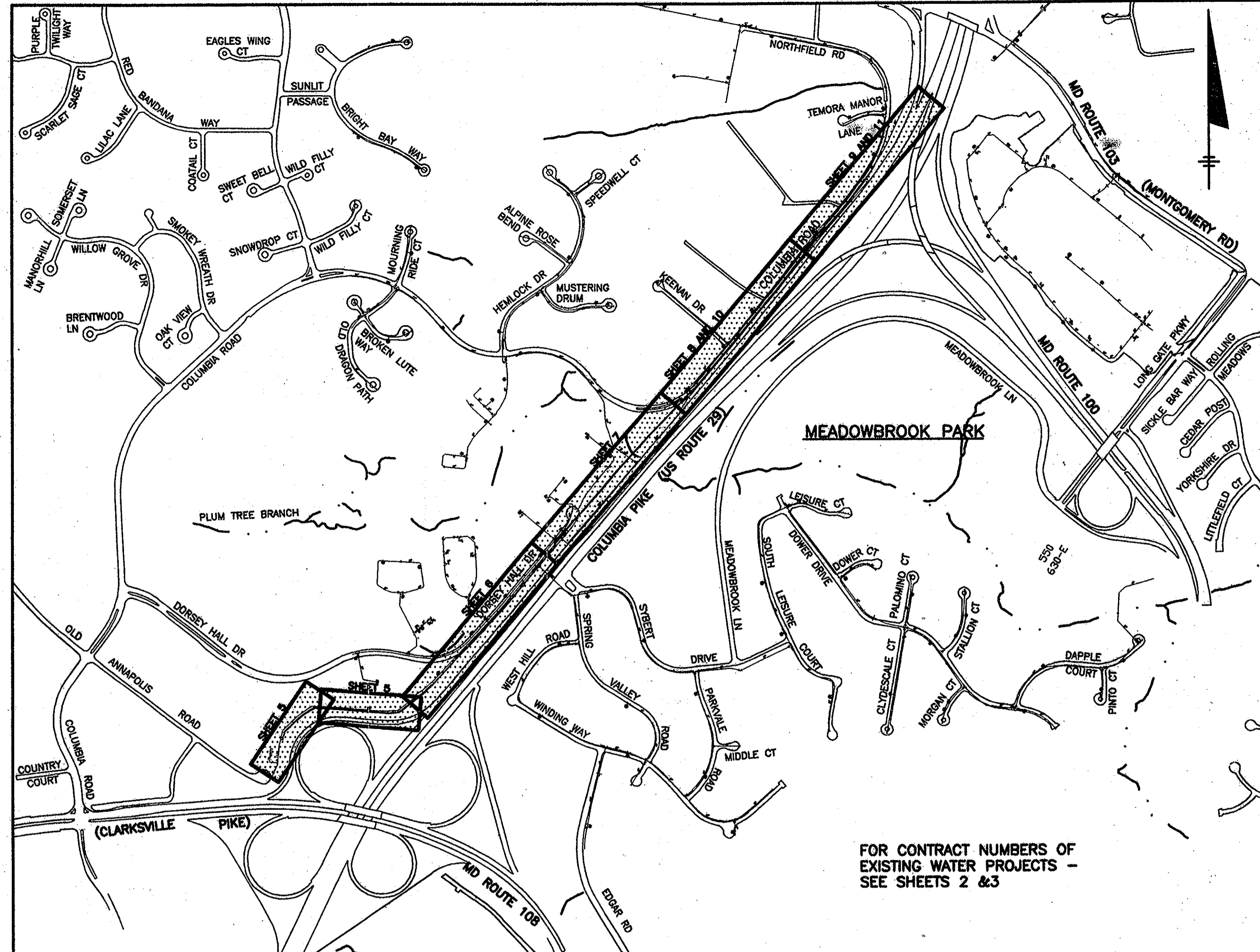


PART "A"	ITEM	QUANTITIES				MATERIAL	SUPPLIER
		BID	AS-BUILT				
A-1	MOBILIZATION		L.S.				
A-2	MAINTENANCE OF TRAFFIC		L.S.				
A-3	OFFICE TRAILER		L.S.				
A-4A	48" DUCTILE IRON; P.O. ALT. A	4,222	L.F.				
A-5A	48" DUCTILE IRON; R.J. ALT. A	2,039	L.F.				
A-6A	36" DUCTILE IRON; R.J. ALT. A	40	L.F.				
A-7A	30" DUCTILE IRON; R.J. ALT. A	56	L.F.				
A-4B	48" STEEL; P.O. ALT. B	4,222	L.F.				
A-5B	48" STEEL; R.J. ALT. B	2,039	L.F.				
A-6B	36" STEEL; R.J. ALT. B	40	L.F.				
A-7B	30" STEEL; R.J. ALT. B	56	L.F.				
A-4C	48" PCCP; P.O. ALT. C	4,184	L.F.	3,104	PCCP	HANSON PIPE	
A-5C	48" PCCP; R.J. ALT. C	2,077	L.F.	2,478	PCCP	HANSON PIPE	
A-6C	36" PCCP; R.J. ALT. C	40	L.F.	45.5	PCCP	HANSON PIPE	
A-7C	30" PCCP; R.J. ALT. C	56	L.F.	42.0	PCCP	HANSON PIPE	
A-8	12" DUCTILE IRON; R.J.	113	L.F.	13.0	D.I.P.	FERGUSON	
A-9	12" DUCTILE IRON; R.J. (ENCASED)	30	L.F.	30.0		LAFARGE	
A-10	8" PVC; P.O.	1595	L.F.	166.3	C.900	FERGUSON	
A-11	8" PVC; R.J.	296	L.F.	251	C.900	FERGUSON	
A-12	6" DUCTILE IRON; R.J.	91	L.F.				
A-13	ACCESS/ BLOW-OFF VALVE ASSEMBLY	4	EA.	4 EA.	PRECAST	ATLANTIC	
A-14	ACCESS/ AIR VALVE ASSEMBLY	2	EA.	2 EA.	PRECAST	ATLANTIC	
A-15	AIR VALVE ASSEMBLY	3	EA.	3 EA.	CRISPAN		
A-16	ACOUSTICAL MANHOLE	1	EA.	1 EA.	PRECAST	ATLANTIC CONCRETE	
A-17	48" RESILIENT SEAT GATE VALVE	1	EA.	1 EA.	RSGV CLOW	FERGUSON	
A-18	36" RESILIENT SEAT GATE VALVE	1	EA.	1 EA.	RSGV CLOW	FERGUSON	
A-19	30" RESILIENT SEAT GATE VALVE	2	EA.	2 EA.	RSGV CLOW	FERGUSON	
A-20	12" RESILIENT SEAT GATE VALVE, 12" TSV	4	EA.	4 EA.	RSGV CLOW	FERGUSON	
A-21	8" RESILIENT SEAT GATE VALVE	5	EA.	3 EA.	RSGV CLOW	FERGUSON	
A-22	6" RESILIENT SEAT GATE VALVE	6	EA.	7 EA.	RSGV CLOW	FERGUSON	
A-23	72" DIAMETER CASING INSTALLED BY OPEN CUT METHODS	55	L.F.	52.0	STEEL		
A-24	6" FIRE HYDRANTS	6	EA.	7 EA.	CLOW SNFH	FERGUSON	
A-25	WHSC - 1-1/2", 1" & 3/4" COPPER	500	L.F.	226	TYPE K	FERGUSON	
A-26	CONNECTION TO EXISTING MAINS	1	L.S.	11 EA.			
A-27	ABANDONMENT OF EXISTING MAINS	1	L.S.				
A-28A	DIP CORROSION PROTECTION SYSTEM	1	L.S.				
A-28B	STEEL CORROSION PROTECTION SYSTEM	1	L.S.				
A-28C	PCCP CORROSION PROTECTION SYSTEM	1	L.S.				
A-29	SANITARY SEWER AND STORM DRAIN ENCASEMENT	35	C.Y.				

**GENERAL NOTES:**

- APPROXIMATE LOCATION OF EXISTING MAINS ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING MAINS AND SERVICES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE.
- HORIZONTAL AND VERTICAL SURVEY CONTROLS:  
THE COORDINATES SHOWN ON THE DRAWINGS ARE BASED ON MARYLAND STATE REFERENCE SYSTEM NAD '83/'91 AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS NO. 24FA, NO. 24FB AND NO. 24H1.  
ALL VERTICAL CONTROLS ARE BASED ON NAVD 88. VERTICAL CONTROL PROVIDED ON THE DRAWINGS ARE REBAR AND CAP (ENGINEERING/SURVEY FIRM SHALL PROVIDE DESCRIPTION OF VERTICAL CONTROL POINTS, I.E., IRON BARS, CROSS CUTS ON CONCRETE STRUCTURES, ETC).
- ALL PIPE ELEVATIONS SHOWN ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
- CLEAR ALL UTILITIES BY A MINIMUM OF 12 INCHES. CLEAR SANITARY SEWERS BY A MINIMUM OF 18 INCHES. CLEAR ALL POLES BY 5'-0" MINIMUM OR TUNNEL AS REQUIRED UNLESS OTHERWISE NOTED. THE OWNER HAS CONTACTED THE UTILITY COMPANIES AND HAS MADE ARRANGEMENTS FOR BRACING OF POLES AS SHOWN ON THE DRAWINGS. IN THE EVENT THE CONTRACTOR'S WORK REQUIRES THE BRACING OF ADDITIONAL POLES, ANY COST INCURRED BY THE OWNER FOR BRACING OF ADDITIONAL POLES OR DAMAGES SHALL BE DEDUCTED FROM MONEYS OWED THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO SCHEDULE THE BRACING OF THE POLES.
- FOR DETAILS NOT SHOWN ON THE DRAWING, AND FOR MATERIALS AND CONSTRUCTION METHODS, USE HOWARD COUNTY DESIGN MANUAL, VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION (LATEST EDITION). THE CONTRACTOR SHALL HAVE A COPY OF VOLUME IV ON THE JOB.
- ALL DUCTILE IRON PIPE TO BE USED ON THE PUBLIC WATER SYSTEM SHALL BE CLASS 54. DUCTILE IRON FITTINGS SHALL MEET THE REQUIREMENTS OF THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION AND SHALL BE EXTERIOR EPOXY COATED IN ACCORDANCE WITH AWWA C116.
- ALL WATER HOUSE CONNECTIONS SHALL BE COPPER MEETING THE REQUIREMENTS OF AND CONSTRUCTED IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
- ALL FIRE HYDRANT LEADS INCLUDING THE TEE SHALL BE DUCTILE IRON CLASS 54 MEETING THE REQUIREMENTS OF AND CONSTRUCTED IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
- ALL DUCTILE IRON WATER MAINS CONSTRUCTED IN FILL AREAS OR WITHIN CASING PIPES SHALL BE RESTRAINED PIPE CLASS 54 MEETING THE REQUIREMENTS OF AND CONSTRUCTED IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
- EXCEPT AS INDICATED ON THE DRAWINGS, THE CONTRACTOR SHALL REMOVE AND DISPOSE OF THE EXISTING 3-INCH DIAMETER WATER MAIN REPLACED BY THE PROPOSED 8" DIAMETER WATER MAIN. DISPOSAL SHALL BE IN ACCORDANCE WITH APPLICABLE REGULATIONS. DISPOSAL SHALL BE PAID FOR IN THE UNIT PRICE BID FOR CONSTRUCTION OF THE 8-INCH DIAMETER WATER MAIN.



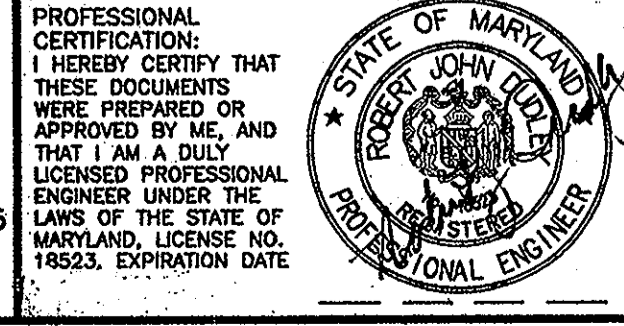
DRAINAGE AREA - PATAPSCO  
VICINITY MAP  
SCALE: 1" = 600'

# U.S. ROUTE 29 WATER MAIN/ COLUMBIA ROAD AT ST. JOHN'S LANE WATER MAIN

**CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
HOWARD COUNTY, MARYLAND  
DEPARTMENT OF PUBLIC WORKS**

PROFESSIONAL CERTIFICATION  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18222, EXPIRATION DATE 12/08/2009  
2007 © O'BRIEN & GERE, INC.

**O'BRIEN & GERE**  
ENGINEERS, INC.  
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(301) 731-5622  
FAX: (301) 577-4737



DSN. BY:	CAB			
DRN. BY:	RPW			
CHK. BY:	RJD	KCI	1	AS-BUILT REVISIONS
DATE:	APR. 2008	BY	NO.	ISSUED FOR BID
				REVISION

3-3-10	04/08
DATE	600' SCALE MAP NO. W&S 24.30 BLOCK NO.

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND  
Director of Public Works: *[Signature]* 4/16/08  
Chief - Bureau of Engineering: *[Signature]* 4/17/08  
Chief, Bureau of Utilities: *[Signature]* 4/16/08  
Chief Utility Design Division: *[Signature]* 4/17/08

**GENERAL NOTES CONT'D:**

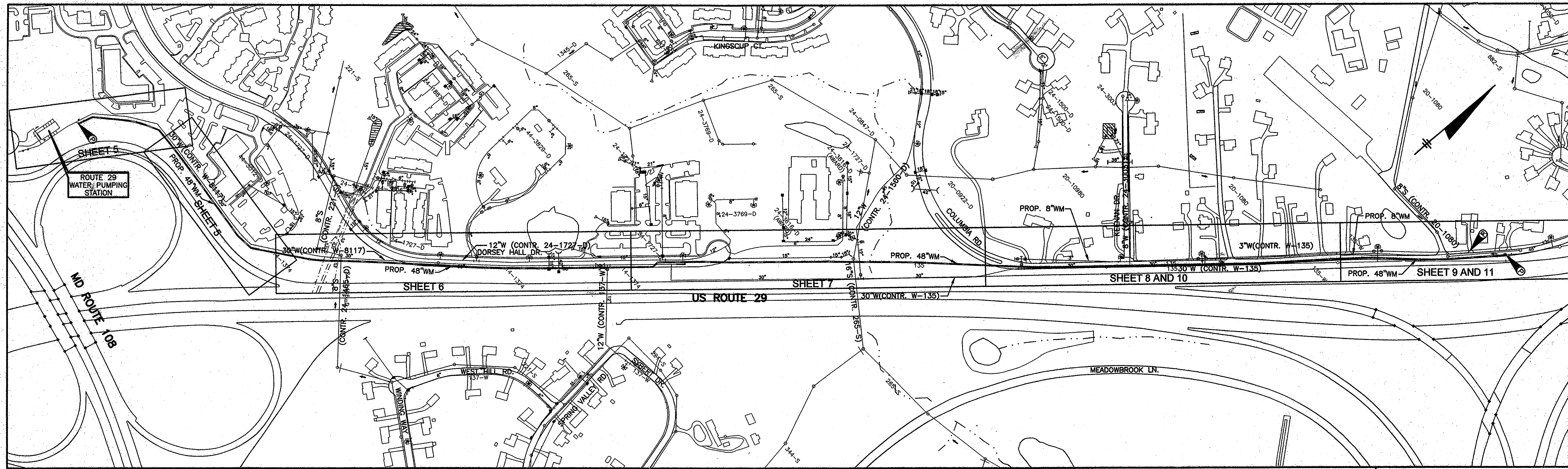
- THE FOLLOWING NOTE IS ADDED TO HOWARD COUNTY STANDARD DETAIL W2.22, BUTTRESSES AND ANCHORAGES FOR VERTICAL BENDS. "WHEN ANCHORING PVC PIPE, THE STRAPPING IN CONTACT WITH THE PIPE SURFACE SHALL BE 1-INCH WIDE BY 1/4-INCH THICK STEEL. THE REMAINING PORTION OF THE STRAP SHALL BE REINFORCING BAR SIZED IN ACCORDANCE WITH THE PERTINENT CHART SHOWN ON THE DETAIL."
- EXCEPT AS INDICATED ON THE PLANS AND NOTED ABOVE, THE 6-INCH AND 8-INCH DIAMETER WATER MAINS SHALL BE POLYVINYL CHLORIDE (PVC) PIPE MEETING THE REQUIREMENTS OF ANWA C900 DR18, PRESSURE CLASS 150 AND THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION AND ALL SUBSEQUENT AMENDMENTS THERETO.
- WHERE TEST PITS HAVE BEEN MADE ON EXISTING UTILITIES, THEY ARE NOTED BY THE SYMBOL ⊕ AT THE LOCATIONS OF THE TEST PITS. A NOTE OR NOTES CONTAINING THE RESULTS OF THE TEST PITS IS LOCATED ON THE DRAWINGS OR WITHIN THE SPECIFICATIONS. EXISTING UTILITIES IN THE VICINITY OF THE PROPOSED WORK FOR WHICH TEST PITS HAVE NOT BEEN DUG SHALL BE LOCATED BY THE CONTRACTOR TWO WEEKS IN ADVANCE OF CONSTRUCTION OPERATIONS AT HIS OWN EXPENSE.
- THE CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES OR AGENCIES AT LEAST FIVE WORKING DAYS BEFORE STARTING WORK SHOWN ON THESE PLANS.  
AT&T.....800-252-1133  
BGE (CONTRACTOR SERVICES).....410-850-4620  
BGE (UNDERGROUND DAMAGE CONTROL).....410-787-9068  
BUREAU OF UTILITIES.....410-313-4900  
COLONIAL PIPELINE COMPANY.....410-795-1390  
MISC. UTILITY.....410-931-4600  
COMCAST.....800-257-7777  
QWEST.....800-283-4237  
STATE HIGHWAY ADMINISTRATION (SHA).....301-624-8121  
VERIZON.....800-743-0033/410-224-9210  
MCI WORLDCOM.....800-624-9675
- THE PERMITTEE IS REQUIRED TO CONTACT THE DISTRICT 7 MAINTENANCE SECTION AT 301-624-8105 OF THE STATE HIGHWAY ADMINISTRATION FOR LOCATING ALL SHA UNDERGROUND FACILITIES AND ED RODENHIZER AT 410-787-7850 FOR LOCATING ALL SHA TRAFFIC FACILITIES AT LEAST 48 HOURS (TWO FULL WORKING DAYS) PRIOR TO STARTING ANY EXCAVATION WORK UNDER THE SHA PERMIT.
- TREES AND SHRUBS ARE TO BE PROTECTED FROM DAMAGE TO THE MAXIMUM EXTENT POSSIBLE. TREES AND SHRUBS LOCATED WITHIN THE 10' (FT.) WIDE TEMPORARY CONSTRUCTION STRIP ARE NOT TO BE REMOVED OR DAMAGED BY THE CONTRACTOR.
- CONTRACTOR SHALL REMOVE TREES, STUMPS, AND ROOTS ALONG LINE OF EXCAVATION. PAYMENT FOR SUCH REMOVAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONSTRUCTION OF THE MAIN.
- THE CONTRACTOR SHALL NOTIFY THE BUREAU OF HIGHWAYS, HOWARD COUNTY, AT (410)-313-7450 AT LEAST FIVE WORKING DAYS BEFORE OPEN CUTTING OR BORING/JACKING OF ANY COUNTY ROAD FOR LAYING WATER/SEWER MAINS OR HOUSE CONNECTIONS. THE APPROVAL OF THESE DRAWINGS WILL CONSTITUTE COMPLIANCE WITH DPW REQUIREMENTS PER SECTION 18.114(A) OF THE HOWARD COUNTY CODE.
- TOPS OF ALL WATER MAINS SHALL HAVE A MINIMUM OF 4'-0" OF COVER UNLESS OTHERWISE NOTED.
- VALVES ADJACENT TO TEES SHALL BE STRAPPED TO TEES, UNLESS OTHERWISE NOTED.
- ALL FITTINGS ON THE 48" MAIN SHALL BE RESTRAINED JOINT, UNLESS OTHERWISE NOTED. ALL FITTINGS ON SMALLER MAINS SHALL BE RESTRAINED JOINT OR BUTTRESSED/ANCHORED WITH CONCRETE IN ACCORDANCE WITH THE STANDARD DETAILS UNLESS OTHERWISE PROVIDED FOR ON THE DRAWINGS.
- FIRE HYDRANTS SHALL BE SET TO THE BURY LINE ELEVATION SHOWN ON THE DRAWINGS. ALL FIRE HYDRANTS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD DETAILS. THE SOIL AROUND THE FIRE HYDRANT SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 1000 AND SECTION 1005 OF THE STANDARD SPECIFICATIONS.
- THE CONTRACTOR SHALL NOT OPERATE ANY WATER MAIN VALVES ON THE EXISTING WATER SYSTEM.
- ALL TIE-INS TO EXISTING WATER MAINS SHALL BE COORDINATED WITH THE HOWARD COUNTY BUREAU OF UTILITIES AT LEAST 10 WORKING DAYS PRIOR TO SCHEDULING WORK. A DETAILED PLAN FOR THE SHUTDOWN OF EXISTING WATER MAINS SHALL BE SUBMITTED FOR APPROVAL BY THE COUNTY.
- THE CONTRACTOR SHALL LOCATE ANY WATER AND OR SEWER HOUSE CONNECTIONS, AND TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THESE EXISTING CONNECTIONS. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE. ALL EXISTING CONNECTIONS SHALL BE REINSTATED UPON COMPLETION OF CONSTRUCTION IN ACCORDANCE WITH COUNTY STANDARDS. TEMPORARY SERVICE SHALL BE PROVIDED AS REQUIRED.
- EXISTING STORM DRAINS DISTURBED BY THE CONSTRUCTION SHALL BE REPLACED IN KIND AT THE SAME LINE AND GRADE AS THE EXISTING STORM DRAINS.
- ANY TREES, OUTSIDE OF EXISTING EASEMENTS, DISTURBED BY CONSTRUCTION SHALL BE REPLACED IN KIND. (3" CALIPER MINIMUM.)
- SALVAGEABLE VALVES AND APPURTENANCES TO BE REMOVED SHALL BE DELIVERED TO THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS - BUREAU OF UTILITIES AS DIRECTED BY THE ENGINEER OR COUNTY.
- THE CONTRACTOR MUST FOLLOW ALL CONDITIONS AND REQUIREMENTS AS SET FORTH IN THE REQUIRED PERMITS FOR THE PROJECT INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING PERMITS/APPLICATIONS:  
COLONIAL PIPELINE COMPANY ENCROACHMENT NO. 1010/100768R-1  
US ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NO. \_\_\_\_\_  
MARYLAND DEPARTMENT OF THE ENVIRONMENT WATER QUALITY CERTIFICATION NO. \_\_\_\_\_
- WHERE THE PROPOSED MAIN PARALLELS EXISTING MAINS, THE APPROXIMATE ELEVATION OF THE EXISTING MAIN IS SHOWN IN THE PROFILES. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING MAIN AS WELL AS ANY EXISTING THRUST RESTRAINT.
- SEE SHEET 14 FOR PIPELINE PAYMENT WIDTHS.
- THE STATE HIGHWAY ADMINISTRATION (SHA) UTILITY PERMIT IS NOT VALID UNTIL AN AUTHORIZATION NUMBER IS OBTAIN FROM STATE HIGHWAY ADMINISTRATION. THE PERMITTEE OR THEIR REPRESENTATIVE MAY OBTAIN AN AUTHORIZATION NUMBER TO ACTIVATE THIS PERMIT BY CALLING SHA DISTRICT NO. 7 UTILITY OFFICE, FREDERICK, MD. AT 301-624-8115 OR 1-800-635-5119, OR THE DISTRICT PERMIT INSPECTOR FOR HOWARD COUNTY, MD. AT 301-624-8121, PRIOR TO STARTING ANY WORK UNDER THIS PERMIT.

**As-Built**

**US ROUTE 29/ COLUMBIA ROAD  
WATER MAIN**  
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET  
1 OF 32

I:\Projects\Landover\2343 - HOWARD\28653\REDESIGN\DWG\SHEETS\KEYMAP.DWG



**LEGEND**  
(PLAN AND PROFILES SHEETS)

- SIDEWALK
- PAVEMENT (EDGE)
- GRAVEL (EDGE)
- CONCRETE (EDGE)
- BUILDING
- CENTERLINE
- SHA THRU HIGHWAY RIGHT-OF-WAY
- PROPERTY LINE/RIGHT-OF-WAY
- GUARDRAIL
- FENCE (WOOD)
- FENCE IRON, RAIL
- FENCE(CHAINLINK)
- UNDG ELECTRIC LINE
- UNDG TELEPHONE LINE
- UNDG CABLE LINE
- UNDG FIBER OPTIC LINE
- OVERHEAD UTILITIES
- SANITARY SEWER
- STORM DRAIN
- WATER MAIN
- PROPOSED WATER
- GAS
- DITCH
- STREAM
- WOODLINE
- BUSH
- RIP-RAP DITCH
- SB# BORING LOCATION
- TP# TEST PIT LOCATION
- BM #
- REBAR
- FLY STATION
- MAIL BOX
- STORM DRAIN MH
- HEADWALL/ENDWALL
- DROP INLET GRATE
- DROP INLET
- ROAD SIGN
- TELE. JUNC. BOX
- UTILITY POLE
- LIGHT POLE
- GUY WIRE
- GROUND LIGHT
- ELEC. TRANSFORMER
- ELEC. MH
- ELEC. JUNC. BOX
- SPOT ELEVATION
- CABLE BOX
- SAN. SEW. MH
- CLEAN OUT
- WATER VALVE
- WATER METER
- WATER MAIN VALVE VAULT
- IRRIGATION VALVE
- FIRE HYDRANT
- GAS VENT PIPE
- GAS VALVE
- GAS PUMP
- GAS LINE MARKER
- IRON PIPE FOUND
- REBAR AND CAP
- TRAVERSE STATION
- POINT OF CONNECTION
- OVERHEAD UTILITY POLE
- APPROX. ARV MH
- BURIED ELEVATION
- BUTTERFLY VALVE
- BALTIMORE GAS & ELECTRIC
- BURY LENGTH
- BUILDING
- BOTTOM
- CURB AND GUTTER
- CORRUGATED METAL PIPE
- CONCRETE CONSTRUCTION
- CONTRACT
- DEGREE
- DET OR DTL
- DIP
- DR
- E OR ELEC
- ESMT
- EX
- FH
- FLG
- FMV
- G
- HB
- HC
- HCR
- HDP
- HORIZ
- INV
- JT
- LOD
- MAC
- MD
- MH
- MIN
- NO
- PC
- PCCP
- PED
- PO
- PROP
- PVC
- PVD
- PVI
- PVMT
- PVT
- R/W
- RAD OR R
- RCP
- RD
- REQD
- RSGV
- APPROXIMATE AIR RELEASE MANHOLE
- BURY ELEVATION
- BUTTERFLY VALVE
- BALTIMORE GAS & ELECTRIC
- BURY LENGTH
- BUILDING
- BOTTOM
- CURB AND GUTTER
- CORRUGATED METAL PIPE
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- NO
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- PED
- PO
- PROP
- PVC
- PVD
- PVI
- PVMT
- PVT
- R/W
- RAD OR R
- RCP
- RD
- REQD
- RSGV

**KEY MAP**  
SCALE: 1" = 200'

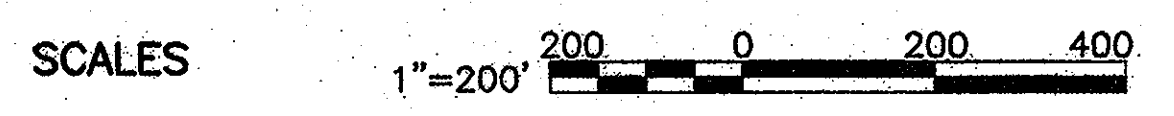
**ABBREVIATION**

- S SANITARY
- SB SOIL BORING
- SCE STABILIZED CONSTRUCTION ENTRANCE
- SD STORM DRAIN
- SHC SEWER HOUSE CONNECTION
- SHT SHEET
- S.S. STAINLESS STEEL
- STA STATION
- STD STANDARD
- TB RENO TO BE RENOVATED (FUTURE)
- TBR TO BE REMOVED (FUTURE)
- TELE TELEPHONE
- TEMP TEMPORARY
- TEST TEST PIT
- TRANS TRANSFORMER
- UNF UTILITY NOT FOUND
- VB VERTICAL BEND
- VCR VERTICAL CURVE RADIUS
- VERT VERTICAL
- W WATER
- WHC WITH WATER HOUSE CONNECTION
- WM WATER MAIN
- APP APPLE
- BPE BRADFORD PEAR
- CHE CHERRY
- DEC DECIDUOUS
- DOG DOGWOOD
- HEM HEMLOCK
- HIC HICKORY
- HOL HOLLY
- LOC LOCUST
- MAG MAGNOLIA
- MAP MAPLE
- MUL MULBERRY
- PINE PINE
- POPLR POPLAR
- SPR SPRUCE
- SYC SYCAMORE
- WAL WALNUT
- WIL WILLOW

WATER AND SEWER CODE FOR COUNTY USE ONLY:

WATER CODE NO.	18
NO. OF CONNECTIONS	N/A
SEWER CODE NO.	0
NO. OF CONNECTIONS	0
DRAINAGE AREA	PATAPSCO

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PROFESSIONAL CERTIFICATION  
I HEREBY CERTIFY THAT THESE DOCUMENTS  
WERE PREPARED OR APPROVED BY ME,  
AND THAT I AM A DULY LICENSED  
PROFESSIONAL ENGINEER UNDER THE  
LAWS OF THE STATE OF MARYLAND,  
LICENSE NO. 18223, EXPIRATION DATE 12/08/2009

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**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: *John J. ...* 4/17/08  
 Chief, Bureau of Engineering: *Paul ...* 4/17/08  
 Chief, Bureau of Utilities: *John ...* 4/17/08  
 Chief, Utility Design Division: *John ...* 4/17/08

**O'BRIEN & GERE**  
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Landover, Maryland 20785  
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PROFESSIONAL CERTIFICATION:  
I HEREBY CERTIFY THAT THESE DOCUMENTS  
WERE PREPARED OR APPROVED BY ME, AND  
THAT I AM A DULY LICENSED PROFESSIONAL  
ENGINEER UNDER THE LAWS OF THE STATE OF  
MARYLAND, LICENSE NO. 18223, EXPIRATION DATE

STATE OF MARYLAND  
PROFESSIONAL ENGINEER

DSN. BY:	CAB				
DRN. BY:	RPW				
CHK. BY:	RJD				
DATE:	APR. 2008	BY	NO.	ISSUED FOR BID	04/08
				REVISION	

**KEY MAP, LEGEND AND ABBREVIATIONS**

600' SCALE MAP NO. W&S 24.30 BLOCK NO.

**US ROUTE 29/ COLUMBIA ROAD WATER MAIN**

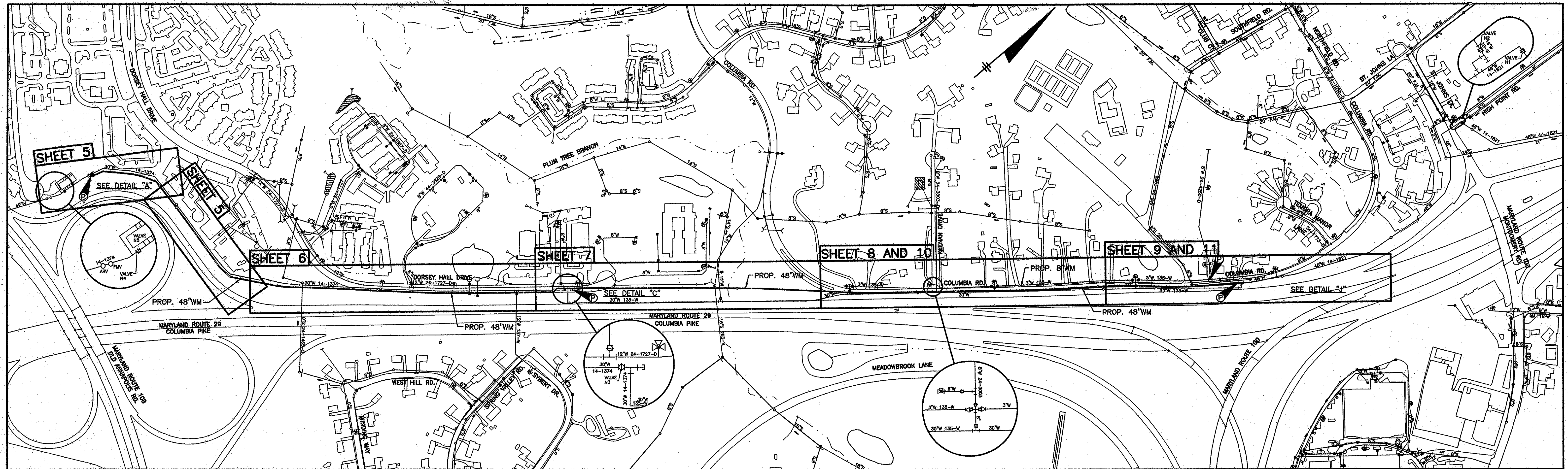
CAPITAL PROJECT: W-8199/W-8234,  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 2 OF 32

I:\Projects\Landover\2343 - Howard\28653\ReDesign\dwg\SHEETS\KeyMap.dwg

28653-0021

I:\PROJECTS\LANDCOVER\2343 - HOWARD\29653\REDESIGN\DWG\SHEETS\VMAP2.DWG



**KEY MAP**  
SCALE: 1" = 250'

**MAIN ISOLATION REQUIREMENTS FOR CONNECTIONS AT DETAILS "C" AND "J"**  
(TO BE COMPLETED AT THE SAME TIME)

TIE-INS TO THE EXISTING 30"WM (14-1374 & 135-W), DETAIL "C", AND THE EXISTING 30"WM (14-1821), DETAIL "J" REQUIRES THE COUNTY OPERATIONS DEPARTMENT TO CLOSE THE FOLLOWING VALVES FOR ISOLATION:

A. AT ST. JOHN'S LANE & HIGH POINT RD.

1. CLOSE EX. 48" VALVE ON THE 48"WM (14-1821) MARKED N1.
2. CLOSE EX. 16" VALVE ON THE 16"WM (10-W) MARKED N2.

B. AT DORSEY HALL DRIVE CUL-DE-SAC, STATION 27+55

1. CLOSE EX. 30" VALVE ON THE 30"WM (14-1374) MARKED N3.

NOTE: THERE MAY BE SEVERAL OTHER SMALLER MAINS THAT NEED TO BE CLOSED TO ISOLATE THE STRETCH OF MAIN IN QUESTION.

**MAIN ISOLATION REQUIREMENTS FOR CONNECTION AT DETAIL "A"**

THE TIE-IN TO THE EXISTING 36"WM (14-1374) NEAR THE ROUTE 29 WATER PUMPING STATION, STATION 0+00, DETAIL "A," REQUIRES THE COUNTY OPERATIONS DEPARTMENT TO CLOSE THE FOLLOWING VALVES FOR ISOLATION.

A. AT DORSEY HALL DRIVE CUL-DE-SAC, STATION 27+55

1. CLOSE EX. 30" VALVE ON THE 30"WM (14-1374) MARKED N3.

B. AT THE ROUTE 29 WATER PUMPING STATION

1. CLOSE THE 42" BUTTERFLY VALVE WITH AUTOMATIC ACTUATOR IN THE VAULT OUTSIDE THE STATION MARKED N4.
2. CLOSE THE 30" GATE VALVE FOR THE 30" BUTTERFLY VALVE WITHIN THE PUMPING STATION MARKED N5.

NOTE: THERE MAY BE SEVERAL OTHER SMALLER MAINS THAT NEED TO BE CLOSED TO ISOLATE THE STRETCH OF MAIN IN QUESTION.

# NOT PART OF CONTRACT DRAWINGS FOR COUNTY USE ONLY

SCALES 1"=250' 250 0 250 500

PROFESSIONAL CERTIFICATION  
I HEREBY CERTIFY THAT THESE DOCUMENTS  
WERE PREPARED OR APPROVED BY ME,  
AND THAT I AM A DULY LICENSED  
PROFESSIONAL ENGINEER UNDER THE  
LAWS OF THE STATE OF MARYLAND,  
LICENSE NO. 18523, EXPIRATION DATE 12/08/2009

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**O'BRIEN & GERE**  
ENGINEERS, INC.  
8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

PROFESSIONAL  
CERTIFICATION:  
I HEREBY CERTIFY THAT  
THESE DOCUMENTS  
WERE PREPARED OR  
APPROVED BY ME, AND  
THAT I AM A DULY  
LICENSED PROFESSIONAL  
ENGINEER UNDER THE  
LAWS OF THE STATE OF  
MARYLAND, LICENSE NO.  
18523, EXPIRATION DATE

DSN. BY:	HC-DPW				
DRN. BY:	RPW				
CHK. BY:	HC-DPW				
DATE:	APR. 2008	BY:	NO.	ISSUED FOR BID	04/08
				REVISION	DATE

**LARGE DIAMETER WATER MAIN  
ISOLATION DIAGRAM**

600' SCALE MAP NO. W&S 24.30 BLOCK NO.

**US ROUTE 29/ COLUMBIA ROAD  
WATER MAIN**

CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

**As-Built**

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: *John C. Green* 4/17/08  
Chief, Bureau of Engineering: *William J. Green* 4/17/08  
Chief, Bureau of Utilities: *John C. Green* 4/17/08  
Chief, Utility Design Division: *John C. Green* 4/17/08

SCALE AS SHOWN  
SHEET 2A OF 32  
FILE NO. 29653-002A

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RESTORATION SCHEDULE - ALONG 48" WATER MAIN. Table with columns: STATIONING (FROM, TO), DESCRIPTION OF LOCATION/RESTORATION TYPE.

RESTORATION SCHEDULE - ALONG 8" WATER MAIN. Table with columns: STATIONING (FROM, TO), DESCRIPTION OF LOCATION/RESTORATION TYPE.

- NOTES: 1. ALL EXISTING SURFACE FEATURES ALONG THE ENTIRE PROJECT ALIGNMENT INCLUDING, BUT NOT LIMITED TO, FENCINGS, SIDEWALKS, CURBS, GUTTERS, MAILBOXES, AND STORMWATER IMPROVEMENTS SHALL BE REPLACED IN LIKE AND KIND FOLLOWING CONSTRUCTION. 2. SEEDING REFERS TO HYDROSEEDING AND MULCHING.

Table with columns: LOT NUMBER, OWNER NAME, LEGAL DESCRIPTION, PREMISES ADDRESS. Lists adjacent property owners.

UTILITY POLE IDENTIFICATION SCHEDULE. Table with columns: ID, BGE NO., VERIZON NO., COMMENT. Lists utility poles and their specifications.

STREET LIGHT ONLY POLE IDENTIFICATION SCHEDULE. Table with columns: ID, BGE LLC NO., COMMENTS. Lists street lighting poles.

8" DIA. WATER MAIN COORDINATE TABLE. Table with columns: STATION, ITEM, NORTHING, EASTING. Lists water main coordinates.

NOTES: 1. DEFLECTION SHALL NOT EXCEED 4-DEGREES. USE ROMAC STYLE 501 OR APPROVED EQUAL.

48" DIA. WATER MAIN COORDINATE TABLE. Table with columns: STATION, ITEM, NORTHING, EASTING. Lists water main coordinates.

PROFESSIONAL CERTIFICATION I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18523, EXPIRATION DATE 12/08/2009

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DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND. Includes signatures of Director of Public Works and Chief, Bureau of Utilities.

O'BRIEN & GERE ENGINEERS, INC. 8401 Corporate Drive Suite 400 Landover, Maryland 20785 (301) 731-5622 FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18523, EXPIRATION DATE 12/08/2009

DSN. BY: CAB DRN. BY: RPW CHK. BY: RJD DATE: APR. 2008 BY NO. 0 ISSUED FOR BID 04/08 REVISION

SCHEDULES AND TABLES 600' SCALE MAP NO. W&S 24.30 BLOCK NO.

US ROUTE 29/ COLUMBIA ROAD WATER MAIN CAPITAL PROJECT: W-8199/W-8234 CONTRACT NO.: 44-4632 ELECTION DISTRICT NO. 2 HOWARD COUNTY, MARYLAND

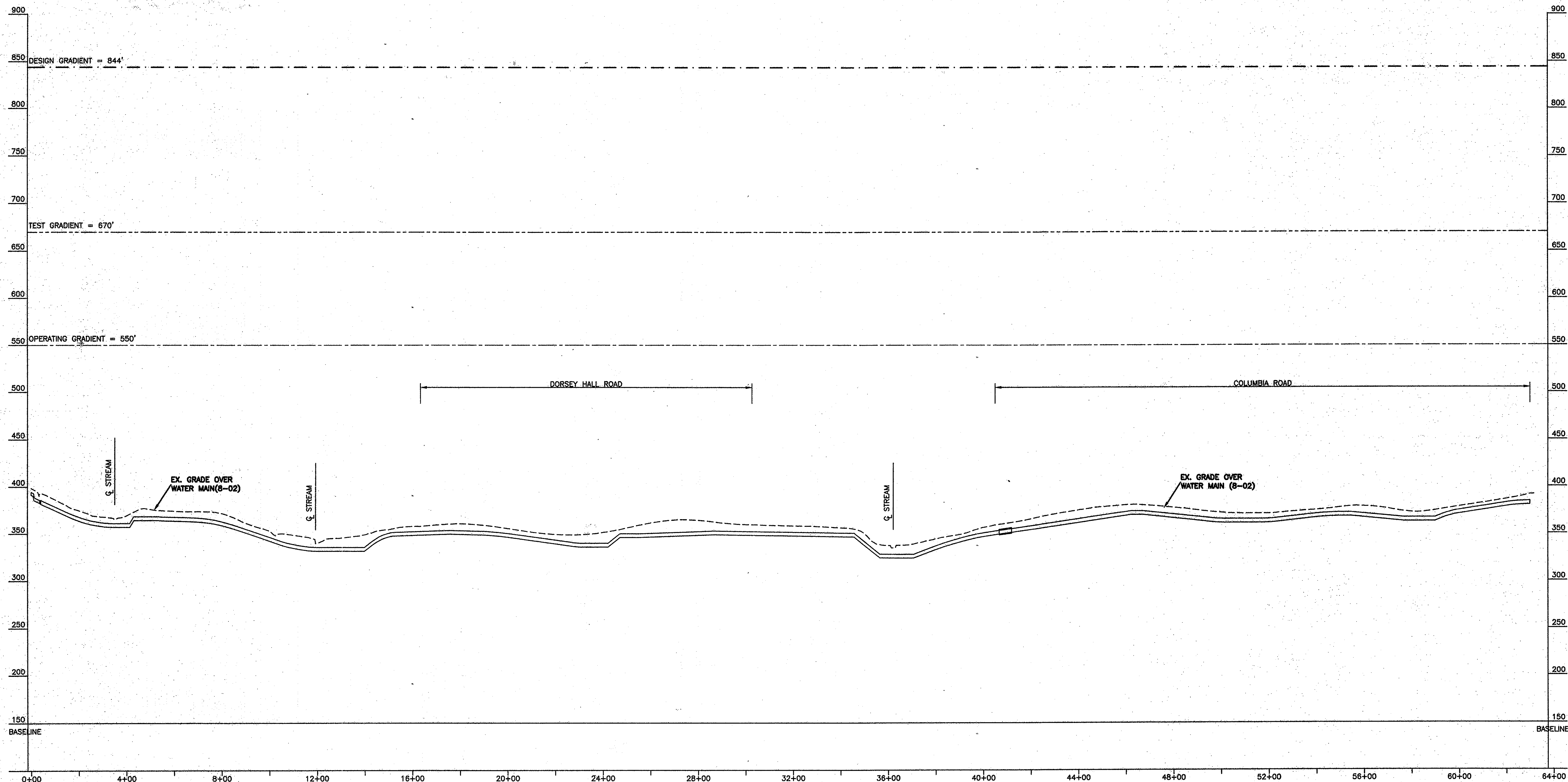
SCALE AS SHOWN SHEET 3 OF 32

As-Built

FILE NO. 29653-003F

I:\PROJECTS\LANDOVER\2343 - HOWARD\29653\REDESIGN\DWG\SHEETS\PLAN-PROFILES.DWG

I:\Projects\Landover\2343 - Howard\29653\Redesign\dwg\SHEETS\Plan-Profiles.dwg



**DEPARTMENT OF PUBLIC WORKS**  
 HOWARD COUNTY, MARYLAND

**Director of Public Works:** Jay D. Hebe (Signature), DATE: 4/17/08  
**Chief - Bureau of Engineering:** Paul R. Sorenson (Signature), DATE: 4/17/08  
**Chief, Bureau of Utilities:** Steve C. Green (Signature), DATE: 4/17/08  
**Chief, Utility Design Division:** [Signature], DATE: 4/17/08

**O'BRIEN & GERE ENGINEERS, INC.**  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
 (301) 731-5622  
 FAX: (301) 577-4737

**PROFESSIONAL CERTIFICATION:**  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
 LICENSE NO. 18252, EXPIRATION DATE 12/08/2009

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**HYDRAULIC PROFILE**  
 HORIZ. SCALE: 1"=200'  
 VERT. SCALE: 1"=50'

DSN. BY:	CAB		
DRN. BY:	RPW		
CHK. BY:	RJD		
DATE:	APR. 2008		
BY NO.	0	ISSUED FOR BID	04/08
		REVISION	DATE

**48"Ø WATER MAIN HYDRAULIC PROFILE**

600' SCALE MAP NO. W&S 24.30 BLOCK NO.

**US ROUTE 29/ COLUMBIA ROAD WATER MAIN**

CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

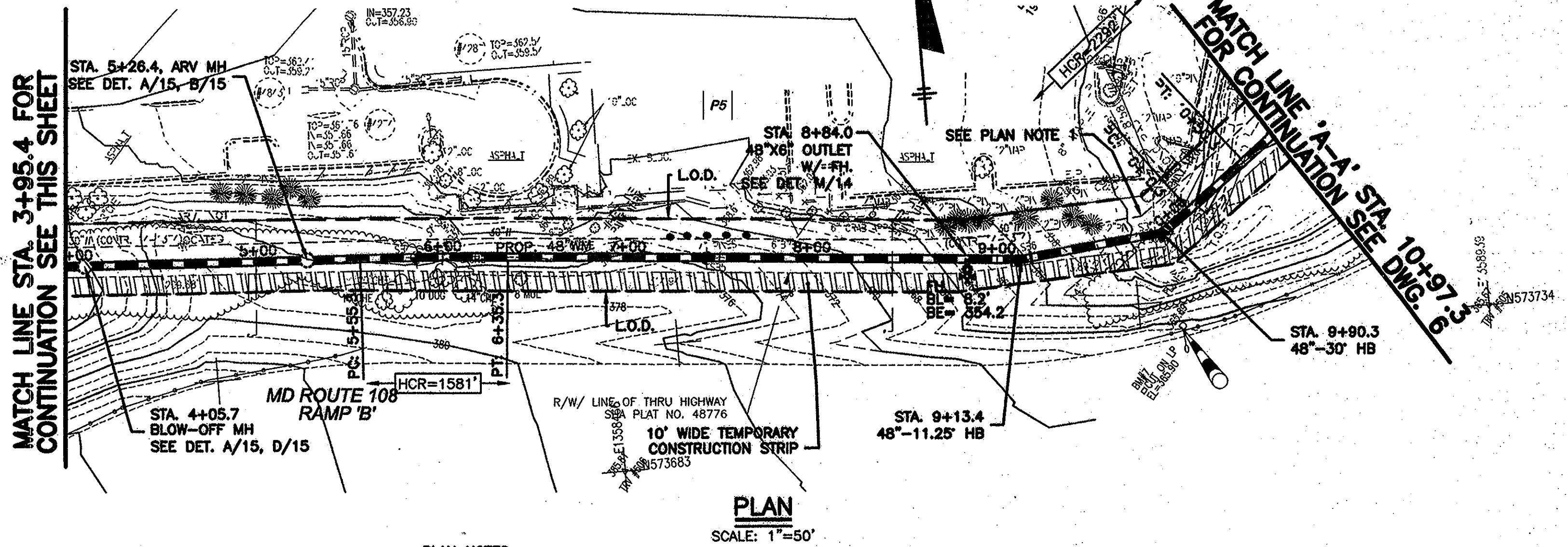
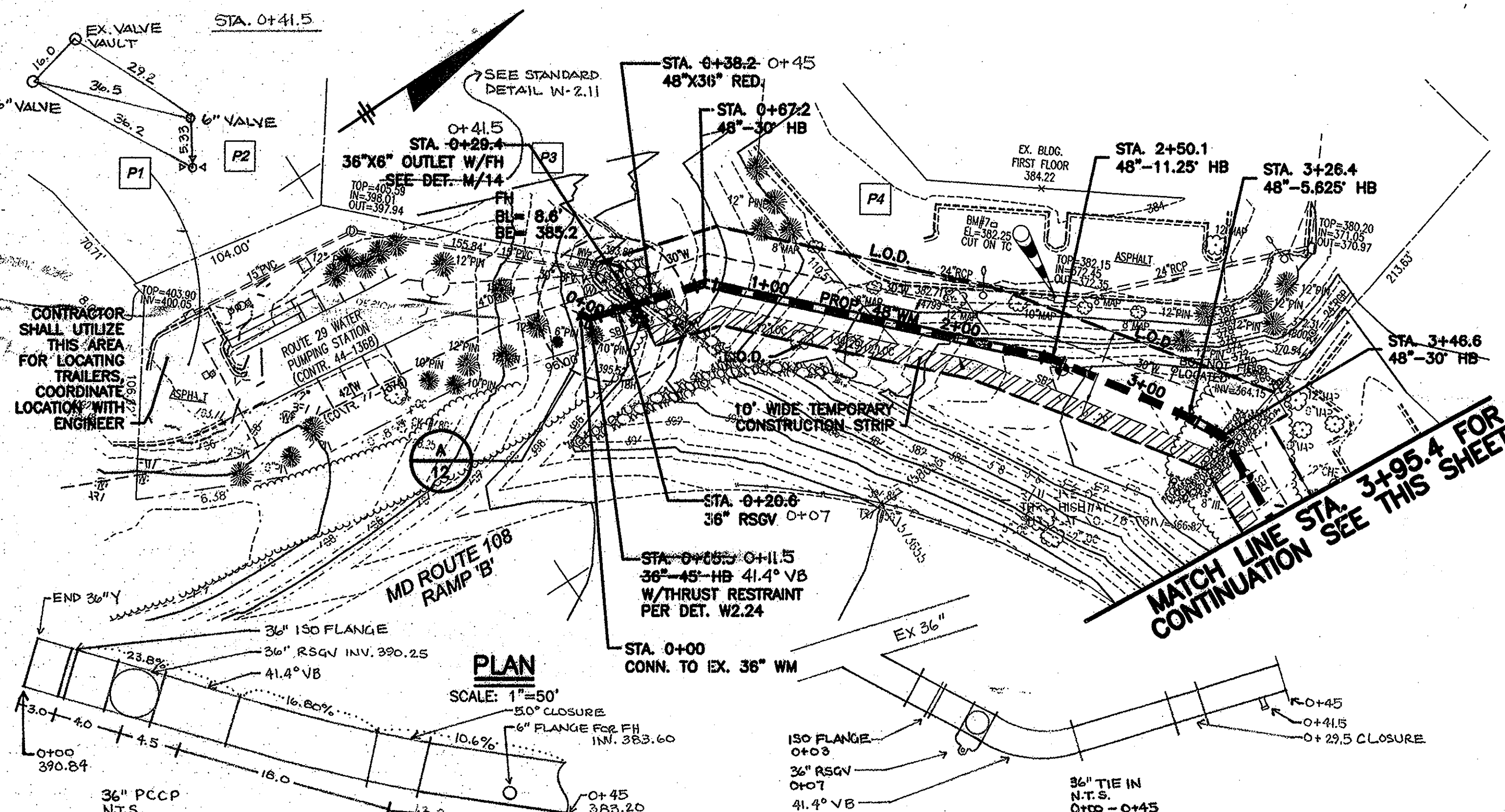
**As-Built**

SCALE AS SHOWN

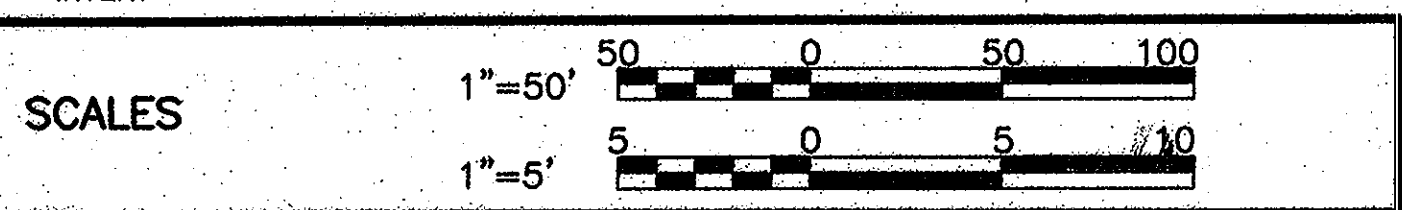
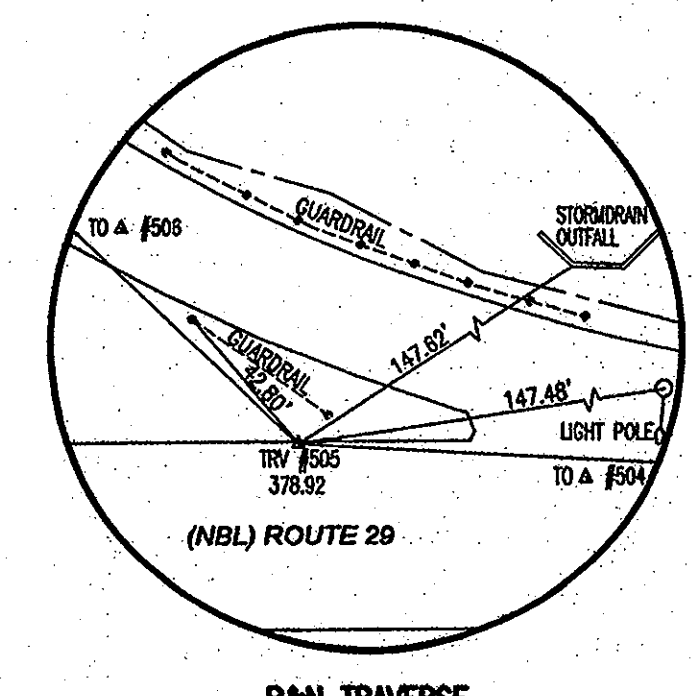
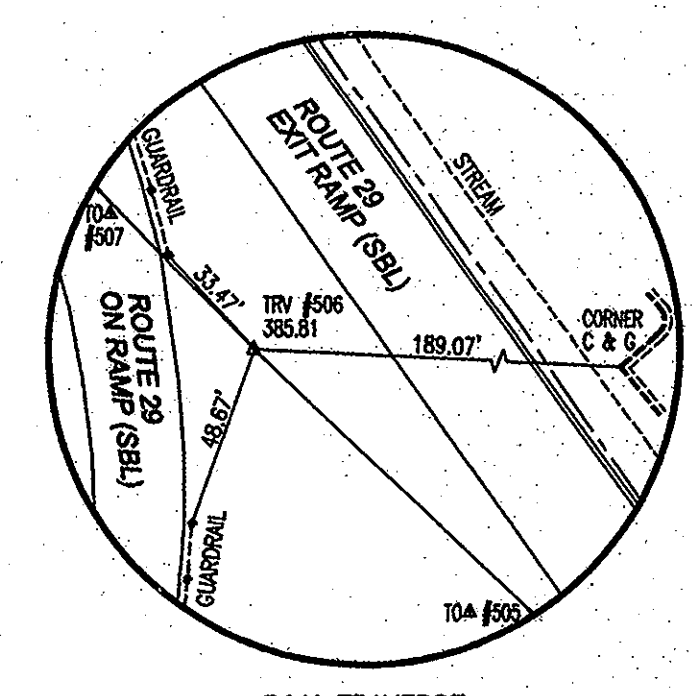
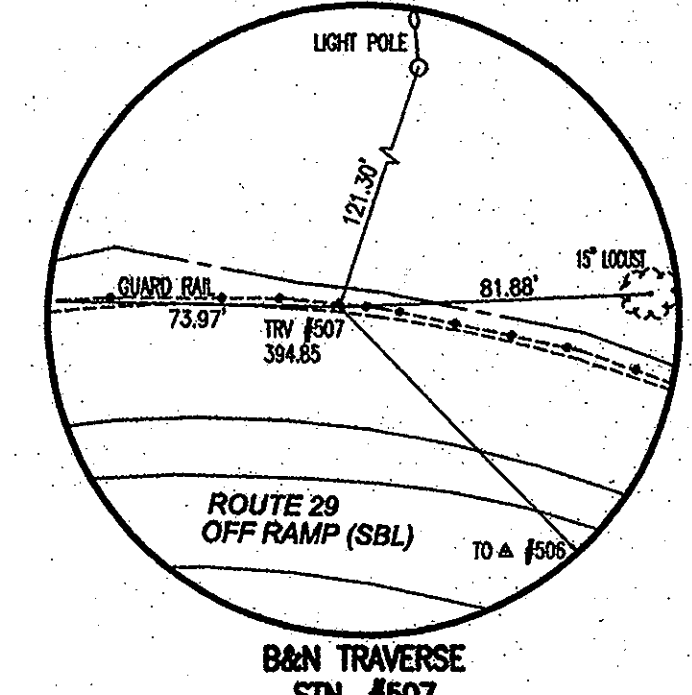
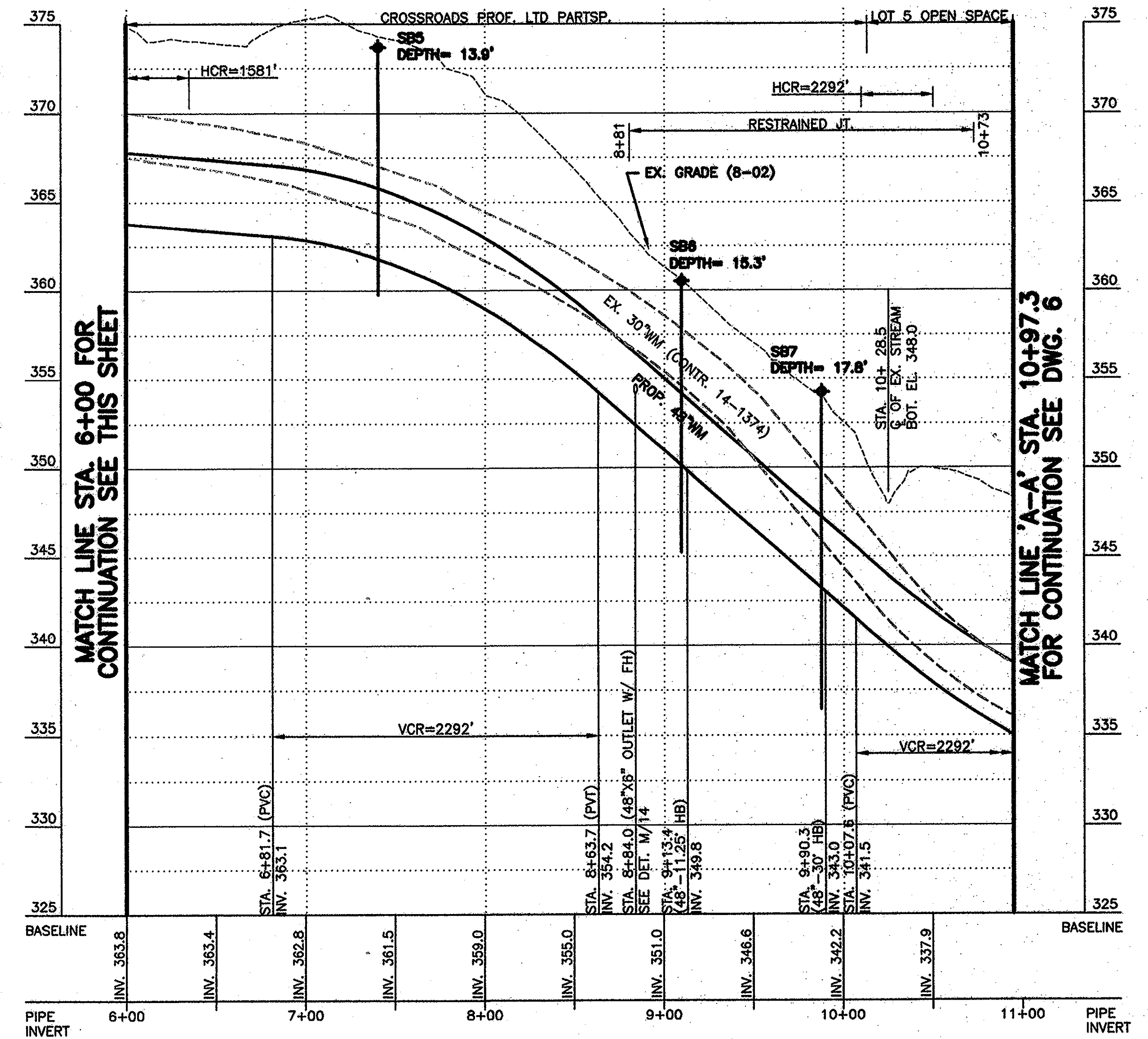
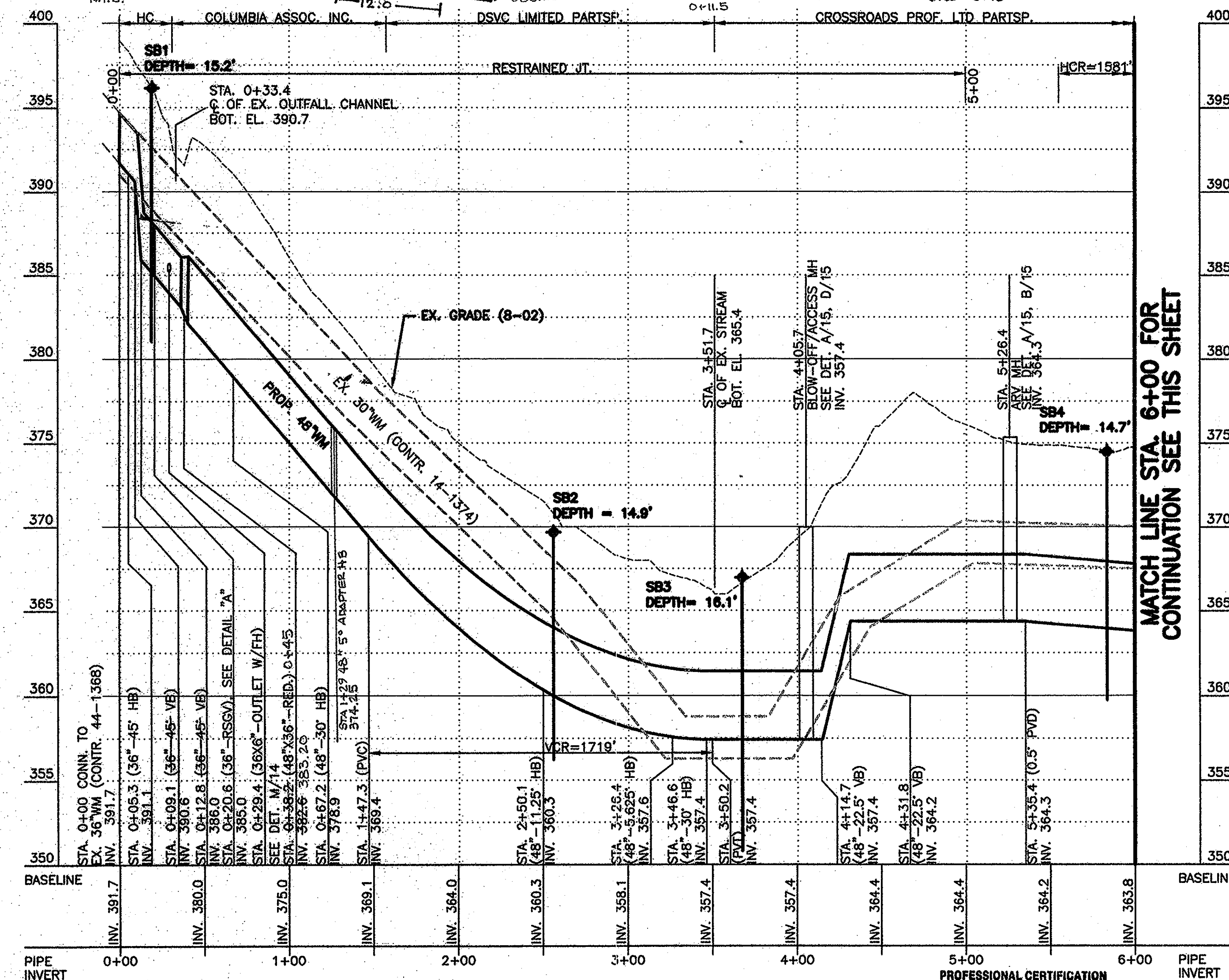
SHEET 4 OF 32

FILE NO. 29653-004F

I:\Projects\Landover\2343 - HOWARD 20853 REDSIGN DWG SHEETS\9081-PROFILES.DWG



**PLAN NOTES:**  
 1. PROPOSED WORK INCLUDES EXCAVATING BEHIND EXISTING THRUST BLOCKS. CONTRACTOR SHALL TEST PIT FOR EXISTING THRUST RESTRAINT BLOCKING AND PROVIDE ENGINEER WITH DIMENSIONS OF BLOCKING IF PRESENCE OF BLOCKING IS FOUND. CONTRACTOR SHALL INCLUDE COST IN BASE BID FOR SHORING EXISTING MAIN DURING CONSTRUCTION.

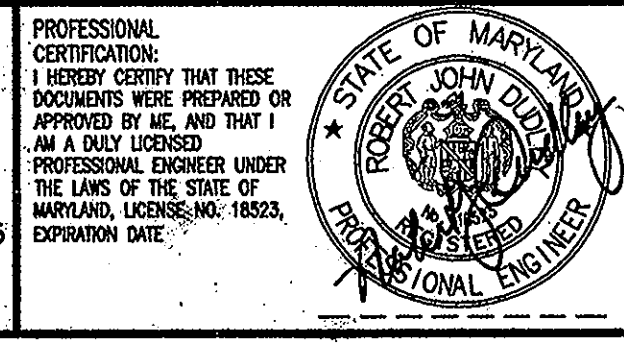


**PROFESSIONAL CERTIFICATION**  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 18522, EXPIRATION DATE 12/08/2009

**PROFILES**  
 HORIZ. SCALE: 1"=50'  
 VERT. SCALE: 1"=5'

**DEPARTMENT OF PUBLIC WORKS**  
 HOWARD COUNTY, MARYLAND  
 Director of Public Works: [Signature] 4/22/08  
 Chief, Bureau of Engineering: [Signature] 4/17/08  
 Chief, Bureau of Utilities: [Signature] 4/17/08  
 Chief, Utility Design Division: [Signature]

**O'BRIEN & GERE, INC.**  
 ENGINEERS, INC.  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
 (301) 731-5622  
 FAX: (301) 577-4737

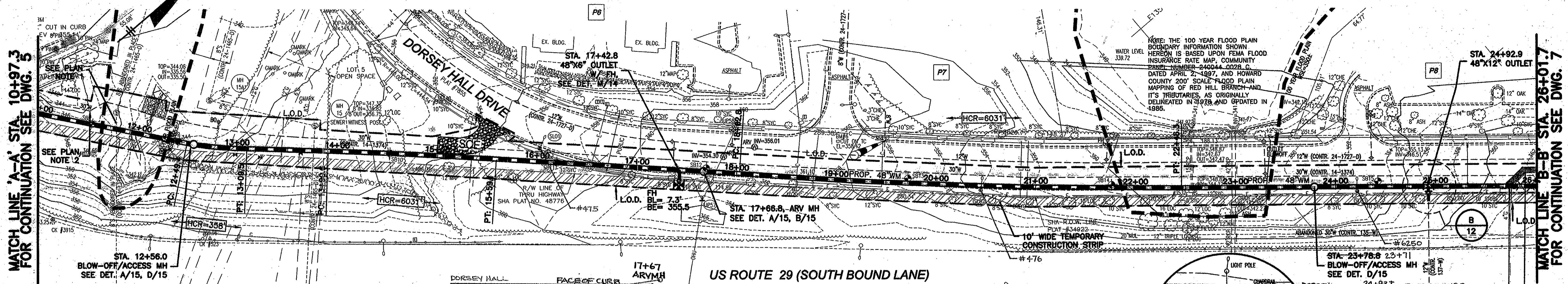


DSN. BY:	CAB		
DRN. BY:	RPW		
CHK. BY:	RJD		
DATE:	APR. 2008		
BY NO.		ASBUILT REVISIONS	3-3-10
		ISSUED FOR BID	04/08
		REVISION	DATE

**48" WATER MAIN**  
**PLAN AND PROFILE**  
**STA. 0+00 TO STA. 10+97.3**  
 600' SCALE MAP NO. W&S 24.30 BLOCK NO.

**US ROUTE 29/ COLUMBIA ROAD**  
**WATER MAIN**  
 CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

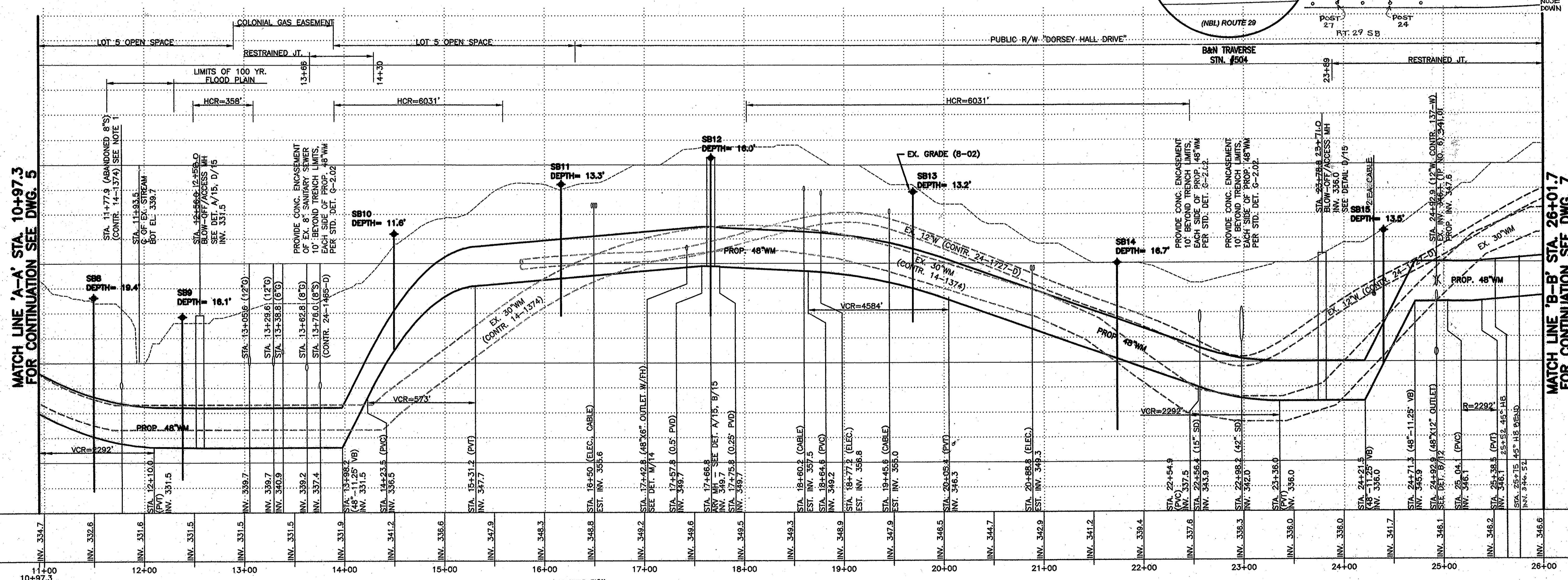
SCALE AS SHOWN  
 SHEET 5 OF 32  
 FILE NO. 29853-005F



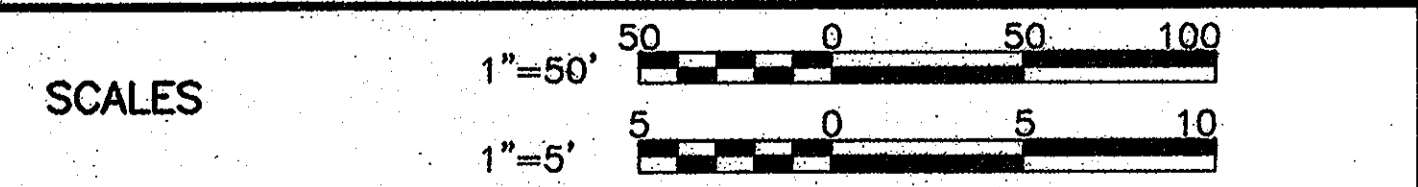
**PLAN NOTES:**

1. REMOVE EX. ABANDONED SEWER WITHIN THE TRENCH LIMITS OF THE PROP. 48" WM
2. PROPOSED WORK INCLUDES EXCAVATING BEHIND EXISTING THRUST BLOCKS. CONTRACTOR SHALL TEST PIT FOR EXISTING THRUST RESTRAINT BLOCKING AND PROVIDE ENGINEER WITH DIMENSIONS OF BLOCKING IF PRESENCE OF BLOCKING IS FOUND. CONTRACTOR SHALL INCLUDE COST IN BASE BID FOR SHORING EXISTING MAIN DURING CONSTRUCTION.

**PLAN**  
SCALE: 1"=50'



**PROFILE**  
HORIZ. SCALE: 1"=50'  
VERT. SCALE: 1"=5'



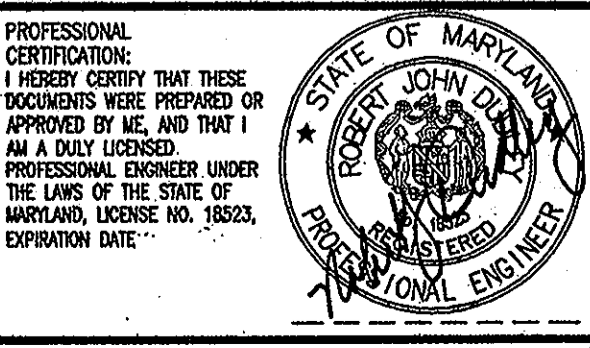
PROFESSIONAL CERTIFICATION  
I HEREBY CERTIFY THAT THESE DOCUMENTS  
WERE PREPARED OR APPROVED BY ME,  
AND THAT I AM A DULY LICENSED  
PROFESSIONAL ENGINEER UNDER THE  
LAWS OF THE STATE OF MARYLAND.  
LICENSE NO. 18223, EXPIRATION DATE 12/08/2009  
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**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: [Signature] DATE: 4/17/08  
Chief, Bureau of Engineering: [Signature] DATE: 4/17/08  
Chief, Bureau of Utilities: [Signature] DATE: 4/17/08  
Chief, Utility Design Division: [Signature] DATE: 4/17/08

**O'BRIEN & GERE**  
ENGINEERS, INC.

8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737



DSN. BY:	CAB
DRN. BY:	RPW
CHK. BY:	RJD
DATE:	APR. 2008
BY:	NO.
NO.	1
REVISION:	AS-BUILT REVISIONS
DATE:	04/08

**48" WATER MAIN**  
**PLAN AND PROFILE**  
**STA. 10+97.3 TO STA. 26+01.7**

600' SCALE MAP NO. W&S 24,30 BLOCK NO.

**US ROUTE 29/ COLUMBIA ROAD**  
**WATER MAIN**

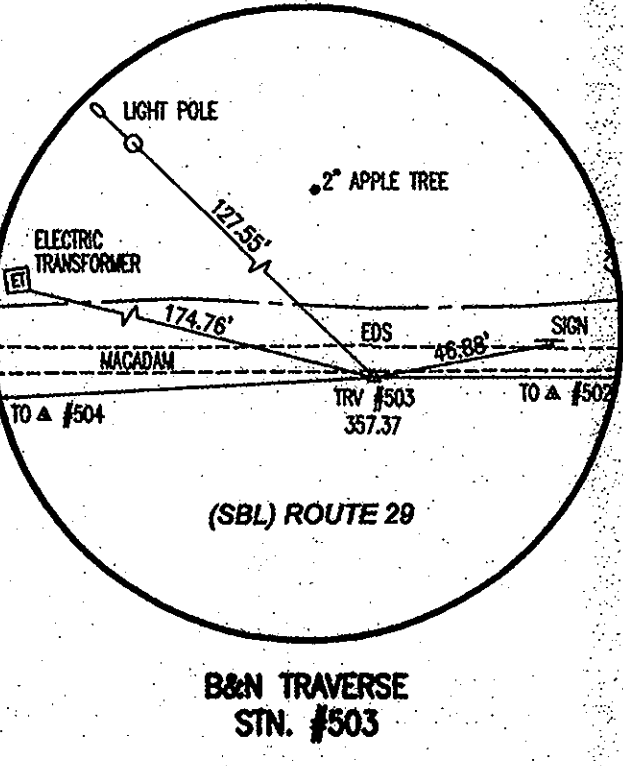
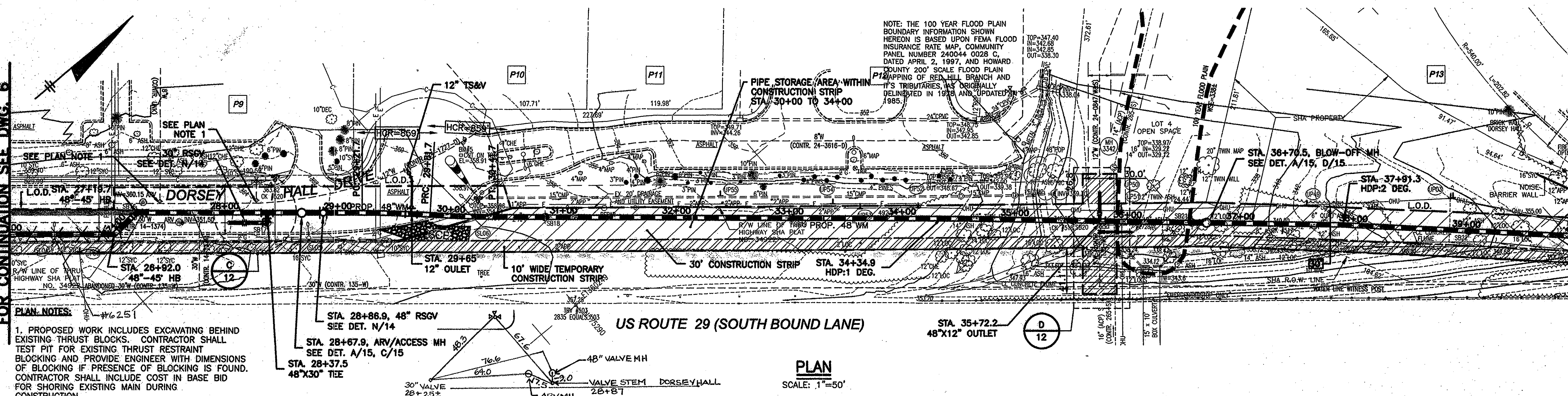
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 6 OF 32  
FILE NO. 29653-006F

**As-Built**

MATCH LINE 'B-B' STA. 26+01.7 FOR CONTINUATION SEE DWG. 6

MATCH LINE 'C-C' STA. 40+00.0 FOR CONTINUATION SEE DWG. 8

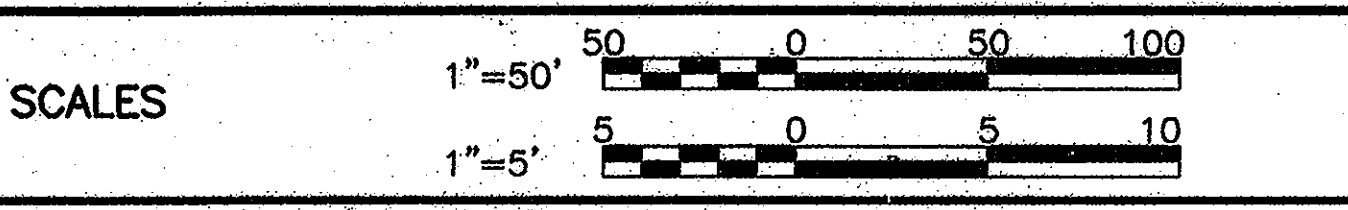
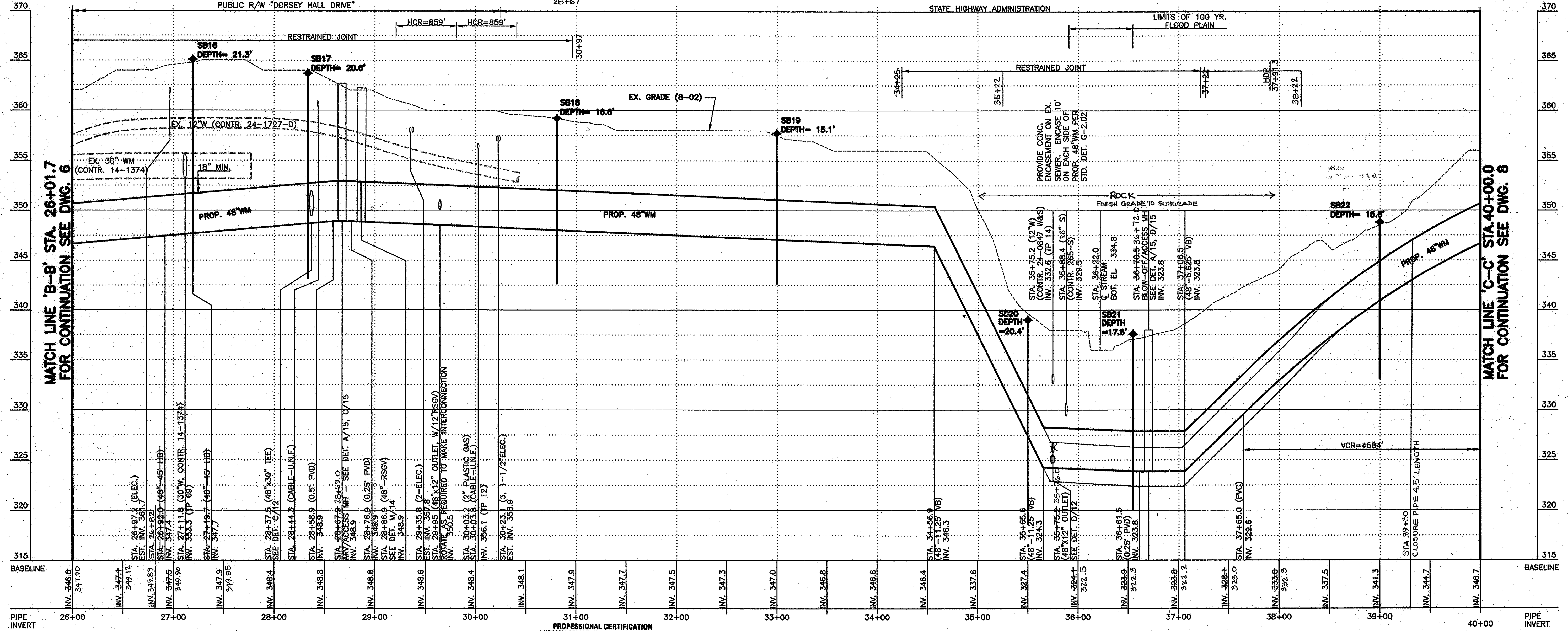


**PLAN NOTES:**  
 1. PROPOSED WORK INCLUDES EXCAVATING BEHIND EXISTING THRUST BLOCKS. CONTRACTOR SHALL TEST PIT FOR EXISTING THRUST RESTRAINT BLOCKING AND PROVIDE ENGINEER WITH DIMENSIONS OF BLOCKING IF PRESENCE OF BLOCKING IS FOUND. CONTRACTOR SHALL INCLUDE COST IN BASE BID FOR SHORING EXISTING MAIN DURING CONSTRUCTION.

**PLAN**  
 SCALE: 1"=50'

MATCH LINE 'B-B' STA. 26+01.7 FOR CONTINUATION SEE DWG. 6

MATCH LINE 'C-C' STA. 40+00.0 FOR CONTINUATION SEE DWG. 8



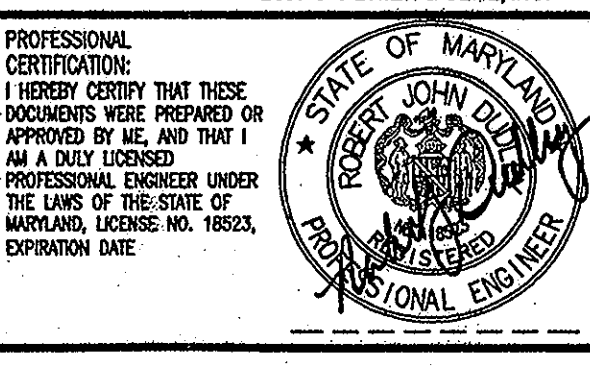
**PROFESSIONAL CERTIFICATION**  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
 LICENSE NO. 16529, EXPIRATION DATE 12/08/2009

**PROFILE**  
 HORIZ. SCALE: 1"=50'  
 VERT. SCALE: 1"=5'

**As-Built**

**DEPARTMENT OF PUBLIC WORKS**  
 HOWARD COUNTY, MARYLAND  
 Director of Public Works: *Joseph D. 4/2/08*  
 Chief - Bureau of Engineering: *Paul R. 4/17/08*  
 Chief, Bureau of Utilities: *Stephen C. 4/18/08*  
 Chief, Utility Design Division: *4/17/08*

**O'BRIEN & GERE ENGINEERS, INC.**  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
 (301) 731-5622  
 FAX: (301) 577-4737



DSN. BY:	CAB
DRN. BY:	RPW
CHK. BY:	RJD
DATE:	APR. 2008
BY:	KCI
NO.:	1
REVISION:	ASBUILT REVISIONS
DATE:	04/08
ISSUED FOR BID:	0

**48" WATER MAIN PLAN AND PROFILE**  
 STA. 26+01.7 TO STA. 40+00.0  
 600' SCALE MAP NO. W&S 24.30 BLOCK NO.

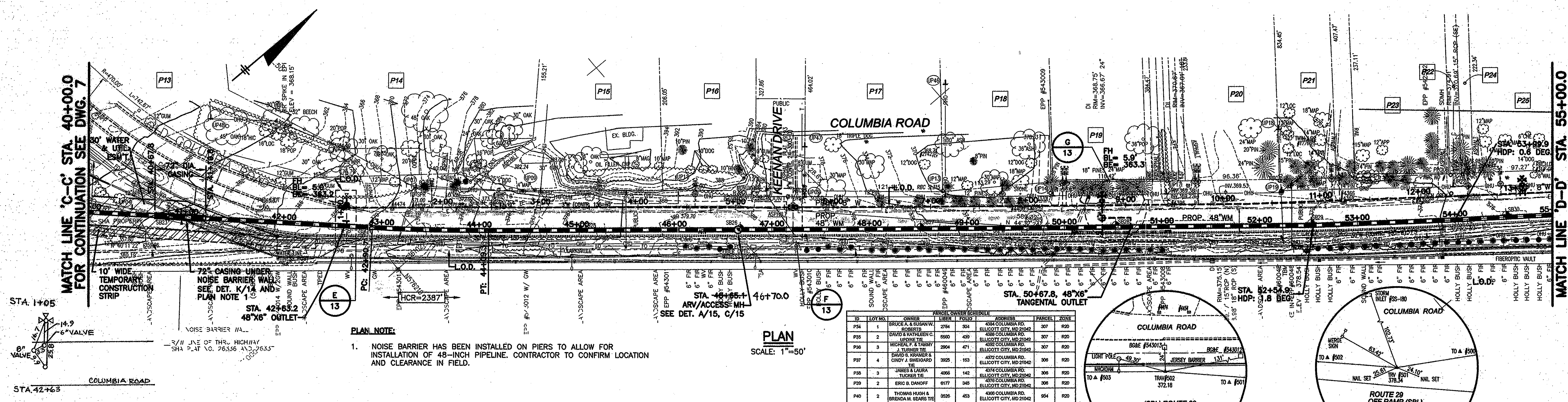
**US ROUTE 29/ COLUMBIA ROAD WATER MAIN**  
 CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND  
 SCALE AS SHOWN  
 SHEET 7 OF 32  
 FILE NO. 28653-007F



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MATCH LINE 'C-C' STA. 40+00.0  
FOR CONTINUATION SEE DWG. 7

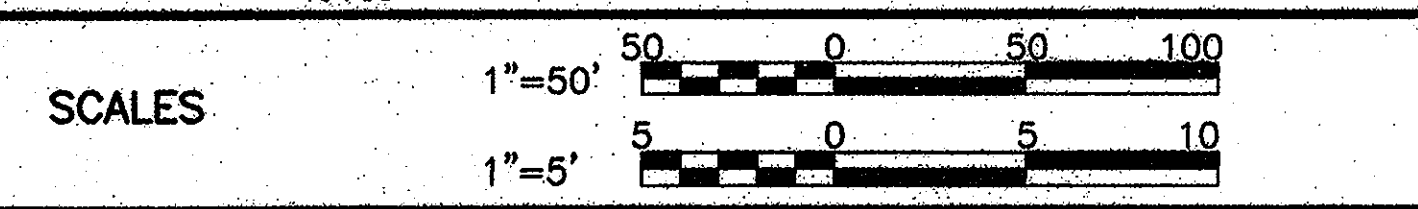
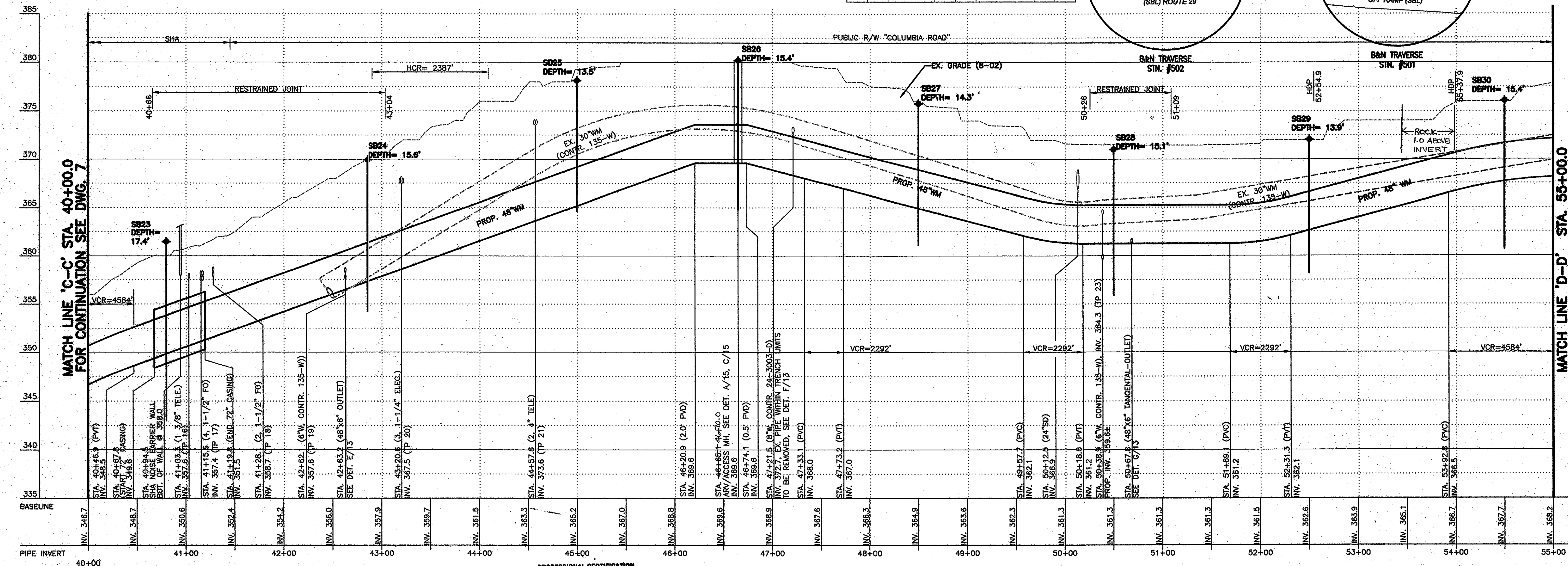
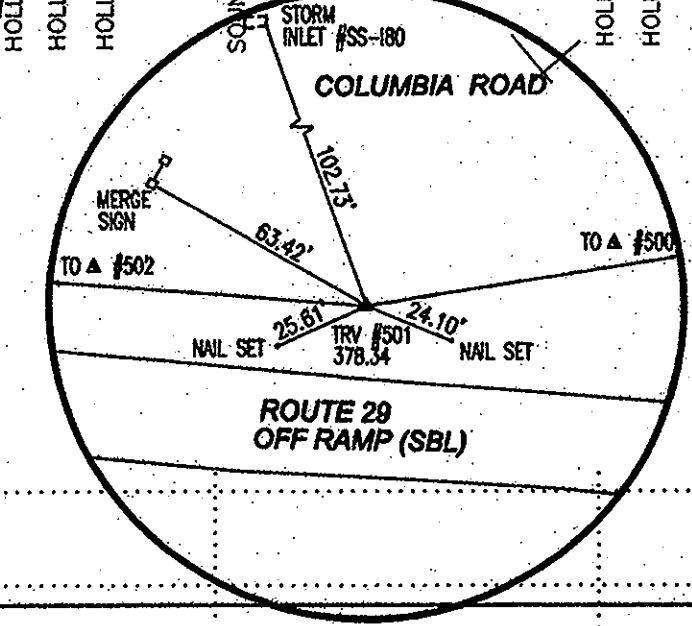
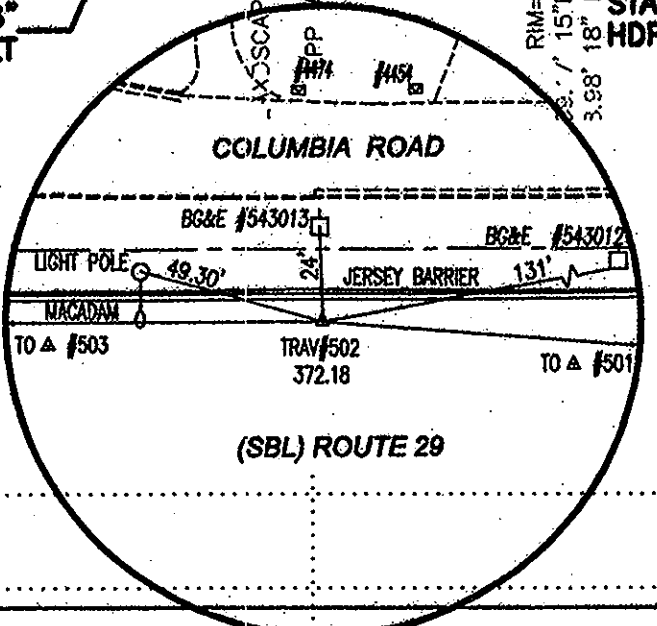
MATCH LINE 'D-D' STA. 55+00.0  
FOR CONTINUATION SEE DWG. 9



ID	LOT NO.	OWNER	PARCEL OWNER SCHEDULE	ADDRESS	PARCEL ZONE
P34	1	BRUCE A. & SUSAN W. ROBERTS	488 COLUMBIA RD.	488 COLUMBIA RD. #2042	307 R20
P35	2	DAVID & KATHLEEN C. SPURDINE TRS.	488 COLUMBIA RD.	488 COLUMBIA RD. #2042	307 R20
P36	3	MICHAEL F. & TAMMY J. TURNER TRS.	488 COLUMBIA RD.	488 COLUMBIA RD. #2042	307 R20
P37	4	DAVID S. KRANER & CINDY J. SWENBERG TRS.	488 COLUMBIA RD.	488 COLUMBIA RD. #2042	308 R20
P38	3	JAMES & LAURA TUCKER TRS.	488 COLUMBIA RD.	488 COLUMBIA RD. #2042	308 R20
P39	2	ERIC B. SHOFF	488 COLUMBIA RD.	488 COLUMBIA RD. #2042	308 R20
P40	2	THOMAS HUGH A. & BRENDA M. SEARS TRS.	488 COLUMBIA RD.	488 COLUMBIA RD. #2042	954 R20

**PLAN NOTE:**  
1. NOISE BARRIER HAS BEEN INSTALLED ON PIERS TO ALLOW FOR INSTALLATION OF 48-INCH PIPELINE. CONTRACTOR TO CONFIRM LOCATION AND CLEARANCE IN FIELD.

**PLAN**  
SCALE: 1"=50'



**PROFESSIONAL CERTIFICATION**  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 12523, EXPIRATION DATE 12/08/2009  
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**PROFILE**  
HORIZ. SCALE: 1"=50'  
VERT. SCALE: 1"=5'

**As-Built**

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: *John De...* 4/17/08  
 Chief, Bureau of Engineering: *Paul...* 4/17/08  
 Chief, Bureau of Utilities: *John...* 4/17/08  
 Chief, Utility Design Division: *John...* 4/17/08

**O'BRIEN & GERE ENGINEERS, INC.**  
8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

**PROFESSIONAL CERTIFICATION:**  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 12523, EXPIRATION DATE: 12/08/2009

DSN. BY:	CAB		
DRN. BY:	RPW		
CHK. BY:	RJD		
DATE:	APR. 2008		
BY:	KCI	NO.:	0
REVISION:	ASPHALT REVISIONS	ISSUED FOR BID:	04/08

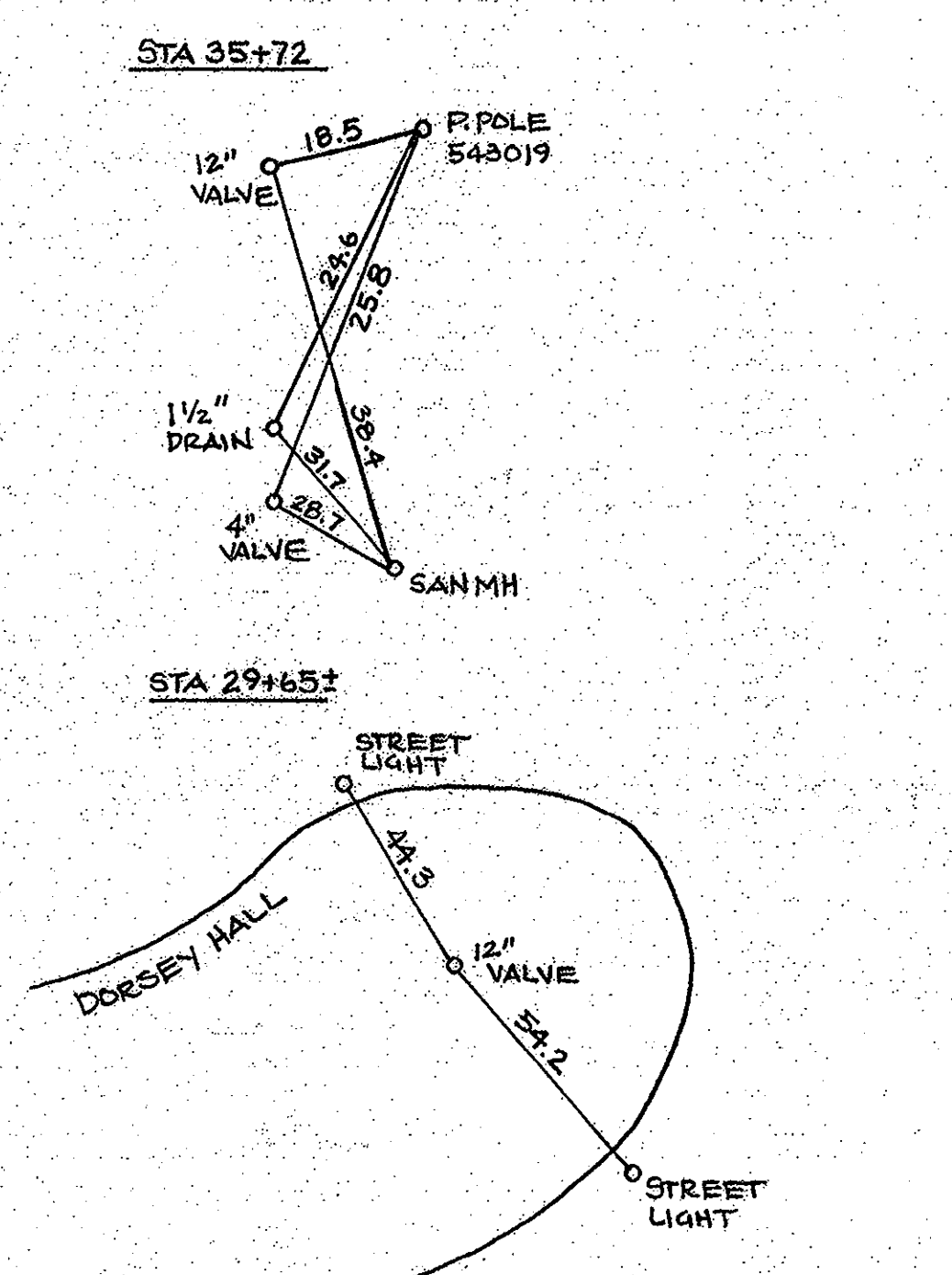
**48"Ø WATER MAIN**  
**PLAN AND PROFILE**  
**STA. 40+00.0 TO STA. 55+00.0**  
60' SCALE MAP NO. W&S 24.30 BLOCK NO.

**US ROUTE 29/ COLUMBIA ROAD**  
**WATER MAIN**  
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

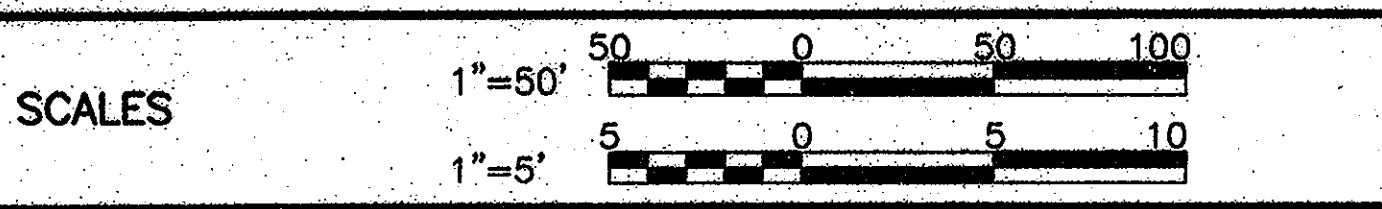
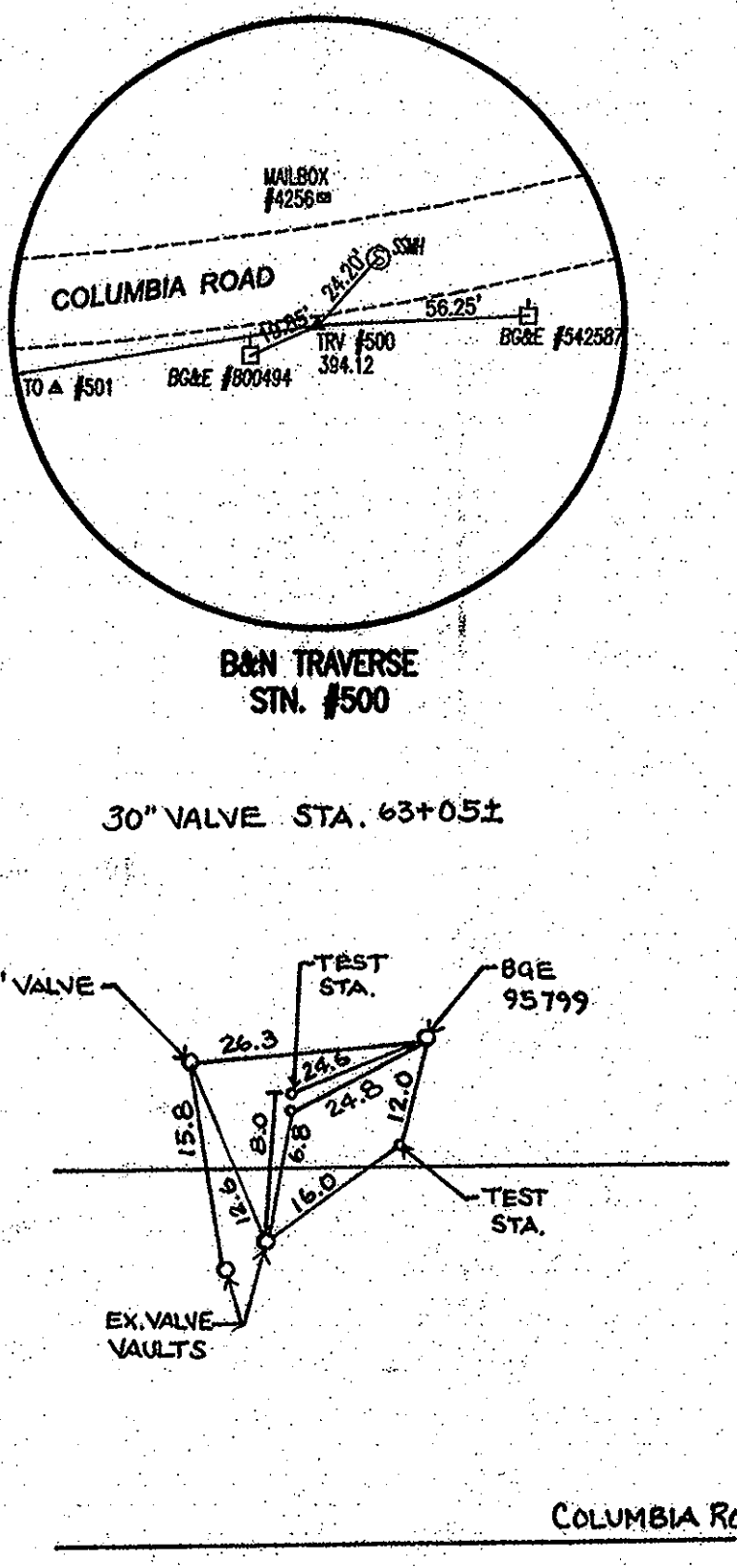
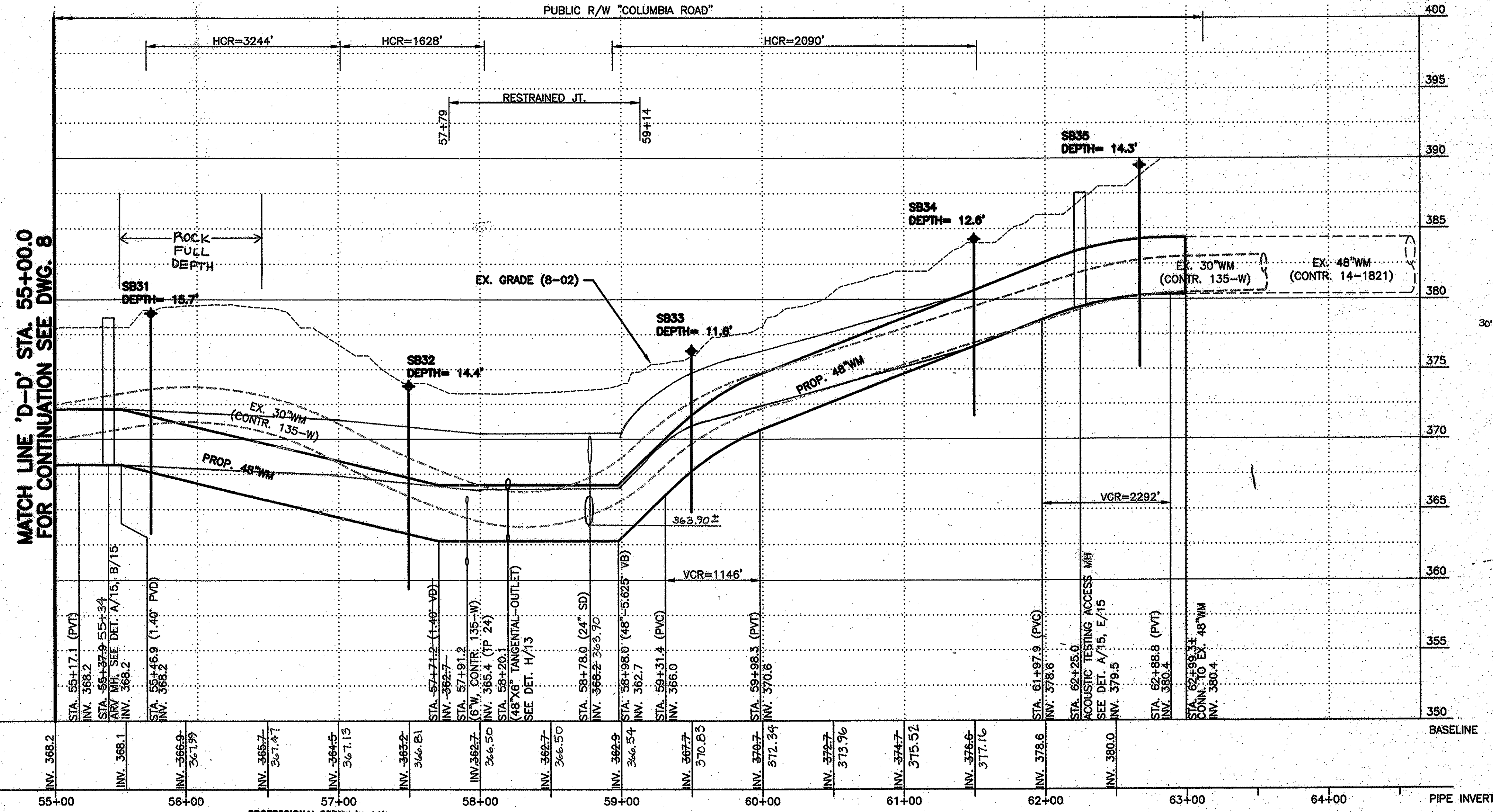
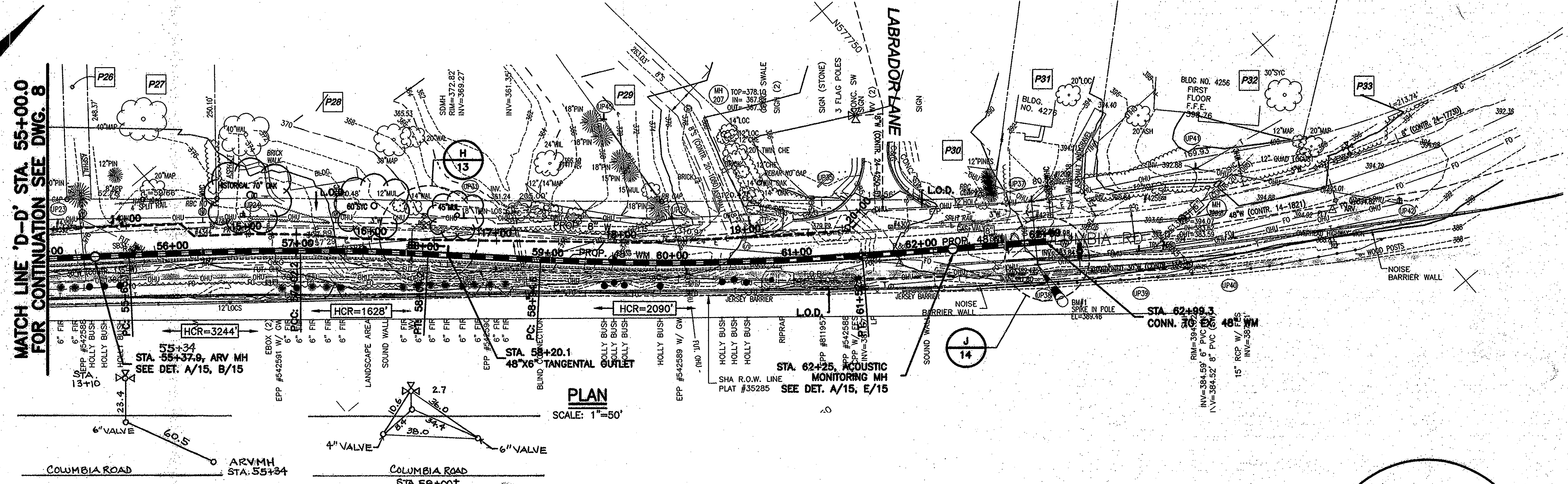
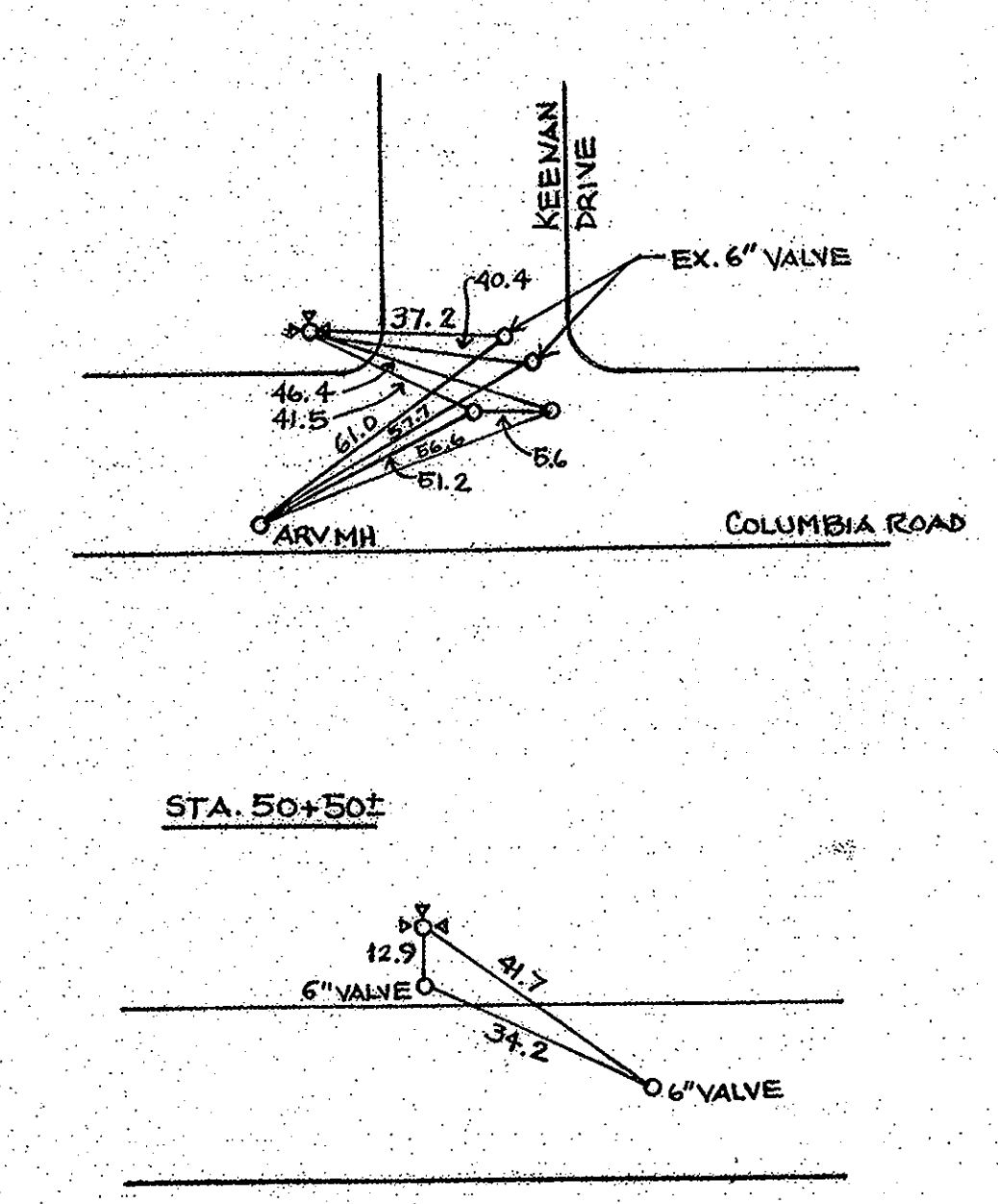
SCALE AS SHOWN  
SHEET 8 OF 32  
FILE NO. 29653-008F

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CONNECTIONS FROM SHEET 7



CONNECTIONS FROM SHEET 8



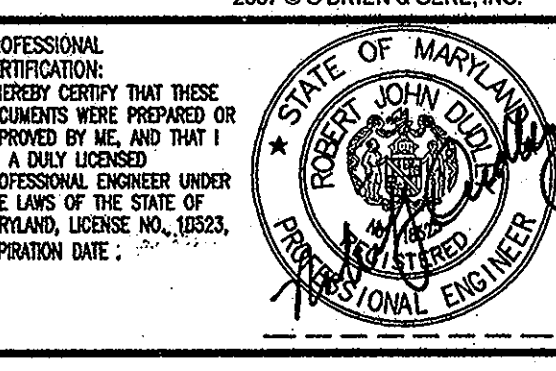
PROFESSIONAL CERTIFICATION  
 I HEREBY CERTIFY THAT THESE DOCUMENTS  
 WERE PREPARED OR APPROVED BY ME,  
 AND THAT I AM A DULY LICENSED  
 PROFESSIONAL ENGINEER UNDER THE  
 LAWS OF THE STATE OF MARYLAND,  
 LICENSE NO. 18223, EXPIRATION DATE 12/08/2009

PROFILE  
 HORIZ. SCALE: 1"=50'  
 VERT. SCALE: 1"=5'

As-Built

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 Director of Public Works: *Janet De...* 4/17/08  
 Chief - Bureau of Engineering: *Paul G...* 4/17/08  
 Chief, Bureau of Utilities: *Steve C...* 4/17/08  
 Chief, Utility Design Division: *...* 4/17/08

O'BRIEN & GERE  
 ENGINEERS, INC.  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
 (301) 731-5622  
 FAX: (301) 577-4737

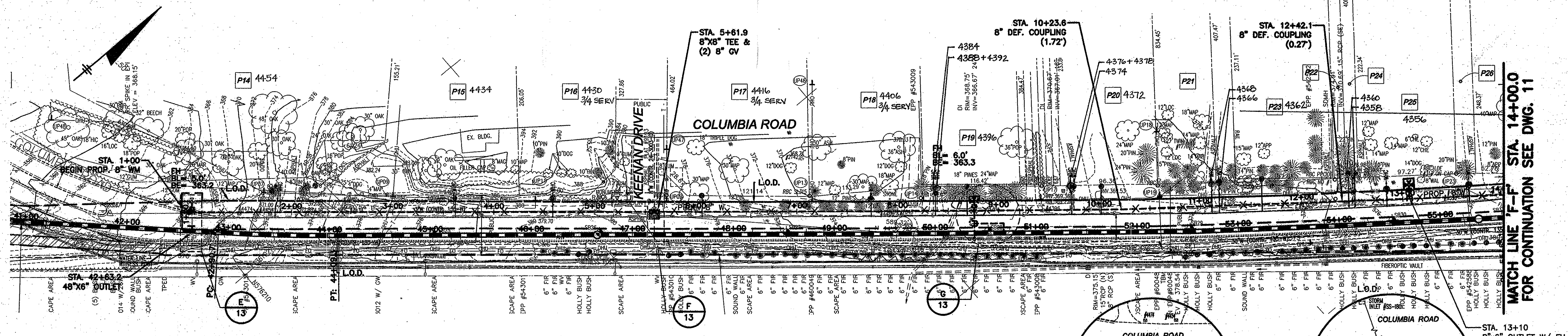


DSN. BY:	CAB		
DRN. BY:	RPW		
CHK. BY:	RJD		
DATE:	APR. 2008		
NO.	0	AS-BUILT REVISIONS	3-4-10
REVISION		ISSUED FOR BID	04/08

48" WATER MAIN  
 PLAN AND PROFILE  
 STA. 55+00.0 TO STA. 62+99.3  
 600' SCALE MAP NO. W&S 24.30 BLOCK NO. ...

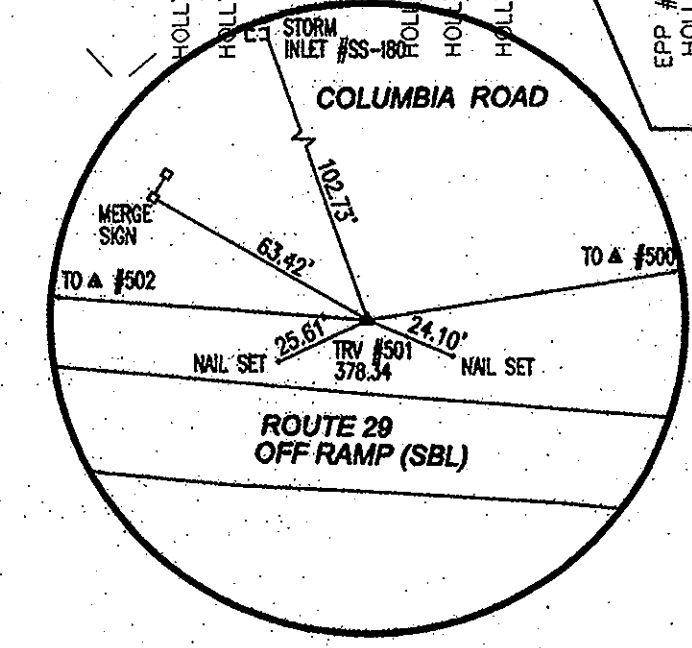
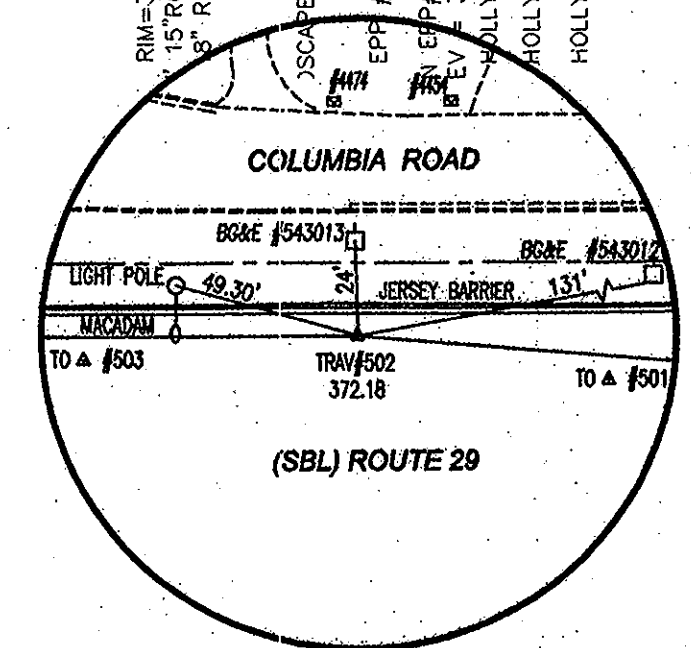
US ROUTE 29/ COLUMBIA ROAD  
 WATER MAIN  
 CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
 SHEET 9 OF 32  
 FILE NO. 29653-009F



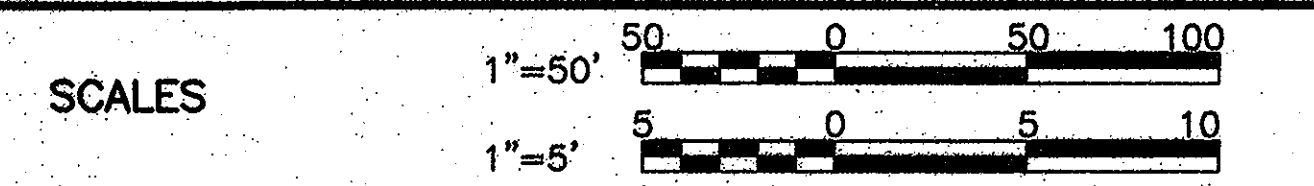
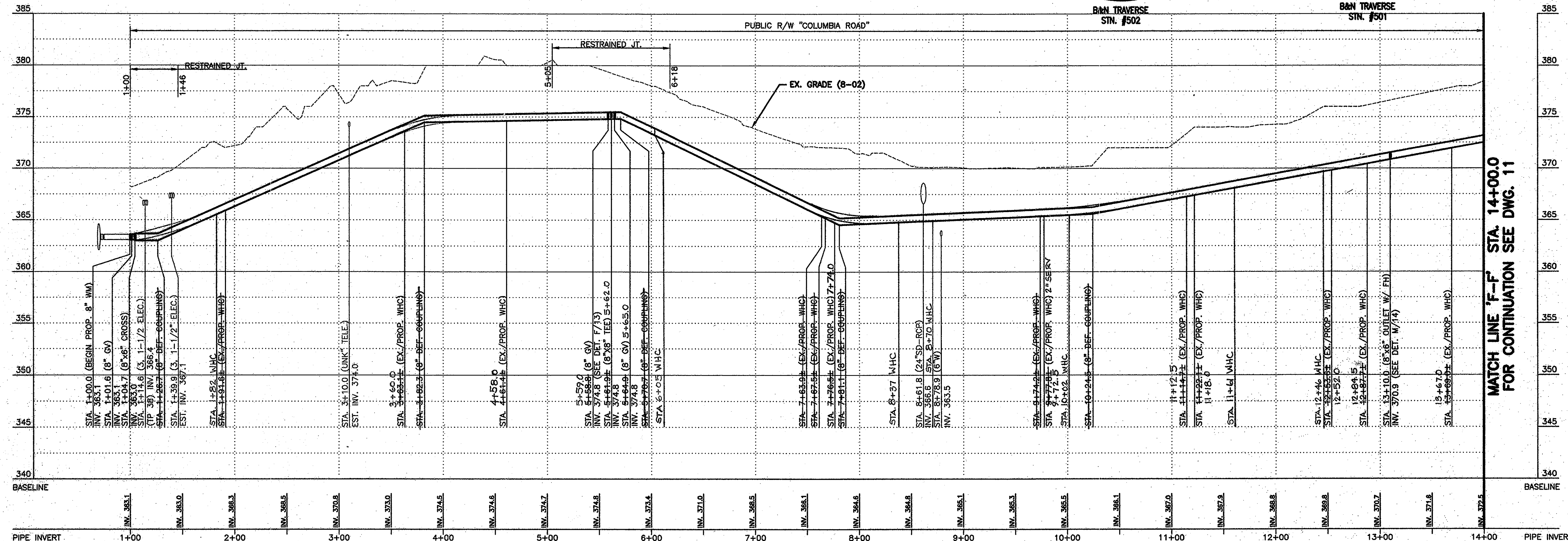
**PLAN NOTE:**  
1. SEE 8" WATER LINE GENERAL NOTES, SHT. 11.

**PLAN**  
SCALE: 1"=50'



MATCH LINE 'F-F' STA. 14+00.0  
FOR CONTINUATION SEE DWG. 11

MATCH LINE 'F-F' STA. 14+00.0  
FOR CONTINUATION SEE DWG. 11



**PROFESSIONAL CERTIFICATION**  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
LICENSE NO. 12523, EXPIRATION DATE 12/03/2009  
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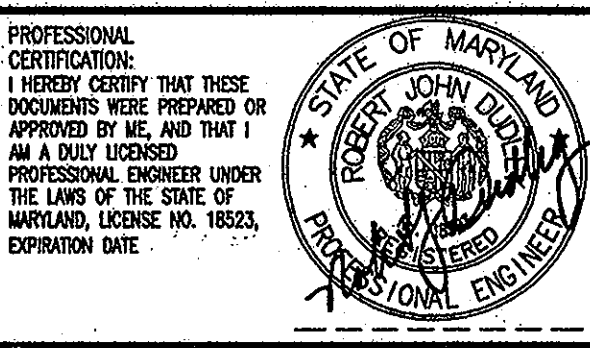
**PROFILE**  
HORIZ. SCALE: 1"=50'  
VERT. SCALE: 1"=5'

**PROFILE NOTE:**  
1. PIPELINE ELEVATIONS AND WHC LOCATIONS TO BE VERIFIED IN THE FIELD BY CONTRACTOR.

**As-Built**

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND  
Director of Public Works: [Signature]  
Chief, Bureau of Engineering: [Signature] 4/17/08  
Chief, Bureau of Utilities: [Signature] 4/17/08  
Chief, Utility Design Division: [Signature] 4/17/08

**O'BRIEN & GERE ENGINEERS, INC.**  
8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

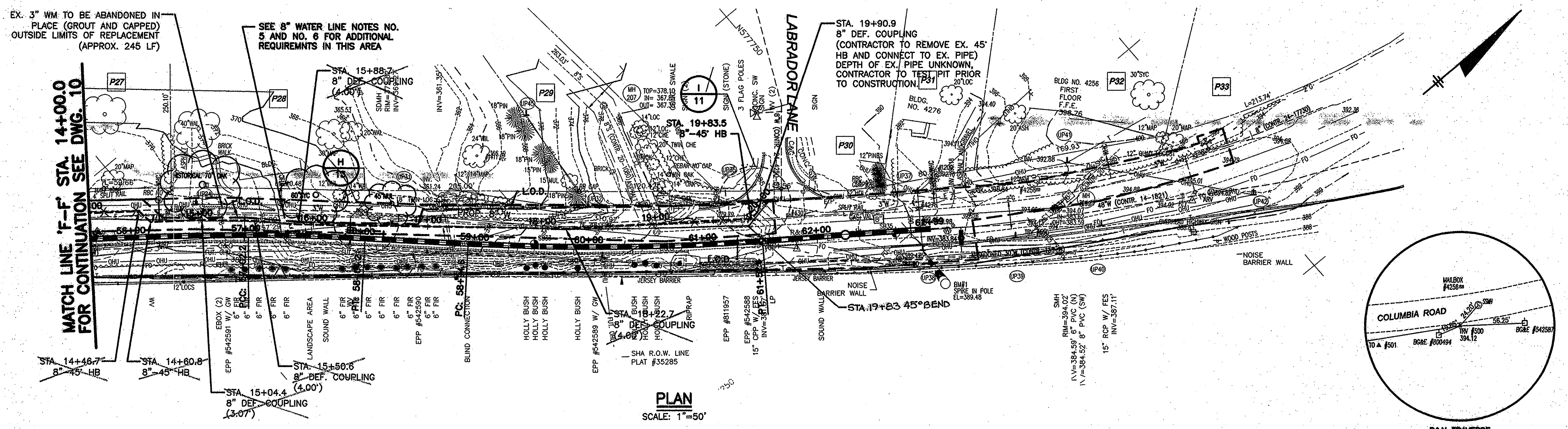


DSN. BY:	CAB
DRN. BY:	RPW
CHK. BY:	RJD
DATE:	APR. 2008
BY:	KCI
NO.:	0
AS-BUILT REVISIONS	
ISSUED FOR BID	3-4-10
REVISION	04/08

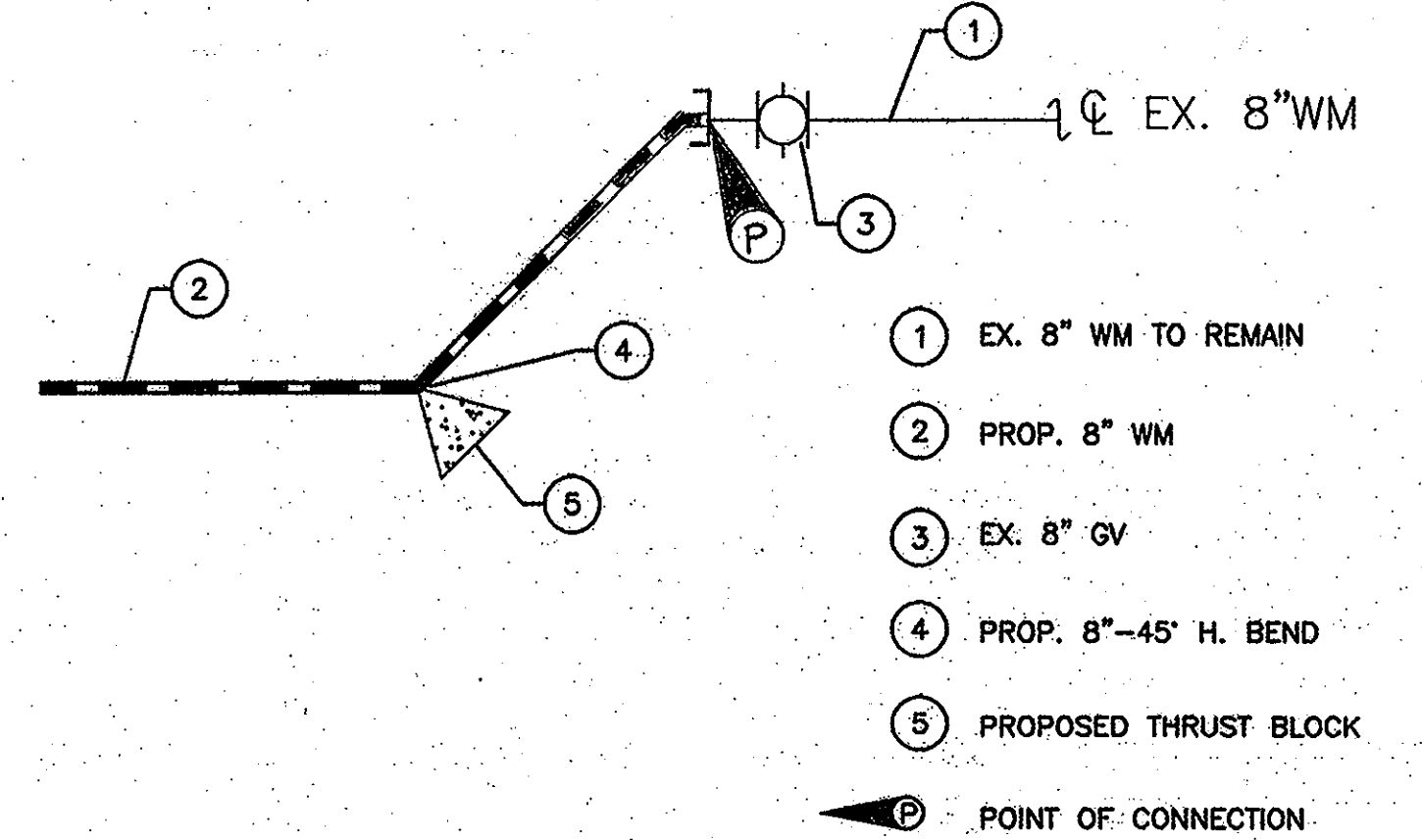
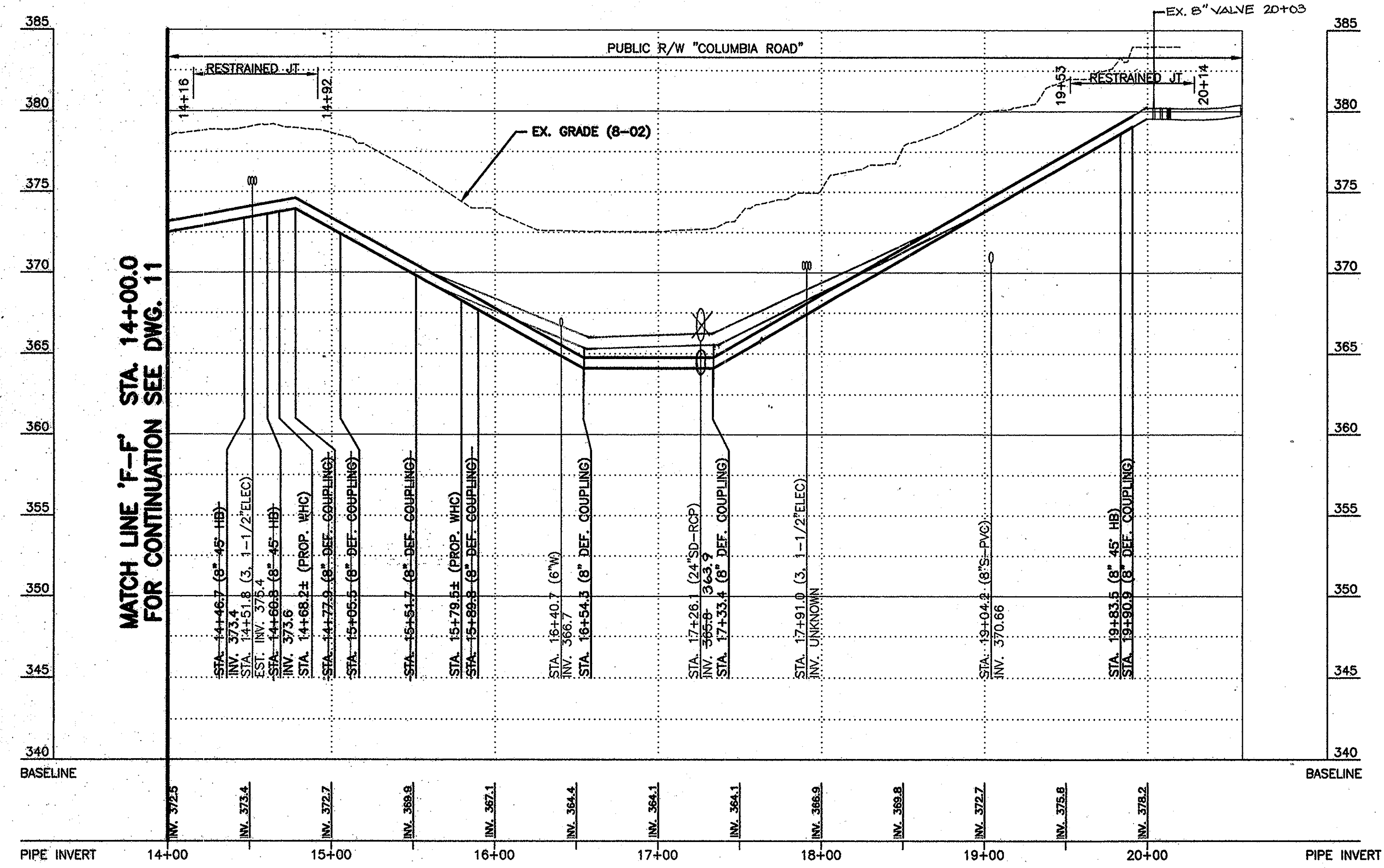
**8" WATER MAIN**  
**PLAN AND PROFILE**  
**STA. 1+00.0 TO STA. 14+00.0**  
600' SCALE MAP NO. W&S 24.30 BLOCK NO.

**US ROUTE 29 / COLUMBIA ROAD**  
**WATER MAIN**  
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 10 OF 32  
FILE NO. 29653-010F



- GENERAL NOTES:**
- EXISTING 3" WATER LINE IS LOCATED APPROXIMATELY 5'-0" WEST OF EX. CURB LINE ALONG COLUMBIA ROAD. CONTRACTOR SHALL TEST PIT FOR LOCATION OF EX. 3" WATER AS REQUIRED FOR INSTALLATION OF PROP. 8" WATER IN SAME TRENCH.
  - CONTRACTOR SHALL PROVIDE TEMPORARY WATER SERVICE FOR ALL SERVICE CONNECTIONS ALONG COLUMBIA ROAD THAT WILL BE AFFECTED BY REPLACEMENT OF EX. 3" WATER. TEMPORARY PIPE SHALL BE PROTECTED FROM DAMAGE AND FREEZING.
  - CONTRACTOR SHALL MAINTAIN 3'-6" MINIMUM COVER ALONG PROP. 8" WATER, AND ADJUST VERTICAL ALIGNMENT AS REQUIRED TO MEET EXISTING TIE-IN LOCATIONS ALONG THE ALIGNMENT.
  - EX. FH'S CURRENTLY CONNECTED TO THE EX. 30" WM (CONTR. 135-W) SHALL BE REPLACED - SEE DETAIL SHEET 13 FOR CONNECTION REQUIREMENTS.
  - PROVIDE OFFSET AROUND EX. 70" HISTORICAL OAK TREE, EX. 60" SYCAMORE, AND EX. 45" MULBERRY, AS SHOWN, USING 45° HORIZONTAL BENDS. PROVIDE RESTRAINED JOINTS AS SHOWN. ALL WORK IN VICINITY OF THESE EXISTING TREES SHALL BE PERFORMED OUTSIDE OF THE TREE DRIP LINES. HORIZONTAL ALIGNMENT SHALL BE ADJUSTED WITHIN THE VICINITY OF THESE TREES, AS SHOWN.
  - CONTRACTOR SHALL CUT, CAP, AND ABANDON THE EXISTING 3" WATER LINE, IN PLACE, IN THE VICINITY OF THE LARGE DIAMETER TREES OFFSET.
  - CONTRACTOR SHALL MAINTAIN ALL EXISTING SERVICES TO EACH DWELLING, SHOP, PLACE OF BUSINESS AND BUILDING ALONG COLUMBIA ROAD AT ALL TIMES. CONTRACTOR SHALL RESTORE ALL EXISTING SERVICES, MAILBOXES, CULVERTS, DRIVEWAYS, ETC. TO A CONDITION AS NEAR AS PRACTICAL TO THE CONDITION THAT EXISTED PRIOR TO BEING DISTURBED. MAIL SERVICE SHALL BE AVAILABLE AT ALL TIMES.
  - DRAINAGE PIPE UNDER DRIVEWAYS SHALL BE REPLACED IN-KIND IF DAMAGED DURING CONSTRUCTION.
  - CONTRACTOR TO FIELD VERIFY HYDRANT BURY LINE DEPTHS PRIOR TO ORDERING FIRE HYDRANTS.
  - ALL WHC REQUIRE A PRESSURE REDUCING VALVE. WORKING PRESSURE IN THIS LINE IS 115 PSI, ACCEPTABLE RESIDENTIAL PRESSURE IS 50-60 PSI.
  - THE USE OF DEFLECTION COUPLINGS IS INTENDED FOR BENDS LESS THAN 5-DEGREES. A MINIMUM OF 10-FEET OF RESTRAINED PIPE MUST BE INSTALLED ON BOTH SIDES OF DEFLECTION COUPLINGS.
  - ALL VALVES WITH PVC PIPE SHALL BE ANCHORED PER COUNTY STANDARD DETAIL W-5.01.



**CONNECTION DETAIL**

N.T.S.

STA. 19+80.09

**As-Built**

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: *John De...* DATE: 4/17/08

Chief, Bureau of Engineering: *Paul Johnson* DATE: 4/17/08

Chief, Bureau of Utilities: *...* DATE: 4/17/08

Chief, Utility Design Division: *...* DATE: 4/17/08

**O'BRIEN & GERE ENGINEERS, INC.**

8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

**PROFESSIONAL CERTIFICATION**

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 18323, EXPIRATION DATE 12/08/2009

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**PROFILE NOTE:**

1. PIPELINE ELEVATIONS AND WHC LOCATIONS TO BE VERIFIED IN THE FIELD BY CONTRACTOR.

DSN. BY:	CAB
DRN. BY:	RPW
CHK. BY:	RJD
DATE:	APR. 2008
BY NO.	0
REVISION	ASBUILT REVISIONS
ISSUED FOR BID	3-4-10
DATE	04/08

**8" WATER MAIN PLAN AND PROFILE**

STA. 14+00.0 TO STA. 19+90.9

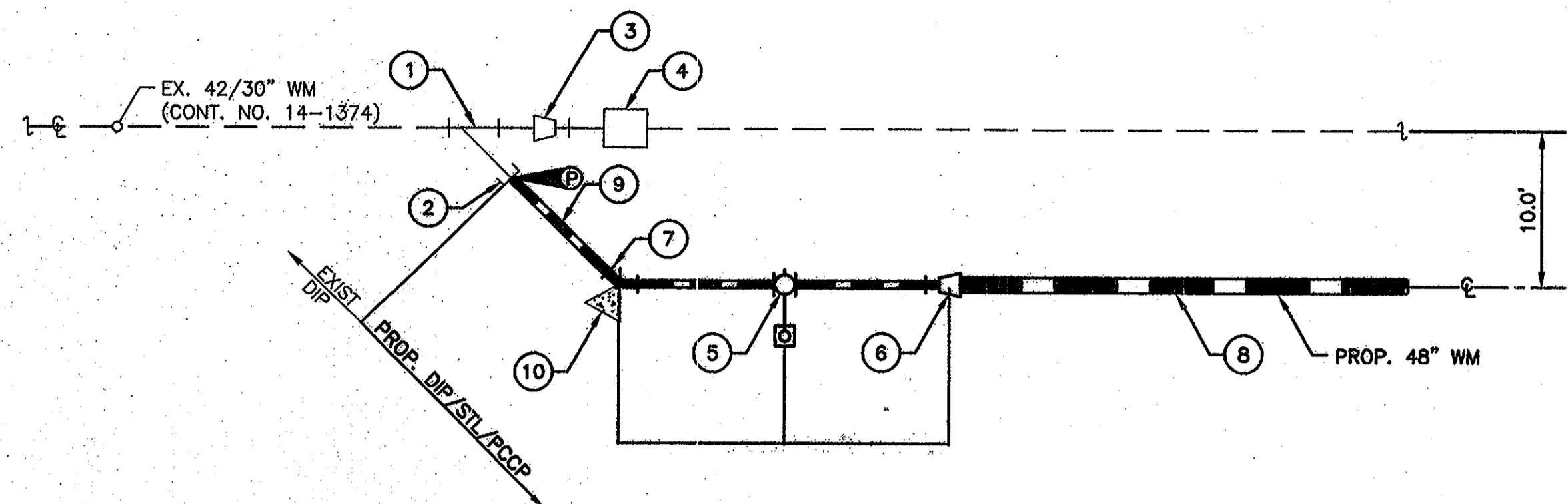
600' SCALE MAP NO. W&S 24.30 BLOCK NO.

**US ROUTE 29/ COLUMBIA ROAD WATER MAIN**

CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN

SHEET 11 OF 32



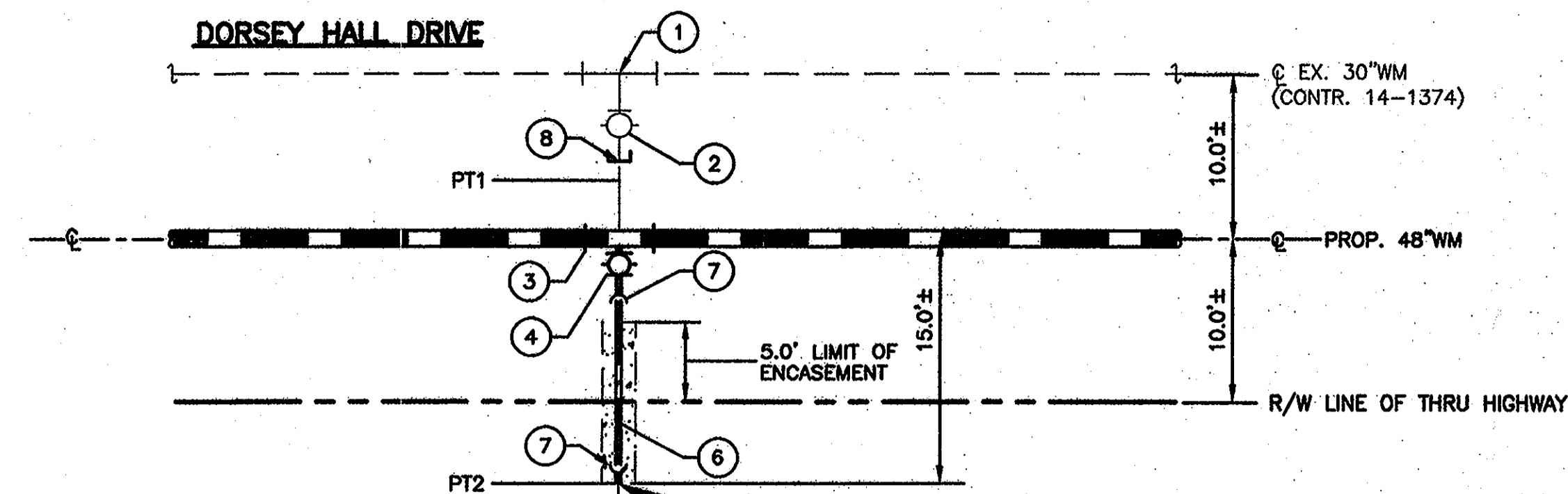
**CONNECTION DETAIL**  
N.T.S.  
STA. 0+00

- 1 EX. 42"x36" WYE
- 2 EX. HARNESSED DISH BULKHEAD ON END OF 36" WYE - TO BE REMOVED
- 3 EX. 42"x30" REDUCER
- 4 EX. VALVE VAULT W/ 30" BV
- 5 PROP. 36" RSGV (RJ/RJ), SEE DETAIL "N" SHEET 14
- 6 PROP. 48"x36" REDUCER (RJ/RJ)
- 7 PROP. 36"-45" HB (RJ/RJ)
- 8 PROP. 48" WM
- 9 PROP. 36" WM
- 10 THRUST BLOCK, SEE DET. SHEET 14

**DETAIL NOTES:**

- SLEEVES NEEDED FOR CONNECTION ARE NOT SHOWN. ALL SLEEVES THAT ARE REQUIRED FOR CONNECTION SHALL BE RESTRAINED.
- SHUTDOWN FOR TIE-IN SHALL INCLUDE ISOLATING ROUTE 29 WATER PUMPING STATION.
- REMOVE EXISTING END CAP AND BUTTRESS TO TIE INTO EXISTING MAIN.

POINT OF CONNECTION



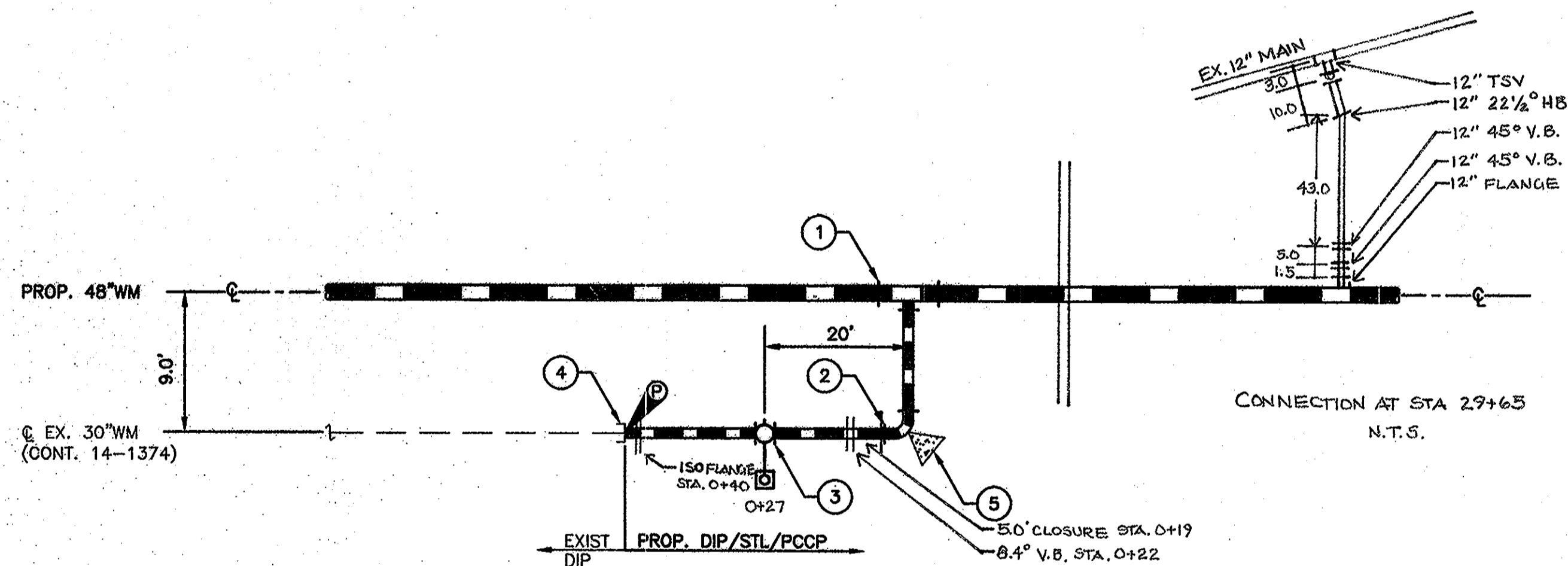
**CONNECTION DETAIL**  
N.T.S.  
STA. 24+92.9

- 1 EX. 30"x12" OUTLET
- 2 EX. 12" VALVE- CLOSE, ABANDON IN PLACE, AND REMOVE ROADWAY BOX. CAP EXISTING MAIN AND RESTRAIN ASSEMBLY TO EX. TEE, SEE STD. DET. W2.21
- 3 PROP. 48"x12" OUTLET
- 4 PROP. 12" RSGV W/ ROADWAY BOX PER STD. DET. W3.65
- 5 EX. (ENCASED) 12"W
- 6 PROP. (ENCASED) 12"W
- 7 PROP. 12"-45" VB
- 8 ABANDON VALVE (CLOSED) IN PLACE AND REMOVE EX. ROADWAY BOX. CAP EX. 12"W AND HARNESS ASSEMBLY TO TEE PER STD. DET. W2.21

**DETAIL NOTES:**

- CONTRACTOR SHALL CONTACT HC-DPW TO ISOLATE EX. 12"W. EX. VALVE(S) AT EX. 30" WATER MAIN AND ON SYBERT DRIVE SHALL BE CLOSED DURING CONNECTION OF EX. 12" WATER TO PROP. 48" WATER.
- CUT AND REMOVE EX. 12"W BETWEEN PT1 AND PT2. CONTRACTOR SHALL CHIP AWAY EX. CONCRETE ENCASUREMENT TO EXPOSED SUCH LENGTH REQUIRED TO ENABLE RECONNECTION. RECONNECT TO EX. 12"W WITH SPOOL PIECE (DIP, CL. 54), RESTRAINED SLEEVE, AND SPACERS AS REQUIRED FOR CONNECTION.
- ENCASE PROP. 12"W PER STD. DET. G2.02 TO LIMIT SHOWN.

POINT OF CONNECTION



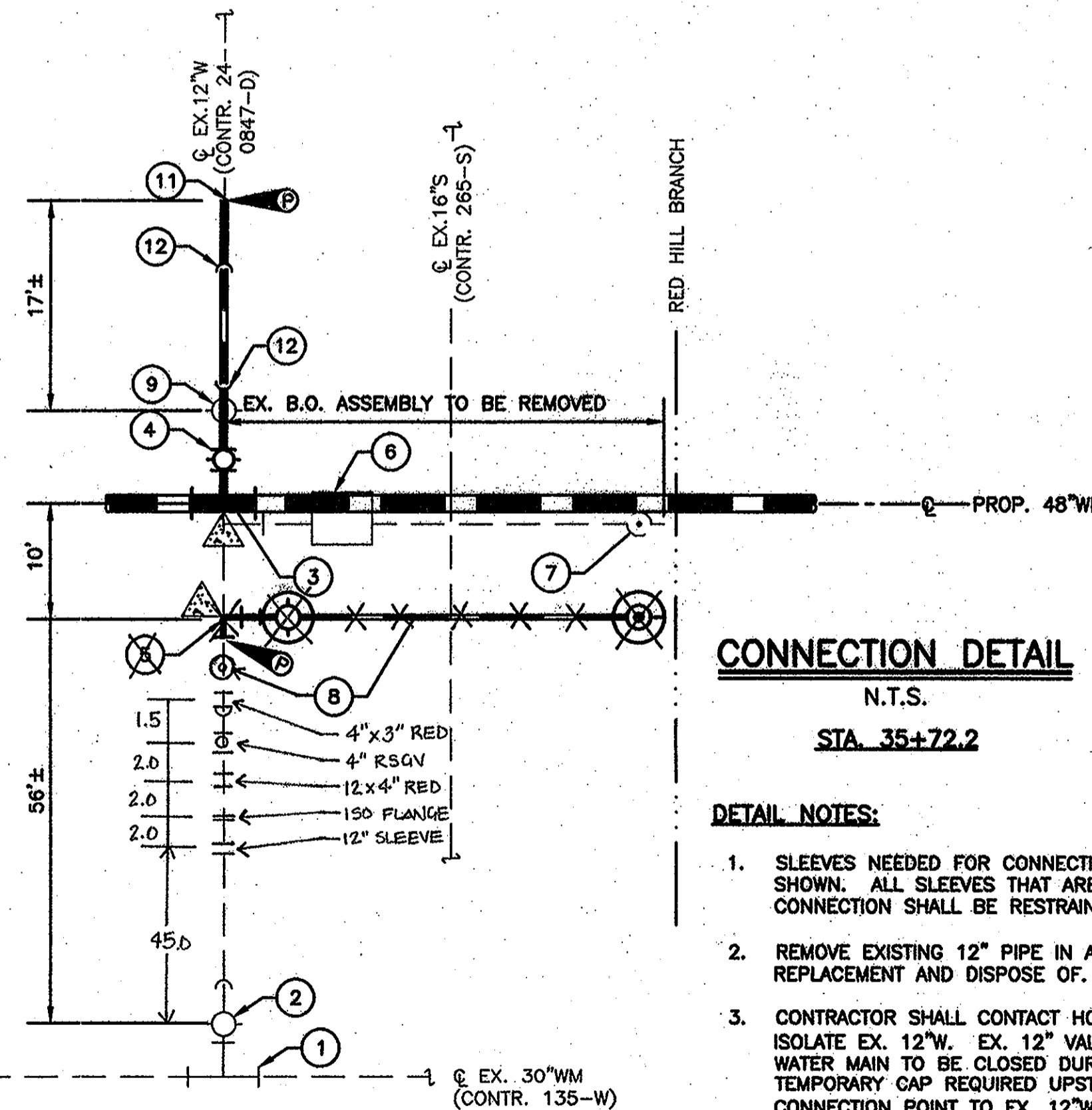
**CONNECTION DETAIL**  
N.T.S.  
STA. 28+37.5

- 1 PROP. 48"x30" TEE (RJ/RJ/RJ), ROTATE AS REQUIRED TO MAKE CONNECTION
- 2 PROP. 30"-90" HB (RJ/RJ), ROTATE AS REQUIRED TO MAKE CONNECTION
- 3 PROP. 30" RSGV (RJ/RJ), SEE DETAIL "N" ON SHEET 14. PROVIDE ROADWAY BOX PER STD ST G-8.01.
- 4 EX. END CAP & BUTTRESS - TO BE REMOVED
- 5 THRUST BLOCK, SEE DTL. SHT. W2.23. BLOCK WITH CONCRETE USING THE FOLLOWING BLOCK DIMENSIONS O=8'-6", P=10'-0", R= 5'-0" AND S=1'-2".

**DETAIL NOTES:**

- REMOVE EX. END CAP & BUTTRESS AND CONNECT TO EX. 30" WM.
- INSTALL PROP. 30"W TO 48"x30" TEE. ROTATE TEE AND HORIZONTAL BEND AS REQUIRED TO MAKE CONNECTION.
- PROP. 30"W SHALL BE RESTRAINED JOINT.
- SLEEVES NEEDED FOR CONNECTION ARE NOT SHOWN. ALL SLEEVES THAT ARE REQUIRED FOR CONNECTION SHALL BE RESTRAINED.

POINT OF CONNECTION



**CONNECTION DETAIL**  
N.T.S.  
STA. 35+72.2

- 1 EX. 30"x12" OUTLET- TO REMAIN
- 2 EX. 12" VALVE- CLOSE, DURING NEW BLOW OFF INSTALLATION.
- 3 PROP. 48"x12" OUTLET W/ THRUST BLOCK, SEE DET. SHEET 15 FOR THRUST BLOCK DETAILS.
- 4 PROP. 12" RSGV, PROVIDE ROADWAY BOX PER STD ST G8.01.
- 5 PROP. 12" 90" HB.
- 6 EX. 4'x4' VAULT W/ 6" TWIN VALVES- TO BE REMOVED
- 7 EX. BLOW-OFF TO BE REMOVED.
- 8 PROP. BLOW-OFF ASSEMBLY PER DETAIL W4.13. RESTRAIN ALL JOINTS AND PROVIDE SMALL CONCRETE VAULTS AS SHOWN ON STD. DET. W3.63.
- 9 EX. 12" VALVE - TO BE SALVAGED FOR HOWARD COUNTY.
- 10 NOT USED
- 11 12" SLEEVE - PROVIDE RESTRAINED JOINT SLEEVE.
- 12 PROP. 12"-45" VB

**DETAIL NOTES:**

- SLEEVES NEEDED FOR CONNECTION ARE NOT SHOWN. ALL SLEEVES THAT ARE REQUIRED FOR CONNECTION SHALL BE RESTRAINED.
- REMOVE EXISTING 12" PIPE IN AREA OF REPLACEMENT AND DISPOSE OF.
- CONTRACTOR SHALL CONTACT HC-DPW TO ISOLATE EX. 12"W. EX. 12" VALVE AT EX. 30" WATER MAIN TO BE CLOSED DURING INSTALLATION. TEMPORARY CAP REQUIRED UPSTREAM OF CONNECTION POINT TO EX. 12"W. CAP TO BE PER DETAIL W-2.21.
- DISTURBED EARTH BETWEEN THRUST BLOCKS TO BE REPLACED WITH FLOWABLE FILL, OR CR-6 COMPACTED TO 95% MAX. DENSITY IN 8" LIFTS.

POINT OF CONNECTION

PROFESSIONAL CERTIFICATION  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
LICENSE NO. 18222, EXPIRATION DATE 12/08/2009

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**DEPARTMENT OF PUBLIC WORKS**

HOWARD COUNTY, MARYLAND

Director of Public Works: *James A. ...* 4/17/08  
 Chief, Bureau of Engineering: *Robert ...* 4/17/08  
 Chief, Bureau of Utilities: *John ...* 4/17/08  
 Chief, Utility Design Division: *...* 4/17/08

**O'BRIEN & GERE ENGINEERS, INC.**  
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 Landover, Maryland 20785  
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 FAX: (301) 577-4737

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 LICENSE NO. 18222, EXPIRATION DATE 12/08/2009

DSN. BY:	CAB
DRN. BY:	RPW
CHK. BY:	RJD
DATE:	APR 2008
BY NO.	0
REVISION	ASBUILT REVISIONS
DATE	04/08

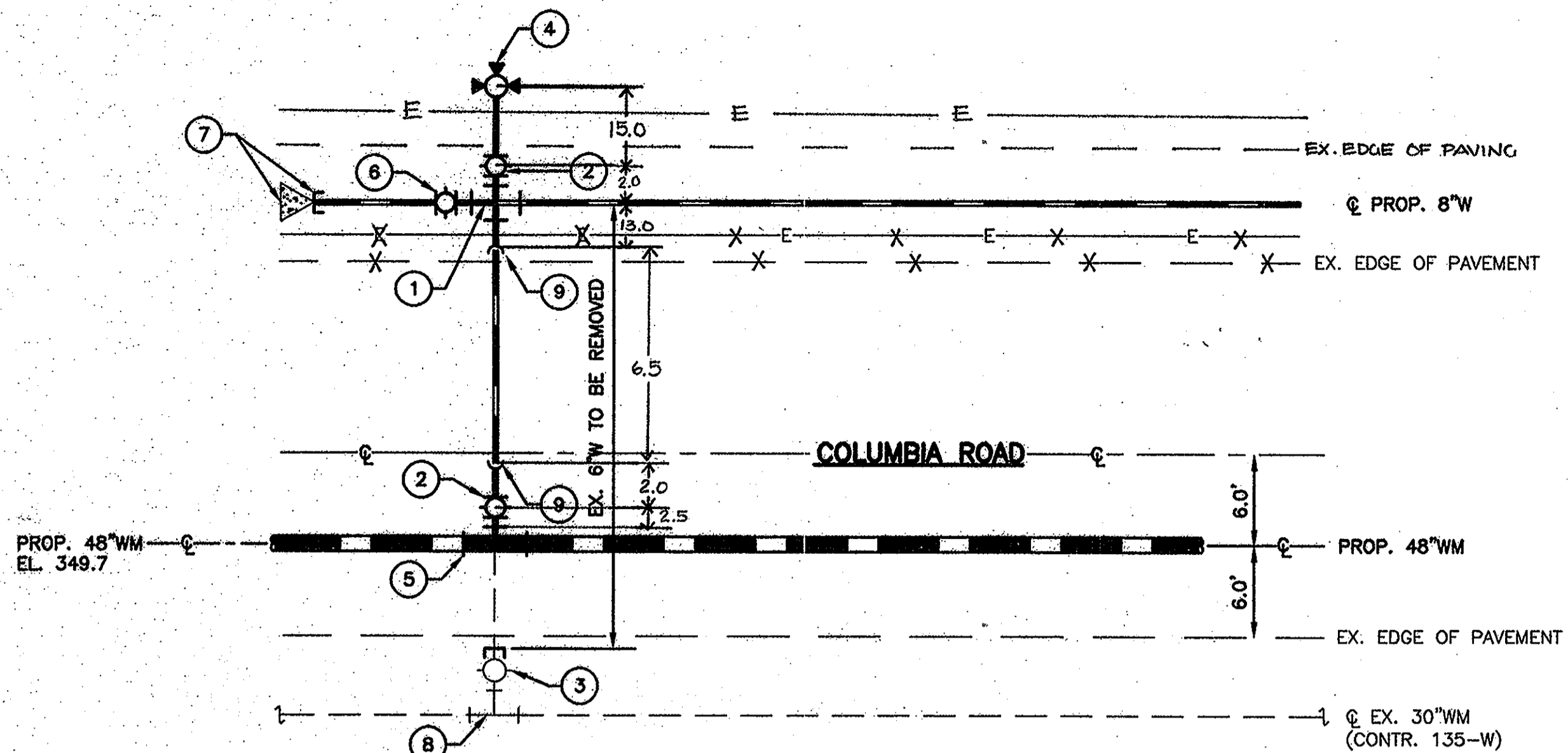
**DETAILS**

60' SCALE MAP NO. W&S 24,30 BLOCK NO.

**US ROUTE 29/ COLUMBIA ROAD WATER MAIN**  
 CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
 SHEET 12 OF 32

**As-Built**



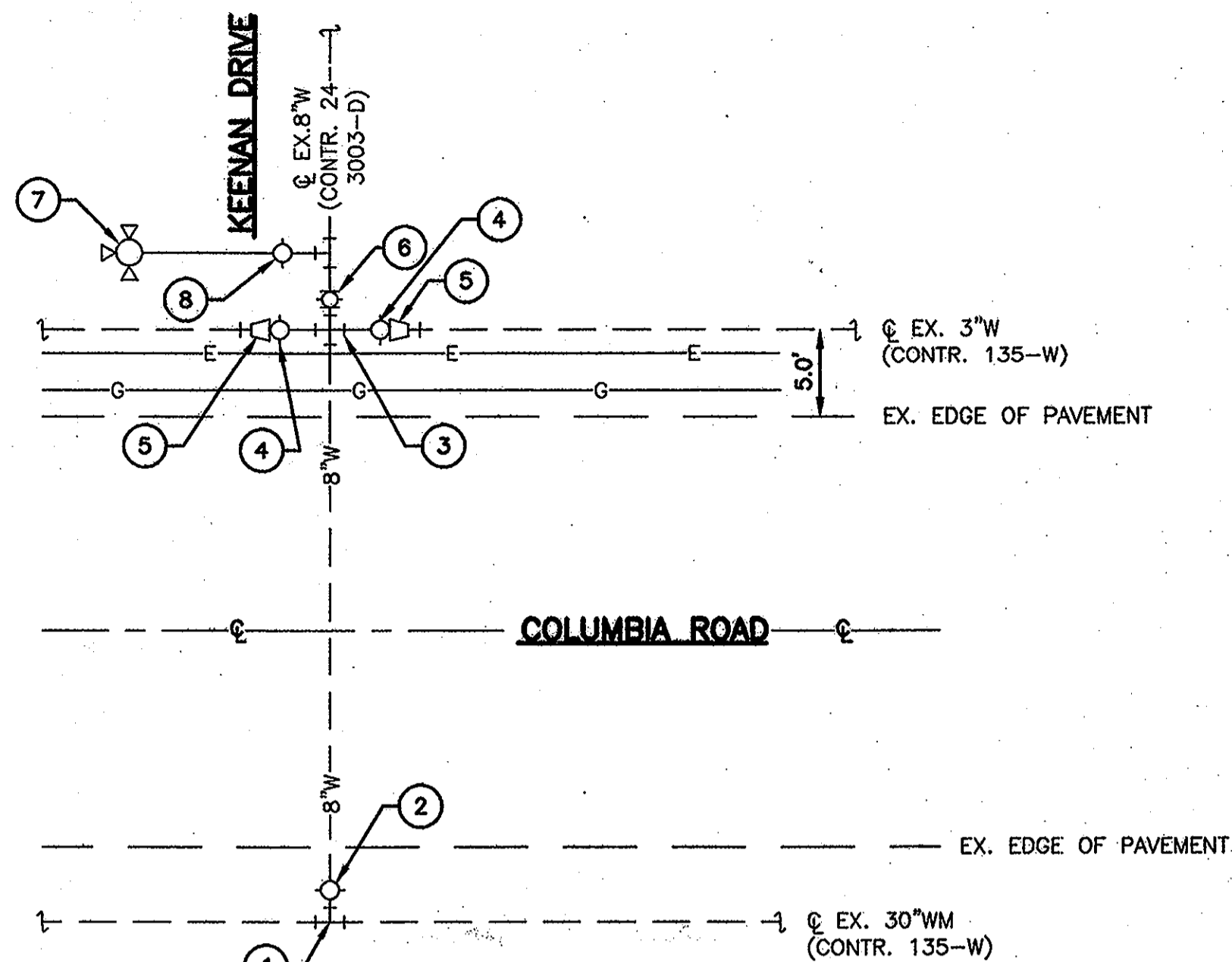
- 1 PROP. 8"x6" CROSS
- 2 PROP. 6" RSGV
- 3 EX. 6" VALVE-- CLOSE, ABANDON IN PLACE, AND REMOVE ROADWAY BOX. CAP EXISTING MAIN AND RESTRAIN ASSEMBLY TO EX. TEE, SEE STD. DET. W2.13
- 4 PROP. FIRE HYDRANT
- 5 PROP. 48"x6" OUTLET
- 6 PROP. 8" RSGV
- 7 8" CAP AND THRUST BLOCK PER. STD. DET. W2.21
- 8 EX. 30"x6" OUTLET-- TO REMAIN
- 9 PROP. 6"-45" VB

**CONNECTION DETAIL**  
N.T.S.

STA. 42+63.2 (48" PROP. WM)  
& STA. 1+04.7 (8" PROP. WM)

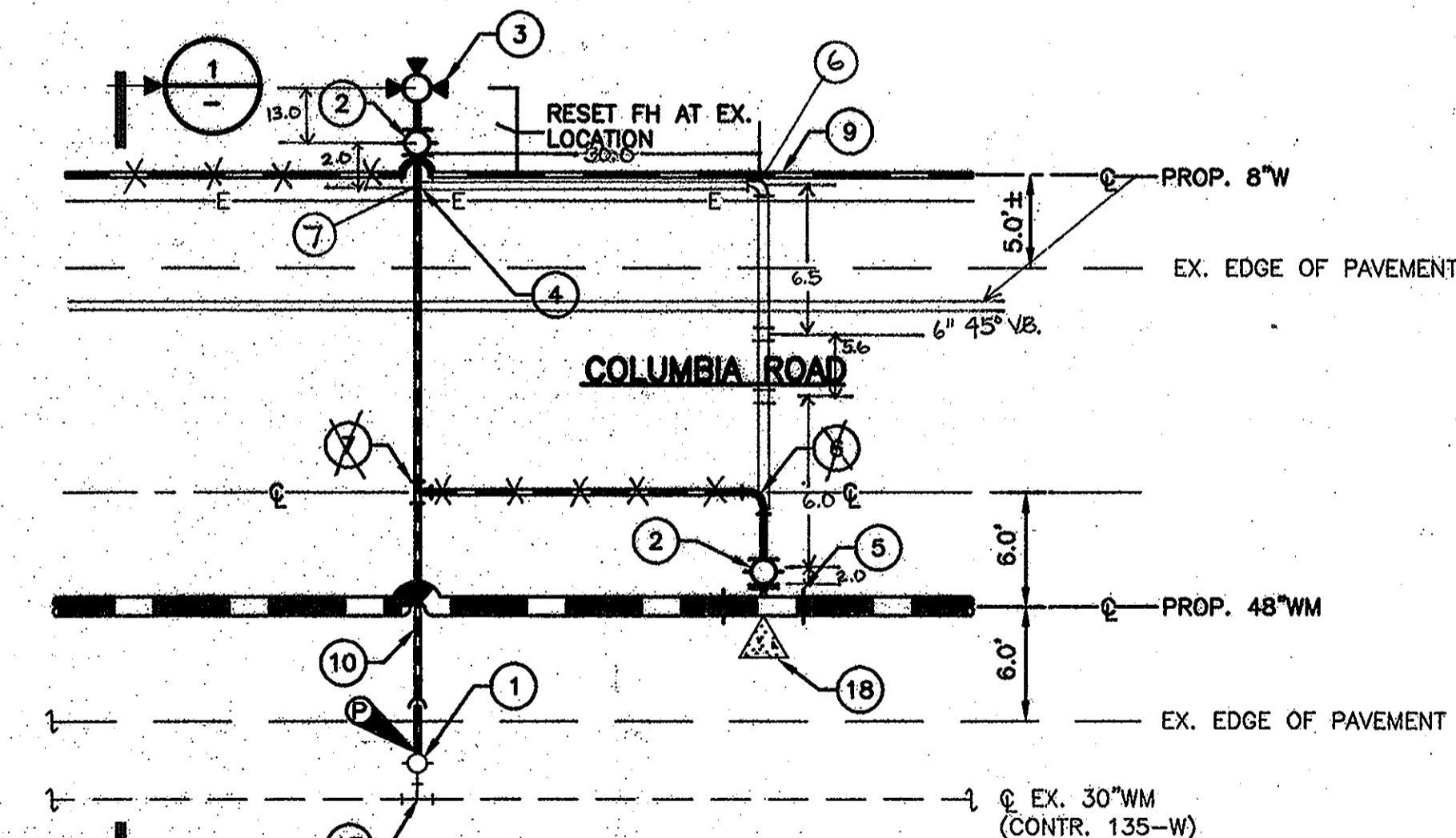
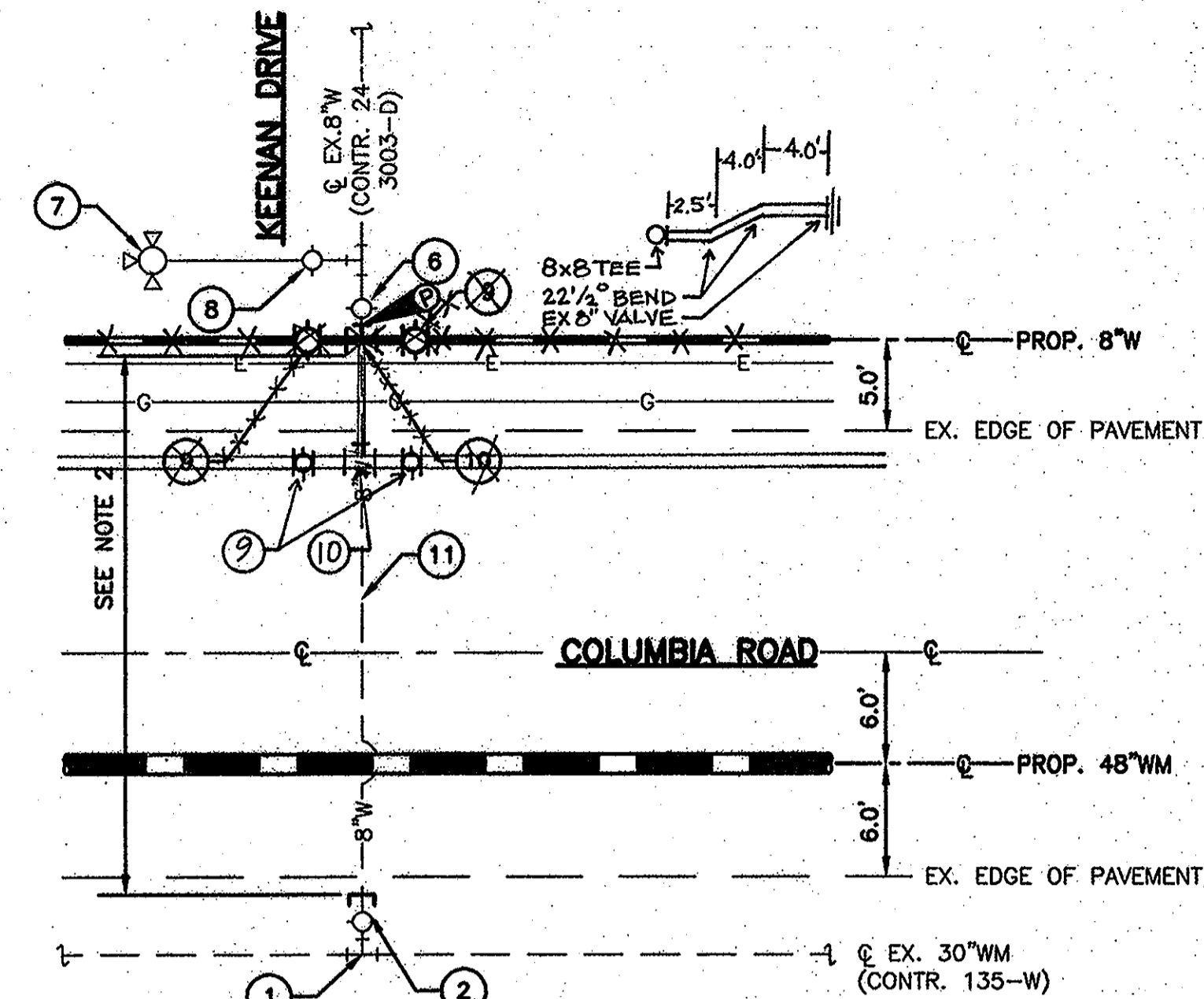
**DETAIL NOTES:**

- SLEEVES NEEDED FOR CONNECTION ARE NOT SHOWN. ALL SLEEVES THAT ARE REQUIRED FOR CONNECTION SHALL BE RESTRAINED.
- ALL CONNECTION PIPING SHALL BE RESTRAINED JOINT.



**DETAIL NOTES:**

- SLEEVES NEEDED FOR CONNECTION ARE NOT SHOWN. ALL SLEEVES THAT ARE REQUIRED FOR CONNECTION SHALL BE RESTRAINED.
- CONTRACTOR SHALL REMOVE EX. 8" PIPE WITHIN LIMITS OF NEW TRENCHING. ABANDON EX. PIPE IN PLACE, AND FILL WITH FLOWABLE FILL.
- CONTRACTOR SHALL COORDINATE NEW CONNECTION AND ISOLATION OF 8" WATER MAIN ALONG WITH TEMPORARY SERVICE TO BE PROVIDED ALONG COLUMBIA ROAD. TEMPORARY SERVICE WILL BE REQUIRED FOR KEENAN DRIVE PRIOR TO DISCONNECTION OF 8" WATER FROM EX. 30" WM.

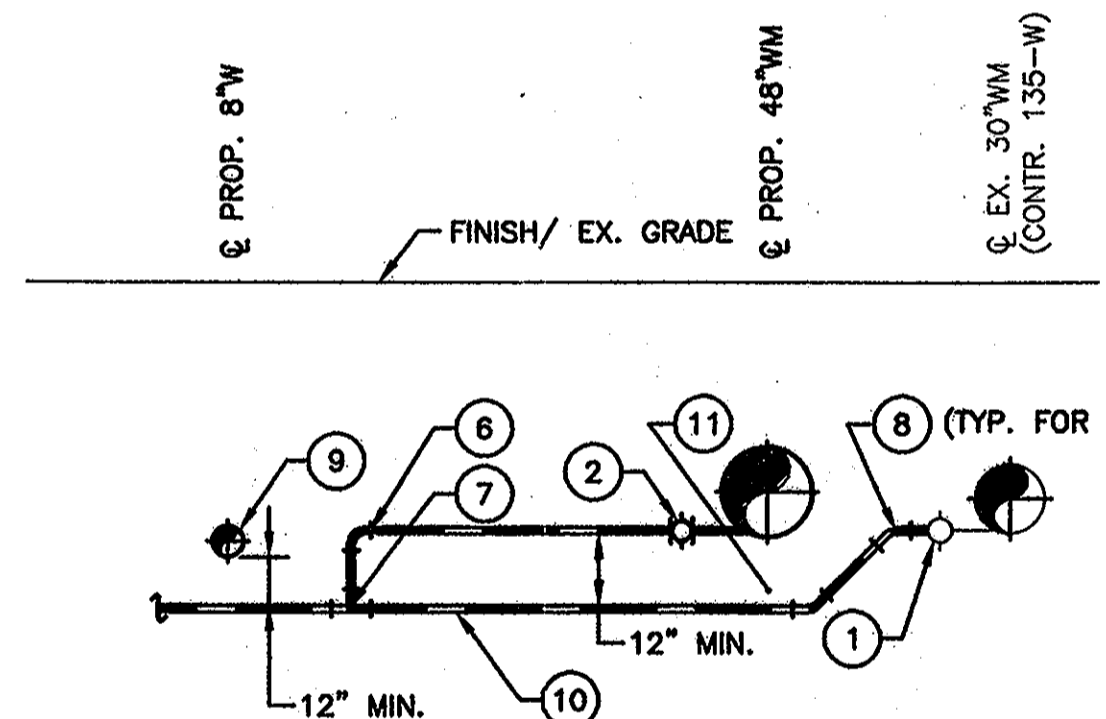


**DETAIL NOTES:**

- BLOW-OFF FIRE HYDRANT SHOWN HERE IS NOT TO BE TIED INTO PROP. 8" W. FIRE HYDRANT SHALL FACE ROAD.
- ALL CONNECTION PIPING SHALL BE RESTRAINED JOINT.
- SLEEVES NEEDED FOR CONNECTION ARE NOT SHOWN. ALL SLEEVES THAT ARE REQUIRED FOR CONNECTION SHALL BE RESTRAINED.
- EXISTING FIRE HYDRANT TO BE SALVAGE FOR HOWARD COUNTY.
- SEE SECTION 1/13 FOR ADDITIONAL DETAILS.

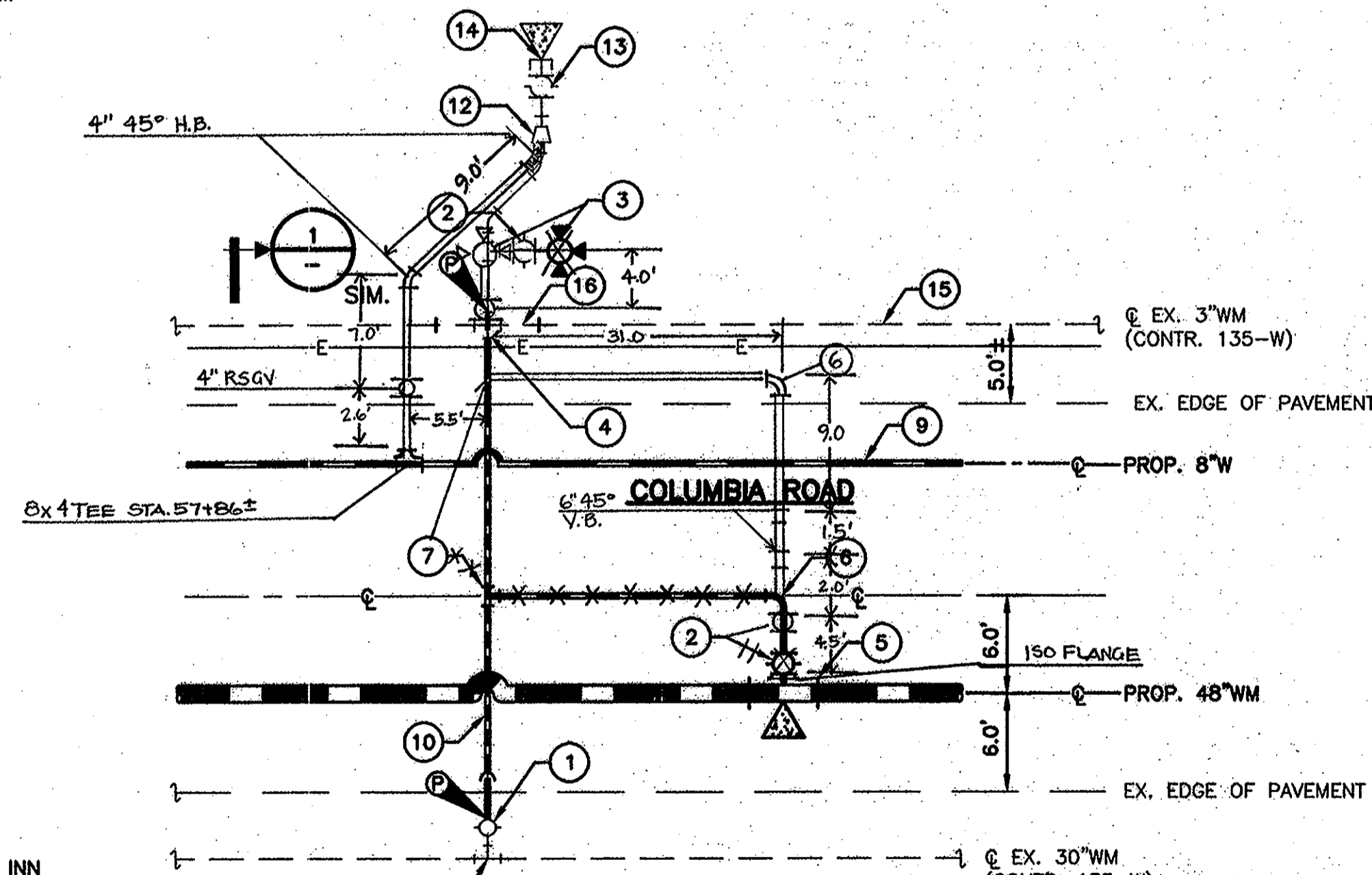
**CONNECTION DETAIL**  
N.T.S.

STA. 50+67.8



**SECTION**  
N.T.S.

- 6 PROP. 6"-90" HB, ROTATE AS REQUIRED FOR CONN.
- 7 PROP. 6" TEE, ROTATE AS REQUIRED FOR CONN.
- 8 PROP. 6"-45" VB, TYP. FOR 2
- 9 PROP. 8" WATER
- 10 PROP. 6" WATER
- 11 PROVIDE COMPACTED #57 STONE WITHIN THIS TRENCH
- 12 EX. 6"x4" REDUCER
- 13 EX. 4" RSGV
- 14 EX. 4" WHC FOR WAYSIDE INN
- 15 EX. 3" WATER-- TO BE ABANDONED IN PLACE, SEE NOTES SHEET 11
- 16 REMOVE EX. 3" WATER
- 17 EX. 30"x6" OUTLET-- TO REMAIN
- 18 PROPOSED THRUST BLOCK



**DETAIL NOTE:**

- BLOW-OFF FIRE HYDRANTS SHOWN HERE ARE NOT TO BE TIED INTO PROP. 8" W. FIRE HYDRANTS SHALL FACE ROAD.
- ALL CONNECTION PIPING SHALL BE RESTRAINED JOINT.
- SLEEVES NEEDED FOR CONNECTION ARE NOT SHOWN. ALL SLEEVES THAT ARE REQUIRED FOR CONNECTION SHALL BE RESTRAINED.
- SEE SECTION 1/13 (SIMILAR) FOR ADDITIONAL DETAILS.

**CONNECTION DETAIL**  
N.T.S.

STA. 58+20.1

PROFESSIONAL CERTIFICATION  
I HEREBY CERTIFY THAT THESE DOCUMENTS  
WERE PREPARED OR APPROVED BY ME,  
AND THAT I AM A DULY LICENSED  
PROFESSIONAL ENGINEER UNDER THE  
LAWS OF THE STATE OF MARYLAND.  
LICENSE NO. 18523, EXPIRATION DATE 12/08/2009

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**DEPARTMENT OF PUBLIC WORKS**

HOWARD COUNTY, MARYLAND

Director of Public Works: *Joseph B. ...* DATE: 4/17/08  
 Chief - Bureau of Engineering: *Richard ...* DATE: 4/17/08  
 Chief, Bureau of Utilities: *Shelli ...* DATE: 4/17/08  
 Chief, Utility Design Division: *...* DATE: 4/17/08

**O'BRIEN & GERE**  
ENGINEERS, INC.  
8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION:  
I HEREBY CERTIFY THAT THESE DOCUMENTS  
WERE PREPARED OR APPROVED BY ME,  
AND THAT I AM A DULY LICENSED  
PROFESSIONAL ENGINEER UNDER THE  
LAWS OF THE STATE OF MARYLAND.  
LICENSE NO. 18523, EXPIRATION DATE 12/08/2009

DSN. BY:	CAB		
DRN. BY:	RPW		
CHK. BY:	RJD	KCI	ASBUILT REVISIONS
DATE:	APR. 2008	0	ISSUED FOR BID
		BY NO.	REVISION
			DATE

**DETAILS**

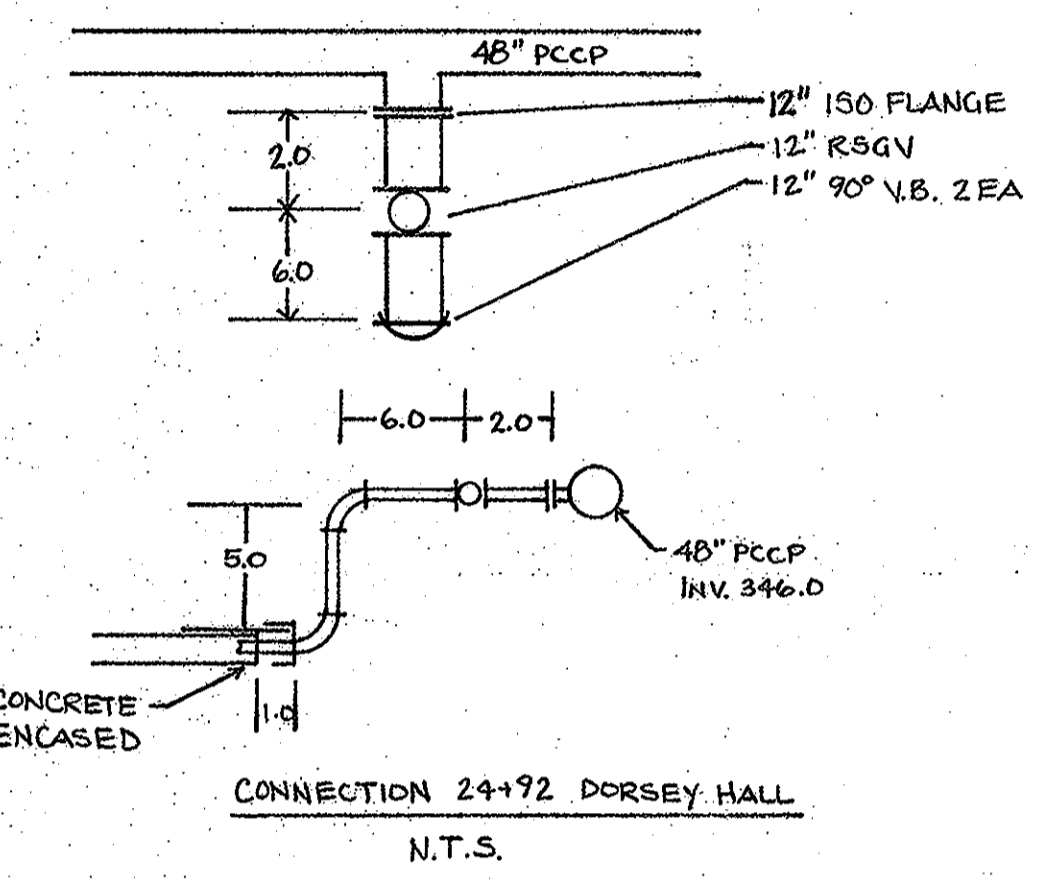
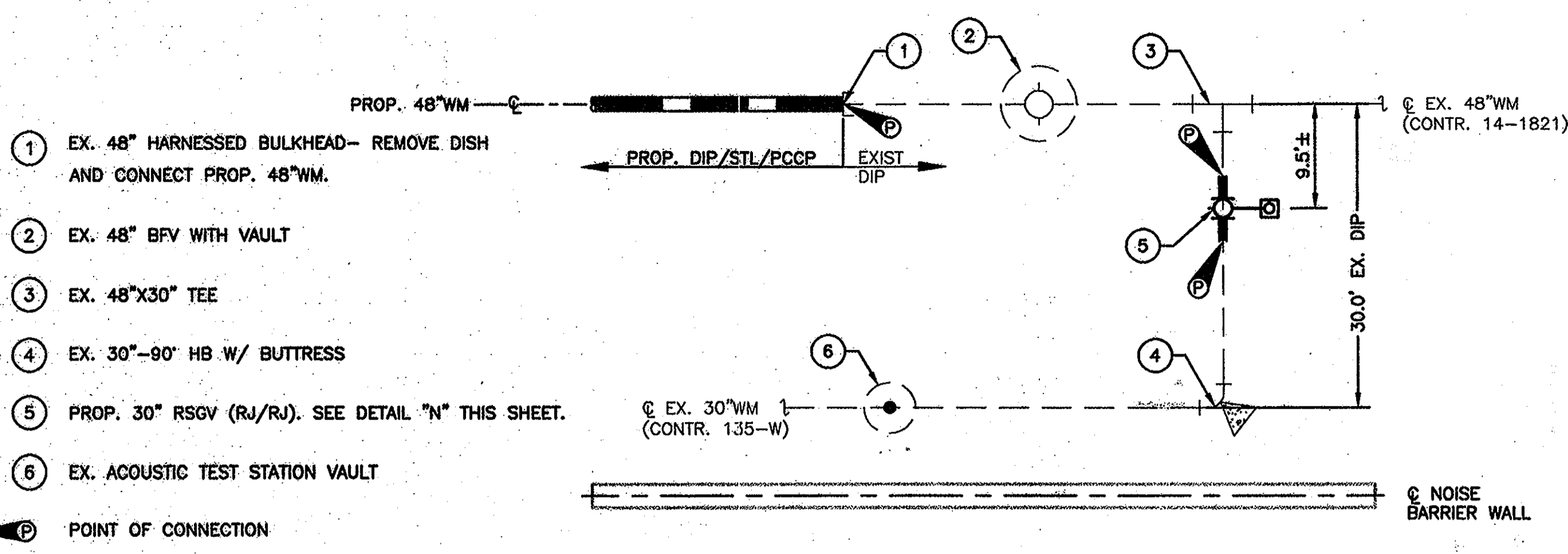
600' SCALE MAP NO. W&S 24.30 BLOCK NO.

**US ROUTE 29/ COLUMBIA ROAD  
WATER MAIN**  
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

**As-Built**

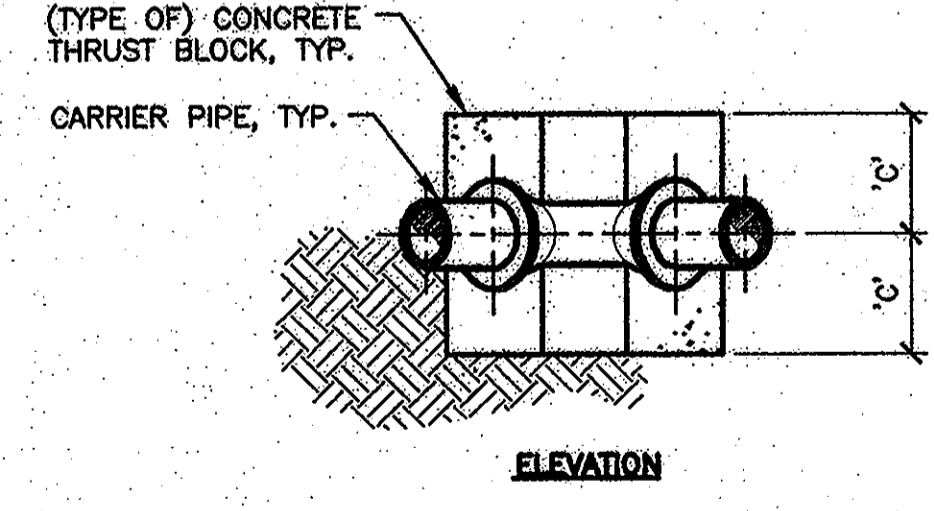
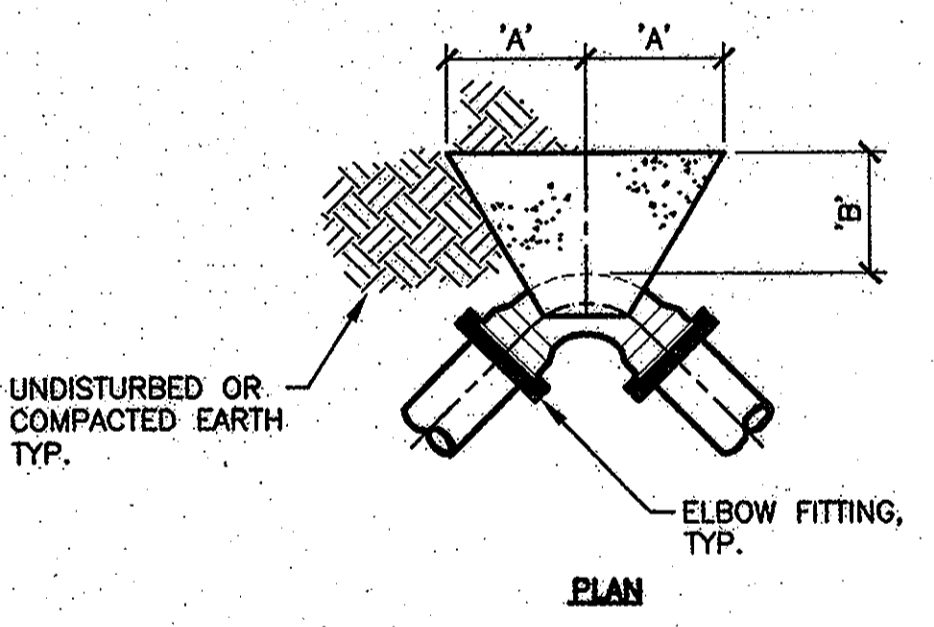
SCALE AS SHOWN  
SHEET 13 OF 32

I:\Projects\Landover\2343 - HOWARD\29653\ReDesign\Drawings\9898.CONTR.BRES.DWG



**CONNECTION DETAIL**  
 N.T.S.

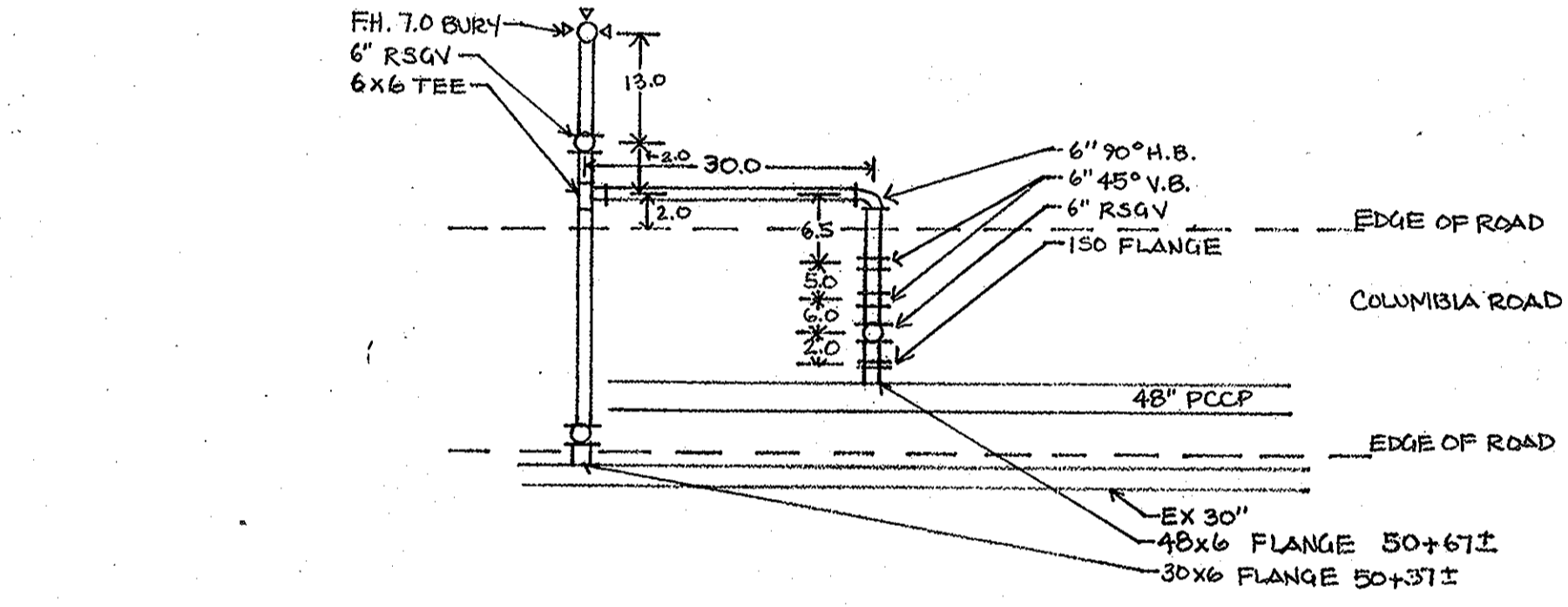
- DETAIL NOTES:**
- ABOVE DETAIL IS BASED ON CUTTING IN A NEW VALVE AND USING DUCTILE IRON PIPE. CONTRACTOR SHALL PROVIDE DETAIL IF ALTERNATE PIPE MATERIALS ARE TO BE USED.
  - CONTRACTOR SHALL COORDINATE VALVE INSERTION AND REQUIRED MAIN SHUTDOWN TIME WITH WORK TO BE PERFORMED AT CONNECTION DETAIL "C" IN AN EFFORT TO MINIMIZE TIME REQUIRED TO SHUTDOWN MAIN.
  - CONTRACTOR SHALL NOTIFY BUREAU OF UTILITIES TO HAVE MAIN SHUT DOWN.
  - SLEEVES NEEDED FOR CONNECTION ARE NOT SHOWN. ALL SLEEVES THAT ARE REQUIRED FOR CONNECTION SHALL BE RESTRAINED.
  - ALL CONNECTION PIPING AND VALVE SHALL BE RESTRAINED.



**DIMENSION SCHEDULE**

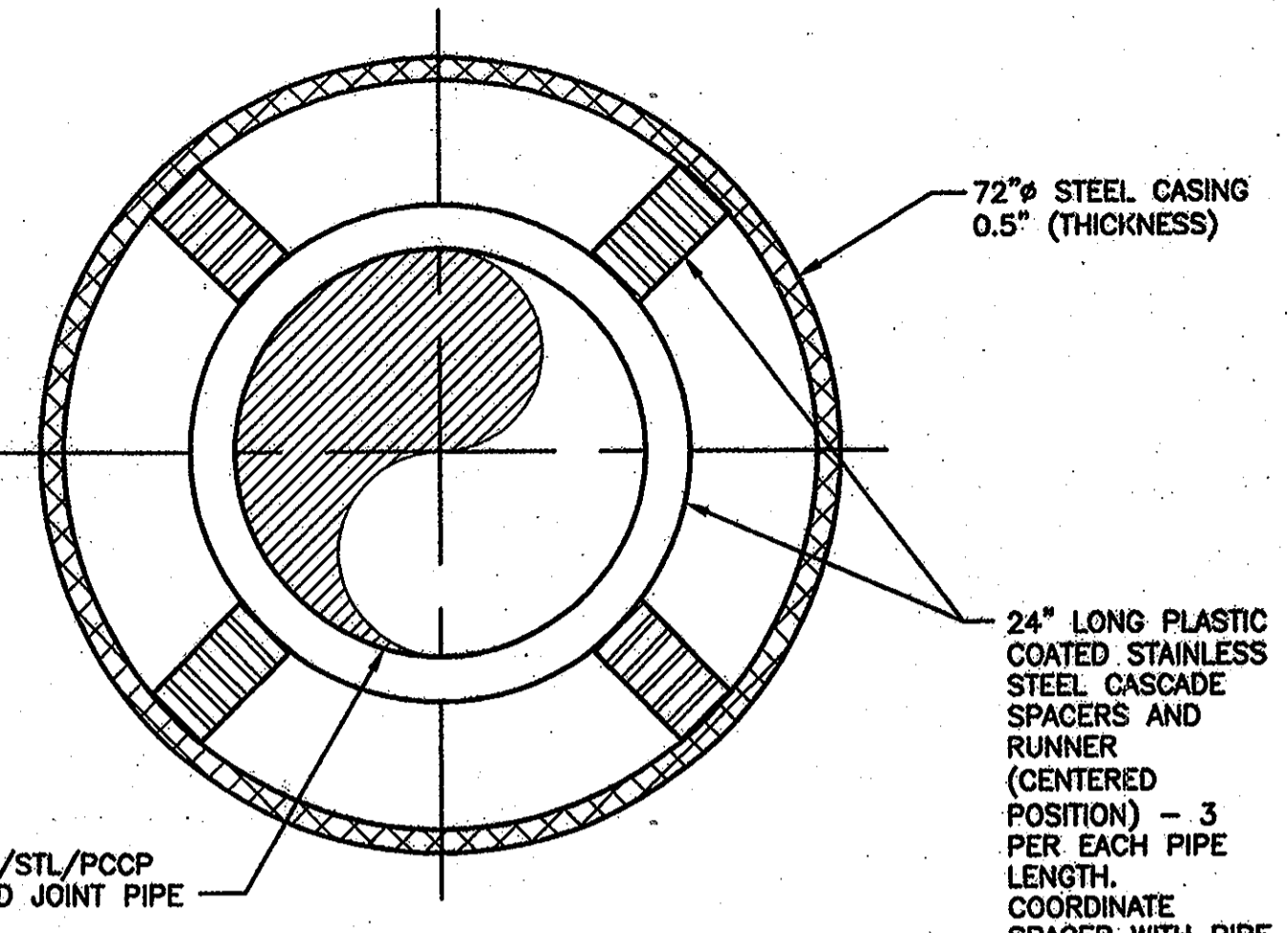
PIPE SIZE	90° ELBOW			45° ELBOW			22.5° ELBOW		
	A'	B'	C'	A'	B'	C'	A'	B'	C'
48"	24'	6'	12'	13'	6'	12'	5'	6'	8'
36"	18'	5'	9'	10'	5'	9'	4'	5'	6'

**THRUST BLOCK FOR BENDS**  
 NOT TO SCALE

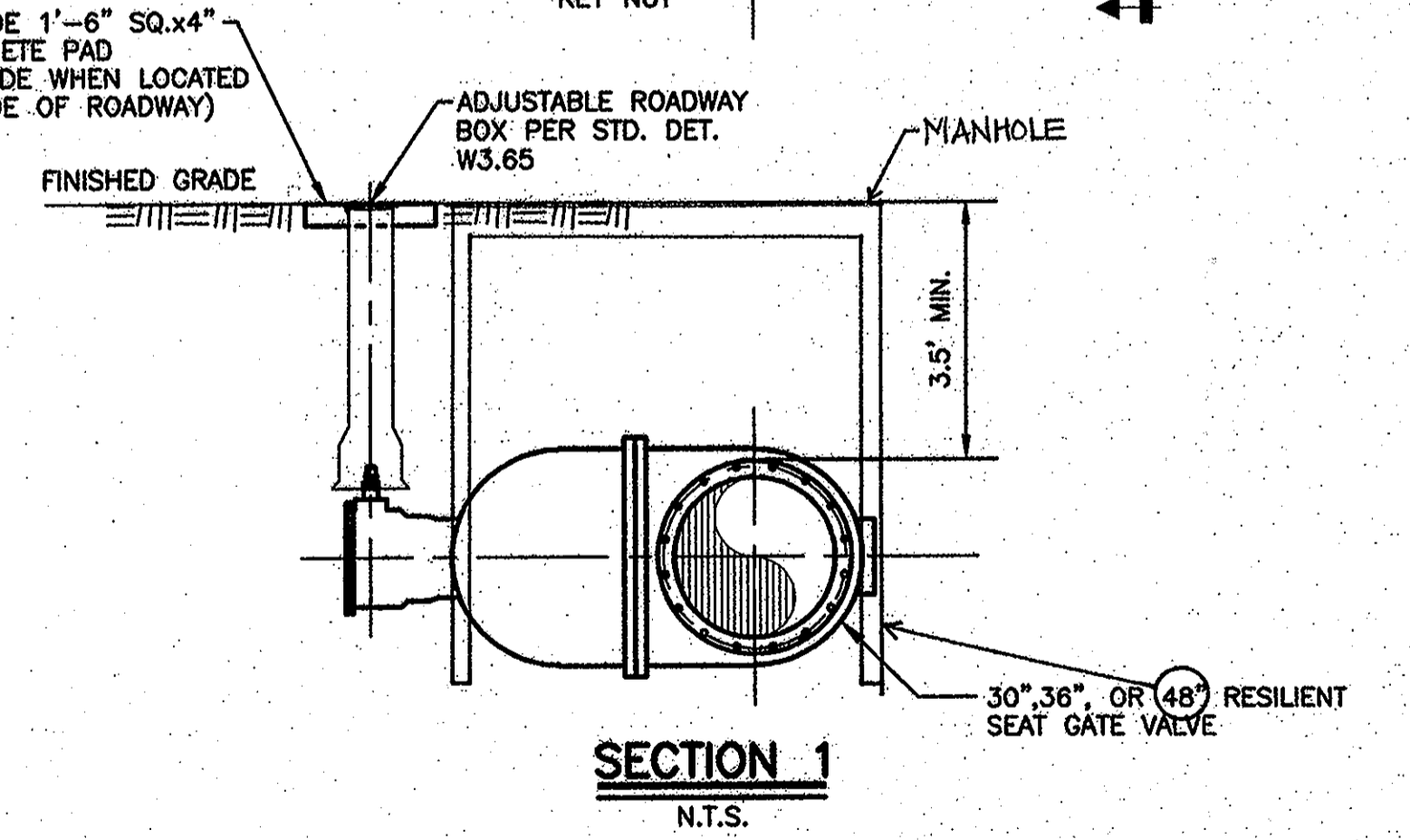
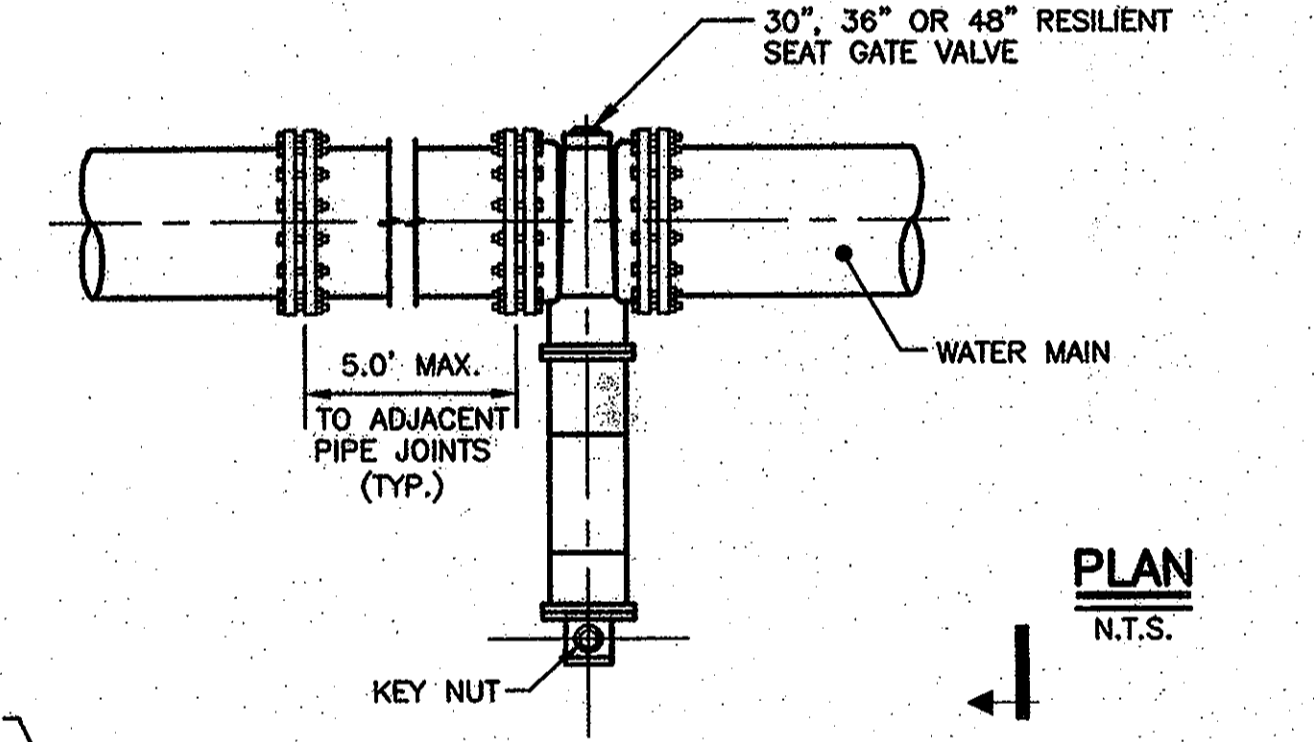
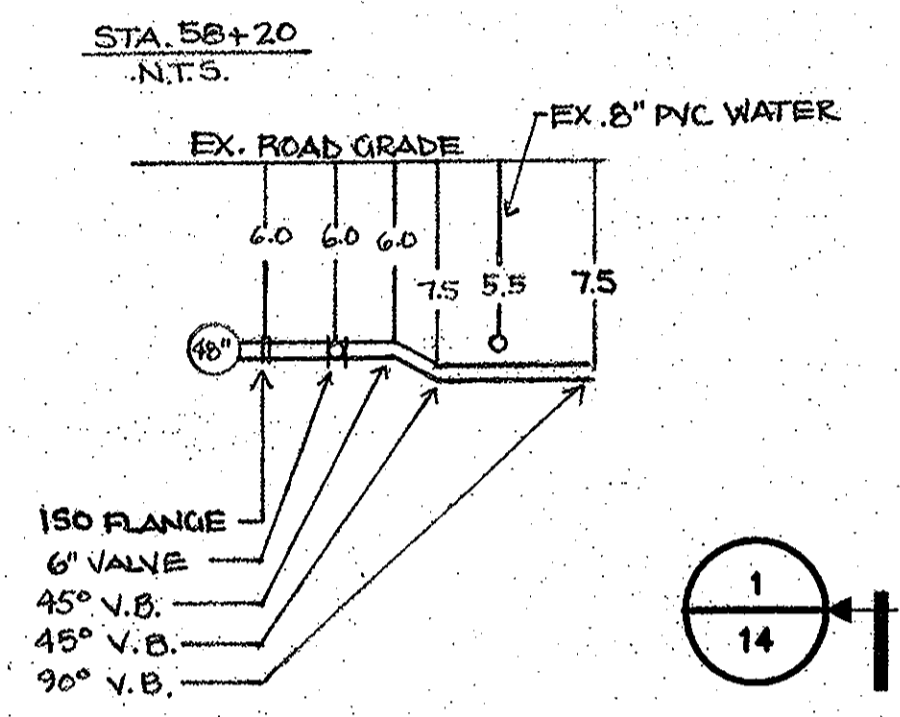
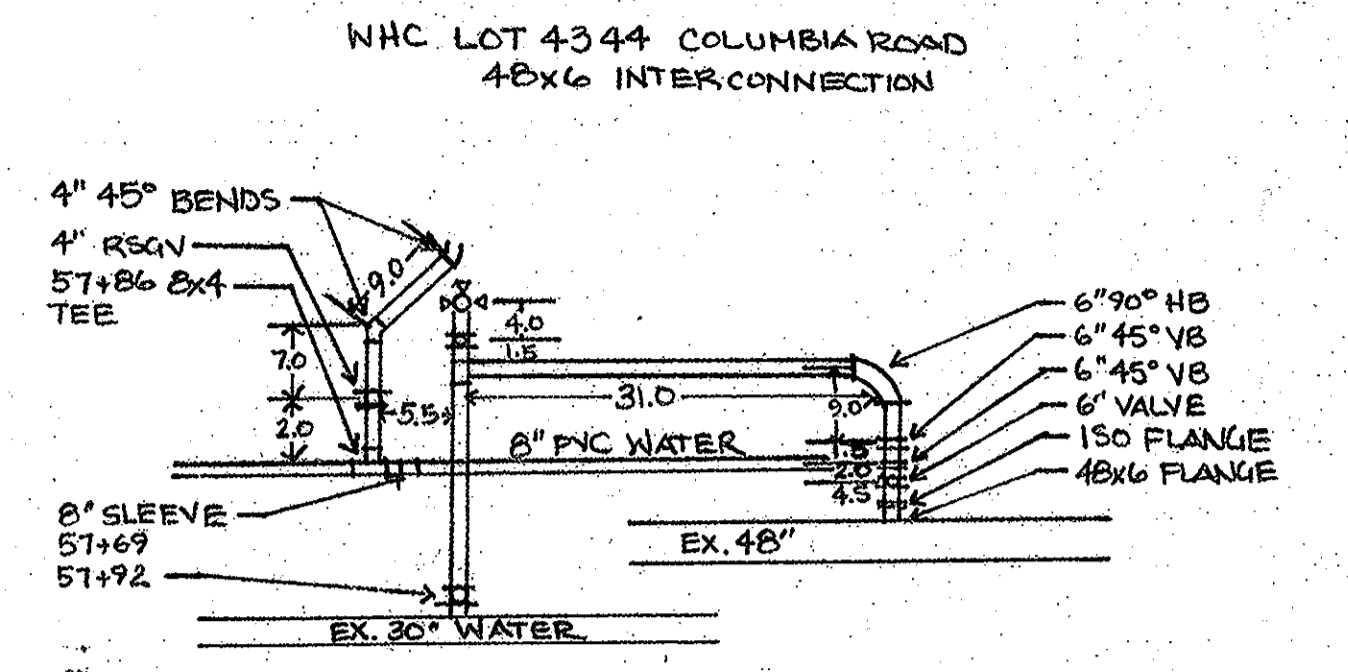


**TYPICAL PIPE TRENCH - DETAIL**  
 (FOR DIP, STEEL, & PCCP PIPE)  
 N.T.S.

- DETAIL NOTES:**
- WITHIN ROAD RIGHT-OF-WAY, TRENCH SHALL BE COMPACTED TO 95% STD. PROCTOR DENSITY, 8" LAYERS MAXIMUM.
  - OUTSIDE OF ROAD RIGHT-OF-WAY, MATERIAL ABOVE TOP OF PIPE SHALL BE COMPACTED TO 90% IN 12" LAYERS.



- DETAIL NOTES:**
- CASING TO BE CLOSED ON BOTH ENDS WITH CASCADE RUBBER END SEALS.
  - PROVIDE PIPE JOINT 1 FOOT FROM EACH END OF CASING PIPE.



**30" THRU 48" RSGV - DETAIL**  
 N.T.S.

**PROFESSIONAL CERTIFICATION**  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18223, EXPIRATION DATE 12/08/2009

2007 © O'BRIEN & GERE, INC.

**DEPARTMENT OF PUBLIC WORKS**  
 HOWARD COUNTY, MARYLAND

*John De...* 4/17/08  
 DIRECTOR OF PUBLIC WORKS DATE

*...* 4/17/08  
 CHIEF - BUREAU OF ENGINEERING DATE

*...* 4/17/08  
 CHIEF, BUREAU OF UTILITIES DATE

*...* 4/17/08  
 CHIEF UTILITY DESIGN DIVISION DATE

**O'BRIEN & GERE ENGINEERS, INC.**  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
 (301) 731-5622  
 FAX: (301) 577-4737

**PROFESSIONAL CERTIFICATION:**  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18223, EXPIRATION DATE 12/08/2009

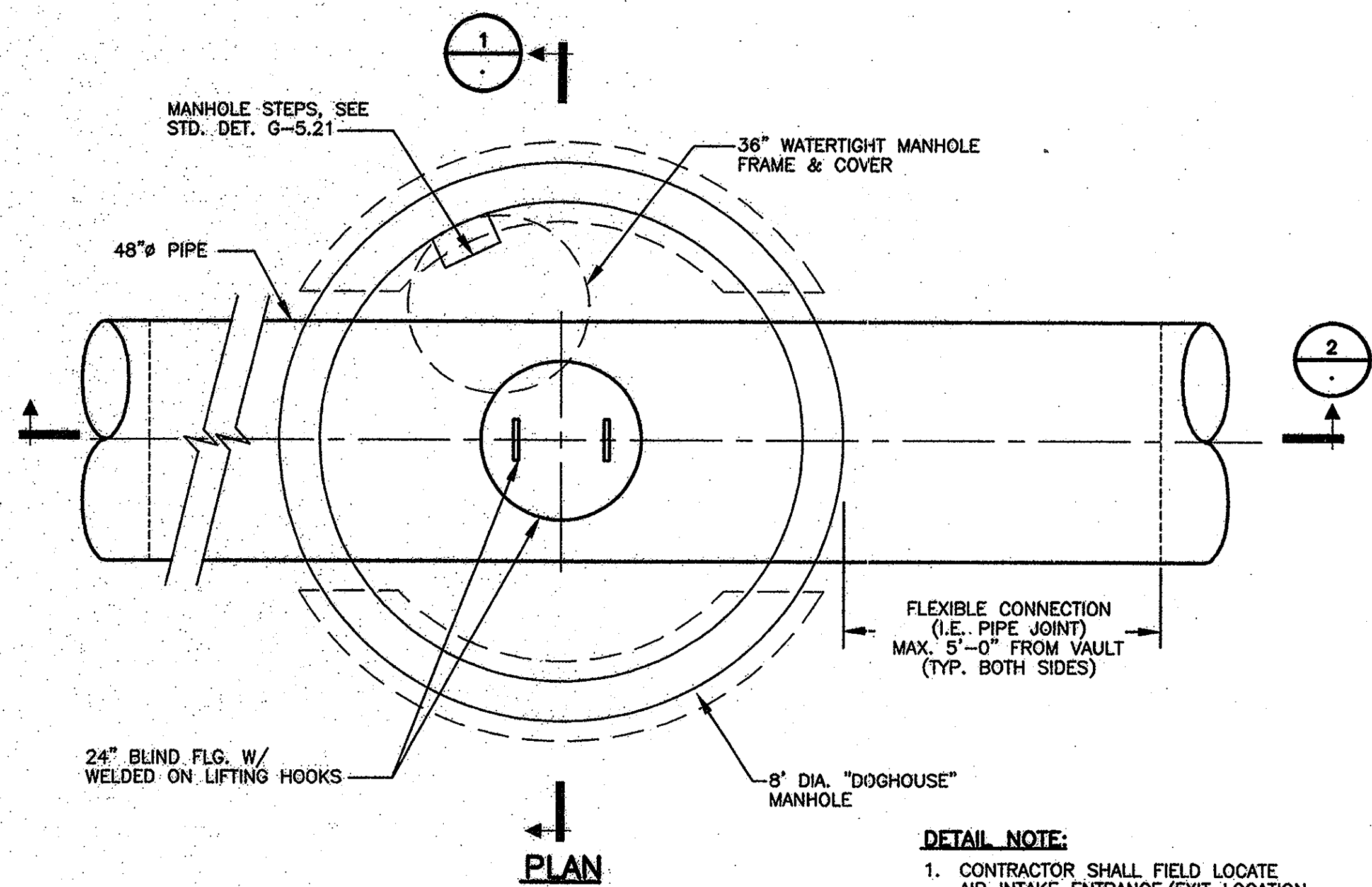
STATE OF MARYLAND  
 ROBERT JOHN DELOACH  
 PROFESSIONAL ENGINEER

DSN. BY:	CAB		
DRN. BY:	RPW		
CHK. BY:	RJD	KCI	1
DATE:	APR. 2008	ASBUILT REVISIONS	3/9/10
		ISSUED FOR BID	04/08
		BY NO.	0
		REVISION	

DATE:	600' SCALE MAP NO. W&S 24.30	BLOCK-NO.	
-------	------------------------------	-----------	--

**US ROUTE 29/ COLUMBIA ROAD WATER MAIN**  
 CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

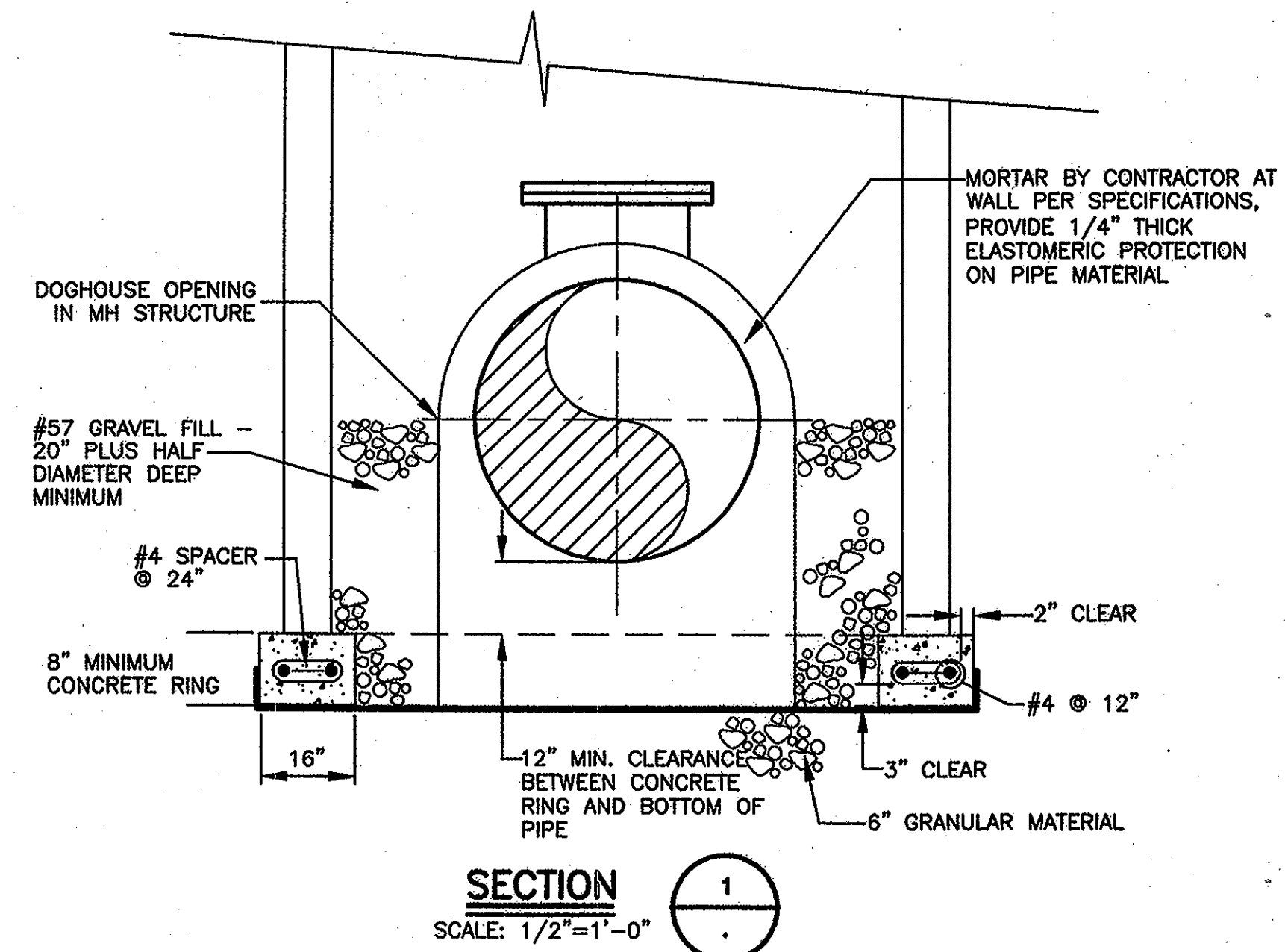
**As-Built**



**TYPICAL ACCESS MANHOLE - DETAIL**

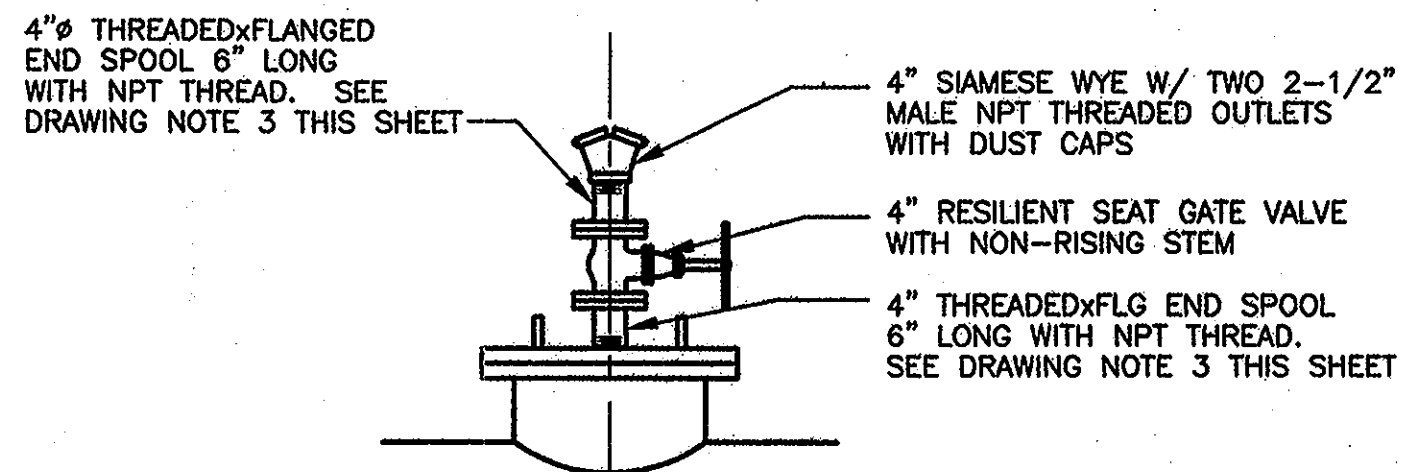
SCALE: 1/2"=1'-0"

- DETAIL NOTE:**
- CONTRACTOR SHALL FIELD LOCATE AIR INTAKE ENTRANCE/EXIT LOCATION AS DIRECTED BY ENGINEER.



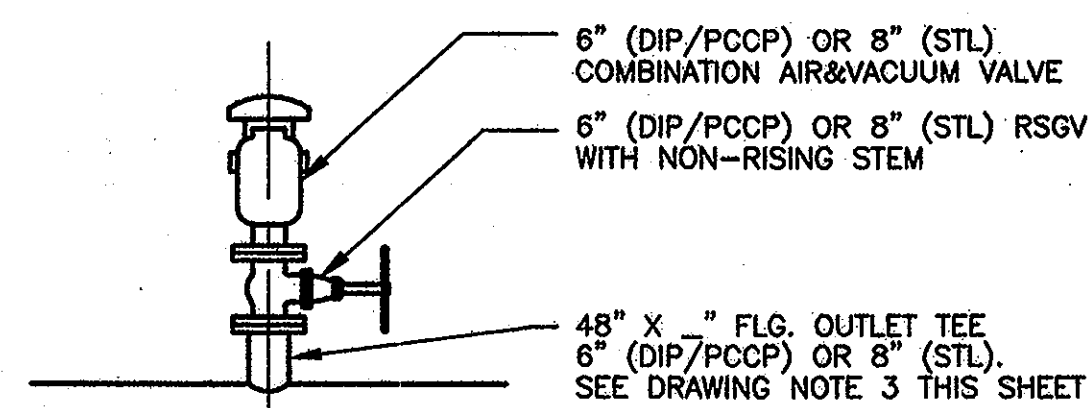
**SECTION 1**

SCALE: 1/2"=1'-0"



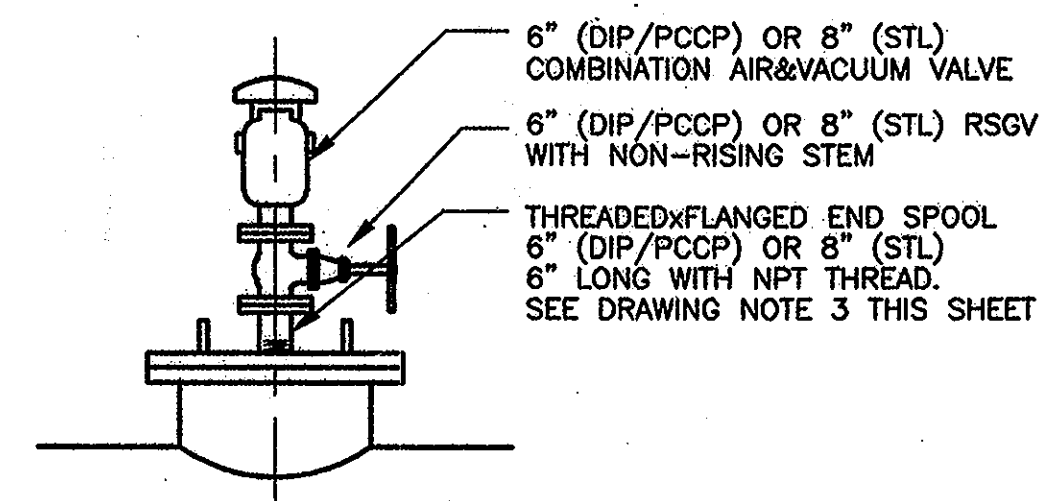
**TYPICAL BLOW-OFF/ACCESS MANHOLE ASSEMBLY - DETAIL**

SCALE: 1/2"=1'-0"



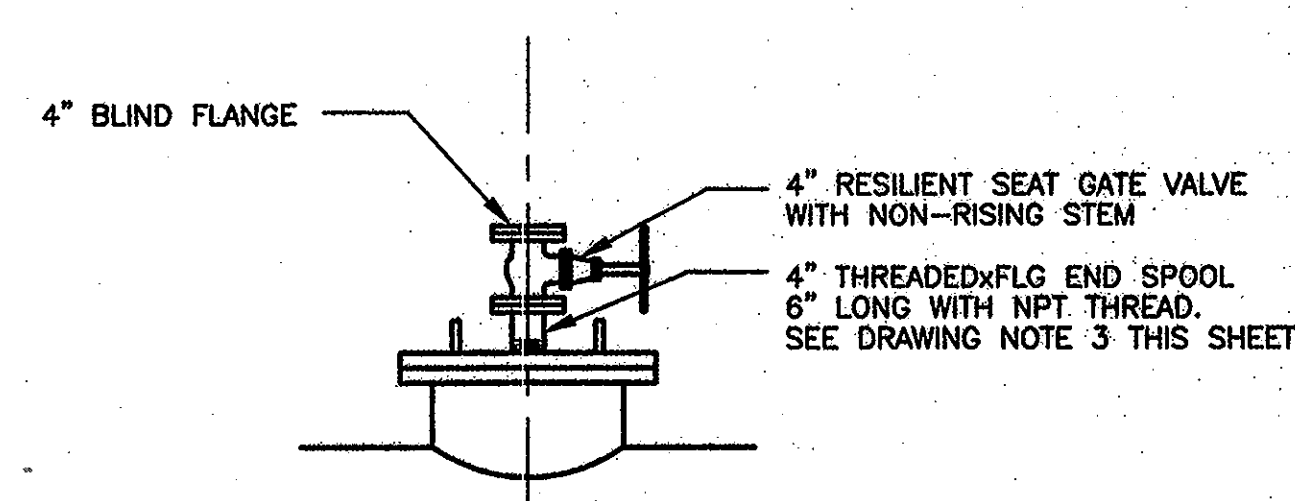
**TYPICAL AIR VALVE MANHOLE ASSEMBLY - DETAIL**

SCALE: 1/2"=1'-0"



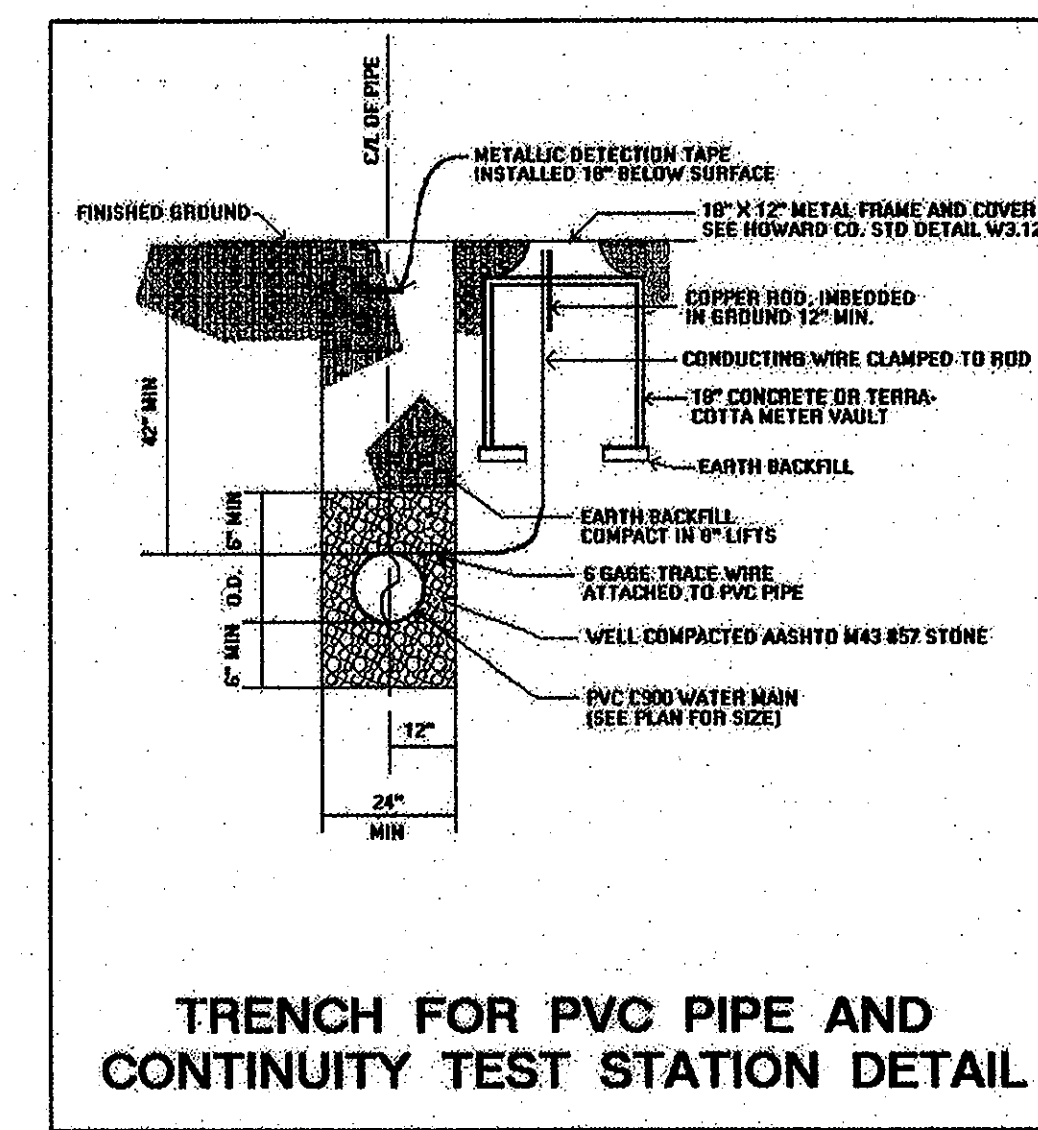
**TYPICAL AIR VALVE/ACCESS MANHOLE ASSEMBLY - DETAIL**

SCALE: 1/2"=1'-0"



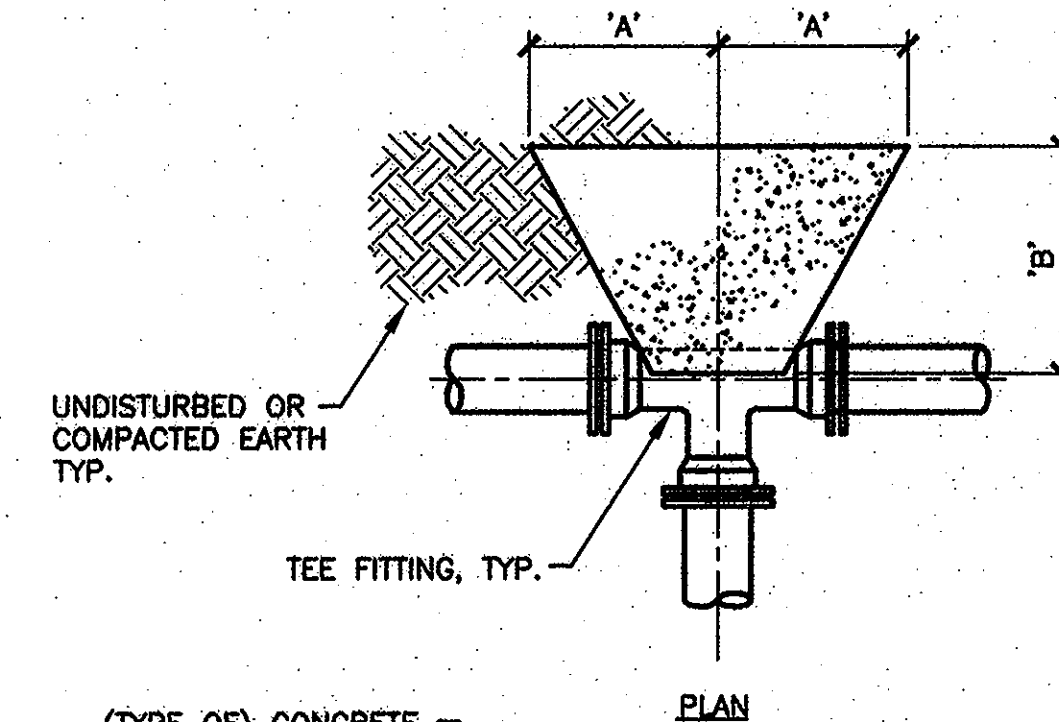
**TYPICAL ACOUSTICAL MONITORING MANHOLE ASSEMBLY - DETAIL**

SCALE: 1/2"=1'-0"



**TRENCH FOR PVC PIPE AND CONTINUITY TEST STATION DETAIL**

TYPICAL PVC PIPE INSTALLATION DETAIL

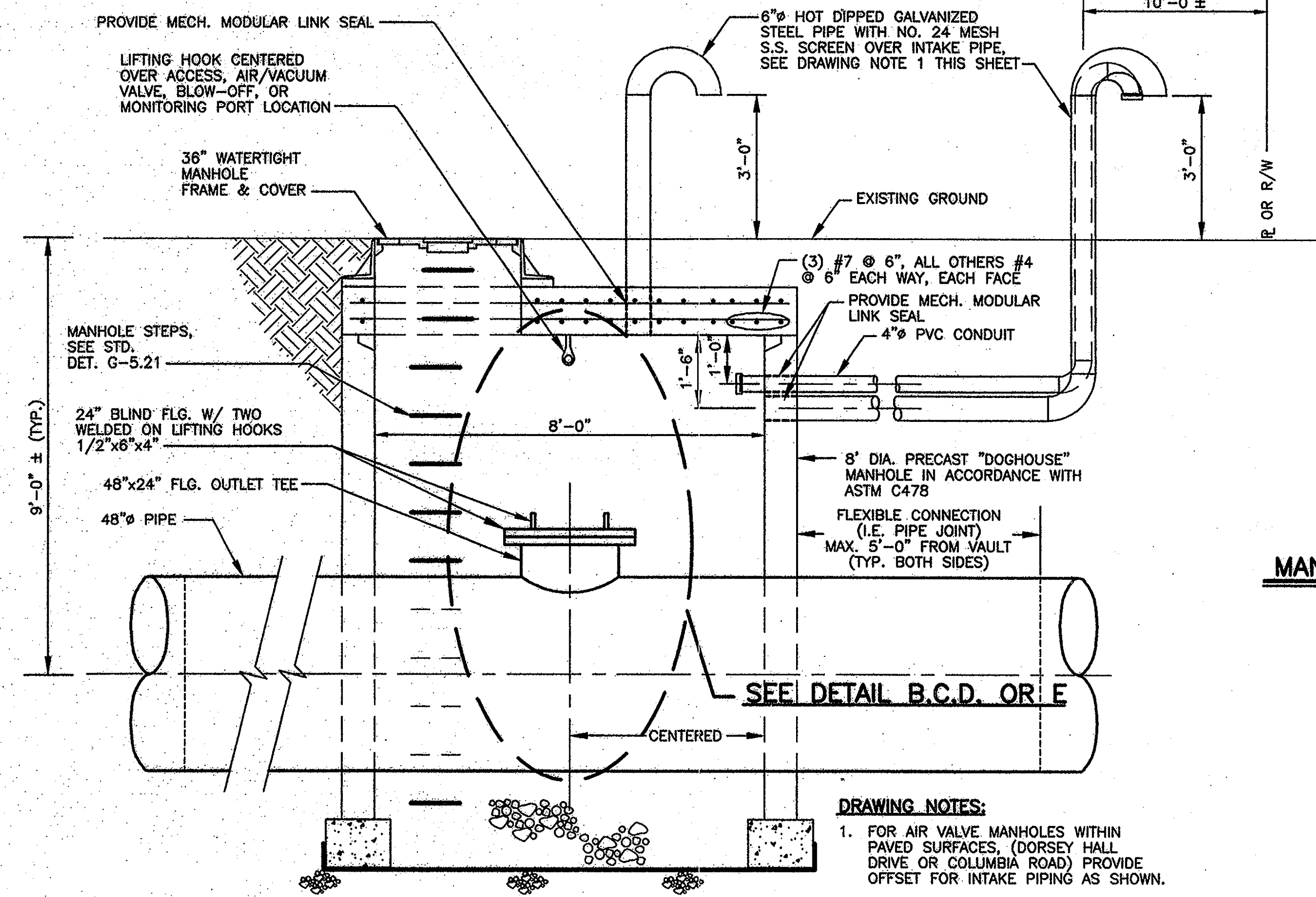


**THRUST BLOCK FOR TEES**

NOT TO SCALE

TEE	DIMENSION SCHEDULE		
	'A'	'B'	'C'
48"x30"	18'	4'	8'
48"x12"	7'	2'	3'
48"x6"	2'	1'	2'

NOTE: CONTRACTOR TO REFERENCE STD DET. W2.23 FOR ADDITIONAL DETAILS



**SECTION 2**

SCALE: 1/2"=1'-0"

- DRAWING NOTES:**
- FOR AIR VALVE MANHOLES WITHIN PAVED SURFACES, (DORSEY HALL DRIVE OR COLUMBIA ROAD) PROVIDE OFFSET FOR INTAKE PIPING AS SHOWN.
  - FOR ACOUSTICAL MONITORING MANHOLE ONLY, PROVIDE 4" SOLVENT WELDED PVC CONDUIT AS SHOWN. PVC CONDUIT SHALL BE PROVIDED WITH 4" THREADED CAPS ON EACH END.
  - COAT EXPOSED STEEL FITTINGS WITH 2 COATS OF ROYSTON R-28 MASTIC, PER MANUFACTURERS' RECOMMENDATIONS.

PROFESSIONAL CERTIFICATION  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18523, EXPIRATION DATE 12/08/2009

2007 © O'BRIEN & OERE, INC.

SCALES 1/2"=1'-0" 0 1 2 3 4 5

DEPARTMENT OF PUBLIC WORKS

HOWARD COUNTY, MARYLAND

Director of Public Works: *[Signature]* 4/17/08  
 Chief - Bureau of Engineering: *[Signature]* 4/17/08  
 Chief, Bureau of Utilities: *[Signature]* 4/17/08  
 Chief, Utility Design Division: *[Signature]* 4/17/08

**O'BRIEN & OERE**  
 ENGINEERS, INC.  
 8401 Corporate Drive  
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DSN. BY:	CAB		
DRN. BY:	RPW		
CHK. BY:	RJD		
DATE:	APR. 2008	BY NO.	0
		REVISION	ISSUED FOR BID 04/08

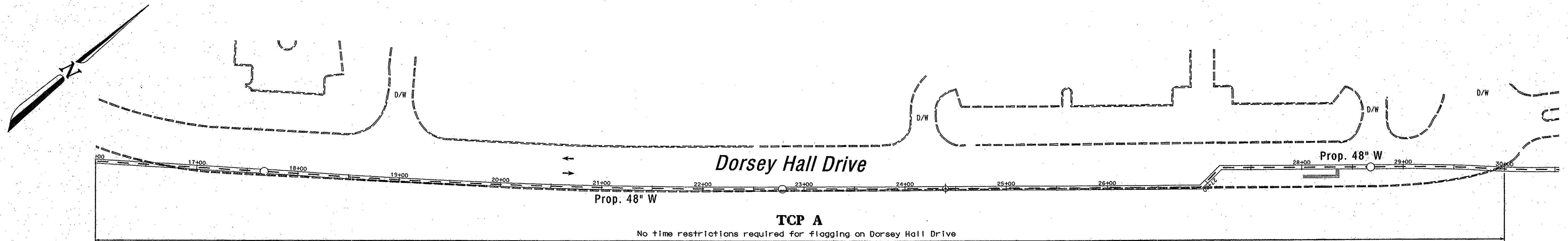
TYPICAL ACCESS, AIR VALVE, BLOW-OFF AND MONITORING MANHOLE DETAILS

US ROUTE 29/ COLUMBIA ROAD WATER MAIN  
 CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

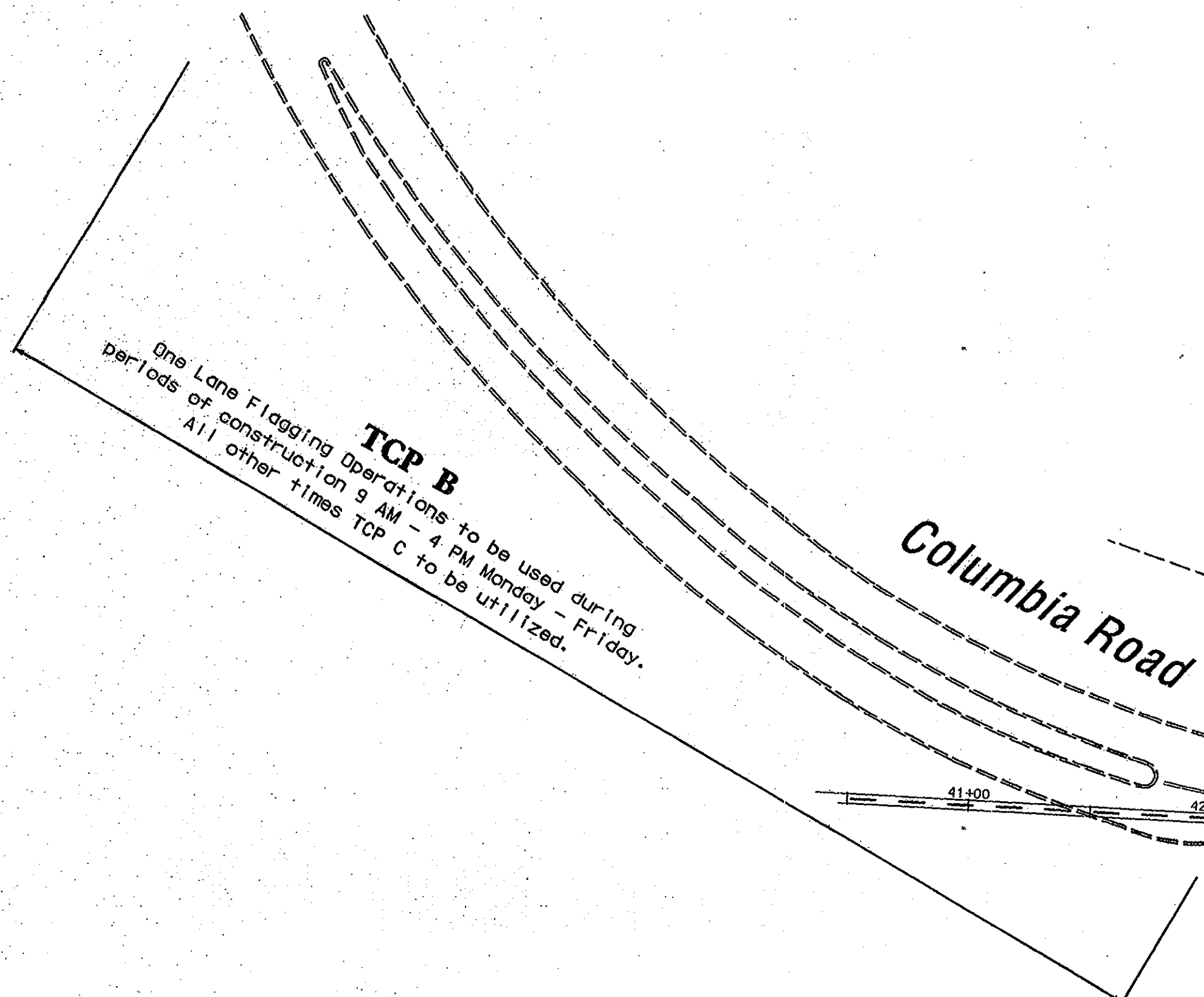
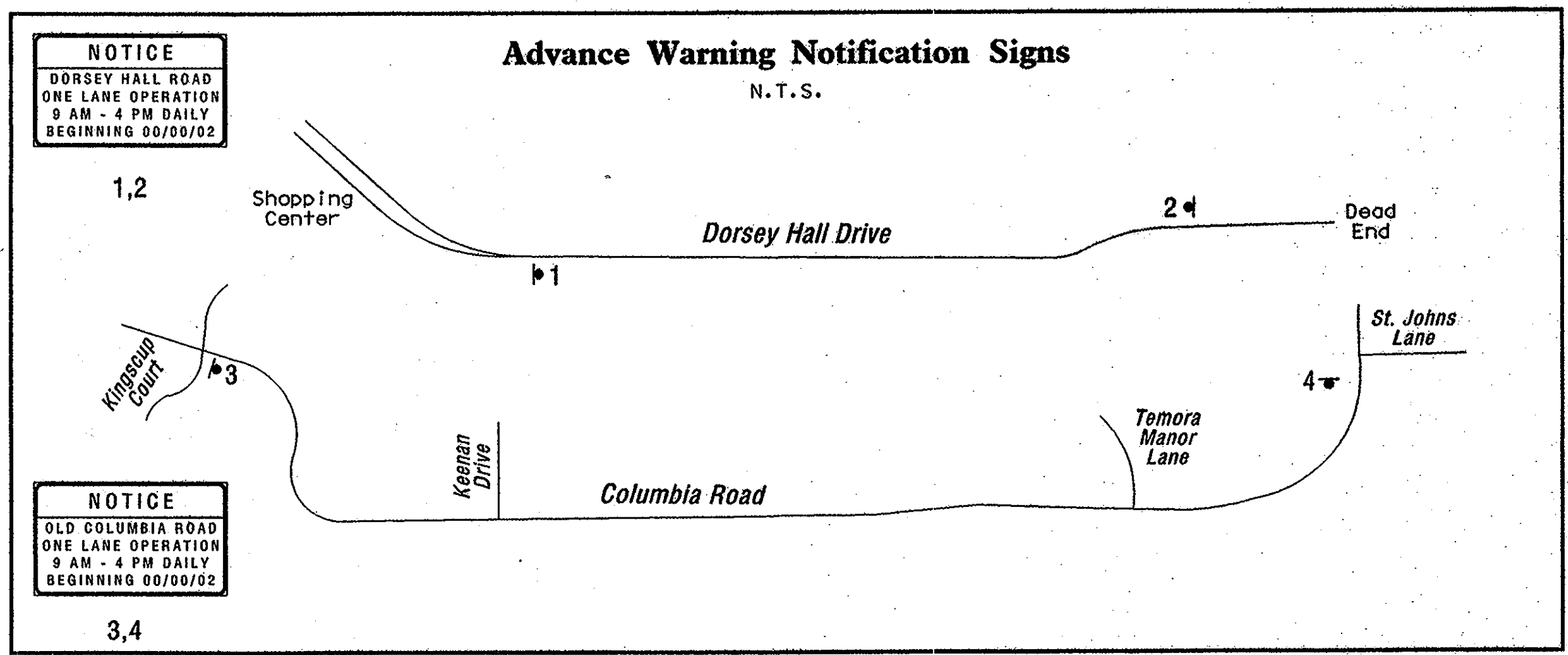
As-Built

SCALE AS SHOWN  
 SHEET 15 OF 32  
 FILE NO. 29653-015F



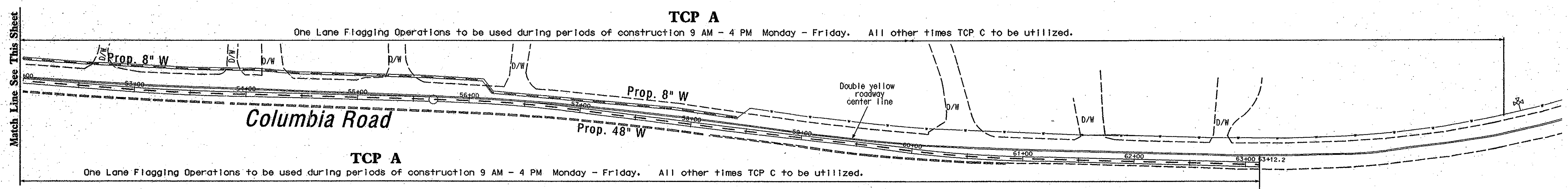


**TCP A**  
No time restrictions required for flagging on Dorsey Hall Drive



**TCP B**  
One Lane Flagging Operations to be used during periods of construction 9 AM - 4 PM Monday - Friday. All other times TCP C to be utilized.

**TCP A**  
One Lane Flagging Operations to be used during periods of construction 9 AM - 4 PM Monday - Friday. All other times TCP C to be utilized.



**TCP A**  
One Lane Flagging Operations to be used during periods of construction 9 AM - 4 PM Monday - Friday. All other times TCP C to be utilized.

- LEGEND**
- Existing Geometrics
  - Proposed Geometrics
  - ◆ Construction Signs (Drums)
  - ... Channelizing Devices
  - Direction of Travel

SCALE 1" = 50'

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.  
 License No. 20761 Expiration Date: 3/07/09

**As-Built**

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

Director of Public Works: [Signature] 4/22/08  
 Chief - Bureau of Engineering: [Signature] 4/17/08  
 Chief - Bureau of Utilities: [Signature] 4/22/08  
 Chief - Utility Design Division: [Signature] 4/17/08

The Traffic Group, Inc.  
 Suite E1  
 9900 Franklin Square Drive  
 Baltimore, Maryland 21226  
 410-521-6600  
 1-800-583-8411  
 Fax 410-931-6601  
 Job No.: 2000-3211  
 File Name: moa-plant.dgn



DSN. BY: FDB	2/15/08
DRN. BY: FDB	
CHK. BY: JDD	
DATE: 9/04/03	
BY NO.	REVISION
	DATE

Maintenance of Traffic Plan  
 48" Water Main - Dorsey Hall Drive  
 48" and 8" Water Main - Columbia Road  
 600' SCALE MAP NO. W&S: 24 & 30 BLOCK NO.

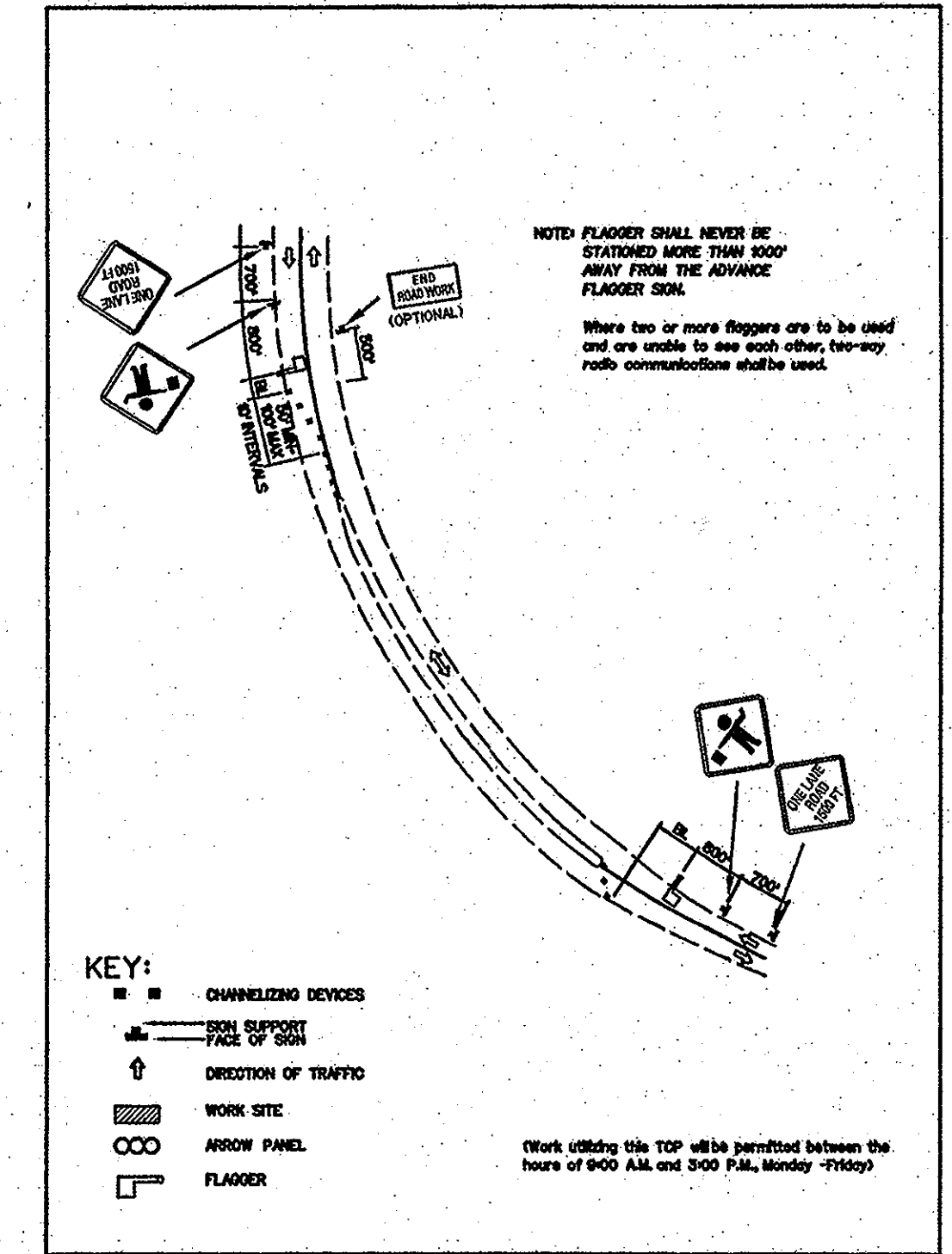
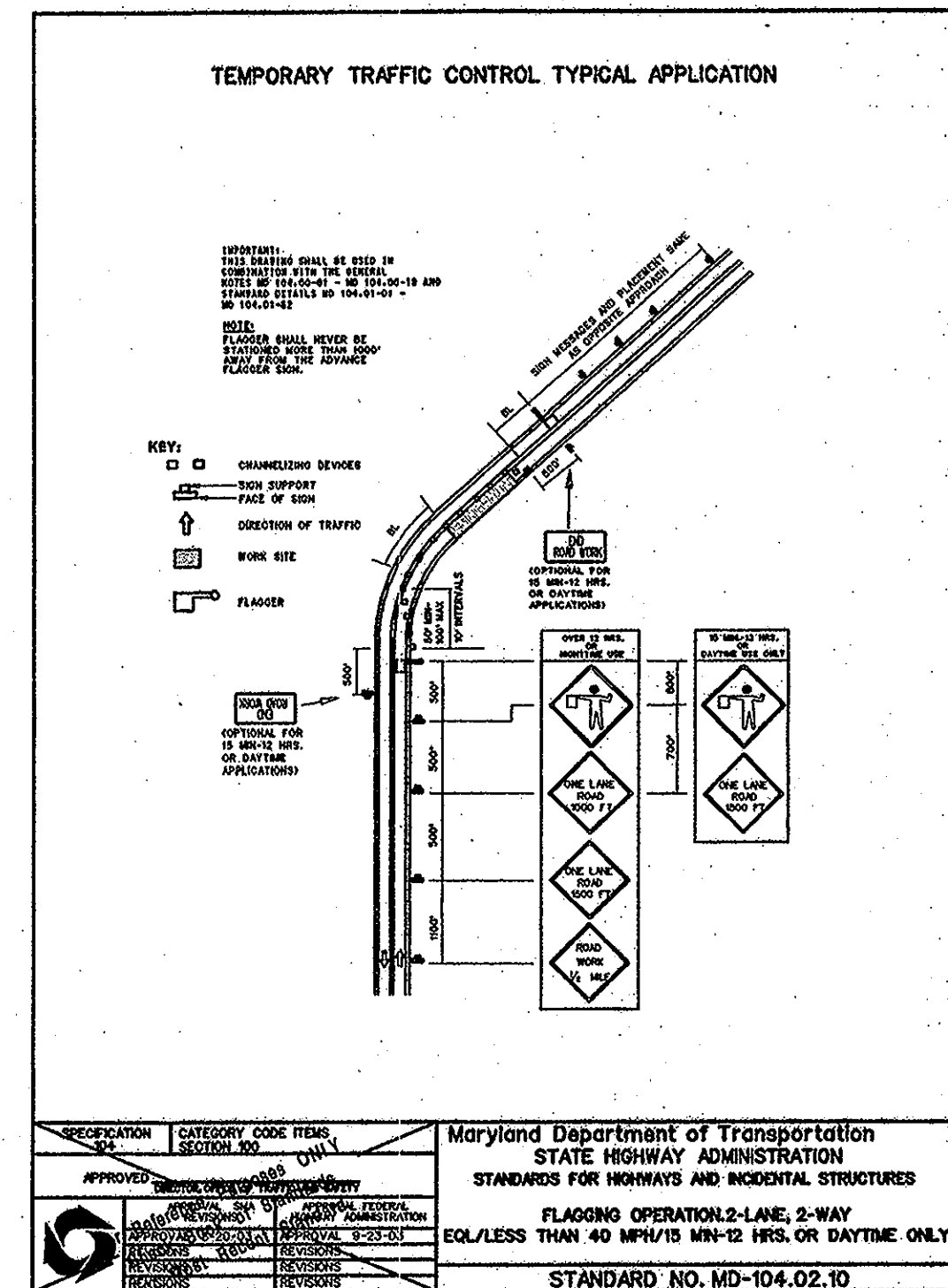
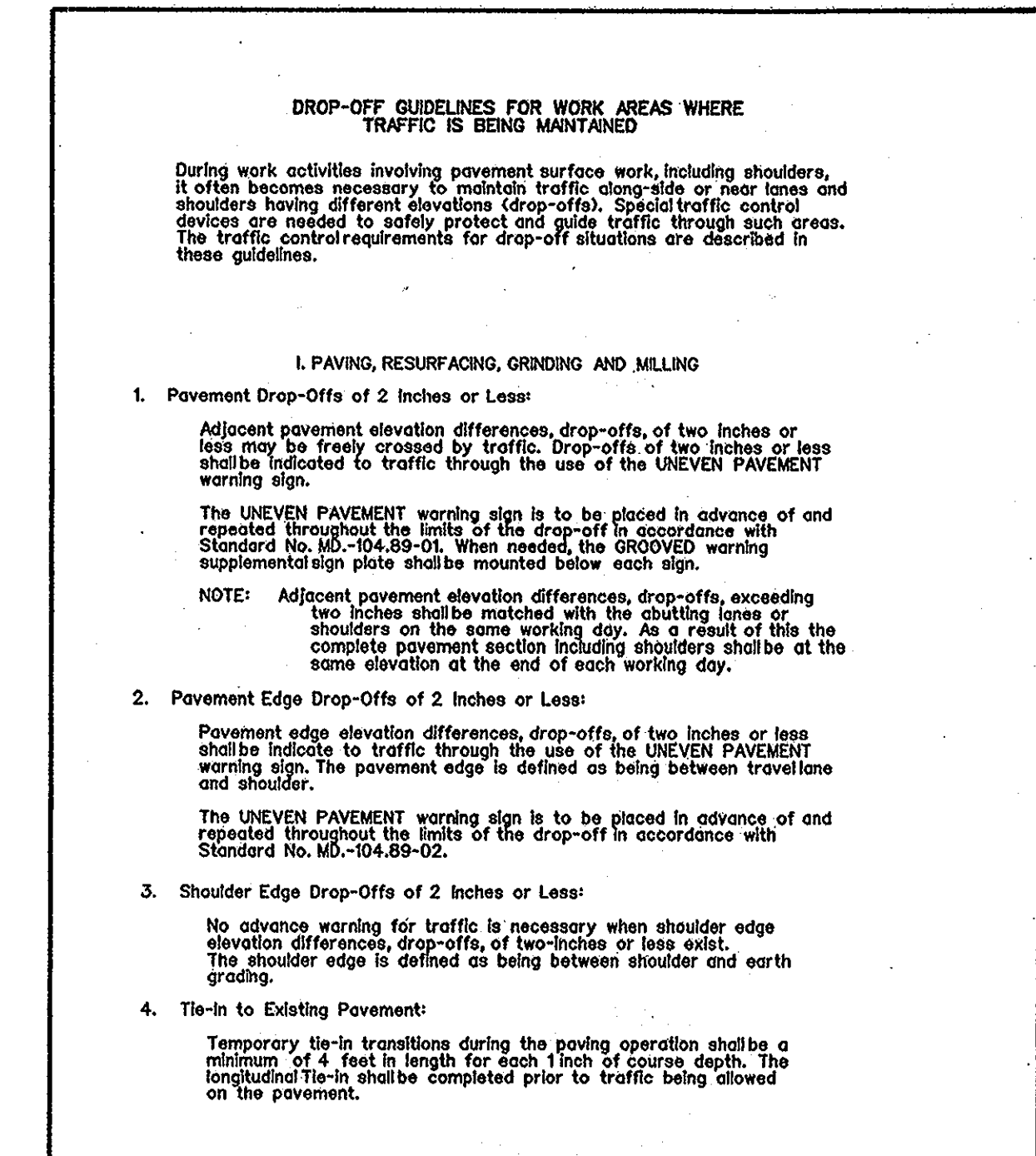
US ROUTE 29 WATER MAIN/COLUMBIA ROAD  
 AT ST. JOHN'S WATER MAIN  
 CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
 SHEET 16 OF 32

GENERAL NOTES FOR TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATIONS (TTCTA)

- 1.0 INTRODUCTION
1.1 The General Notes (GN) supplement the TTCTA set-ups, and have been assembled to provide additional directions on the installation and application of traffic control devices shown on these standards.
1.2 The TTCTA show the minimum requirements necessary to plan for the safety of workers, motorists, pedestrians and other traffic throughout the temporary traffic control zones for various types of activity along roadways.
1.3 The TTCTA address a wide variety of different applications, however, every situation could not be shown.
1.4 In applying these standards and guidelines, questions for applications and interpretations should be referred to the State Highway Administration's Assistant District Engineer-Traffic, County Traffic Engineer, City Traffic Engineer, Public Works Department and so forth, who are the experts in traffic engineering and who has jurisdiction on the appropriate roadways for applying such controls establishing the appropriate speed criteria for the appropriate speed condition and other operational/or elements.

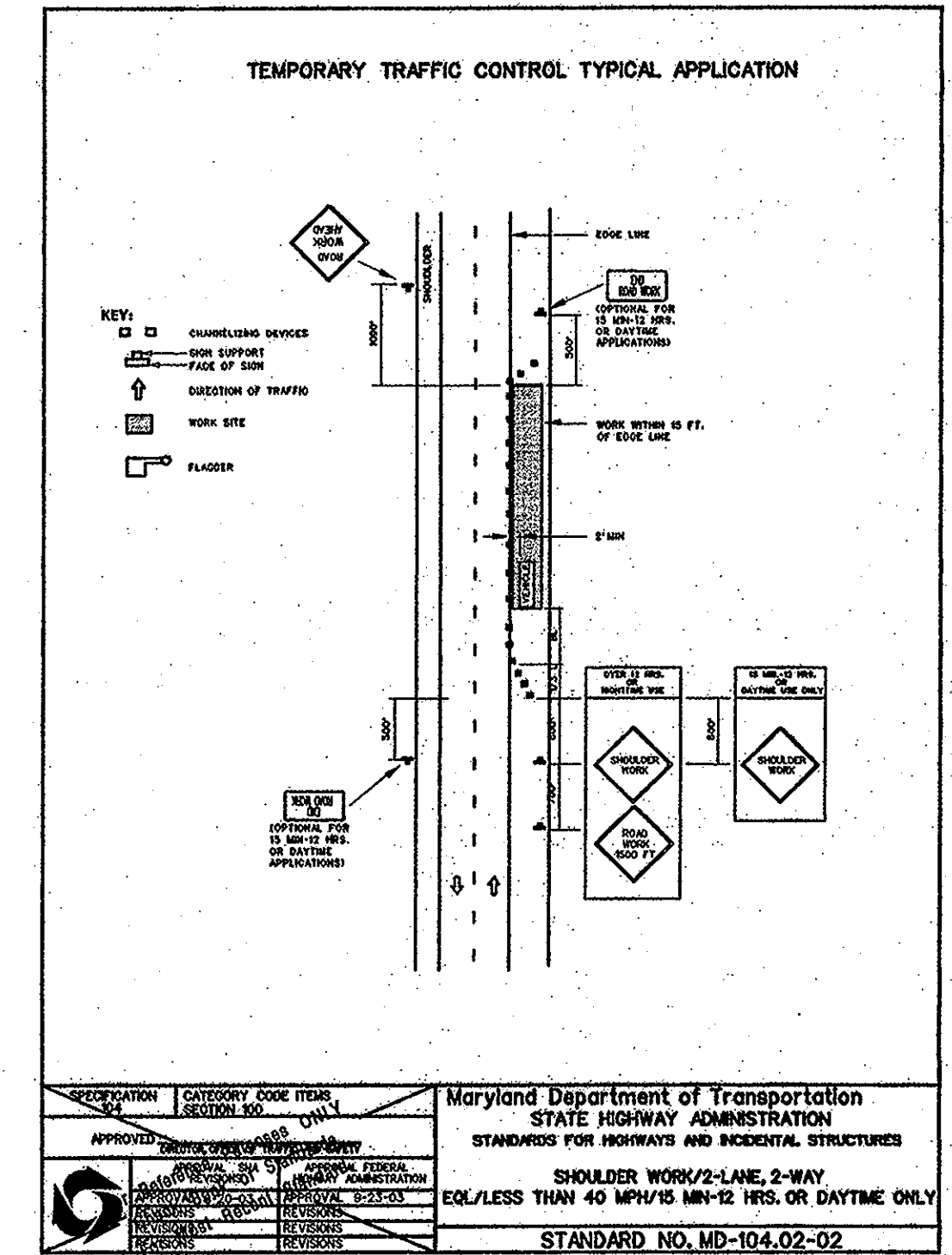
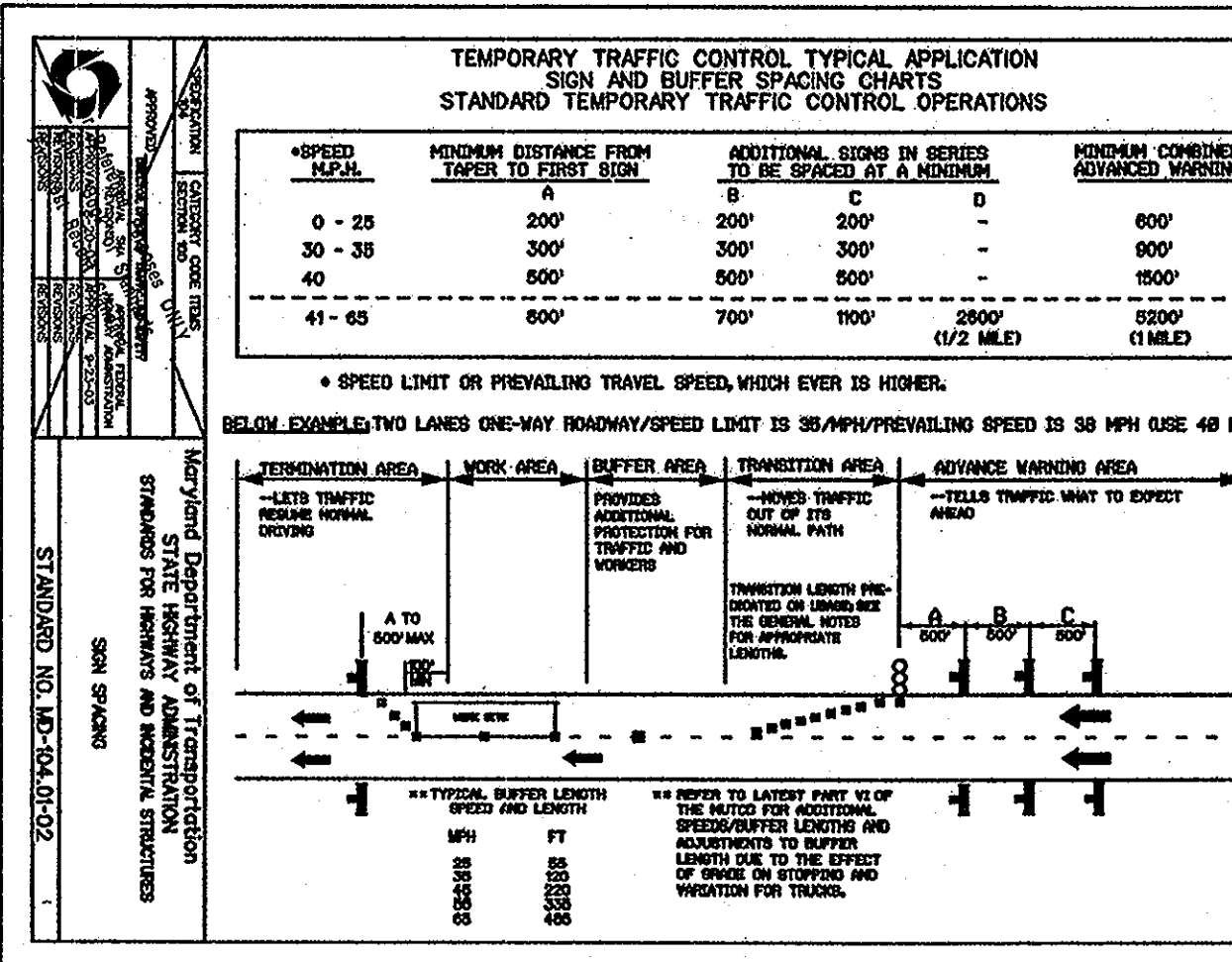
- 7.0 CHANNELIZING DEVICES
7.1 Taper Formulas
L = WS for speeds greater than 40 mph
L = WSIS is squared/60 for speeds equal to or less than 40 mph
Where L = minimum length of taper (ft)
S = numerical value of prevailing travel speed or speed limit (MPH), whichever is higher, prior to work starting.
W = width of offset (ft).
7.2 Maximum spacing between channelizing devices:
a. Taper Channelization - shall be equal feet to the posted speed limit.
b. Tangent Channelization - shall be equal feet to twice the posted speed limit.
7.3 Channelizing devices, especially at horizontal vertical curves, are to be extended to a point where they are visible to approaching traffic. A full taper length on two-lane, two-way roadways shall always be provided in advance of curves.
7.4 Drums should always be used to form the taper on roadways having a posted or prevailing travel speed (whichever is higher) equal to or greater than 40 MPH.
7.5 Storing channelizing devices along any roadway is prohibited without approval of the Engineer.
7.6 Type 3 object markers (VP-1) are required for barrier tangent points.
7.7 The appropriate channelizing devices (including approved barrier) to separate opposing traffic shall be as shown on the plans or as directed by the Engineer.



General Notes & Standards are For Reference Purposes ONLY Check Book of Standards For Most Recent Standard

- 8.0 PAVEMENT MARKINGS
8.1 Pavement markings no longer applicable shall be completely removed or obliterated.
8.2 Pavement markings adjacent to any lane transition or lane closure taper shall be removed for covered with SMA approved black pavement marking tape as depicted on TTCTA for over 12 hours or nighttime use, unless otherwise directed by the Engineer.
8.3 Temporary markings on intermediate pavement surfaces shall be paint placed to full dimensions per the Contract Documents, i.e. continuous double yellow center lines single dashed yellow center line 1.0 ft segments, 20 ft gaps to denote passing when closed lanes less than 1.0 ft segments, 30 ft gaps.
8.4 On straight sections of roadway with full dimension center and/or lane lines, but without edge lines, channelizing drums may be used to delineate the edge of the roadway and may be spaced up to 500 ft apart where no undue hazards exist and when directed by the Engineer.
9.0 FLAGGING
9.1 Where two or more flaggers are to be used and are unable to see each other, two-way radio communications shall be used.
9.2 If the entire work area is visible from one station, a single flagger may be used, subject to other safety considerations.
9.3 All channelizing devices and flag persons shall be moved accordingly as construction progresses.
9.4 All persons designated as flaggers shall be MD-SHA certified.

- 10.0 VEHICLES
10.1 Work vehicles should not occupy or be stopped in a lane beyond a horizontal curve or a vertical curve (hill).
10.2 Work vehicles, if required, should not occupy any part of the buffer area (see vehicle) may occupy part of the work area.
10.3 Vehicle safety lights (amber in color) shall be approved by the Office of Traffic & Safety.
10.4 A protection vehicle with a rear truck-mounted attenuator (TMA) shall be required for all work operations on freeways, where no formations closure exists.
11.0 WORK RESTRICTIONS
11.1 Work within a lane, or within 15 ft of the nearest edge line is prohibited during the peak hours 6 AM - 9 AM and 4 PM - 7 PM Monday - Friday.
11.2 Travel lanes shall be a minimum of ten feet in width.
11.3 All open trenches shall be closed at the end of each day.
11.4 Access shall be provided to all existing driveways at all times.
12.0 TRAFFIC CONTROL PLANS
12.1 Alternate traffic control plans may be presented to Howard County Dept. of Public Works for approval in conformance with Specification 104.01.
12.2 For emergency repair operations, a minimum number of traffic control devices (TCD's) may be used.
12.3 All signs, channelizing devices, and other traffic control devices shall be in conformance with the latest edition of the MUTCD.



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND. Includes signatures and dates for the Director of Public Works and Chief of Utility Design Division.


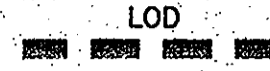
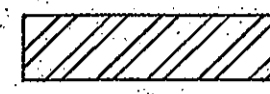
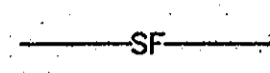
The Traffic Group, Inc. logo and contact information. Includes address, phone numbers, and website.

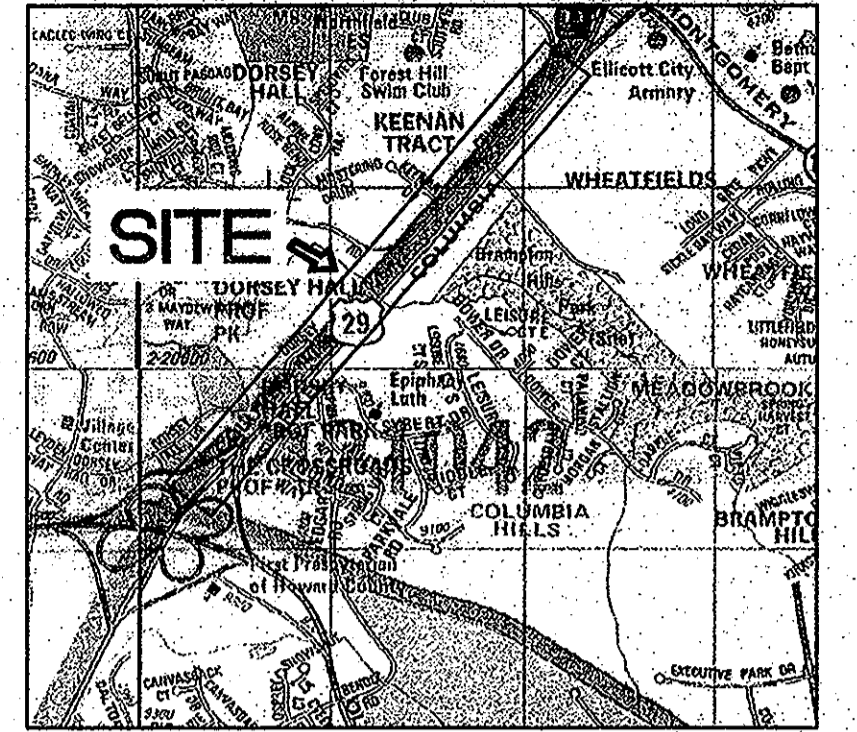
Professional Certification section. Includes a statement of certification, license number 20761, and a table for document control with columns for DSN, DRN, CHK, and DATE.

Maintenance of Traffic Plan General Notes. Includes a table for document control with columns for BY, NO., REVISION, and DATE.

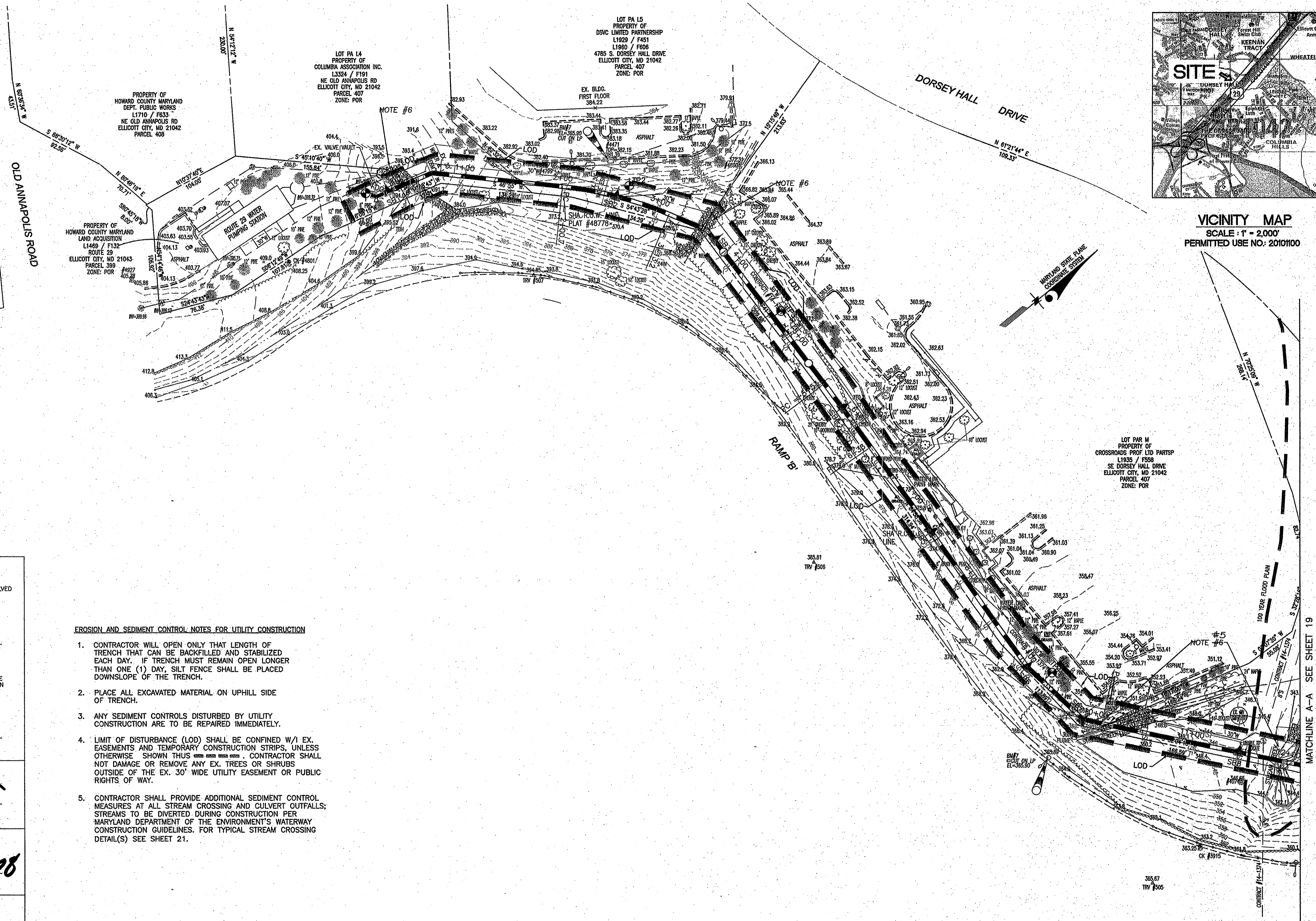
Project information section. Includes project name 'US ROUTE 29 WATER MAIN/COLUMBIA ROAD AT ST. JOHN'S LANE WATER MAIN', contract number, and sheet number '17 OF 32'.

**EROSION AND SEDIMENT CONTROL LEGEND**

-  STABILIZED CONSTRUCTION ENTRANCE
-  LOD LIMIT OF DISTURBANCE
-  TEMPORARY CONSTRUCTION STRIP
-  SF SILT FENCE



**VICINITY MAP**  
SCALE: 1" = 2,000'  
PERMITTED USE NO. 2010100



**ENGINEER'S CERTIFICATE**

I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING OF THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.

*David M. Beaman* 4/14/08  
SIGNATURE OF ENGINEER DATE

**DEVELOPER'S CERTIFICATE**

I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING OF THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT.

*Paul J. Segan* 4/17/08  
SIGNATURE OF DEVELOPER (HOWARD COUNTY DPW) DATE

REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEETS TECHNICAL REQUIREMENTS.

*[Signature]* DATE

NATURAL RESOURCES CONSERVATION SERVICE

THIS DEVELOPMENT IS APPROVED FOR EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

*John R. Kolubica* 4-29-08  
HOWARD SOIL CONSERVATION DISTRICT DATE

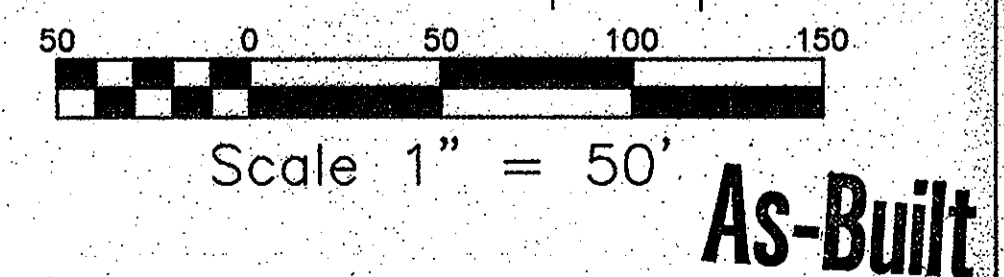
SEDIMENT CONTROL MEASURES FOR THIS CONTRACT WILL BE IMPLEMENTED IN ACCORDANCE WITH SECTION 219 OF THE SPECIFICATIONS AND AS SHOWN ON THESE PLANS.

*Paul J. Segan* 4/17/08  
SIGNATURE OF DEVELOPER (HOWARD COUNTY DPW) DATE

**EROSION AND SEDIMENT CONTROL NOTES FOR UTILITY CONSTRUCTION**

1. CONTRACTOR WILL OPEN ONLY THAT LENGTH OF TRENCH THAT CAN BE BACKFILLED AND STABILIZED EACH DAY. IF TRENCH MUST REMAIN OPEN LONGER THAN ONE (1) DAY, SILT FENCE SHALL BE PLACED DOWNSLOPE OF THE TRENCH.
2. PLACE ALL EXCAVATED MATERIAL ON UPHILL SIDE OF TRENCH.
3. ANY SEDIMENT CONTROLS DISTURBED BY UTILITY CONSTRUCTION ARE TO BE REPAIRED IMMEDIATELY.
4. LIMIT OF DISTURBANCE (LOD) SHALL BE CONFINED W/I EX. EASEMENTS AND TEMPORARY CONSTRUCTION STRIPS, UNLESS OTHERWISE SHOWN THUS ~~LOD~~, CONTRACTOR SHALL NOT DAMAGE OR REMOVE ANY EX. TREES OR SHRUBS OUTSIDE OF THE EX. 30' WIDE UTILITY EASEMENT OR PUBLIC RIGHTS OF WAY.
5. CONTRACTOR SHALL PROVIDE ADDITIONAL SEDIMENT CONTROL MEASURES AT ALL STREAM CROSSING AND CULVERT OUTFALLS; STREAMS TO BE DIVERTED DURING CONSTRUCTION PER MARYLAND DEPARTMENT OF THE ENVIRONMENT'S WATERWAY CONSTRUCTION GUIDELINES. FOR TYPICAL STREAM CROSSING DETAIL(S) SEE SHEET 21.

**THIS SHEET FOR EROSION AND SEDIMENT CONTROL ONLY!!!**



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

PROFESSIONAL CERTIFICATION  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 14440, EXPIRATION DATE: 5-19-2009

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*John G. ...* 4/2/08  
DIRECTOR OF PUBLIC WORKS DATE

*Paul J. Segan* 4/17/08  
CHIEF - BUREAU OF ENGINEERING DATE

*John C. ...* 4/17/08  
CHIEF, BUREAU OF UTILITIES DATE

*Paul J. Segan* 4/17/08  
CHIEF, UTILITY DESIGN DIVISION DATE

**OBRIENEGERE ENGINEERS, INC.**  
8201 Corporate Drive  
Suite 1000  
Londontown, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

**BURGESS & NIPL**  
170 ROLLING ARCADE BOVING, MARYLAND, 20689-0089  
TEL (202) 462-2400 FAX (202) 468-8669

DSN. BY:	JAT			
DRN. BY:	JCS			
CHK. BY:	JAT			
DATE:	4/08			
	KCI	ASBUILT REVISIONS	3-3-10	
	BY NO.	REVISION	DATE	

**EROSION AND SEDIMENT CONTROL PLAN**

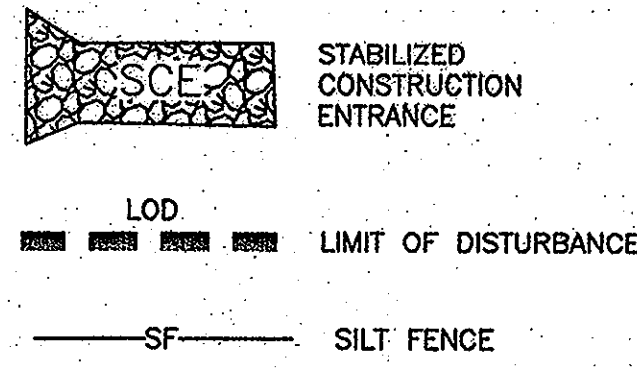
600' SCALE MAP NO. W&S: 24, 30 BLOCK NO.

U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD AT ST. JOHN'S LANE WATER MAIN

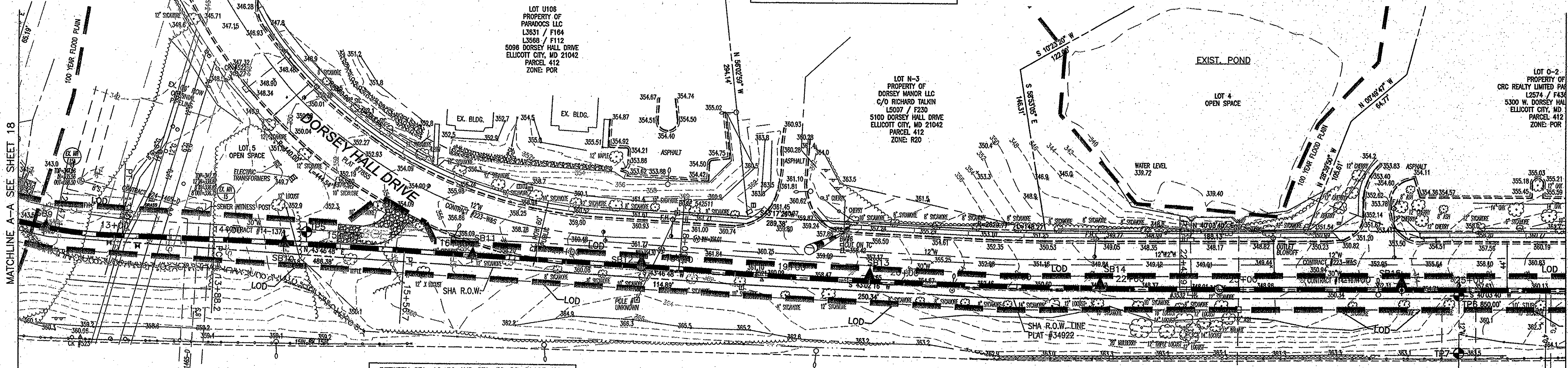
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 18 OF 32  
FILE NO. 19

### EROSION AND SEDIMENT CONTROL LEGEND



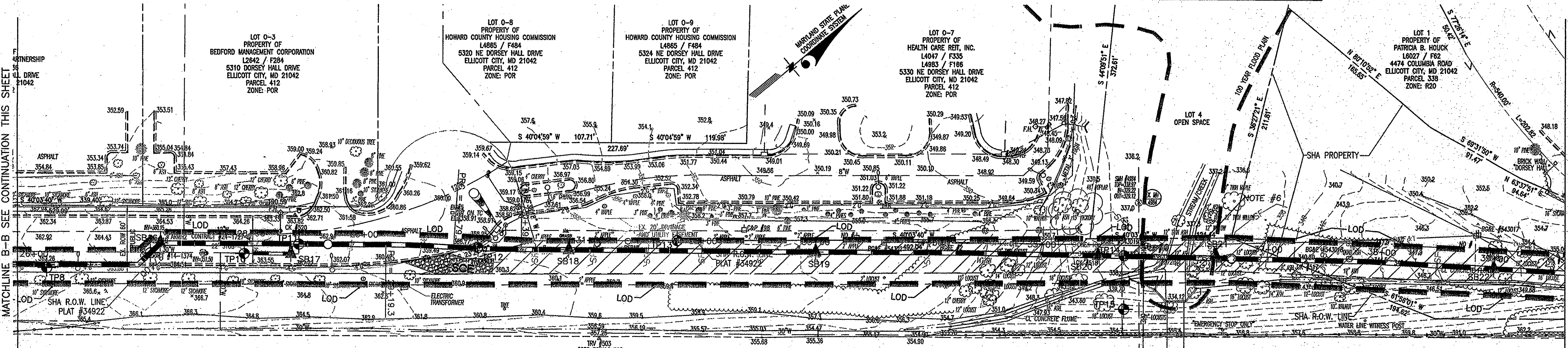
BETWEEN STA. 16+00 AND STA. 30+00, CONTRACTOR SHALL PROVIDE TEMPORARY MEANS TO HANDLE STORMWATER RUNOFF UNTIL CURB AND GUTTER IS REPLACED IN KIND.



BETWEEN STA. 16+50 AND STA. 30+00, PLACE ALL EXCAVATED MATERIALS AS DIRECTED BY THE CONTRACTOR.

BETWEEN STA. 22+50 AND STA. 23+00, EX. SD INLET, 15" RCP AND 42" RCP TO BE REMOVED AND REPLACED IN KIND AS REQUIRED. CONTRACTOR SHALL PROVIDE PROTECTION AND/OR OTHER TEMPORARY MEANS TO HANDLE STORMWATER UNTIL EX. SD IS RESTORED TO ITS FORMER CONDITION.

US ROUTE 29 (SOUTH BOUND LANE)

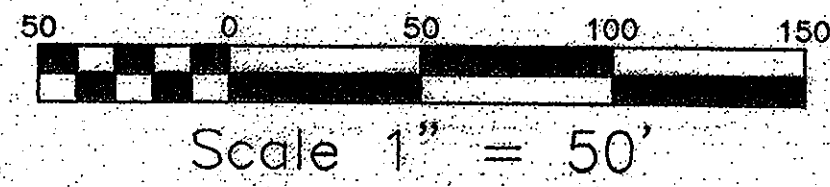


BETWEEN STA. 16+50 AND STA. 30+00, PLACE ALL EXCAVATED MATERIALS AS DIRECTED BY THE CONTRACTOR.

US ROUTE 29 (SOUTH BOUND LANE)

#### EROSION AND SEDIMENT CONTROL NOTES FOR UTILITY CONSTRUCTION

- CONTRACTOR WILL OPEN ONLY THAT LENGTH OF TRENCH THAT CAN BE BACKFILLED AND STABILIZED EACH DAY. IF TRENCH MUST REMAIN OPEN LONGER THAN ONE (1) DAY, SILT FENCE SHALL BE PLACED DOWNSLOPE OF THE TRENCH.
- PLACE ALL EXCAVATED MATERIAL ON UPHILL SIDE OF TRENCH.
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- LIMIT OF DISTURBANCE (LOD) SHALL BE CONFINED W/ EX. EASEMENTS AND TEMPORARY CONSTRUCTION STRIPS, UNLESS OTHERWISE SHOWN. THIS STRIP SHALL BE PLACED NOT DAMAGE OR REMOVE ANY EX. TREES OR SHRUBS OUTSIDE OF THE EX. 30' WIDE UTILITY EASEMENT OR PUBLIC RIGHTS OF WAY.
- CONTRACTOR SHALL PROVIDE ADDITIONAL SEDIMENT CONTROL MEASURES AT ALL STREAM CROSSING AND CULVERT OUTFALLS; STREAMS TO BE DIVERTED DURING CONSTRUCTION PER MARYLAND DEPARTMENT OF THE ENVIRONMENT'S WATERWAY CONSTRUCTION GUIDELINES. FOR TYPICAL STREAM CROSSING DETAIL(S) SEE SHEET 21.



**THIS SHEET FOR EROSION AND SEDIMENT CONTROL ONLY!!!**

**As-Built**

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PROFESSIONAL CERTIFICATION  
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DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*John J. ...* 4/17/08  
DIRECTOR OF PUBLIC WORKS DATE

*Paul ...* 4/17/08  
CHIEF - BUREAU OF ENGINEERING DATE

*Steve ...* 4/17/08  
CHIEF, BUREAU OF UTILITIES DATE

*Chris ...* 4/17/08  
CHIEF, UTILITY DESIGN DIVISION DATE

**OBIENSGERE ENGINEERS, INC.**  
8201 Corporate Drive  
Suite 1000  
Lanham, Maryland 20786  
(301) 731-5922  
FAX: (301) 577-4737

**BURGESS & NIPLE**  
170 ROLAND AVENUE, ROCKVILLE, MARYLAND, 20850-4999  
TEL: (301) 490-2000 FAX: (301) 490-2000



DSN. BY:	JAT				
DRN. BY:	JCS				
CHK. BY:	JAT				
DATE:	4/08				
BY NO.					
REVISION					
DATE					

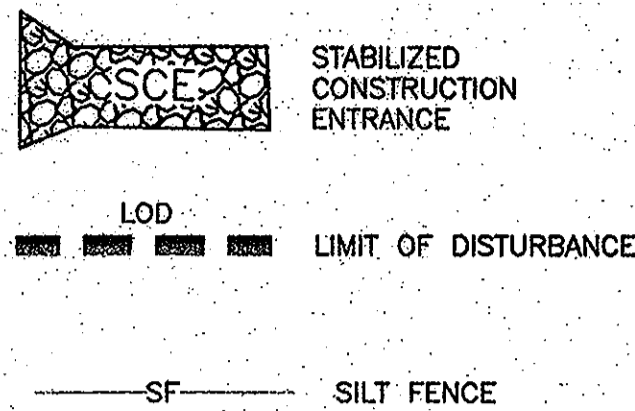
**EROSION AND SEDIMENT CONTROL PLAN**

600' SCALE MAP NO. W&S: 24, 30 BLOCK NO.

U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD  
AT ST. JOHN'S LANE WATER MAIN

CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

**EROSION AND SEDIMENT CONTROL LEGEND**

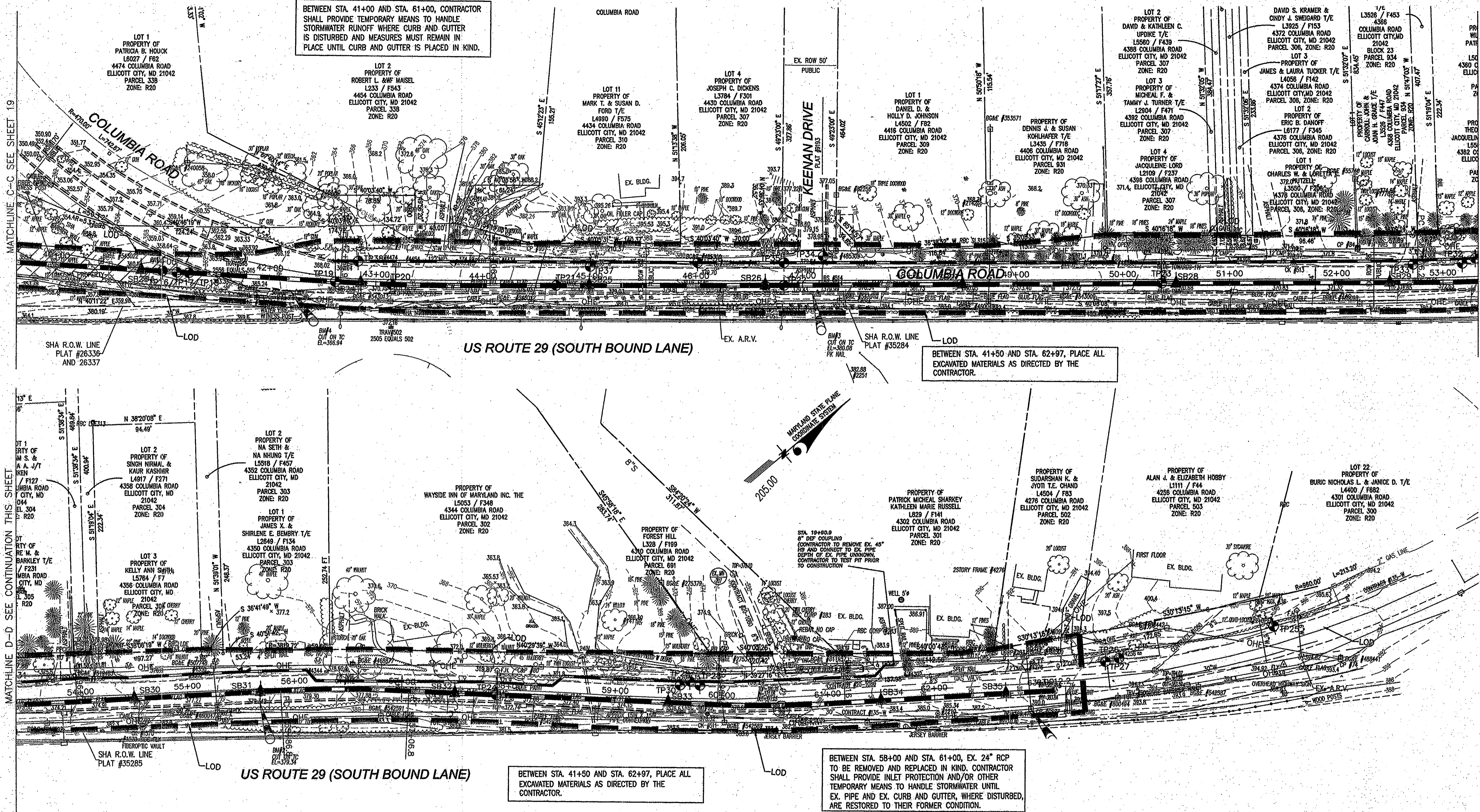


BETWEEN STA. 41+00 AND STA. 61+00, CONTRACTOR SHALL PROVIDE TEMPORARY MEANS TO HANDLE STORMWATER RUNOFF WHERE CURB AND GUTTER IS DISTURBED AND MEASURES MUST REMAIN IN PLACE UNTIL CURB AND GUTTER IS PLACED IN KIND.

BETWEEN STA. 41+50 AND STA. 62+97, PLACE ALL EXCAVATED MATERIALS AS DIRECTED BY THE CONTRACTOR.

BETWEEN STA. 41+50 AND STA. 62+97, PLACE ALL EXCAVATED MATERIALS AS DIRECTED BY THE CONTRACTOR.

BETWEEN STA. 58+00 AND STA. 61+00, EX. 24" RCP TO BE REMOVED AND REPLACED IN KIND. CONTRACTOR SHALL PROVIDE INLET PROTECTION AND/OR OTHER TEMPORARY MEANS TO HANDLE STORMWATER UNTIL EX. PIPE AND EX. CURB AND GUTTER, WHERE DISTURBED, ARE RESTORED TO THEIR FORMER CONDITION.

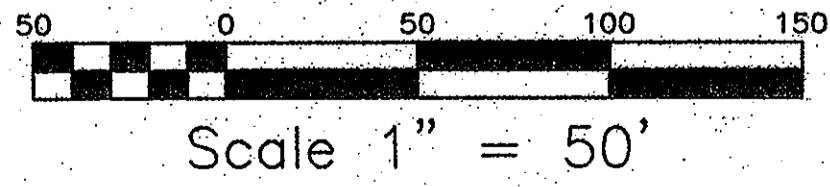


MATCHLINE D-D SEE CONTINUATION THIS SHEET

MATCHLINE D-D SEE SHEET CONTINUATION THIS SHEET

**EROSION AND SEDIMENT CONTROL NOTES FOR UTILITY CONSTRUCTION**

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DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

Director of Public Works: *James J. De...*  
Chief, Bureau of Utilities: *...*  
Date: 4/17/08

**OBRIENGERE ENGINEERS, INC.**  
8201 Corporate Drive, Suite 1000, Landover, Maryland 20785  
FAX: (301) 577-4737

**BURGESS & NIPLE**  
170 ROLLING WOOD DRIVE, ANNE ARBOR, MICHIGAN 48106  
TEL: (313) 488-8100 FAX: (313) 488-8882



DSN. BY:	JAT				
DRN. BY:	JCS				
CHK. BY:	JAT				
DATE:	4/08				
BY NO.		REVISION		DATE	

**EROSION AND SEDIMENT CONTROL PLAN**

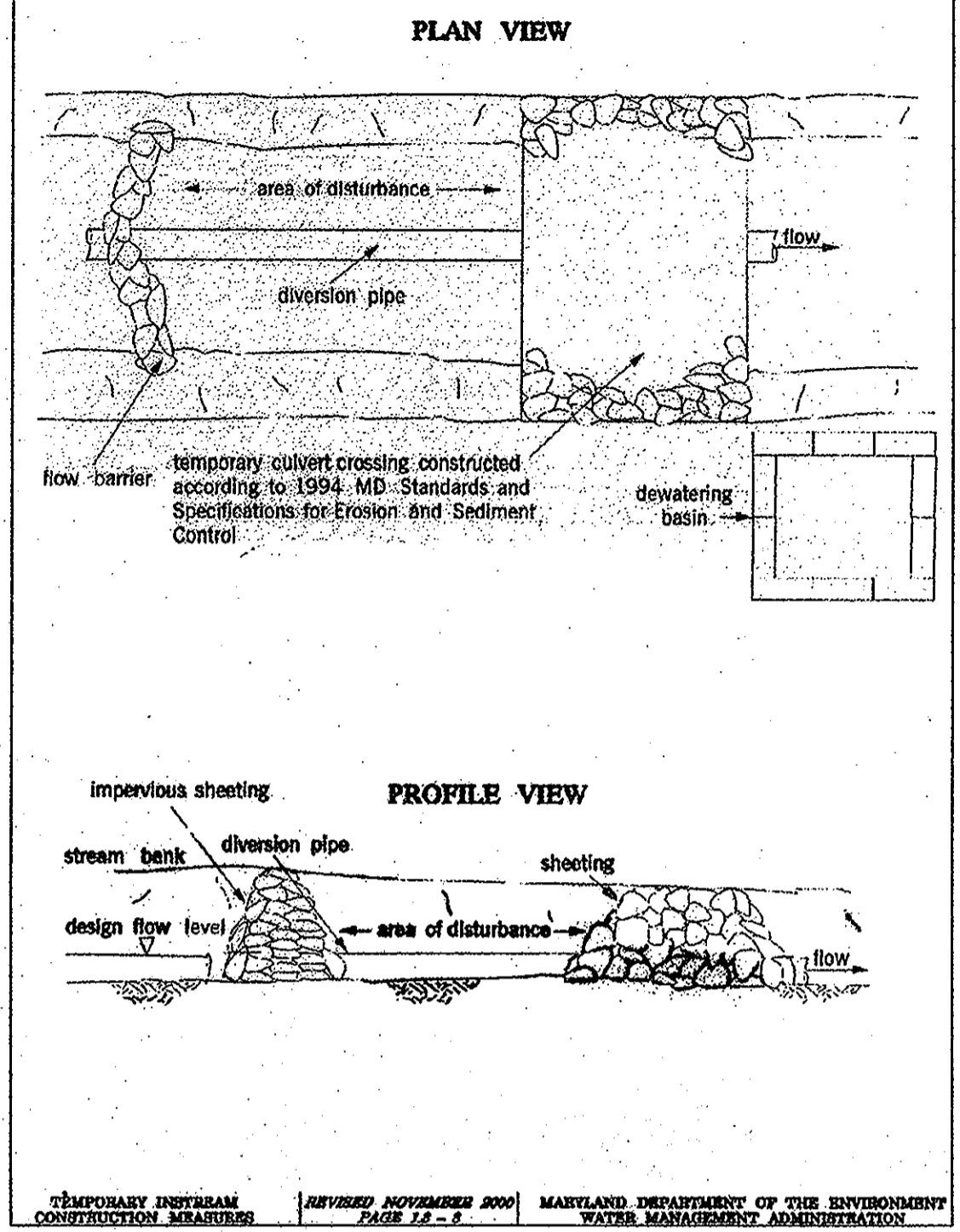
US ROUTE 29 WATER MAIN/COLUMBIA ROAD  
AT ST. JOHN'S LANE WATER MAIN  
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

**As-Built**

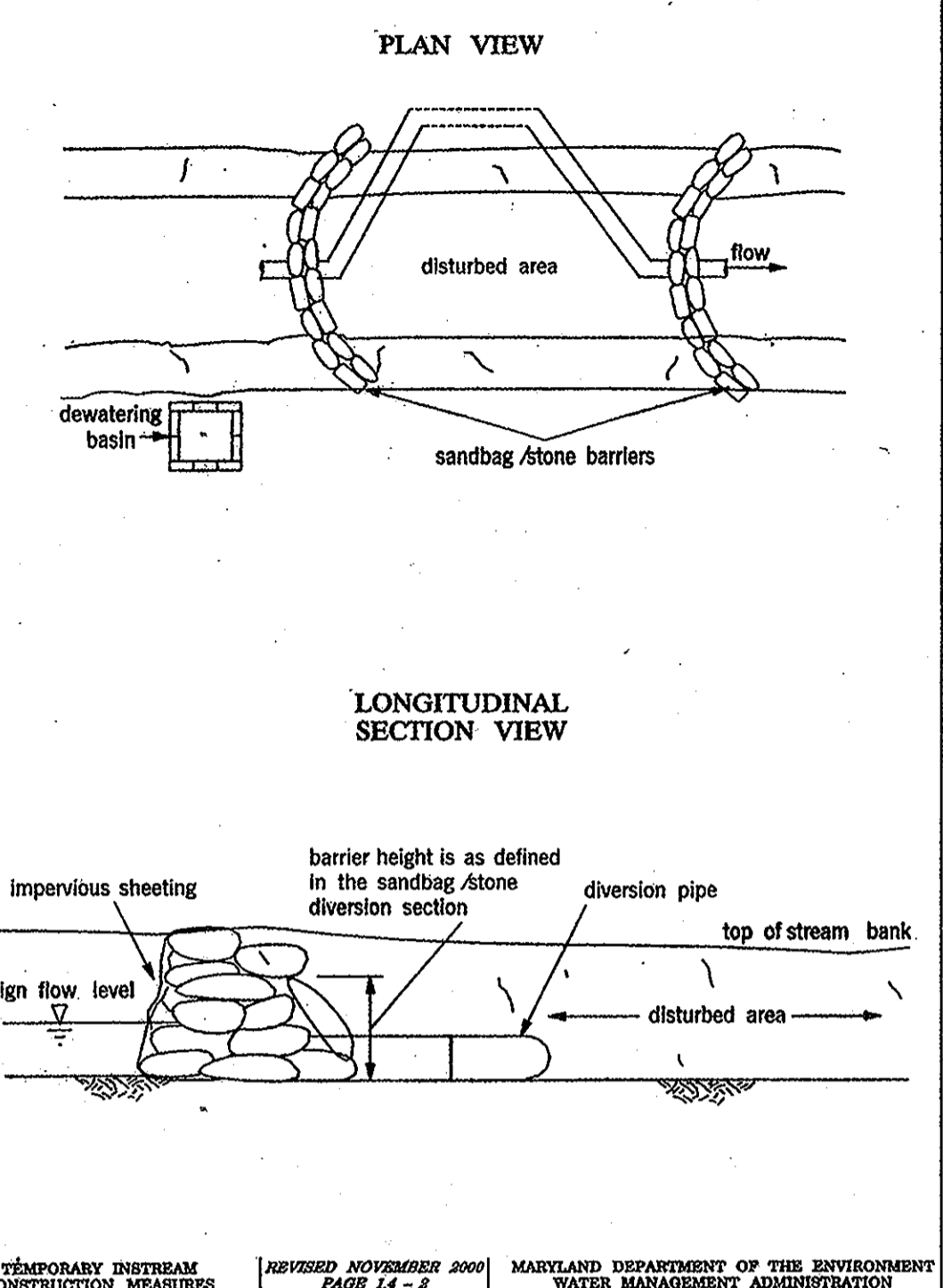
SCALE AS SHOWN  
SHEET 20 OF 32  
FILE NO. 20

DESC: TYPICAL UTILITY CONSTRUCTION PLAN 7-3-05 9:57:26 am S:\DWG\...

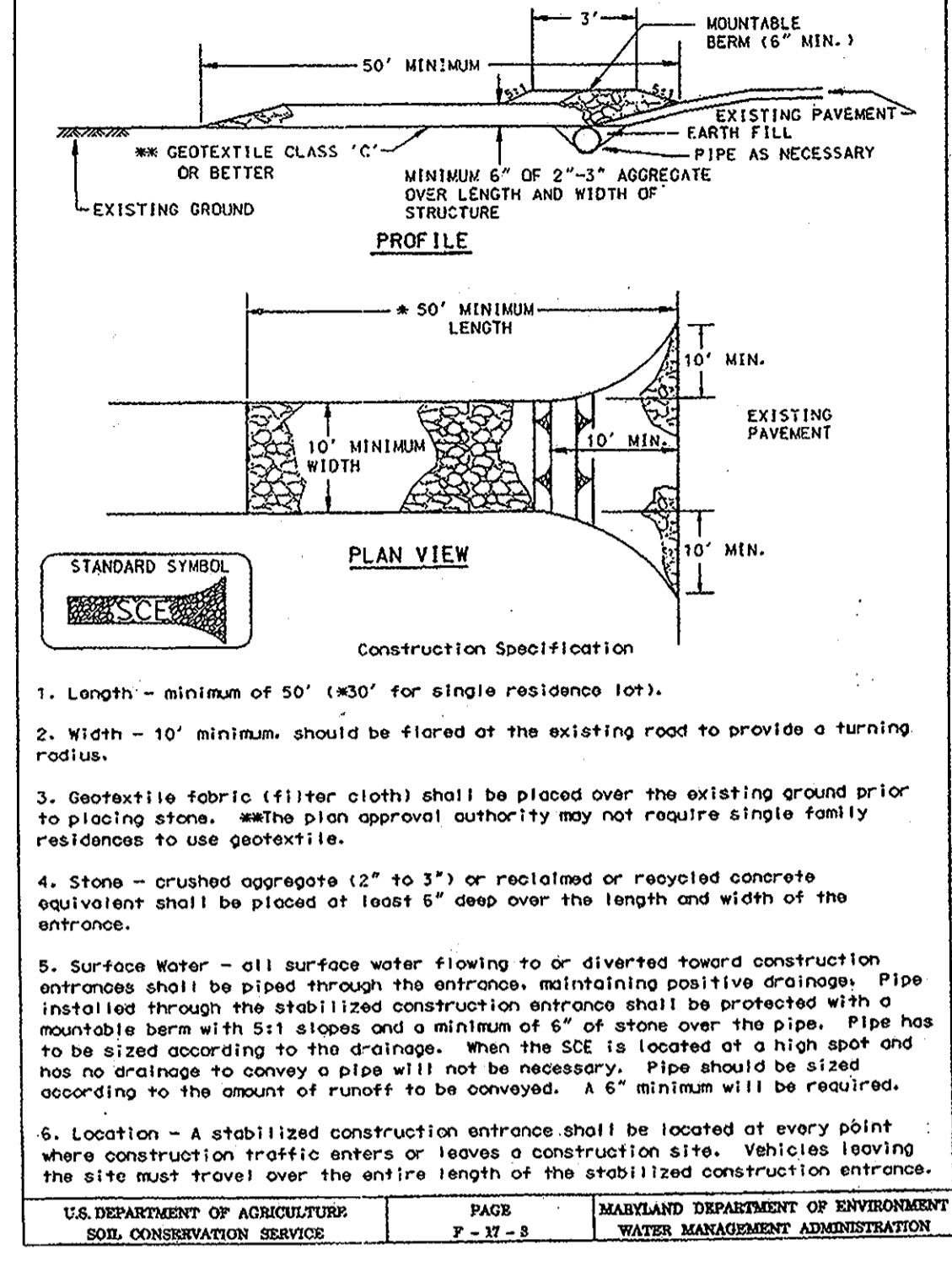
Maryland's Guidelines To Waterway Construction  
DETAIL 1.3: CULVERT PIPE W/ACCESS ROAD



Maryland's Guidelines To Waterway Construction  
DETAIL 1.4: DIVERSION PIPE



DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE



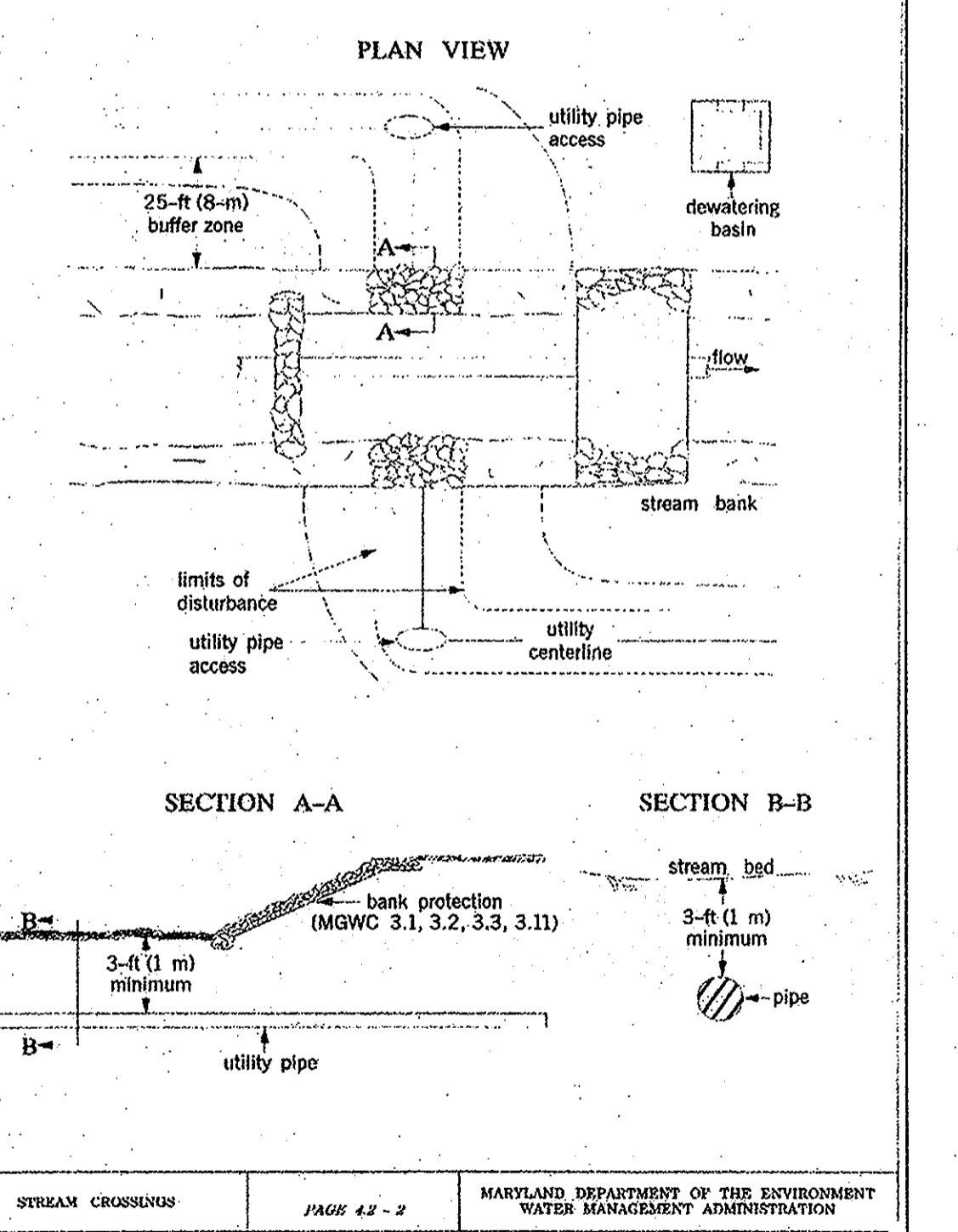
GENERAL SEDIMENT CONTROL NOTES:

- 1. A MINIMUM OF 48 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS AND PERMITS PRIOR TO THE START OF ANY CONSTRUCTION.
2. ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE 'MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL AND EROSION CONTROL' AND REVISIONS THERETO.
3. FOLLOWING INITIAL SOIL DISTURBANCE AND REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN (a) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, e.g., TEMPORARY DIVERSION DIKES AND ALL SLOPES GREATER THAN 3:1 AND, (b) 14 DAYS FOR ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
4. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE LATEST EDITION OF THE MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL AND EROSION CONTROL FOR PERMANENT SEEDINGS (SEC. 51) AND (SEC. 54), TEMPORARY SEEDINGS (SEC. 50) AND MULCHING (SEC. 53). TEMPORARY STABILIZATION WITH MULCH CAN ONLY BE DONE WHEN RECOMMENDED SEEDING DATES DO NOT ALLOW FOR PROPER GERMINATION AND ESTABLISHMENT OF GRASSES.
5. ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE AND ARE TO BE MAINTAINED IN OPERATIVE CONDITION UNTIL PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
6. SITE ANALYSIS:
TOTAL AREA OF SITE = 7.31± ACRES
AREA DISTURBED = 6.5± ACRES
AREA TO BE PAVED = 24,619± SF
AREA TO BE VEGETATIVELY STABILIZED = 19,480± S.F.
TOTAL CUT = 4,275± C.Y.
TOTAL FILL = 9,480± C.Y.
7. ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
8. ADDITIONAL SEDIMENT CONTROLS MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
9. SITE GRADING WILL BEGIN ONLY AFTER ALL PERIMETER SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED AND ARE IN OPERATING CONDITION.
10. CUT AND FILL QUANTITIES PROVIDED UNDER SITE ANALYSIS DO NOT REPRESENT BID QUANTITIES. THESE QUANTITIES DO NOT DISTINGUISH BETWEEN TOPSOIL, STRUCTURAL FILL OR EMBANKMENT MATERIAL NOR DO THEY REFLECT CONSIDERATION OF UNDERCUTTING OR REMOVAL OF UNSUITABLE MATERIAL. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE SITE CONDITIONS WHICH MAY AFFECT THE WORK.
11. ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUESTED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
12. CONTRACTOR SHALL MAKE EVERY EFFORT TO AVOID DAMAGE TO EXISTING TREES.
13. CONTRACTOR SHALL NOT ALLOW SOIL TO ENTER EXISTING STORM DRAINS OR BE TRACKED ONTO EXISTING ROADWAYS.
14. DEWATERING BASINS TO BE FIELD LOCATED TO MINIMIZE LAND DISTURBANCE AND PROMOTE A NON-EROSIVE OUTLET.
15. ALL STREAMS ARE CL.
16. AT ALL CONSTRUCTION ACCESS POINTS, CONTRACTOR SHALL INSTALL A STABILIZED CONSTRUCTION ENTRANCE AS REQUIRED.

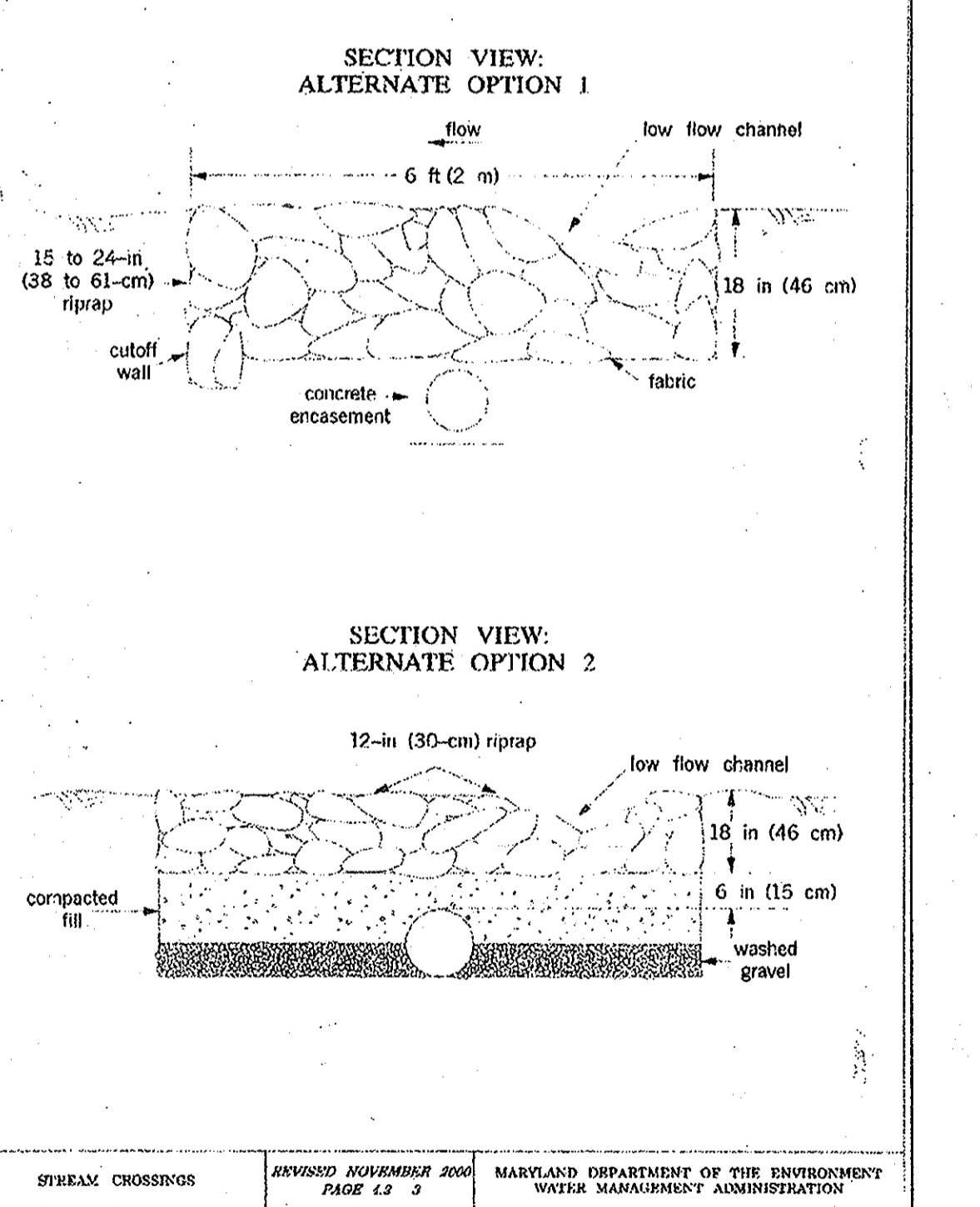
SEQUENCE OF CONSTRUCTION

- 1. OBTAIN GRADING PERMIT AND OTHER NECESSARY PERMITS PRIOR TO BEGINNING CONSTRUCTION. ALL EROSION AND SEDIMENT CONTROL SHALL CONFORM TO THE LATEST MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
2. STAKEOUT WATER MAIN ALIGNMENT.
3. INSTALL EROSION AND SEDIMENT CONTROL DEVICES AS REQUIRED BY INSPECTOR.
4. BEGIN CONSTRUCTION. CONTRACTOR WILL OPEN ONLY THAT LENGTH OF TRENCH THAT CAN BE BACKFILLED AND STABILIZED EACH DAY. IF TRENCH MUST REMAIN OPEN LONGER THAN ONE (1) DAY, SILT FENCE SHALL BE PLACED DOWN SLOPE OF THE TRENCH. COMPLETE EACH STREAM CROSSING DURING A 3 DAY CLEAR WEATHER FORECAST.
NOTE: STREAM UTILITY CROSSINGS SHALL BE MADE IN ONE (1) DAY WHILE STREAM IS SAND BAGGED. STREAM FLOW SHALL BE CONTINUOUSLY PUMPED (OVERNIGHT PUMPING TO BE AVOIDED) OR DIVERTED WITH A 24" CMP. DISTURBED AREA IN WETLANDS SHALL BE STABILIZED PER TYPICAL CROSS SECTION WITH FASCINES, LIVE CANES AND SPECIAL SEEDING MIX AS SHOWN ON STREAM BANK STABILIZATION DETAIL. CONTRACTOR TO USE TEMPORARY ACCESS CULVERTS OR BRIDGES TO CROSS STREAMS.
5. COMPLETE 48" & 8" WATER MAIN LINE CONSTRUCTION.
6. PROVIDE SEEDING OR PAVING AS APPLICABLE. PAVING TO BE PER CONSTRUCTION PLANS AND SPECIFICATIONS, COMPLETE SITE CLEANUP.
7. UPON APPROVAL OF HOWARD COUNTY SEDIMENT CONTROL INSPECTOR, REMOVE REMAINING SEDIMENT CONTROL DEVICES AND STABILIZE AREAS DISTURBED BY THIS PROCESS WITH PERMANENT, TEMPORARY OR SPECIAL SEEDING IN WETLANDS AS REQUIRED.

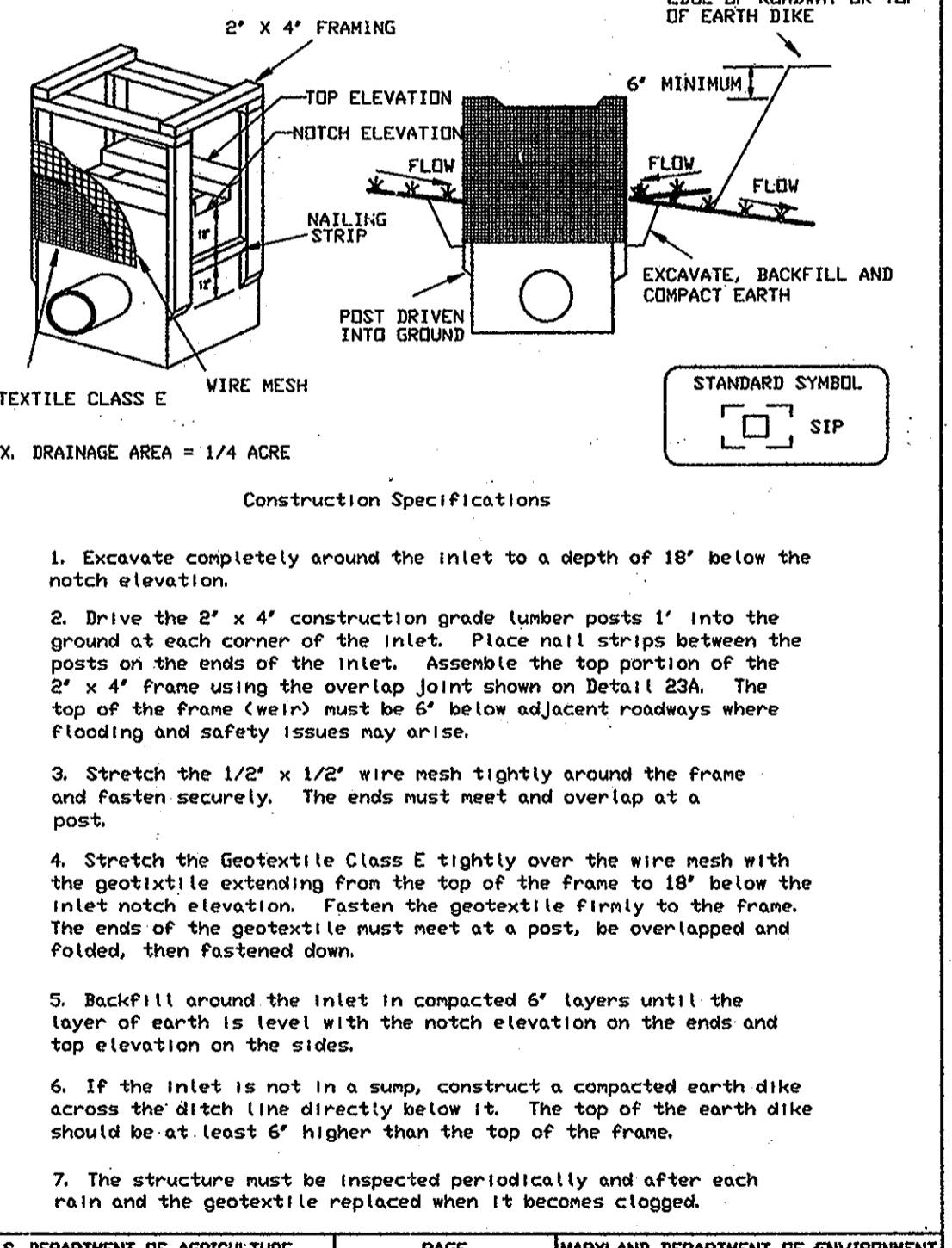
Maryland's Guidelines To Waterway Construction  
DETAIL 4.2(a): UTILITY CROSSING



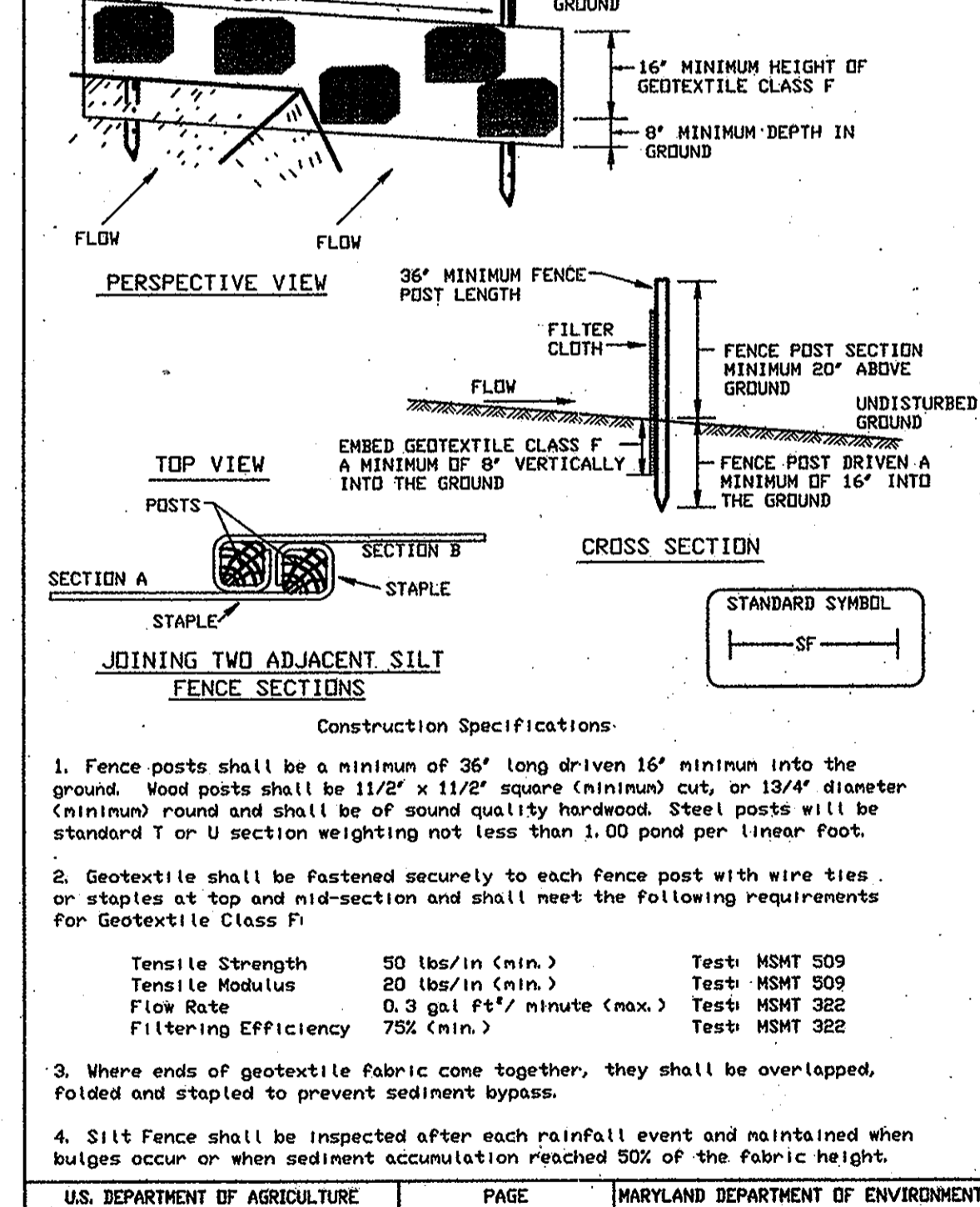
Maryland's Guidelines To Waterway Construction  
DETAIL 4.2(b): UTILITY CROSSING



DETAIL 23A - STANDARD INLET PROTECTION



DETAIL 22 - SILT FENCE



BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

- 1) No excess fill, construction material, or debris shall be stockpiled or stored in nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
2) Place materials in a location and manner that does not adversely impact surface or subsurface water flow into or out of nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain.
3) Do not use the excavated material as backfill if it contains waste metal products, unsightly debris, toxic material, or any other deleterious substance. If additional backfill is required, use clean material free of waste metal products, unsightly debris, toxic material, or any other deleterious substance.
4) Place heavy equipment on mats or suitably operate the equipment to prevent damage to nontidal wetlands, nontidal wetland buffers, waterways, or the 100-year floodplain. Repair and maintain any serviceable structure or fill so there is no permanent loss of nontidal wetlands, nontidal wetland buffers, or waterways, or permanent modification of the 100-year floodplain in excess of that lost under the originally authorized structure or fill.
5) Rectify any nontidal wetlands, wetland buffers, waterways, or 100-year floodplain temporarily impacted by any construction.
6) All stabilization in the nontidal wetland and nontidal wetland buffer shall consist of the following species: Annual Ryegrass (Lolium multiflorum), Millet (Setaria italica), Barley (Hordeum sp.), Oats (Urtiola sp.), and/or Rye (Secale cereale). These species will allow for the stabilization of the site while also allowing for the voluntary revegetation of natural wetland species. Other non-persistent vegetation may be acceptable, but must be approved by the Nontidal Wetlands and Waterways Division. Kentucky 31 fence shall not be utilized in wetland or buffer areas. The area should be seeded and mulched to reduce erosion after construction activities have been completed.
7) After installation has been completed, make post-construction grades and elevations the same as the original grades and elevations in temporarily impacted areas.
8) To protect aquatic species, in-stream work is prohibited as determined by the classification of the stream:
Use 1 waters: in-stream work shall not be conducted during the period March 1 through June 15, inclusive, during any year.
9) Stormwater runoff from impervious surfaces shall be controlled to prevent the washing of debris into the waterway.
10) Culverts shall be constructed and any riprap placed so as not to obstruct the movement of aquatic species, unless the purpose of the activity is to impound water.

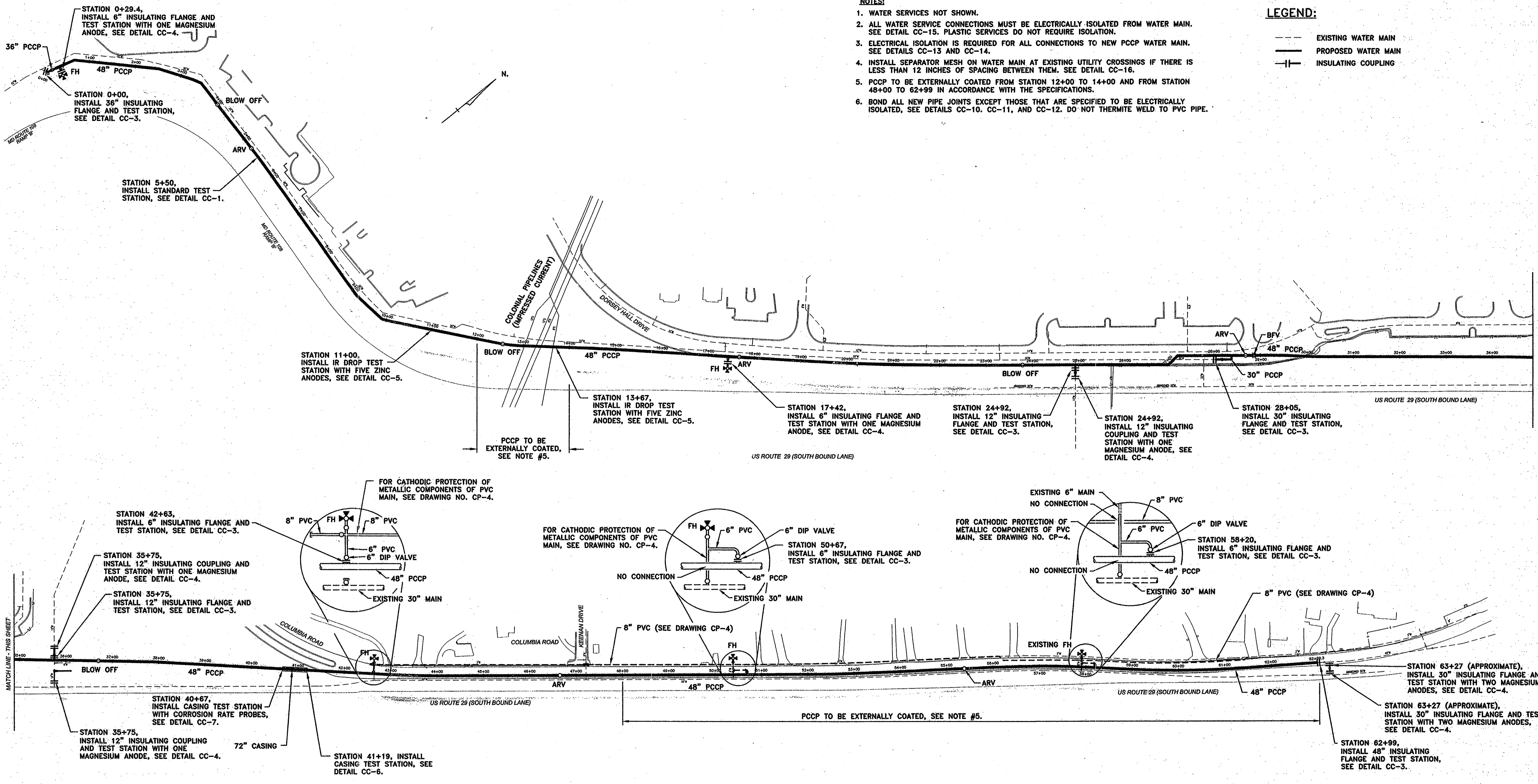
DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND. Includes signatures of Director of Public Works, Chief of Engineering, and Chief of Utilities.

O'BRIEN & GERE ENGINEERS, INC. 8201 Corporate Drive Suite 1000 Landover, Maryland 20785. Includes contact information and a professional seal.

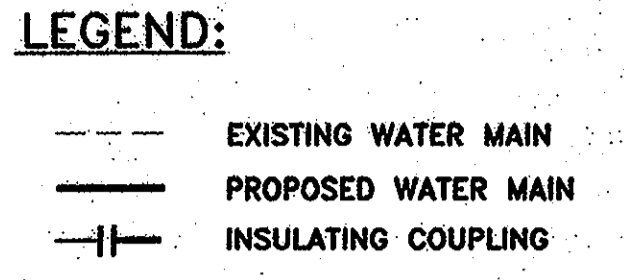
PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 144470 EXPIRATION DATE: 3-19-2004. Includes a signature and date.

EROSION AND SEDIMENT CONTROL NOTES AND DETAILS. Includes a table for revisions and a note about the 600' scale map.

US ROUTE 29 WATER MAIN/COLUMBIA ROAD AT ST. JOHN'S LANE WATER MAIN. CAPITAL PROJECT: W-8199/W-8234. CONTRACT NO.: 44-4632. ELECTION DISTRICT NO. 2 HOWARD COUNTY, MARYLAND. Includes scale and sheet information.



- NOTES:**
1. WATER SERVICES NOT SHOWN.
  2. ALL WATER SERVICE CONNECTIONS MUST BE ELECTRICALLY ISOLATED FROM WATER MAIN. SEE DETAIL CC-15. PLASTIC SERVICES DO NOT REQUIRE ISOLATION.
  3. ELECTRICAL ISOLATION IS REQUIRED FOR ALL CONNECTIONS TO NEW PCCP WATER MAIN. SEE DETAILS CC-13 AND CC-14.
  4. INSTALL SEPARATOR MESH ON WATER MAIN AT EXISTING UTILITY CROSSINGS IF THERE IS LESS THAN 12 INCHES OF SPACING BETWEEN THEM. SEE DETAIL CC-16.
  5. PCCP TO BE EXTERNALLY COATED FROM STATION 12+00 TO 14+00 AND FROM STATION 48+00 TO 62+99 IN ACCORDANCE WITH THE SPECIFICATIONS.
  6. BOND ALL NEW PIPE JOINTS EXCEPT THOSE THAT ARE SPECIFIED TO BE ELECTRICALLY ISOLATED, SEE DETAILS CC-10, CC-11, AND CC-12. DO NOT THERMITE WELD TO PVC PIPE.



**CORROSION MONITORING LAYOUT FOR 48" PCCP OPTION**  
SCALE: 1"=100'

THIS DRAWING IS NOT APPLICABLE FOR USE AS STANDARD CORROSION CONTROL PROCEDURES FOR OTHER PROJECTS DUE TO VARIOUS CONDITIONS AT OTHER SITES. NEITHER THIS DESIGN NOR ANY PART THEREOF MAY BE DUPLICATED IN ANY WAY FOR OTHER PROJECTS OR MODIFIED IN ANY WAY FOR THIS OR OTHER PROJECTS EXCEPT BY WRITTEN AGREEMENT WITH RUSSELL CORROSION CONSULTANTS, INC.

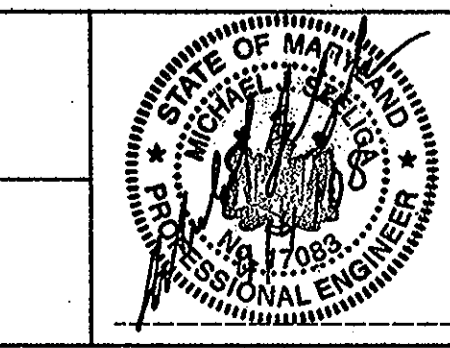
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**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: *John A. De...* 4/21/08  
 Chief - Bureau of Engineering: *Russell...* 4/17/08  
 Chief, Bureau of Utilities: *Stefan C. Green* 4/21/08  
 Chief, Utility Design Division: *...* 4/17/08

**O'BRIEN & GERE**  
ENGINEERS, INC.

**RUSSELL CORROSION CONSULTANTS, INC.**  
Columbia, Maryland



DSN. BY:	MJS			
DRN. BY:	DJD			
CHK. BY:	MJS			
DATE:	4/4/08	BY NO.		REVISION

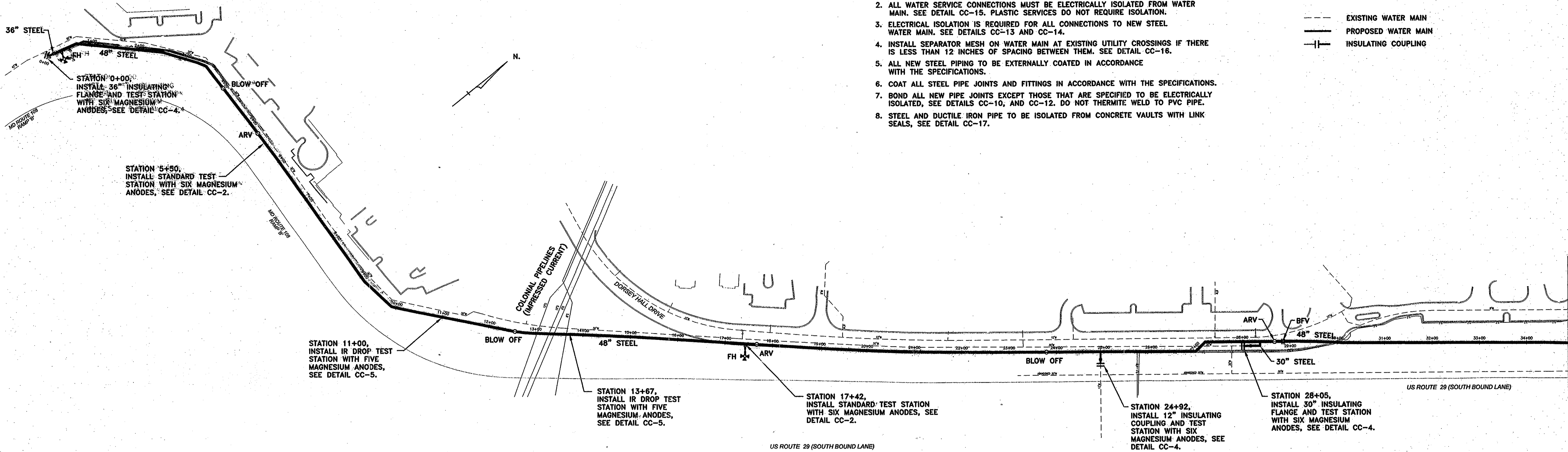
**48" PCCP WATER MAIN**  
**CORROSION MONITORING LAYOUT**

600' SCALE MAP NO. W&S: 24, 30 BLOCK NO. \_\_\_\_\_

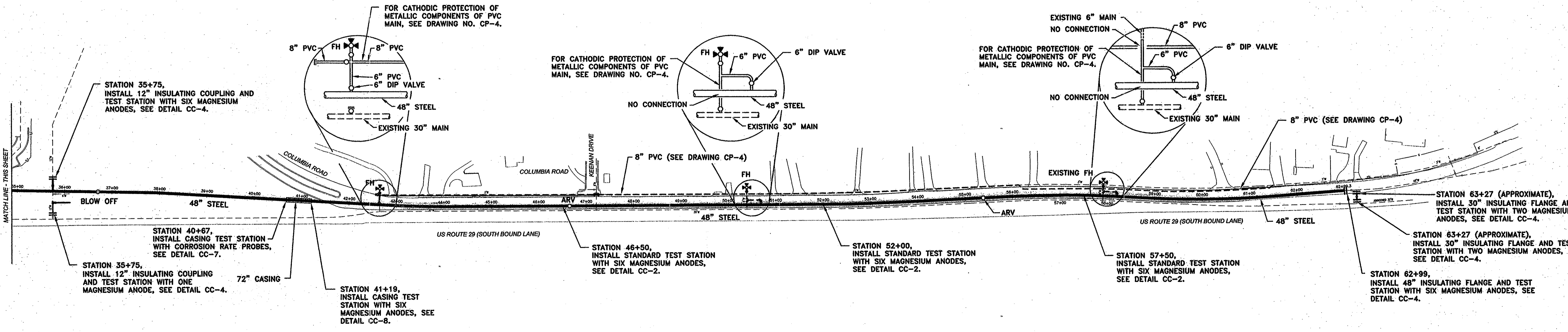
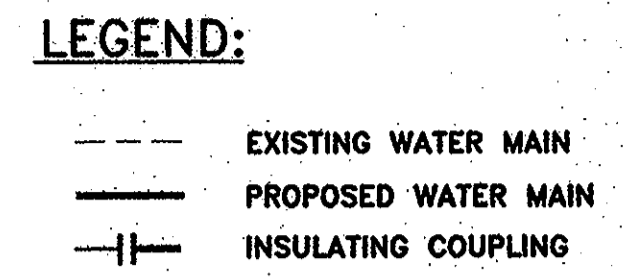
**U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD**  
**AT ST. JOHN'S LANE WATER MAIN**

CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

**As-Built**



- NOTES:**
1. WATER SERVICES NOT SHOWN. SEE PIPELINE INSTALLATION DRAWINGS.
  2. ALL WATER SERVICE CONNECTIONS MUST BE ELECTRICALLY ISOLATED FROM WATER MAIN. SEE DETAIL CC-15. PLASTIC SERVICES DO NOT REQUIRE ISOLATION.
  3. ELECTRICAL ISOLATION IS REQUIRED FOR ALL CONNECTIONS TO NEW STEEL WATER MAIN. SEE DETAILS CC-13 AND CC-14.
  4. INSTALL SEPARATOR MESH ON WATER MAIN AT EXISTING UTILITY CROSSINGS IF THERE IS LESS THAN 12 INCHES OF SPACING BETWEEN THEM. SEE DETAIL CC-16.
  5. ALL NEW STEEL PIPING TO BE EXTERNALLY COATED IN ACCORDANCE WITH THE SPECIFICATIONS.
  6. COAT ALL STEEL PIPE JOINTS AND FITTINGS IN ACCORDANCE WITH THE SPECIFICATIONS.
  7. BOND ALL NEW PIPE JOINTS EXCEPT THOSE THAT ARE SPECIFIED TO BE ELECTRICALLY ISOLATED, SEE DETAILS CC-10, AND CC-12. DO NOT THERMITE WELD TO PVC PIPE.
  8. STEEL AND DUCTILE IRON PIPE TO BE ISOLATED FROM CONCRETE VAULTS WITH LINK SEALS, SEE DETAIL CC-17.



CATHODIC PROTECTION LAYOUT FOR 48"Ø STEEL OPTION  
SCALE: 1"=100'

THIS DRAWING IS NOT APPLICABLE FOR USE AS STANDARDS CORROSION CONTROL PROCEDURES FOR OTHER PRODUCTS. SEE THE MANUFACTURER'S INSTRUCTIONS FOR USE. THE USER SHALL BE RESPONSIBLE FOR VERIFYING THAT THE MATERIALS AND METHODS SHOWN ARE APPROPRIATE FOR THE PROJECT AND CONDITIONS. THE USER SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY PERMITS AND APPROVALS. THE USER SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY INFORMATION FROM THE FIELD. THE USER SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY INFORMATION FROM THE FIELD. THE USER SHALL BE RESPONSIBLE FOR OBTAINING NECESSARY INFORMATION FROM THE FIELD.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*John C. Green* 4/17/08  
DIRECTOR OF PUBLIC WORKS DATE

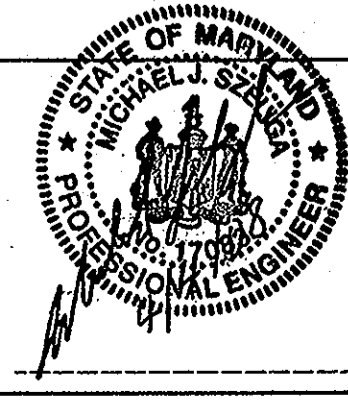
*Russell E. Green* 4/17/08  
CHIEF - BUREAU OF ENGINEERING DATE

*John C. Green* 4/17/08  
CHIEF, BUREAU OF UTILITIES DATE

*Ch. Da. Lee* 4/17/08  
CHIEF, UTILITY DESIGN DIVISION DATE

**O'BRIEN & GERE**  
ENGINEERS, INC.

**RUSSELL CORROSION CONSULTANTS, INC.**  
Columbia, Maryland



DSN. BY:	MJS				
DRN. BY:	DJD				
CHK. BY:	MJS				
DATE:	4/4/08	BY	NO.	REVISION	DATE

48"Ø STEEL WATER MAIN  
CATHODIC PROTECTION LAYOUT

600' SCALE MAP NO. W&S: 24, 30 BLOCK NO. \_\_\_\_\_

U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD  
AT ST. JOHN'S LANE WATER MAIN

CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

As-Built

CP-2  
SCALE AS SHOWN  
SHEET 23 OF 32

FILE NO. 29653-023

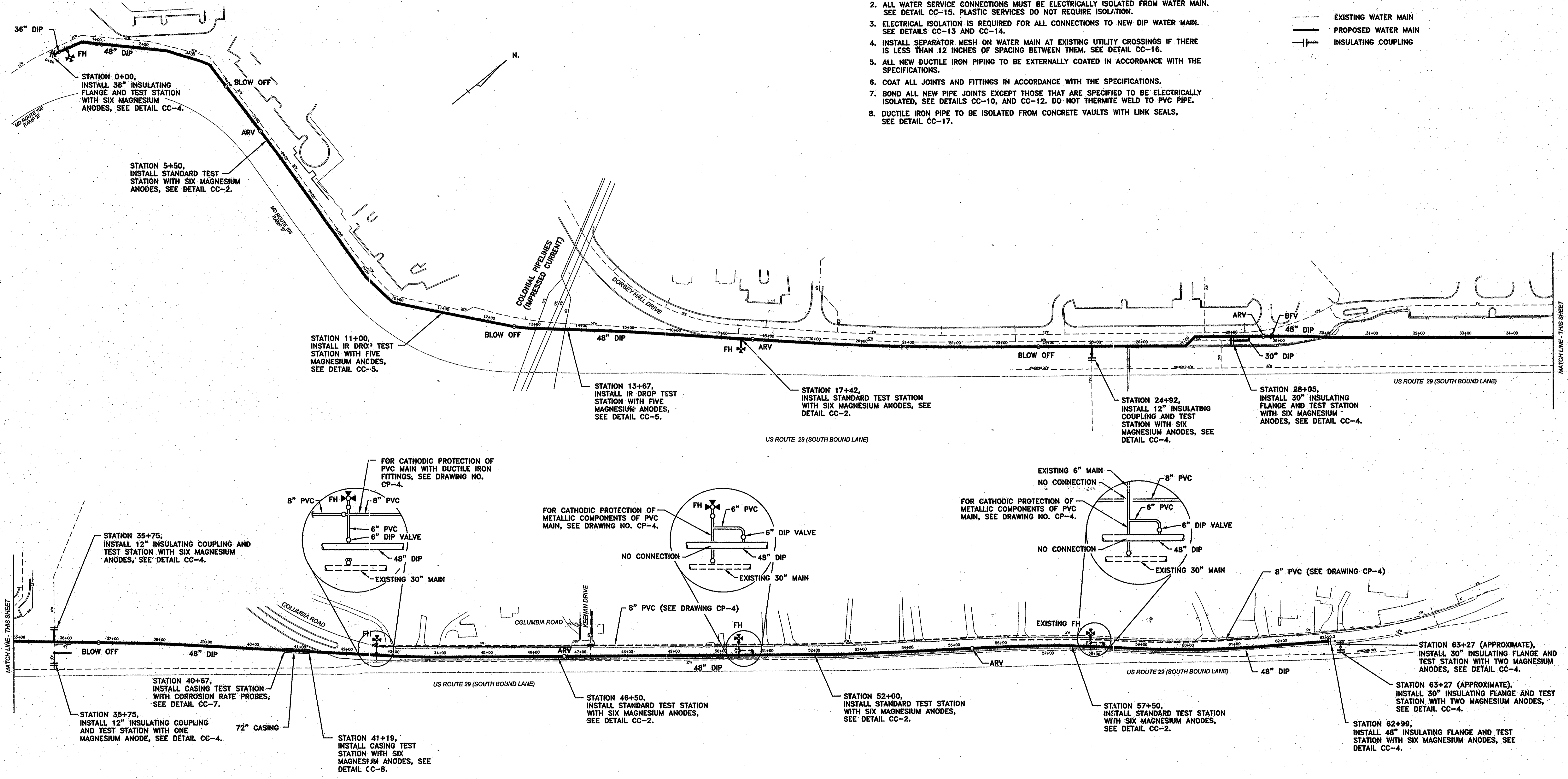


**NOTES:**

1. WATER SERVICES NOT SHOWN. SEE PIPELINE INSTALLATION DRAWINGS.
2. ALL WATER SERVICE CONNECTIONS MUST BE ELECTRICALLY ISOLATED FROM WATER MAIN. SEE DETAIL CC-15. PLASTIC SERVICES DO NOT REQUIRE ISOLATION.
3. ELECTRICAL ISOLATION IS REQUIRED FOR ALL CONNECTIONS TO NEW DIP WATER MAIN. SEE DETAILS CC-13 AND CC-14.
4. INSTALL SEPARATOR MESH ON WATER MAIN AT EXISTING UTILITY CROSSINGS IF THERE IS LESS THAN 12 INCHES OF SPACING BETWEEN THEM. SEE DETAIL CC-16.
5. ALL NEW DUCTILE IRON PIPING TO BE EXTERNALLY COATED IN ACCORDANCE WITH THE SPECIFICATIONS.
6. COAT ALL JOINTS AND FITTINGS IN ACCORDANCE WITH THE SPECIFICATIONS.
7. BOND ALL NEW PIPE JOINTS EXCEPT THOSE THAT ARE SPECIFIED TO BE ELECTRICALLY ISOLATED, SEE DETAILS CC-10, AND CC-12. DO NOT THERMITE WELD TO PVC PIPE.
8. DUCTILE IRON PIPE TO BE ISOLATED FROM CONCRETE VAULTS WITH LINK SEALS, SEE DETAIL CC-17.

**LEGEND:**

- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- |— INSULATING COUPLING



**CATHODIC PROTECTION LAYOUT FOR 48" DIP OPTION**  
SCALE: 1"=100'

THIS DRAWING IS NOT APPLICABLE FOR USE AS STANDARD CORROSION CONTROL PROCEDURES FOR OTHER PROJECTS DUE TO VARIOUS CONDITIONS AT OTHER SITES. NOTHING IN THIS DESIGN OR ANY PART THEREOF MAY BE REPRODUCED OR MODIFIED IN ANY WAY FOR THIS OR OTHER PROJECTS WITHOUT THE WRITTEN AGREEMENT OF RUSSELL CORROSION CONSULTANTS, INC.

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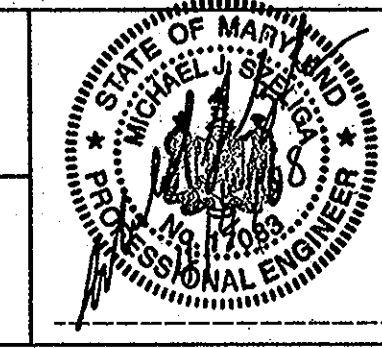
**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: *John B. [Signature]*  
 Chief, Bureau of Utilities: *Shane C. [Signature]*  
 Chief, Bureau of Engineering: *Paul [Signature]*  
 Chief, Utility Design Division: *Debra [Signature]*

DATE: 4/17/08

**O'BRIEN & GERE**  
ENGINEERS, INC.

**RUSSELL CORROSION CONSULTANTS, INC.**  
Columbia, Maryland



DSN. BY:	MJS				
DRN. BY:	DJD				
CHK. BY:	MJS				
DATE:	4/4/08	BY NO.		REVISION	

**48" DIP WATER MAIN**  
**CATHODIC PROTECTION LAYOUT**

600' SCALE MAP NO. W&S: 24, 30 BLOCK NO. \_\_\_\_\_

**U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD**  
**AT ST. JOHN'S LANE WATER MAIN**

CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4652  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

**As-Built**

CP-3

SCALE AS SHOWN

SHEET 24 OF 32

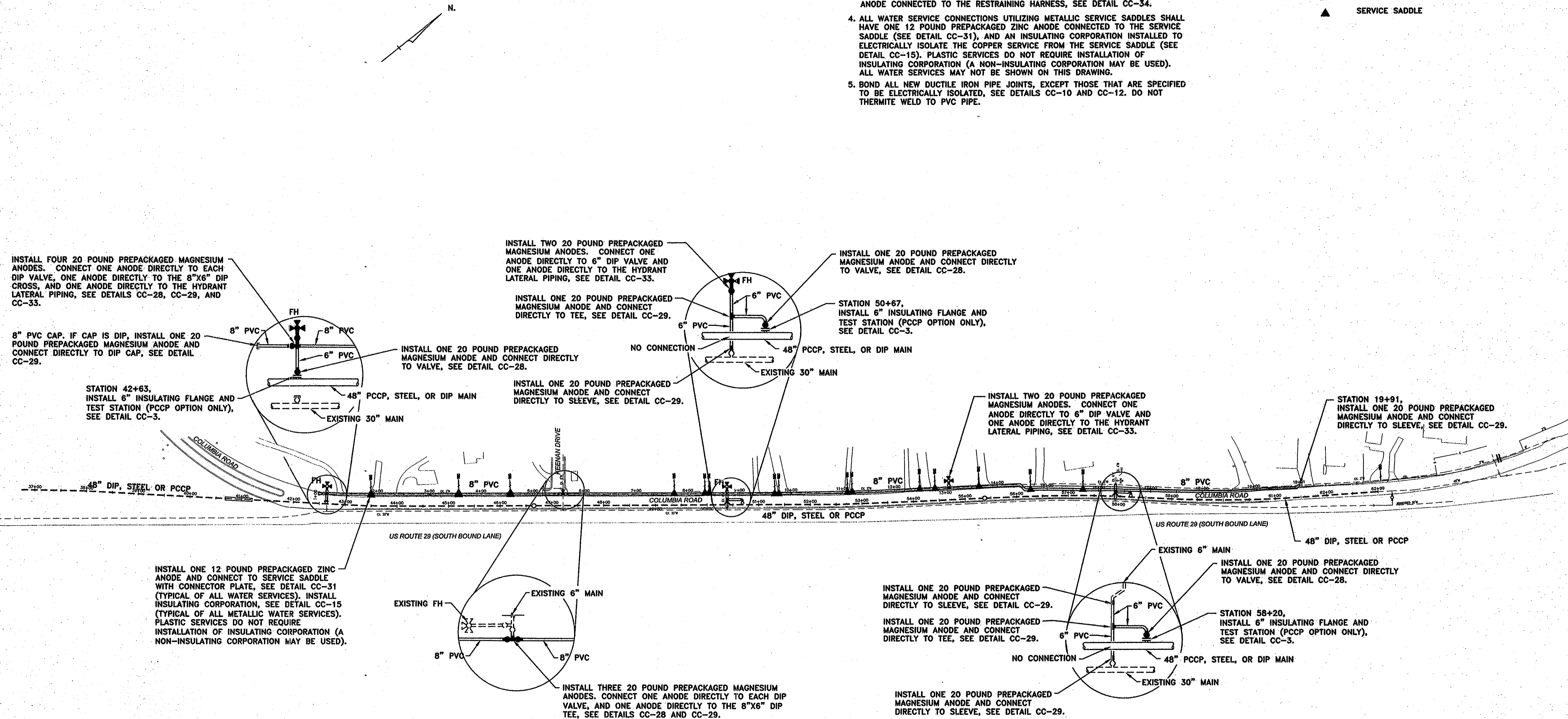
FILE NO. 29653-024

**NOTES:**

- ALL NEW DUCTILE IRON TEES, CROSSES, CAPS, VALVES, HYDRANTS, AND ELBOWS ALONG THE PVC WATER MAINS ARE TO BE PROVIDED WITH CORROSION PROTECTION (ALL DUCTILE IRON COMPONENTS NOT SHOWN ON THIS DRAWING), SEE DETAILS CC-28, CC-29, CC-33.
- ALL PVC PIPE DESIGNATED AS BEING "RESTRAINED JOINT" SHALL HAVE ONE 12 POUND PREPACKAGED ZINC ANODE CONNECTED TO EACH METALLIC RESTRAINING HARNESS, SEE DETAIL CC-30. ALL RESTRAINED JOINT PIPE MAY NOT BE SHOWN ON THIS DRAWING.
- ALL IN-LINE THRUST BLOCK RESTRAINS SHALL HAVE ONE 20 POUND MAGNESIUM ANODE CONNECTED TO THE RESTRAINING HARNESS, SEE DETAIL CC-34.
- ALL WATER SERVICE CONNECTIONS UTILIZING METALLIC SERVICE SADDLES SHALL HAVE ONE 12 POUND PREPACKAGED ZINC ANODE CONNECTED TO THE SERVICE SADDLE (SEE DETAIL CC-31), AND AN INSULATING CORPORATION INSTALLED TO ELECTRICALLY ISOLATE THE COPPER SERVICE FROM THE SERVICE SADDLE (SEE DETAIL CC-15). PLASTIC SERVICES DO NOT REQUIRE INSTALLATION OF INSULATING CORPORATION (A NON-INSULATING CORPORATION MAY BE USED). ALL WATER SERVICES MAY NOT BE SHOWN ON THIS DRAWING.
- BOND ALL NEW DUCTILE IRON PIPE JOINTS, EXCEPT THOSE THAT ARE SPECIFIED TO BE ELECTRICALLY ISOLATED, SEE DETAILS CC-10 AND CC-12. DO NOT THERMITE WELD TO PVC PIPE.

**LEGEND:**

- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- |— INSULATING COUPLING
- ▲ SERVICE SADDLE



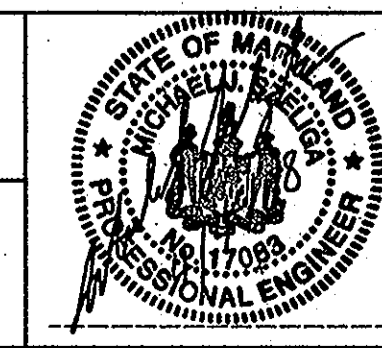
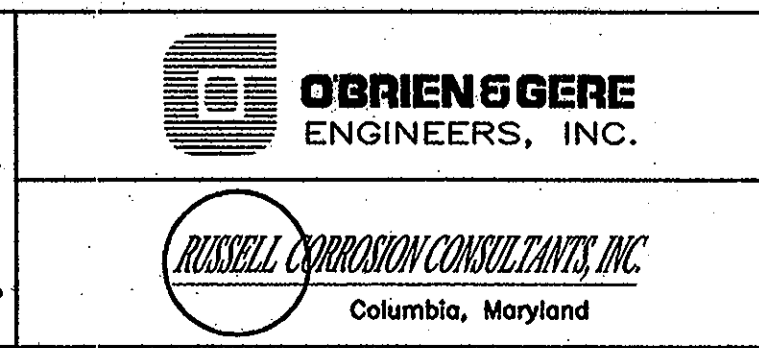
**CATHODIC PROTECTION LAYOUT FOR 8" PVC**  
SCALE: 1"=100'

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**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: *John A. Stube* DATE: *4/17/08*  
 Chief, Bureau of Engineering: *Russell G. ...* DATE: *4/17/08*  
 Chief, Bureau of Utilities: *Stake ...* DATE: *4/17/08*  
 Chief, Utility Design Division: *...* DATE: *4/17/08*



DSN. BY:	MJS				
DRN. BY:	DJD				
CHK. BY:	MJS				
DATE:	4/4/08	BY	NO.	REVISION	DATE

**8" PVC WATER MAIN**  
**CATHODIC PROTECTION LAYOUT**

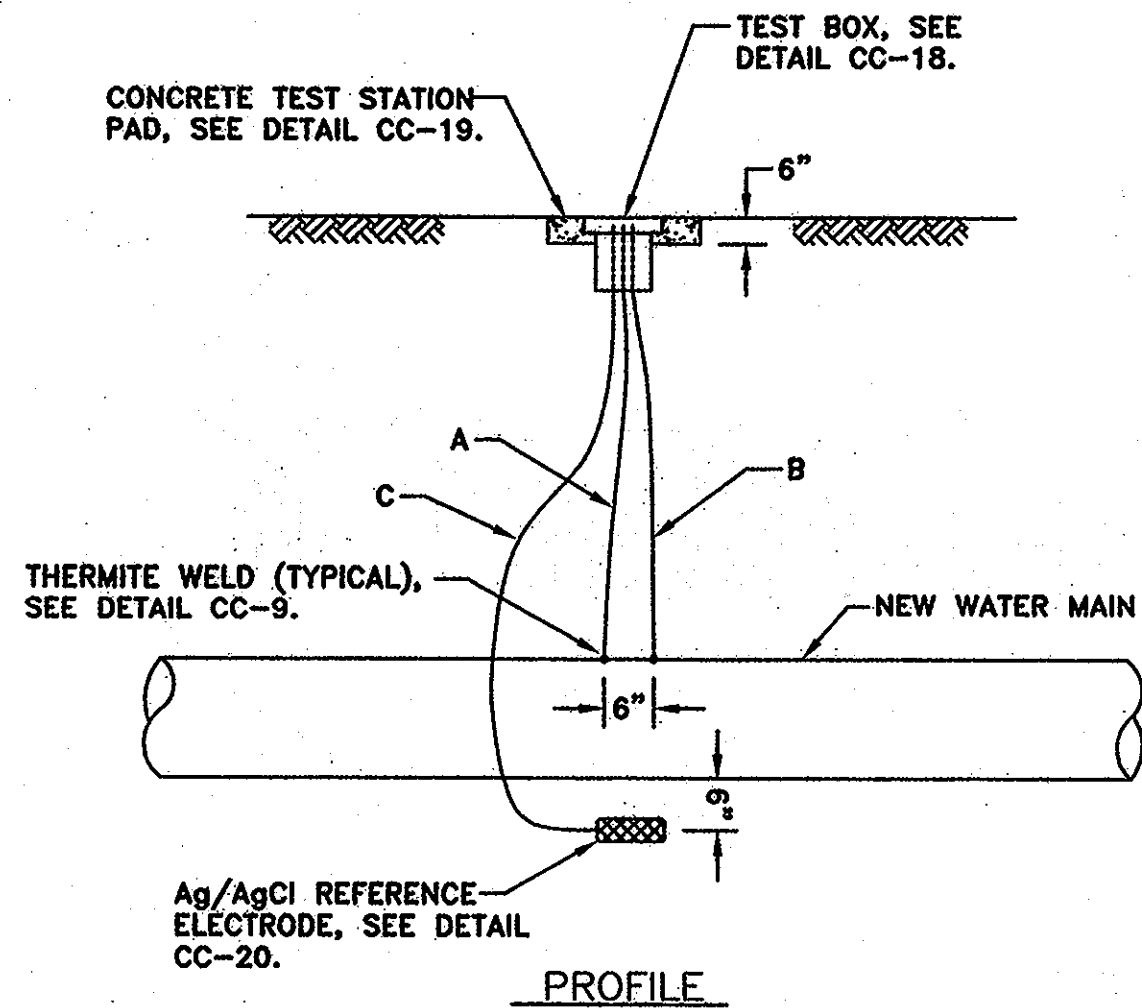
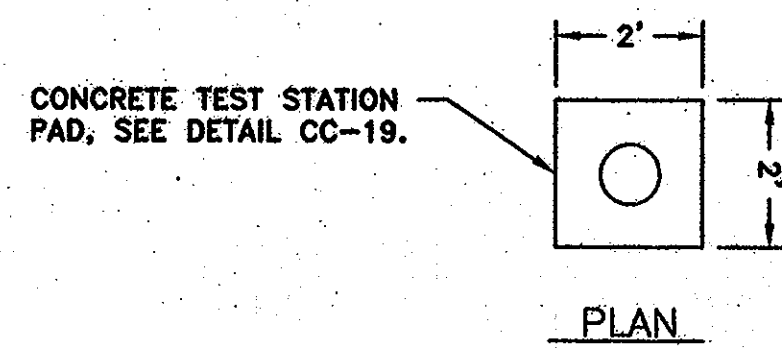
600' SCALE MAP NO. W&S: 24, 30 BLOCK NO. \_\_\_\_\_

**U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD**  
**AT ST. JOHN'S LANE WATER MAIN**

CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

**As-Built**

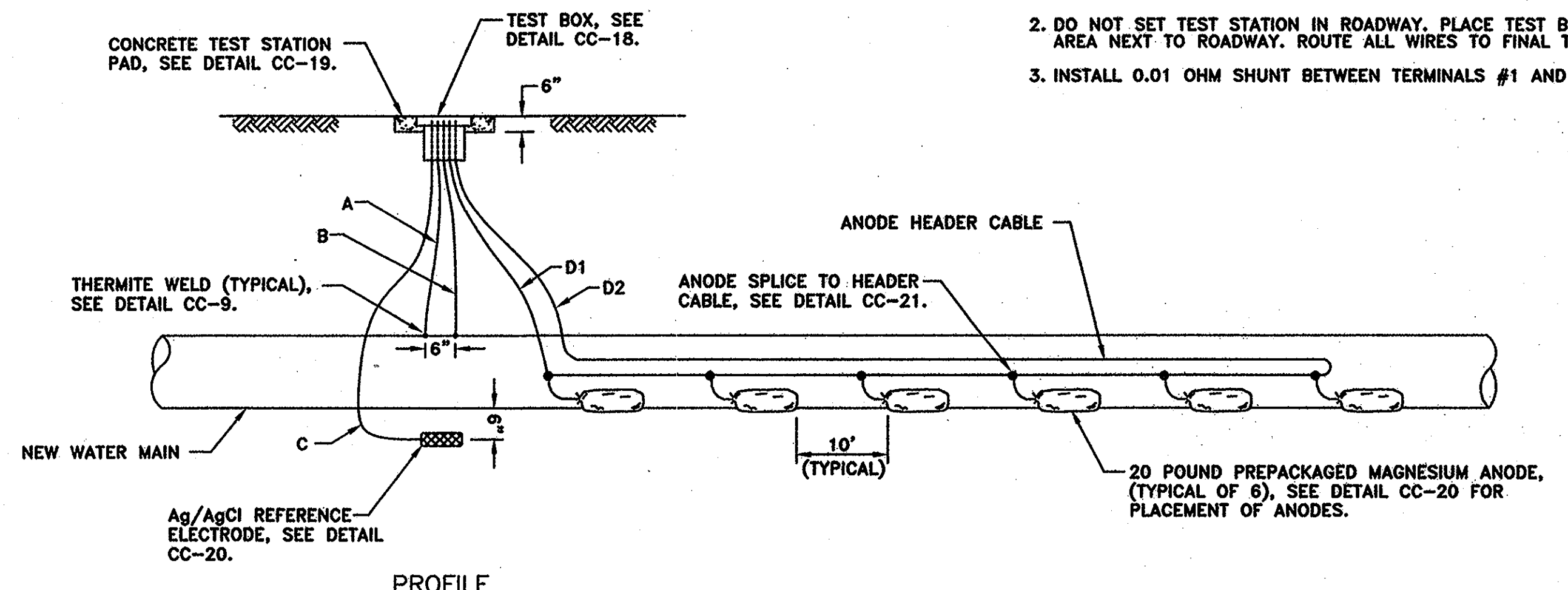
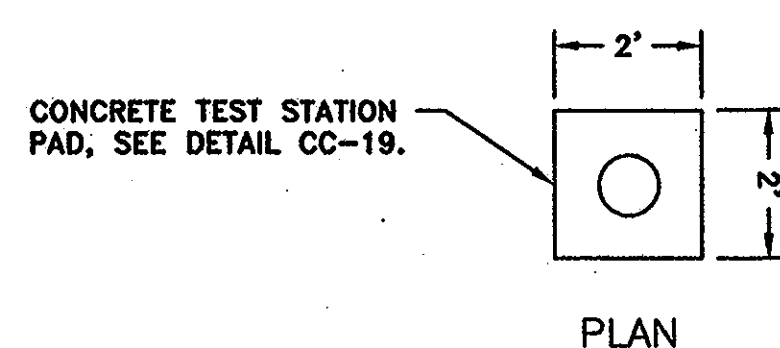
CP-4  
 SCALE AS SHOWN  
 SHEET 25 OF 32  
 FILE NO. 29653-025



**CC-1: STANDARD TEST STATION**  
NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A	1	#10	THWN	BLUE
	B	3	#10	THWN	BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK

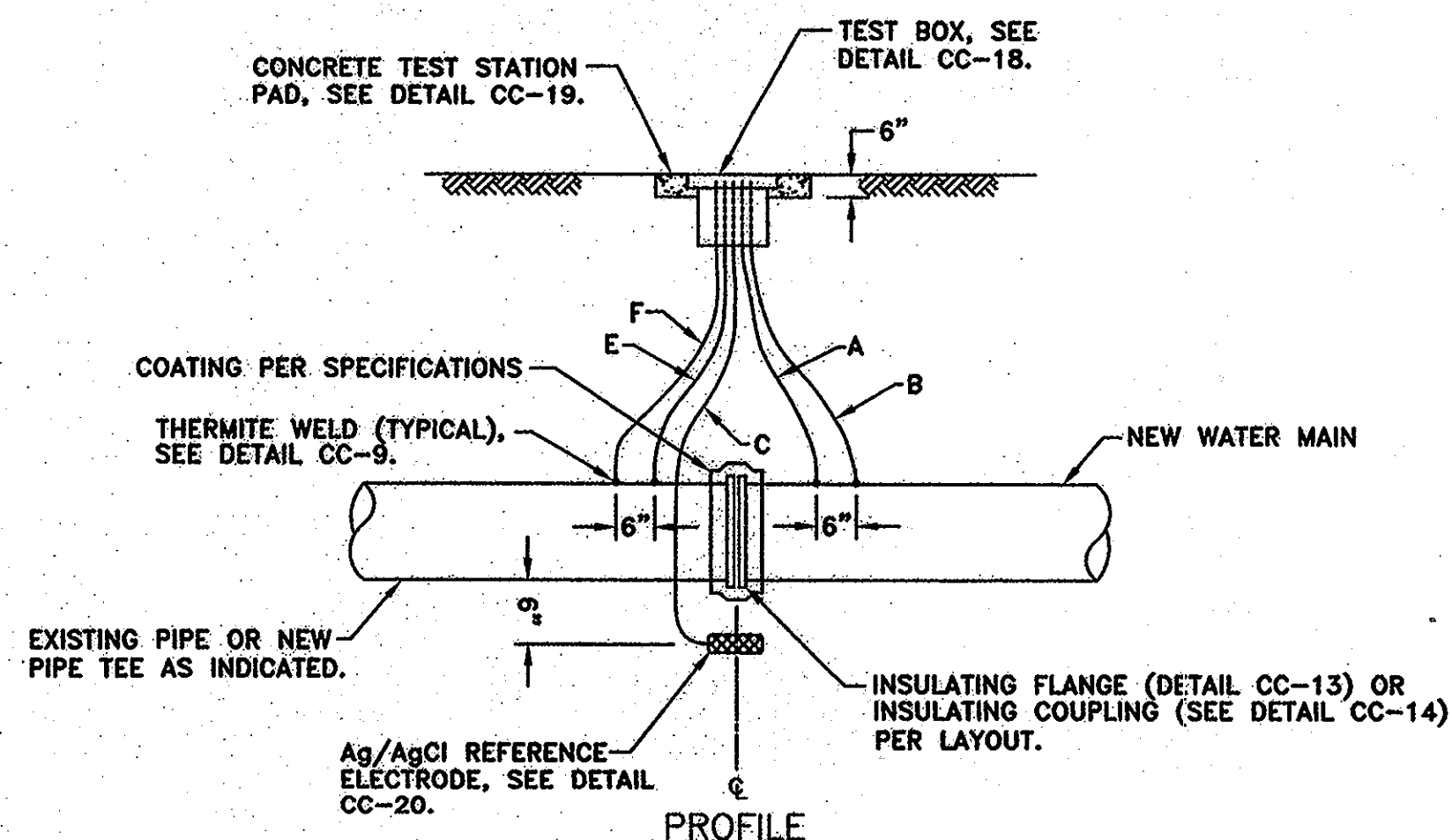
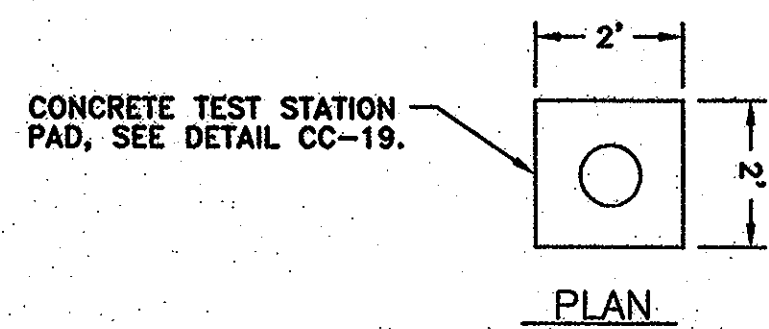
- NOTES:**
- DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES TO FINAL TEST BOX LOCATION.
  - ALL THERMITE WELDS TO PCCP TO BE PERFORMED AT STEEL BONDING PLATES.



**CC-2: STANDARD TEST STATION WITH ANODES**  
NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A	1	#10	THWN	BLUE
	B	3	#10	THWN	BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
ANODE HEADER CABLE	D1	4	#8	HMWPE	BLACK
	D2	7	#8	HMWPE	BLACK

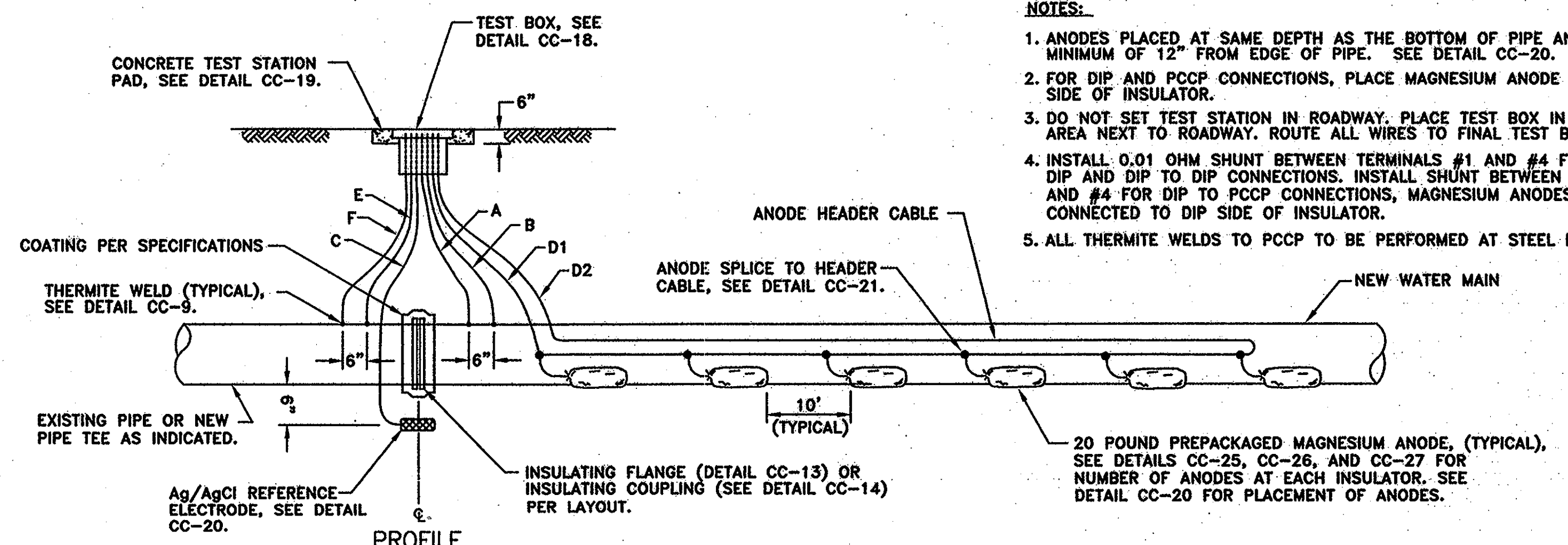
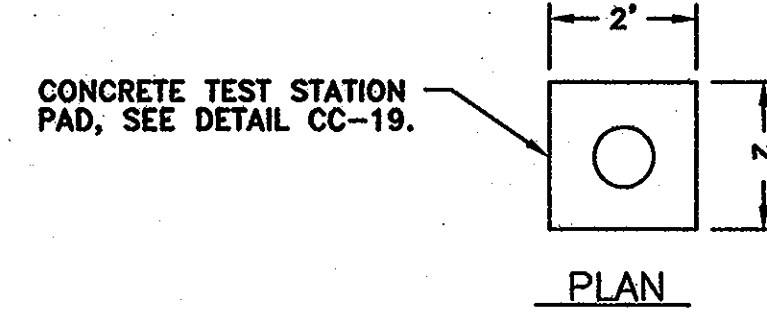
- NOTES:**
- ANODES PLACED AT SAME DEPTH AS THE BOTTOM OF PIPE AND AT A MINIMUM OF 12" FROM EDGE OF PIPE, SEE DETAIL CC-20.
  - DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES TO FINAL TEST BOX LOCATION.
  - INSTALL 0.01 OHM SHUNT BETWEEN TERMINALS #1 AND #4.



**CC-3: INSULATING JOINT TEST STATION**  
NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A	1	#10	THWN	BLUE
	B	3	#10	THWN	BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
EXISTING PIPE OR NEW PIPE TEE	E	2	#10	THWN	WHITE
	F	5	#10	THWN	WHITE

- NOTES:**
- DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES TO FINAL TEST BOX LOCATION.
  - ALL THERMITE WELDS TO PCCP TO BE PERFORMED AT STEEL BONDING PLATES.



**CC-4: INSULATING JOINT TEST STATION**  
NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A	1	#10	THWN	BLUE
	B	3	#10	THWN	BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
ANODE HEADER CABLE	D1	4	#8	HMWPE	BLACK
	D2	7	#8	HMWPE	BLACK
EXISTING PIPE OR NEW PIPE TEE	E	2	#10	THWN	WHITE
	F	5	#10	THWN	WHITE

- NOTES:**
- ANODES PLACED AT SAME DEPTH AS THE BOTTOM OF PIPE AND AT A MINIMUM OF 12" FROM EDGE OF PIPE. SEE DETAIL CC-20.
  - FOR DIP AND PCCP CONNECTIONS, PLACE MAGNESIUM ANODE ON DIP SIDE OF INSULATOR.
  - DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES TO FINAL TEST BOX LOCATION.
  - INSTALL 0.01 OHM SHUNT BETWEEN TERMINALS #1 AND #4 FOR STEEL TO DIP AND DIP TO DIP CONNECTIONS. INSTALL SHUNT BETWEEN TERMINALS #2 AND #4 FOR DIP TO PCCP CONNECTIONS. MAGNESIUM ANODES TO BE CONNECTED TO DIP SIDE OF INSULATOR.
  - ALL THERMITE WELDS TO PCCP TO BE PERFORMED AT STEEL BONDING PLATES.

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**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: *John P. ...* 4/22/08  
 Chief, Bureau of Engineering: *Robert ...* 4/17/08  
 Chief, Bureau of Utilities: *John ...* 4/17/08  
 Chief, Utility Design Division: *Paul ...* 4/17/08

**O'BRIEN & GERE ENGINEERS, INC.**  
Columbia, Maryland

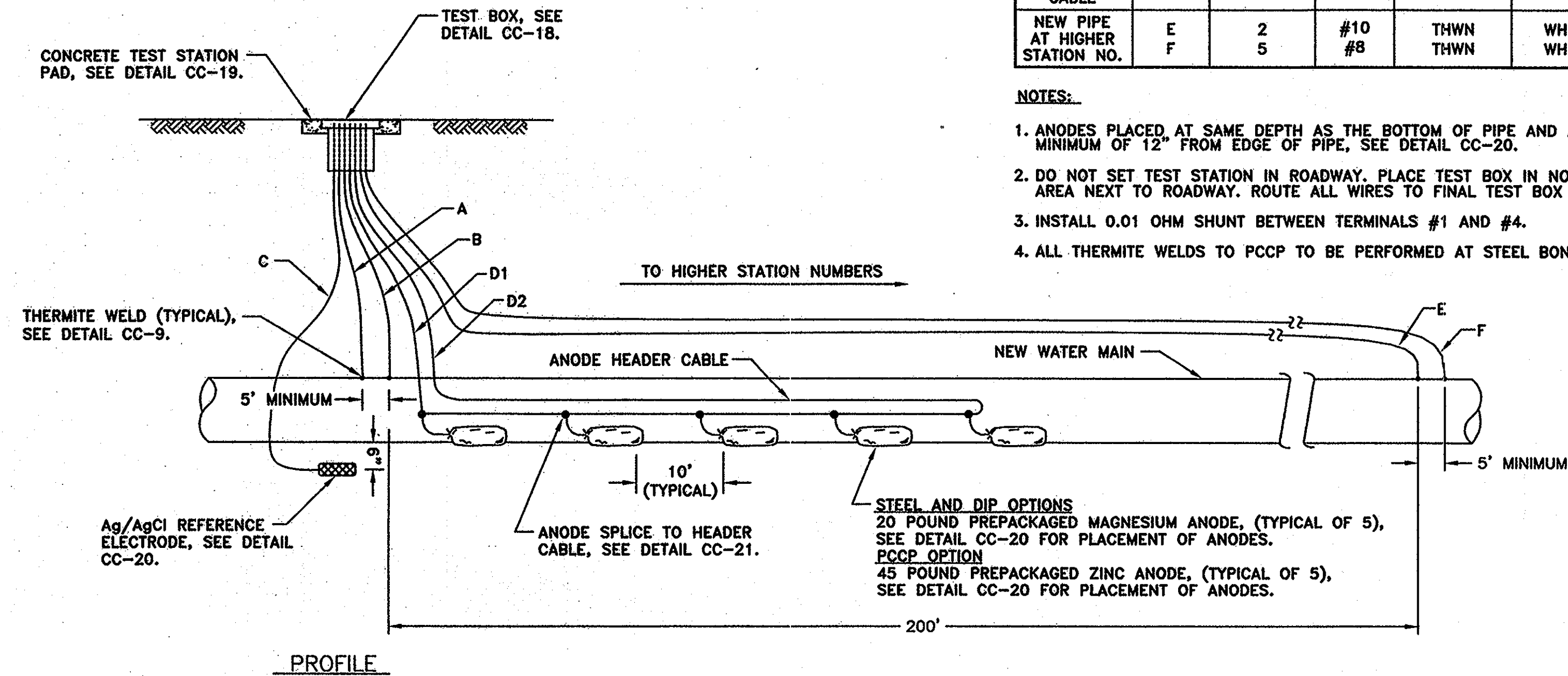
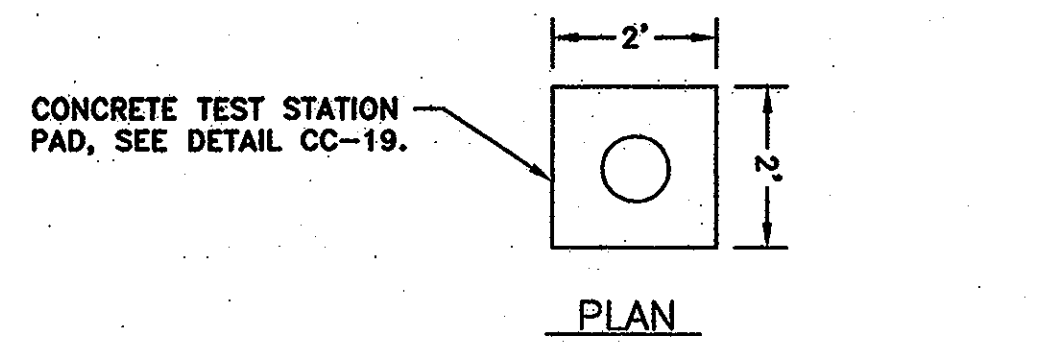
**RUSSELL CORROSION CONSULTANTS, INC.**  
Columbia, Maryland

STATE OF MARYLAND  
PROFESSIONAL ENGINEER  
No. 11709

DSN. BY: MJS					
DRN. BY: DJD					
CHK. BY: MJS					
DATE: 4/4/08	BY NO.	REVISION	DATE	600' SCALE MAP NO. W&S: 24, 30	BLOCK NO.

**U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD AT ST. JOHN'S LANE WATER MAIN**  
 CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4632  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

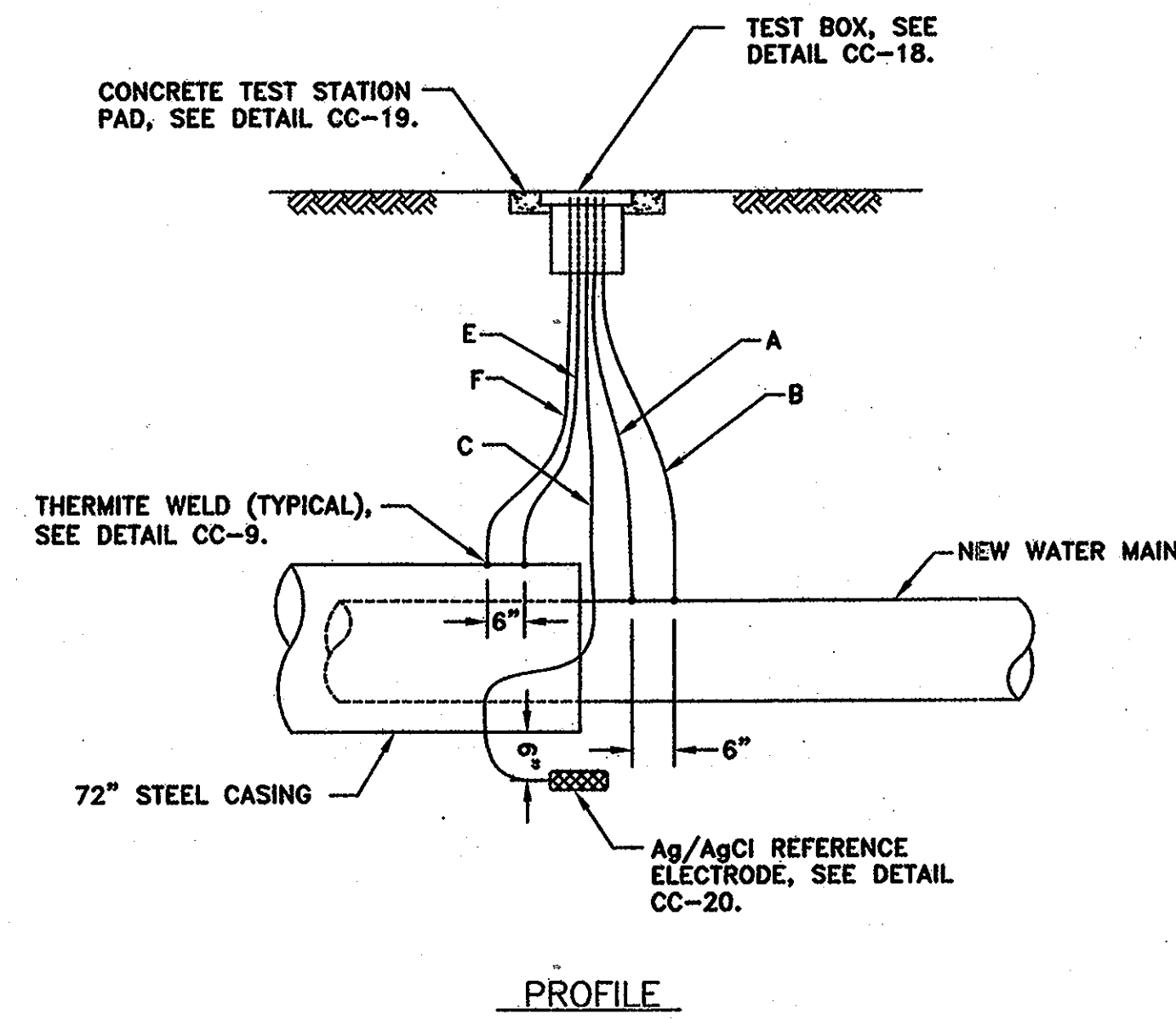
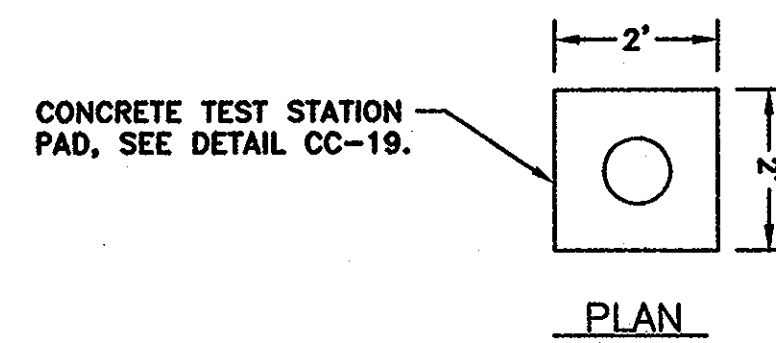
**As-Built**  
CP-5  
SCALE AS SHOWN  
SHEET 26 OF 32  
FILE NO. 29653-026



CC-5: IR DROP TEST STATION WITH ANODES  
NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW PIPE AT TEST STATION	A	1	#8	THWN	BLUE
	B	3	#10	THWN	BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
ANODE HEADER CABLE	D1	4	#8	HMWPE	BLACK
	D2	7	#8	HMWPE	BLACK
NEW PIPE AT HIGHER STATION NO.	E	2	#10	THWN	WHITE
	F	5	#8	THWN	WHITE

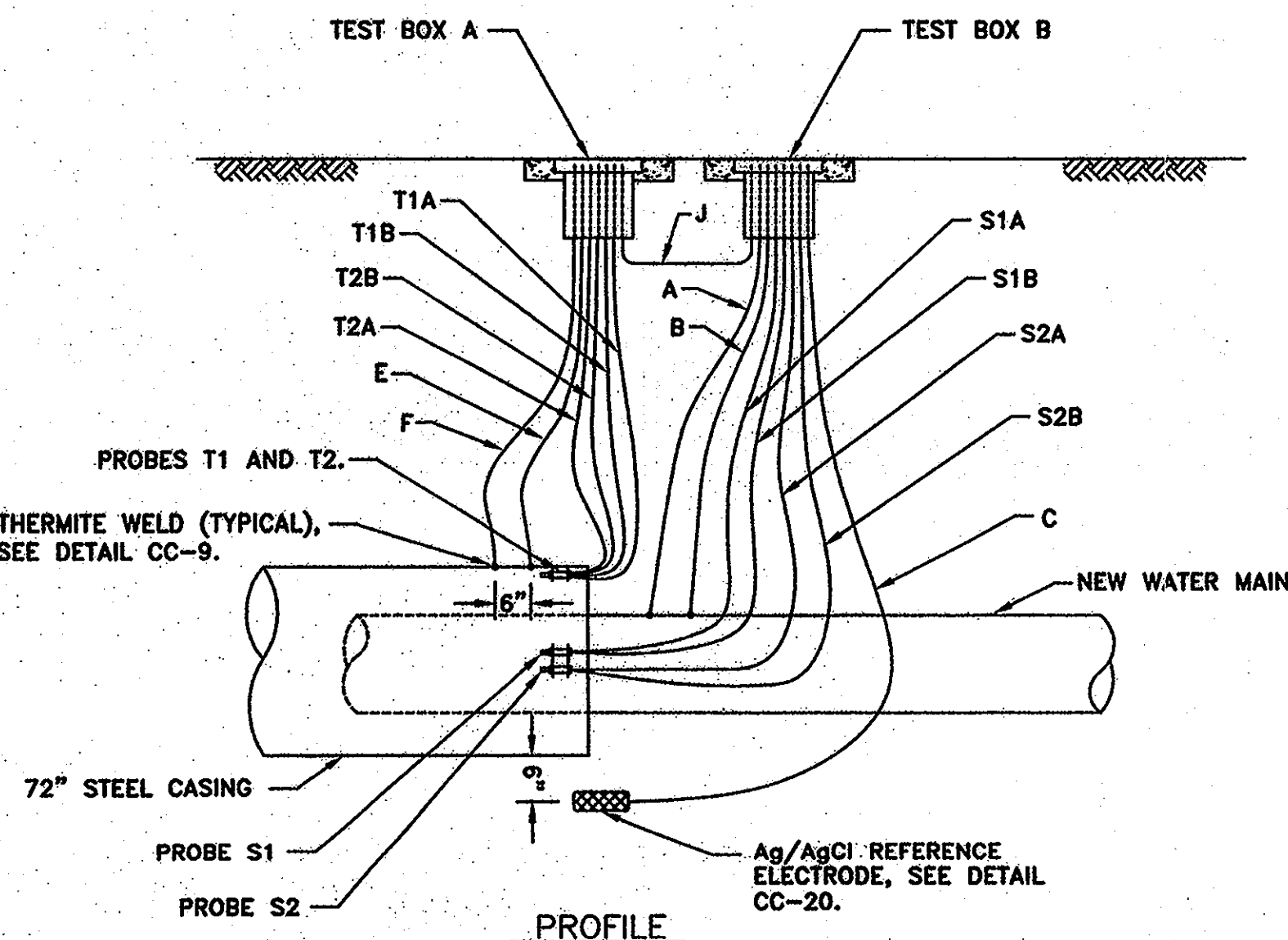
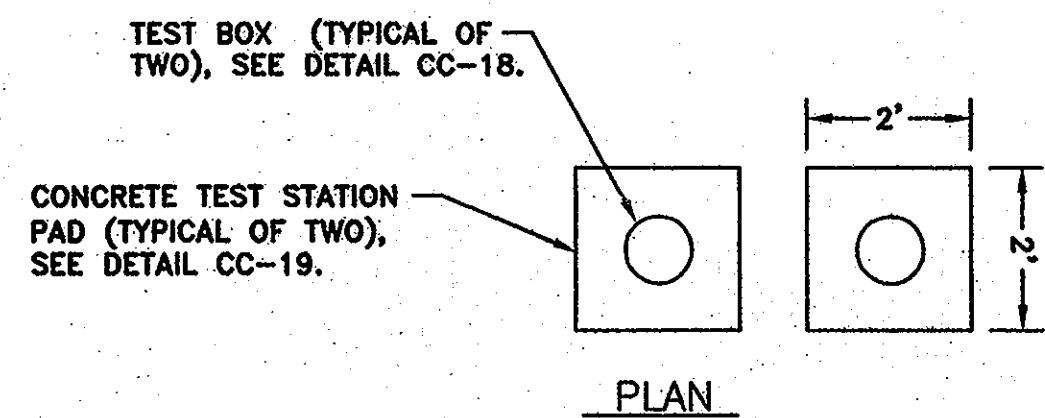
- NOTES:
1. ANODES PLACED AT SAME DEPTH AS THE BOTTOM OF PIPE AND AT A MINIMUM OF 12" FROM EDGE OF PIPE, SEE DETAIL CC-20.
  2. DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES TO FINAL TEST BOX LOCATION.
  3. INSTALL 0.01 OHM SHUNT BETWEEN TERMINALS #1 AND #4.
  4. ALL THERMITE WELDS TO PCCP TO BE PERFORMED AT STEEL BONDING PLATES.



CC-6: CASING TEST STATION  
NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A	1	#10	THWN	BLUE
	B	3	#10	THWN	BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
CASING	E	2	#10	THWN	WHITE
	F	5	#10	THWN	WHITE

- NOTES:
1. DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES TO FINAL TEST BOX LOCATION.
  2. ALL THERMITE WELDS TO PCCP TO BE PERFORMED AT STEEL BONDING PLATES.

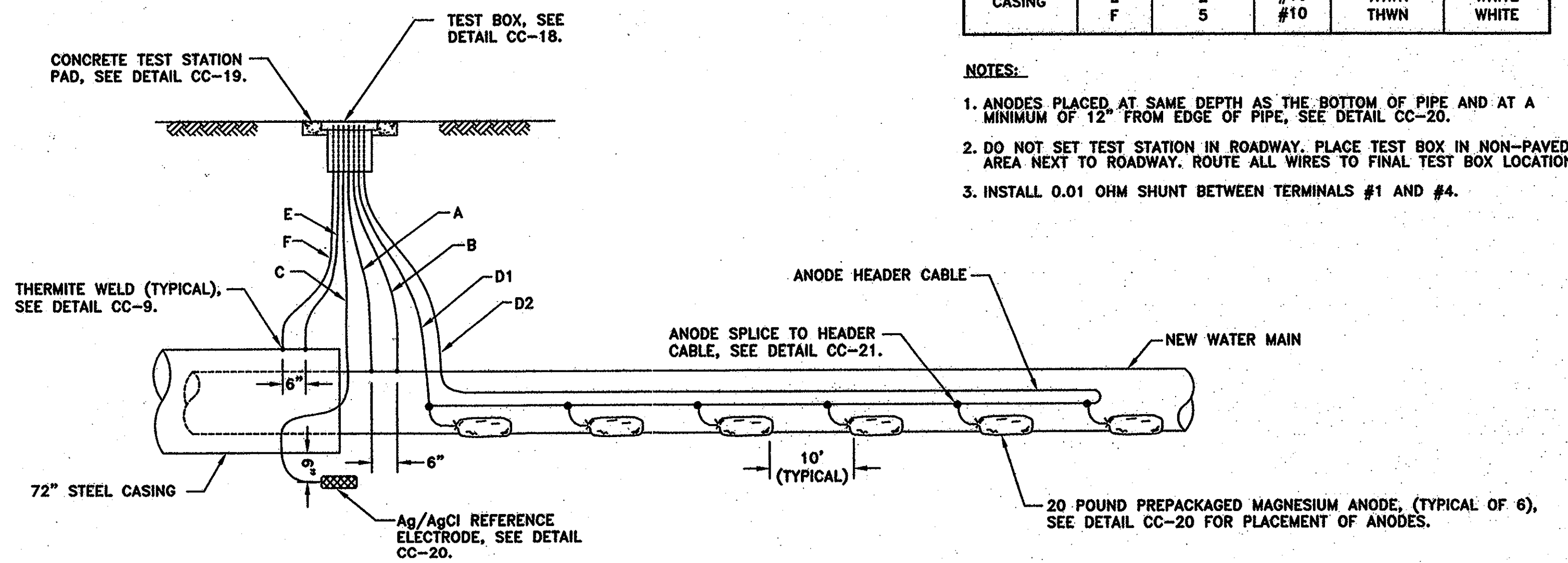
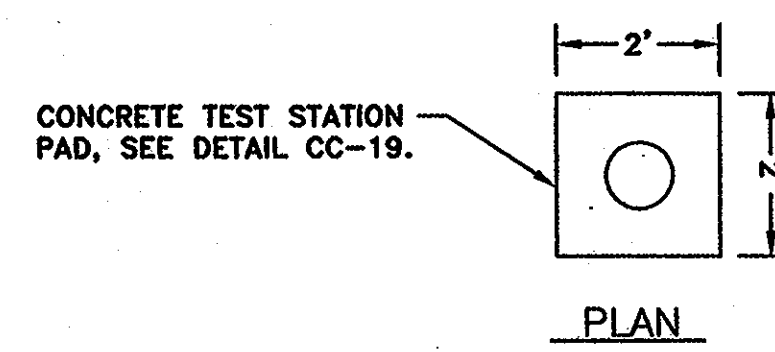


CC-7: CASING TEST STATION WITH CORROSION RATE PROBES  
NOT TO SCALE

WIRING SCHEDULE - TEST BOX A					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
PROBE T1	T1A	4	#14	THWN	BLACK
	T1B	4	#14	THWN	BLACK
PROBE T2	T2A	7	#14	THWN	BLACK
	T2B	7	#14	THWN	BLACK
CASING	E	2	#10	THWN	WHITE
	F	5	#10	THWN	WHITE
JUMPER	J	1	#8	HMWPE	BLACK

WIRING SCHEDULE - TEST BOX B					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A	1	#10	THWN	BLUE
	B	3	#10	THWN	BLUE
PROBE S1	S1A	4	#14	THWN	BLACK
	S1B	4	#14	THWN	BLACK
PROBE S2	S2A	7	#14	THWN	BLACK
	S2B	7	#14	THWN	BLACK
REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
JUMPER	J	2	#8	HMWPE	BLACK

- NOTES:
1. DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES TO FINAL TEST BOX LOCATION.
  2. ALL THERMITE WELDS TO PCCP TO BE PERFORMED AT STEEL BONDING PLATES.
  3. SEE DETAIL CC-22 FOR CORROSION RATE PROBE PLACEMENT.



CC-8: CASING TEST STATION WITH ANODES  
NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A	1	#10	THWN	BLUE
	B	3	#10	THWN	BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
ANODE HEADER CABLE	D1	4	#8	HMWPE	BLACK
	D2	7	#8	HMWPE	BLACK
CASING	E	2	#10	THWN	WHITE
	F	5	#10	THWN	WHITE

- NOTES:
1. ANODES PLACED AT SAME DEPTH AS THE BOTTOM OF PIPE AND AT A MINIMUM OF 12" FROM EDGE OF PIPE, SEE DETAIL CC-20.
  2. DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES TO FINAL TEST BOX LOCATION.
  3. INSTALL 0.01 OHM SHUNT BETWEEN TERMINALS #1 AND #4.

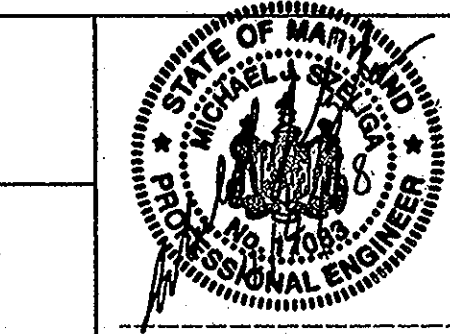
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DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

Director of Public Works: *[Signature]* 4/16/08  
Chief, Bureau of Engineering: *[Signature]* 4/17/08  
Chief, Bureau of Utilities: *[Signature]* 4/16/08  
Chief, Utility Design Division: *[Signature]* 4/17/08

O'BRIEN & GERE ENGINEERS, INC.

RUSSELL CORROSION CONSULTANTS, INC.  
Columbia, Maryland



DSN. BY: MJS  
DRN. BY: DJD  
CHK. BY: MJS  
DATE: 4/4/08

BY NO. REVISION DATE

CORROSION CONTROL DETAILS - 2

600' SCALE MAP NO. W&S: 24, 30 BLOCK NO.

U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD AT ST. JOHN'S LANE WATER MAIN  
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

As-Built  
CP-6  
SCALE AS SHOWN  
SHEET 27 OF 32  
FILE NO. 29653-027

DUCTILE IRON PIPE, STEEL PIPE, STEEL CASING, STEEL BONDING PLATE, OR STEEL CONNECTOR PLATE

CLEAN SURFACE TO BRIGHT METAL AT WELD LOCATION BY MECHANICAL GRINDER.

STEP 1

ADAPTER SLEEVE  
STRANDED COPPER WIRE (WITH THWN OR HMWPE INSULATION).

STRIP INSULATION FROM WIRE AND INSTALL ADAPTER SLEEVE.

STEP 2

GRAPHITE MOLD

OPENING

TOP

HANDLE  
GRAPHITE COVER  
STARTING POWDER  
METAL POWDER  
METAL DISC  
WIRE

SIDE

DUCTILE IRON PIPE, STEEL PIPE, STEEL CASING, STEEL BONDING PLATE, OR STEEL CONNECTOR PLATE

HOLD GRAPHITE MOLD FIRMLY OVER ADAPTER SLEEVE WITH OPENING AWAY FROM OPERATOR - IGNITE STARTING POWDER.

STEP 3

NOTES:

1. THERMITE WELDS MADE DUCTILE IRON PIPE OR STEEL PIPE OR STEEL CASING SHALL BE COATED WITH A PREFABRICATED ONE PIECE PLASTIC CAP FILLED WITH ELASTOMERIC MATERIAL, ROYSTON HANDY-CAP OR APPROVED EQUAL.
2. THERMITE WELDS MADE TO THE STEEL BONDING PLATES OF PCCP PIPING SHALL BE COATED WITH BRUSH APPLIED R28 MASTIC (10 MILS MINIMUM THICKNESS) OR APPROVED EQUAL. MASTIC SHALL BE DRY BEFORE THERMITE WELDS ARE COVERED OVER WITH GROUT.

REMOVE SLAG FROM CONNECTION. THOROUGHLY CLEAN WELD AREA.

STEP 4

PRIME AND COAT ALL EXPOSED METAL AT WELD AREA.

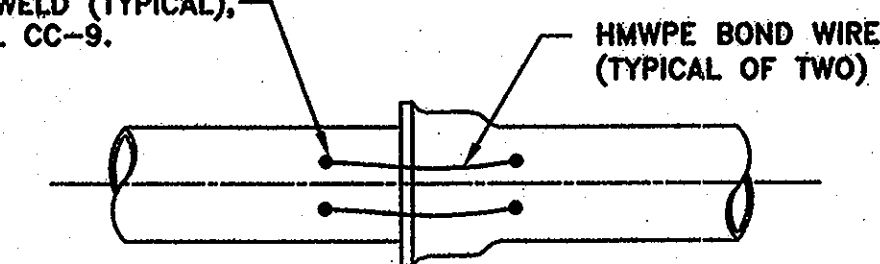
THERMITE WELD  
WIRE  
DUCTILE IRON PIPE, STEEL PIPE, STEEL CASING, STEEL BONDING PLATE, OR STEEL CONNECTOR PLATE

STEP 5

CC-9: THERMITE WELD

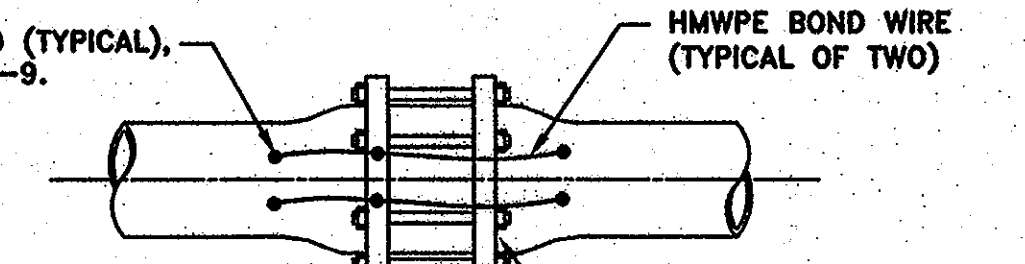
NOT TO SCALE

THERMITE WELD (TYPICAL), SEE DETAIL CC-9.



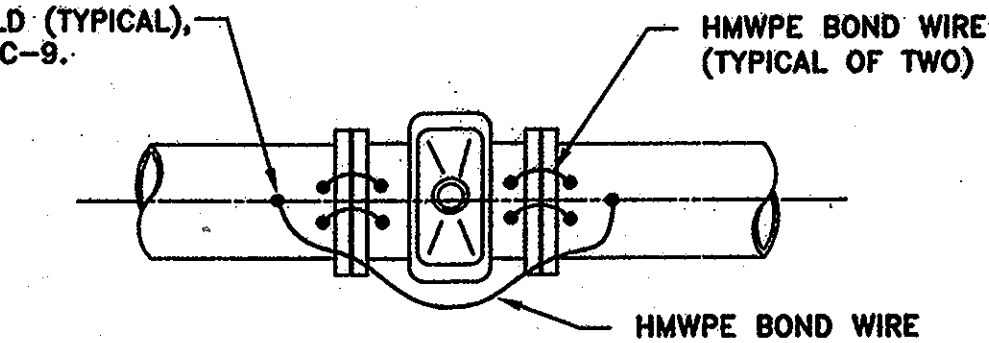
TYPICAL PIPE JOINT BOND

THERMITE WELD (TYPICAL), SEE DETAIL CC-9.



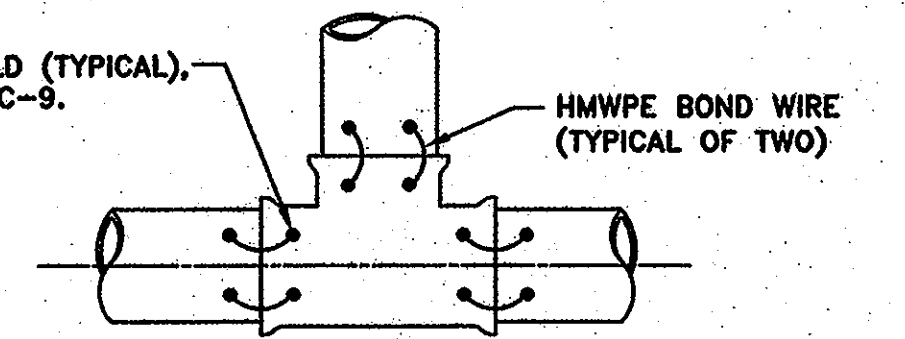
TYPICAL MECHANICAL COUPLING BOND

THERMITE WELD (TYPICAL), SEE DETAIL CC-9.



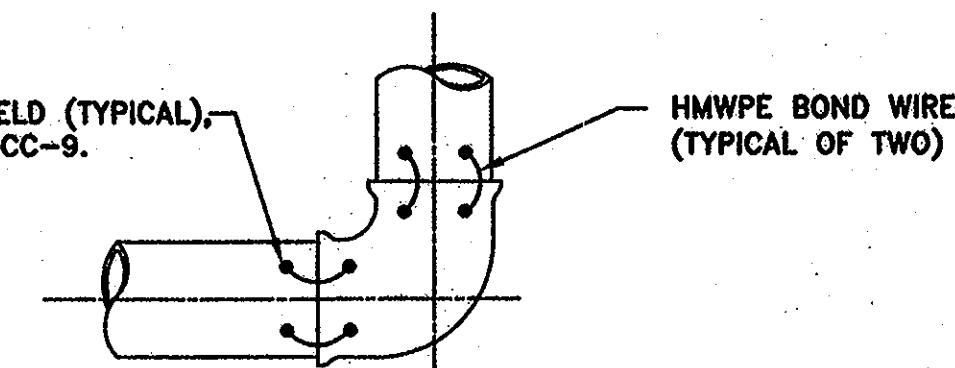
TYPICAL BONDING OF VALVE

THERMITE WELD (TYPICAL), SEE DETAIL CC-9.



TYPICAL BONDING OF TEE

THERMITE WELD (TYPICAL), SEE DETAIL CC-9.



TYPICAL BONDING OF BEND, REDUCER OR SOLID SLEEVE

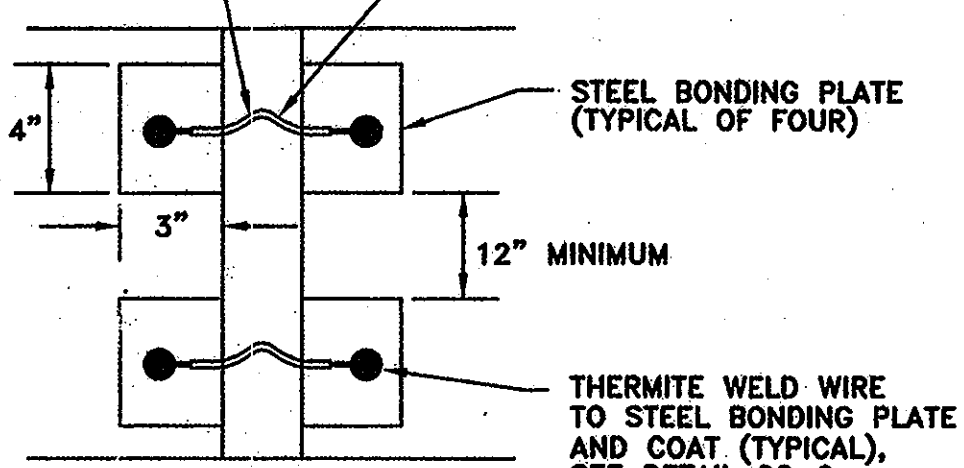
NOTES:

1. BOND ALL JOINTS ON UNDERGROUND PIPING ASSOCIATED WITH THE WATER MAIN EXCEPT INSULATED JOINTS.
2. THERMITE WELD BONDING WIRES TO TOP OF PIPE OR FITTINGS, SEE DETAIL CC-9.
3. WIRE SIZE FOR BONDING JOINTS SHALL BE AS FOLLOWS:  
12" & SMALLER - AWG NO. 6  
16" TO 36" - AWG NO. 4  
LARGER THAN 36" - AWG NO. 2
4. ALL THERMITE WELDS TO PCCP TO BE PERFORMED AT THE STEEL BONDING PLATES, SEE DETAIL CC-11.

CC-10: JOINT BONDING

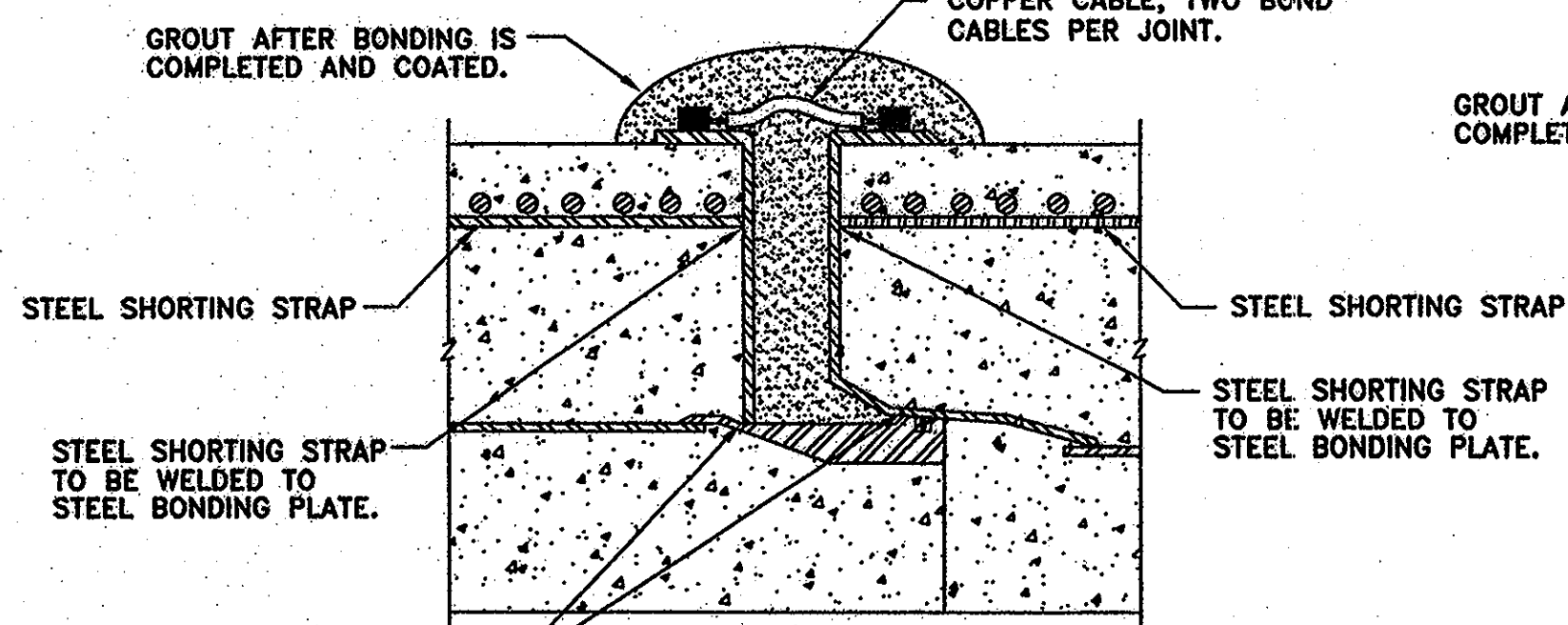
NOT TO SCALE

COPPER CABLE, TWO BOND CABLES PER JOINT.



TOP VIEW

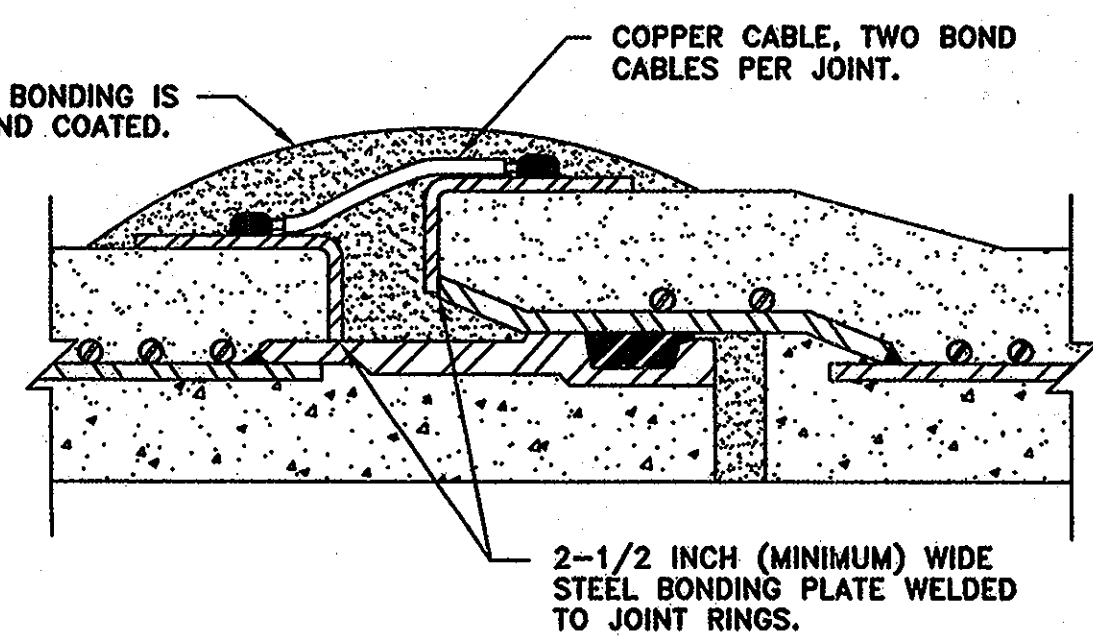
GROUT AFTER BONDING IS COMPLETED AND COATED.



SIDE VIEW

EMBEDDED CYLINDER PIPE JOINT

GROUT AFTER BONDING IS COMPLETED AND COATED.



SIDE VIEW

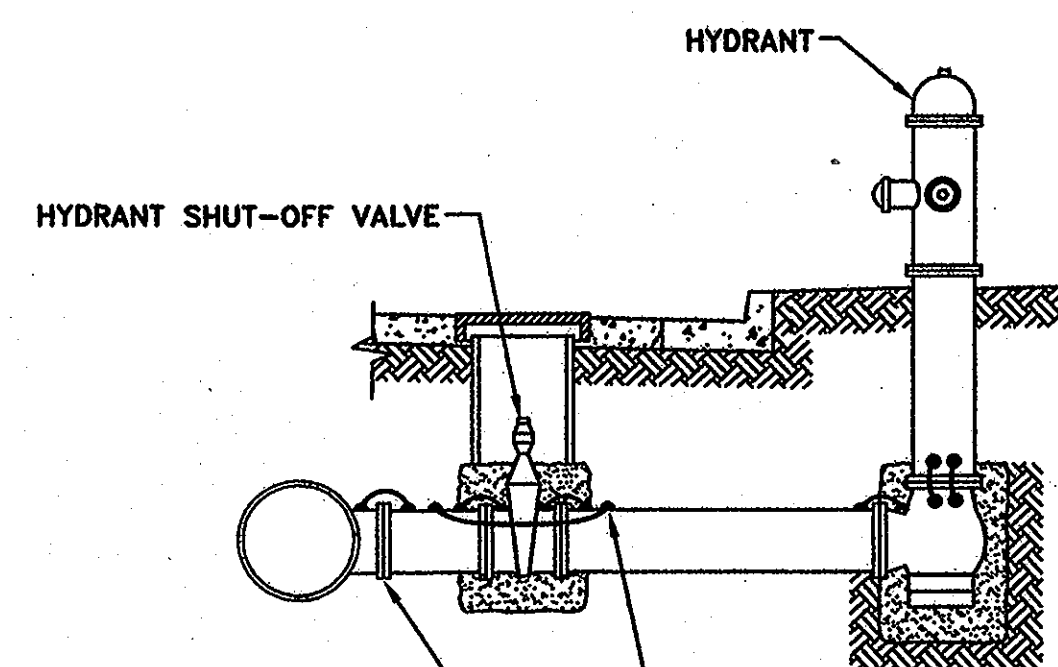
LINED CYLINDER PIPE JOINT

NOTES:

1. TWO STEEL SHORTING STRAPS REQUIRED PER PIPE SECTION FOR EMBEDDED CYLINDER PIPE. NO SHORTING STRAPS REQUIRED FOR LINED CYLINDER PIPE.
2. STEEL BONDING PLATES AND STEEL SHORTING STRAPS (IF REQUIRED) TO BE INSTALLED BY PIPE MANUFACTURER DURING PIPE FABRICATION.
3. BOND ALL PIPE JOINTS, INCLUDING THOSE ON PIPE, FITTINGS, VALVES, ETC., EXCEPT THOSE SPECIFIED TO BE INSULATED.

CC-11: PCCP JOINT BONDING

NOT TO SCALE



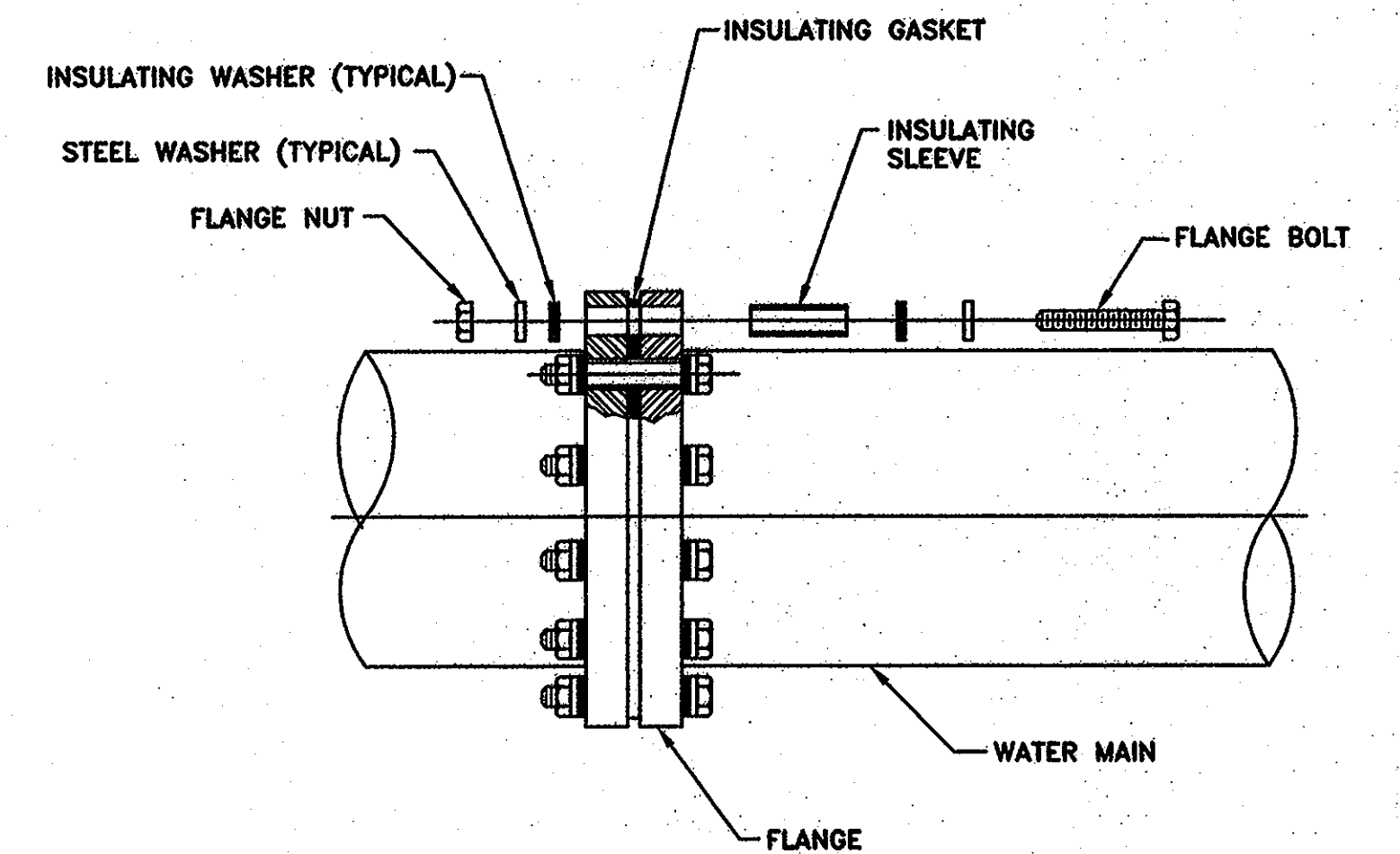
IF INSULATED JOINT IS SPECIFIED, DO NOT INSTALL BONDS ACROSS INSULATED JOINT.

NOTES:

1. BOND ALL DUCTILE IRON COMPONENTS TOGETHER WITH AWG NO. 6 HMWPE WIRES.
2. INSTALL BOND WIRES ON TOP OF PIPE OR FITTING WHERE POSSIBLE.
3. INSTALL A MINIMUM OF TWO BOND CABLES ACROSS EACH PIPE JOINT.
4. SEE DETAIL CC-10 FOR BONDING OF VALVE.
5. BOND HYDRANT PIPING ASSOCIATED WITH THE WATER MAIN.
6. DO NOT THERMITE WELD TO PVC PIPE.

CC-12: ELECTRICAL BONDING OF HYDRANT PIPING

NOT TO SCALE



NOTES:

1. THE CONTRACTOR SHALL CAREFULLY ALIGN AND INSTALL THE INSULATING COMPONENTS ACCORDING TO THE INSULATOR MANUFACTURER'S INSTRUCTIONS.
2. BEFORE BACKFILLING, EACH INSULATOR SHALL BE TESTED FOR ELECTRICAL ISOLATION. IF THE FLANGE IS NOT PROPERLY ISOLATED, THE CONTRACTOR SHALL, AT HIS EXPENSE, REPAIR OR REPLACE ALL DEFECTIVE COMPONENTS. THE REPAIRED INSULATOR SHALL BE TESTED. THIS PROCESS WILL CONTINUE UNTIL THE FLANGE IS TESTED TO BE PROPERLY ISOLATED.
3. AFTER THE FLANGE IS TESTED TO BE PROPERLY ISOLATED, THE INSULATOR SHALL BE COATED WITH FOUR COMPONENTS OF TRENTON WAX TAPE SYSTEM OR APPROVED EQUAL. TEST WIRES AND MAGNESIUM ANODES SHALL BE INSTALLED AT INSULATING FLANGES AS REQUIRED BY LAYOUT DRAWING AND AS SHOWN IN DETAILS CC-5, AND CC-4.

CC-13: INSULATING FLANGE

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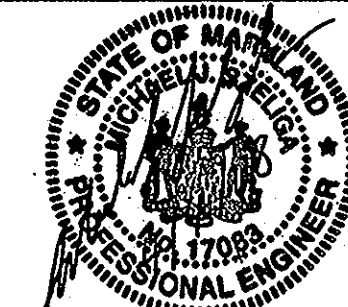
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DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

Director of Public Works: *Jay A. ...* 4/21/08  
 Chief, Bureau of Engineering: *Robert J. ...* 4/17/08  
 Chief, Bureau of Utilities: *Stuart C. ...* 4/21/08  
 Chief, Utility Design Division: *Clayton ...* 4/17/08

O'BRIEN & GERE  
ENGINEERS, INC.

RUSSELL CORROSION CONSULTANTS, INC.  
Columbia, Maryland



DSN. BY: MJS			
DRN. BY: DJD			
CHK. BY: MJS			
DATE: 4/4/08	BY NO.	REVISION	DATE

CORROSION CONTROL  
DETAILS - 3

600' SCALE MAP NO. W&S: 24, 30 BLOCK NO.

U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD  
AT ST. JOHN'S LANE WATER MAIN

CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

As-Built

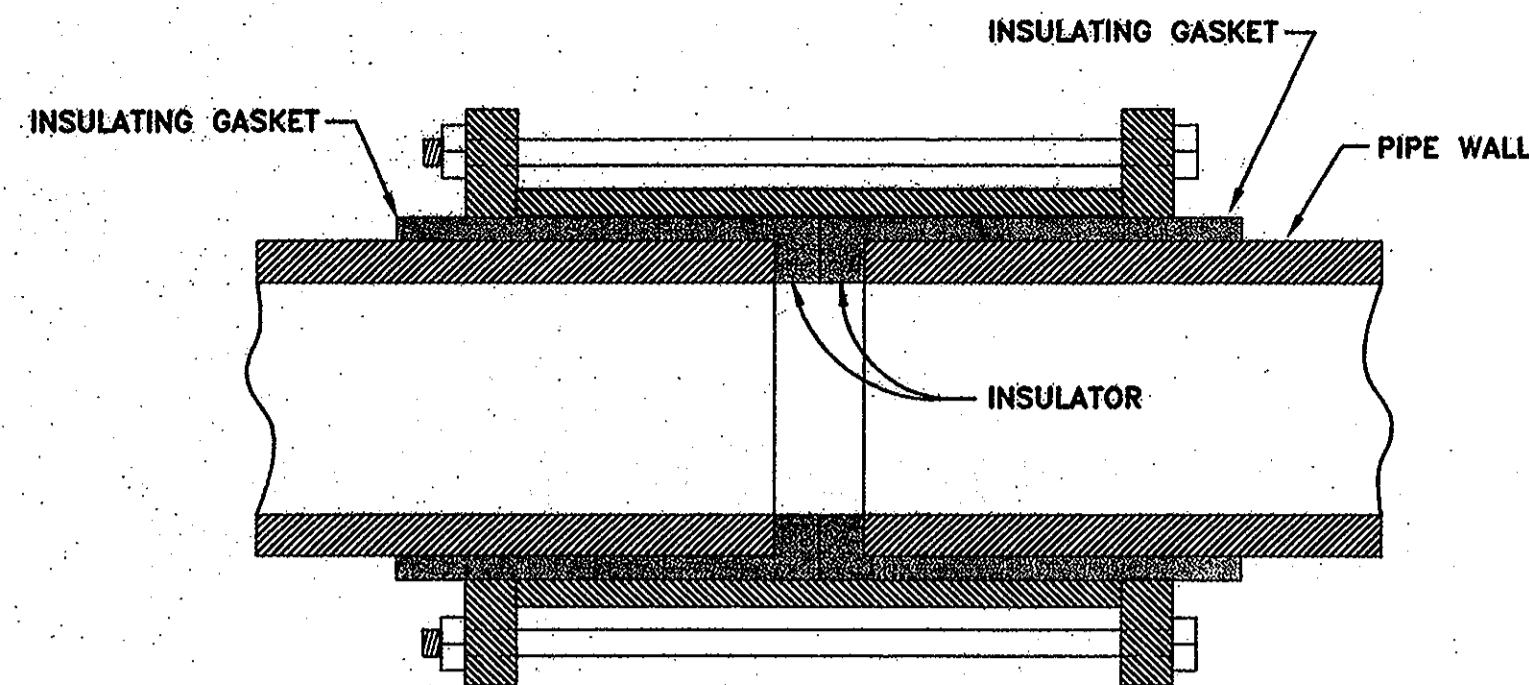
CP-7

SCALE AS SHOWN

SHEET

28 OF 32

FILE NO. 29653-028

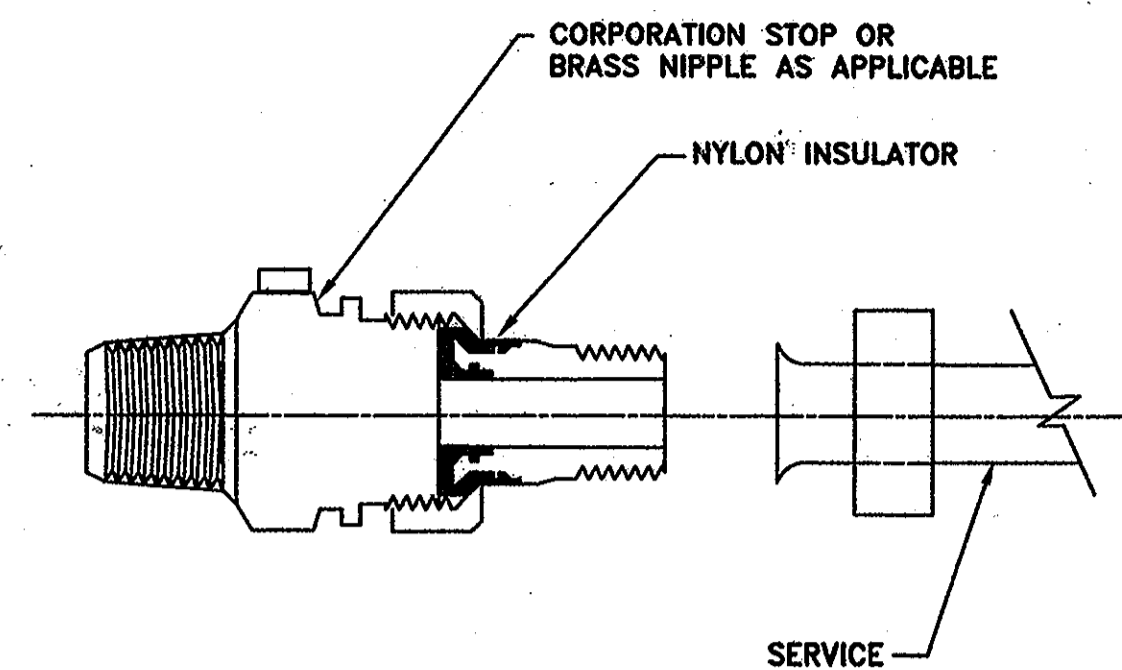


**NOTES:**

1. MATERIALS: THE INSULATING MATERIALS SHALL INCLUDE AN INSULATING GASKET AND A "FULL BOOT" PLASTIC TUBULAR INSULATOR INSIDE THE MIDDLE RING TO PREVENT CONTACT BETWEEN PIPE ENDS THAT ARE ISOLATED FROM ONE ANOTHER. INSULATION SHALL BE PROVIDED TO BOTH ENDS OF COUPLING. INSULATING COUPLINGS SHALL BE AS MANUFACTURED BY DRESSER INDUSTRIES, INC. STYLE 39 INSULATING COUPLING OR APPROVED EQUAL.
2. EXECUTION:
  - A. THE CONTRACTOR SHALL CAREFULLY ALIGN AND INSTALL THE INSULATING COMPONENTS ACCORDING TO THE INSULATOR MANUFACTURER'S INSTRUCTIONS.
  - B. BEFORE BACKFILLING, EACH INSULATOR SHALL BE TESTED FOR ELECTRICAL ISOLATION. IF THE COUPLING IS NOT PROPERLY ISOLATED, THE CONTRACTOR SHALL, AT HIS EXPENSE, REPAIR OR REPLACE ALL DEFECTIVE COMPONENTS. THE REPAIRED INSULATOR SHALL BE TESTED. THIS PROCESS WILL CONTINUE UNTIL THE COUPLING IS TESTED TO BE PROPERLY ISOLATED.
  - C. AFTER THE COUPLING IS TESTED TO BE PROPERLY ISOLATED, THE INSULATOR SHALL BE COATED WITH FOUR COMPONENTS OF TRENTON WAX TAPE SYSTEM OR APPROVED EQUAL. TEST WIRES AND MAGNESIUM ANODES SHALL BE INSTALLED AT INSULATING COUPLINGS AS REQUIRED BY DETAILS CC-3, AND CC-4.

**CC-14: INSULATING COUPLING**

NOT TO SCALE

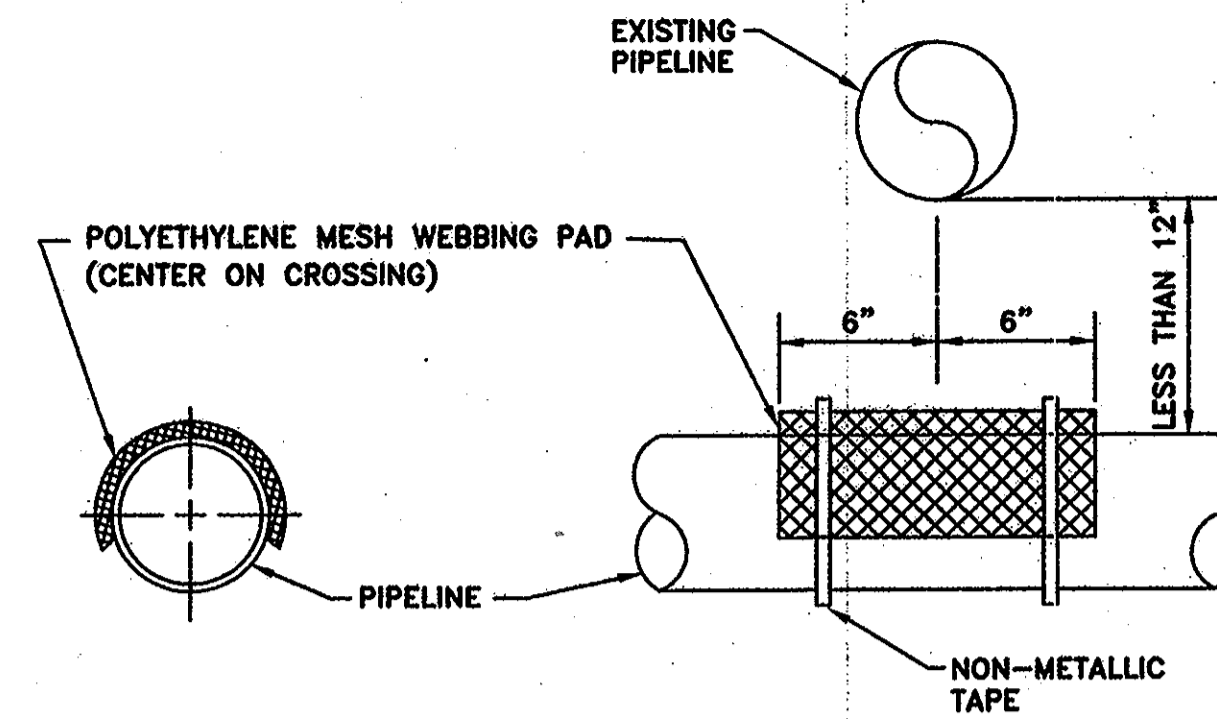


**NOTES:**

1. INSTALL ELECTRICAL ISOLATION ON ALL SMALL DIAMETER (2" AND LESS) WATER SERVICE CONNECTIONS TO MAIN.
2. BEFORE BACKFILLING, EACH INSULATOR SHALL BE TESTED FOR ELECTRICAL ISOLATION. IF THE CORPORATION IS NOT PROPERLY ISOLATED, THE CONTRACTOR SHALL, AT HIS EXPENSE, REPAIR OR REPLACE ALL DEFECTIVE COMPONENTS. THE REPAIRED INSULATOR SHALL BE TESTED. THIS PROCESS WILL CONTINUE UNTIL THE CORPORATION IS TESTED TO BE PROPERLY ISOLATED.
3. AFTER THE CORPORATION IS TESTED TO BE PROPERLY ISOLATED, THE INSULATOR AND 12 INCHES OF SERVICE PIPING SHALL BE COATED WITH FOUR COMPONENTS OF TRENTON WAX TAPE SYSTEM OR APPROVED EQUAL.

**CC-15: INSULATING CORPORATION**

NOT TO SCALE

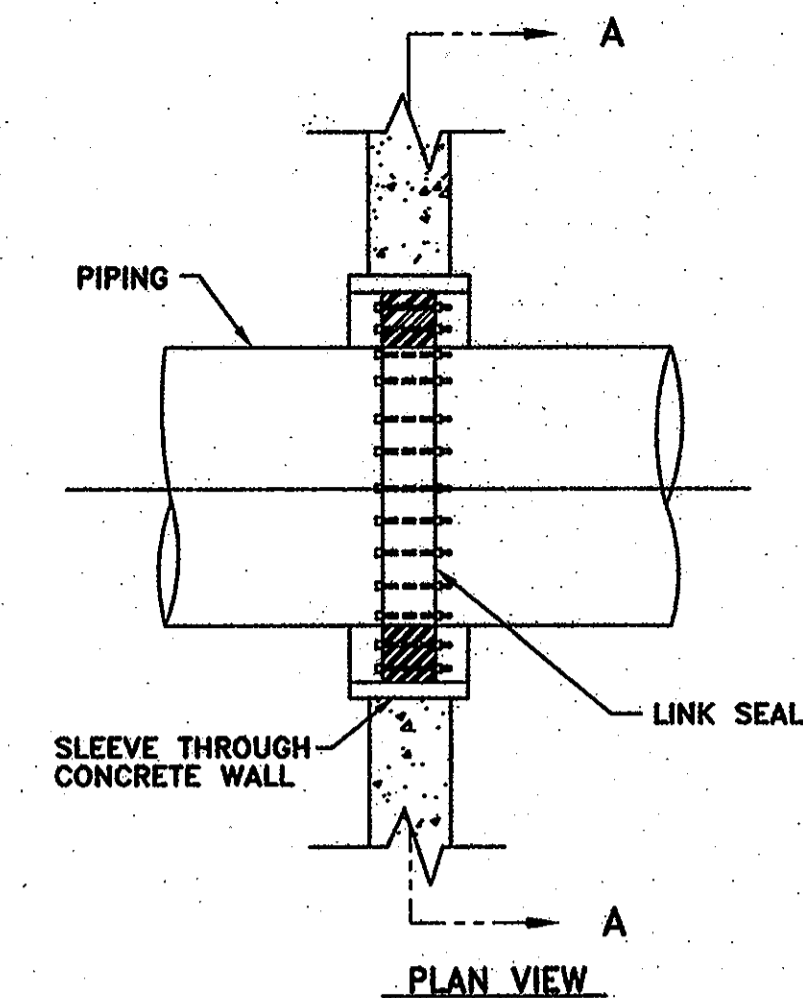


**NOTE:**

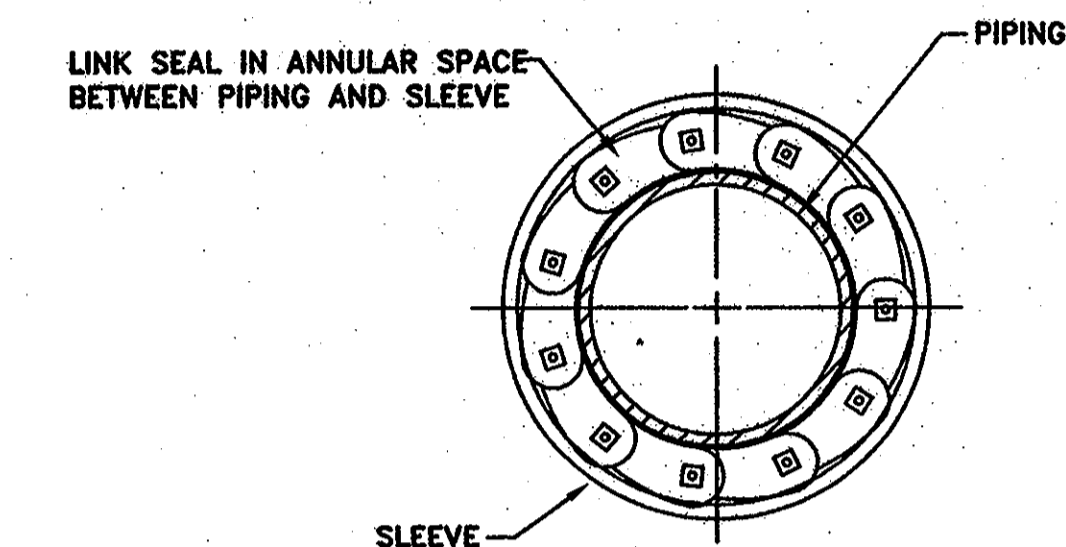
USE ONLY WHEN PIPES ARE LESS THAN 12" APART.

**CC-16: SEPARATOR TO AVOID ELECTRICAL CONTACT**

NOT TO SCALE



**PLAN VIEW**



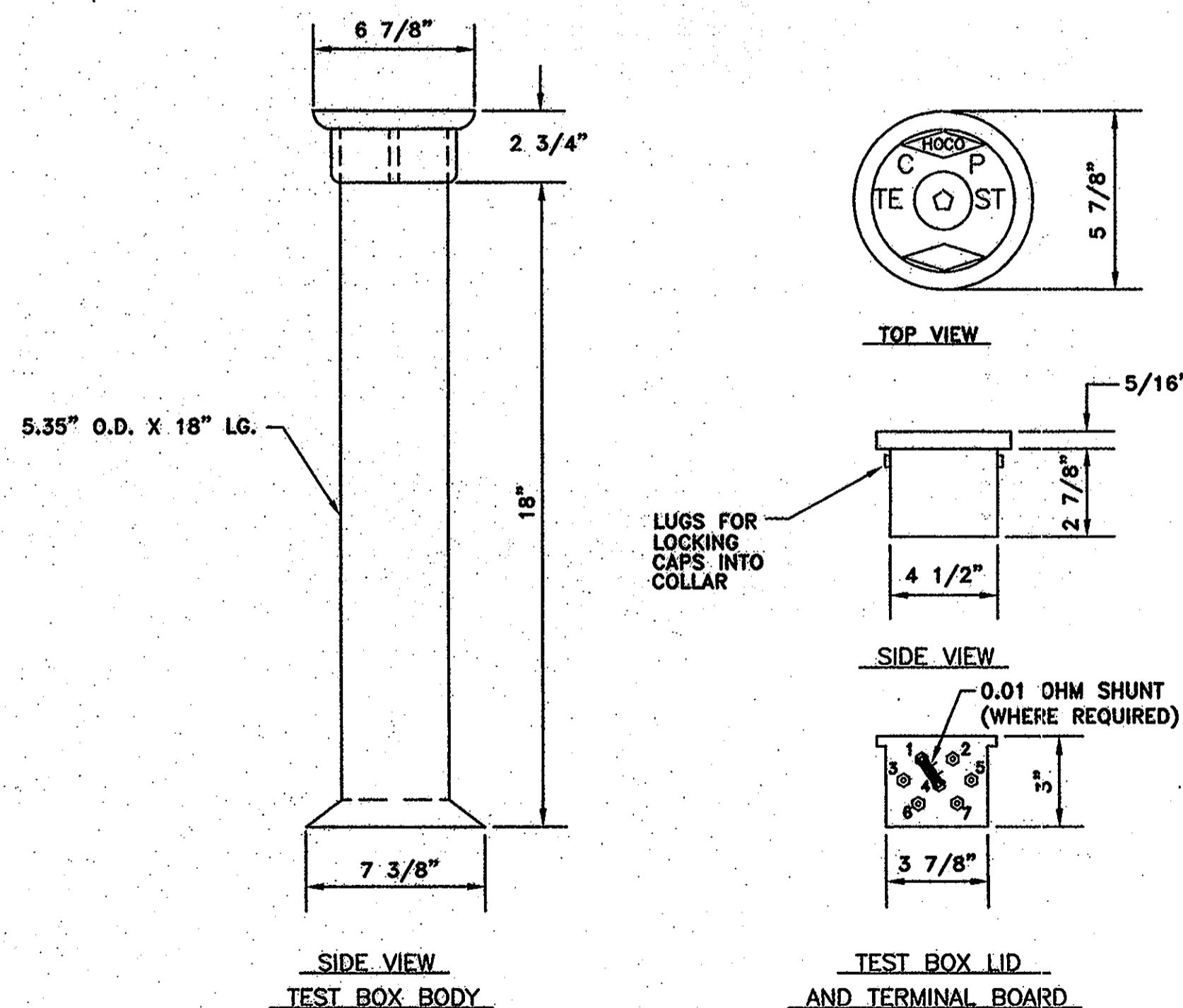
**SECTION C-C**

**NOTE:**

INSTALL LINK SEAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDED PROCEDURE.

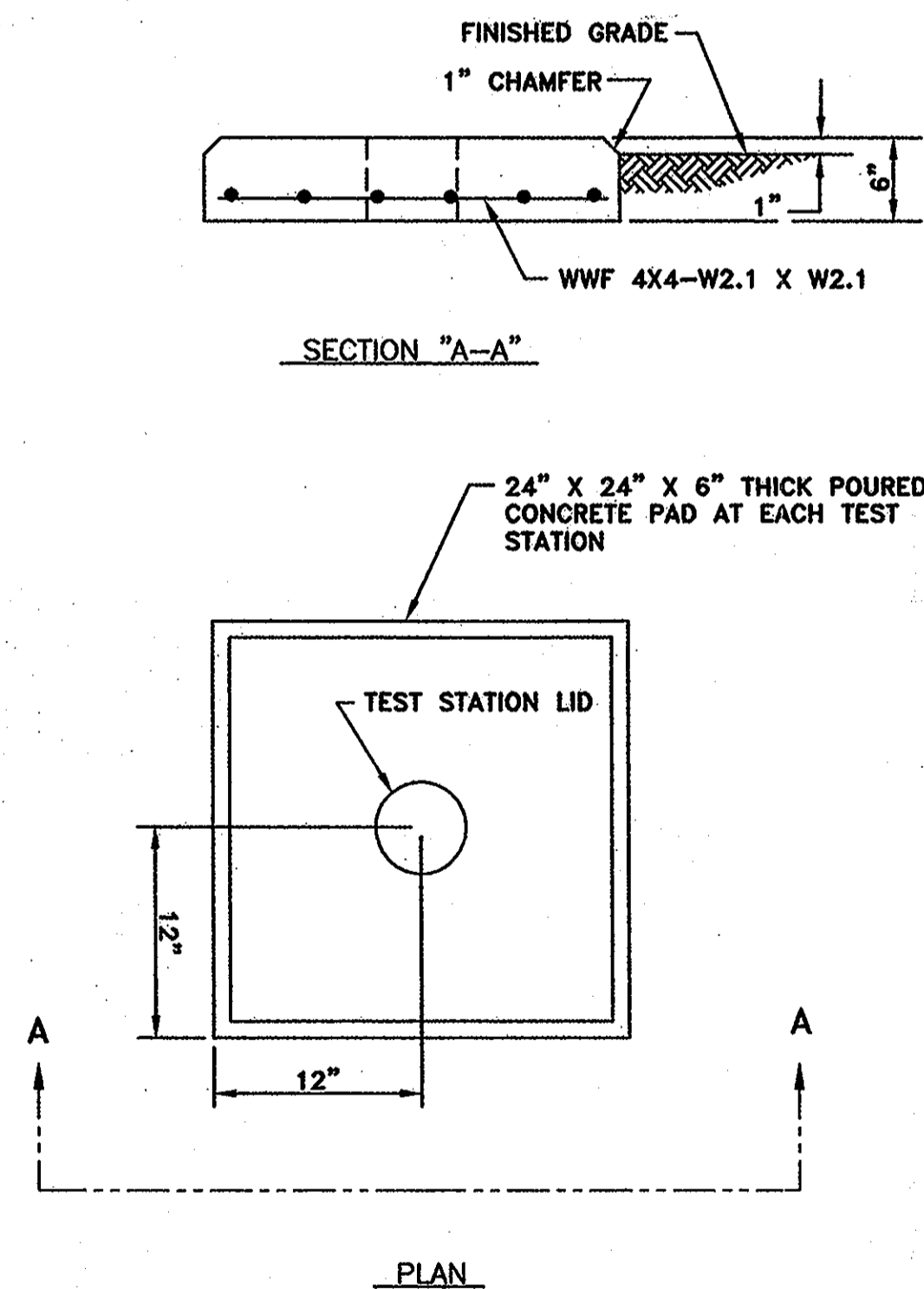
**CC-17: LINK SEAL AT CONCRETE WALLS**

NOT TO SCALE



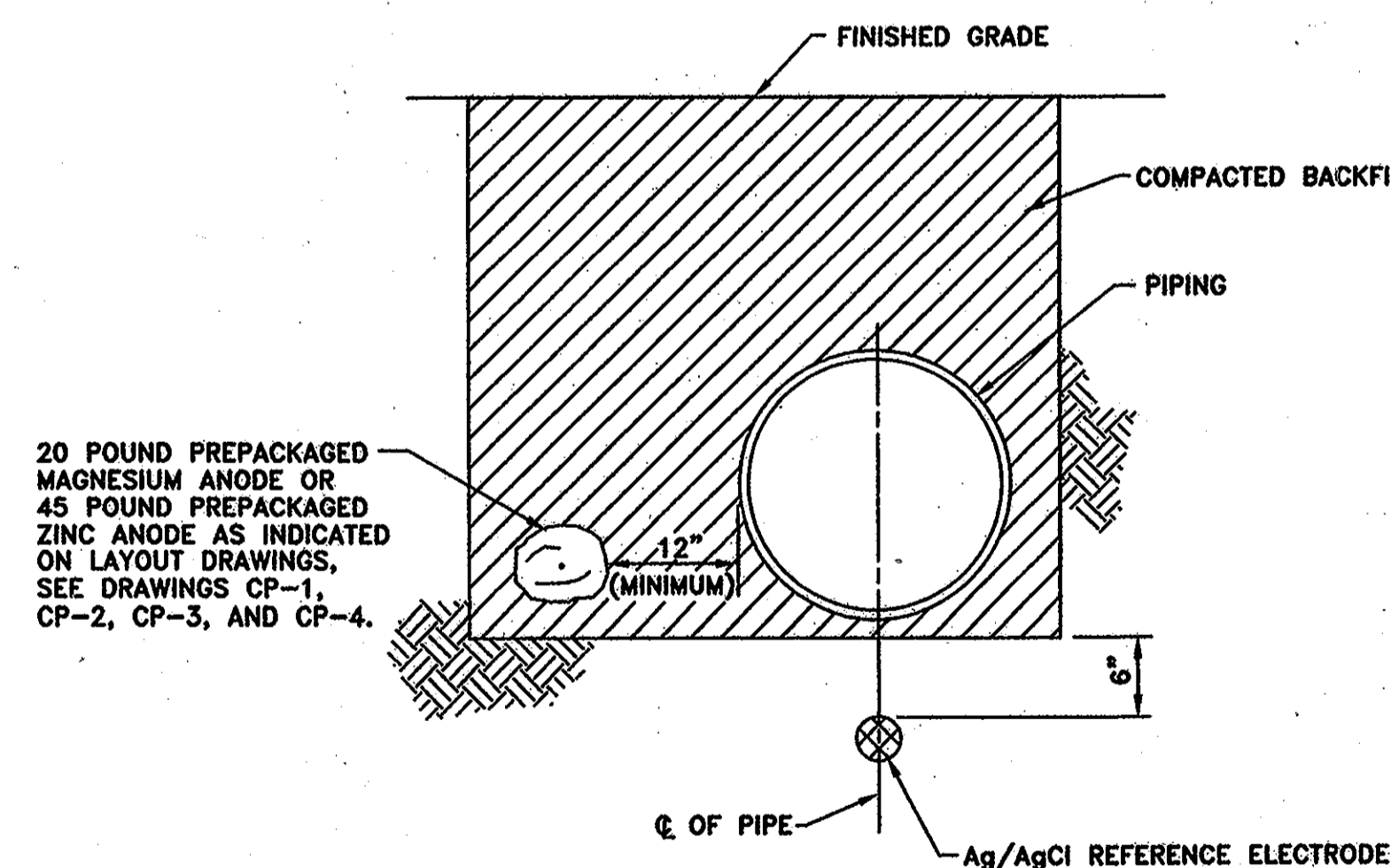
**CC-18: TEST BOX**

NOT TO SCALE



**CC-19: TEST STATION PAD**

NOT TO SCALE

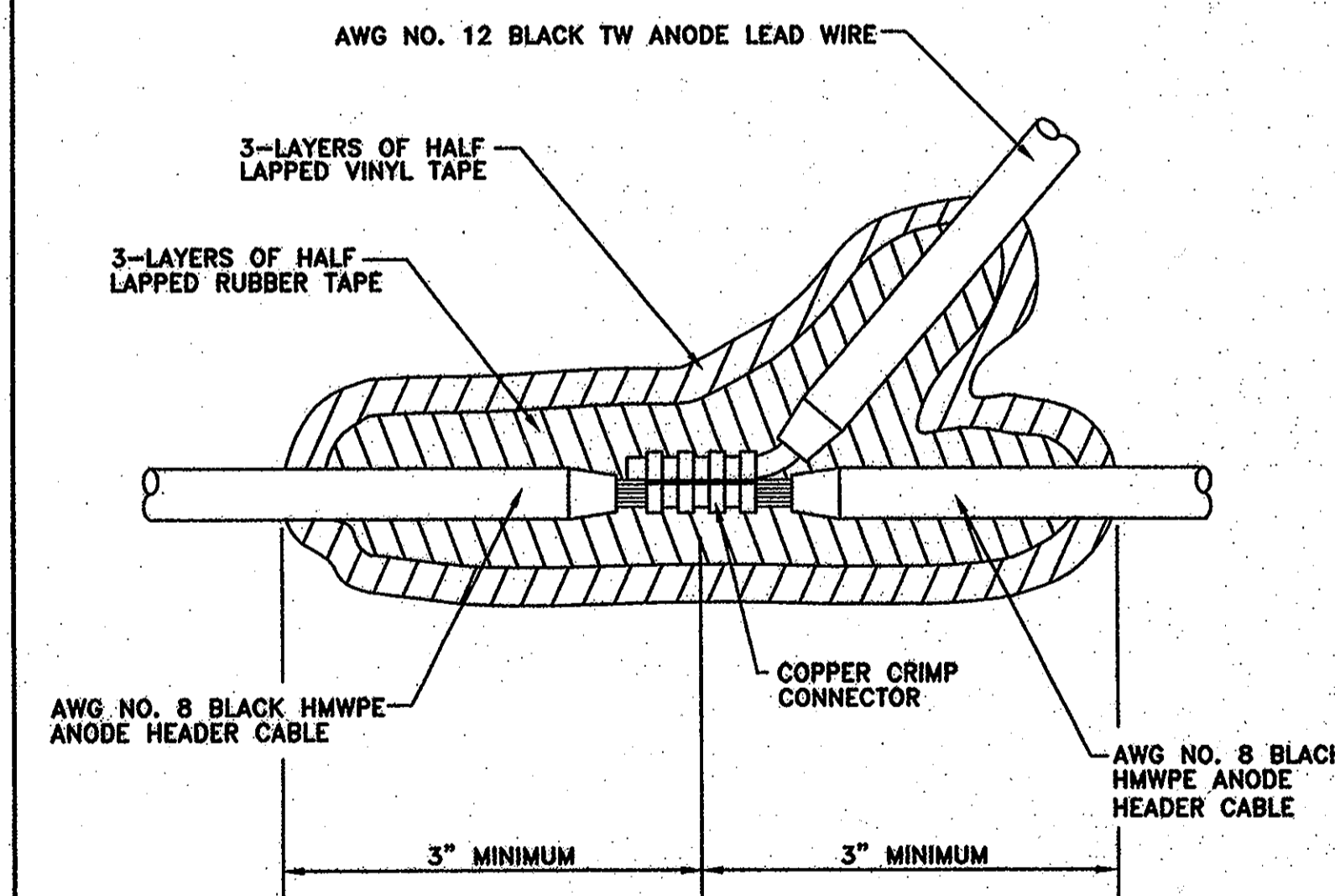


**NOTE:**

BACKFILL ANODE AND REFERENCE ELECTRODE WITH NATIVE SOIL FOR A MINIMUM OF 6 INCHES ON ALL SIDES.

**CC-20: ANODE AND REFERENCE ELECTRODE PLACEMENT**

NOT TO SCALE



**CC-21: ANODE TO HEADER CABLE SPLICE**

NOT TO SCALE

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DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

Director of Public Works: *John A. ...* DATE: 4/17/08  
 Chief, Bureau of Engineering: *Russell ...* DATE: 4/17/08  
 Chief, Bureau of Utilities: *Steve ...* DATE: 4/17/08  
 Chief, Utility Design Division: *...* DATE: 4/17/08

**O'BRIEN & GERE**  
ENGINEERS, INC.

RUSSELL CORROSION CONSULTANTS, INC.  
Columbia, Maryland



DSN. BY:	MJS				
DRN. BY:	DJD				
CHK. BY:	MJS				
DATE:	4/4/08				
BY	NO.	REVISION	DATE		

CORROSION CONTROL  
DETAILS - 4

600' SCALE MAP NO. W&S: 24, 30 BLOCK NO.

U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD  
AT ST. JOHN'S LANE WATER MAIN  
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

**As-Built**

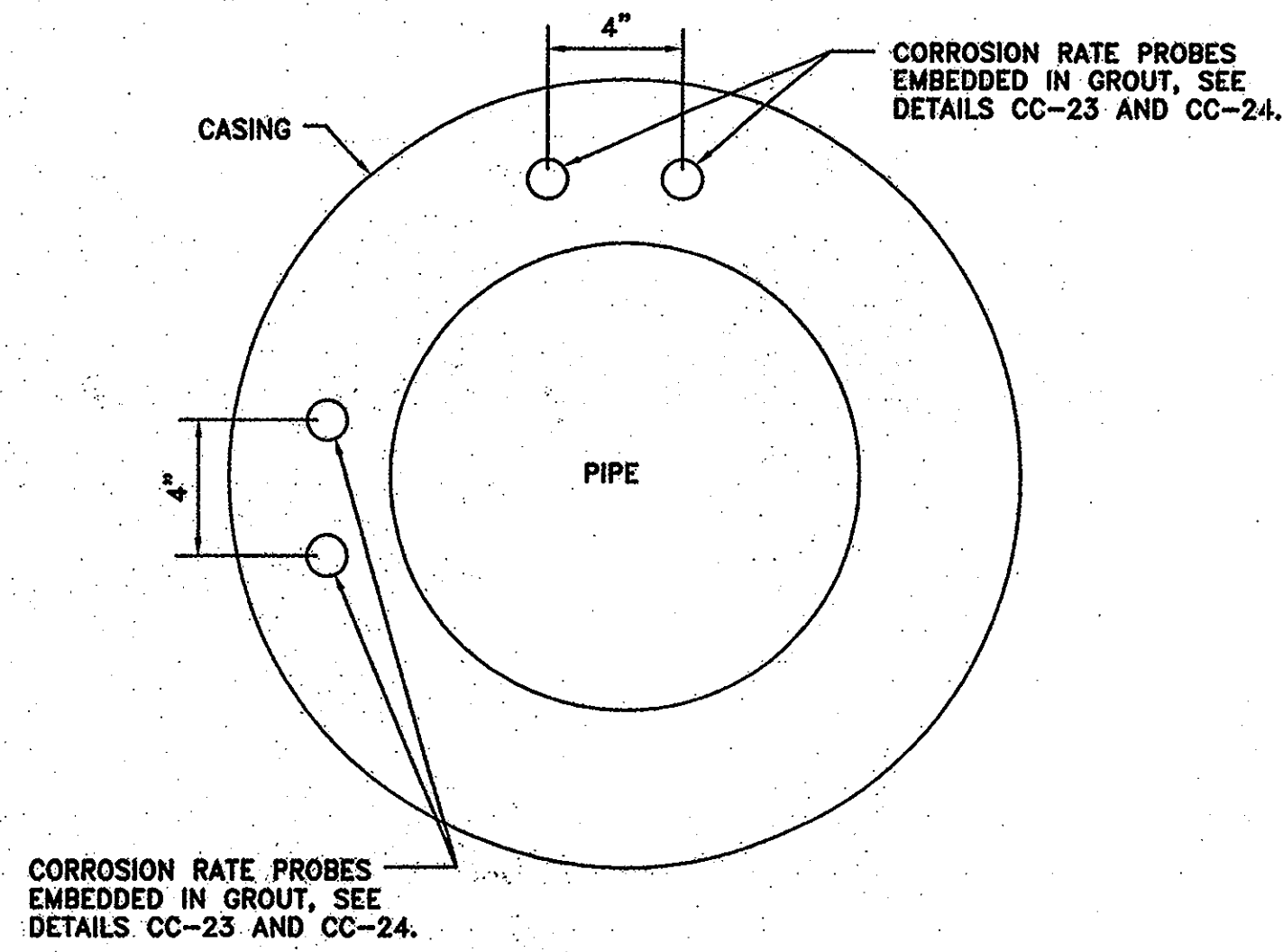
CP-8

SCALE AS SHOWN

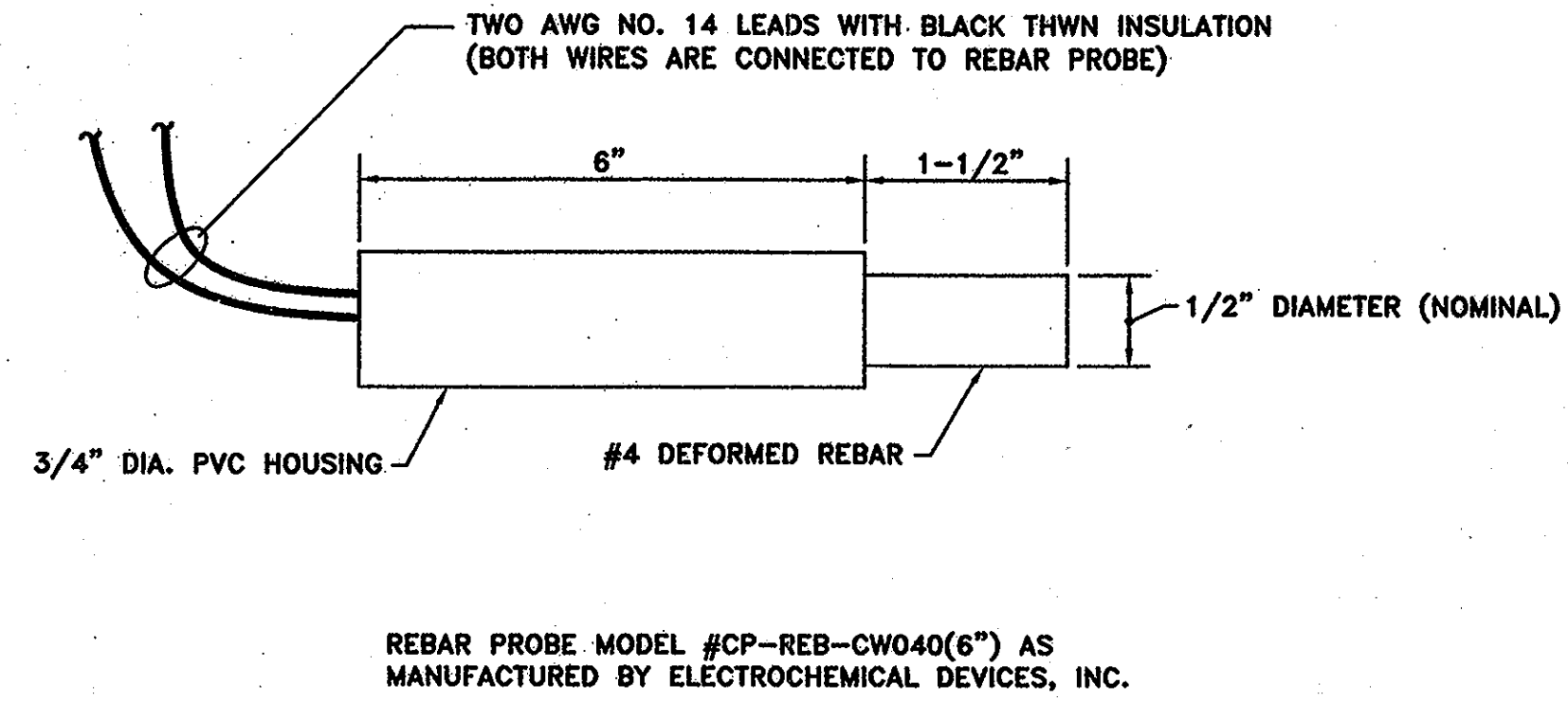
SHEET

29 OF 32

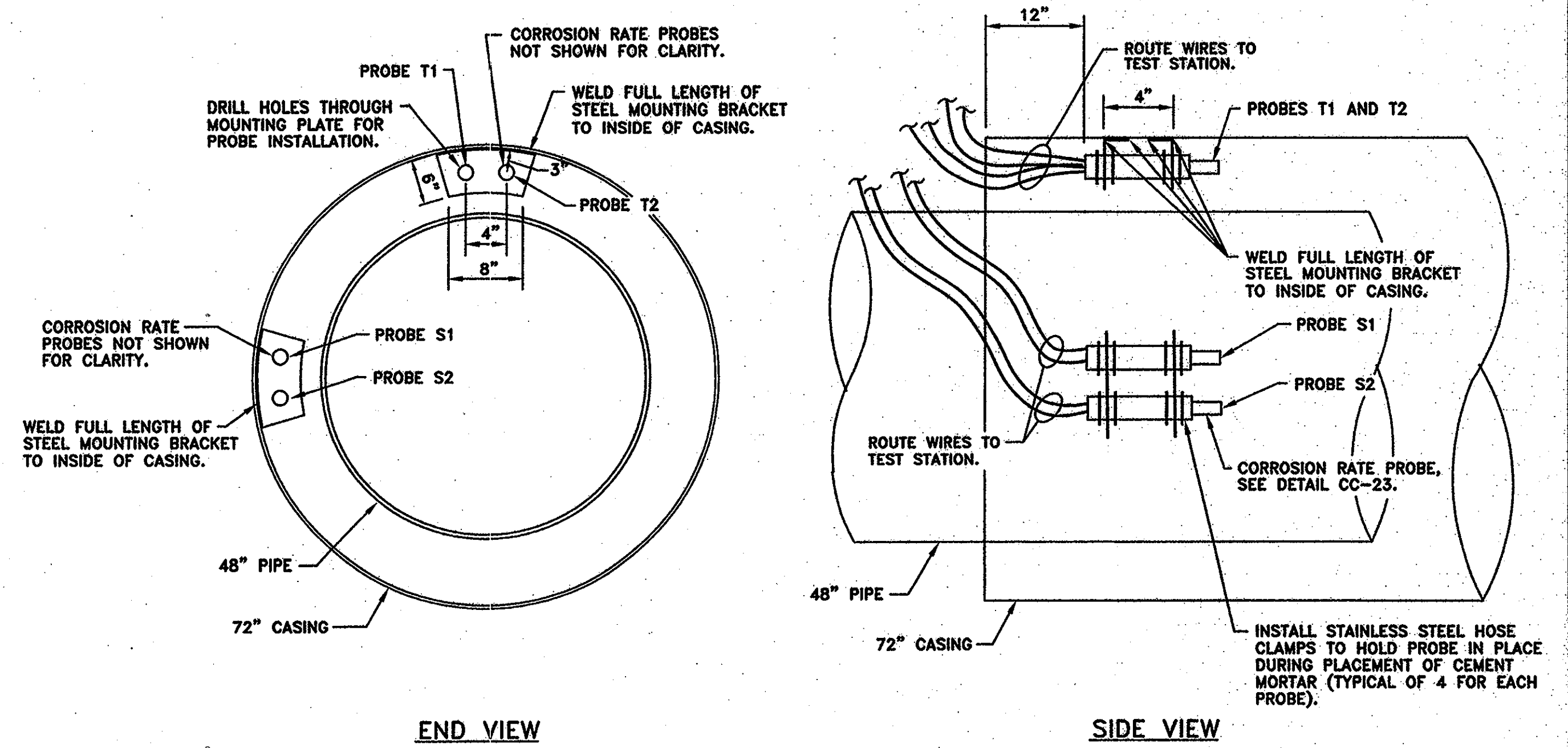
FILE NO.: 29653-029



**CC-22: CASING PROBE INSTALLATION**  
NOT TO SCALE



**CC-23: CORROSION RATE PROBE**  
NOT TO SCALE



**CC-24: CORROSION RATE PROBE MOUNTING BRACKET**  
NOT TO SCALE

HOWARD COUNTY 48" PCCP WATER MAIN				
STATION NUMBER	TEST STATION TYPE	DETAIL NUMBER	NUMBER OF ANODES	REFERENCE ELECTRODE
0+00	INSULATING FLANGE	CC-3	0	YES
0+29.4	INSULATING FLANGE WITH ANODES	CC-4	1 MAGNESIUM	YES
5+50	STANDARD	CC-1	0	YES
11+00	IR DROP WITH ANODES	CC-5	5 ZINC	YES
13+67	IR DROP WITH ANODES	CC-5	5 ZINC	YES
17+42	INSULATING FLANGE WITH ANODES	CC-4	1 MAGNESIUM	YES
24+92	INSULATING FLANGE	CC-3	0	YES
24+92	INSULATING COUPLING WITH ANODES	CC-4	1 MAGNESIUM	YES
28+05	INSULATING FLANGE	CC-3	0	YES
35+75	INSULATING FLANGE	CC-3	0	YES
35+75	INSULATING COUPLING WITH ANODES	CC-4	1 MAGNESIUM	YES
35+75	INSULATING COUPLING WITH ANODES	CC-4	1 MAGNESIUM	YES
40+67	CASING WITH CORROSION RATE PROBES	CC-7	0	YES
41+19	CASING	CC-6	0	YES
42+63	INSULATING FLANGE	CC-3	0	YES
50+67	INSULATING FLANGE	CC-3	0	YES
58+20	INSULATING FLANGE	CC-3	0	YES
62+99	INSULATING FLANGE	CC-3	0	YES
HOWARD COUNTY 30" DIP WATER MAIN				
63+27 (APPROX.)	INSULATING FLANGE WITH ANODES	CC-4	2 MAGNESIUM	YES
63+27 (APPROX.)	INSULATING FLANGE WITH ANODES	CC-4	2 MAGNESIUM	YES

**CC-25: TEST STATION SCHEDULE (48" PCCP OPTION)**

HOWARD COUNTY 48" STEEL WATER MAIN				
STATION NUMBER	TEST STATION TYPE	DETAIL NUMBER	NUMBER OF MAGNESIUM ANODES	REFERENCE ELECTRODE
0+00	INSULATING FLANGE WITH ANODES	CC-4	6	YES
5+50	STANDARD WITH ANODES	CC-2	6	YES
11+00	IR DROP WITH ANODES	CC-5	5	YES
13+67	IR DROP WITH ANODES	CC-5	5	YES
17+42	STANDARD WITH ANODES	CC-2	6	YES
24+92	INSULATING COUPLING WITH ANODES	CC-4	6	YES
28+05	INSULATING FLANGE WITH ANODES	CC-4	6	YES
35+75	INSULATING COUPLING WITH ANODES	CC-4	6	YES
35+75	INSULATING COUPLING WITH ANODES	CC-4	1	YES
40+67	CASING WITH CORROSION RATE PROBES	CC-7	0	YES
41+19	CASING WITH ANODES	CC-8	6	YES
46+50	STANDARD WITH ANODES	CC-2	6	YES
52+00	STANDARD WITH ANODES	CC-2	6	YES
57+50	STANDARD WITH ANODES	CC-2	6	YES
62+99	INSULATING FLANGE WITH ANODES	CC-4	6	YES
HOWARD COUNTY 30" DIP WATER MAIN				
63+27 (APPROX.)	INSULATING FLANGE WITH ANODES	CC-4	2	YES
63+27 (APPROX.)	INSULATING FLANGE WITH ANODES	CC-4	2	YES

**CC-26: TEST STATION SCHEDULE (48" STEEL OPTION)**

HOWARD COUNTY 48" DIP WATER MAIN				
STATION NUMBER	TEST STATION TYPE	DETAIL NUMBER	NUMBER OF MAGNESIUM ANODES	REFERENCE ELECTRODE
0+00	INSULATING FLANGE WITH ANODES	CC-4	6	YES
5+50	STANDARD WITH ANODES	CC-2	6	YES
11+00	IR DROP WITH ANODES	CC-5	5	YES
13+67	IR DROP WITH ANODES	CC-5	5	YES
17+42	STANDARD WITH ANODES	CC-2	6	YES
24+92	INSULATING COUPLING WITH ANODES	CC-4	6	YES
28+05	INSULATING FLANGE WITH ANODES	CC-4	6	YES
35+75	INSULATING COUPLING WITH ANODES	CC-4	6	YES
35+75	INSULATING COUPLING WITH ANODES	CC-4	1	YES
40+67	CASING WITH CORROSION RATE PROBES	CC-7	0	YES
41+19	CASING WITH ANODES	CC-8	6	YES
46+50	STANDARD WITH ANODES	CC-2	6	YES
52+00	STANDARD WITH ANODES	CC-2	6	YES
57+50	STANDARD WITH ANODES	CC-2	6	YES
62+99	INSULATING FLANGE WITH ANODES	CC-4	6	YES
HOWARD COUNTY 30" DIP WATER MAIN				
63+27 (APPROX.)	INSULATING FLANGE WITH ANODES	CC-4	2	YES
63+27 (APPROX.)	INSULATING FLANGE WITH ANODES	CC-4	2	YES

**CC-27: TEST STATION SCHEDULE (48" DIP OPTION)**

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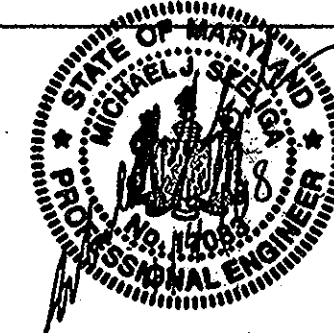
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**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: [Signature] 4/22/08  
 Chief, Bureau of Engineering: [Signature] 4/17/08  
 Chief, Bureau of Utilities: [Signature] 4/21/08  
 Chief, Utility Design Division: [Signature] 4/17/08

**O'BRIEN & GERE ENGINEERS, INC.**  
Columbia, Maryland

**RUSSELL CORROSION CONSULTANTS, INC.**  
Columbia, Maryland



DSN. BY:	MJS			
DRN. BY:	DJD			
CHK. BY:	MJS			
DATE:	4/4/08	BY	NO.	REVISION

**CORROSION CONTROL DETAILS - 5**

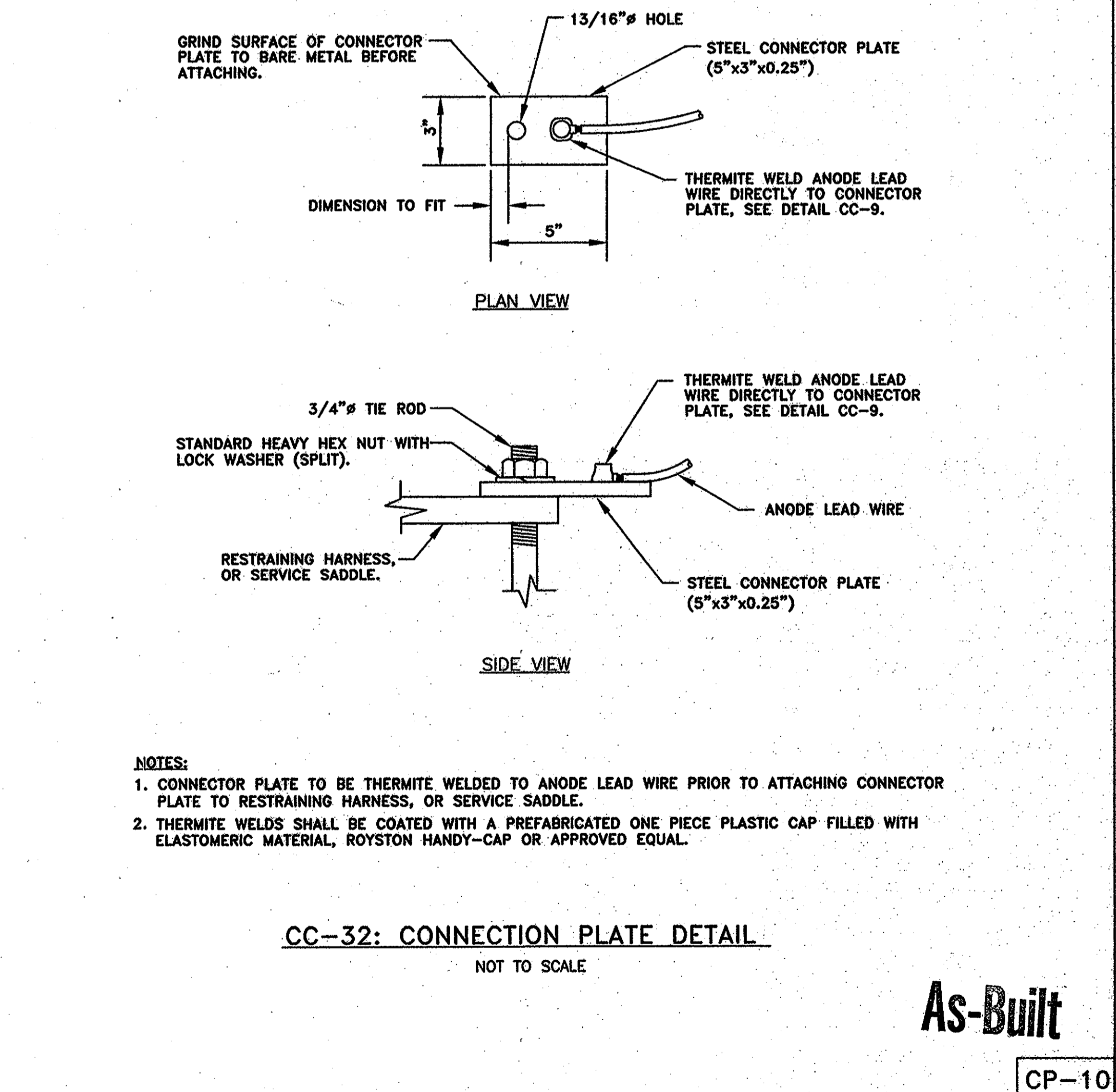
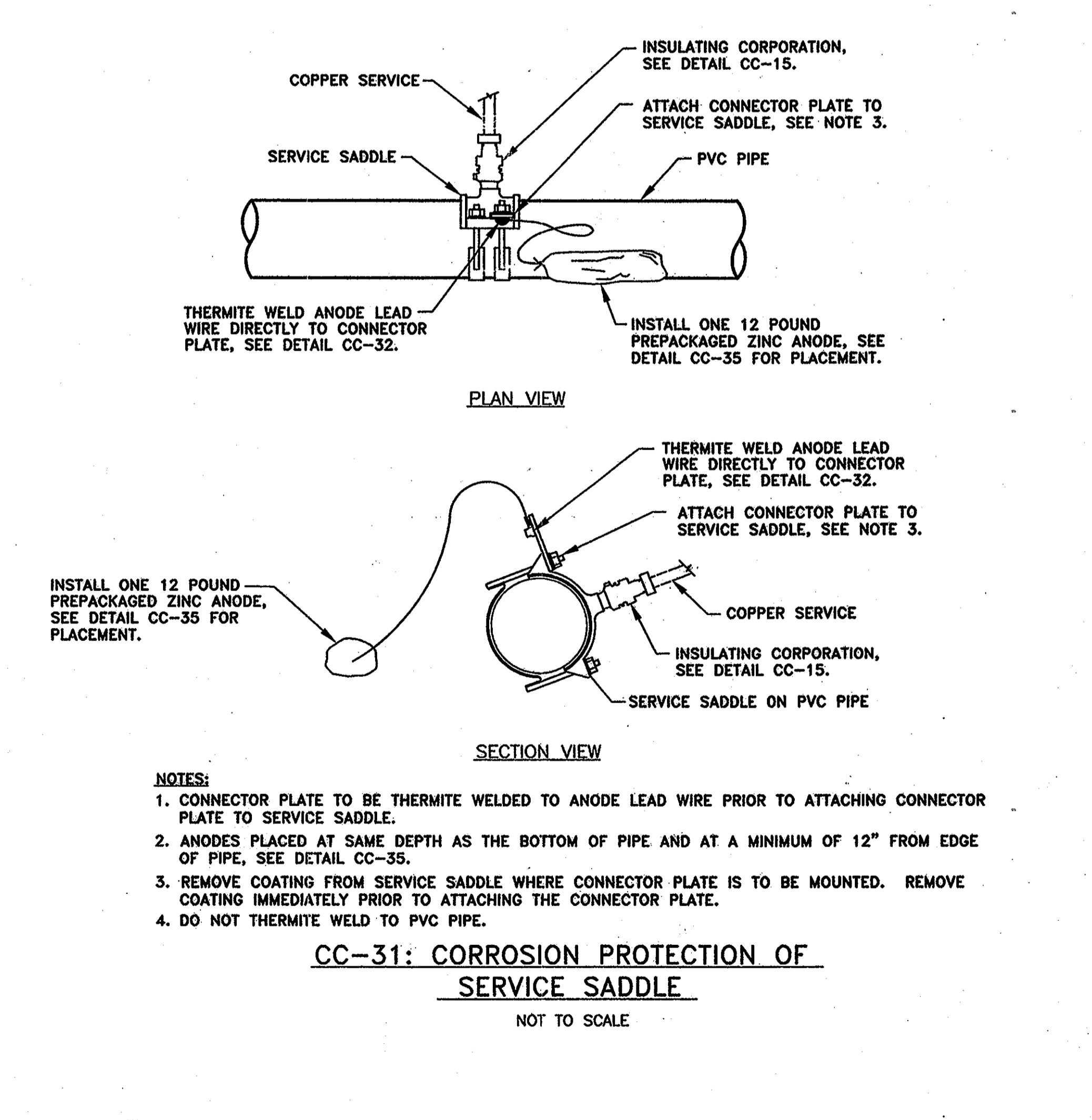
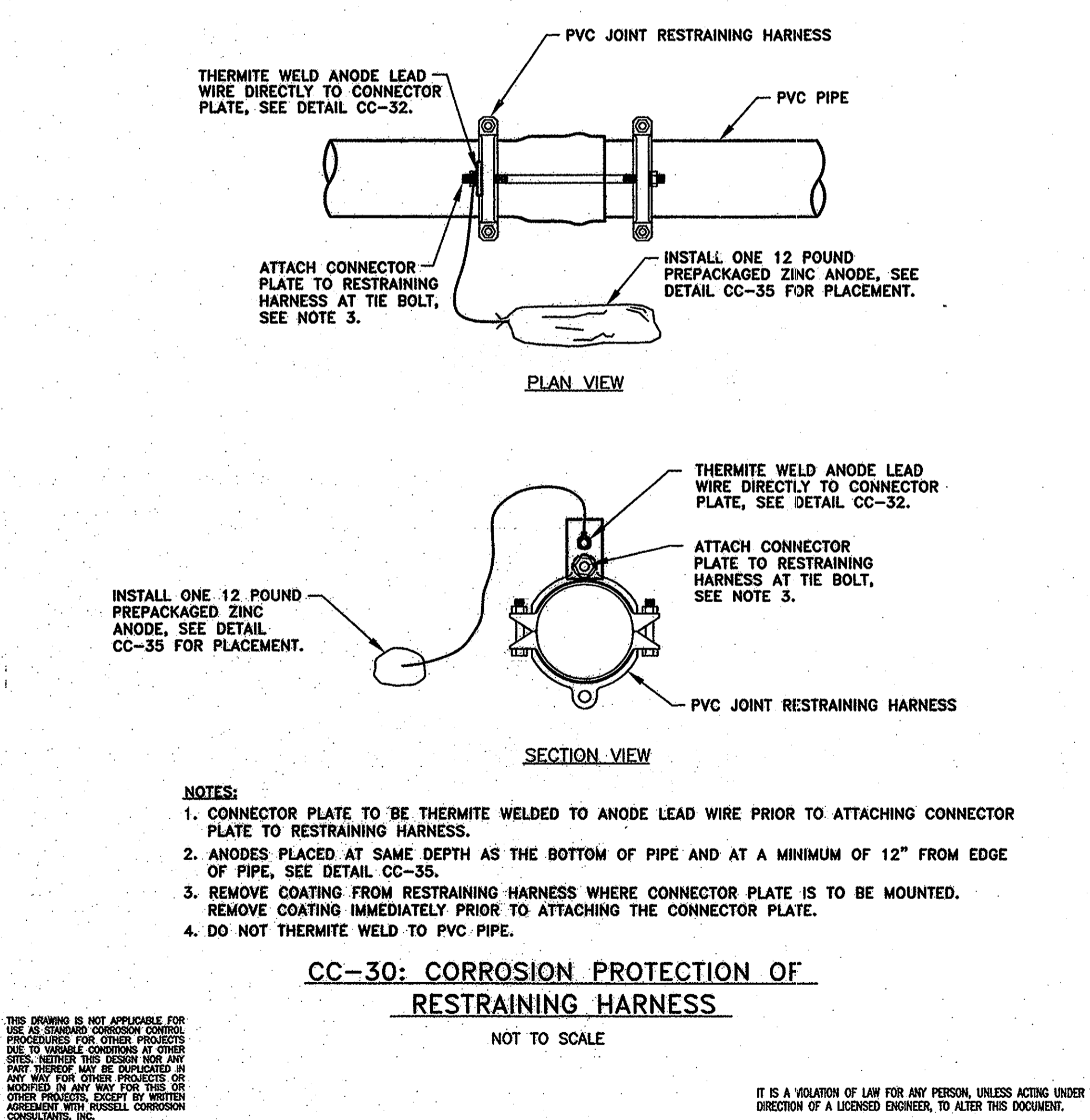
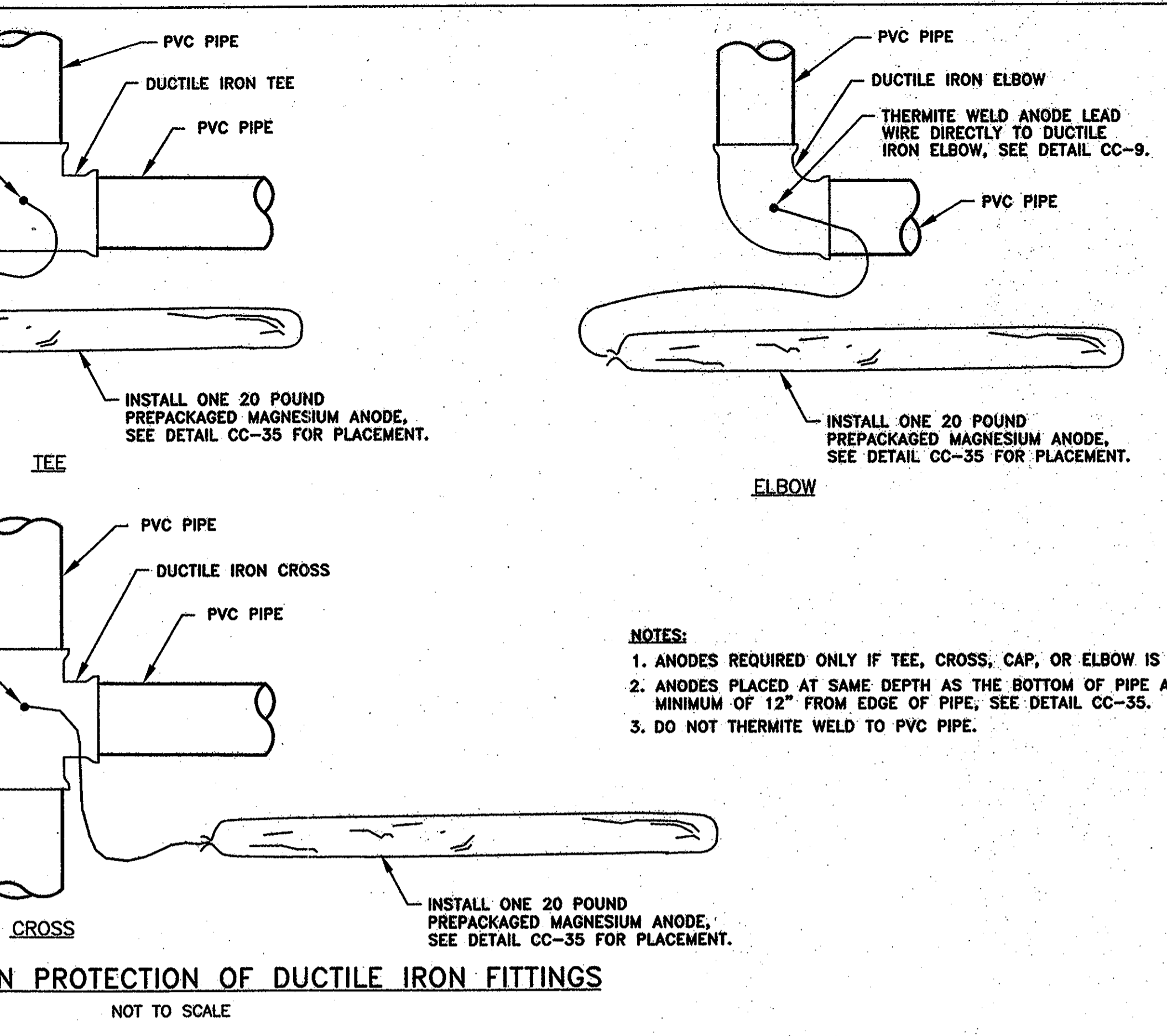
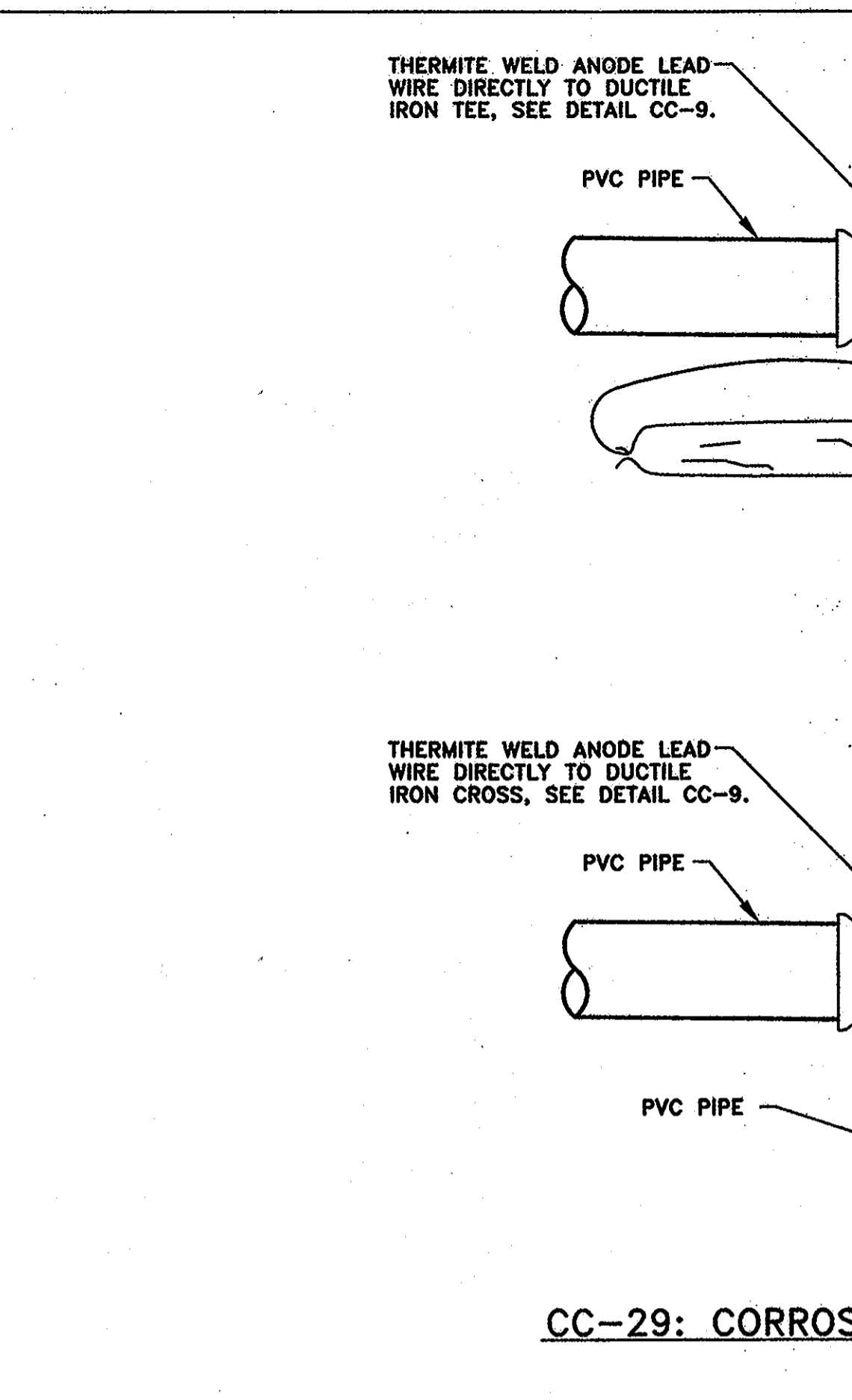
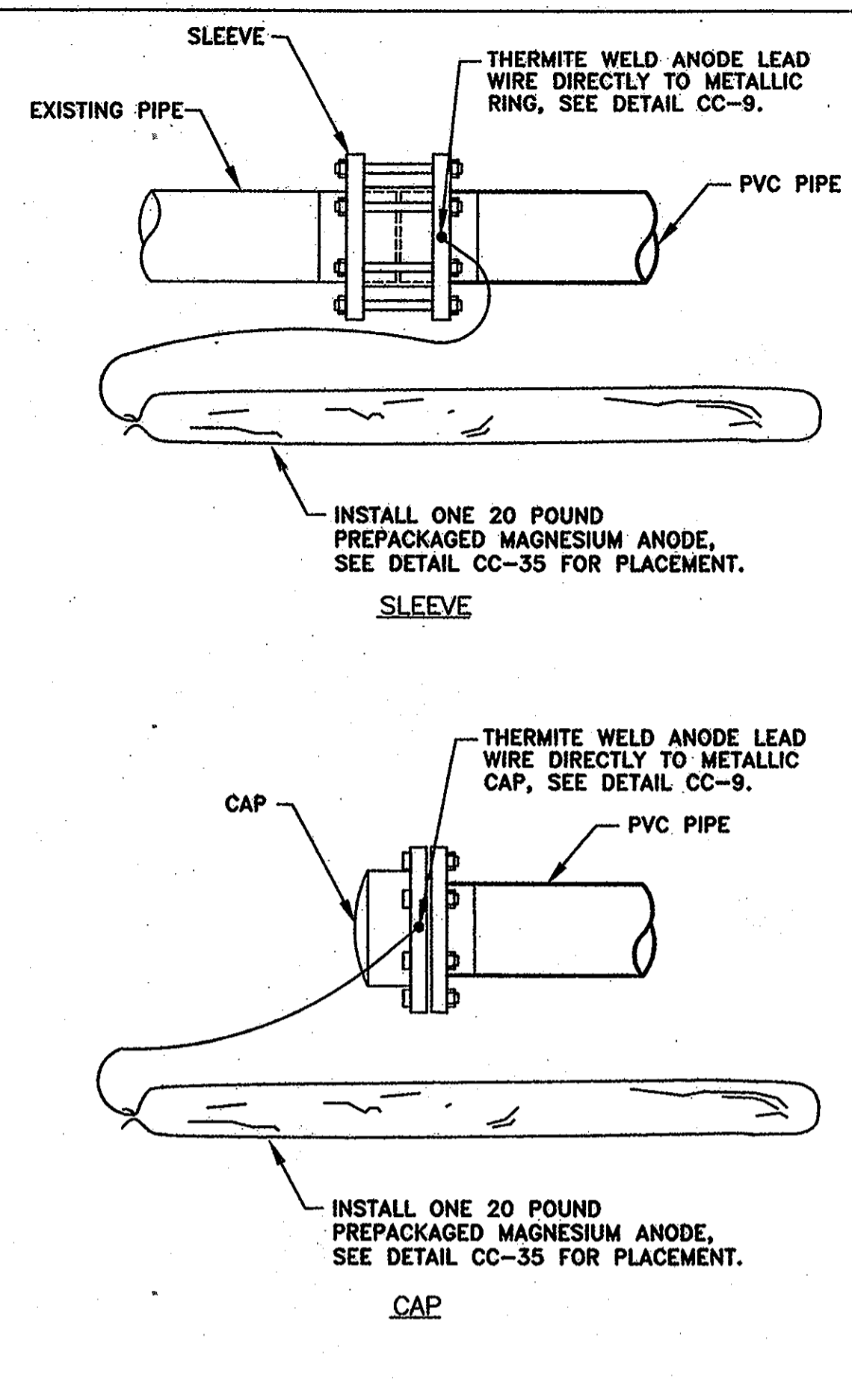
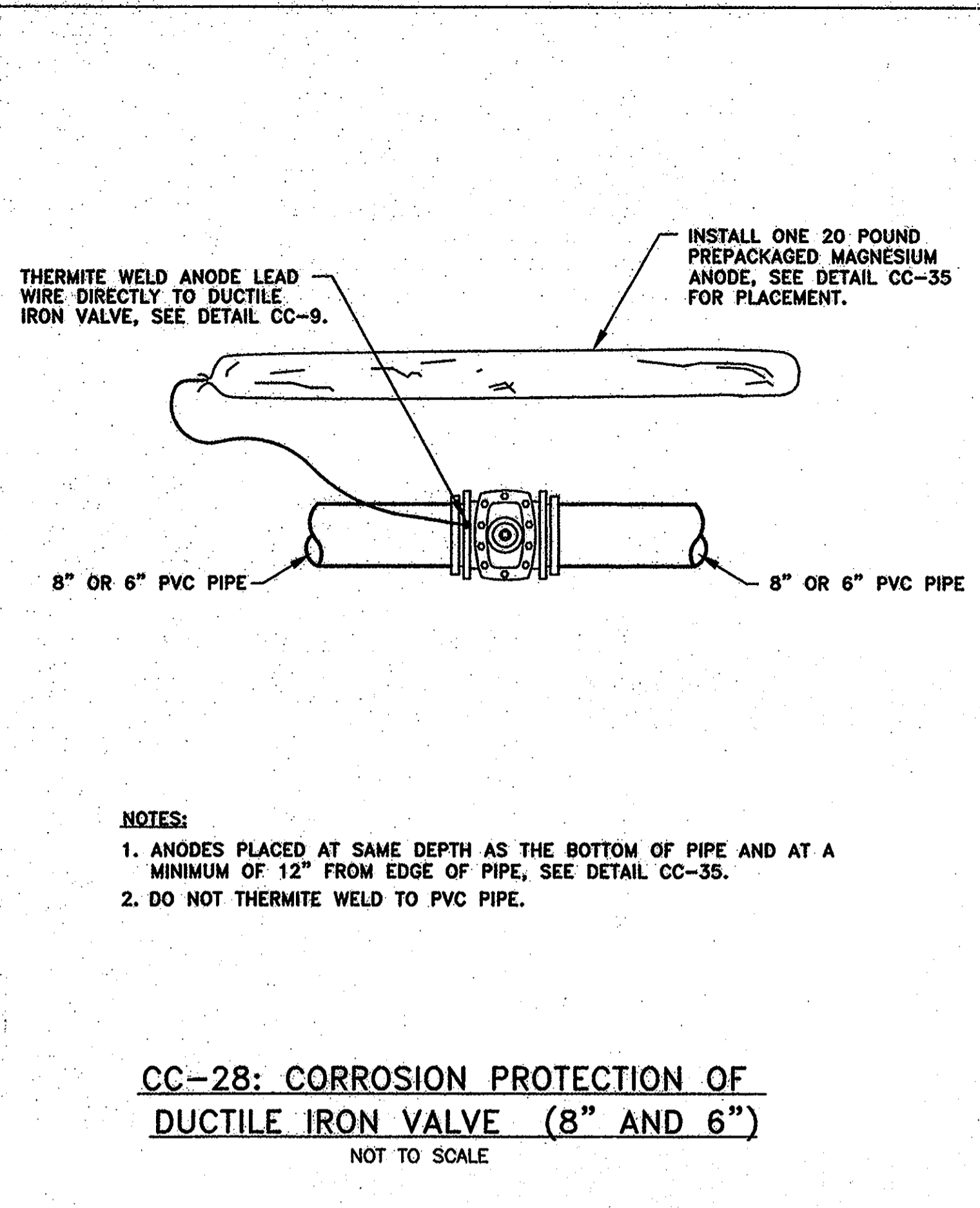
600' SCALE MAP NO. W&S: 24, 30 BLOCK NO.

U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD AT ST. JOHN'S LANE WATER MAIN

CAPITAL PROJECT: W-8199/W-8234  
 CONTRACT NO.: 44-4652  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

CP-9  
SCALE AS SHOWN  
SHEET 30 OF 32

FILE NO. 29863-030



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

Director of Public Works: *James H. ...* 4/21/08  
Chief, Bureau of Engineering: *Paul ...* 4/17/08  
Chief, Bureau of Utilities: *Stake ...* 4/11/08  
Chief, Utility Design Division: *...* 4/11/08

O'BRIEN & GERE ENGINEERS, INC.  
RUSSELL CORROSION CONSULTANTS, INC. Columbia, Maryland



DSN. BY:	MJS			
DRN. BY:	DJD			
CHK. BY:	MJS			
DATE:	4/4/08	BY NO.	REVISION	DATE

CORROSION CONTROL DETAILS - 6  
600' SCALE MAP NO. W&S: 24, 30 BLOCK NO.

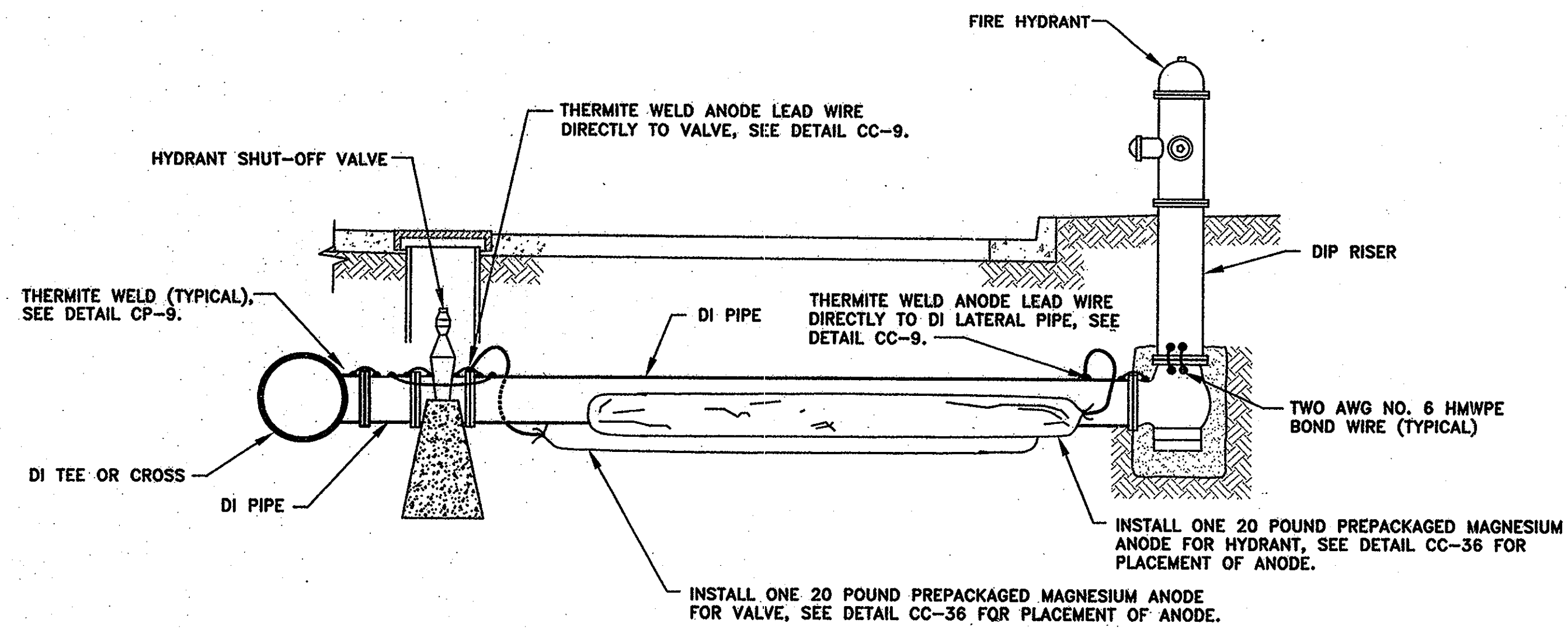
U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD AT ST. JOHN'S LANE WATER MAIN  
CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

CP-10  
SCALE AS SHOWN  
SHEET 31 OF 32

As-Built

FILE NO. 29653-031



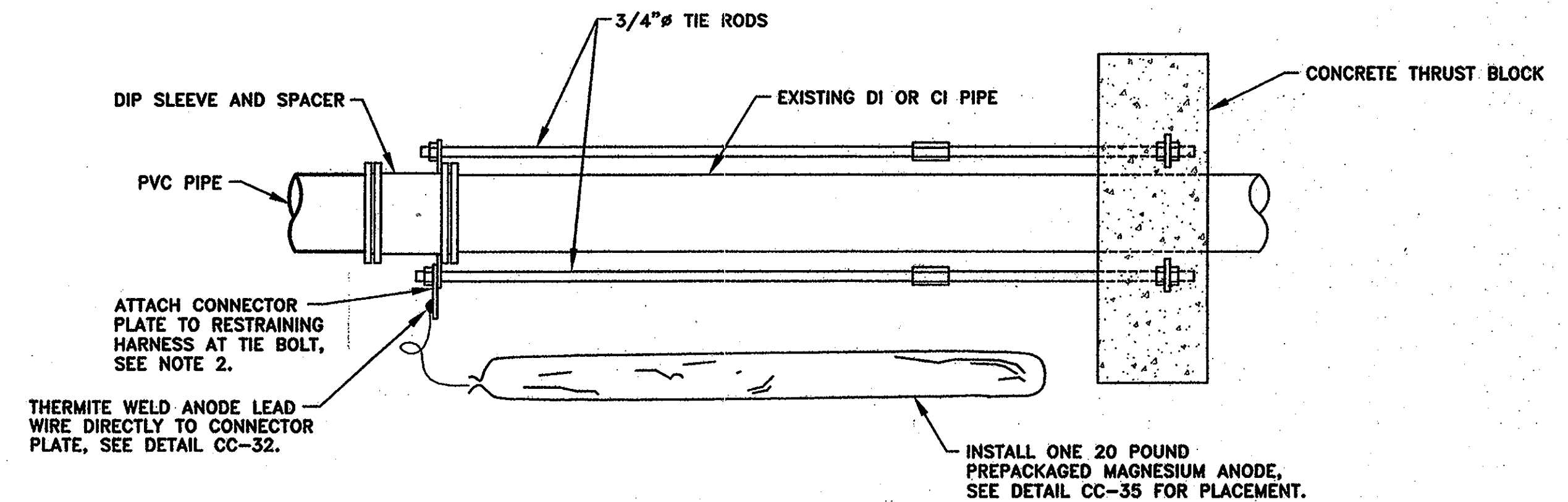


**NOTES:**

1. ANODES PLACED AT SAME DEPTH AS THE BOTTOM OF PIPE AND AT A MINIMUM OF 12" FROM EDGE OF PIPE, SEE DETAIL CC-36.
2. BOND ALL DUCTILE IRON COMPONENTS TOGETHER WITH AWG NO. 6 HMWPE WIRES, SEE DETAIL CC-10.
3. INSTALL BOND WIRES ON TOP OF PIPE OR FITTING WHERE POSSIBLE.
4. INSTALL A MINIMUM OF TWO BOND CABLES ACROSS EACH PIPE JOINT.
5. SEE DETAIL CC-10 FOR BONDING OF VALVE.
6. DO NOT THERMITE WELD TO PVC PIPE.

**CC-33: CORROSION PROTECTION AT FIRE HYDRANT**

NOT TO SCALE

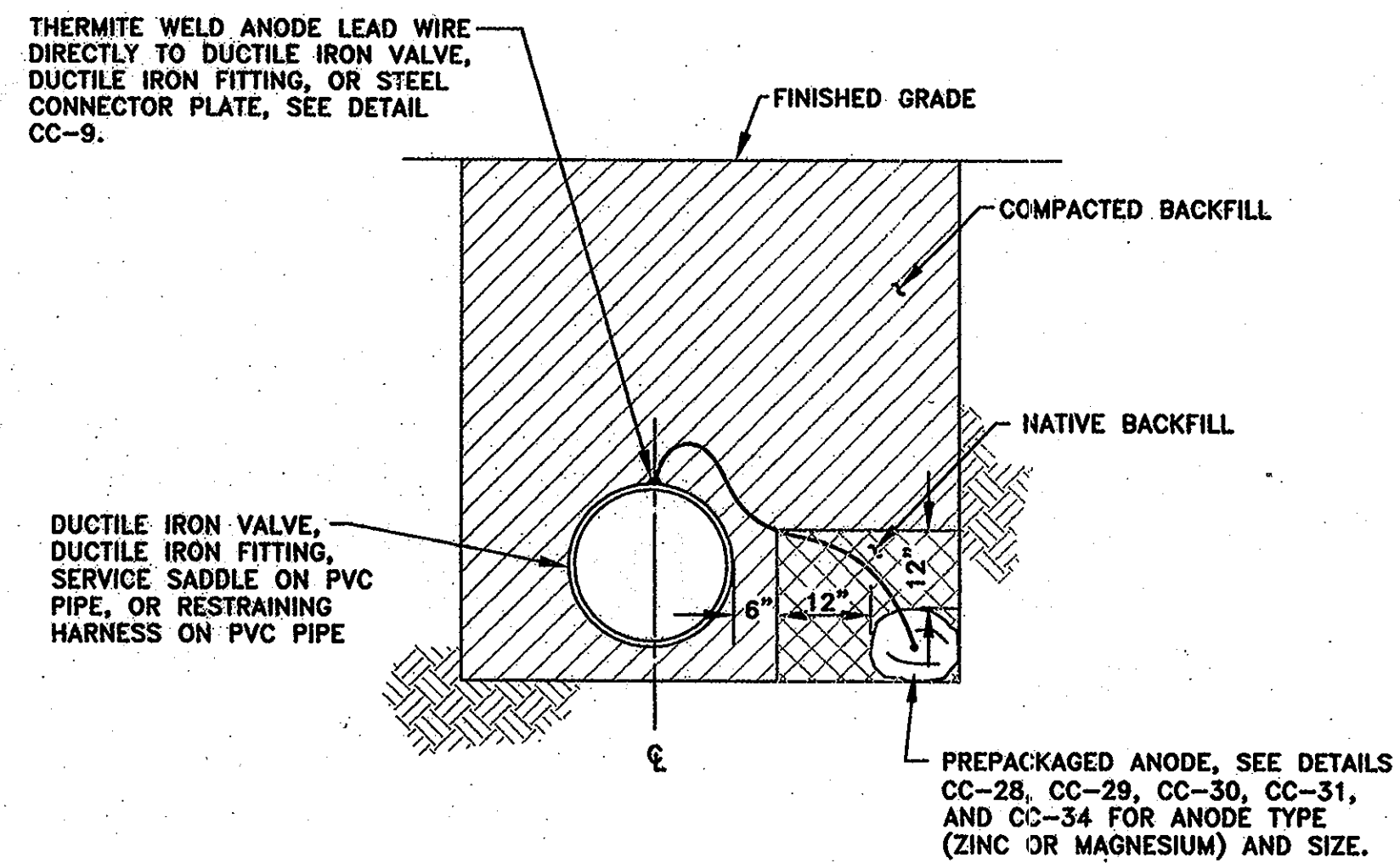


**NOTES:**

1. ANODES PLACED AT SAME DEPTH AS THE BOTTOM OF PIPE AND AT A MINIMUM OF 12" FROM EDGE OF PIPE, SEE DETAIL CC-35.
2. REMOVE COATING FROM RESTRAINING HARNESS WHERE CONNECTOR PLATE IS TO BE MOUNTED. REMOVE COATING IMMEDIATELY PRIOR TO ATTACHING THE CONNECTOR PLATE.
3. DO NOT THERMITE WELD TO PVC PIPE.

**CC-34: CORROSION PROTECTION AT IN-LINE THRUST BLOCK**

NOT TO SCALE

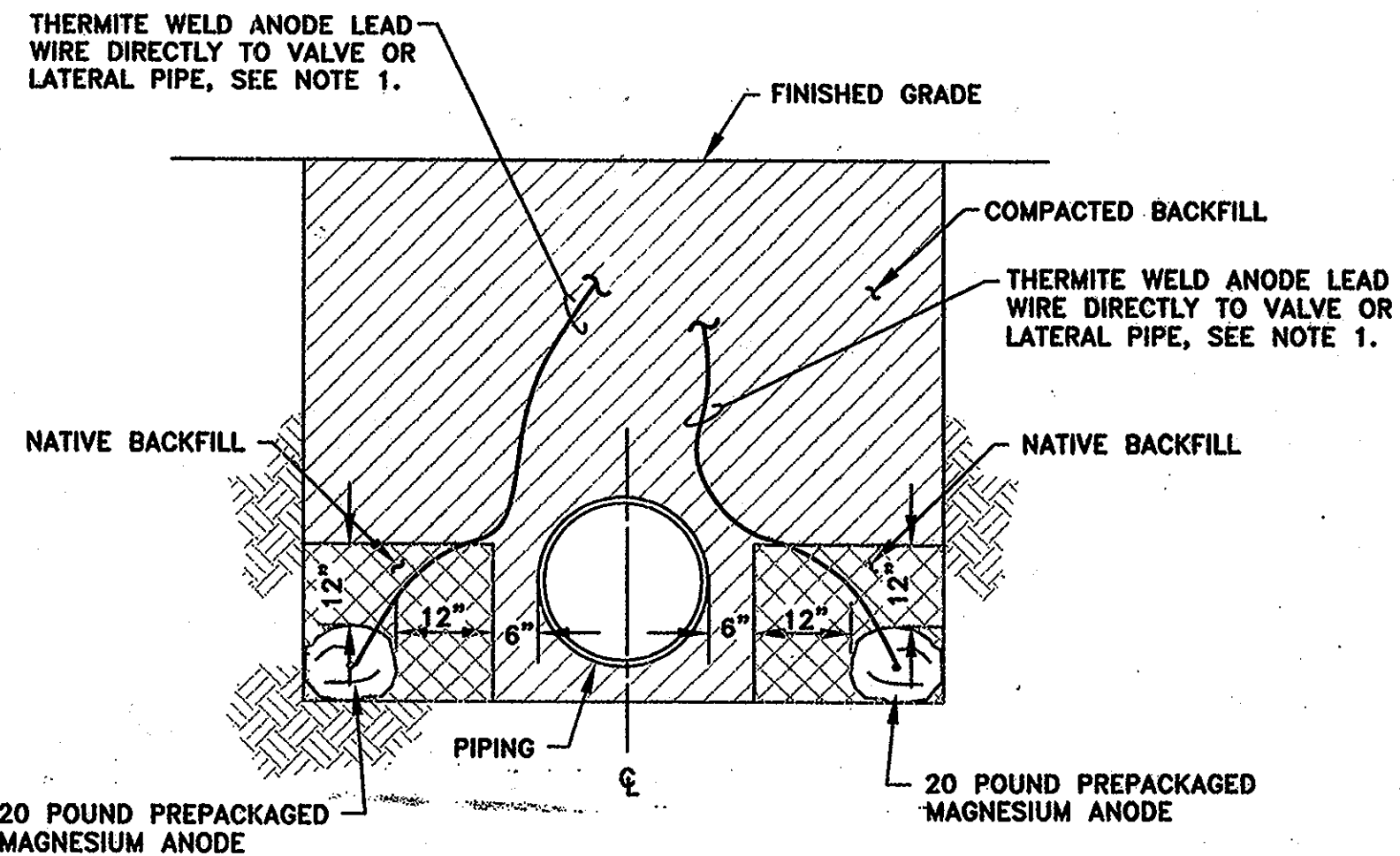


**NOTES:**

1. INSTALL ANODES A MINIMUM OF 12 INCHES FROM PIPE.
2. BACKFILL ANODES WITH NATIVE SOIL FOR A MINIMUM OF 12 INCHES ON ALL SIDES. DO NOT BACKFILL ANODES WITH SAND OR STONE.
3. DO NOT THERMITE WELD TO PVC PIPE.

**CC-35: SINGLE ANODE PLACEMENT**

NOT TO SCALE



**NOTES:**

1. WHEN INSTALLING ANODES AT HYDRANTS, ATTACH ONE ANODE LEAD TO SHUT-OFF VALVE, AND ONE ANODE LEAD TO HYDRANT LATERAL PIPE, SEE DETAIL CC-33.
2. INSTALL ANODES A MINIMUM OF 12 INCHES FROM PIPE.
3. BACKFILL ANODES WITH NATIVE SOIL FOR A MINIMUM OF 12 INCHES ON ALL SIDES. DO NOT BACKFILL ANODES WITH SAND OR STONE.
4. DO NOT THERMITE WELD TO PVC PIPE.

**CC-36: DOUBLE ANODE PLACEMENT**

NOT TO SCALE

THIS DRAWING IS NOT APPLICABLE FOR USE AS STANDARD CORROSION CONTROL PROCEDURES FOR OTHER PROJECTS DUE TO VARIABLE CONDITIONS AT OTHER SITES. NEITHER THIS DESIGN NOR ANY PART THEREOF MAY BE DUPLICATED IN ANY WAY FOR OTHER PROJECTS OR MODIFIED IN ANY WAY FOR THIS OR OTHER PROJECTS EXCEPT BY WRITTEN AGREEMENT WITH RUSSELL CORROSION CONSULTANTS, INC.

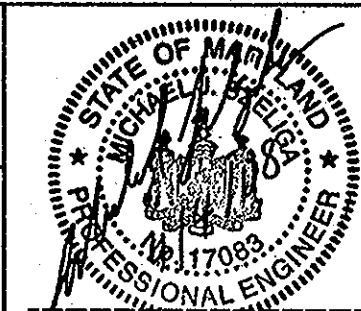
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

Director of Public Works: *[Signature]* 4/22/08  
Chief, Bureau of Engineering: *[Signature]* 4/17/08  
Chief, Bureau of Utilities: *[Signature]* 4/16/08  
Chief Utility Design Division: *[Signature]* 4/17/08

O'BRIEN & GERE  
ENGINEERS, INC.

RUSSELL CORROSION CONSULTANTS, INC.  
Columbia, Maryland



DSN. BY:	MJS				
DRN. BY:	DJD				
CHK. BY:	MJS				
DATE:	4/4/08	BY	NO.	REVISION	DATE

CORROSION CONTROL  
DETAILS - 7

600' SCALE MAP NO. W&S: 24, 30 BLOCK NO.

U.S. ROUTE 29 WATER MAIN/COLUMBIA ROAD  
AT ST. JOHN'S LANE WATER MAIN

CAPITAL PROJECT: W-8199/W-8234  
CONTRACT NO.: 44-4632  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

CP-11  
SCALE AS SHOWN  
SHEET 32 OF 32

As-Built

FILE NO. 29653-032