

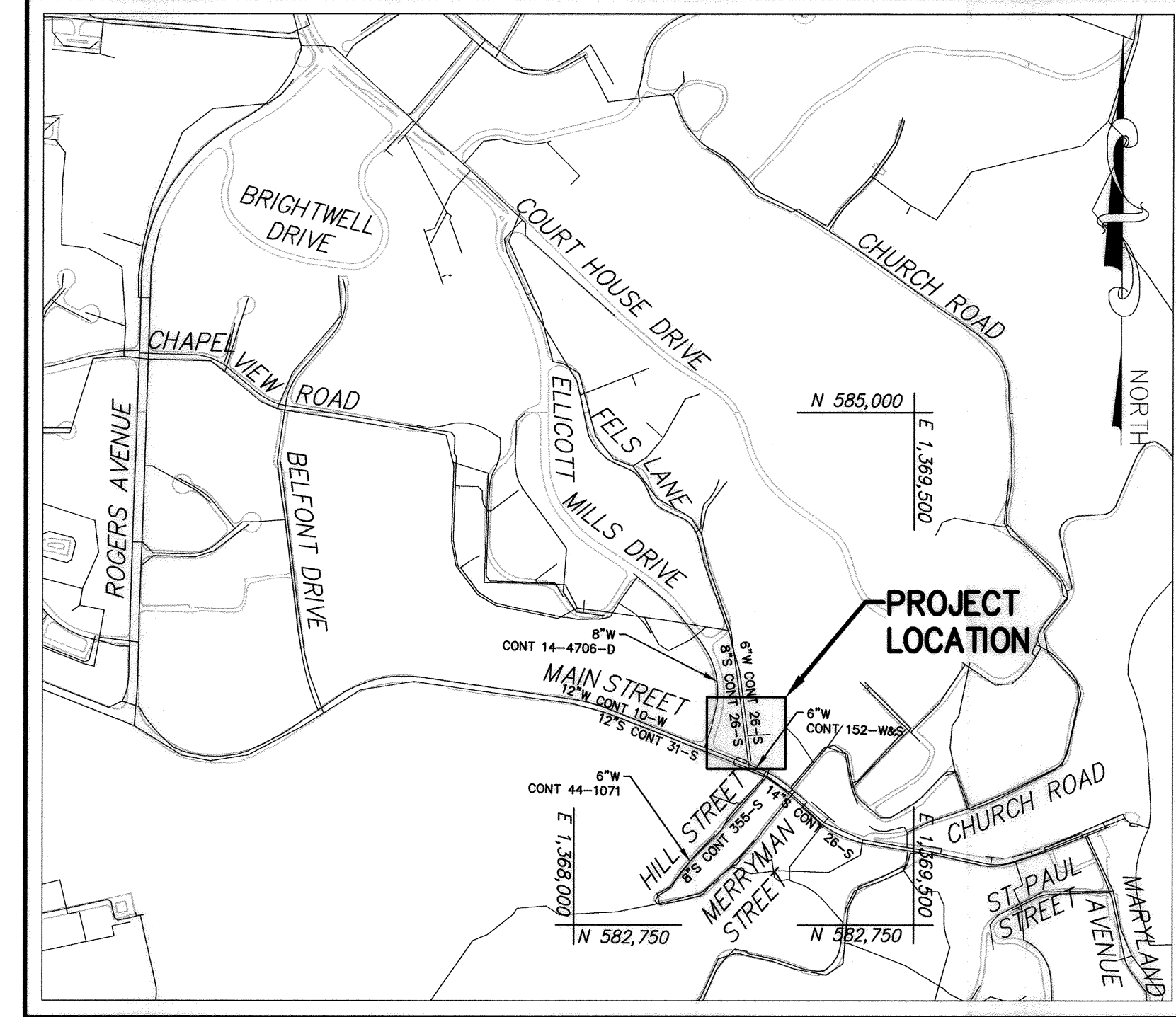
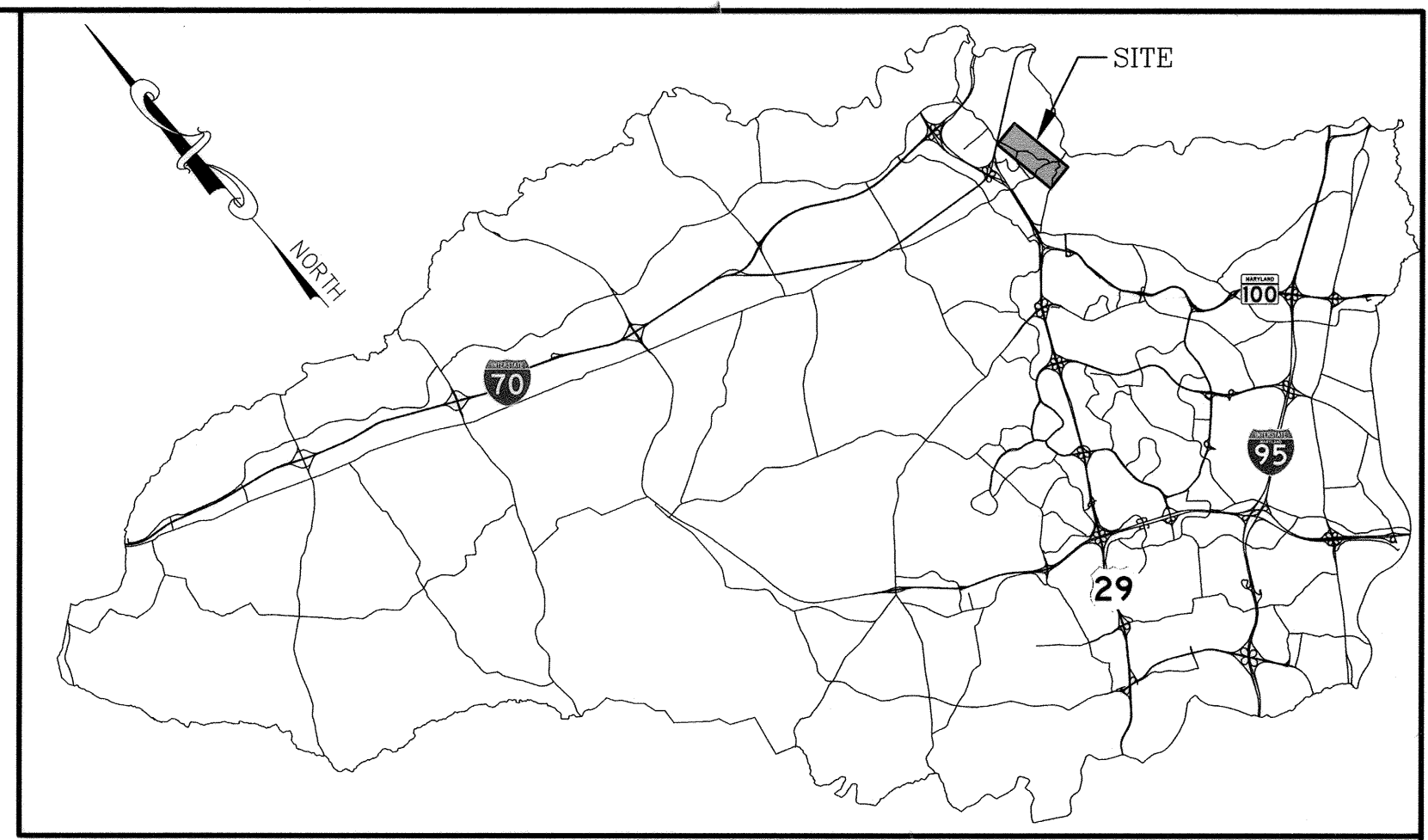
**WATER & SEWER NOTES:**

- ALL WATER MAINS SHALL BE RESTRAINED JOINT C900 PVC DR-14 IN ACCORDANCE WITH ANSI/AWWA C900, WITH DUCTILE IRON (DI) FITTINGS.
- ALL SEWER MAINS SHALL BE RESTRAINED JOINT DUCTILE IRON PIPE CLASS 54. ALL PIPES AND FITTINGS SHALL BE DOUBLE CEMENT- MORTAR LINED IN ACCORDANCE WITH ANSI/AWWA C104/A21.4.
- ALL WATER MAINS SHALL HAVE A MINIMUM OF 3'-6" OF COVER UNLESS OTHERWISE NOTED.
- WATER VALVES ADJACENT TO TEES SHALL BE STRAPPED TO TEES.
- ALL FITTINGS SHALL BE BUTTRESSED OR ANCHORED WITH CONCRETE IN ACCORDANCE WITH STANDARD DETAILS UNLESS OTHERWISE PROVIDED FOR ON THE DRAWINGS.
- THE CONTRACTOR SHALL NOT OPERATE ANY WATER MAIN VALVES ON THE EXISTING WATER SYSTEM.
- TRACER WIRES AND CONTINUITY TEST STATIONS SHALL BE INSTALLED ON ALL DIP AND PVC WATER MAINS IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL.
- FOR PVC WATER MAINS, ALL RECORDS FOR THE QUALITY CONTROL AND QUALIFICATION TEST REQUIREMENTS NOTED IN SECTION 5.1 OF THE AWWA STANDARD C900 FOR PVC PRESSURE PIPES SHALL BE SUBMITTED WITH THE PIPE MATERIAL CERTIFICATIONS OR SHOP DRAWINGS PRIOR TO APPROVAL OF THE MATERIAL FOR USE. THE TEST RECORDS SHALL BE FOR THE PIPE TO BE INSTALLED UNDER THIS CONTRACT. ALL PVC PIPE SHALL CONTAIN MARKINGS TO ALLOW CROSS REFERENCING OF THE PIPE SUPPLIED TO THE TEST RECORDS RECEIVED.
- UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIFICATIONS, SACRIFICIAL ANODES SHALL BE INSTALLED ON ALL VALVES AND METALLIC FITTINGS USED WITH PVC WATER MAINS IN ACCORDANCE WITH VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION. SEVENTEEN (17) POUND MAGNESIUM ANODES SHALL BE INSTALLED ON ALL VALVES AND DUCTILE IRON FITTINGS INCLUDING RESTRAINTS AND HARNESSSES. TWELVE (12) POUND ZINC ANODES SHALL BE INSTALLED ON ALL STAINLESS STEEL FITTINGS AND SADDLES USED WITH PVC MAINS. ALL "TEES" USED WITH PVC MAINS SHALL BE DUCTILE IRON.
- PROPER ASSEMBLY OF GASKETED PVC PIPE JOINTS: THE MANUFACTURER'S INSERTION LINE OF GASKETED PVC PIPE JOINTS INDICATES THE MAXIMUM DEPTH OF INSERTION OF THE SPIGOT INTO THE BELL. AFTER ASSEMBLY OF THE JOINT, THE INSERTION LINE SHALL REMAIN VISIBLE. DUAL INSERTION LINES ON GASKETED PVC PIPE INDICATE THE MAXIMUM AND MINIMUM DEPTH OF INSERTION OF THE SPIGOT INTO THE BELL. THE CONTRACTOR SHALL NOT OVER INSERT OR OVER HOME THE SPIGOT INTO THE BELL OF THE PVC PIPE.
- ALL CHANGES IN HORIZONTAL OR VERTICAL DIRECTION OF PVC WATER PIPE SHALL BE MADE WITH STANDARD BENDS, 5-DEGREE SWEEPS OR HIGH DEFLECTION (HD) COUPLINGS. NO BENDING OF THE PIPE OR DEFLECTING OF PVC PIPE JOINTS IS PERMITTED. WHERE HIGH DEFLECTION COUPLINGS OR 5-DEGREE SWEEPS ARE PERMITTED, THE CONTRACTOR SHALL PROVIDE ONE FULL PIPE LENGTH (20-FOOT LONG) ON EITHER SIDE OF THE HIGH DEFLECTION COUPLING OR 5-DEGREE SWEEP. THE CONTRACTOR SHALL USE A VIBRATORY PLATE COMPACTOR OR OTHER APPROVED MEANS TO THOROUGHLY COMPACT THE #57 STONE ON BOTH SIDES OF THE HIGH DEFLECTION COUPLING OR 5-DEGREE SWEEP, TAKING CARE NOT TO USE COMPACTION EQUIPMENT DIRECTLY OVER THE FITTING. PVC HIGH DEFLECTION COUPLINGS SHALL BE LIMITED TO A TOTAL DEFLECTION OF 3-DEGREES (1 1/2- DEGREE ON EITHER END OF THE COUPLING), SHALL BE RATED FOR A MINIMUM 235 PSI MEETING THE REQUIREMENTS OF AWWA C900, SHALL HAVE A MINIMUM LAY LENGTH OF 9-INCHES AND SHALL HAVE CENTER STOPS. PVC HIGH DEFLECTION COUPLINGS SHALL BE CERTAINTIED PVC HIGH DEFLECTION (HD) STOP COUPLINGS OR EQUAL. FIVE DEGREE SWEEPS SHALL BE BELL BY SPIGOT, RATED FOR A MINIMUM 305 PSI, DR 18 MEETING THE REQUIREMENTS OF AWWA C900 AND SHALL BE MULTI FITTINGS (IPEX) BLUE BRUTE DR18 OR EQUAL.
- WHEN PVC HIGH DEFLECTION COUPLINGS OR PVC 5-DEGREE SWEEPS ARE USED TO FACILITATE CHANGES IN HORIZONTAL OR VERTICAL ALIGNMENTS OF AWWA C-900 PVC PIPELINES, THE CONTRACTOR SHALL INSTALL DEVICES FOR THE PREVENTION OF OVER-INSERTION OF THE PVC PIPE SPIGOTS OR PLAIN ENDS INTO THE PUSH ON BELL JOINT ON BOTH SIDES OF THE HIGH DEFLECTION COUPLINGS AND 5-DEGREE SWEEPS. BELL STOPS SHALL BE PLACED AT THE PROPER INSERTION LINE FOR THE FITTING. THE BELL STOP SHALL BE MANUFACTURED OF DUCTILE IRON AND INCORPORATES AN EXPANSION RETENTION SPRING TO ALLOW FOR PIPE EXPANSION AND CONTRACTION. THE BELL STOPS SHALL BE SERIES 5000 MEGA-STOP, AS MANUFACTURED BY EBAA IRON, INC. OR APPROVED EQUAL.
- DISTANCES SHOWN FOR THE SEWER MAIN ARE ALONG THE CENTERLINE OF THE PIPE FROM CENTER OF MANHOLE TO CENTER OF MANHOLE.
- THE NEW SEWER MAIN SLOPE AND INVERTS SHALL MATCH THE EXISTING SEWER MAIN.
- ALL SEWER MANHOLES SHALL BE 4'-0" INSIDE DIAMETER UNLESS OTHERWISE NOTED.

# FELS LANE WATER, SEWER, & PRESSURE RELIEF VAULT RELOCATIONS

## HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS

### CAPITAL PROJECT NO. W8600 CONTRACT NO. 44-5084



VICINITY MAP  
SCALE: 1" = 600'

WATER ZONE: 350  
TEST GRADIENT: 627 FT  
TEST PRESSURE: 197 PSI  
TYPE OF BUILDINGS: N/A  
NUMBER OF PARCELS: N/A  
NO. OF WATER CONNECTIONS: 0  
NO. OF SEWER CONNECTIONS: 0  
DRAINAGE AREA: PATAPSCO

HOWARD COUNTY GEODETIC SURVEY CONTROL POINTS:

STATION#	NORTHING	EASTING	ELEVATION
TS09	583,508.26	1,368,680.78	196.22'
TS10	584,017.72	1,368,605.70	206.25'

**INDEX OF DRAWINGS**

SHEET NO.	DRAWING NO.	DESCRIPTION
1	G-1	TITLE SHEET, GENERAL NOTES AND INDEX OF DRAWINGS
2	G-2	LEGEND, ABBREVIATIONS, FITTING SCHEDULES, SURVEY CONTROL AND STAKEOUT
3	C-1	WATER SHUTOFF PLAN AND SEQUENCE OF CONSTRUCTION
4	C-2	WATER & SEWER RELOCATION PLAN & PROFILES
5	C-3	PRESSURE RELIEF VALVE NOTES AND DETAILS
6	S-1	PRESSURE RELIEF VALVE VAULT DETAILS

**PURPOSE STATEMENT:**

THE PURPOSE OF CONTRACT 44-5084 IS TO COMPLETE THE RELOCATION OF EXISTING WATER AND SEWER MAINS AND A PRESSURE RELIEF VALVE VAULT BETWEEN FELS LANE AND MAIN STREET TO PROVIDE A CLEAR PATH FOR THE PROPOSED OPEN DRAINAGE CHANNEL. THE SCOPE OF WORK TO BE COMPLETED UNDER THIS CONTRACT INCLUDES: (1) THE INSTALLATION OF APPROXIMATELY 115 LINEAR FEET OF 6-INCH DIAMETER C900 PVC DR-14 WATER MAIN INCLUDING APPROXIMATELY 61 LINEAR FEET OF 24-INCH STEEL CASING PIPE, FITTINGS AND APPURTENANCES, (2) THE INSTALLATION OF APPROXIMATELY 70 LINEAR FEET OF 8-INCH DIAMETER RJ CLASS 54 DUCTILE IRON SEWER MAIN INCLUDING APPROXIMATELY 60 LINEAR FEET OF 24-INCH STEEL CASING PIPE AND TWO (2) 48-INCH SEWER MANHOLES, AND (3) INSTALLATION OF A NEW PRESSURE RELIEF VALVE VAULT INCLUDING MONITORING SYSTEM AND APPROXIMATELY 5 LINEAR FEET OF 6-INCH DIAMETER DUCTILE IRON WATER MAIN, FITTINGS, AND APPURTENANCES.

**GENERAL NOTES:**

- APPROXIMATE LOCATIONS 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.
- LASER SCAN SURVEY OF PHYSICAL FEATURES AND TOPOGRAPHY AND UTILITY INVESTIGATION AND LOCATION SURVEY WAS PERFORMED BY KCI TECHNOLOGIES, INC. IN 2014.
- HORIZONTAL AND VERTICAL SURVEY CONTROLS: THE COORDINATES SHOWN ON THE DRAWINGS ARE BASED ON THE MARYLAND STATE REFERENCE SYSTEM NAD '83/ '91 AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS TS09 AND TS10. ALL VERTICAL CONTROLS ARE BASED ON NAVD '88. VERTICAL CONTROLS PROVIDED ON THE DRAWING ARE HOWARD COUNTY GEODETIC CONTROL TS09 AND TS10.
- ALL PIPE ELEVATIONS SHOWN ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
- 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.
- CLEAR ALL UTILITIES BY A MINIMUM OF 12 INCHES. CLEAR ALL POLES BY 5'-0" MINIMUM OR TUNNEL AS REQUIRED UNLESS OTHERWISE NOTED. 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.
- 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 PIT OR PITS ARE INCLUDED ON THE DRAWINGS. 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).....410-637-8713
  - BGE (EMERGENCY).....410-685-0123
  - BUREAU OF UTILITIES.....410-313-4900
  - COLONIAL PIPELINE CO.....410-795-1390
  - MISS UTILITY.....800-257-7777
  - STATE HIGHWAY ADMINISTRATION.....410-531-5533
- TREES AND SHRUBS ARE TO BE PROTECTED FROM DAMAGE TO THE MAXIMUM EXTENT. TREES AND SHRUBS LOCATED WITHIN THE CONSTRUCTION STRIP ARE NOT TO BE REMOVED OR DAMAGED BY THE CONTRACTOR.
- THE CONTRACTOR SHALL REMOVE TREES, STUMPS, AND ROOTS ALONG THE LINE OF EXCAVATION.
- 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.

**AS-BUILT 9-17-2019**

G-1

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**HOWARD COUNTY CONTACT INFORMATION**  
 HOWARD COUNTY PM: ZACK KNIGHT, PE  
 PHONE (410) 313-6125  
 HOWARD COUNTY UTILITY DESIGN DIVISION  
 PHONE (410) 313-2040

**AS-BUILT DRAWINGS:**  
 I HEREBY CERTIFY THAT THIS PLAN HAS BEEN REVISED TO REFLECT THE AS-BUILT CONDITIONS OF THE FELS LANE WATER, SEWER & PRESSURE RELIEF VAULT RELOCATIONS RECORDED BY HOWARD COUNTY'S CONTRACTOR AND INSPECTOR.  
  
 20566      06/02/2020  
 Engineer's Signature - Registration Number      Date

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
  
 DIRECTOR OF PUBLIC WORKS      7/8/2020  
  
 CHIEF, BUREAU OF ENGINEERING      06/25/2020  
  
 CHIEF, UTILITY DESIGN DIVISION      06/02/2020

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. 20566, EXPIRATION DATE 09/06/2020.  
  
 RUMMEL, KLEPPER & KAHL, LLP  
 700 EAST PRATT STREET, SUITE 500  
 BALTIMORE, MARYLAND 21202  
 (410) 728-2800      WWW.RKK.COM

DES.	BY	NO.	REVISION	DATE
REG/NKS	RKK	1	AS-BUILT REPLACEMENT SHEET	1/2020
DRN:				
RAD				
CHK:				
JCM				
SIGN DATE:				
06/02/2020				

DECEMBER 2018  
**TITLE SHEET, GENERAL NOTES, AND INDEX OF DRAWINGS**  
 600' SCALE MAP NO. 25      BLOCK NO. 8

PROJECT NO. W8600  
 CONTRACT NO. 44-5084  
**FELS LANE WATER, SEWER, & PRESSURE RELIEF VAULT RELOCATIONS**  
 ELECTION DISTRICT NO. 2      HOWARD COUNTY, MARYLAND  
 SCALE: AS SHOWN  
 SHEET NO. 01 OF 6

RKK21SYS - \\bmdm05\0207\2017\17240\_Hocobocall\Howard County\Task 4 - Ellicott Mills Drive Survey\CADD\Plans\PRV\Plan\AS-Built\Record Draw\2-p04-1002-ELLICOTT PRV.dwg Plot Scale 1=1 Plot By: rgreen Tab: G-2

**ABBREVIATIONS**

ABAN	ABANDONED
ADA	AMERICANS WITH DISABILITIES ACT
ADJ	ADJUSTABLE, ADJACENT
ALT	ALTERNATE, ALTERNATIVE
APPROX	APPROXIMATE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AVE	AVENUE
BGE	BALTIMORE GAS AND ELECTRIC
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BLT(S)	BOLT(S)
BM	BENCHMARK
CC	CORROSION CONTROL
CFM	CUBIC FEET PER MINUTE
C&G	CURB AND GUTTER
CI	CAST IRON
CIP	CAST IRON PIPE
CL	CLASS, CLEARANCE, CENTER LINE
CLR	CLEAR, CLEARANCE
CO	CLEAN OUT
COMB	COMBINATION
CONC	CONCRETE
COND	CONDUIT
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS, CONTINUATION, CONTROL
COV	COVER
CP	CATHODIC PROTECTION
CPLG	COUPLING
CTV	CABLE TELEVISION
CSPX	CONCRETE SEWER PIPE EXTRA STRENGTH
DEG	DEGREE
DEPT	DEPARTMENT
DET	DETAIL
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DIV	DIVISION
DN	DOWN
DOT	DEPARTMENT OF TRANSPORTATION
DR	DRAIN
DTL	DETAIL
DV	DIVISION VALVE
DWG(S)	DRAWING(S)
E	EAST, ELECTRIC
EA	EACH
EBOX	ELECTRICAL BOX
EL	ELEVATION
ELEC	ELECTRIC
ELEV	ELEVATION
EOP	EDGE OF PAVEMENT
EQ	EQUAL
EQUIP	EQUIPMENT
EX	EXISTING
EXT	EXTENSION, EXTERIOR, EXTERNAL
FH	FIRE HYDRANT
FLEX	FLEXIBLE
FLG	FLANGE
FM	FORCE MAIN, FLOW METER
FO	FIBER OPTIC
FP	FLOOD PLAIN
FT	FEET, FOOT
G	GAS
GAB	GRADED AGGREGATE BASE
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GR	GRADE
GV	GATE VALVE, GRAVITY VENTILATOR
HB	HORIZONTAL BEND
HC	HOWARD COUNTY
HD	HIGH DEFLECTION
HMA	HOT MIX ASPHALT
HORIZ	HORIZONTAL
HR	HOUR
HWY	HIGHWAY
ID	INSIDE DIAMETER
IN	INCH, INCHES
INC	INCORPORATED
INCL	INCLUDING
INL	INLET
INSUL	INSULATE, INSULATION, INSULATING
INV	INVERT

**ABBREVIATIONS (CONT'D)**

JT	JOINT
L	LENGTH
LB(S)	POUND(S)
LF	LINEAR FEET
LG	LENGTH, LONG
LOC	LIMIT OF CONTRACT
LOD	LIMIT OF DISTURBANCE
LP	LOW POINT, LIGHT POLE
LT	LEFT
MAX	MAXIMUM
M.B.	MAILBOX
MDSHA	MARYLAND STATE HIGHWAY ADMINISTRATION
MECH	MECHANICAL
MED	MEDIUM
MFR(S)	MANUFACTURER(S)
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM, MINUTE
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MPH	MILES PER HOUR
N	NORTH
NA	NOT APPLICABLE
N.I.C	NOT IN CONTRACT
NO.(S)	NUMBER(S)
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE
OD	OUTSIDE DIAMETER
OH	OVERHEAD
OPP	OPPOSITE, OPPOSING
PAV	PAVEMENT
PE	PLAIN END
PK	PK NAIL
PL	PLATE
PROP	PROPOSED
PSI	POUNDS PER SQUARE INCH
PT	POINT
PVC	POLYVINYL CHLORIDE
R	RADIUS, RISER, RIM ELEVATION
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
REF	REFERENCE
REQD	REQUIRED
REV	REVISION, REVISED
RJ	RESTRAINED JOINT
ROW	RIGHT-OF-WAY
R/W	RIGHT-OF-WAY
RT	RIGHT
S	SOUTH, SEWER
SAN	SANITARY
SB	SOIL BORING
SD	STORM DRAIN
SECT	SECTION
SF	SILT FENCE
SHC	SANITARY SEWER HOUSE CONNECTION
SPEC(S)	SPECIFICATION(S)
SQ	SQUARE
SS	STAINLESS STEEL, SANITARY SEWER
STA	STATION
STD	STANDARD
SYS	SYSTEM
T	TOP
TBD	TO BE DETERMINED
TEL	TELEPHONE
TEMP	TEMPERATURE, TEMPORARY
TH	TEST HOLE
TOP	TOP (OF PIPE) ELEVATION
TP	TEST PIT
TRAV	TRAVERSE
TYP	TYPICAL
UFGS	UNIFIED FACILITIES GUIDE SPECIFICATIONS
USGS	UNITED STATES GEOLOGICAL SURVEY
V	VALVE, VERTICAL
VB	VERTICAL BEND
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
W	WEST, WIDTH, WATER
W/	WITH
WHC	WATER HOUSE CONNECTION
WM	WATER METER

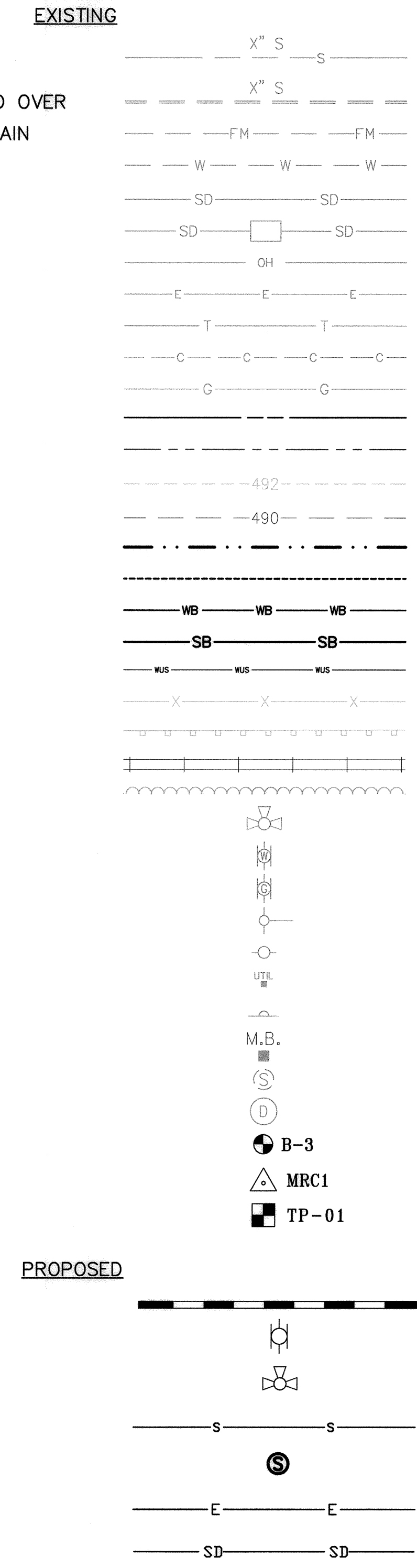
**ABBREVIATIONS (CONT'D)**

W/O	WITHOUT
WSS	WATER SUPPLY SERVICE
WV	WATER VALVE
X	BY, TIMES
&	AND
@	AT
#	NUMBER
%	PERCENT

**ABBREVIATIONS (CONT'D)**

SANITARY SEWER
SANITARY SEWERS 12" AND OVER
SANITARY SEWER FORCE MAIN
WATER
STORM DRAIN
STORM DRAIN INLET
OVERHEAD ELECTRIC
UNDERGROUND ELECTRIC
UNDERGROUND TELEPHONE
UNDERGROUND CABLE
GAS
PROPERTY LINE
UTILITY EASEMENT
MINOR CONTOURS
MAJOR CONTOURS
100-YEAR FLOODPLAIN
WETLAND BOUNDARY
25' WETLAND BUFFER
STREAM BUFFER
WATERS OF THE US
FENCE
GUARDRAIL
RAILROAD TRACKS
TREE LINE OR WOODS
WATER FIRE HYDRANT
WATER VALVE
GAS METER
ELECTRIC POLE GUY
ELECTRIC POLE
UTILITY MARKER
SIGN
MAILBOX
SANITARY SEWER MANHOLE
STORM DRAIN MANHOLE
BORING
TRAVERSE LOCATION
TEST PIT LOCATION
WATER MAIN
WATER VALVE
FIRE HYDRANT
SANITARY SEWER PIPE
SANITARY SEWER MANHOLE
UNDERGROUND ELECTRIC
STORM DRAIN

**LEGEND**



QUANTITIES			
ITEM	ESTIMATED QUANTITY	AS-BUILT	SUPPLIER
6" X 6" TEE	1	EA	
6" C900 PVC DR-14 PIPE	115	LF	
6" PRESSURE RELIEF VALVE	1	EA	
6" - 45' (1/8) ELBOW	4	EA	
6" DI SOLID SLEEVE	2	EA	
PRV VAULT WITH PIPING & APPURTENANCES	1	EA	
8" CL 54 DIP	70	LF	
24" STEEL CASING PIPE	121	LF	
48" DOGHOUSE SAN MH	2	EA	
2" SCHEDULE 80 PVC CONDUIT	110	LF	

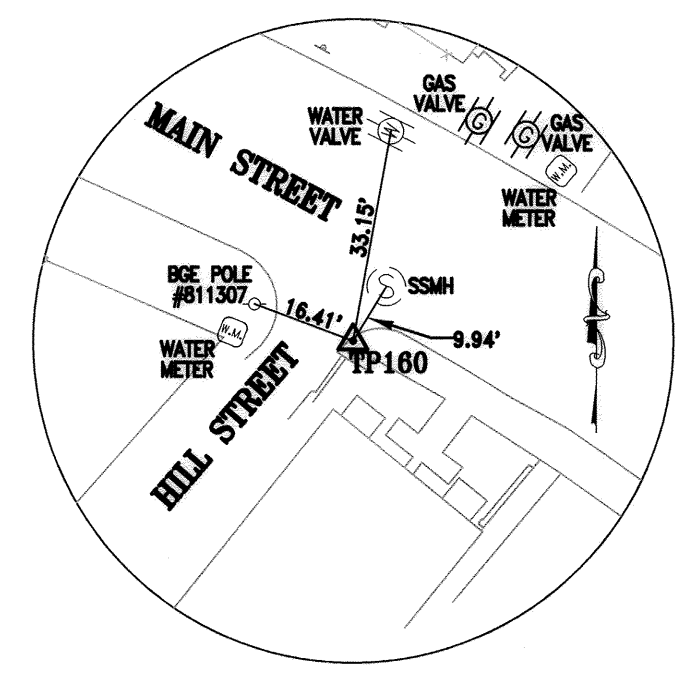
WATER FITTING SCHEDULE - FELLS LANE			
STATION	FITTING	NORTHING	EASTING
0+00	6" DI SOLID SLEEVE	583,521.94	1,368,773.29
0+16.6	6"x6" TEE	583,538.47	1,368,771.20
1+14.7	6" DI SOLID SLEEVE	583,635.56	1,368,757.94

SANITARY MANHOLE SCHEDULE - FELLS LANE		
MH	NORTHING	EASTING
1054B	583,566.02	1,368,760.54
1055A	583,635.23	1,368,752.46

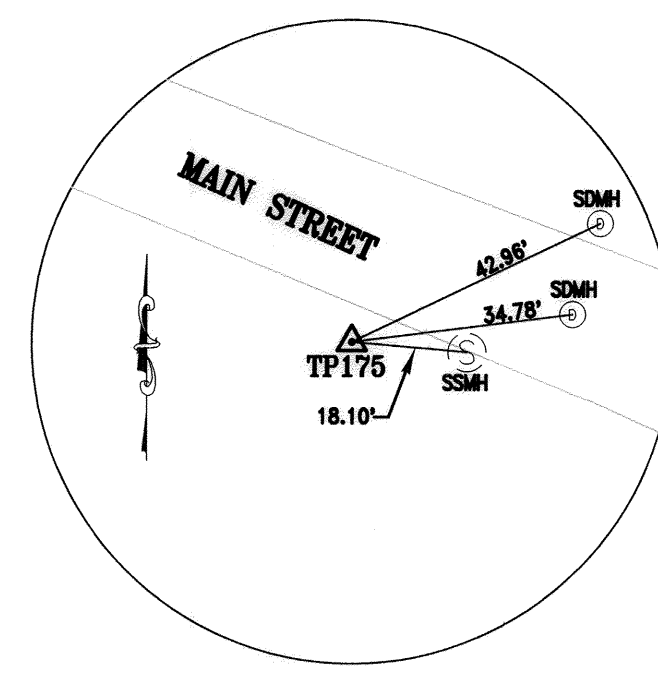
**AS-BUILT DRAWINGS:**

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN REVISED TO REFLECT THE AS-BUILT CONDITIONS OF THE FELLS LANE WATER, SEWER & PRESSURE RELIEF VAULT RELOCATIONS RECORDED BY HOWARD COUNTY'S CONTRACTOR AND INSPECTOR.

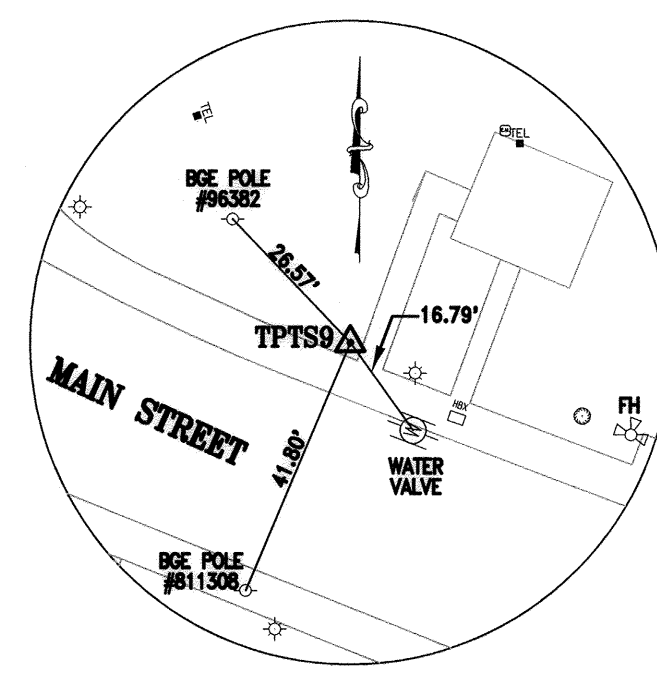
*John C. Moore* 20566 *06/24/2020*  
 Engineer's Signature - Registration Number Date



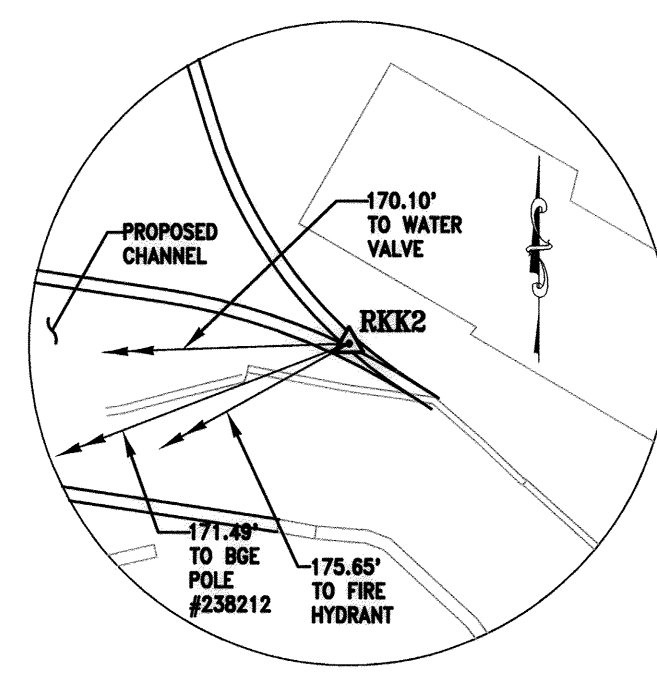
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 NORTHING = 583,392.37  
 EASTING = 1,368,847.37  
 ELEVATION = 185.14



TP175  
 NORTHING = 583,568.54  
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 ELEVATION = 206.01



TS09  
 NORTHING = 583,508.26  
 EASTING = 1,368,680.78  
 ELEVATION = 196.22



RKK2  
 NORTHING = 583,591.28  
 EASTING = 1,368,940.71  
 ELEVATION = 183.59

**AS-BUILT 9-17-2019**

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

*John C. Moore* 7/8/2020  
 DIRECTOR OF PUBLIC WORKS DATE

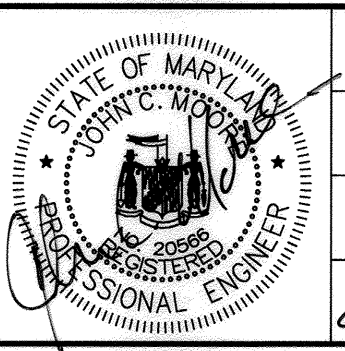
*Thomas E. Buller* 6/25/20  
 CHIEF, BUREAU OF ENGINEERING DATE

*John C. Moore* 6-29-2020  
 CHIEF, BUREAU OF UTILITIES DATE

*John C. Moore* 6/25/20  
 CHIEF, UTILITY DESIGN DIVISION DATE

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. 20566, EXPIRATION DATE 09/06/2020

**RK&K** RUMMEL, KLEPPER & KAHL, LLP  
 700 EAST PRATT STREET, SUITE 500  
 BALTIMORE, MARYLAND 21202  
 (410) 728-2900 WWW.RK&K.COM



DES: REG/NKS	BY	NO.	REVISION	DATE
DRN: RAD	RKK	1	AS-BUILT REPLACEMENT SHEET	1/2020
CHK: JCM				
SIGN DATE: 06/22/2020				

DECEMBER 2018

**LEGEND, ABBREVIATIONS, FITTING SCHEDULES, SURVEY CONTROL AND STAKEOUT**

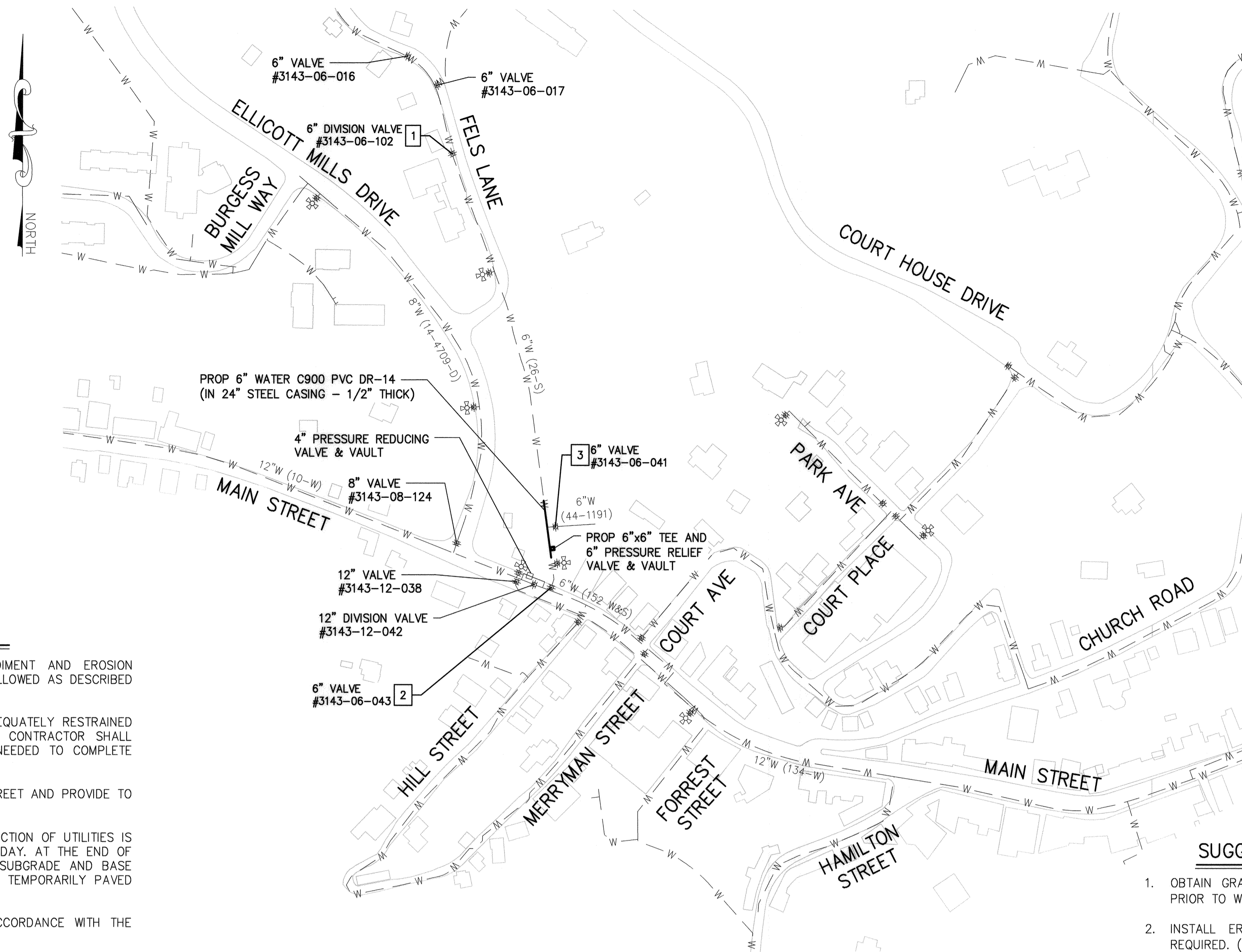
600' SCALE MAP NO. 25 BLOCK NO. 8 ELECTION DISTRICT NO. 2

PROJECT NO. W8600  
 CONTRACT NO. 44-5084

**FELLS LANE WATER, SEWER, & PRESSURE RELIEF VAULT RELOCATIONS**

HOWARD COUNTY, MARYLAND

RKK21515 - \\baltimore\2017\2017\7240\_106060606\Howard County\Task 4 - Ellicott Mills Drive Survey\CADD\Plans\PRV Plans\As-Built\_Record Dwg\3-p11-001\_ELLICOTT PRV.dwg May 19, 2020 - 11:37am ENV.GIB Plot Scale 1"=1' Plot By: rgruen Tab: C-01



**SEQUENCE OF CONSTRUCTION – GENERAL NOTES**

1. THE SUGGESTED SEQUENCE OF CONSTRUCTION DOES NOT INCLUDE CONCURRENT SEDIMENT AND EROSION CONTROL MEASURES, AND MAINTENANCE OF TRAFFIC ACTIVITIES, WHICH SHALL ALSO BE FOLLOWED AS DESCRIBED IN THE CONTRACT DOCUMENTS.
2. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING WATER MAINS AND VALVES ARE ADEQUATELY RESTRAINED PRIOR TO REMOVAL OF EXISTING WATER MAIN AT THE CONNECTION LOCATIONS. THE CONTRACTOR SHALL PROVIDE TEMPORARY THRUST BLOCKING ON THE EXISTING AND NEW WATER MAINS AS NEEDED TO COMPLETE CONNECTION TO THE NEW WATER MAIN AT NO ADDITIONAL COST TO THE COUNTY.
3. TEST PIT EXISTING 6" WATER MAIN AT PROPOSED TIE-IN ALONG FELLS LANE NEAR MAIN STREET AND PROVIDE TO ENGINEER.
4. INSTALL WATER MAIN AND SEWER MAIN AND BACKFILL. OPEN TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THAT WHICH CAN BE BACKFILLED AND STABILIZED BY THE END OF THE WORK DAY. AT THE END OF EACH WORK DAY, ALL DISTURBED PAVED AREAS SHALL BE RESTORED WITH PERMANENT SUBGRADE AND BASE ASPHALT TO THE EXTENT SHOWN PER HOWARD COUNTY STANDARD DETAIL G-4.01, THEN TEMPORARILY PAVED OR PROPERLY COVERED TO PERMIT VEHICULAR TRAFFIC DURING NON-WORK HOURS.
5. INSTALL TRACER WIRES, CONTINUITY TEST STATIONS, AND CORROSION PROTECTION IN ACCORDANCE WITH THE WATER NOTES AND STANDARD DETAILS.
6. RESTORE LANDSCAPED AREA WITH 6" TOPSOIL AND SEED AND ESTABLISH TURF.

**SANITARY SEWER BYPASS NOTES**

1. CONTRACTOR TO SUBMIT THE FOLLOWING PRIOR TO EXECUTION:
  - A) METHOD FOR MAINTAINING SEWAGE FLOWS TO INCLUDE A BYPASS PLAN SHOWING:
    1. INTAKE MANHOLE
    2. RECEIVING MANHOLE
    3. EXPECTED FLOWS (CONTRACTOR TO FIELD VERIFY)
    4. PUMP SIZE
    5. PIPE LAYOUT
    6. BACKUP EQUIPMENT
  - B) SCHEDULE SHOWING BYPASS DURATION
2. MAINTAIN EX SEWAGE FLOWS DURING CONNECTION TO EXISTING SEWER.
3. TAKE PRECAUTION AND EMPLOY METHODS REQUIRED TO PREVENT SEWAGE BACKUP.
4. RETURN DIVERTED SEWAGE TO SANITARY SYSTEM AND DO NOT DISCHARGE ON SURFACES OR INTO STREAMS OR STORM DRAINS.
5. USE ENCLOSED BYPASS FLUMES EQUIVALENT IN SIZE TO EXISTING SEWER BEING DIVERTED, WHEN REQUIRED.
6. IMMEDIATELY CLEAN AND DISINFECT RAW SEWAGE SPILLS AND OVERFLOWS, AND NOTIFY HOWARD COUNTY BUREAU OF UTILITIES AT (410) 313-4900.
7. ANY TIME SEWER BYPASS PUMPING OCCURS, THE CONTRACTOR SHALL BE PHYSICALLY PRESENT AT THE JOBSITE TO RESPOND TO ANY PUMP OR EQUIPMENT FAILURES. SEE HOWARD COUNTY DESIGN MANUAL VOLUME IV, SECTION 1013.03.03 FOR MORE INFORMATION.

**WATER SHUTOFF PLAN**

SCALE: 1" = 150'

**SUGGESTED SEQUENCE OF CONSTRUCTION – WATER & SEWER**

1. OBTAIN GRADING PERMIT FROM COUNTY PM AND NOTIFY THE COUNTY TEN (10) BUSINESS DAYS PRIOR TO WORK. (10 WORK DAYS)
2. INSTALL EROSION/SEDIMENT DEVICES AND MAINTENANCE/PROTECTION OF TRAFFIC DEVICES AS REQUIRED. (1 WORK DAY)
3. TEST PIT EXISTING 6" WATER MAIN PER GENERAL NOTE 3 ON THIS SHEET. (1 WORK DAY)
4. COORDINATE SHUTDOWN OF EXISTING 6"W ALONG FELLS LANE WITH THE COUNTY BUREAU OF UTILITIES TO CLOSE VALVE 2 10 DAYS PRIOR TO SCHEDULING THE WORK. ONCE SHUT, REMOVE EXISTING 6"W ON FELLS LANE AND INSTALL NEW 6" PVC WATER MAIN INCLUDING ALL FITTINGS, PRV, VAULT, AND PIPING UTILIZING "SAME-DAY TRENCH STABILIZATION" METHODS IN ACCORDANCE WITH GENERAL NOTE 4 ON THIS SHEET. (10 WORK DAYS)
5. PERFORM HYDROSTATIC TESTING PER SECTION 1006 OF COUNTY DESIGN MANUAL VOL. IV. (1 WORK DAY)
6. UPON SUCCESSFUL COMPLETION OF HYDROSTATIC TESTING, DISINFECT WATER MAIN AND PERFORM BACTERIOLOGICAL TESTING ACCORDING TO SECTIONS 1007 AND 1008, RESPECTIVELY. (2 WORK DAYS)
7. COMPLETE TIE-INS OF NEW 6" PVC WATER MAIN TO THE EXISTING 6"W AS SHOWN.
8. OPEN VALVE 2. VALVE 1 WILL REMAIN CLOSED. (1 WORK DAY)
9. COORDINATE THE SEWER BYPASS ACCORDING TO THE SANITARY SEWER BYPASS NOTES AND INSTALL MH 1055A AND 1054B WITH FLOW CHANNELS BUT DO NOT BREAK THE EXISTING PIPE UNTIL BYPASS IS IN PLACE AND APPROVED BY THE COUNTY. (2 WORKS DAYS)
11. BREAK EXISTING PIPE IN MH 1055A AND MH 1054B AND DIVERT EX FLOW FROM MH 1055A TO MH 1054B THROUGH TEMPORARY BYPASS PIPING. DEMOLISH EX 8" SEWER AND INSTALL NEW 8" DIP SEWER MAIN IN THE SAME TRENCH. MAINTAIN THE SAME INVERTS AND SLOPE AS EXISTING. (2 WORK DAYS)
12. INSPECT AND TEST PROPOSED SEWER. (1 WORK DAY)
13. REMOVE SEWER BYPASS AND RESTORE AREA AS SPECIFIED. (5 WORK DAYS)
14. CLEAN CONSTRUCTION SITE AND REMOVE EROSION/SEDIMENT CONTROL DEVICES AFTER PERMISSION IS GRANTED BY THE EROSION/SEDIMENT CONTROL INSPECTOR. (1 WORK DAY)

**AS-BUILT DRAWINGS:**  
 I HEREBY CERTIFY THAT THIS PLAN HAS BEEN REVISED TO REFLECT THE AS-BUILT CONDITIONS OF THE FELLS LANE WATER, SEWER & PRESSURE RELIEF VAULT RELOCATIONS RECORDED BY HOWARD COUNTY'S CONTRACTOR AND INSPECTOR.  
*John C. McE...* 20566 06/02/2020  
 Engineer's Signature - Registration Number Date

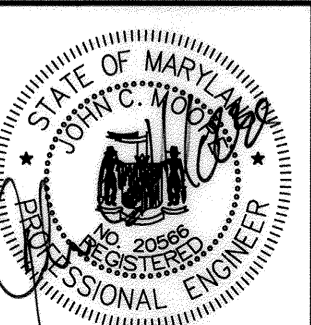


**AS-BUILT 9-17-2019**

C-1

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 Director of Public Works: *John C. McE...* 7/8/2020  
 Chief, Bureau of Engineering: *Thomas E. Butler* 6/25/20  
 Chief, Bureau of Utilities: *John C. McE...* 6-29-2020  
 Chief, Utility Design Division: *John C. McE...*

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. 20566, EXPIRATION DATE 09/08/2020.  
**RKK** RUMMEL, KLEPPER & KAHL, LLP  
 700 EAST PRATT STREET, SUITE 500  
 BALTIMORE, MARYLAND 21202  
 (410) 728-2900 WWW.RKK.COM

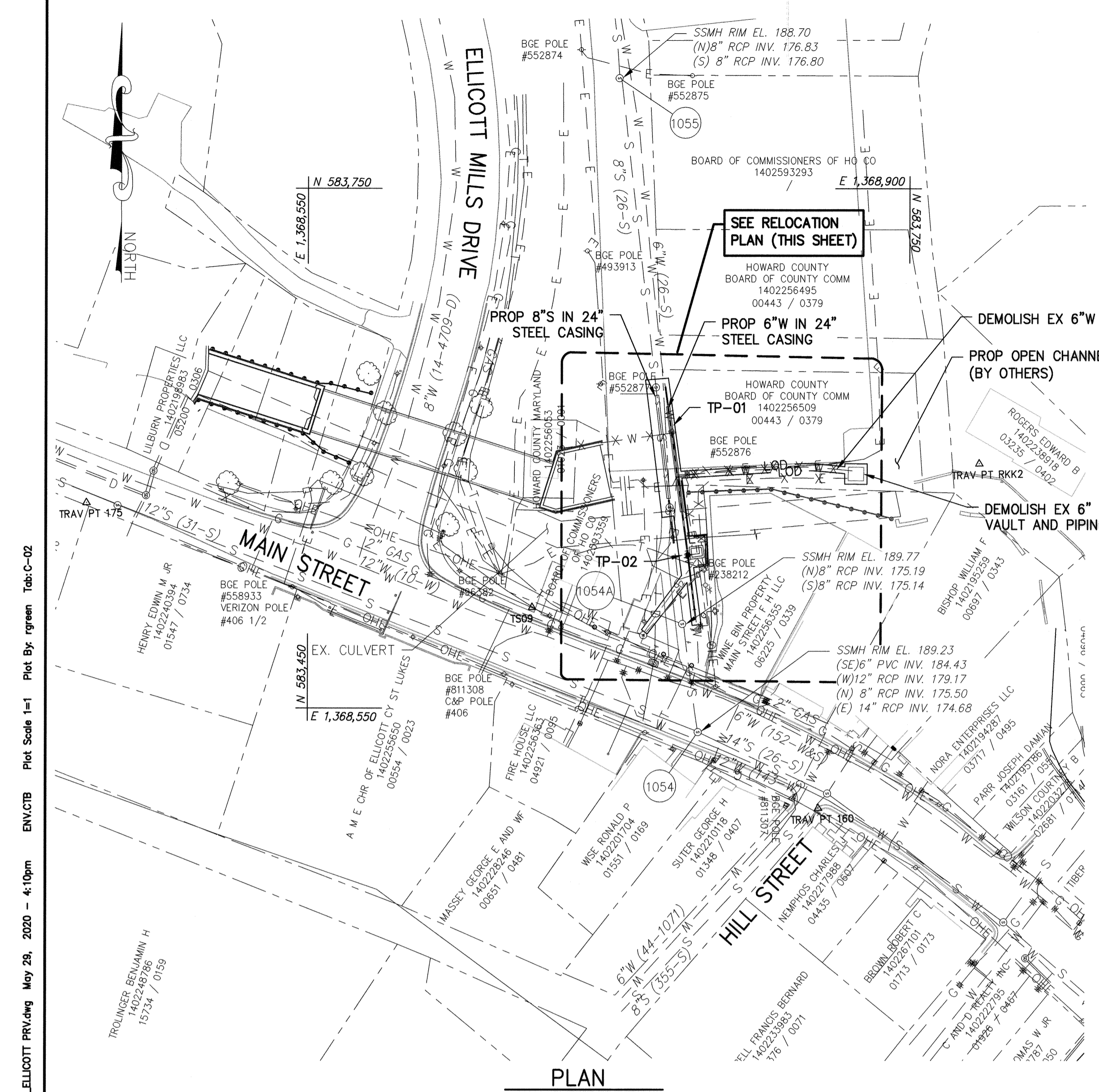


DES:	BY:	NO.	REVISION	DATE
REG/NKS	RKK	3	AS-BUILT REPLACEMENT SHEET	1/2020
DRN:	RAD			
CHK:	JCM			
SIGN DATE:				06/02/2020

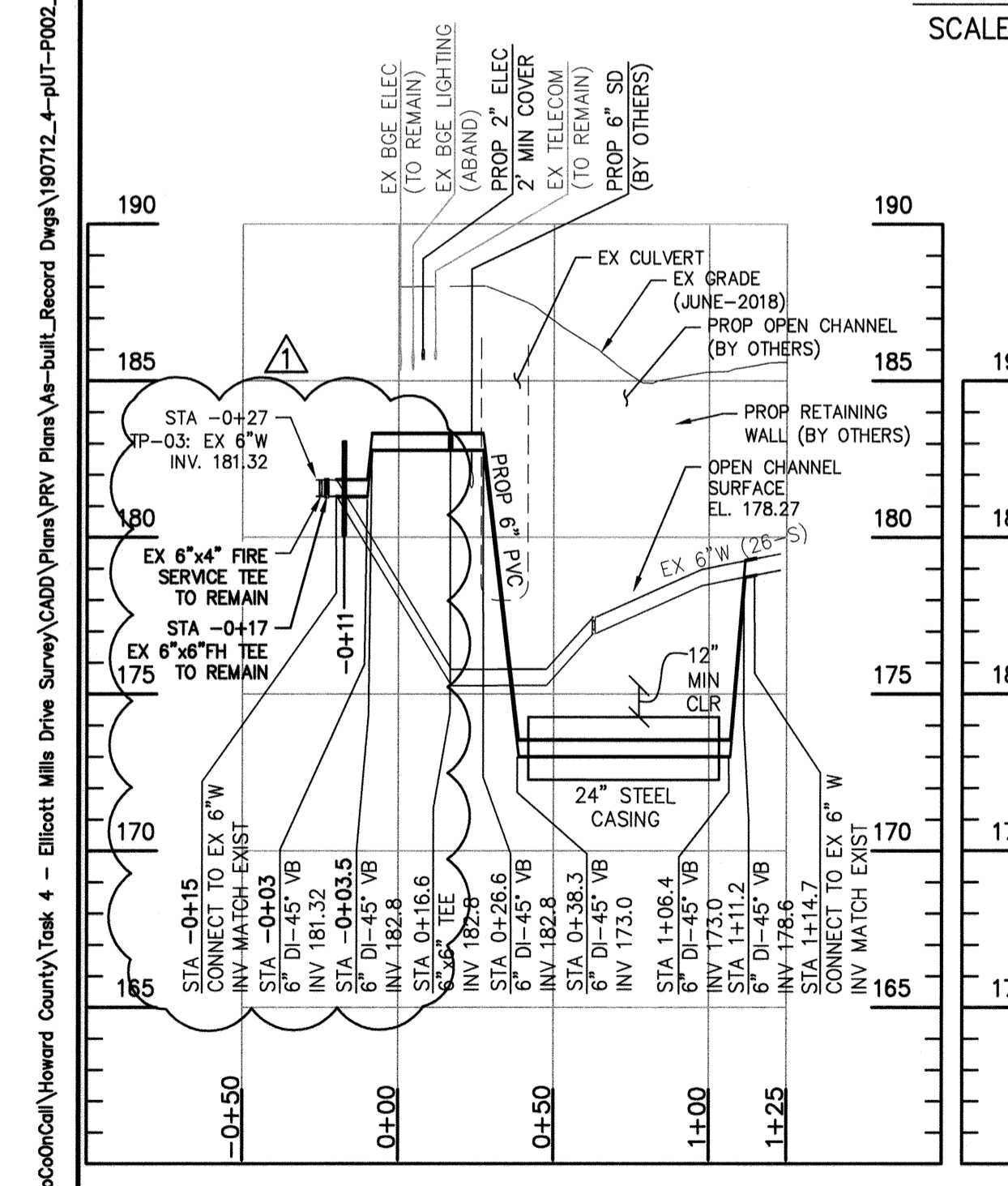
DECEMBER 2018  
**WATER SHUTOFF PLAN AND SEQUENCE OF CONSTRUCTION**  
 600' SCALE MAP NO. 25 BLOCK NO. 8

PROJECT NO. W8600  
 CONTRACT NO. 44-5084  
**FELLS LANE WATER, SEWER, & PRESSURE RELIEF VAULT RELOCATIONS**  
 ELECTION DISTRICT NO. 2 HOWARD COUNTY, MARYLAND

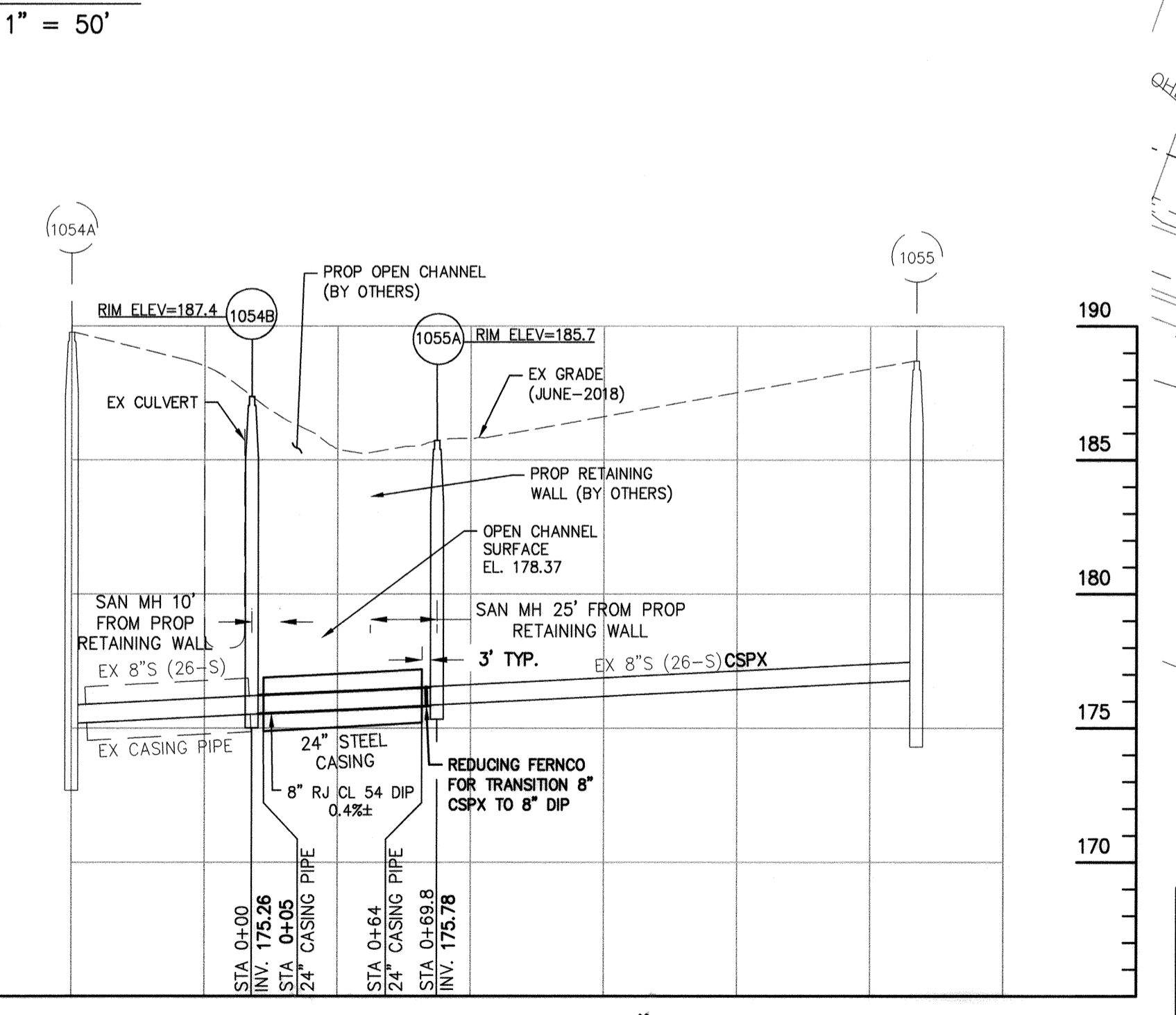
SCALE AS SHOWN  
 SHEET NO. 3 OF 6



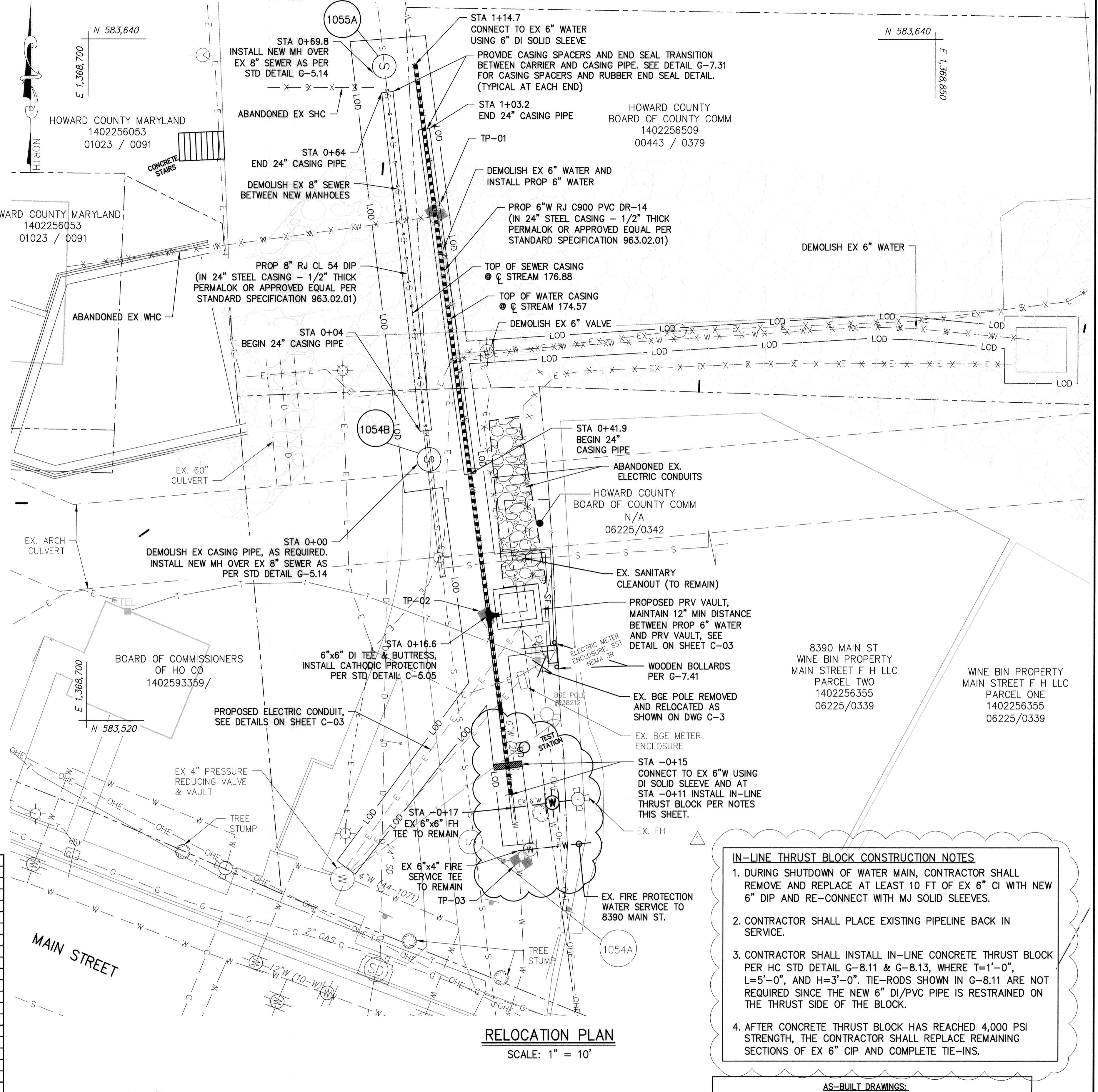
PLAN  
SCALE: 1" = 50'



PROFILE - PROP 6" WATER  
SCALE: 1" = 50' HORIZ.  
1" = 5' VERT.



PROFILE - PROP 8" SEWER  
SCALE: 1" = 50' HORIZ.  
1" = 5' VERT.



RELOCATION PLAN  
SCALE: 1" = 10'

**IN-LINE THRUST BLOCK CONSTRUCTION NOTES**

- DURING SHUTDOWN OF WATER MAIN, CONTRACTOR SHALL REMOVE AND REPLACE AT LEAST 10 FT OF EX 6" CI WITH NEW 6" DIP AND RE-CONNECT WITH MJ SOLID SLEEVES.
- CONTRACTOR SHALL PLACE EXISTING PIPELINE BACK IN SERVICE.
- CONTRACTOR SHALL INSTALL IN-LINE CONCRETE THRUST BLOCK PER HC STD DETAIL G-8.11 & G-8.13, WHERE T=1'-0", L=5'-0", AND H=3'-0". TIE-RODS SHOWN IN G-8.11 ARE NOT REQUIRED SINCE THE NEW 6" DI/PVC PIPE IS RESTRAINED ON THE THRUST SIDE OF THE BLOCK.
- AFTER CONCRETE THRUST BLOCK HAS REACHED 4,000 PSI STRENGTH, THE CONTRACTOR SHALL REPLACE REMAINING SECTIONS OF EX 6" CI AND COMPLETE TIE-INS.

TEST PIT #	TOP OF UTILITY	DESCRIPTION
TP-01	178.32	6" CI WATER
TP-02	175.66	6" CI WATER
TP-03	181.32	6" CI WATER

**EROSION AND SEDIMENT CONTROL CONSTRUCTION NOTE**  
EROSION AND SEDIMENT CONTROLS ARE EITHER EXISTING, PROVIDED UNDER SEPARATE CONTRACT, OR WILL BE ORDERED BY THE COUNTY INSPECTOR USING THIS CONTRACT'S CONTINGENCY

**AS-BUILT DRAWINGS:**  
I HEREBY CERTIFY THAT THIS PLAN HAS BEEN REVISED TO REFLECT THE AS-BUILT CONDITIONS OF THE FELLS LANE WATER, SEWER & PRESSURE RELIEF VAULT RELOCATIONS RECORDED BY HOWARD COUNTY'S CONTRACTOR AND INSPECTOR.

*John C. Moore*  
20566  
Engineer's Signature - Registration Number

06/02/2020  
Date

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*7/8/20*  
DIRECTOR OF PUBLIC WORKS DATE

*06/29/2020*  
CHIEF, BUREAU OF UTILITIES DATE

*06/29/2020*  
CHIEF, BUREAU OF UTILITIES DATE

*06/29/2020*  
CHIEF, UTILITY DESIGN DIVISION DATE

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DES. REG/NKS	BY	NO.	REVISION	DATE
	REG	1	DESIGN MODIFICATION NO.1	07/19
	REG	2	AS-BUILT REPLACEMENT SHEET	1/2020

DRN: RAD  
CHK: JCM  
SIGN DATE: 06/02/2020

DECEMBER 2018

**WATER & SEWER RELOCATION PLAN & PROFILES**

600' SCALE MAP NO. 25

BLOCK NO. 8

ELECTION DISTRICT NO. 2

PROJECT NO. W8600  
CONTRACT NO. 44-5084

**FELLS LANE WATER, SEWER, & PRESSURE RELIEF VAULT RELOCATIONS**

HOWARD COUNTY, MARYLAND

SCALE: AS SHOWN

SHEET NO. 4 OF 6

**PRESSURE RELIEF VALVE (PRV) VAULT SPECIFICATIONS:**

1. THE PRV VAULT SHALL BE PRE-CAST OR CAST-IN-PLACE AND SHALL BE DESIGNED PER ACI 318 WITH SPECIAL LIMITATIONS IN ACCORDANCE WITH ACI 350. FOR CAST-IN-PLACE VAULT, THE CONCRETE STRENGTH SHALL BE 4,000 PSI @ 28 DAYS; FOR PRE-CAST STRUCTURE, IT SHALL BE 5,000 PSI @ 28 DAYS.
2. THE DESIGN SHALL CONSIDER THE EFFECTS OF BUOYANCY WITH THE FLOTATION SAFETY FACTOR OF 1.1 MINIMUM. THE GROUNDWATER ELEVATION SHALL BE CONSIDERED AT THE TOP OF THE STRUCTURE.
3. THE CONTRACTOR SHALL SUBMIT STRUCTURAL COMPUTATIONS FOR REVIEW ALONG WITH SHOP DRAWINGS AND CALCULATIONS SIGNED AND SEALED BY A MARYLAND LICENSED PROFESSIONAL ENGINEER.
4. THE INSIDE DIMENSIONS OF THE VAULT SHALL BE AS SHOWN ON THE PLAN.
5. PROVIDE 30"x30" SQ. ALUMINUM HATCH FOR ACCESS AND VALVE REMOVAL, WITH MINIMUM 300 LB/SQ. FT. DESIGN LOAD AND MAXIMUM DEFLECTION LIMITED TO L/150. THE HATCH SHALL BE BILCO TYPE J OR APPROVED EQUAL.
6. LADDER SHALL BE RATED FOR A 300 LB CONCENTRATED LOAD AT THE MIDDLE OF THE LADDER RUNG. RUNGS SHALL BE CONSTRUCTED OF A SOLID BAR WITH SERRATED SURFACE. STRINGERS SHALL BE A MINIMUM OF 3/8" THICK. BRACKET SUPPORTS FOR THE STRINGERS SHALL BE PROVIDED AT FOUR (4) FOOT SPACING. LADDER SHALL BE INSTALLED WITH TELESCOPING POST/GRAB BAR OF BILCO TYPE LU OR APPROVED EQUAL. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL.

**PRESSURE RELIEF VALVE (PRV) PIPING AND APPURTENANCES SPECIFICATIONS:**

1. THE PRESSURE RELIEF VALVE SHALL BE 6-INCH SIZE, PILOT OPERATED, DIAPHRAGM ACTUATED, GLOBE PATTERN. THE VALVE SHALL BE ACTUATED BY THE LINE PRESSURE THROUGH A PILOT CONTROL SYSTEM, OPENING FAST TO MAINTAIN STEADY LINE PRESSURE BUT CLOSING GRADUALLY TO PREVENT SURGES.
2. THE VALVE SHALL MEET OR EXCEED THE REQUIREMENTS OF NSF/ANSI 372, NSF/ANSI 61, AND AWWA STANDARD C530.
3. THE MAIN VALVE SHALL BE OF THE GLOBE DESIGN AND CONSIST OF A DUCTILE IRON BODY AND COVER WITH STAINLESS STEEL TRIM. THE VALVE SHALL COME FULLY ASSEMBLED AND THE MANUFACTURER SHALL SUPPLY ALL APPURTENANCES, INCLUDING REQUIRED PILOT VALVE AND INTERCONNECTING PIPING. THE VALVE SHALL HAVE TWO COATS OF MANUFACTURER'S STANDARD FUSION-BONDED EPOXY CONFIRMING TO AWWA C550.
4. THE MAIN VALVE SHALL HAVE FLANGED CONNECTIONS. FLANGED CONNECTIONS SHALL BE ANSI B16.42, CLASS 150 RATED TO 250 PSI WORKING PRESSURE. FLANGED ASSEMBLIES SHALL CONFORM TO AWWA STANDARDS FOR FLANGE THICKNESS AND WALL THICKNESS OF BODY AND CAPS.
5. THE PILOT CONTROL VALVE SHALL BE A DIRECT-ACTING, ADJUSTABLE, SPRING-LOADED DIAPHRAGM TYPE VALVE, NORMALLY CLOSED, CLA-VAL MODEL CRL-60 OR APPROVED EQUAL, WITH PRESSURE ADJUSTMENT RANGE OF 20 TO 200 PSI. THE PILOT VALVE SHALL HAVE LOW LEAD BRONZE BODY WITH STAINLESS STEEL TRIM INTERNALLY, BRONZE WITH COPPER PIPING AND FITTINGS, WITH EXTERNAL STRAINER AND ISOLATION BALL VALVES. CONTACT HOWARD COUNTY FOR PRESSURE SETTING OF THE PILOT VALVE.
6. PRESSURE RELIEF VALVE SHALL BE CLA-VAL 50-01 OR APPROVED EQUAL.
7. PROVIDE 6-INCH AWWA CLASS 150B BUTTERFLY VALVE WITH DUCTILE IRON BODY AND WAFER END CONNECTIONS DESIGNED FOR INSTALLATION BETWEEN ANSI B16.1 CLASS 125 IRON FLANGES. THE VALVE SHALL BE DESIGNED, MANUFACTURED AND TESTED IN ACCORDANCE WITH AWWA STANDARD C504, AND CERTIFIED TO NSF/ANSI 372 AND NSF/ANSI 61. THE VALVE SHALL HAVE MANUFACTURER'S STANDARD FUSION-BONDED EPOXY CONFIRMING TO AWWA C550. THE CONTRACTOR SHALL SIZE THE LENGTH OF (2) 6" DI PIPES (PEXFL) APPROPRIATELY THAT WILL ALLOW REMOVAL OF THE PRV BY DISMANTLING MJ SOLID SLEEVE.
8. PROVIDE A FLANGED ELBOW AT THE POINT OF DISCHARGE WITH THE INSECT SCREEN SECURELY FLANGED TO THE PIPE.
9. RESTRAIN ALL JOINTS UP TO AND INCLUDING DISCHARGE PIPING AND BLOCK ALL FITTINGS.
10. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS/CATALOG CUT SHEETS FOR PRESSURE RELIEF VALVES, PIPING, APPURTENANCES, AND PIPE SUPPORT FOR APPROVAL PRIOR TO ORDERING THE MATERIALS.

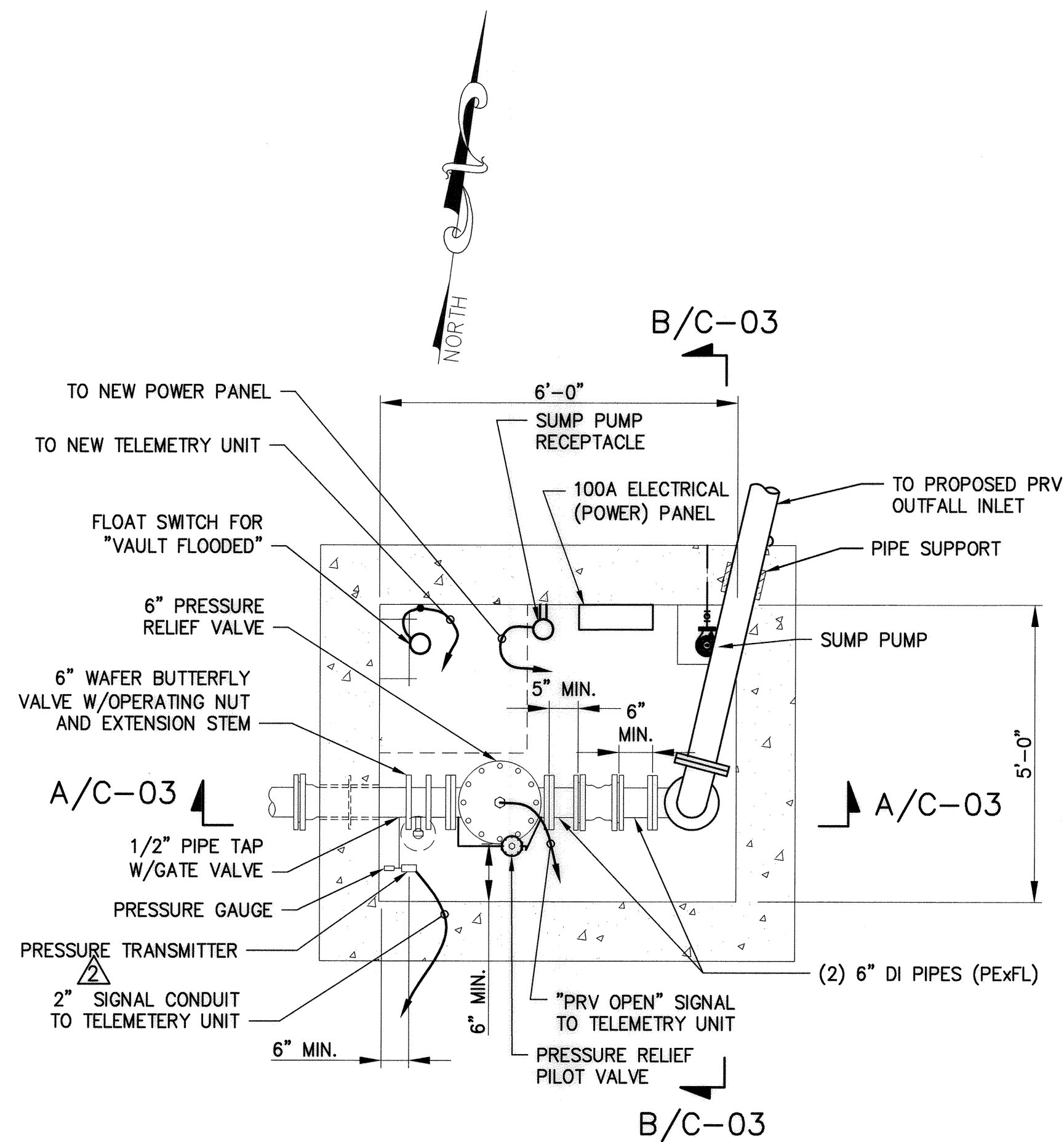
**ELECTRICAL NOTES:**

1. EXISTING PRESSURE REDUCING VALVE VAULT CONTAINING EXISTING POWER PANEL AND EXISTING TELEMETRY UNIT, BOTH TO REMAIN. THE CONTRACTOR SHALL COORDINATE WITH THE COUNTY AND MAKE ALL POWER AND SIGNAL TERMINATIONS FOR CIRCUITS INDICATED ON THIS DRAWING. CONTRACTOR SHALL PROVIDE A SINGLE-POLE, 20-AMPERE CIRCUIT BREAKER FOR THE SUMP PUMP AND HEAT TRACE WIRE RECEPTACLE TO MATCH EXISTING PANEL MANUFACTURER AND BREAKER TYPE.
2. THE CONTRACTOR SHALL PROVIDE TWO 2" SCHEDULE 80 PVC CONDUITS DIRECT BURIED A MINIMUM OF 24" BELOW GRADE. ONE CONDUIT SHALL CONTAIN THE POWER FEED TO THE NEW 100A ELECTRICAL (POWER) PANEL. LOADS IN THE EXISTING PRV VAULT SHALL BE BACK FED FROM THE NEW PANEL. THE CONTRACTOR SHALL PROVIDE 3 #12 AWG THHN CONDUCTORS AND MAKE ALL FINAL CONNECTIONS. THE OTHER CONDUIT SHALL CONTAIN THE FLOAT CABLE FOR THE "VAULT FLOODED" SIGNAL AND 6 #14 AWG THHN CONDUCTORS FOR MONITORING SIGNALS; 2 #14 SHALL BE USED FOR THE "PRV OPEN" SIGNAL, 2 #14 SHALL BE USED FOR PRESSURE TRANSMITTER, AND 2 #14 SHALL BE SPARE. THE CONTRACTOR SHALL PROVIDE ALL CONDUITS AND MAKE ALL FINAL CONNECTIONS.
3. PROVIDE THE FOLLOWING IN THE PROPOSED PRV VAULT:
  - CONNECT 2 #14 FROM PROPOSED PRV LIMIT SWITCH TO EXISTING TELEMETRY UNIT IN EXISTING VALVE VAULT TO ANNUNCIATE "PRV OPEN" STATUS.
  - CONNECT 2 #18 TWISTED SHIELDED PAIR FROM PRESSURE TRANSMITTER TO THE TELEMETRY UNIT, IN EXISTING VALVE VAULT TO RECORD WATER PRESSURE.
  - FLOAT SWITCH TO ANNUNCIATE "VAULT FLOODED" SIGNAL. PROVIDE MANUFACTURER'S CABLE OF SUFFICIENT LENGTH TO CONNECT TO EXISTING TELEMETRY UNIT IN EXISTING VALVE VAULT AND MAKE ALL FINAL CONNECTIONS. FLOAT SWITCH SHALL BE ANCHOR SCIENTIFIC TYPE S (SUSPENDED), NORMALLY OPEN, WITH 316 STAINLESS STEEL WALL BRACKET MODEL WMS.
  - SIMPLEX SUMP PUMP RECEPTACLE, 20-AMPERE, SPECIFICATION GRADE IN WEATHER PROOF BOX WITH WHILE-IN-USE COVER.
4. EXISTING BGE SECONDARY SERVICE ENTRANCE UNDERGROUND FEEDER TO BE REMOVED.
5. EXISTING BGE METER CABINET AND SERVICE DISCONNECT TO BE REMOVED.
6. PROVIDE NEMA 3R STAINLESS STEEL PAD-MOUNTED METER ENCLOSURE. SIZE SHALL MATCH EXISTING OR AS REQUIRED TO HOUSE METER SOCKET AND SERVICE DISCONNECT. PROVIDE METER SOCKET PER BGE STANDARDS AND A SERVICE ENTRANCE RATED 3P-100A ENCLOSED CIRCUIT BREAKER DISCONNECT SIMILAR TO EXISTING. BREAKER ENCLOSURE SHALL BE NEMA 3R. PROVIDE 12-INCH THICK CONCRETE PAD FOR ENCLOSURE TO EXTEND 6-INCHES BEYOND CABINET ON ALL SIDES. PROVIDE 6-INCH WELDED WIRE FABRIC MIDWAY THROUGH SLAB. CONNECT ALL WIRING.
7. EXISTING BGE POLE TO BE REMOVED.
8. EXISTING BGE TRANSFORMER. PRIMARY FEEDER HAS BEEN PROVIDED BY BGE, BUT NOT SHOWN FOR CLARITY.
9. PROVIDE 4-INCH SCH. 40 PVC CONDUIT FROM TRANSFORMER TO METER. CONDUIT IS ALREADY STUBBED OUT FROM TRANSFORMER. REDUCE CONDUIT AT METER SOCKET PER BGE STANDARDS. BGE WILL PROVIDE SECONDARY CONDUCTORS AND CONNECTIONS.
10. PROVIDE BOLLARDS (TWO) ON PARKING LOT SIDE OF METER ENCLOSURE, PER HOWARD COUNTY STANDARD DETAIL G-7.42. ENCLOSURE DOORS SHALL OPEN AWAY FROM PARKING LOT. COORDINATE INSTALLATION LOCATIONS WITH THE COUNTY IN THE FIELD.
11. NEW BGE POLE.
12. NEW TELEPHONE SERVICE NETWORK INTERFACE DEVICE (NID).
13. PROVIDE 4# 3AWG CONDUCTORS IN 2-INCH SCH 40 PVC CONDUIT DIRECT BURIED FROM METER ENCLOSURE TO NEW ELECTRICAL (POWER) PANEL IN NEW VAULT. MAKE ALL FINAL CONNECTIONS IN NEW PANEL AND SERVICE DISCONNECT. PROVIDE SAME FEEDER SIZE BETWEEN METER AND DISCONNECT.
14. PROVIDE CAT-5 CABLE IN 4-INCH SCH 40 PVC CONDUIT DIRECT BURIED BETWEEN POLE-MOUNTED NID AND EXISTING VAULT COMMUNICATION EQUIPMENT. MAKE ALL FINAL CONNECTIONS.

**AS-BUILT DRAWINGS:**

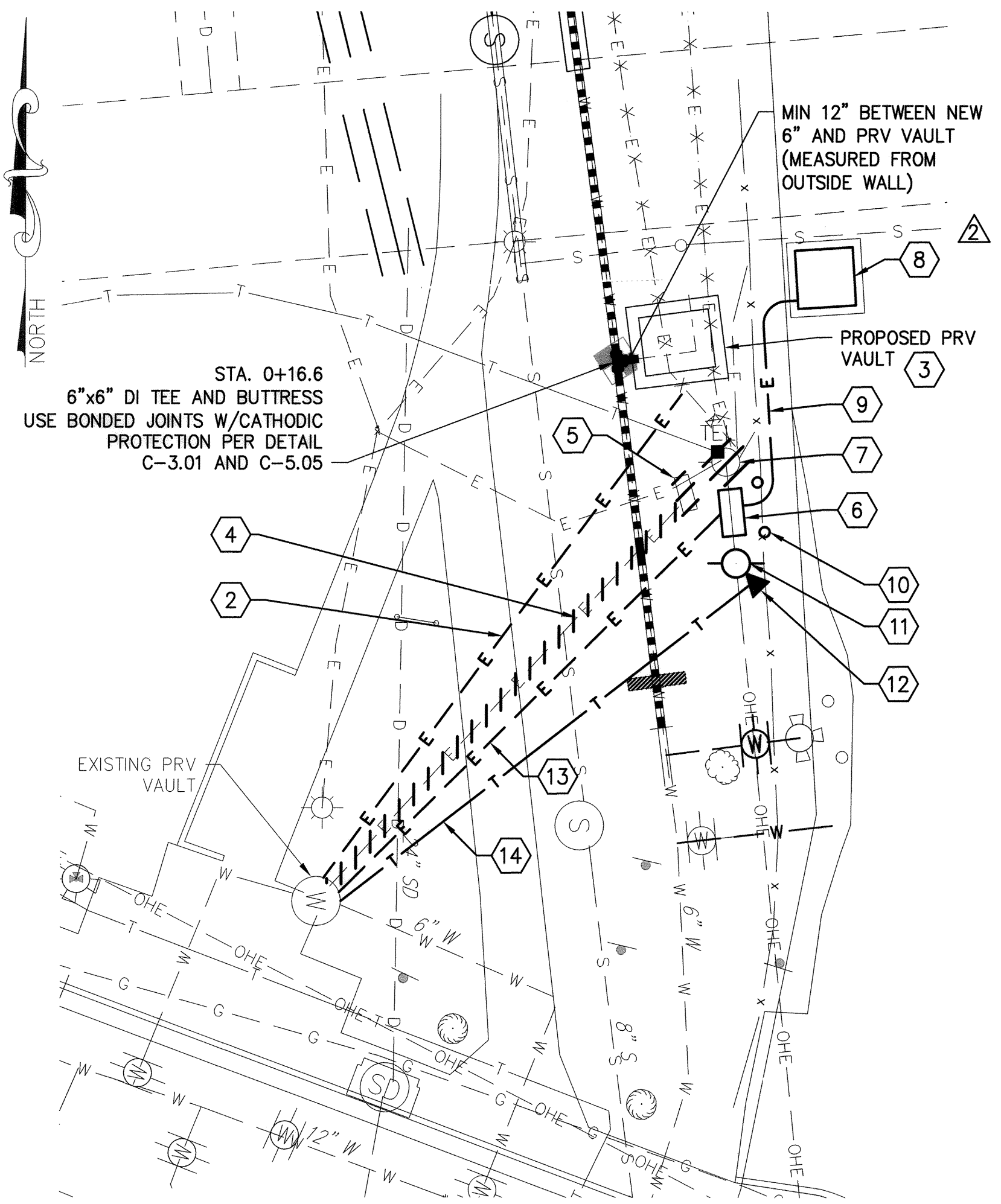
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*John C. Miller* 20566 06/02/2020  
 Engineer's Signature - Registration Number Date



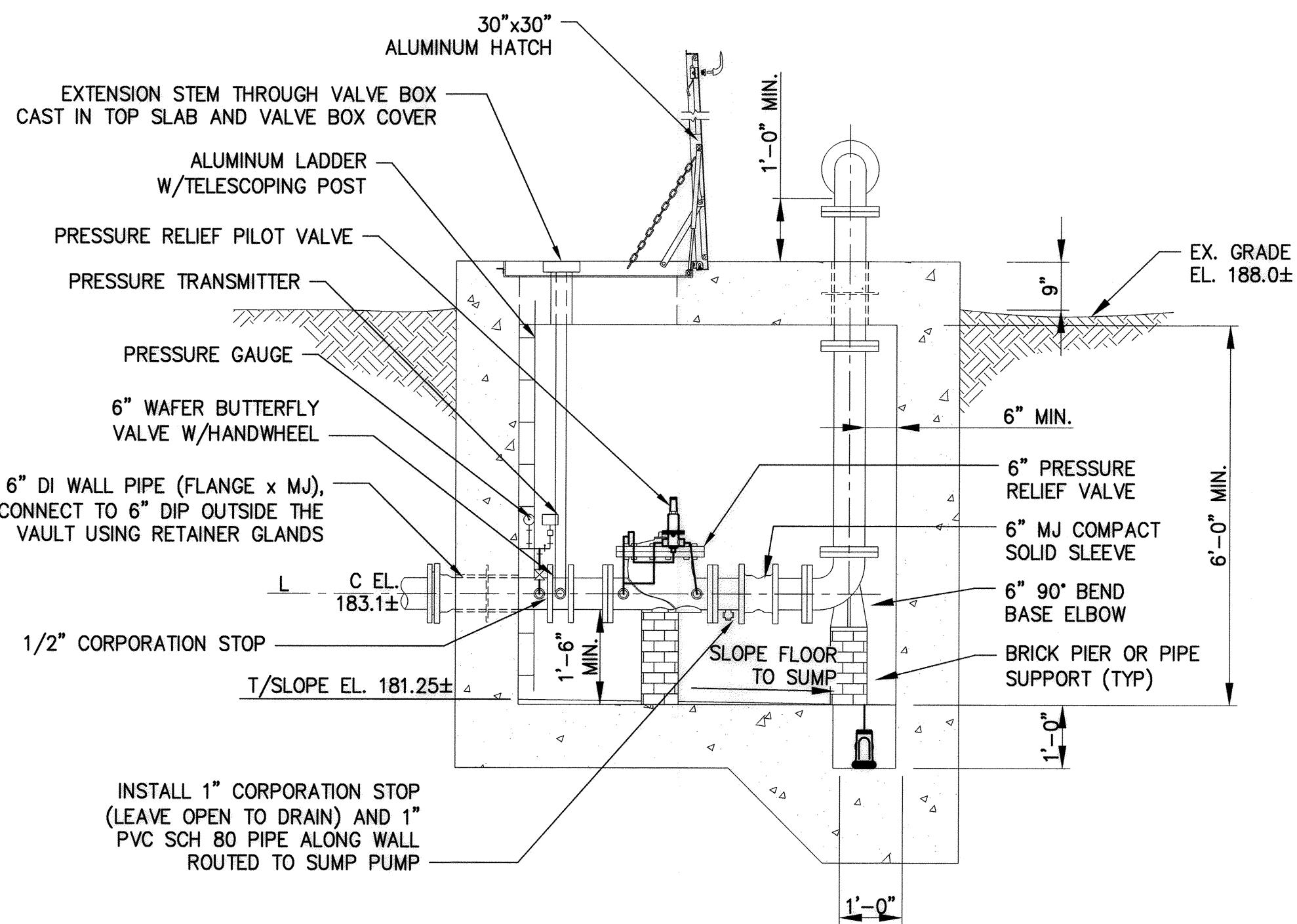
**PRV VAULT PLAN (TOP SLAB REMOVED)**

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

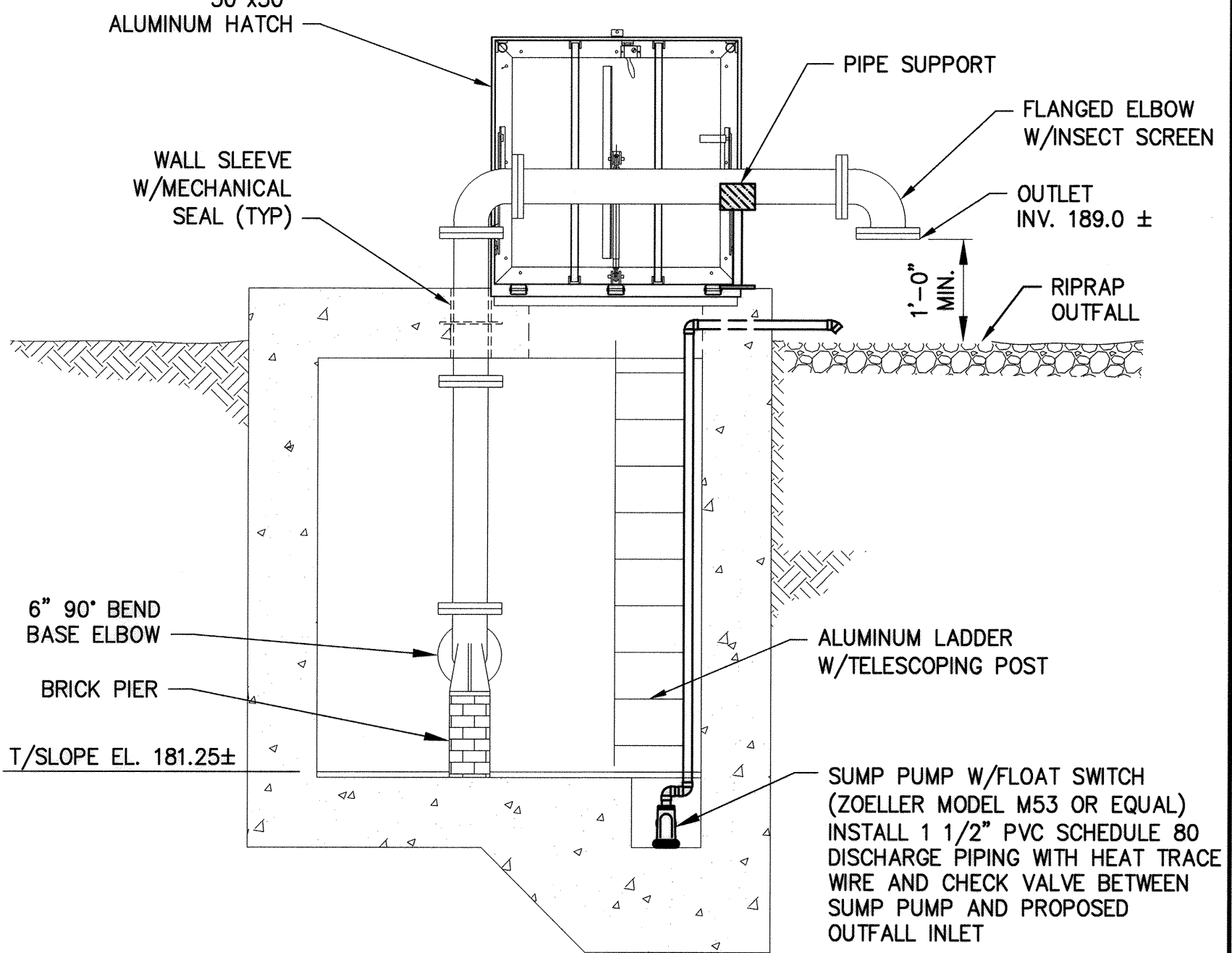


**PRV VAULT ELECTRICAL PLAN**

SCALE: 1" = 10'

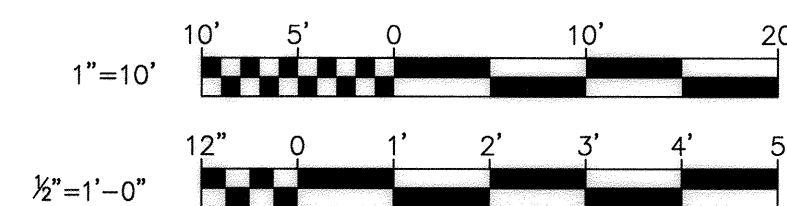


**A SECTION**  
 C-03 SCALE: 1/2" = 1'-0"



**B SECTION**  
 C-03 SCALE: 1/2" = 1'-0"

**NOTE:**  
 REFER TO ELECTRICAL DRAWING NOTES (THIS SHEET) FOR INFORMATION ON ELECTRICAL REQUIREMENTS.



**AS-BUILT 9-17-2019**

C-3

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

*John C. Miller* 7/8/2020  
 CHIEF, BUREAU OF UTILITIES DATE

*Thomas B. Suttle* 6/25/20  
 CHIEF, BUREAU OF ENGINEERING DATE

*John C. Miller* 6-29-2020  
 CHIEF, BUREAU OF UTILITIES DATE

*John C. Miller* 6/29/2020  
 CHIEF, UTILITY DESIGN DIVISION DATE

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 700 EAST PRATT STREET, SUITE 500  
 BALTIMORE, MARYLAND 21202  
 (410) 728-2900 WWW.RK&K.COM

STATE OF MARYLAND  
 PROFESSIONAL ENGINEER

DES: REG/NKS BY: NO. REVISION DATE  
 DRN: RAD RKK DESIGN MODIFICATION NO. 2 8/16  
 CHK: JCM RKK AS-BUILT REPLACEMENT SHEET 1/2020  
 SIGN DATE: 06/02/2020

DES:	BY:	NO.	REVISION	DATE
REG/NKS	RKK		DESIGN MODIFICATION NO. 2	8/16
DRN:	RAD	RKK	AS-BUILT REPLACEMENT SHEET	1/2020
CHK:	JCM			
SIGN DATE:				06/02/2020

DECEMBER 2018

**PRESSURE RELIEF VALVE NOTES AND DETAILS**

600' SCALE MAP NO. 25 BLOCK NO. 8 ELECTION DISTRICT NO. 2

PROJECT NO. W8600  
 CONTRACT NO. 44-5084

**FELLS LANE WATER, SEWER, & PRESSURE RELIEF VAULT RELOCATIONS**

HOWARD COUNTY, MARYLAND

SCALE: AS SHOWN  
 SHEET NO.: 5 OF 6

RKK121875 - \\baird\05\2017\17240\_Hobson\Drawings\PRV Plans\AS-Built\_Record Drawings\PRV.dwg May 19, 2020 - 1:59pm  
 ENV.CTB Plot Scale 1=1  
 Plot By: rgreen Tab: S-1

**NOTES:**  
 1. CONCRETE TO BE SHA MIX NO. 6, 5,000 PSI.  
 2. REINFORCING STEEL TO BE ASTM A615 GRADE 60.  
 3. LAP SPICES TO BE A MINIMUM OF 36 BAR DIAMETERS.  
 4. STRUCTURAL CONCRETE WORK TO CONFORM TO ACI CODE ACI 350

**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. 20467, Expiration Date: 6-1-2020.

**CNA**  
 engineers, surveyors & landscape architects  
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 Planners • Geotechnical Engineers • Environmental Engineers  
 Forest Hill, Maryland 21050  
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 E-mail: cna@mail@cna-engineers.com

**PLAN FOR FELS LANE WATER, SEWER, AND PRESSURE RELIEF VAULT RELOCATIONS**  
 2nd ELECTION DISTRICT HOWARD COUNTY, MARYLAND  
 Drawn: J.E.B. Date: 03/29/2019 Scale: 1/2"=1' Job No: 003C065.03  
 REV. 08-23-19

**NOTES:**  
 1. CONCRETE TO BE SHA MIX NO. 6, 5,000 PSI.  
 2. REINFORCING STEEL TO BE ASTM A615 GRADE 60.  
 3. LAP SPICES TO BE A MINIMUM OF 36 BAR DIAMETERS.  
 4. STRUCTURAL CONCRETE WORK TO CONFORM TO ACI CODE ACI 350

**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. 20467, Expiration Date: 6-1-2020.

**CNA**  
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**SECTION A-A FOR FELS LANE WATER, SEWER, AND PRESSURE RELIEF VAULT RELOCATIONS**  
 2nd ELECTION DISTRICT HOWARD COUNTY, MARYLAND  
 Drawn: J.E.B. Date: 03/29/2019 Scale: 1/2"=1' Job No: 003C065.03  
 REV. 08-23-19

**NOTES:**  
 1. CONCRETE TO BE SHA MIX NO. 6, 5,000 PSI.  
 2. REINFORCING STEEL TO BE ASTM A615 GRADE 60.  
 3. LAP SPICES TO BE A MINIMUM OF 36 BAR DIAMETERS.  
 4. STRUCTURAL CONCRETE WORK TO CONFORM TO ACI CODE ACI 350

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**SECTION B-B FOR FELS LANE WATER, SEWER, AND PRESSURE RELIEF VAULT RELOCATIONS**  
 2nd ELECTION DISTRICT HOWARD COUNTY, MARYLAND  
 Drawn: J.E.B. Date: 03/29/2019 Scale: 1/2"=1' Job No: 003C065.03  
 REV. 08-23-19

**Fels Lane PRV Vault**  
 Calculations to Accompany Shop Drawings  
 08-23-19

Analysis according to ACI 350 - (LRFD using factors provided in ACI 350)  
 Vault size (inside dimensions)  
 Length 6.50 ft  
 Width 5.00 ft  
 Height 8.00 ft

Top Slab 8.00 inches thick  
 Walls 8.00 inches thick  
 Base 6.00 inches thick  
 use minimum of 2" cover for steel design

Reinforcement steel design - Top Slab  
 slab thickness 8.00 inches  
 normal weight of concrete 150 pcf  
 span (center of wall to center of wall) 7.17 feet  
 Max soil surcharge 0 ft  
 overburden pressure - soil unit wt. 110 0 pcf  
 Dead Load (Overburden + Concrete load (w)) 100 pcf

Dead Load Moment (includes concrete weight and surcharge)  
 $w^2/8$  642.01 ft-lbs

Live Load Moment:  
 Use long direction of vault Main reinforcement perpendicular to traffic

Moment in foot-pounds (AASHTO 3.24.3.1)  $M=(S+3/32)(P)$   
 H20 Load, P= 16000 lbs 4583.33 ft-lbs  
 Impact (30%) 1375.00 ft-lbs  
 Total Design Moment (1.4\*DLM+1.7\*(LLM+I)) 9845.59 ft-lbs

concrete strength = 5000  
 steel = grade 60 fy= 60000 psi  
 $k=$  318  
 $j=$  0.868  
 $n=$  7  
 minimum d = 5.56 in  
 actual d = 5.63 in  
 Steel Area Required =  $M_{max}/(\phi_y j d)$  0.45 in<sup>2</sup> per foot

Steel Provided = # 6 bars @ 8 inches o/c  
 $\rho = 0.66$  in<sup>2</sup> per foot

Results: use #6 bars at 8 inches o/c in both directions. Add extra # 6 bars at opening.

**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. 20467, Expiration Date: June 1, 2020.

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 State of Maryland Professional Engineer  
 License No. 20566  
 Date: 06/02/2020

08-26-19  
 Page 1 of 4

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**Fels Lane PRV Vault**  
 Calculations to Accompany Shop Drawings  
 08-23-19

**Note:** slabs designed for bending moment in accordance with 3.24.3 shall be considered satisfactory in bond and shear

Temperature steel  
 steel percentage =  $0.030 \cdot b \cdot d$  b= 12 d= 8  
 steel percentage = 0.288  
 Steel Provided = # 6 bars @ 8 inches o/c  
 = 0.66 in<sup>2</sup> per foot

Design of vault walls  
 Design as one way slab to span between walls  
 Use bottom foot of top section of structure to be worst case condition  
 Assumed Equivalent Fluid Pressure 75 pcf

Depth to bottom of structure = (Top Slab) + (Inside Height) - (9")  
 = 0.67 8.00 -0.75  
 = 7.92 ft  
 Maximum distributed load = 593.75 pcf  
 Max width of structure = 7.17 ft  
 wall thickness = 8.00 in

maximum moment -  $(w \cdot l^2)/12$  (fixed ends) 2541.30 ft<sup>2</sup>lbs Factor 1.7 4320.218  
 negative moment -  $(w \cdot l^2)/24$  1270.65 1.7 2160.109

concrete strength =  $f_c =$  5000 psi  
 steel = grade 60  $f_y =$  60000 psi  
 $k=$  318  
 $j=$  0.868  
 $n=$  7

minimum d = 3.69 in at walls 2.61 at mid span  
 place steel at center of walls  
 actual d = 4 in 4 in

positive moment  
 Steel Area Required =  $M_{max}/(\phi_y j d)$  0.27651168 in<sup>2</sup> per foot  
 Steel Provided = # 5 bars @ 6 inches o/c  
 = 0.61 in<sup>2</sup> per foot

negative moment  
 Steel Area Required =  $M_{max}/(\phi_y j d)$  0.138 in<sup>2</sup> per foot  
 Steel Provided = # 5 bars @ 6 inches o/c  
 = 0.61 in<sup>2</sup> per foot

Results: 8.00 -inch walls with # 5 bars @ 6 -inch o/c at center of wall  
 Use temperature steel in vertical direction

Temperature steel  
 steel percentage =  $0.030 \cdot b \cdot d$  b= 12 d= 8.00  
 steel percentage = 0.288  
 Steel Provided = # 4 bars @ 8 inches o/c  
 = 0.29 in<sup>2</sup> per foot

Page 2 of 4

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**Fels Lane PRV Vault**  
 Calculations to Accompany Shop Drawings  
 08-23-19

Check for shear  
 Shear 2127.60 lbs  
 Design Shear (1.4DL+1.7LL+1.7H) 3616.93 lbs  
 Shear at distance d from w/2 3448.70  
 Shear resistance from concrete  $V_c = 2(\text{sqrt}(f_c))bd$  6788.23

$V_u < \phi V_c$  3616.93 < 5769.99 0.85 so no shear reinforcement is necessary

**Anti-flotation**  
 Note: above represents most conservative location.

Concrete Weight:  
 Inside volume of structure  
 Length 6.50 ft Top Slab: 8.00 inches  
 Width 5.00 ft Walls: 8.00 inches  
 Height 8.00 ft Base: 6.00 inches  
 Volume 260.00 ft<sup>3</sup>

Outside dimensions of structure including lid and base slab (no lip)  
 Length 7.83 ft  
 Width 6.33 ft  
 Height 9.17 ft  
 Volume 454.77 ft<sup>3</sup>

Subtract hatch volume  
 l 2.50 ft  
 w 2.50 ft  
 Thickness 0.67 ft  
 Volume 4.17 cu. ft.

Subtract volume for pipes in/out  
 Number 2.00  
 Diameter 0.50 in  
 Thickness 0.67  
 Volume 0.26

Add concrete for lip at bottom  
 size of lip outside of structure 3 in  
 thickness 6 in  
 volume of concrete 1.58 ft<sup>3</sup>

Total Volume of Concrete in structure 191.92 ft<sup>3</sup>  
 Concrete Weight 28,788.51 lbs

Page 3 of 4

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**Fels Lane PRV Vault**  
 Calculations to Accompany Shop Drawings  
 08-23-19

weight of soil over structure  
 Area of Structure 49.61 ft<sup>2</sup>  
 height of soil surcharge 0.00 ft  
 effective soil weight 110.00 pcf  
 overburden weight of soil over structure 0.00 lb

weight of soil over lip  
 Area of lip 7.33 ft<sup>2</sup>  
 height of soil surcharge 8.67 ft  
 effective soil weight 47.60 pcf  
 overburden weight of soil over structure 3,025.24 lb

TOTAL FORCES RESISTING UPLIFT 31,813.75 lb

total external volume of structure (buoyancy) 419.14 ft<sup>3</sup>  
 TOTAL BUOYANT FORCES 26,154.56 lb

FACTOR OF SAFETY AGAINST FLOTATION 1.22

Page 4 of 4

**AS-BUILT DRAWINGS:**

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN REVISED TO REFLECT THE AS-BUILT CONDITIONS OF THE FELS LANE WATER, SEWER & PRESSURE RELIEF VAULT RELOCATIONS RECORDED BY HOWARD COUNTY'S CONTRACTOR AND INSPECTOR.

*John C. W. Moore* 20566 06/02/2020  
 Engineer's Signature - Registration Number Date

**AS-BUILT 9-17-2019**

Page 1 of 4

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

*Michael J. Meunier* 7/8/2020  
 DIRECTOR OF PUBLIC WORKS DATE

*Thomas P. Butler* 6/29/2020  
 CHIEF, BUREAU OF ENGINEERING DATE

*John S. Kelly* 6-29-2020  
 CHIEF, BUREAU OF UTILITIES DATE

*Walter J. Kelly*  
 CHIEF, UTILITY DESIGN DIVISION DATE

**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. 20566, EXPIRATION DATE 09/08/2020

**RK&K**  
 RUMMEL, KLEPPER & KAHL, LLP  
 700 EAST PRATT STREET, SUITE 500  
 BALTIMORE, MARYLAND 21202  
 (410) 728-2900 WWW.RKK.COM

STATE OF MARYLAND  
 PROFESSIONAL ENGINEER  
 License No. 20566  
 Date: 06/02/2020

DES.	BY	NO.	DATE
REG/NKS	RKK	1	1/2020
DRN:	RAD		
CHK:	JCM		
SIGN DATE:	06/02/2020		

REVISION	DATE
AS-BUILT REPLACEMENT SHEET	1/2020

DECEMBER 2018

**PRESSURE RELIEF VALVE DETAILS**

600' SCALE MAP NO. 25 BLOCK NO. 8

PROJECT NO. W8600  
 CONTRACT NO. 44-5084

**FELS LANE WATER, SEWER, & PRESSURE RELIEF VAULT RELOCATIONS**

ELECTION DISTRICT NO. 2 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN SHEET NO. 6 OF 6