
OWNER APPROVAL:	
BY:	
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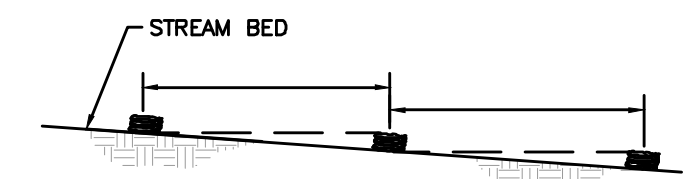


CROSS SECTION

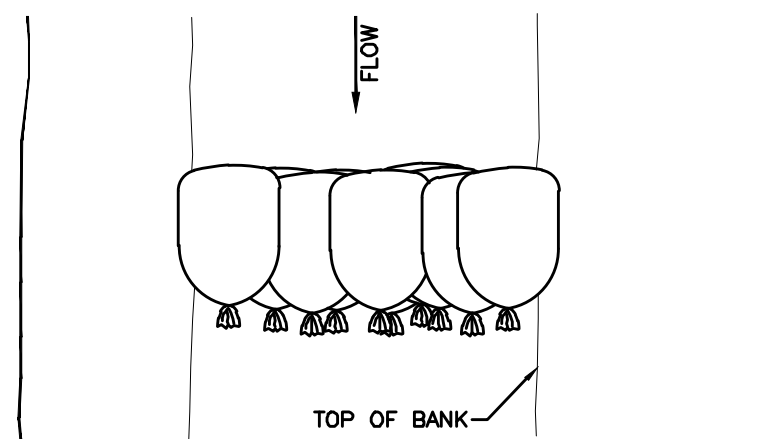


PLAN VIEW

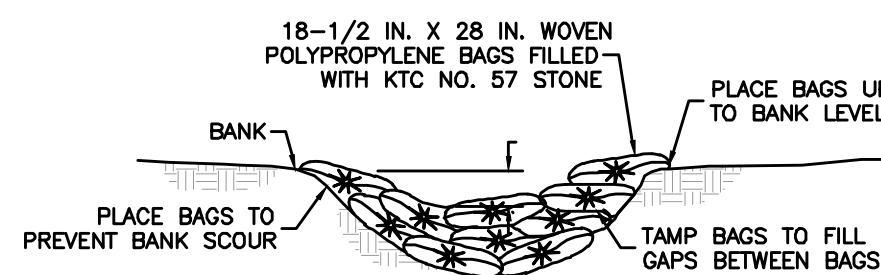
CONSTRUCTION ENTRANCE  
DETAIL A



NOTE: SPACE SERIES OF VELOCITY CHECKS ALONG STREAM REACH. USE SPACING "S" SUCH THAT THE CRESTS OF DOWNSTREAM CHECKS ARE THE SAME ELEVATION AS THE TOE OF UPSTREAM CHECKS.



TYPICAL PLAN



TYPICAL CROSS SECTION

STONE BAG SILT/VELOCITY CHECK  
DETAIL B

STONE BAG CHECK DAM NOTES:

- STONE BAG CHECKS SHALL BE WOVEN POLYPROPYLENE BAGS WITH APPROXIMATE DIMENSIONS OF 18 1/2 INCHES BY 28 INCHES. THE BAGS SHALL BE FILLED WITH KTC NO. 57 STONE. TIE THE ENDS OF FILLED BAGS USING EITHER DRAW STRINGS OR WIRE TIES.
- STONE BAG CHECK DAMS SHALL SPAN THE BANKS OF THE DITCH OR SWALE.
- THE CENTERLINE OF THE DITCH SHALL BE THE LOW POINT OF THE CHECKS. PLACE BAGS AT THE BANKS TO A HEIGHT AT LEAST 6 INCHES ABOVE THE CENTER OF THE CHECK.
- SPACE STONE BAG DITCH CHECKS AT APPROXIMATE LOCATIONS AS SHOWN ON THE PLANS, OR SUCH THAT THE CREST OF THE DOWNSTREAM CHECK IS AT THE SAME ELEVATION AS THE TOE OF THE CHECK LOCATED IMMEDIATELY UPSTREAM.
- REINFORCE CHECKS WITH ADDITIONAL STONE BAGS AS REQUIRED TO MAINTAIN INTEGRITY. REMOVE AND REPLACE ANY DAMAGED BAGS AND DISPOSE OF THEM PROPERLY. DO NOT LEAVE DAMAGED OR EMPTY BAGS IN THE DITCH AT ANY TIME.
- REMOVE CHECKS AS SOON AS THEY ARE NO LONGER REQUIRED AND RESTORE AND PERMANENTLY STABILIZE THE DISTURBED AREA. THE DISTURBED AREA BENEATH THE DITCH CHECKS SHOULD BE SEEDED AND MULCHED IMMEDIATELY AFTER CHECK DAM REMOVAL.

SPECIFICATIONS FOR GEOTEXTILE FABRIC

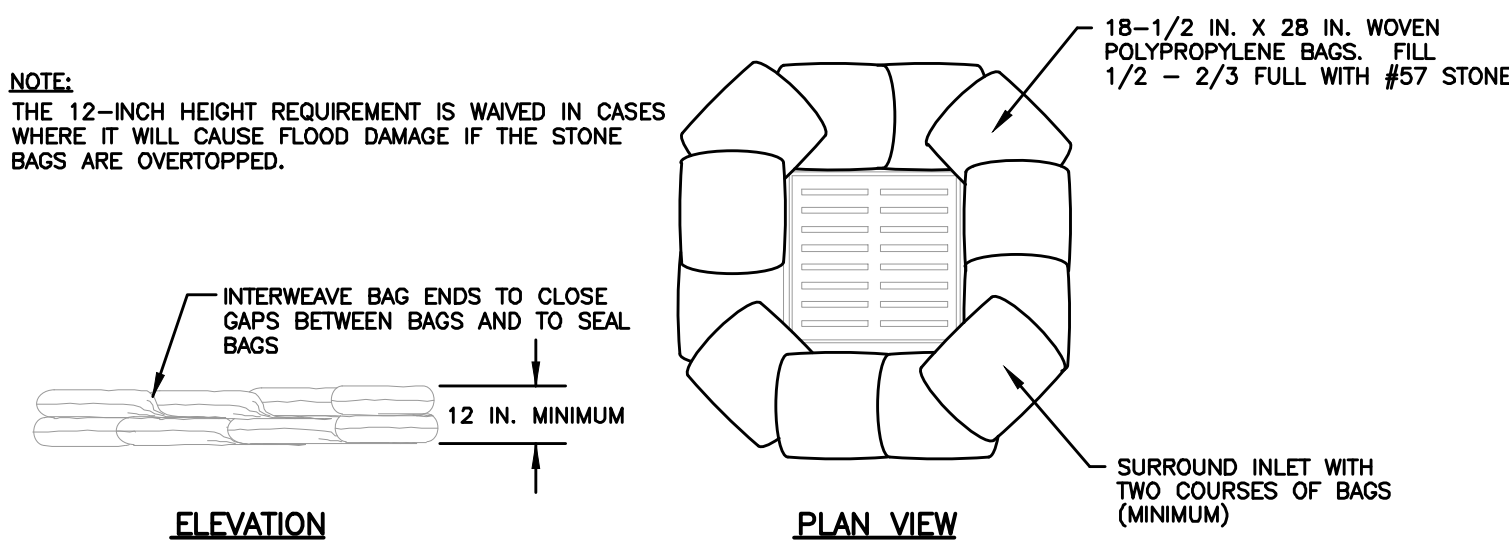
GRAB TENSILE STRENGTH	220 LBS. (MIN.) (ASTM D1682)
ELONGATION FAILURE	15% (MIN.) (ASTM D1682)
MULLEN BURST STRENGTH	430 LBS. (MIN.) (ASTM D3768)
PUNCTURE STRENGTH	120 LBS. (MIN.) (ASTM D751) (MODIFIED)
EQUIVALENT OPENING	SIZE 40-80 (US STD SIEVE) (CW-02215)

CONSTRUCTION ENTRANCE NOTES:

- A STABILIZED ENTRANCE PAD OF CRUSHED STONE SHALL BE LOCATED WHERE TRAFFIC WILL ENTER OR LEAVE THE CONSTRUCTION SITE ONTO A PUBLIC STREET.
- INSTALL A CULVERT PIPE ACROSS THE ENTRANCE WHEN NEEDED TO PROVIDE POSITIVE DRAINAGE.
- SOIL STABILIZATION FABRIC SHALL BE USED AS A BASE FOR THE CONSTRUCTION ENTRANCE, SUCH AS MIRAFI 600X OR APPROVED EQUIVALENT.
- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC STREETS OR EXISTING PAVEMENT. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS WARRANT AND REPAIR OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
- ANY SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC STREETS OR INTO STORM DRAINS MUST BE REMOVED IMMEDIATELY.
- WHEN APPROPRIATE, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTERING A PUBLIC STREET. WHEN WASHING IS REQUIRED, IT SHALL BE DONE IN AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT BASIN.
- REMOVE CONSTRUCTION ENTRANCES AS SOON AS THEY ARE NO LONGER NEEDED TO PROVIDE ACCESS TO THE SITE. BRING THE DISTURBED AREA TO GRADE, AND STABILIZE IT USING APPROPRIATE PERMANENT STABILIZATION METHODS.
- MINIMUM LOCATIONS ARE SHOWN ON THE PLANS. ADDITIONAL ENTRANCES MAY BE REQUIRED BY CONTRACTOR FOR ACCESS.

NOTE:

THE 12-INCH HEIGHT REQUIREMENT IS WAIVED IN CASES WHERE IT WILL CAUSE SOIL DAMAGE IF THE STONE BAGS ARE OVERTOPPED.



STONE BAG INLET PROTECTION  
DETAIL C

STONE BAG INLET PROTECTION NOTES:

INSTALLATION:

STONE FILL BAGS SHALL BE WOVEN POLYPROPYLENE BAGS WITH APPROXIMATE DIMENSIONS OF 18-1/2 INCHES BY 28 INCHES.

THE BAGS SHALL BE FILLED 1/2 TO 2/3 FULL WITH KTC NO. 57 STONE. TIE THE ENDS OF FILLED BAGS USING EITHER DRAW STRINGS OR WIRE TIES.

INTERWEAVE THE LOOSE ENDS OF THE BAGS SO THAT THE GAPS BETWEEN BAGS ARE FILLED AND THE ENDS OF THE BAGS ARE SEALED.

COMPLETELY SURROUND THE INLET WITH A MINIMUM OF TWO (2) ROWS OF BAGS TO A MINIMUM OF 12 INCHES IN HEIGHT.

INSPECTION AND MAINTENANCE:

INSPECTIONS SHOULD BE MADE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24-HOURS AFTER EACH RAINFALL EVENT THAT PRODUCES 1/2-INCHES OR MORE OF PRECIPITATION. ANY NEEDED REPAIRS SHOULD BE HANDLED IMMEDIATELY.

IF SEDIMENT ACCUMULATES, REMOVE IT FROM THE FACE OF THE BAGS BEFORE IT ACCUMULATES TO A HEIGHT EQUAL TO 1/3 THE STRUCTURE HEIGHT. ANY NEEDED REPAIRS SHOULD BE HANDLED IMMEDIATELY. TAKE CARE NOT TO DAMAGE OR UNDERCUT THE BAGS WHEN REMOVING SEDIMENT.

REMOVE AND REPLACE ANY DAMAGED BAGS AND DISPOSE OF THEM PROPERLY.

STORM DRAIN INLET PROTECTION STRUCTURES SHOULD BE REMOVED ONLY AFTER THE DISTURBED AREAS ARE PERMANENTLY STABILIZED. REMOVE ALL CONSTRUCTION MATERIAL AND SEDIMENT, AND DISPOSE OF THEM PROPERLY. GRADE THE DISTURBED AREA TO THE ELEVATION OF THE DROP INLET STRUCTURE CREST. USE APPROPRIATE PERMANENT STABILIZATION METHODS TO STABILIZE BARE AREAS AROUND THE INLET.

HEADWALL INLET PROTECTION NOTES:

PURPOSE:

INSTALL STONE BAG PROTECTION AT STRAIGHT HEADWALL INLETS TO POOL WATER, PROVIDING OPPORTUNITY FOR SETTLING SEDIMENT BEFORE IT ENTERS HEADWALL.

DESIGN CRITERIA:

BAG SPECIFICATIONS: APPROXIMATELY 18 1/2-INCH X 28-INCH WOVEN POLYPROPYLENE BAGS.

STONE: USE KTC NO. 57 STONE. STONE BAGS SHALL BE FILLED WITH KTC NO. 57 STONE. THE HEIGHT OF STONE BAGS ABOVE CULVERT INVERTS: CONSTRUCT A MINIMUM OF TWO COURSES OF BAGS. THE STONE-FILLED BAGS SHALL BE STACKED TO A HEIGHT EQUAL TO 1/2 THE DIAMETER OF THE CULVERT BEING PROTECTED.

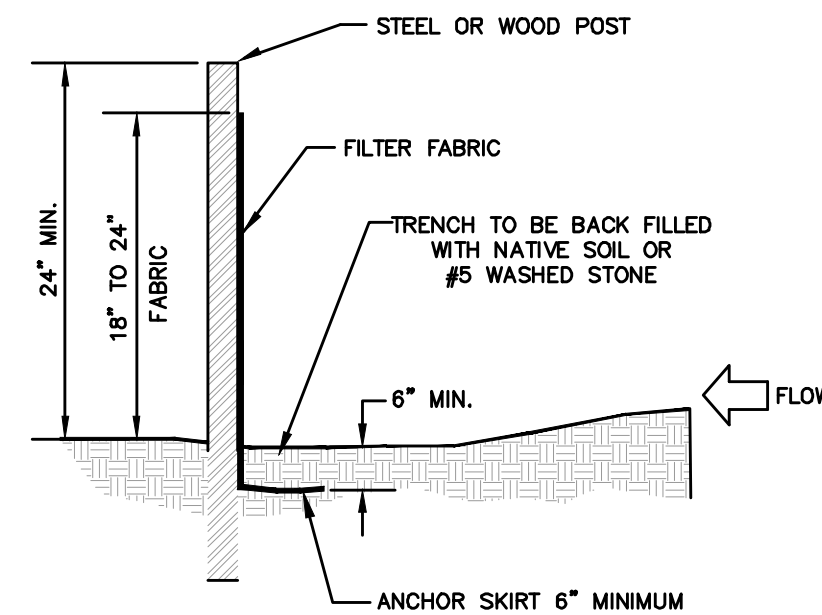
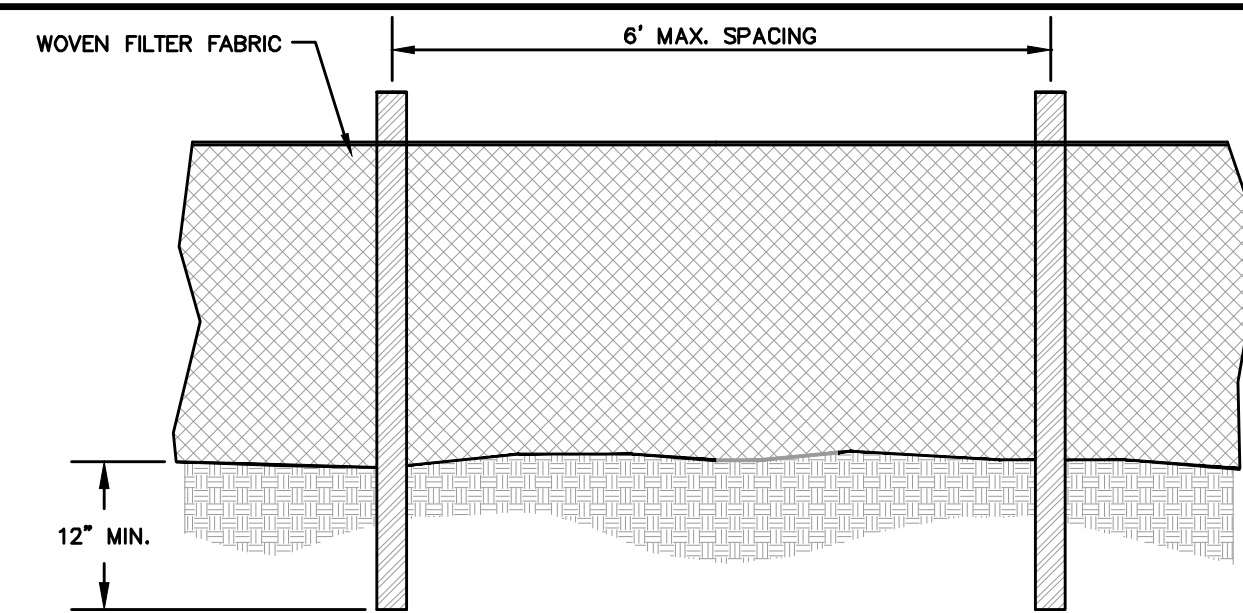
BID UNITS:

INSTALLATION: "EACH"

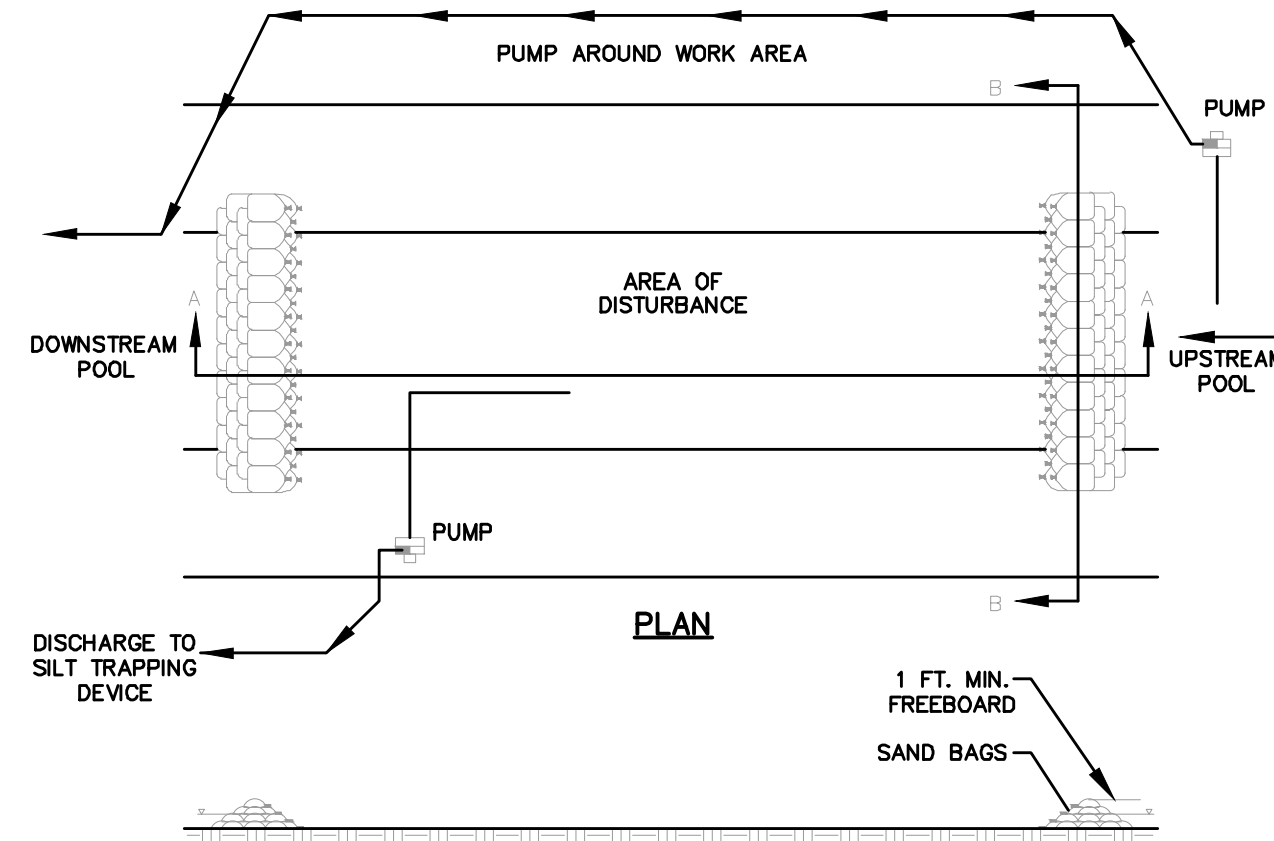
BID EACH STONE BAG INLET PROTECTION STRUCTURE SHOWN ON THE EROSION PREVENTION AND SEDIMENT CONTROL PLAN AS A UNIT. DO NOT SEPARATE ITEMS SUCH AS STONE AND BAGS.

MAINTENANCE: "EACH"

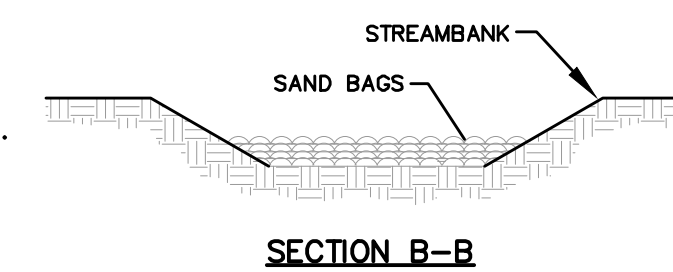
BID ITEM PROVIDES FOR SEDIMENT REMOVAL AND GENERAL UPKEEP FOR THE LIFE OF THE PROJECT. REPLACEMENT OF INLET PROTECTION STRUCTURES DAMAGED BY STORM FLOWS OR NATURAL DETERIORATION WILL BE REIMBURSED AT THE UNIT COST ESTABLISHED FOR INSTALLATION. REPLACEMENT OF STONE BAG INLET PROTECTION THAT WAS DAMAGED BY ACTIVITIES INCIDENTAL TO CONSTRUCTION WILL NOT BE REIMBURSED. INSPECT INLET PROTECTION EVERY SEVEN (7) DAYS AND AFTER EVERY STORM EVENT



TEMPORARY SILT FENCE  
DETAIL D



SECTION A-A

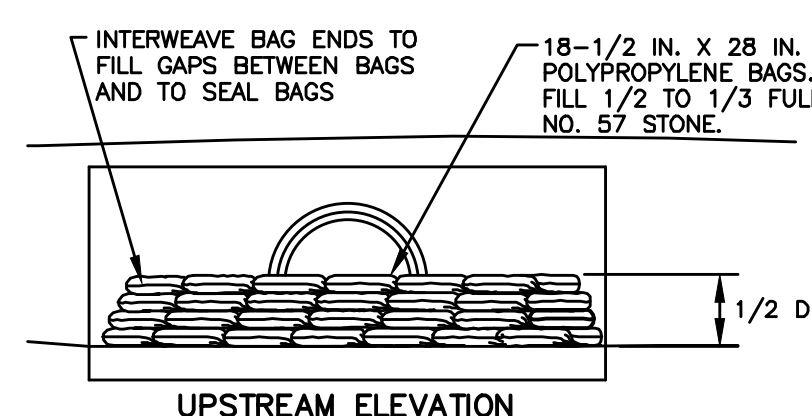


SECTION B-B

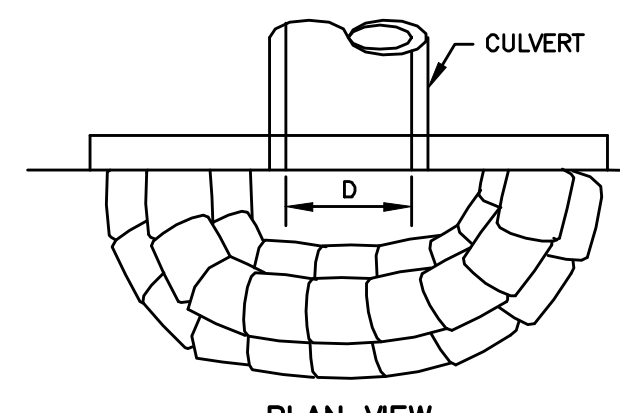
PUMP AROUND FLOW DIVERSION NOTES:

- USE PUMP AROUND DIVERSION WHEN CONSTRUCTION ACTIVITY IS WITHIN A FLOWING STREAM, CREEK, OR DITCH.
- PUMP AROUND DIVERSION LOCATIONS IDENTIFIED ON THE PLANS MAY NOT BE REQUIRED IF STREAM, CREEK OR DITCH CROSSING IS DRY AND NOT FLOWING.

PUMP AROUND FLOW DIVERSION  
DETAIL E



UPSTREAM ELEVATION



PLAN VIEW

HEADWALL INLET PROTECTION  
DETAIL F

RECORD DRAWING

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SILT FENCE NOTES:

- THE FENCE SHOULD BE PLACED ACROSS THE SLOPE ALONG A LINE OF UNIFORM ELEVATION (PERPENDICULAR TO THE DIRECTION OF FLOW). THE FENCE SHOULD BE LOCATED AT LEAST 10- FEET FROM THE TOE OF STEEP SLOPES TO PROVIDE SEDIMENT STORAGE AND ACCESS FOR MAINTENANCE AND CLEANOUT. THE ENDS SHOULD BE TURNED UP SLOPE TO CREATE TIE-BACKS FOR PONDING WATER.
- A FLAT-BOTTOM TRENCH APPROXIMATELY 6-INCHES WIDE AND 6-INCHES DEEP, OR A V-SHAPED TRENCH 8-INCHES DEEP SHOULD BE EXCAVATED. ON THE DOWNSLOPE SIDE OF THE TRENCH, DRIVE THE 2-INCH X 2-INCH WOOD POSTS AT LEAST 12-INCHES INTO THE GROUND, SPACING THEM NO FURTHER THAN 6- FEET APART. STEEL POSTS SHALL BE 1.33 LBS PER LINEAR FOOT.
- POSTS SHOULD BE INSTALLED, WITH 1- TO 2-INCHES OF THE POST PROTRUDING ABOVE THE TOP OF THE FABRIC AND NO MORE THAN 3- FEET OF THE POST SHOULD PROTRUDE ABOVE THE GROUND. THE MINIMUM FENCE HEIGHT (HEIGHT OF FILTER FABRIC ABOVE GRADE) SHALL BE 18-INCHES. THE MAXIMUM FENCE HEIGHT (HEIGHT OF FILTER FABRIC ABOVE GRADE) SHALL BE 24-INCHES.
- THE FILTER FABRIC SHOULD BE PURCHASED IN A CONTINUOUS ROLL AND CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHOULD BE WRAPPED TOGETHER ONLY AT A SUPPORT POST WITH BOTH ENDS SECURELY FASTENED TO THE POST, WITH A MINIMUM 6-INCH OVERLAP.
- EXTRA-STRENGTH FILTER CLOTH (50 POUNDS/LINEAR INCH MINIMUM TENSILE STRENGTH) SHOULD BE USED. A 2-INCH WIDE LATHE SHALL BE STAPLED OVER THE FILTER FABRIC TO SECURELY FASTEN IT TO THE UPSLOPE SIDE OF THE POSTS. THE STAPLES USED SHOULD BE 1.5-INCH HEAVY-DUTY WIRE STAPLES SPACED A MAXIMUM OF 8-INCHES APART.
- PLACE THE BOTTOM 12-INCHES OF THE FILTER FABRIC INTO THE 6-INCH DEEP TRENCH, EXTENDING THE REMAINING 6-INCHES TOWARDS THE UPSLOPE SIDE OF THE TRENCH AND BACKFILL THE TRENCH WITH SOIL OR GRAVEL AND COMPACT.
- REINFORCED SILT FENCE SHALL USE STEEL POSTS AND 6-INCH BY 6-INCH 14 GAUGE WIRE MESH. THE WIRE MESH SHALL BE FASTENED TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY DUTY WIRE STAPLES AT LEAST 1-INCH LONG, TIE WIRES, OR HOG RINGS. EXTEND THE MESH 6-INCHES INTO THE TRENCH. THE FILTER FABRIC SHALL BE FASTENED TO THE FENCE ON THE UPSLOPE SIDE OF THE WIRE MESH.
- SILT FENCE MOVED TO PROVIDE CONSTRUCTION ACCESS SHALL BE REINSTALLED BY THE END OF THE WORKDAY.
- SILT FENCE SHOULD BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER TEMPORARY BMP'S ARE NO LONGER NEEDED. TRAPPED SEDIMENT SHOULD BE REMOVED OR STABILIZED ON SITE. DISTURBED AREAS RESULTING FROM FENCE REMOVAL SHALL BE PERMANENTLY STABILIZED PER FINAL RESTORATION REQUIREMENTS.

EROSION AND SEDIMENT CONTROL GENERAL NOTES:

- THE APPROVED EROSION AND SEDIMENT CONTROL PLAN (ESC PLAN) SHALL BE IMPLEMENTED PRIOR TO ANY LAND-DISTURBING ACTIVITY ON THE CONSTRUCTION SITE. ANY MODIFICATIONS TO THE APPROVED ESC PLAN MUST BE REVIEWED AND APPROVED BY SANITATION DISTRICT NO. 1. ESC BEST MANAGEMENT PRACTICES (BMPs) SHALL BE INSTALLED PER THE PLAN AND SPECIFICATIONS.
- RUNOFF FROM ALL DISTURBED AREAS MUST BE ROUTED THROUGH A SILT CONTROL STRUCTURE PRIOR TO DISCHARGE FROM THE CONSTRUCTION AREA AND PRIOR TO ENTERING A RECEIVING STREAM OR WATER BODY.
- ACTIONS MUST BE TAKEN TO MINIMIZE THE TRACKING OF MUD AND SOIL FROM CONSTRUCTION AREAS ONTO PUBLIC ROADWAYS. SOIL TRACKED ONTO THE ROADWAY SHALL BE REMOVED DAILY.
- SOIL STOCKPILES SHALL BE LOCATED AWAY FROM STREAMS, PONDS, SWALES, AND CATCH BASINS. STOCKPILES SHALL BE SEEDED, MULCHED, AND ADEQUATELY CONTAINED THROUGH THE USE OF SILT FENCE.
- ALL STREAM CROSSINGS MUST UTILIZE LOW-WATER CROSSING STRUCTURES. PUMP AROUND FLOW DIVERSIONS MUST BE USED WHEN CONSTRUCTION ACTIVITY IS WITHIN A FLOWING STREAM, CREEK, OR DITCH.
- SEDIMENT-LADEN GROUNDWATER ENCOUNTERED DURING TRENCHING, BORING, OR OTHER EXCAVATION ACTIVITIES, AND SEDIMENT-LADEN WATER FROM STREAM CROSSING PUMP AROUNDS, SHALL BE PUMPED TO A SEDIMENT TRAPPING DEVICE PRIOR TO BEING DISCHARGED INTO A STREAM, POND, SWALE, OR CATCH BASIN. ACCEPTABLE SEDIMENT TRAPPING DEVICES INCLUDE SEDIMENT TRAPS, SILT FENCE, SILT BAGS, OR OVERLAND FLOW OVER VEGETATED FILTERS.
- WHERE CONSTRUCTION OR LAND DISTURBING ACTIVITY WILL OR HAS TEMPORARILY CEASED ON ANY PORTION OF A SITE, TEMPORARY SITE STABILIZATION MEASURES SHALL BE REQUIRED AS SOON AS PRACTICABLE, BUT NO LATER THAN 14 CALENDAR DAYS AFTER THE ACTIVITY HAS CEASED.
- ESC CONTROL DEVICES (SUCH AS DITCH CHECKS, SILT FENCE, AND OTHER CONTROLS INSTALLED) SHALL BE INSPECTED AT LEAST EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24-HOURS AFTER EACH RAINFALL EVENT THAT PRODUCES 1/2-INCHES OR MORE OF PRECIPITATION. CHECK FOR AREAS WHERE RUNOFF HAS ERODED A CHANNEL BENEATH THE DEVICE, OR WHERE THE DEVICE HAS BEEN OVERTOPPED AND/OR COLLAPSED.
- IF THE ESC CONTROL DEVICE BECOMES INEFFECTIVE DUE TO WEATHERING, DECOMPOSING, OR DAMAGE, REPLACE THE AFFECTED SECTION IMMEDIATELY.
- SEDIMENT MUST BE REMOVED WHEN IT REACHES APPROXIMATELY 1/3 THE HEIGHT OF THE SILT FENCE OR CHECK DAM, ESPECIALLY IF HEAVY RAINS ARE EXPECTED.
- USE BMP CONSTRUCTION TECHNIQUES SUCH AS:
  - PLACE CLEARED BRUSH ON DOWN SLOPE SIDE OF CONSTRUCTION AREA.
  - PLACE SOIL EXCAVATED BACKFILL ON UP-SLOPE SIDE OF TRENCH EXCAVATION.
  - MAINTAIN TEMPORARY STRAW MULCH ON DISTURBED SLOPES OVER 33%
- THE ESC CONTROL DEVICES, SUCH AS SILT FENCE AND CLEAN WATER DIVERSION BERMS, ARE GENERALLY SHOWN ON THE PLANS AT APPROXIMATELY 30' OFF THE CENTERLINE OF THE PIPE. THE CONTRACTOR MAY USE DISCRETION, AS ALLOWED BY THE CONTRACT AND EASEMENT REQUIREMENTS, TO PLACE THESE CONTROLS FURTHER APART TO ALLOW SUFFICIENT WIDTH FOR CONSTRUCTION OF THE SANITARY SEWERS. THE CONTRACTOR SHALL, HOWEVER, MINIMIZE CONSTRUCTION WIDTH TO ONLY THAT REASONABLY NECESSARY. THE FULL WIDTH OF DISTURBED AREA SHALL BE STABILIZED AND RESTORED UPON COMPLETION OF THE PROJECT PER THE CONTRACT, FINAL RESTORATION REQUIREMENTS.
- THE ESC PLAN INDICATES MINIMUM MEASURES AND BMPs TO PROTECT AGAINST EROSION AND PROVIDE SEDIMENT CONTROL. THE CONTRACTOR'S ACCESS, STORAGE/STAGING AREAS, AND CONSTRUCTION METHODS MAY REQUIRE ADDITIONAL ESC MEASURES NOT INDICATED ON THE PLANS. ADDITIONAL BMPs AND ESC MEASURES MAY BE REQUIRED BY THE CONTRACTOR TO MINIMIZE SEDIMENT FROM LEAVING THE CONSTRUCTION ZONE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADHERING TO THE MOST RECENT NORTHERN KENTUCKY REGIONAL STORM WATER MANAGEMENT PROGRAM RULES AND REGULATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR PREPARING AND SUBMITTING THE NOTICE OF INTENT (NOI) FOR COVERAGE UNDER THE KENTUCKY GENERAL KPDES PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES AND ADHERING TO THE PLAN AND CERTIFICATION REQUIREMENTS OF THE PERMIT.

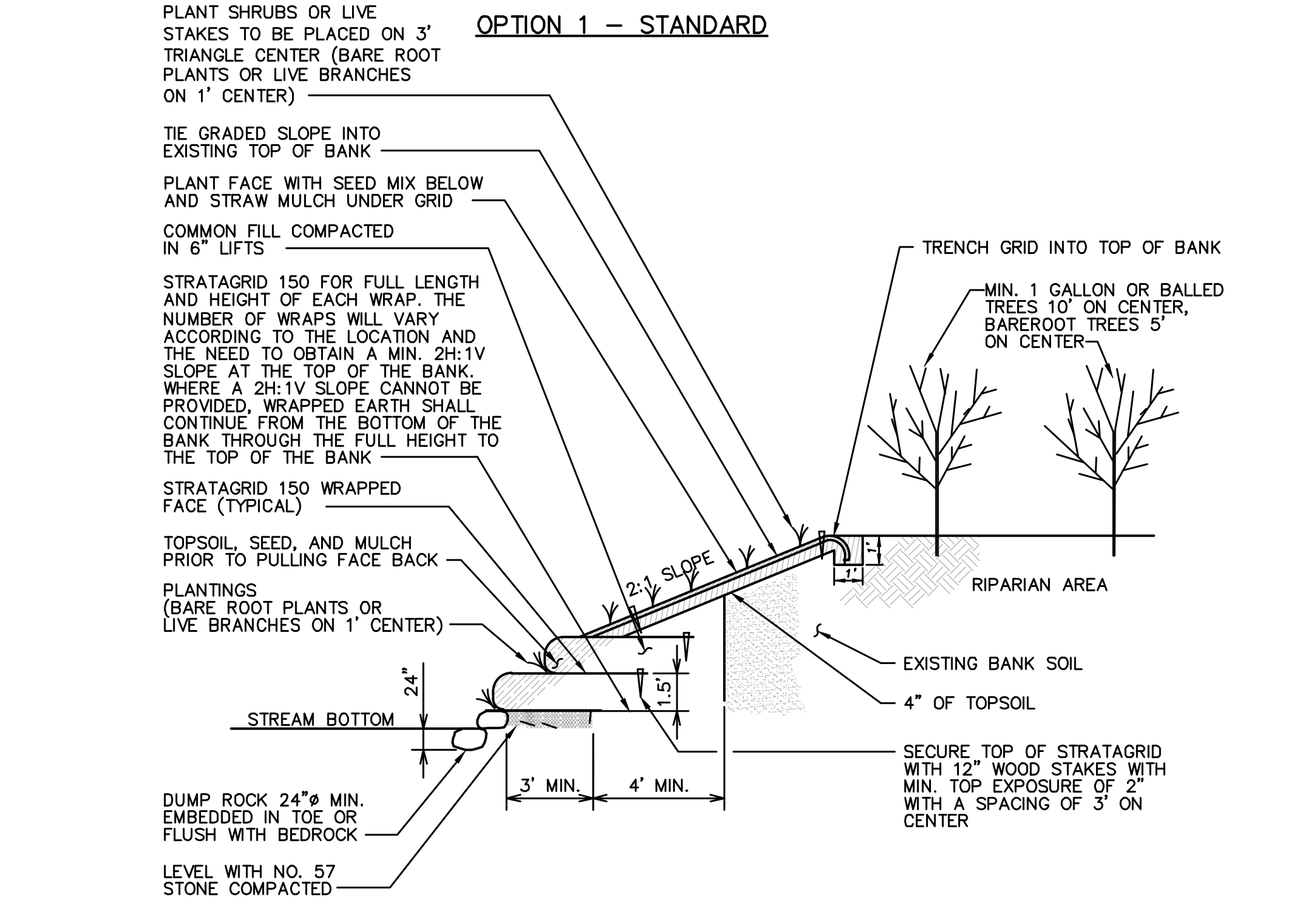
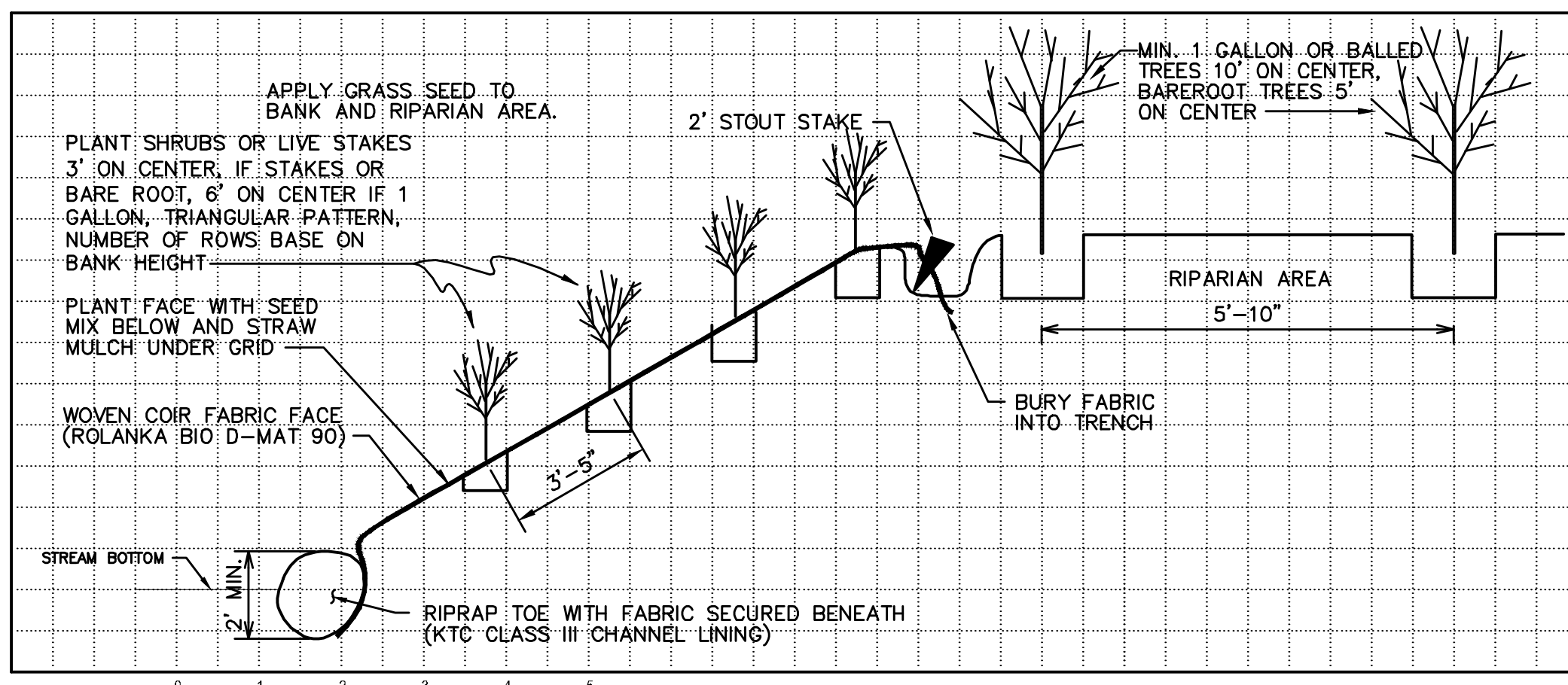
COX ROAD AND OLIVER ROAD  
WATER MAIN REPLACEMENT  
NORTHERN KENTUCKY WATER DISTRICT  
KENTON COUNTY, KENTUCKY  
EROSION CONTROL DETAILS

1"=5' VERT.  
SCALE: NONE  
DATE: OCTOBER 2018  
JOB NO.: 94-364  
DESIGNED: KJB  
DRAWN: WMG  
CHECKED: NJB  
Q/C:  
OWNER APPROVAL:  
BY:  
TITLE:  
REVISIONS:  
NO.: DATE:

DRAWING:  
20  
OF 21

HDR

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- STREAM RESTORATION NOTES:**
- STREAM/CHANNEL BANK RESTORATION FOR ALL CROSSINGS, SHOWN ON THE DRAWINGS, SHALL BE PER DETAIL H, OPTION 1 - STANDARD RESTORATION, UNLESS NOTED OTHERWISE ON THE PLANS.
  - CONTRACTOR SHALL RESTORE STREAM CHANNEL BANKS IMMEDIATELY FOLLOWING SEWER CROSSING CONSTRUCTION AND REMOVAL OF TEMPORARY CONSTRUCTION CROSSING. FAILURE TO COMPLETE RESTORATION IMMEDIATELY AFTER CROSSING, TO THE SATISFACTION OF THE OWNER, WILL RESULT IN NONPAYMENT OF THE CONTRACTOR'S PAY REQUEST. TEMPORARY PUMP AROUND FLOW DIVERSION WILL BE REQUIRED FOR ROCK TOE PLACEMENT IF STREAM WATER IS PRESENT.
  - SEED MIX: SUGGESTED SOURCE: SHOOTING STAR NURSERY, ERNST CONSERVATION SEEDS LLP, OR SPENCE RESTORATION NURSERY

COMMON NAME	SCIENTIFIC NAME	PLANT TYPE	QUANTITY (lbs/acre)
RICE CUTGRASS	<i>Leersia oryzoides</i>	GRASS	1
MANAGRASS	<i>Cyperus striatus</i>	GRASS	1
BARNYARD GRASS	<i>Echinochloa crus-galli</i>	GRASS	2
SWITCHGRASS	<i>Panicum virgatum</i>	GRASS	0.5
WILD RYE	<i>Wymus virginicus</i>	GRASS	3
DEFTYONGUE GRASS	<i>Panicum clandestinum</i>	GRASS	2
RIVERBANK MILK YRT	<i>Lymus riparius</i>	GRASS	2
FOX SEDGE	<i>Carex vulpinoidea</i>	SEDEG	2
SEED OATS	<i>Avena sativa</i>	TEMPORARY SEED MATRIX	2
ANNUAL RYE	<i>Lolium multiflorum</i>	TEMPORARY SEED MATRIX	2
TIMOTHY	<i>Phleum pratense</i>	TEMPORARY SEED MATRIX	2
TOTAL			42.50

COMMON NAME	SCIENTIFIC NAME	MATERIAL	PLANT TYPE	QUANTITY (lbs/acre)
PIN OAK	<i>Quercus palustris</i>	BAREROOT	TREE	1
GREEN ASH	<i>Fraxinus pennsylvanica</i>	BAREROOT	TREE	1
EASTERN DOGWOOD	<i>Cornus florida</i>	BAREROOT	TREE	1
BLACK WALNUT	<i>Juglans nigra</i>	BAREROOT	TREE	1
YELLOW POPLAR	<i>Liriodendron tulipifera</i>	BAREROOT	TREE	1
ORIGAN SUECIC	<i>Aesculus glabra</i>	BAREROOT	TREE	1
SYCAMORE	<i>Platanus occidentalis</i>	BAREROOT	TREE	1
SANDBAR WILLOW	<i>Salix interio</i>	LIVE STAKE	TREE	1
GREEN ASH	<i>Fraxinus pennsylvanica</i>	MIN. 1 GAL. OR BALLED	TREE	1
YELLOW POPLAR	<i>Liriodendron tulipifera</i>	MIN. 1 GAL. OR BALLED	TREE	1
SYCAMORE	<i>Platanus occidentalis</i>	MIN. 1 GAL. OR BALLED	TREE	1
PIN OAK	<i>Quercus palustris</i>	MIN. 1 GAL. OR BALLED	TREE	1
TOTAL				12

COMMON NAME	SCIENTIFIC NAME	MATERIAL	PLANT TYPE	QUANTITY (lbs/acre)
ARROW WOOD	<i>Viburnum dentatum</i>	BAREROOT	SHRUB	1
CRAY DOGWOOD	<i>Cornus racemosa</i>	BAREROOT	SHRUB	1
SILKY DOGWOOD	<i>Cornus amomum</i>	BAREROOT	SHRUB	1
SPICEBUSH	<i>Lindera benzoin</i>	BAREROOT	SHRUB	1
AMERICAN ELDER	<i>Sambucus canadensis</i>	BAREROOT	SHRUB	1
BUTTON BUSH	<i>Cephalanthus occidentalis</i>	BAREROOT	SHRUB	1
TOTAL				6

**STREAM BANK RESTORATION  
DETAIL G**

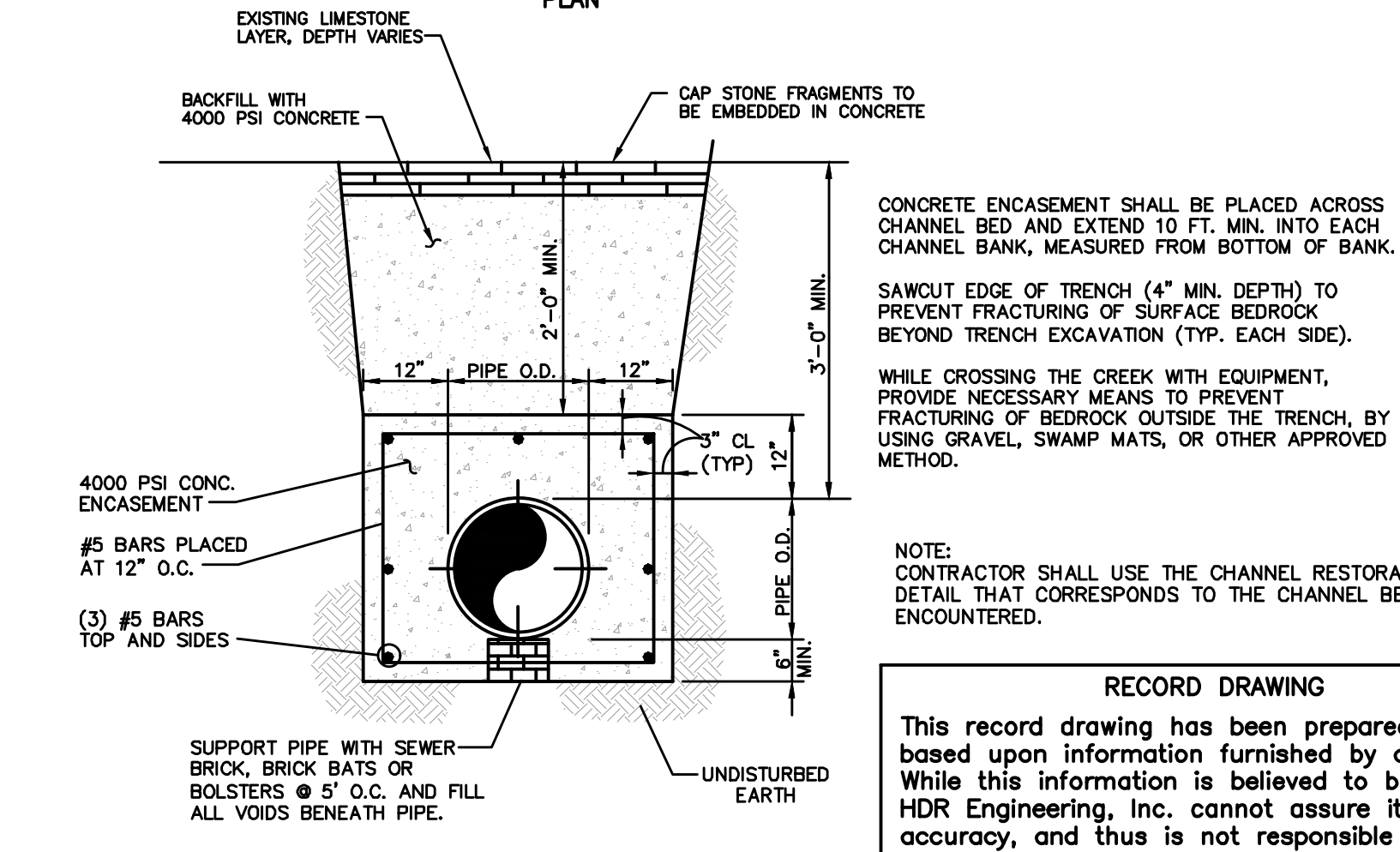
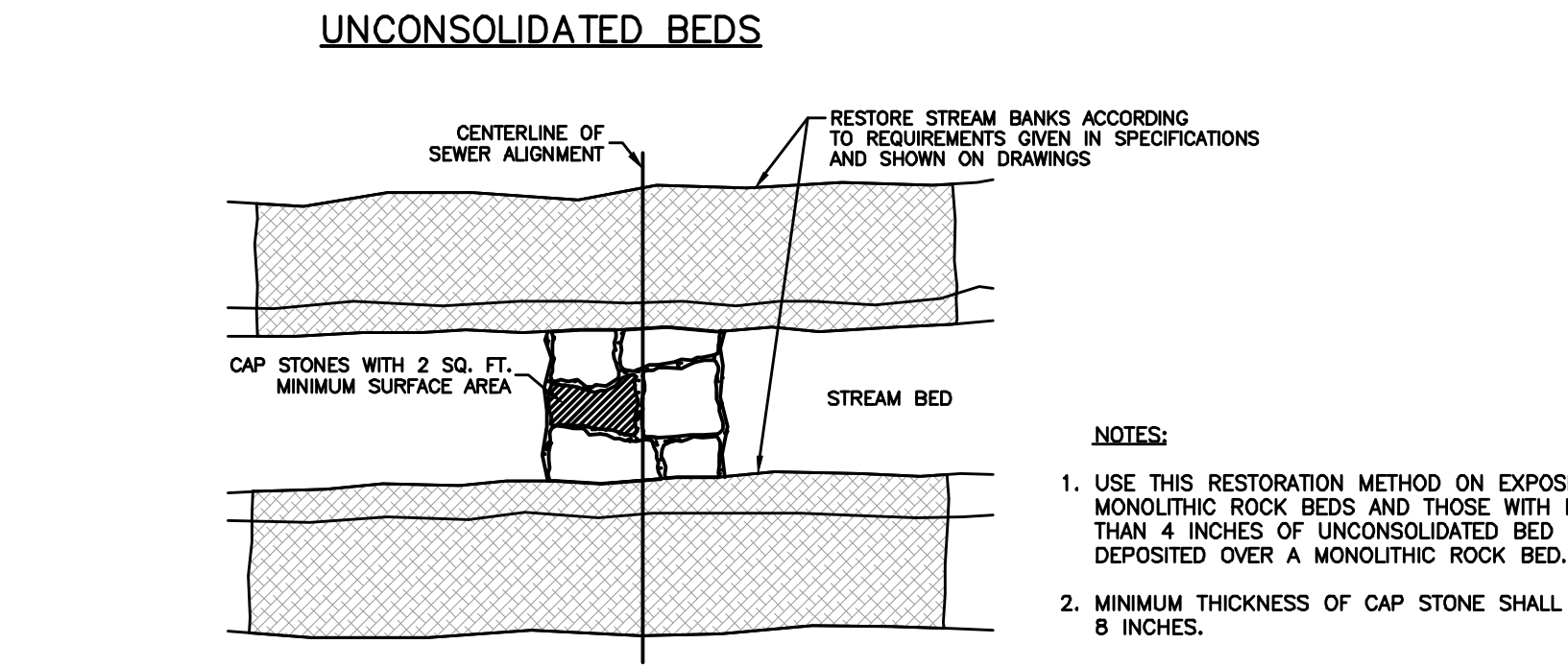
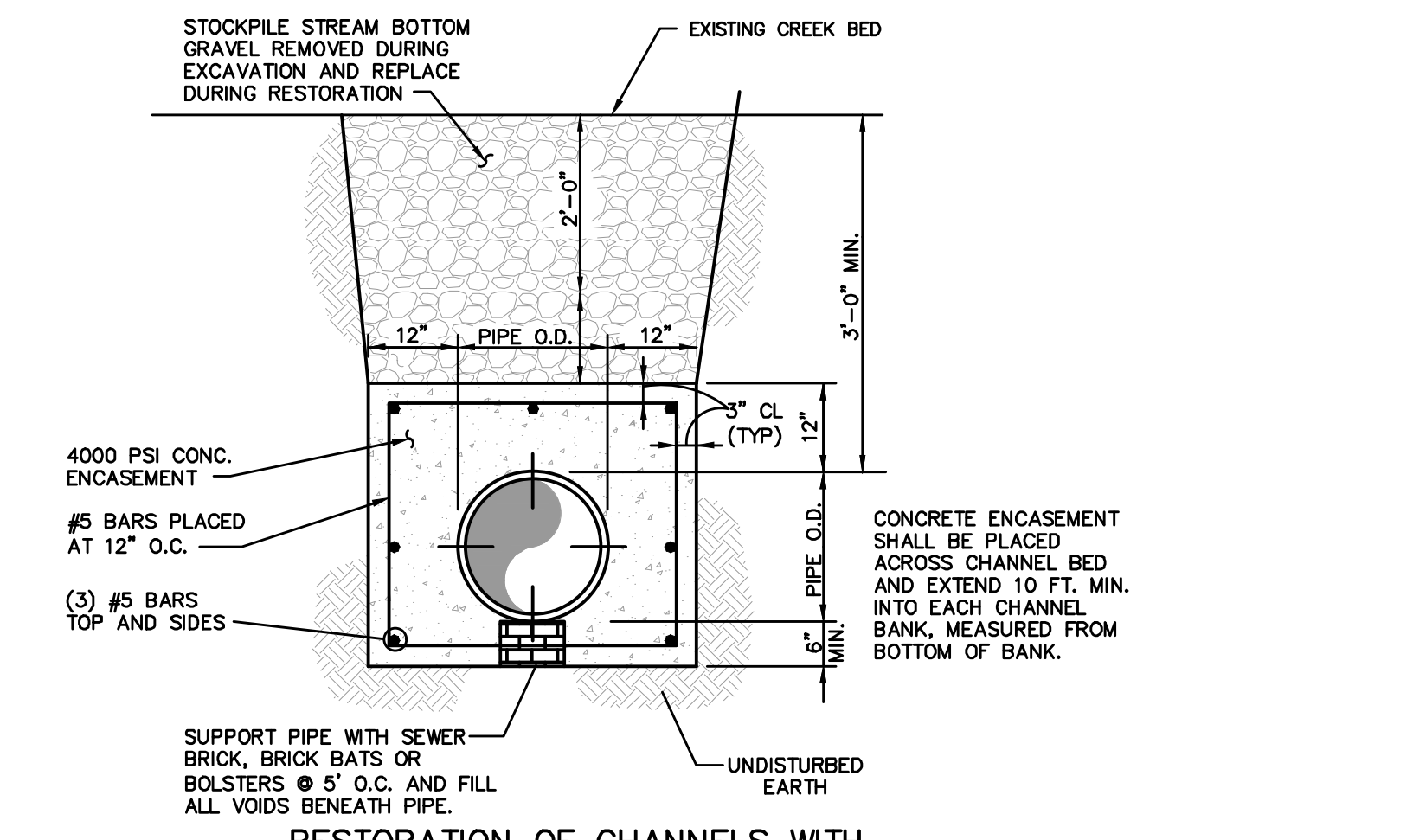
**STREAMBANK AND RIPARIAN RESTORATION SPECIFICATIONS:**

- TOPSOIL FOR SEEDING**
- CONSISTS OF LOADING, HAULING, PLACING, SPREADING, AND ROLLING SELECTED TOPSOIL MATERIAL. ALL FINISHED EARTH SURFACES, INCLUDING TOE OF BANKS, SHALL BE COVERED WITH A MINIMUM OF 2 INCHES OF TOPSOIL. SEEDING SHALL NOT BE PLACED WITHIN THE STREAM CHANNEL. ALL OPERATIONS INVOLVED IN THE PLACING, SPREADING, AND ROLLING OF THE TOPSOIL SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER. SELECTED TOPSOIL SHALL BE OBTAINED FROM APPROVED STOCKPILES OF MATERIALS FROM EXCAVATING, FROM BORROW AREAS, OR FROM OTHER APPROVED SOURCES. THE MATERIAL SHALL CONTAIN THE MOST FERTILE LOAM AVAILABLE FROM APPROVED SOURCES AND SHALL BE FREE FROM EXCESSIVE QUANTITIES OF GRASS, ROOTS, WEEDS, STICKS, STONES, OR OTHER OBJECTIONABLE MATERIALS. AREAS TO RECEIVE TOPSOIL SHALL BE FINISHED SMOOTH AND UNIFORM BEFORE THE TOPSOIL IS APPLIED. TOPSOIL SHALL BE EVENLY PLACED AND SPREAD OVER THE GRADED AREA, AND COMPACTED IN TWO LAYERS. TOPSOIL SHALL NOT BE PLACED WHEN THE SUBGRADE IS FROZEN OR IN CONDITION OTHERWISE DETRIMENTAL TO PROPER GRADING AND SEEDING AS DETERMINED BY THE OWNER. IT IS RECOMMENDED THAT COMPACTION OF THE TOPSOIL BE OBTAINED BY RUNNING TRACKED EQUIPMENT ON THE BANKS IN A DIRECTION PERPENDICULAR TO THE STREAM. THE COMPACTION WILL PROVIDE GROOVES THAT ARE PARALLEL TO THE STREAM AND CAPTURE SEED AND SOIL PRIOR TO ERODING.
- SEEDING**
- GENERAL** - SEEDING SHALL CONSIST OF GROUND PREPARATION, FURNISHING AND PLANTING APPROVED SEED, FURNISHING AND PLACING MULCH, AND FURNISHING AND SPREADING APPROVED COMMERCIAL FERTILIZER. EXCEPT FOR PLACING, SPREADING, AND ROLLING TOPSOIL, ALL SEEDING OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH PROVISIONS OF THIS SECTION. ALL EXCAVATION SURFACES COMPOSED OF ROCK AND EXCAVATED SLOPES WITH A SLOPE OF 1:1 OR STEEPER, SHALL BE EXCLUDED FROM THE SEEDED AREAS.
    - WHERE TOPSOIL FOR SEEDING IS NOT REQUIRED - THE CONTRACTOR SHALL PREPARE THE AREAS TO BE SEED TO PROVIDE A FIRM, LEVEL AND UNIFORM SURFACE SUITABLE FOR ESTABLISHING GRASS STANDS JUST PRIOR TO SOWING THE SEED. WHERE SEEDING IS REQUIRED, THE CONTRACTOR SHALL PREPARE THE AREAS TO BE SEED TO PROVIDE A FIRM, LEVEL AND UNIFORM SURFACE SUITABLE FOR ESTABLISHING GRASS STANDS JUST PRIOR TO SOWING THE SEED. WHERE SEEDING IS REQUIRED, THE CONTRACTOR SHALL PREPARE THE AREAS TO BE SEED TO PROVIDE A FIRM, LEVEL AND UNIFORM SURFACE SUITABLE FOR ESTABLISHING GRASS STANDS JUST PRIOR TO SOWING THE SEED. WHERE SEEDING IS REQUIRED, THE CONTRACTOR SHALL PREPARE THE AREAS TO BE SEED TO PROVIDE A FIRM, LEVEL AND UNIFORM SURFACE SUITABLE FOR ESTABLISHING GRASS STANDS JUST PRIOR TO SOWING THE SEED.
    - SEEDS - SEED AND SEEDING MIXTURES SHALL BE FREE OF ALL PROHIBITED NOXIOUS WEED SEEDS AND SHALL NOT CONTAIN MORE THAN 0.5 PERCENT, BY WEIGHT, OF RESTRICTED NOXIOUS WEED SEEDS. PROHIBITED AND RESTRICTED NOXIOUS WEEDS SHALL BE THOSE OF CLASSIFIED BY THE STATE SEED DEPARTMENT.
    - SEED CONTAINERS MUST BE SEALED AND LABELED TO COMPLY WITH EXISTING SEED LAWS AND REGULATIONS OR IN ACCORDANCE WITH U.S. DEPARTMENT OF AGRICULTURE RULES AND REGULATIONS UNDER THE FEDERAL SEED ACT, IF SHIPPED IN INTERSTATE COMMERCE. ALL DIFFERENT GRASS SPECIES SPECIFIED SHALL BE SEPARATELY PACKAGED AND LABELED, AND SHALL BE UNIFORMLY AND THOROUGHLY MIXED AFTER THEY RECEIVED ON THE JOB.
    - SEEDING PERIODS - SEEDING SHALL BE DONE AT SUCH TIMES OF THE YEAR AS INDICATED IN THE PLANS OR AS APPROVED BY THE ENGINEER.
    - MULCHING - THE CONTRACTOR SHALL FURNISH AND UNIFORMLY PLACE, AFTER SEEDING, A UNIFORM LAYER OF 2-INCHES OF HAY OR STRAW MULCH ON ALL SEEDED AREAS. MULCH MATERIAL SHALL BE REASONABLY FREE OF OTHER VEGETATION. MULCH SHALL BE DECOMPOSITION AND WEED SEED. MULCH WILL BE ANCHORED AT 6- TO 12-INCH INTERVALS ACROSS THE SLOPE BY CRIMPING INTO SOIL.
    - SOWING SEED**
      - METHOD - THE MIXTURE SPECIFIED HEREIN SHALL BE SOWN BY MECHANICAL OR HAND BROADCASTING. HYDROSEEDING IS NOT PERMITTED.
        - MECHANICAL BROADCASTING - A MECHANICAL BROADCASTER OF EITHER THE CENTRIFUGAL TYPE OR PULL TYPE SIMILAR TO FERTILIZER SPREADERS IS ACCEPTABLE. ANY EQUIPMENT OF THIS TYPE USED FOR BROADCAST SEEDING SHALL BE DESIGNED AND REGULATED TO ENSURE THAT THE PROPER SEEDING RATE PER ACRE SPECIFIED HEREIN IS UNIFORMLY APPLIED ON AREAS TO BE SEED. WHEN THIS METHOD IS USED, SEED AND FERTILIZER MAY NOT BE APPLIED IN THE SAME MIXTURE SIMULTANEOUSLY, BUT EACH SHALL BE BROADCAST SEPARATELY.
        - HAND BROADCASTING - HAND BROADCASTING MAY BE PERFORMED ONLY ON SMALL, INACCESSIBLE AREAS AS APPROVED BY THE OWNER. SEED APPLICATION MAY BE PERFORMED BY USING AN APPROVED HAND BROADCASTER OR BY BROADCASTING THE SEED BY HAND FROM A SACK OR OTHER SUITABLE CONTAINER. WHICHEVER MEANS IS USED, THE SEED SHALL BE UNIFORMLY APPLIED AT THE RATES SPECIFIED HEREIN. WHEN USING THIS METHOD, BOTH THE SEED AND FERTILIZER SHALL BE BROADCAST SEPARATELY.
      - IMMEDIATELY AFTER BROADCASTING THE SEED BY EITHER MECHANICAL OR HAND METHODS, THE SEED SHALL BE PROPERLY COVERED WITH SOIL TO THE DEPTHS PRESCRIBED USING A SPIKE TOOTH HARROW, ROTARY HOE, DUNHAM PACKER, OR OTHER ACCEPTABLE IMPLEMENTS. COVERING BROADCAST SEED BY DRAGGING A LOG CHAIN OR SIMILAR DEVICE WILL NOT BE PERMITTED. SEED BROADCAST AROUND STRUCTURES SHALL BE COVERED WITH SOIL BY A HAND RAKE OR FLOAT.
    - FERTILIZER - FERTILIZER WILL NOT BE USED FOR RIPARIAN RESTORATION AREAS OR WOODLAND AREAS. FERTILIZER SHALL BE USED WHEN THE SEEDING IS TAKING PLACE IN LANDSCAPED AREAS USING TURF TYPE GRASS SEED. THE CONTRACTOR SHALL FURNISH AND APPLY COMMERCIAL FERTILIZER AT A RATE OF 436 POUNDS OF 10-10-10 FERTILIZER PER ACRE, OR 363 POUNDS OF 2-12-12 FERTILIZER PER ACRE. THE FERTILIZER SHALL BE PACKAGED AND LABELED SHOWING THE GUARANTEED ANALYSIS AND NET WEIGHT PER BAG WHEN RECEIVED ON THE JOB. FERTILIZER MAY BE APPLIED PRIOR TO SEEDING BY SUITABLE MECHANICAL SPREADERS, BLOWERS, OR HYDRAULIC EQUIPMENT.
    - WATERING - ALL SEEDED AREAS SHALL BE WATERED SO AS TO ACHIEVE 70 PERCENT COVERAGE IN THE RIPARIAN ZONES AND 100% COVERAGE IN TURF ZONES.

- LIVE STAKING SPECIFICATION AND LIVE BRANCHES SPECIFICATION**
- LIVE STAKING INVOLVES THE INSERTION AND TAMPING OF LIVE, ROOTABLE VEGETATIVE CUTTINGS INTO THE GROUND. THIS MEASURE CAN ONLY BE PERFORMED DURING THE DORMANT PERIOD FOR THE PLANT, DEFINED AS THAT PERIOD AFTER THE LEAVES FALL OFF AND BEFORE BUDS OPEN, FROM NOVEMBER TO MARCH, IF CORRECTLY PREPARED, HANDLED, AND PLACED, THE LIVE STAKE WILL ROOT AND GROW. BARE ROOTED PLANTS SHALL BE USED DURING NON-DORMANT PERIODS.
- THE LIVE STAKES GENERALLY ARE 0.5 TO 3 INCHES IN DIAMETER AND 4 TO 5 FEET LONG. THE APPROVED SPECIES OF STAKE SHALL BE AS INDICATED ON THE CONSTRUCTION PLANS OR AS APPROVED BY THE OWNER. THE MATERIALS MAY BE COLLECTED OR PURCHASED.
  - THE STAKES MUST HAVE SIDE BRANCHES CLEANLY REMOVED WITH THE BARK INTACT. THE BASAL ENDS (BOTTOM) SHOULD BE CUT AT AN ANGLE OR POINT FOR EASY INSERTION INTO THE SOIL. THE TOP OF THE STAKE SHOULD BE CUT SQUARE TO IDENTIFY IT AND TO ALLOW A SOLID STRIKING SURFACE. THE STAKES SHOULD BE INSTALLED AFTER 24 HOURS OF SOAKING THE BASAL END OF THE PLANT IN WATER. PLANTING SHOULD OCCUR AS SOON AS POSSIBLE AFTER COLLECTION AND SOAKING. IF IMMEDIATE PLANTING CAN NOT BE PERFORMED, THE BASAL END OF THE PLANT SHALL BE KEPT IN WATER AND THE PLANT SHALL BE REFRIGERATED AND KEPT IN A DARK SETTING. STAKES THAT BEGIN SPROUTING BEFORE PLANTING WILL BE REJECTED.
  - THE STAKE SHALL BE INSTALLED IN THE BANK BEGINNING SLIGHTLY ABOVE THE WATER LEVEL AND PROCEEDING UP THE BANK. TAMP THE LIVE STAKE INTO THE GROUND AT RIGHT ANGLES TO THE SLOPE AND DIVERTED DOWNSTREAM. THE LIVE STAKES SHOULD BE INSTALLED 2 TO 3 FEET APART USING TRIANGULAR SPACING. THE DENSITY OF THE INSTALLATION WILL RANGE FROM 2 TO 4 STAKES PER SQUARE YARD, TYPICALLY 3 FEET ON CENTER IN A TRIANGULAR PATTERN. SITE VARIATIONS MAY REQUIRE SLIGHTLY DIFFERENT SPACING. THE BANKS SHOULD BE ORIENTED UP. TAMP THE STAKE INTO THE GROUND WITH A 24" BUSH HAMMER OR A 2" HEAD FILLED WITH SHOT OR SAND). FOUR FIFTHS OF THE LENGTH OF THE LIVE STAKE SHOULD BE INSTALLED INTO THE GROUND, AND SOIL SHOULD BE FIRMLY PACKED AROUND IT AFTER INSTALLATION. DO NOT SPLIT THE STAKES DURING INSTALLATION. STAKES THAT SPLIT SHOULD BE REMOVED AND REPLACED. AN IRON BAR OR A STINGER ATTACHED TO A BACKHOE BUCKET CAN BE USED TO MAKE A PILOT HOLE IN FIRM OR ROCKY SOIL. IF A PILOT HOLE IS USED, THE VOID AROUND THE STAKE SHOULD BE FILLED WITH SOIL. A SLURRY OF MUD OR BY COMPACTION.
  - THE CONTRACTOR SHALL WARRANT 50 PERCENT SURVIVAL OF THE STAKES AFTER ONE (1) YEAR. IF 50 PERCENT IS NOT ACHIEVED, THE CONTRACTOR SHALL REPLACE ALL DEAD STAKES. IF A LARGE AMOUNT OF MORTALITY OCCURS IN ONE AREA, THE OWNER MAY REQUEST REPLACEMENT OF THE STAKES.

- BAREROOT SHRUB OR TREE PLANTING SPECIFICATION**
- UNPACK TREE AND SOAK ROOTS IN WATER 3 TO 6 HOURS. DO NOT PLANT WITH PACKING MATERIALS ATTACHED TO ROOTS, AND DO NOT ALLOW ROOTS TO DRY OUT. PLANT ROOTS WILL BE DIPPED IN TERRA-SORB SYNTHETIC ROOT DIP, MEDIUM GRADE PRIOR TO PLANTING.
  - DIG A HOLE, WIDER THAN SEEMS NECESSARY, SO THE ROOTS CAN SPREAD WITHOUT CROWDING. THE SPACING FOR SHRUBS SHALL BE 3 FOOT ON CENTER IN A TRIANGULAR PATTERN, TYPICALLY OCCURRING ON THE BANKS OF THE STREAM. SPACING FOR TREES SHALL BE 5 FOOT ON CENTER IN A TRIANGULAR PATTERN BEGINNING AT THE TOP OF THE BANK. AND THE NUMBER OF ROWS SHALL BE SPECIFIED BY THE OWNER. REMOVE ANY GRASS WITHIN A THREE-FOOT CIRCULAR AREA. TO AID ROOT GROWTH, TURN SOIL IN AN AREA UP TO 3 FEET IN DIAMETER. BURY ONE AGRIFORM FERTILIZER 10-GRAM FOREST STARTER TABLET IN THE BOTTOM OF THE HOLE AND COVER TABLET WITH DIRT TO AVOID CONTACT WITH ROOTS.
  - WHERE MORE THAN ONE SPECIES OF SHRUB OR TREE IS TO BE PLANTED, THE PLANTS SHALL BE RANDOMLY PLACED TO INTERMIX THE SPECIES PLANTED UNLESS OTHERWISE SPECIFIED. PLANT THE SHRUB OR TREE AT THE SAME DEPTH IT STOOD IN THE NURSERY, WITHOUT CROWDING THE ROOTS. PARTIALLY FILL THE HOLE, FIRING THE SOIL AROUND THE LOWER ROOTS. BACKFILL SHOULD BE SHREDDED TOPSOIL.
  - SHOVEL IN THE REMAINING SOIL. IT SHOULD BE FIRMLY, BUT NOT TIGHTLY PACKED WITH YOUR HEEL. CONSTRUCT A WATER-HOLDING BASIN AROUND THE SHRUB OR TREE IF IT IS ON A FLAT GROUND. WATER THE SHRUB OR TREE GENEROUSLY TO SETTLE THE SOIL AND PROMOTE GROWTH.
  - AFTER THE WATER HAS SOAKED IN, PLACE A 2-INCH DEEP PROTECTIVE MULCH AREA 3 FEET IN DIAMETER AROUND THE BASE OF THE SHRUB OR TREE (BUT NOT TOUCHING THE TRUNK) IF IT IS ON A FLAT AREA. A COIR 0.4-INCH THICK WEED MAT MAY BE SUBSTITUTED FOR MULCH. FOR TREES, A RIGID SEEDLING PROTECTOR TUBE SHALL BE PLACED AROUND THE BASE OF EACH PLANT TO PREVENT DEER AND RODENT DAMAGE.
  - WATER THE TREE OR SHRUB ON AN AS NEEDED BASIS FOR SURVIVAL. RECOMMENDED RATES ARE EVERY WEEK OR 10 DAYS DURING THE GROWING SEASON FOR THE FIRST YEAR.
  - THE CONTRACTOR SHALL WARRANT 70 PERCENT SURVIVAL OF ALL TREES AND SHRUBS AFTER ONE (1) YEAR. IF 70 PERCENT IS NOT ACHIEVED, THE CONTRACTOR SHALL REPLACE ALL DEAD TREES AND SHRUBS. IF A LARGE AMOUNT OF MORTALITY OCCURS IN ONE AREA, THE OWNER MAY REQUEST REPLACEMENT OF THE PLANTINGS.
  - DURING NON-DORMANT PERIOD, WHEN BARE-ROOT PLANTS ARE NOT USED, CONTRACTOR SHALL DIG HOLES AND PLANT ONE GALLON TREES ON 5 FOOT CENTER.

- POTTED OR BALLED SHRUB OR TREE PLANTING SPECIFICATION**
- ALL PLANT MATERIAL SHALL CONFORM TO AMERICAN STANDARD FOR NURSERY STOCK. ALL MATERIAL SHALL BE OF THE SIZE, SPECIES, AND TYPE SPECIFIED.
  - SPACING OF THE TREES SHALL BE 10 FEET ON CENTER IN A TRIANGULAR PATTERN. SPECIES SHALL BE INTERMIXED UNLESS OTHERWISE SPECIFIED. TREE SHALL BE PLANTED AT THE TOP OF THE BANKS AND PROCEED AWAY FROM THE STREAM FOR THE NUMBER OF ROWS SPECIFIED. SPACING OF SHRUBS SHALL BE 5 FEET ON CENTER IN A TRIANGULAR PATTERN.
  - TREES AND SHRUBS SHALL BE PLANTED SO THAT THE ROOT BALL IS EQUAL TO OR SLIGHTLY HIGHER THAN THE SURROUNDING SOIL SURFACE. A HOLE THAT IS A MINIMUM OF ONE-AND-ONE HALF TIMES THE SIZE OF THE ROOT DIAMETER SHALL BE DUG FOR SOILS HIGH IN CLAY AND ROCK CONTENT. A LARGER HOLE SHALL BE MADE. THE DEPTH OF THE HOLE SHOULD BE LESS THAN THE HEIGHT OF THE ROOT BALL. BURY ONE AGRIFORM FERTILIZER 25-GRAM FOREST STARTER TABLET IN THE BOTTOM OF THE HOLE AND COVER TABLET WITH DIRT TO AVOID CONTACT WITH ROOTS.
  - THE TREE OR SHRUB SHALL BE PLACED IN THE HOLE IN AN UPRIGHT POSITION. THE BACKFILL FOR THE PLANT SHALL BE SHREDDED TOP SOIL. FILL THE HOLE AROUND THE ROOT BALL WITH SOIL. WHEN THE HOLE IS FILLED WITH SOIL, THE ROOT BALL SHOULD REMAIN 2 TO 3 INCHES ABOVE THE BACKFILL SOIL. SLICE THE SHOVEL 20 TO 30 TIMES INTO THE BACKFILL TO SETTLE THE SOIL. ADD 10 TO 20 GALLONS OF WATER TO THE ROOT BALL AND BACKFILL. FILL IN ANY HOLES OR DEPRESSIONS WITH ADDITIONAL BACKFILL SOIL. DO NOT FIRMLY PACK BACKFILL SOIL IN AN ATTEMPT TO ELIMINATE AIR POCKETS BECAUSE THIS COULD CAUSE TOO MUCH SOIL COMPACTION. WATER THE PLANT GENEROUSLY TO FILL VOIDS AND COMPACT SOIL.
  - AFTER THE WATER HAS SOAKED IN, PLACE A 2-INCH DEEP PROTECTIVE MULCH AREA 3 FEET IN DIAMETER AROUND THE BASE OF THE SHRUB OR TREE (BUT NOT TOUCHING THE TRUNK) IF IT IS ON A FLAT AREA. A COIR 0.4-INCH THICK WEED MAT MAY BE SUBSTITUTED FOR MULCH. FOR TREES, A RIGID TRUNK PROTECTOR TUBE SHALL BE PLACED AROUND THE TRUNK OF EACH PLANT TO PREVENT DEER AND RODENT DAMAGE.
  - WATER THE TREE OR SHRUB ON AN AS NEEDED BASIS FOR SURVIVAL. RECOMMENDED RATES ARE EVERY WEEK OR 10 DAYS DURING THE GROWING SEASON FOR THE FIRST YEAR.
  - THE CONTRACTOR SHALL WARRANT 90 PERCENT SURVIVAL OF ALL TREES AND SHRUBS AFTER ONE (1) YEAR. IF 90 PERCENT IS NOT ACHIEVED, THE CONTRACTOR SHALL REPLACE ALL DEAD TREES AND SHRUBS. IF A LARGE AMOUNT OF MORTALITY OCCURS IN ONE AREA, THE OWNER MAY REQUEST REPLACEMENT OF THE PLANTINGS.



**RESTORATION OF CHANNELS WITH ROCK BEDS  
STREAM CROSSING RESTORATION  
DETAIL H**

**RECORD DRAWING**

This record drawing has been prepared, in part, based upon information furnished by others. While this information is believed to be reliable, HDR Engineering, Inc. cannot assure its accuracy, and thus is not responsible for any errors or omissions which may have been incorporated into it as a result. Those relying on this record document are advised to obtain independent verification of its accuracy before applying it for any purpose.

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**COX ROAD AND OLIVER ROAD  
WATER MAIN REPLACEMENT**

NORTHERN KENTUCKY WATER DISTRICT  
KENTON COUNTY, KENTUCKY

**EROSION CONTROL DETAILS**

**1"=5' VERT.**  
SCALE: NONE  
DATE: OCTOBER 2018  
JOB NO.: 94-364  
DESIGNED: KJB  
DRAWN: WMG  
CHECKED: NJB  
Q/C:

**OWNER APPROVAL:**  
BY: \_\_\_\_\_  
TITLE: \_\_\_\_\_  
REVISIONS:  
NO.: \_\_\_\_\_ DATE: \_\_\_\_\_

DRAWING: 21  
OF 21