

TECHNICAL SPECIFICATIONS FOR UNDERGROUND WATER STORAGE TANKS FOR FIRE PROTECTION CONTINUED

3.12.6 WHEN THE TANK HAS BEEN BACKFILLED TO SUBGRADE (BEFORE PLACEMENT OF ASPHALT OR CONCRETE), TAKE A MEASUREMENT OF THE INTERNAL DIAMETER OF THE TANK. RECORD THIS MEASUREMENT AS FINAL INTERNAL DIAMETER ON THE TANK INSTALLATION CHECKLIST.

3.12.7 COMPLETE THE TANK INSTALLATION CHECKLIST.

4. TESTING AND ACCEPTANCE

4.1 GENERAL

- 4.1.1 THE TANK SHALL BE OPERABLE WITH A RATE OF FLOW (FIRE FLOW) OF 1000 GALLONS PER MINUTE (GPM) MINIMUM USING A FIRE DEPARTMENT PUMPER OPERATING UNDER NORMAL CONDITIONS. CONTACT (410) 313-6300 TO SCHEDULE THE TEST.
- 4.1.2 AN OPERATIONAL FLOW TEST SHALL BE PERFORMED WHEN CONSTRUCTION IS COMPLETED. IN ACCORDANCE WITH THE APPROVED PROCEDURES. THE TEST SHALL BE CONDUCTED BY THE FIRE DEPARTMENT AND THE INSTALLER. WHEN TESTING HAS BEEN COMPLETED, THE INSTALLER SHALL REFILL THE TANK TO FULL CAPACITY AS REQUIRED. ONCE ACCEPTED, FURTHER USE OF THE TANK SHALL BE LIMITED TO FIREFIGHTING OPERATIONS AND ROUTINE TESTING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING WATER FOR TESTING AND TO FILL TANK.
- 4.1.3 FINAL APPROVAL WILL BE MADE PER NOTIFICATION IN WRITING BY THE HOWARD COUNTY FIRE OFFICIAL.
- 4.1.4 ALL TESTING SHALL BE WITNESSED BY THE HOWARD COUNTY INSPECTOR OR OTHER REPRESENTATIVE AS APPROVED BY THE HOWARD COUNTY PROJECT MANAGER.

4.2 POST INSTALLATION TESTING

- 4.2.1 REMOVE ALL TEMPORARY SERVICE-FITTING PLUGS.
- 4.2.2 RE-DOPE FITTINGS AND INSTALL PLUGS IN ALL OPENINGS, EXCEPT ONE SERVICE FITTING (NEEDED FOR THE TEST MANIFOLD).
- 4.2.3 INSTALL THE TEST MANIFOLD IN THE OPEN SERVICE FITTING. CONNECT THE PRESSURE SOURCE TO THE TEST MANIFOLD.
- 4.2.4 PRESSURIZE THE TANK TO 5 PSIG/MAXIMUM. ALLOW THE PRESSURE TO STABILIZE BY ADDING OR REMOVING AIR AS NECESSARY, AS PER TANK MANUFACTURER SPECIFICATION.
- 4.2.5 CLOSE THE AIR-SUPPLY VALVE ON THE TEST MANIFOLD. DISCONNECT THE AIR-SUPPLY LINE.
- 4.2.6 SOAP THE ENTIRE EXTERIOR OF THE TANK, CHECKING FOR LEAKS. WATCH FOR ACTIVE AIR BUBBLES, WHICH INDICATE A LEAK. PAY SPECIAL ATTENTION TO FITTINGS AND MANWAYS.
- 4.2.7 MONITOR THE PRESSURE FOR ONE HOUR. 5 PSIG SHALL BE MAINTAINED.
- 4.2.8 WHEN THE TEST IS COMPLETE, CAREFULLY RELEASE THE AIR PRESSURE FROM THE TANK BY OPENING THE AIR-SUPPLY VALVE.
- 4.2.9 WHEN AIRFLOW STOPS, REMOVE THE TEST MANIFOLD.
- 4.2.10 REPLACE THE PROTECTIVE COVERS IN THE SERVICE FITTINGS.

4.3 DEFLECTION MEASUREMENTS

- 4.3.1 OBTAIN THE DEFLECTION MEASUREMENTS BY TAKING A MINIMUM OF TWO MEASUREMENTS OF THE INTERNAL DIAMETER OF THE TANK.
- 4.3.2 MEASURING THE INTERNAL DIAMETER OF THE TANK CAN BE PERFORMED BY USING A DIPSTICK OR USING A TAPE MEASURE, ETC.
- 4.3.3 TAKE THE INITIAL INTERNAL DIAMETER MEASUREMENT BEFORE BACKFILLING THE TANK, AND RECORD THIS MEASUREMENT ON THE TANK INSTALLATION CHECKLIST. IN A GROUNDWATER INSTALLATION, TAKE THIS MEASUREMENT BEFORE THE TANK IS PLACED IN THE EXCAVATION HOLE.
- 4.3.4 TAKE OTHER DIAMETER MEASUREMENTS DURING THE BACKFILLING PROCESS TO DETERMINE WHETHER VERTICAL DEFLECTION CONTINUES TO BE WITHIN THE LIMITS SPECIFIED BY THE TANK MANUFACTURER.
- 4.3.5 TAKE THE FINAL INTERNAL DIAMETER MEASUREMENT WHEN THE TANK HAS BEEN BACKFILLED TO SUBGRADE.
- 4.3.6 TO GET THE DEFLECTION MEASUREMENT AT ANY TIME, SUBTRACT THE CURRENT INTERNAL DIAMETER MEASUREMENT FROM THE INITIAL INTERNAL DIAMETER MEASUREMENT.
- 4.3.7 COMPARE THIS MEASUREMENT TO THE ALLOWABLE DEFLECTIONS PROVIDED BY THE TANK MANUFACTURER AND RECORD THE INFORMATION ON THE TANK INSTALLATION CHECKLIST.
- 4.3.8 VERTICAL DEFLECTION IN EXCESS OF ALLOWABLE DEFLECTION INDICATES IMPROPER INSTALLATION AND VOIDS THE TANK WARRANTY.

5. ACCESSIBILITY SIGNS AND SURROUNDING FEATURES

- 5.1 A PULLOFF SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS. THE REQUIREMENTS FOR EACH SITE WILL BE EVALUATED AND APPROVED BY THE FIRE OFFICIAL PRIOR TO START OF WORK. DETAILS SHALL BE INDICATED AS APPLICABLE. THE EDGE OF PAVEMENT SHALL BE MIN. 8 FT FROM EDGE OF SLAB.
- 5.2 NO OBSTRUCTIONS SHALL IMPEDE ACCESS TO TANK FITTINGS. THE FACILITY SHALL REMAIN ACCESSIBLE ON A YEAR-ROUND BASIS.
- 5.3 LANDSCAPING, BRUSH, AND TREES SHALL BE TRIMMED AWAY FROM FITTINGS. OVERHANGING BRANCHES SHALL BE TRIMMED AWAY AT A MINIMUM OF 12 FEET OVERHEAD. GRASS AND WEEDS SHALL BE CUT AS NEEDED.
- 5.4 PROTECTIVE DEVICES SHALL BE USED AS APPLICABLE TO PREVENT DAMAGE TO THE FITTINGS AND TO PROVIDE SAFETY TO OPERATORS. THESE INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:
 - A. BOLLARDS
 - B. GUARD RAILS
 - C. FENCING
 - D. WALKWAYS
 - E. CURBS
 - F. ANY OTHER BARRIERS/DEVICES AS DETERMINED BY THE FIRE OFFICIAL
- 5.5 A REFLECTIVE SIGN SHALL BE POSTED WHICH CLEARLY INDICATES TANK FULL CAPACITY AND IDENTIFICATION (ID) NUMBER. AN IDENTIFICATION NUMBER SHALL BE ASSIGNED BY THE COUNTY AND POSTED AT THE SITE. SIGNS SHALL BE PLACED ON ALL MAJOR ROADS, INDICATING THE DISTANCE AND DIRECTION TO TANK WITHIN A 2,500 FOOT RADIUS. FINAL PLACEMENT OF SIGNS SHALL BE APPROVED BY MARTIN LEPORE @ 410-313-0513.
- 5.6 AN APPROVED NO PARKING SIGN SHALL BE PAINTED WITH EXTERIOR-GRADE ENAMEL. COLOR SHALL BE YELLOW UNLESS OTHERWISE SPECIFIED, WITH THE EXCEPTION OF THE DRAFT CONNECTION, WHICH SHALL BE PAINTED RED.
- 5.7 ALL PLANTINGS SHALL BE INSTALLED AND MAINTAINED PER HOWARD COUNTY STANDARDS.

6. OPERATING GUIDELINES

- 6.1 NO PERSON SHALL BE PERMITTED TO ENTER THE TANK UNLESS IT HAS BEEN PROPERLY EMPTIED AND VENTED, AND UNLESS THE PERSON ENTERING THE TANK HAS BEEN TRAINED IN CONFINED SPACE ENTRY PROCEDURES, APPLICABLE OSHA REGULATIONS, AND IS IN POSSESSION OF A VALID HOWARD COUNTY CONFINED SPACE ENTRY PERMIT.
- 6.2 NEVER OVERFILL THE TANK.
- 6.3 EACH TIME THE TANK IS FILLED, THE OWNER/OPERATOR SHALL MAKE SURE THE TANK IS PROPERLY VENTED TO PREVENT PUTTING TANK UNDER PRESSURE.
- 6.4 OWNER/OPERATOR SHALL DETERMINE WHETHER THE TANK HAS OVERFILL PROTECTION, SUCH AS AUTOMATIC SHUT-OFF DEVICES OR VENT-RESTRICTION DEVICES (BALL-FLOAT VALVES), WHICH WILL CLOSE OFF THE INTERNAL PIPING AND REDUCE THE TANK'S CAPACITY.
- 6.5 OWNER/OPERATOR SHALL NOTIFY WHOEVER FILLS THE TANK THAT IT HAS OVERFILL PROTECTION, WHICH REDUCES THE TANK'S CAPACITY.
- 6.6 BEFORE EACH TANK FILLING, OWNER/OPERATOR OR THE DELIVERY SERVICE MUST DETERMINE THE TANK'S REDUCED CAPACITY DUE TO THE OVERFILL PROTECTION, AND CONSULT THE INSTRUCTION OR GUIDELINES PROVIDED BY THE INSTALLER AND MANUFACTURER OF THE OVERFILL PROTECTION DEVICE TO DETERMINE HOW MUCH ADDITIONAL PRODUCT THE TANK CAN HOLD.
- 6.7 THE MAXIMUM TEMPERATURE FOR STORING NON-POTABLE WATER IS 150° F.
- 6.8 POTABLE WATER IS TO BE STORED AT AMBIENT TEMPERATURE.

7. REFERENCES

- 7.1 PUBLISHED STANDARDS
 - 7.1.1 NFPA 1963 - STANDARD FOR FIRE HOSE SCREW THREADS
 - 7.1.2 NFPA 1142 - STANDARD FOR WATER SUPPLIES FOR SUBURBAN AND RURAL FIRE PROTECTION
 - 7.1.3 NFPA 1141 - STANDARD FOR FIRE PROTECTION IN PLANNED BUILDING GROUPS
 - 7.1.4 ASTM C33 - STANDARD SPECIFICATION FOR CONCRETE AGGREGATES
- 7.2 OTHER REFERENCED DOCUMENTS
 - 7.2.1 THE CODE OF PUBLIC LOCAL LAWS AND ORDINANCES OF HOWARD COUNTY MARYLAND, CHAPTER 112.
 - 7.2.2 UNDERGROUND TANKS & DRY FIRE HYDRANTS MAINTENANCE AND INSPECTION, CHIEF GREG DODS / REGIONAL FIRE PROTECTION COMMITTEE, 2003.

DEC 28 2015

AS-BUILTS

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 Plot Style: HP-DesignJet1100e.ctb
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 Sheet: 3 of 12

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND	
[Signature] 1/15/15 DIRECTOR OF PUBLIC WORKS DATE	[Signature] 1/15/15 CHIEF, BUREAU OF ENGINEERING DATE
[Signature] 1/15/15 CHIEF, BUREAU OF UTILITIES DATE	[Signature] 1/15/15 CHIEF, UTILITY DESIGN DIVISION DATE

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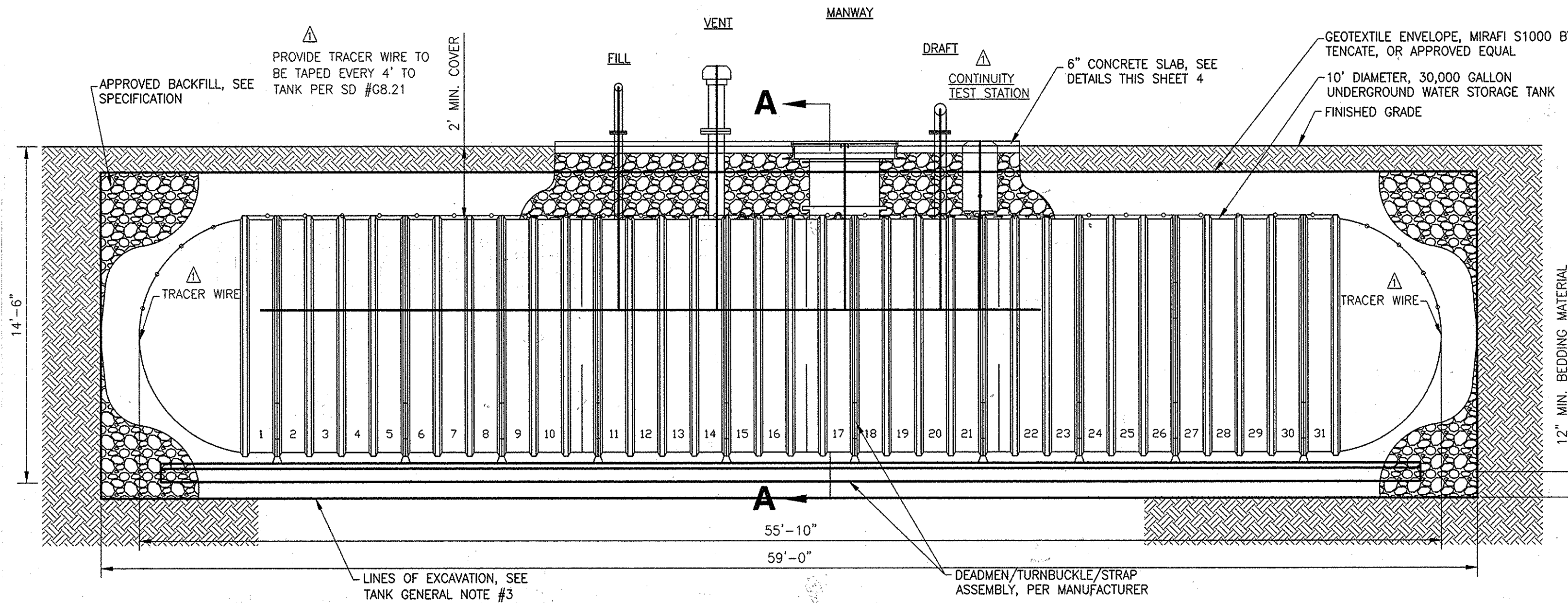
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DRN: RLI			
CHK: TND			
DATE: 1/2015	BY: NO.	REVISIONS	DATE

SPECIFICATIONS - 2

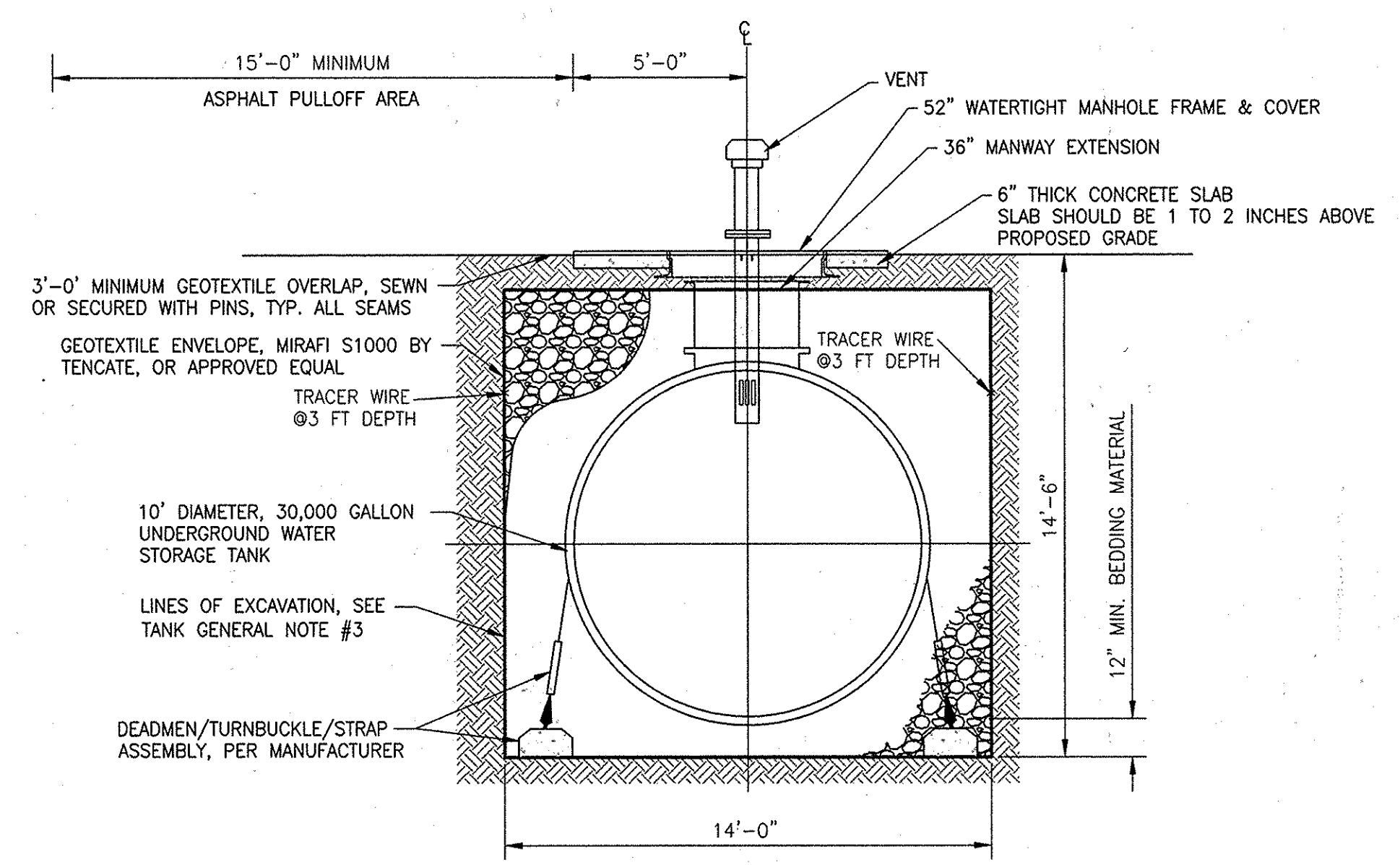
600' SCALE MAP NO. 22,21,21,34 BLOCK NO. 8,17,21,9

UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION
 CAPITAL PROJECT NO. F-5972, CONTRACT NO. 65-4908
 ELECTION DISTRICT NO. 4
 HOWARD COUNTY, MARYLAND

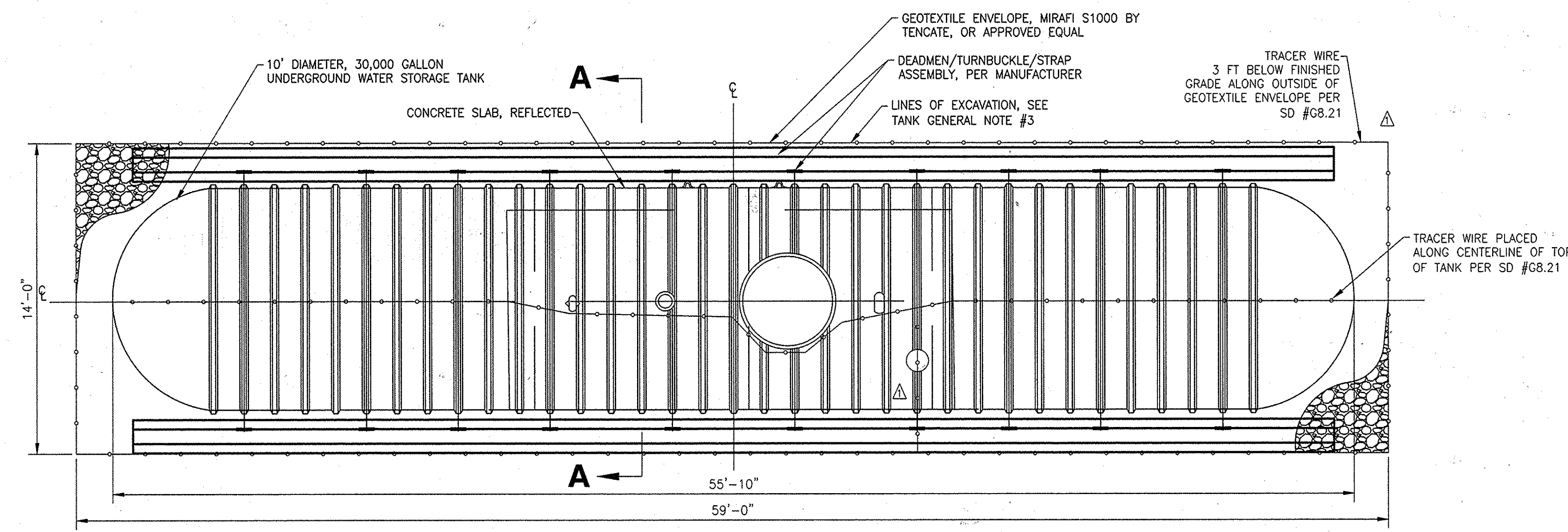
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 SHEET 3 OF 12



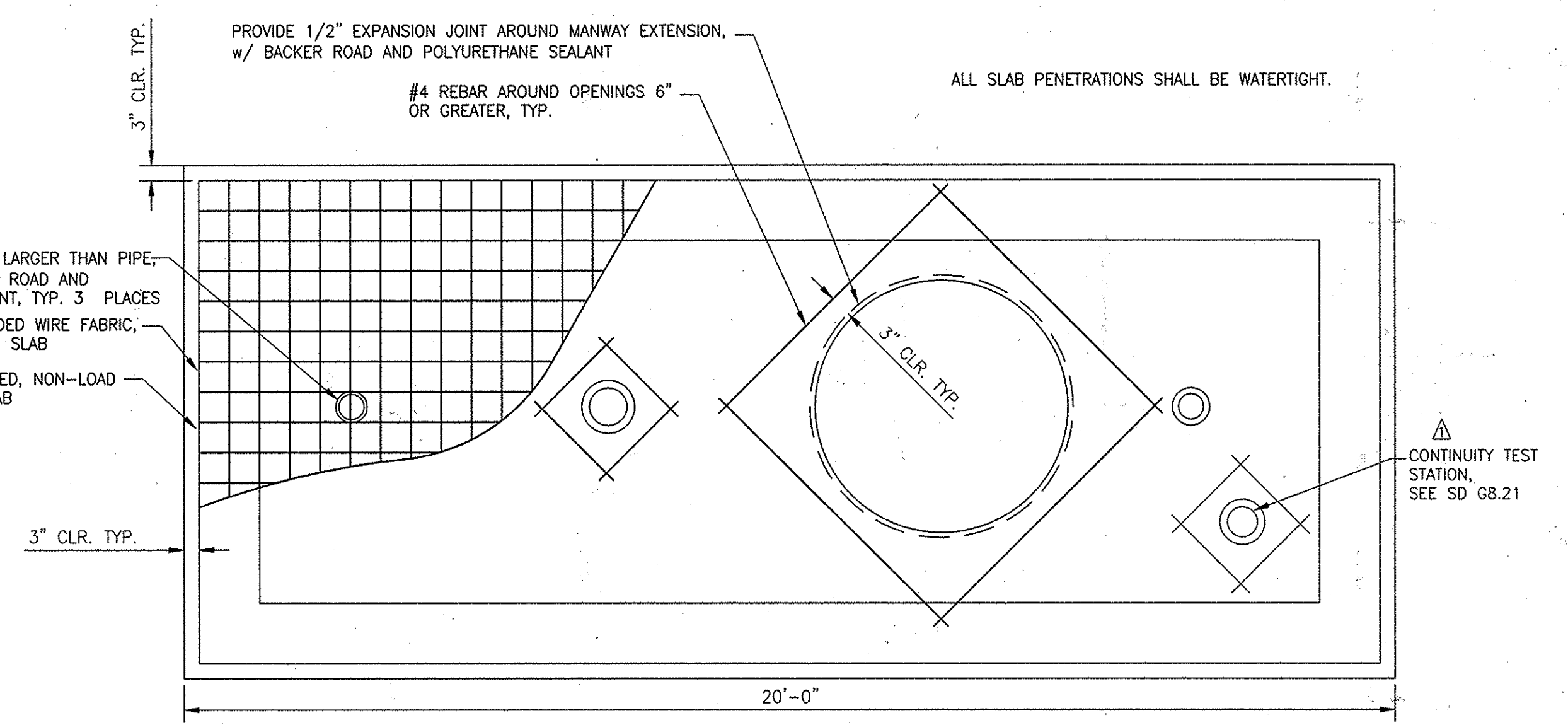
ELEVATION: 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK
SCALE 1/4" = 1'-0"



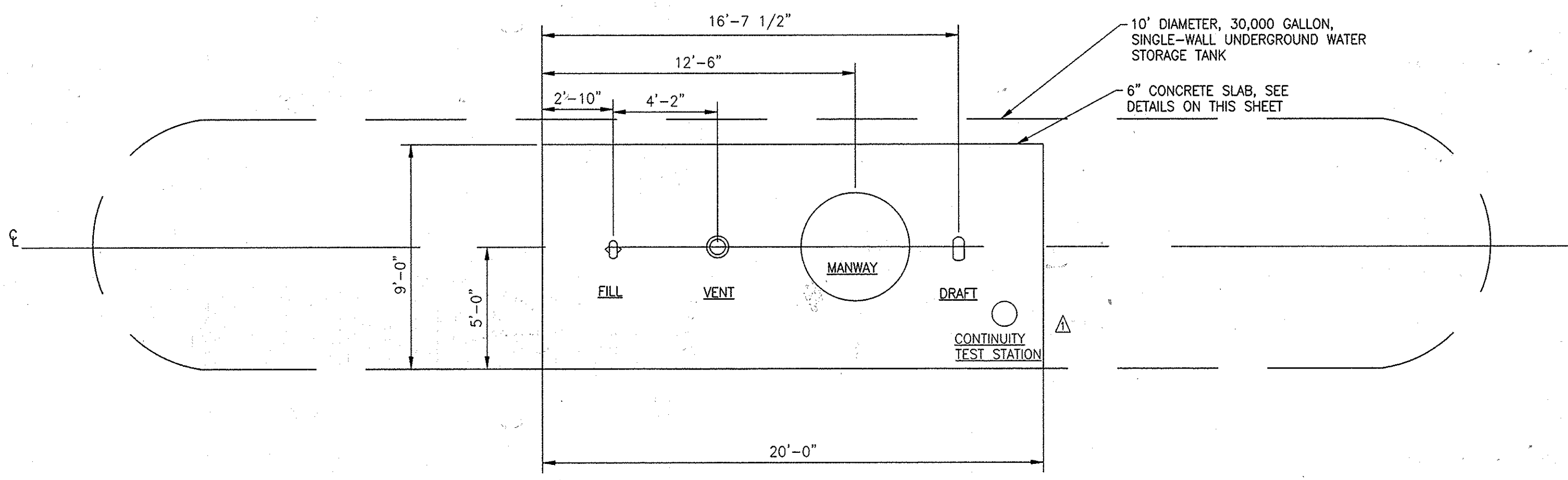
SECTION A-A
SCALE 1/4" = 1'-0"



PLAN: 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK
SCALE 1/4" = 1'-0"



DETAIL: CONCRETE SLAB REINFORCEMENT
SCALE 1/2" = 1'-0"

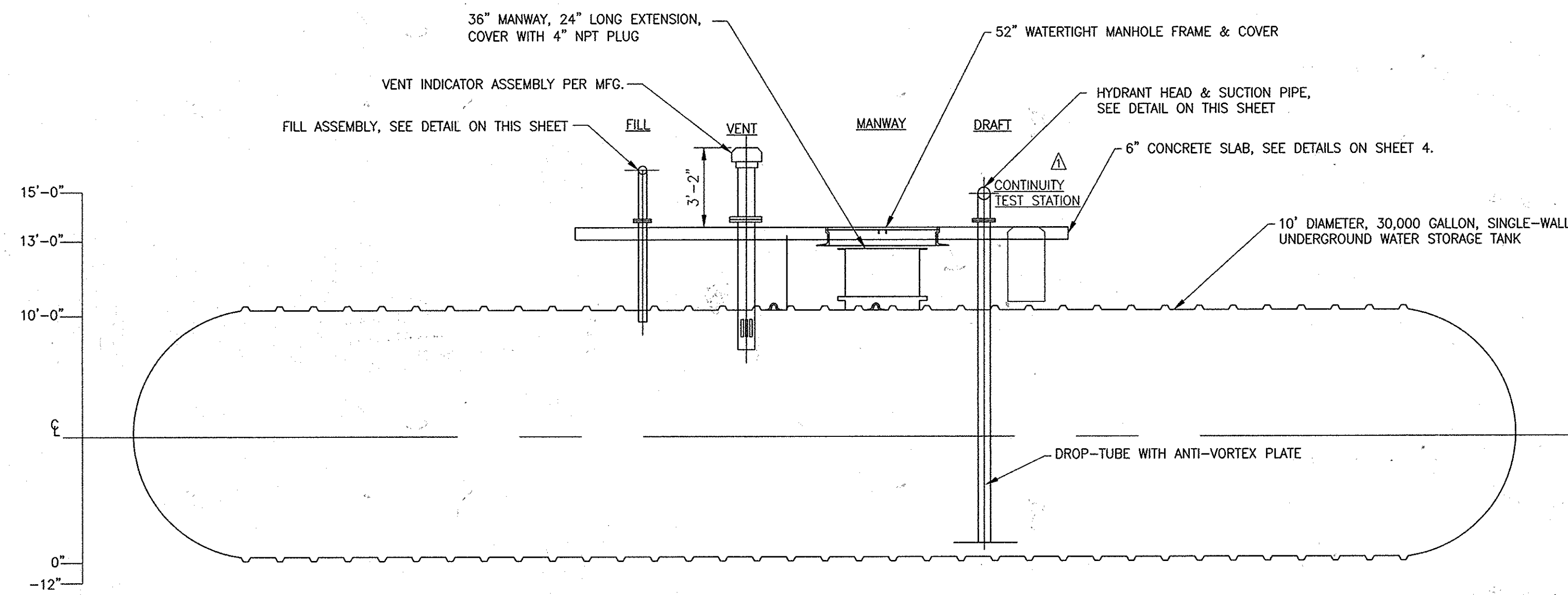


DETAIL: CONCRETE SLAB
SCALE 1/4" = 1'-0"

12-28-15
ASBUILT

Project: 12-28-15, How. Co. 4, 2015, 1/15/15
 Drawn by: J. C. Jones, 1/15/15
 Checked by: M. B. Butler, 1/15/15
 Date: 1/15/15
 Scale: 1/4" = 1'-0"

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND J. C. Jones, 1/15/15, Director of Public Works M. B. Butler, 1/15/15, Chief, Bureau of Engineering J. C. Jones, 1/15/15, Chief, Utility Design Division		Dewberry Dewberry Consultants, LLC 3100 LORD BALTIMORE DRIVE, SUITE 110, BALTIMORE, MD 21244-2682 410.265.9500, 410.265.9875		DES: LAL DRN: RLI CHK: TND DATE: 1/2015		LAL/RLI ADDED CONTINUITY TEST STATION & TRACER WIRE ALONG TANK 7/15		GENERAL DETAILS 1 600' SCALE MAP NO. 22,21,21,34 BLOCK NO. 8,17,21,9		UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION CAPITAL PROJECT NO. F-5972, CONTRACT NO. 65-4908 ELECTION DISTRICT NO. 4 HOWARD COUNTY, MARYLAND		SCALE: SHOWN SHEET 4 OF 12
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SECTION THROUGH 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK
SCALE 1/4" = 1'-0"

TABLE 1 - CONNECTION & FITTING SCHEDULE

FITTING	CONNECTION DESCRIPTION	DESCRIPTION	SPECIFICATION	CENTER DRAFT	
				SECTION*	OFFSET**
DRAFT	6" 6NH FEMALE SWIVEL (SCH 40 BLACK)	6" NPT FULL COUPLING	2.3.2	20	29'-1 1/2"
FILL	4" SCH 40 BLACK (2) 2 1/2" FEMALE SIAMESE AND (1) 4" STORZ	4" NPT FULL COUPLING	2.3.4	11	15'-4"
VENT	8" PVC	10" CLASS 150 FLANGE	2.3.3	14	19'-6 1/2"
MANWAY	36" DIAMETER, 52" COVER	36" MANWAY, 24" EXTENSION, 4" NPT COUPLING AND PLUG	2.2.7	17-18	25'-0"

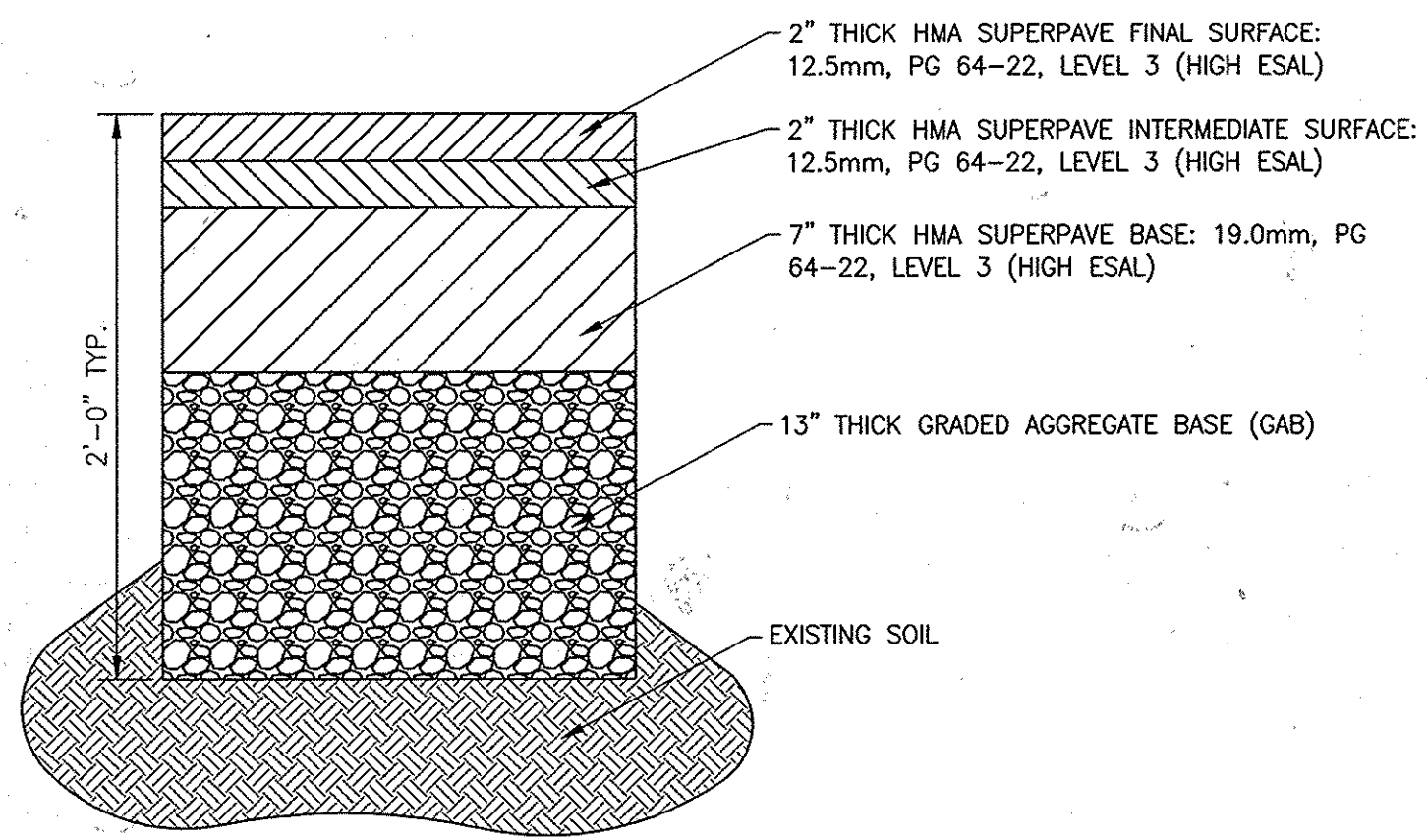
* SEE ELEVATION ON SHEET 4 FOR SECTION NUMBER
** OFFSET FROM CENTER OF SECTION 1

TABLE 2 - ELEVATIONS

ELEVATION	DESCRIPTION
15'-0" (MAX)	DRAFT PIPE CENTERLINE
13'-0"	TOP OF SLAB
10'-0"	TOP OF TANK
0	BOTTOM OF TANK
-10"	BOTTOM OF EXCAVATION

PAVING NOTES

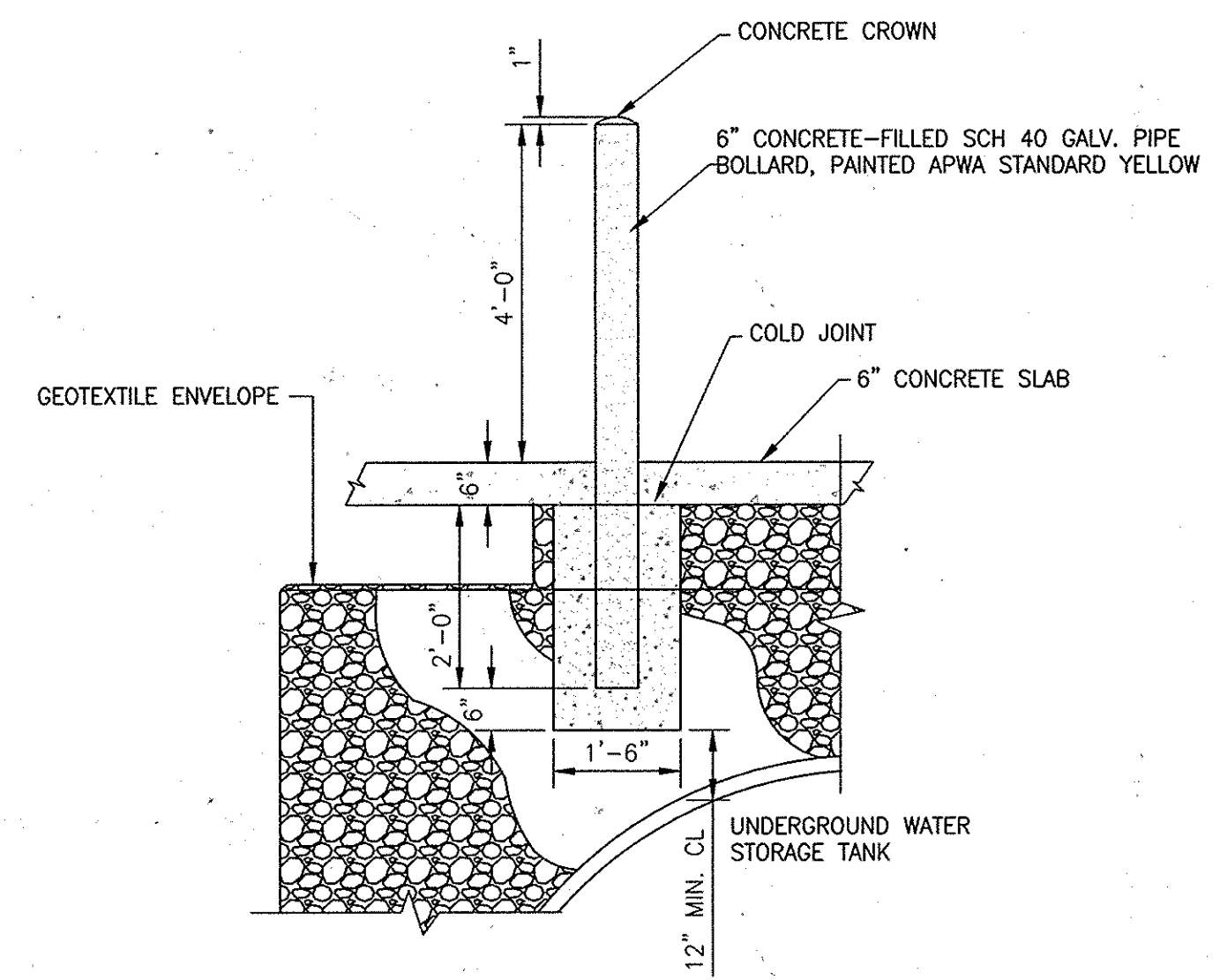
- LATEST EDITION OF THE HOWARD COUNTY VOLUME IV DESIGN MANUAL STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
- PAVING FOR THE ASPHALT PULLOFF SHALL CONFORM TO DETAIL R-2.02, SECTION NUMBER P-6 OF THE MAY 18, 2007 EDITION OF THE HOWARD COUNTY DESIGN MANUAL.
- HOWARD COUNTY DPW RESERVES THE RIGHT TO REQUIRE AN ALTERNATE PAVING SECTION, BASED ON SITE CONDITIONS OR VEHICULAR REQUIREMENTS.
- ALL PAVING THICKNESSES SHOWN, DIMENSIONED OR OTHERWISE NOTED ARE MINIMUM THICKNESSES.



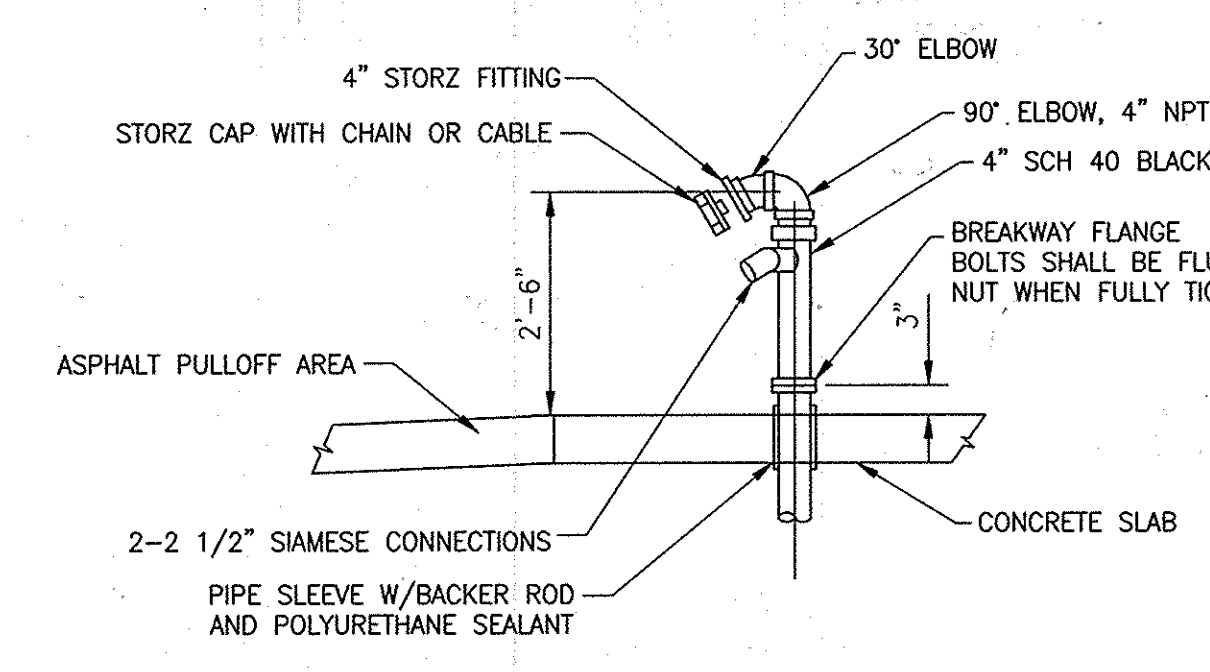
DETAIL: PAVING SECTION
SCALE 1-1/2" = 1'-0"

NOTES

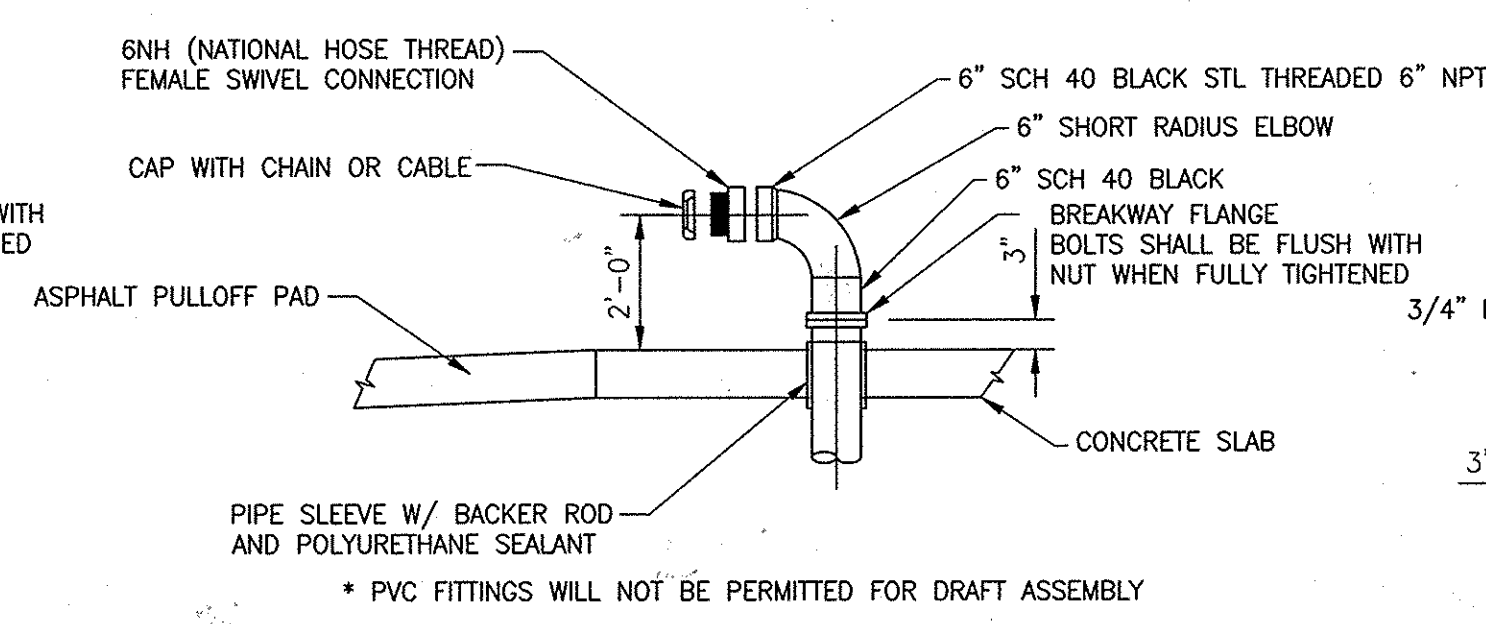
- TANK DIMENSIONS AND LAYOUT ARE FOR REFERENCE ONLY. ACTUAL TANK DIMENSIONS WILL VARY WITH MANUFACTURER.
- BOLLARDS SHALL ONLY BE INSTALLED AT THE DIRECTION OF HOWARD COUNTY.



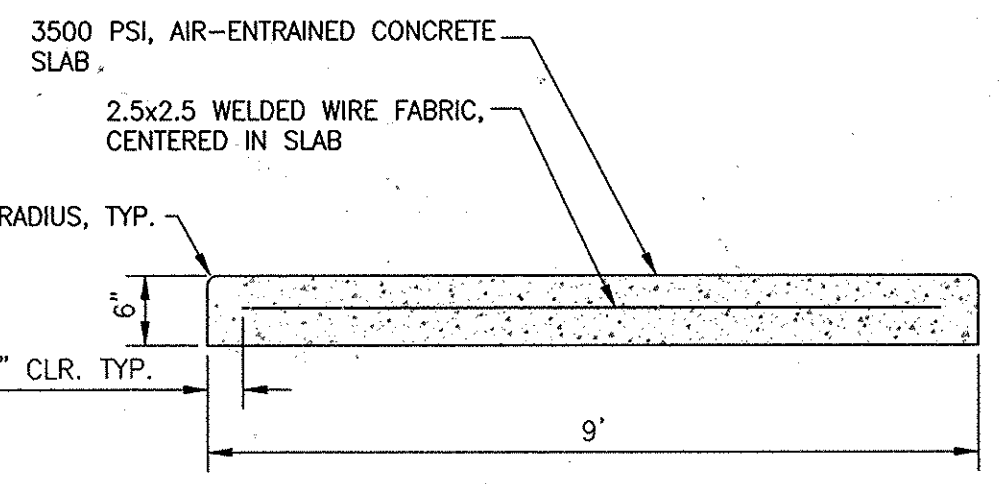
DETAIL: TYPICAL BOLLARD
SCALE 1/2" = 1'-0"



DETAIL: FILL ASSEMBLY
SCALE 1/2" = 1'-0"



DETAIL: HYDRANT HEAD (DRAFT) ASSEMBLY
SCALE 1/2" = 1'-0"

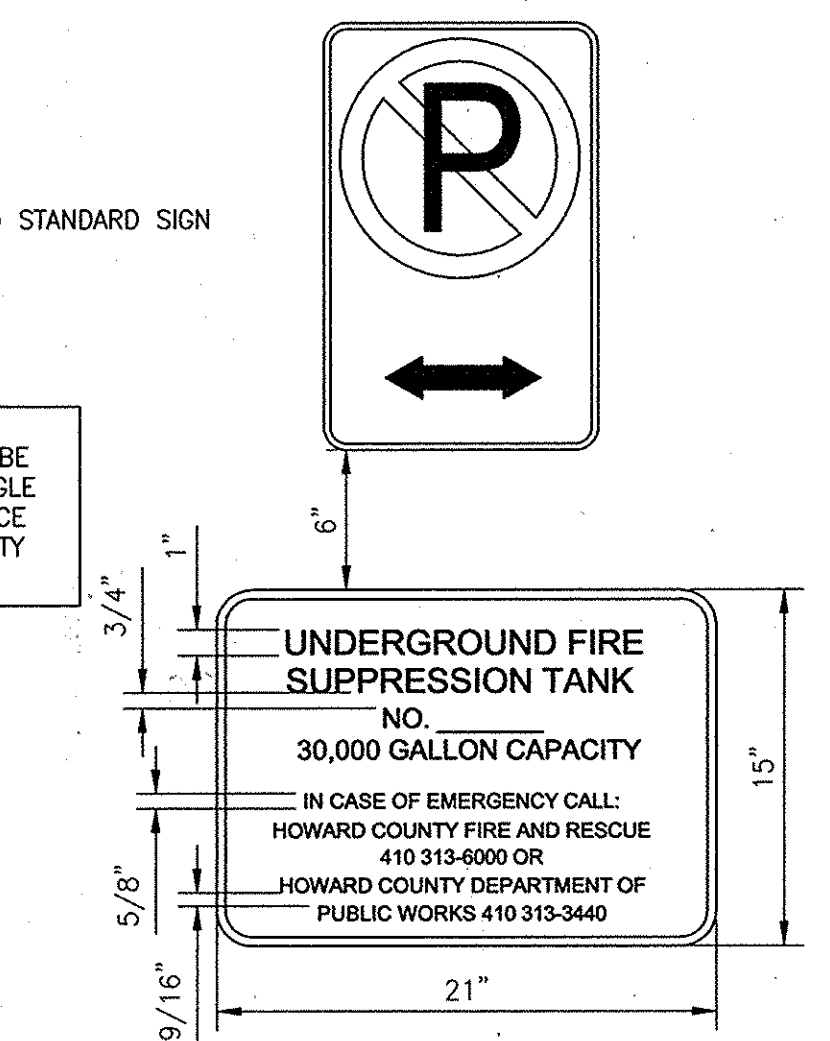


DETAIL: CONCRETE SLAB TYPICAL SECTION
SCALE 3/4" = 1'-0"

MDSA R7-1(1) STANDARD SIGN

NOTE: BOTH SIGNS SHALL BE MOUNTED ON A SINGLE POST, IN ACCORDANCE WITH HOWARD COUNTY STANDARD DETAILS

MDSA BLANK STANDARDS HORIZONTAL RECTANGLE 21" x 15"



DETAIL: TYPICAL TANK SIGNAGE
SCALE 1/2" = 1'-0"



DETAIL: TYPICAL ADVANCE SIGNAGE
SCALE 1/2" = 1'-0"

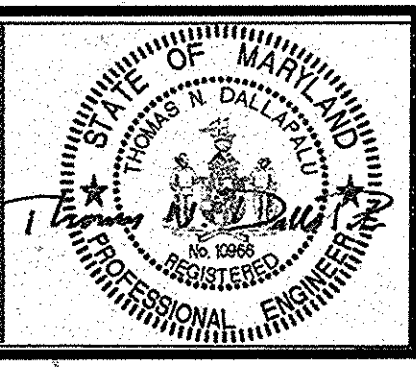
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 Project Name: 12-28-15
 Sheet Name: 12-28-15

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

Director of Public Works: *James R. Williams* 1/15/15
 Chief, Bureau of Engineering: *Monica E. Butler* 1/15/15
 Chief, Bureau of Utilities: *James R. Williams* 1/15/15
 Chief, Utility Design Division: *James R. Williams* 1/15/15

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DES: LAL	LAL/RLI	ADDED CONTINUITY TEST STATION & TRACER WIRE ALONG TANK	7/15
DRN: RLI			
CHK: TND			
DATE: 1/2015	BY: NO.	REVISIONS	DATE

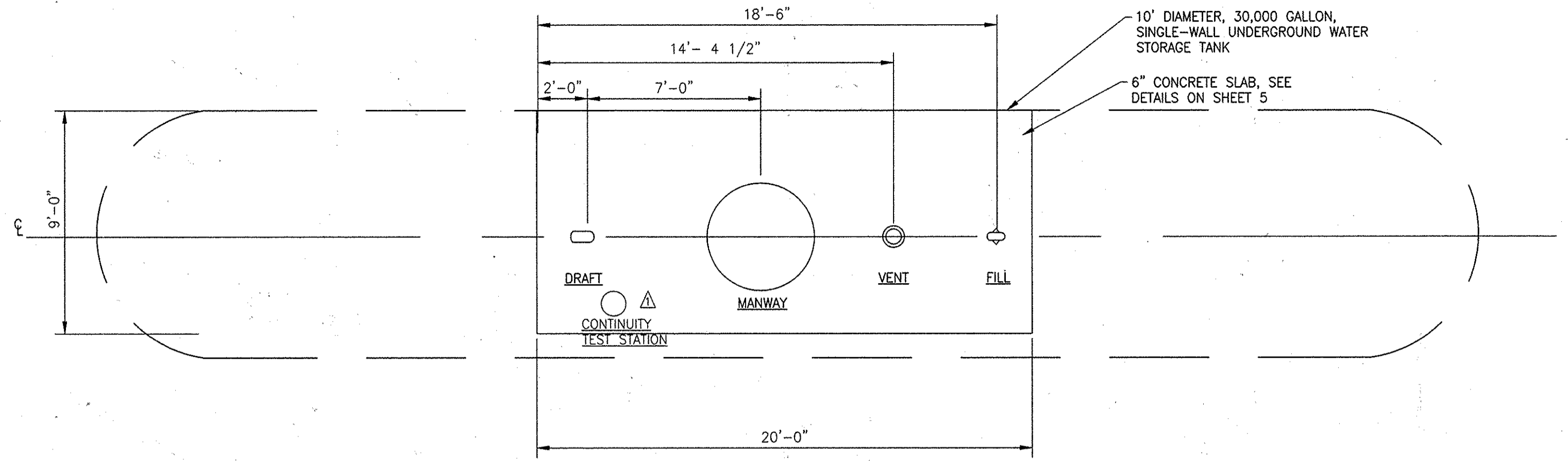
GENERAL DETAILS - 2

600' SCALE MAP NO. 22,21,21,34 BLOCK NO. 8,17,21,9

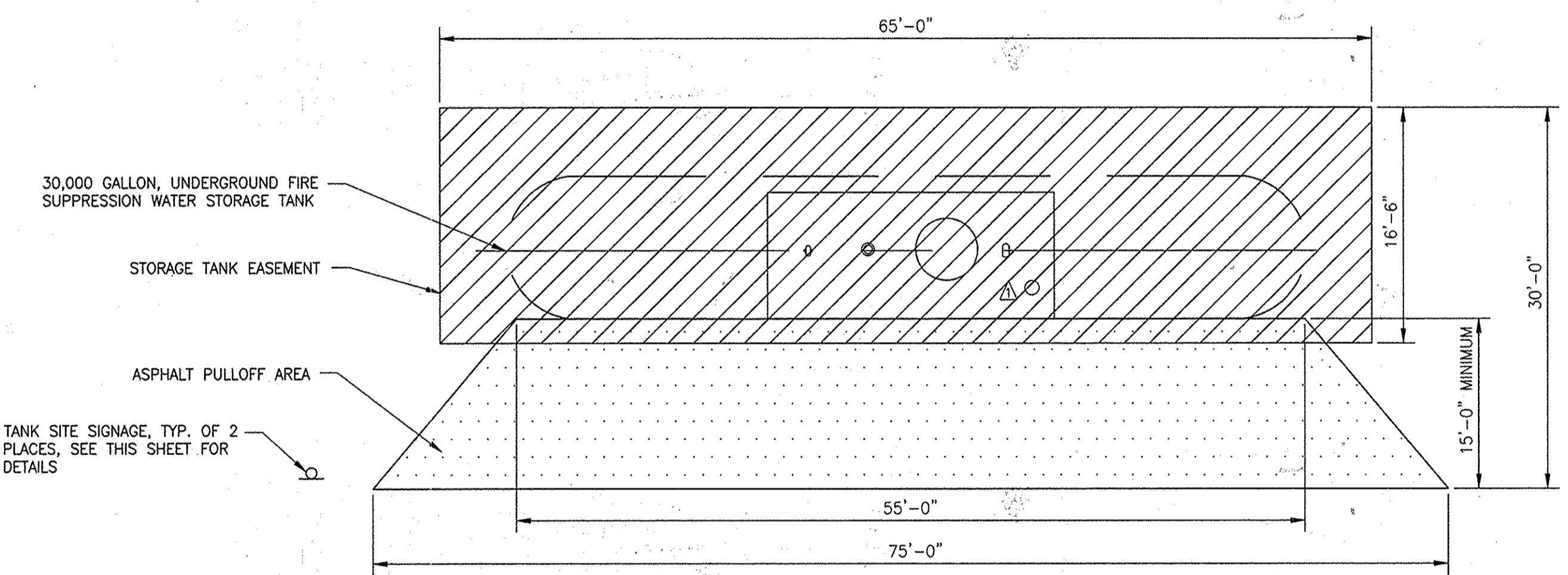
UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION
CAPITAL PROJECT NO. F-5972, CONTRACT NO. 65-4908

ELECTION DISTRICT NO. 4 HOWARD COUNTY, MARYLAND

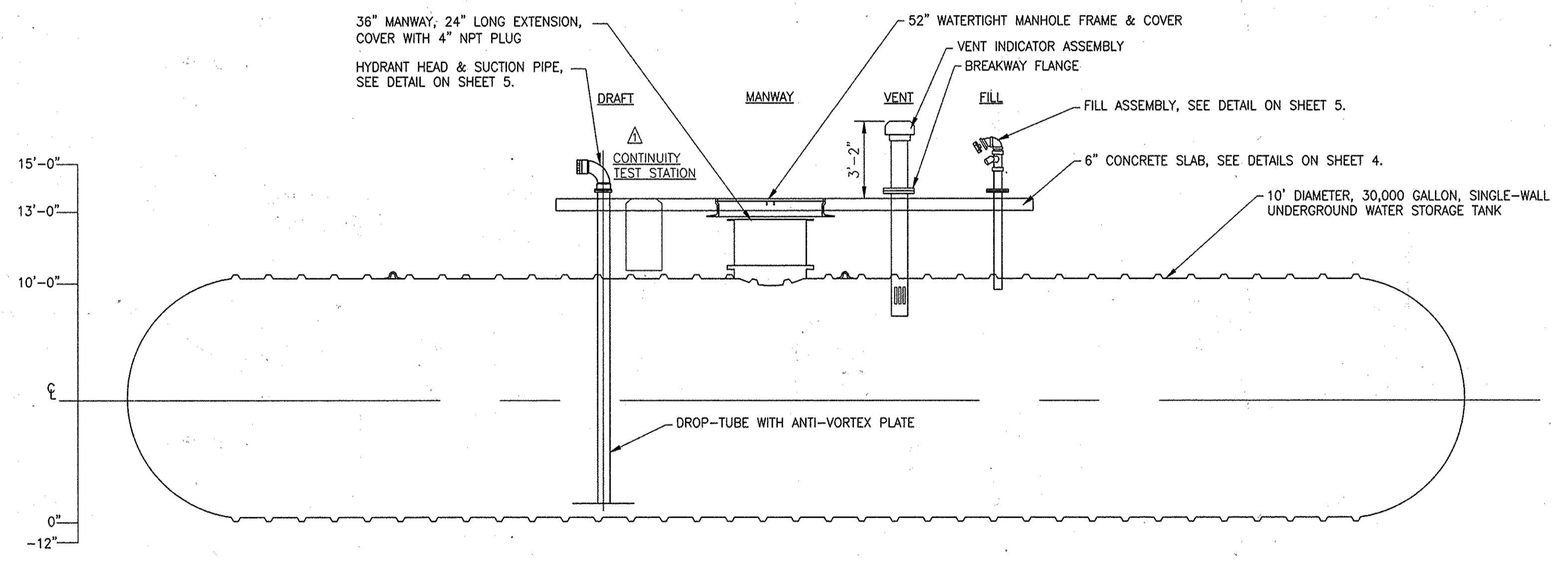
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SHEET 5 OF 12



PLAN: 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK DRAFT CONFIGURATION
SCALE 1/4" = 1'-0"



DETAIL: TYPICAL TANK SITE LAYOUT
SCALE 1/8" = 1'-0"

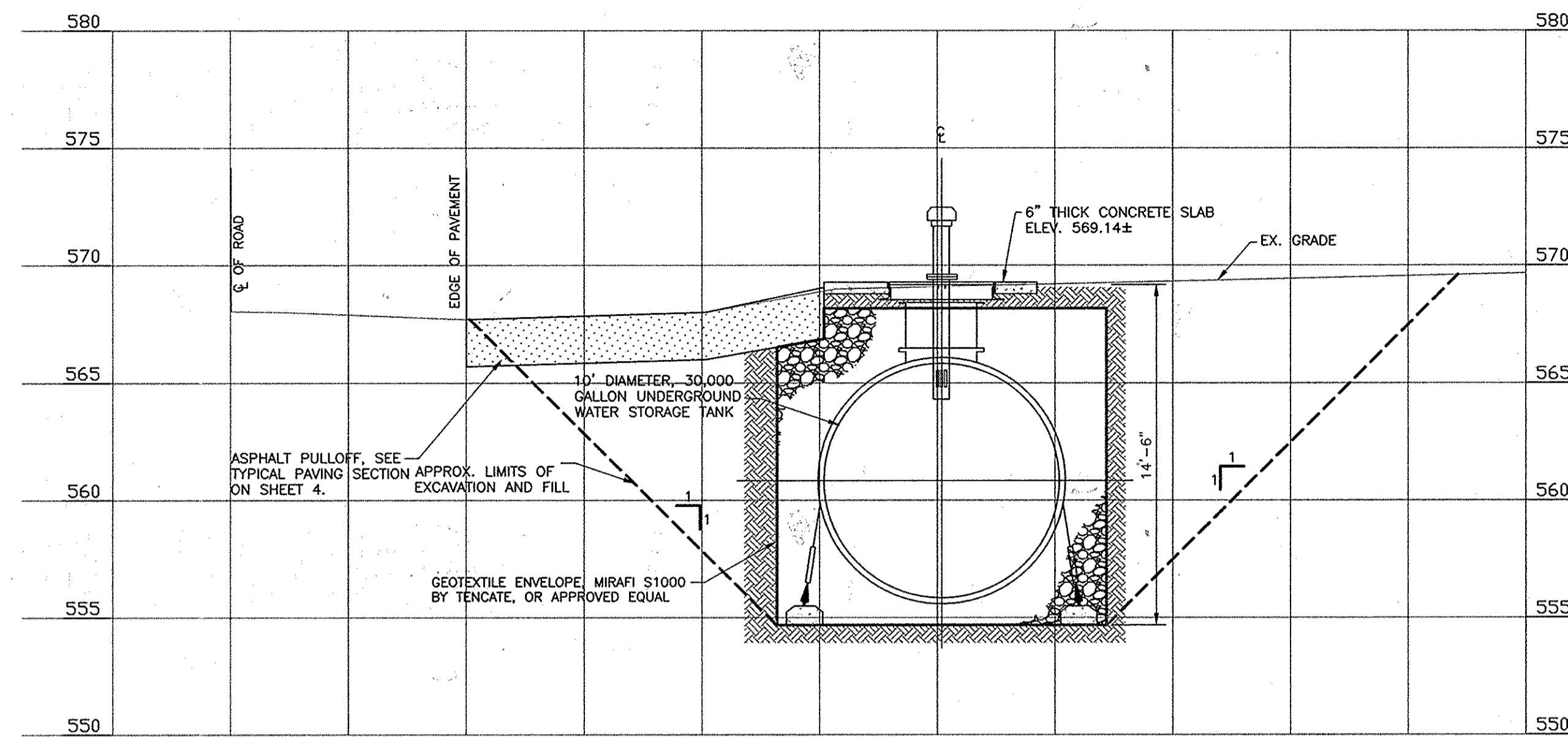


SECTION THROUGH 30,000 GALLON FIRE SUPPRESSION WATER STORAGE TANK DRAFT CONFIGURATION
SCALE 1/4" = 1'-0"

**12-28-15
ASBUILT**

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DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND Director: [Signature] 1/15/15 Chief, Bureau of Utilities: [Signature] 1/15/15		Dewberry Dewberry Consultants, LLC 3106 LORD BALTIMORE DRIVE SUITE 110 BALTIMORE, MD 21244-2682 410.265.9500 FAX: 410.265.8875				DES: LAL DRN: RLI CHK: TND DATE: 1/2015	<table border="1"> <tr> <th>BY</th> <th>NO.</th> <th>REVISIONS</th> <th>DATE</th> </tr> <tr> <td></td> <td></td> <td>ADDED CONTINUITY TEST STATION & TRACER WIRE ALONG TANK</td> <td>7/15</td> </tr> </table>	BY	NO.	REVISIONS	DATE			ADDED CONTINUITY TEST STATION & TRACER WIRE ALONG TANK	7/15	GENERAL DETAILS - 3		UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION CAPITAL PROJECT NO. F-5972, CONTRACT NO. 65-4908 ELECTION DISTRICT NO. 4 HOWARD COUNTY, MARYLAND		SCALE: SHOWN SHEET 6 OF 12
BY	NO.	REVISIONS	DATE																	
		ADDED CONTINUITY TEST STATION & TRACER WIRE ALONG TANK	7/15																	



PROFILE

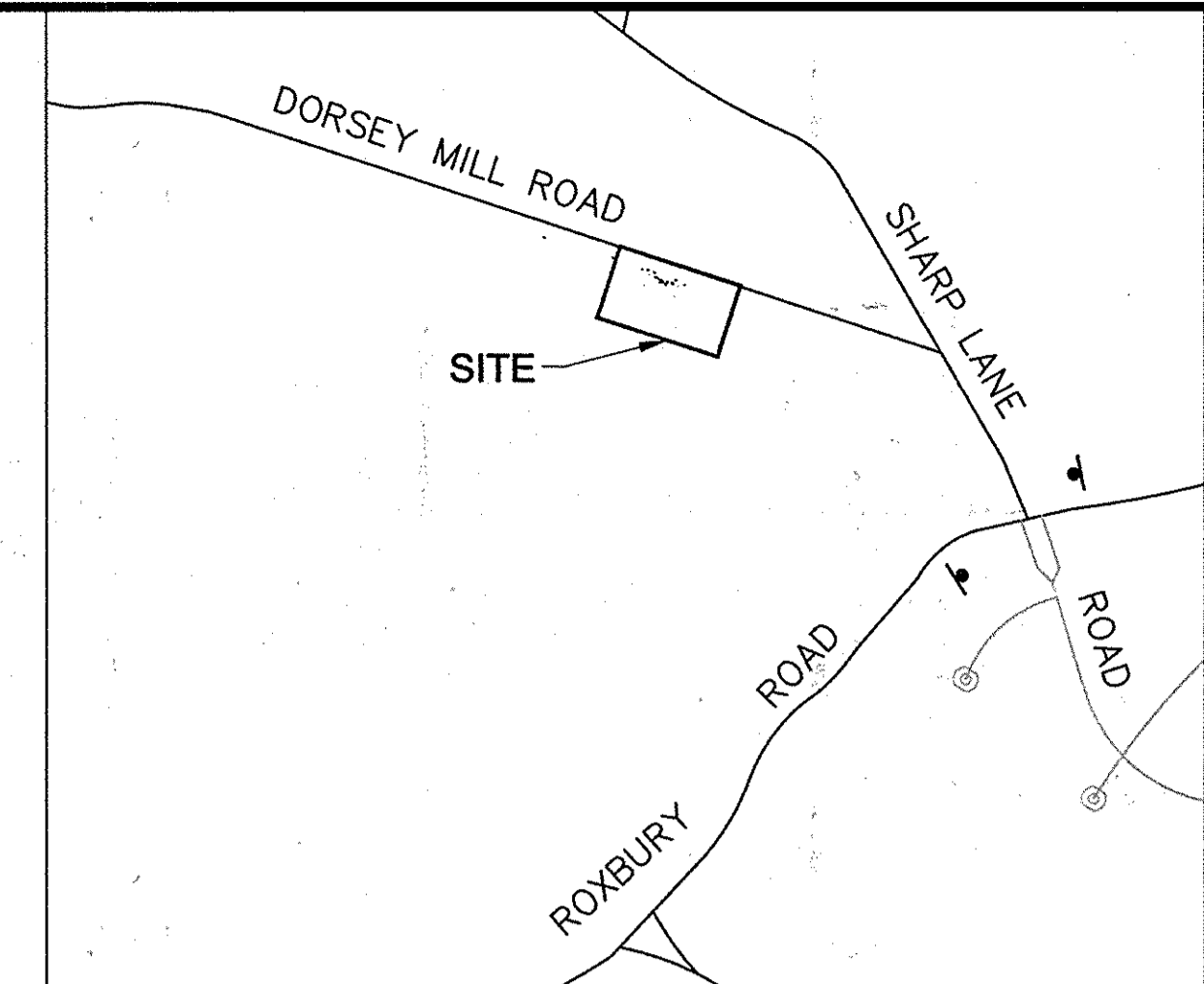
SCALE : HORIZ. 1" = 5'
VERT. 1" = 5'

UTILITY NOTE:

1. THE UNDERGROUND UTILITY LOCATIONS SHOWN HEREON HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION, MISS UTILITY, AND/OR EXISTING DRAWINGS. THE ENGINEER MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE ENGINEER FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH HE DOES CERTIFY THAT THEY ARE INDICATED ON THE AFOREMENTIONED INFORMATION OBTAINED BY THE ENGINEER.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING "MISS UTILITY" 48 HOURS PRIOR TO CONSTRUCTION 1-800-257-7777.
3. HOWARD COUNTY SHALL TAKE ACTION TO RELOCATE THE TANK OR UTILITY.
4. ANY DELAY OR CLAIM RELATED TO UTILITY LOCATIONS WILL NOT BE ACCEPTED BY HOWARD COUNTY.
5. THE CONTRACTOR SHALL PROTECT AND RELOCATE UTILITIES, VERTICALLY AND/OR HORIZONTALLY, IN COORDINATION WITH THE UTILITY OWNER IN THE VICINITY OF THE TANKS AS NEEDED.

SITE ANALYSIS

Total Area of Site	0.14 Acres
Area Disturbed	0.14 Acres
Area to be roofed or paved	0.02 Acres
Area to be Vegetatively Stabilized	0.11 Acres
Total Cut	1338 Cu. Yds.
Total Fill	1053 Cu. Yds.
Offsite waste/borrow area location	To be determined by contractor.



SITE LOCATION MAP

SCALE : 1" = 600'
ADC MAP REFERENCE: HOWARD COUNTY MAP 4812, GRID J9

HORIZONTAL & VERTICAL CONTROL

COORDINATES & BEARINGS SHOWN HEREON ARE BASED ON HOWARD COUNTY CONTROL STATIONS AND REPRESENT THE MARYLAND STATE PLANE COORDINATE SYSTEM AS DERIVED FROM NORTH AMERICAN DATUM (NAD83/07) FOR HORIZONTAL AND NORTH AMERICAN VERTICAL DATUM (NAVD88) FOR VERTICAL DATUM. DEWBERRY UTILIZED THE REAL TIME NETWORK (RTN) "KEYNETGPS" OPERATED BY TRIMBLE TO ACQUIRE MEASUREMENTS FOR THE SURVEY CONTROL SET AT THE SUBJECT SITES FOR THE PROJECT AS WELL AS THE CONTROL NOTED BELOW. THE "KEYNETGPS" NETWORK PROVIDES FOR HIGH ACCURACY POSITIONING THROUGHOUT THE GEOGRAPHIC REGION. THE USE OF AN RTN FOR GEODETIC CONTROL INVOLVES THE COLLECTION AND USE OF ATMOSPHERIC, TROPOSPHERIC, AND OTHER CORRECTION FROM MULTIPLE CONTROL POINTS SURROUNDING THE PROJECT SITE, RESULTING IN HIGH PRECISION POSITIONAL DATA. THE CONTROL POINTS OF THIS NETWORK ARE NATIONAL GEODETIC SURVEY CONTINUOUSLY OPERATING REFERENCE STATIONS OR NGS CORS, AND THE RESULTING MEASUREMENT VECTORS BETWEEN THE GPS RECEIVER AND NETWORK ARE DIRECT MEASUREMENTS TO EXISTING, HIGH ORDER PHYSICAL MONUMENTATION WHICH HAVE BEEN VETTED, MAINTAINED, AND DISTRIBUTED BY THE NATIONAL GEODETIC SURVEY. THE FOLLOWING HOWARD COUNTY CONTROL STATIONS WERE USED FOR THIS PROJECT:

HOWARD COUNTY GEODETIC SURVEY CONTROL

NO.	NORTHING (FT)	EASTING (FT)	ELEV (FT)
45CA	540070.9730	1327702.7218	426.15
42IB	542366.9133	1363075.9515	282.35
08AB	610602.2863	1297911.2033	579.72
16E1	593251.0015	1340192.6876	463.815

GENERAL NOTES:

1. FOR GENERAL TANK INSTALLATION, PIPING, SPECIFICATIONS, AND DETAILS REFER TO SHEETS 1-6, INCLUSIVE.
2. ALL TREES AND PLANTINGS INTERFERING WITH EXCAVATION SHALL BE REMOVED AND REPLACED WITH VIABLE TREES AND SIMILAR SPECIES AS INDICATED ON DRAWINGS. TREES AND PLANTINGS THAT ARE NOT CALLED OUT ON THE PLANS AND NEED TO BE REMOVED FOR CONSTRUCTION SHALL BE IDENTIFIED TO THE HOWARD COUNTY INSPECTOR PRIOR TO REMOVAL.
3. THE CONTRACTOR SHALL TAKE ALL REASONABLE MEANS POSSIBLE TO PROTECT EXISTING TREES AND PLANTINGS WITHIN THE CONSTRUCTION AREA AND SHALL REPLACE IN KIND THOSE DAMAGED AS DIRECTED ON THE DRAWING.
4. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL MANUAL.
5. CONTRACTOR IS RESPONSIBLE FOR ACQUIRING ALL STAGING AREAS TO BE USED DURING CONSTRUCTION.
6. THERE SHALL BE NO STOCKPILING OF EXCAVATED MATERIAL ON THE WORK SITE.
7. ALL SURVEY STAKEOUT IS THE RESPONSIBILITY OF THE CONTRACTOR.
8. ALL TANK EXCAVATIONS MUST MEET OSHA REQUIREMENTS.
9. CONTRACTOR TO CONFIRM FINAL SIGN LOCATIONS WITH MARTIN.LAPORE@410-313-0513.

TRAFFIC CONTROL NOTES:

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SCHEDULE A MEETING WITH HOWARD COUNTY TRAFFIC CONTROL MANAGER FOR THE APPROVAL OF TRAFFIC CONTROL PLANS.
2. USE MD 104.02-10 FOR FLAGGING OPERATION AND MD 104.02-02 FOR SHOULDER WORK.

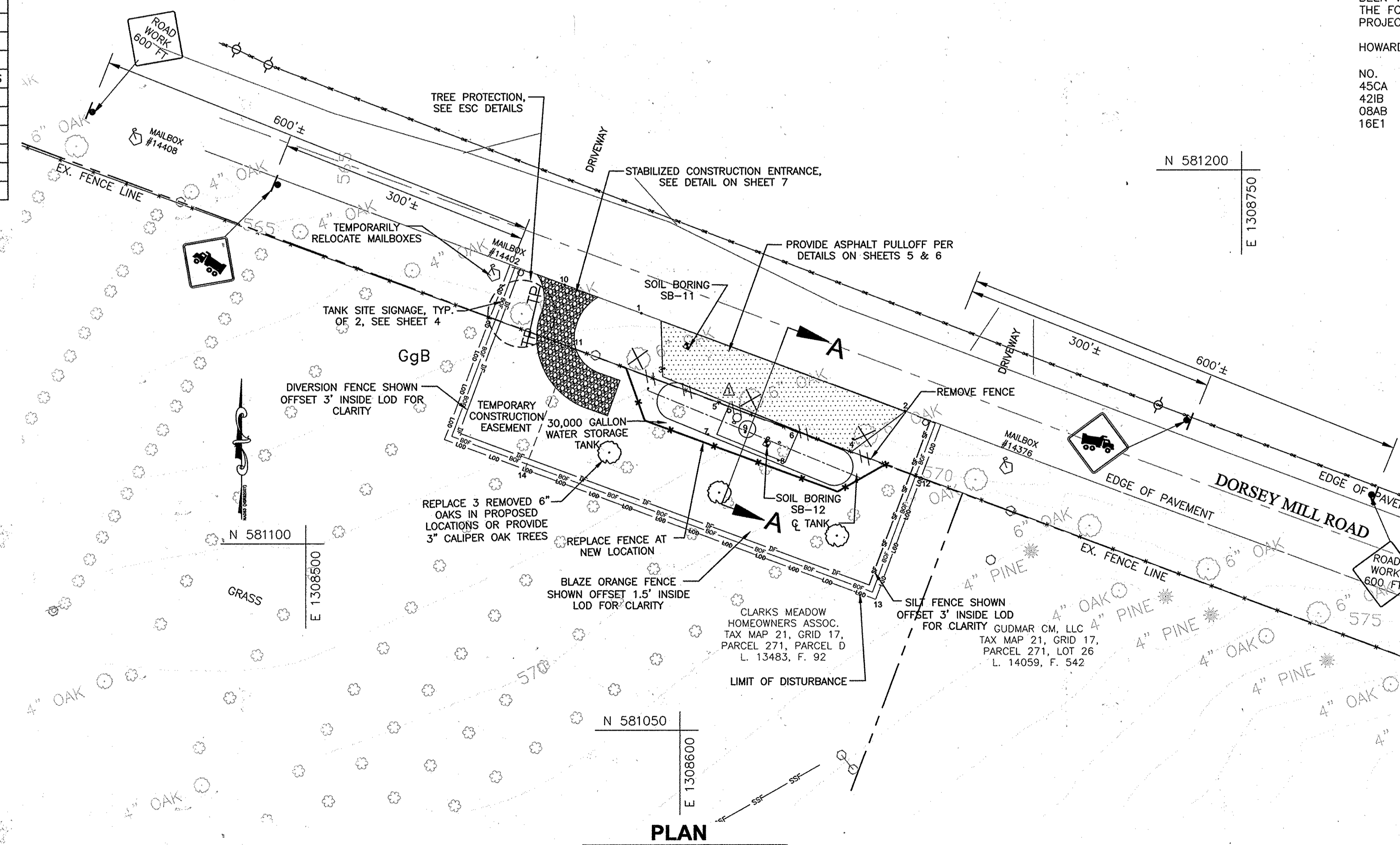
ASBUILT QUANTITIES TABLE

ITEM	UNIT	ESTIMATE	AS-BUILT	MANUFACTURER
MOBILIZATION/DEMOLITION	LS.	1	1	NA
30,000 GALLON DRAFT WATER STORAGE TANK, COMPLETE IN PLACE, WITH PIPING CONNECTIONS	LS.	1	1	TANKS DIRECT
ASPHALT PAVING (FULL DEPTH), P-6, & (MILL & OVERLAY)	S.F.	998	899	NA
CONCRETE SLAB	S.F.	160	175	NA
CLEARING AND GRUBBING	LS.	1	1	NA
SIGN, SITE IDENTIFICATION	EA.	2	2	SHANNON-BAUM SIGNS
SIGN, ADVANCE	EA.	2	2	NA
SILT FENCE	LF.	164	164	NA
DIVERSION FENCE	LF.	47	47	NA
BLAZE ORANGE FENCE	LF.	217	217	NA
SITE RESTORATION	S.F.	6,147	6,147	NA

NAME OF UTILITY CONTRACTOR: TANKS DIRECT, 8580 LAURELDALE DR, LAUREL, MD 20724

ASBUILT STAKEOUT TABLE

DESCRIPTION	NORTHING	EASTING	ELEVATION
TRAV 100	581226.19	1308198.73	559.89
TRAV 101	580974.39	1308512.01	571.17
BORING SB-11	581152.83	1308601.99	566.61
BORING SB-12	581126.75	1308623.21	569.23
1 NW CORNER ASPHALT PULLOFF	581159.56	1308594.98	566.70
2 NE CORNER ASPHALT PULLOFF	581135.29	1308660.17	568.50
3 SW CORNER ASPHALT PULLOFF	581144.64	1308595.46	567.70
4 SE CORNER ASPHALT PULLOFF	581124.47	1308645.67	569.20
5 NW CORNER CONCRETE SLAB	581137.43	1308613.29	569.14
6 NE CORNER CONCRETE SLAB	581129.83	1308631.64	569.14
7 SW CORNER CONCRETE SLAB	581129.22	1308609.89	569.14
8 SE CORNER CONCRETE SLAB	581121.71	1308628.10	569.14
9 CENTER OF TANK MANHOLE	581130.61	1308618.01	569.14
10 SCE, MIDPOINT AT ROAD EDGE	581169.28	1308569.17	566.00
11 CORNER PERMANENT EASEMENT	581152.52	1308570.72	
12 CORNER PERMANENT EASEMENT	581117.49	1308664.38	
13 CORNER PERMANENT EASEMENT	581084.97	1308652.31	
14 CORNER PERMANENT EASEMENT	581119.89	1308558.61	

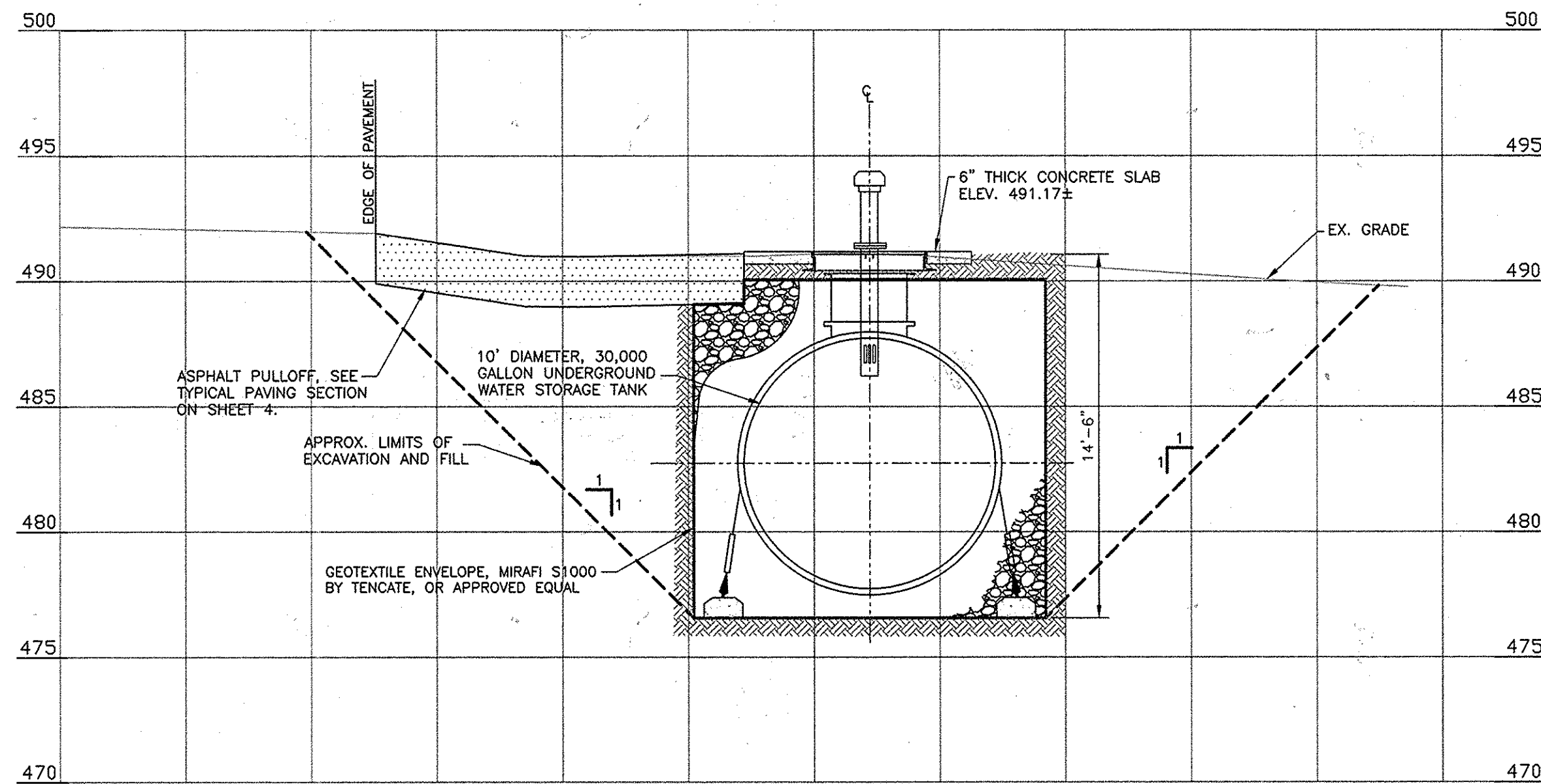


PLAN

SCALE : HORIZ. 1" = 20'

**12-28-15
ASBUILT**

<p>DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND</p> <p><i>John R. Butler</i> 1/15/15 DIRECTOR OF PUBLIC WORKS DATE</p> <p><i>Thomas C. Jones</i> 1/15/15 CHIEF, BUREAU OF UTILITIES DATE</p>	<p>Dewberry Dewberry Consultants, LLC</p> <p>3106 LORD BALTIMORE DRIVE SUITE 110 BALTIMORE, MD 21244-2602 410.265.9500 FAX: 410.265.8875</p>	<p>STATE OF MARYLAND REGISTERED PROFESSIONAL ENGINEER No. 10988 EXPIRES 12/31/15</p>	DES: LAL	LAL/RLI	ADDED CONTINUITY TEST STATION	7/15
			DRN: RLI			
			CHK: TND			
			DATE: 1/2015	BY NO.	REVISIONS	DATE
			RT # 14 OPPOSITE 14405 DORSEY MILL ROAD, GLENWOOD, MD 21738		600' SCALE MAP NO. 21 BLOCK NO. 17	
			UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION		ELECTION DISTRICT NO. 4	
			CAPITAL PROJECT NO. F-5972, CONTRACT NO. 65-4908		HOWARD COUNTY, MARYLAND	
			SCALE: SHOWN		SHEET 10 OF 12	



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

ASBUILT QUANTITIES TABLE				
ITEM	UNIT	ESTIMATE	AS-BUILT	MANUFACTURER
MOBILIZATION/DEMOLITION	L.S.	1	1	NA
30,000 GALLON DRAFT WATER STORAGE TANK, COMPLETE IN PLACE, WITH PIPING CONNECTIONS	L.S.	1	1	TANKS DIRECT
ASPHALT PAVING (FULL DEPTH), P-6, & (MILL & OVERLAY)	S.F.	964	927	NA
CONCRETE SLAB	S.F.	160	177	NA
CLEARING AND GRUBBING	L.S.	1	1	NA
SIGN, SITE IDENTIFICATION	EA.	2	2	SHANNON-BAUM SIGNS
SIGN, ADVANCE	EA.	2	2	NA
SILT FENCE	L.F.	156	156	NA
DIVERSION FENCE	L.F.	25	25	NA
BLAZE ORANGE FENCE	L.F.	185	185	NA
SITE RESTORATION	S.F.	5,733	5,733	NA

NAME OF UTILITY CONTRACTOR: TANKS DIRECT, 8580 LAURELDALE DR, LAUREL, MD 20724

ASBUILT STAKEOUT TABLE			
DESCRIPTION	NORTHING	EASTING	ELEVATION
TRAV 100	560120.88	1320393.80	484.91
TRAV 101	559980.86	1320286.74	491.82
BORING SB-15	559998.13	1320276.19	491.43
BORING SB-16	559965.56	1320299.13	491.64
1 NW CORNER ASPHALT PULLOFF	560014.86	1320275.43	490.50
2 NE CORNER ASPHALT PULLOFF	560008.88	1320292.93	489.80
3 SW CORNER ASPHALT PULLOFF	559945.83	1320293.50	493.00
4 SE CORNER ASPHALT PULLOFF	559959.73	1320305.22	492.80
5 NW CORNER CONCRETE SLAB	559993.75	1320296.75	491.17
6 NE CORNER CONCRETE SLAB	559996.05	1320305.31	491.17
7 SW CORNER CONCRETE SLAB	559974.39	1320301.98	491.17
8 SE CORNER CONCRETE SLAB	559976.62	1320310.44	491.17
9 CENTER OF TANK MANHOLE	559982.47	1320304.27	491.17
10 SCE, MIDPOINT AT ROAD EDGE	560025.91	1320274.88	490.00
11 CORNER PERMANENT EASEMENT	560034.58	1320289.01	
12 CORNER PERMANENT EASEMENT	566043.48	1320322.80	
13 CORNER PERMANENT EASEMENT	559945.31	1320345.75	
14 CORNER PERMANENT EASEMENT	559931.25	1320312.86	

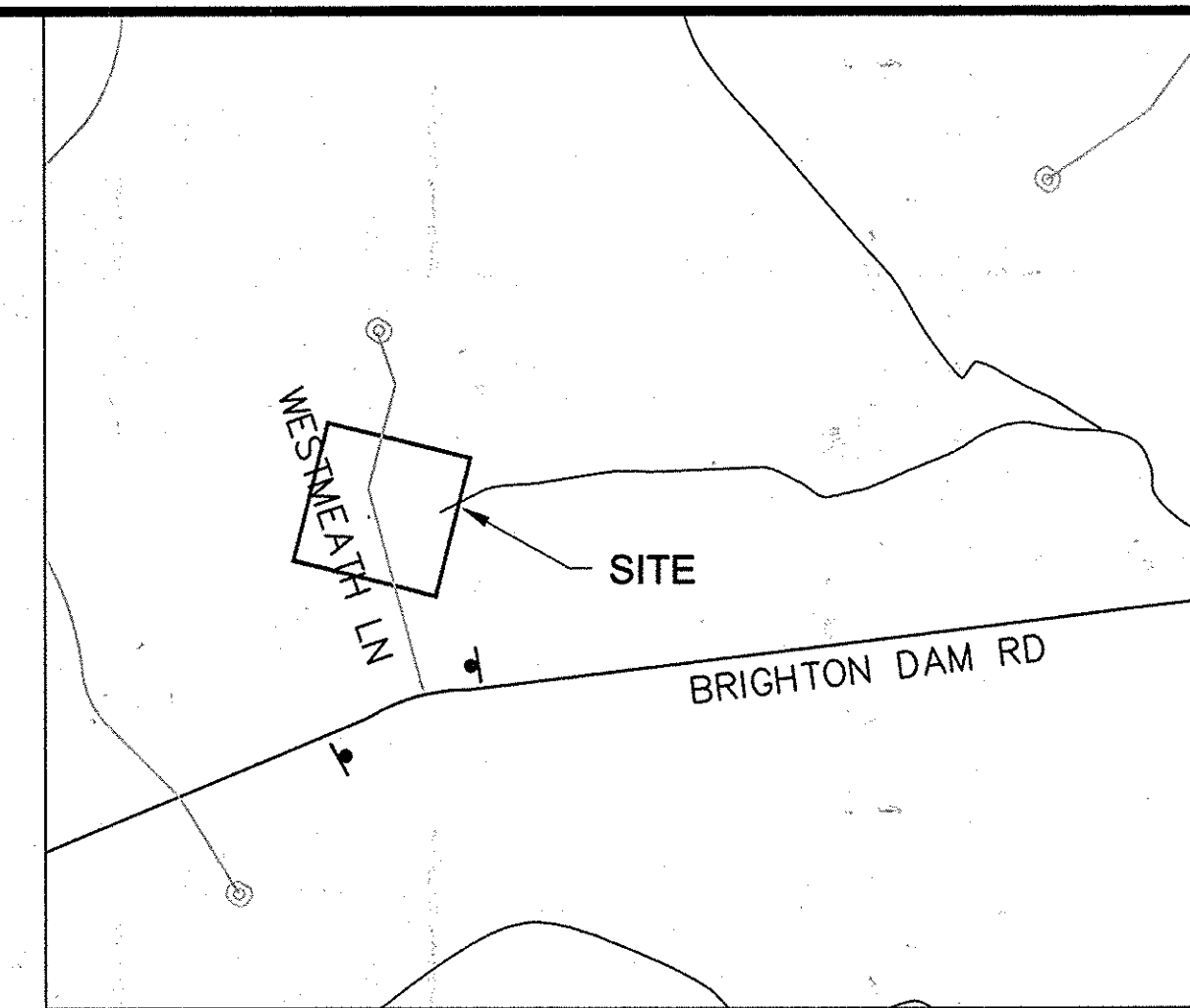
UTILITY NOTE:

1. THE UNDERGROUND UTILITY LOCATIONS SHOWN HEREON HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION, MISS UTILITY, AND/OR EXISTING DRAWINGS. THE ENGINEER MAKES NO GUARANTEE THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE ENGINEER FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED, ALTHOUGH HE DOES CERTIFY THAT THEY ARE INDICATED ON THE AFOREMENTIONED INFORMATION OBTAINED BY THE ENGINEER.
2. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING "MISS UTILITY" 48 HOURS PRIOR TO CONSTRUCTION 1-800-257-7777.
3. HOWARD COUNTY SHALL TAKE ACTION TO RELOCATE THE TANK OR UTILITY.
4. ANY DELAY OR CLAIM RELATED TO UTILITY LOCATIONS WILL NOT BE ACCEPTED BY HOWARD COUNTY.
5. THE CONTRACTOR SHALL PROTECT AND RELOCATE UTILITIES, VERTICALLY AND/OR HORIZONTALLY, IN COORDINATION WITH THE UTILITY OWNER IN THE VICINITY OF THE TANKS AS NEEDED.

SITE ANALYSIS

Total Area of Site	0.13 Acres
Area Disturbed	0.13 Acres
Area to be roofed or paved	0.02 Acres
Area to be Vegetatively Stabilized	0.13 Acres
Total Cut	1338 Cu. Yds.
Total Fill	1053 Cu. Yds.

Offsite waste/borrow area location To be determined by contractor.



SITE LOCATION MAP

SCALE: 1" = 600'
ADC MAP REFERENCE: HOWARD COUNTY MAP 4933, GRID E8

HORIZONTAL & VERTICAL CONTROL

COORDINATES & BEARINGS SHOWN HEREON ARE BASED ON HOWARD COUNTY CONTROL STATIONS AND REPRESENT THE MARYLAND STATE PLANE COORDINATE SYSTEM AS DERIVED FROM NORTH AMERICAN DATUM (NAD83/07) FOR HORIZONTAL AND NORTH AMERICAN VERTICAL DATUM (NAV83) FOR VERTICAL DATUM. DEWBERRY UTILIZED THE REAL TIME NETWORK (RTN) "KEYNETGPS" OPERATED BY TRIMBLE TO ACQUIRE MEASUREMENTS FOR THE SURVEY CONTROL SET AT THE SUBJECT SITES FOR THE PROJECT AS WELL AS THE CONTROL NOTED BELOW. THE "KEYNETGPS" NETWORK PROVIDES FOR HIGH ACCURACY POSITIONING THROUGHOUT THE GEOGRAPHIC REGION. THE USE OF AN RTN FOR GEODETIC CONTROL INVOLVES THE COLLECTION AND USE OF ATMOSPHERIC, TROPOSPHERIC, AND OTHER CORRECTION FROM MULTIPLE CONTROL POINTS SURROUNDING THE PROJECT SITE, RESULTING IN HIGH PRECISION POSITIONAL DATA. THE CONTROL POINTS OF THIS NETWORK ARE NATIONAL GEODETIC SURVEY CONTINUOUSLY OPERATING REFERENCE STATIONS OR INGS CORES, AND THE RESULTING MEASUREMENT VECTORS BETWEEN THE GPS RECEIVER AND NETWORK ARE DIRECT MEASUREMENTS TO EXISTING, HIGH ORDER PHYSICAL MONUMENTATION WHICH HAVE BEEN VETTED, MAINTAINED, AND DISTRIBUTED BY THE NATIONAL GEODETIC SURVEY. THE FOLLOWING HOWARD COUNTY CONTROL STATIONS WERE USED FOR THIS PROJECT:

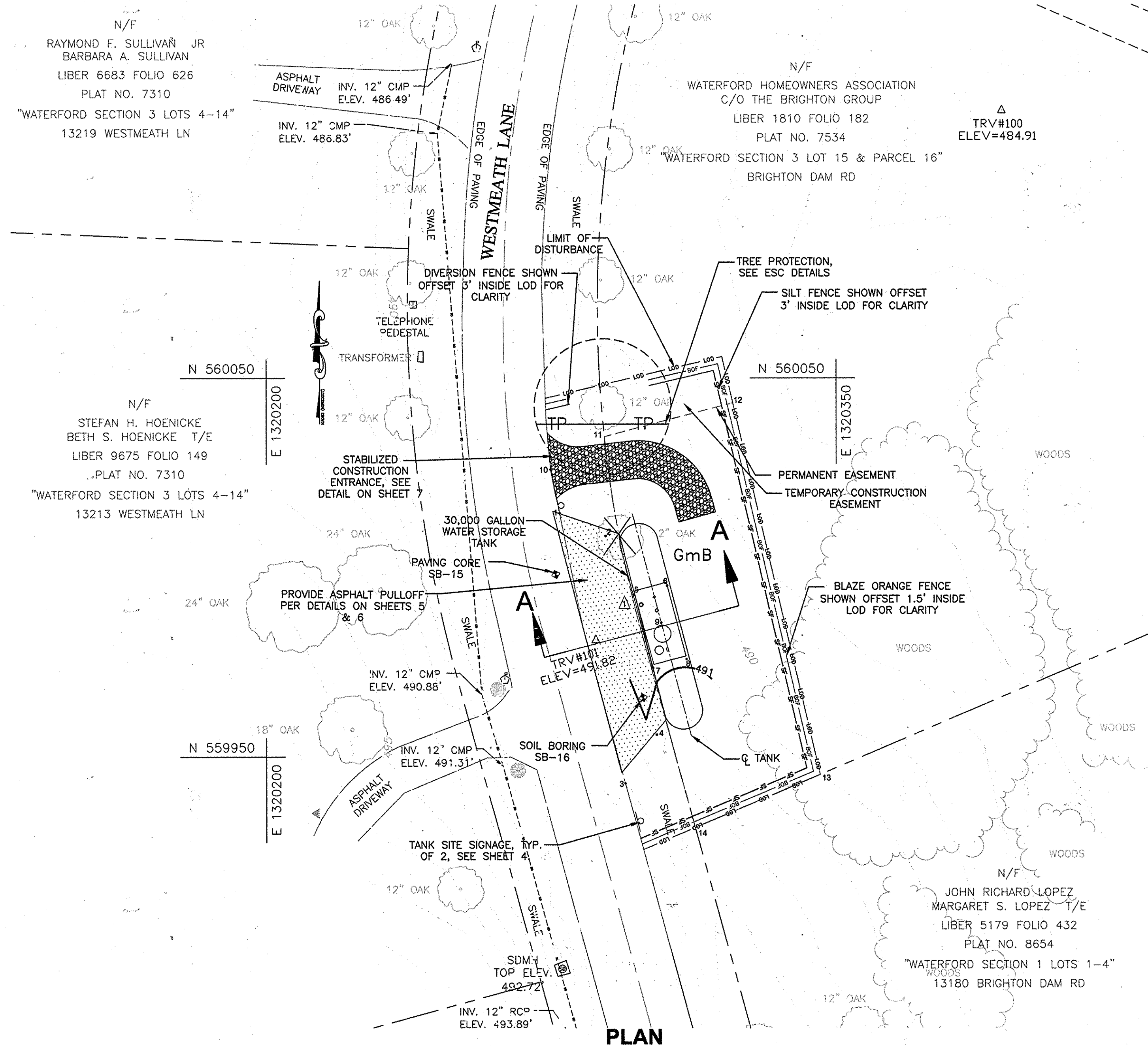
HOWARD COUNTY GEODETIC SURVEY CONTROL			
NO.	NORTHING (FT)	EASTING (FT)	ELEV (FT)
45CA	540070.9730	1327702.7218	428.15
42IB	542366.9133	1363075.9515	282.35
08AB	610602.2863	1297911.2033	579.72
16E1	593251.0015	1340192.6876	463.815

GENERAL NOTES:

1. FOR GENERAL TANK INSTALLATION, PIPING, SPECIFICATIONS, AND DETAILS REFER TO SHEETS 1-6, INCLUSIVE.
2. ALL TREES AND PLANTINGS INTERFERING WITH EXCAVATION SHALL BE REMOVED AND REPLACED WITH VIABLE TREES AND SIMILAR SPECIES AS INDICATED ON DRAWINGS. TREES AND PLANTINGS THAT ARE NOT CALLED OUT ON THE PLANS AND NEED TO BE REMOVED FOR CONSTRUCTION SHALL BE IDENTIFIED TO THE HOWARD COUNTY INSPECTOR PRIOR TO REMOVAL.
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7. ALL SURVEY STAKEOUT IS THE RESPONSIBILITY OF THE CONTRACTOR.
8. ALL TANK EXCAVATIONS MUST MEET OSHA REQUIREMENTS.
9. CONTRACTOR TO CONFIRM FINAL SIGN LOCATIONS WITH MARTIN LAPORE@410-313-0513.

TRAFFIC CONTROL NOTES:

1. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SCHEDULE A MEETING WITH HOWARD COUNTY TRAFFIC CONTROL MANAGER FOR THE APPROVAL OF TRAFFIC CONTROL PLANS.
2. USE MD 104.02-10 FOR FLAGGING OPERATION AND MD 104.02-02 FOR SHOULDER WORK.



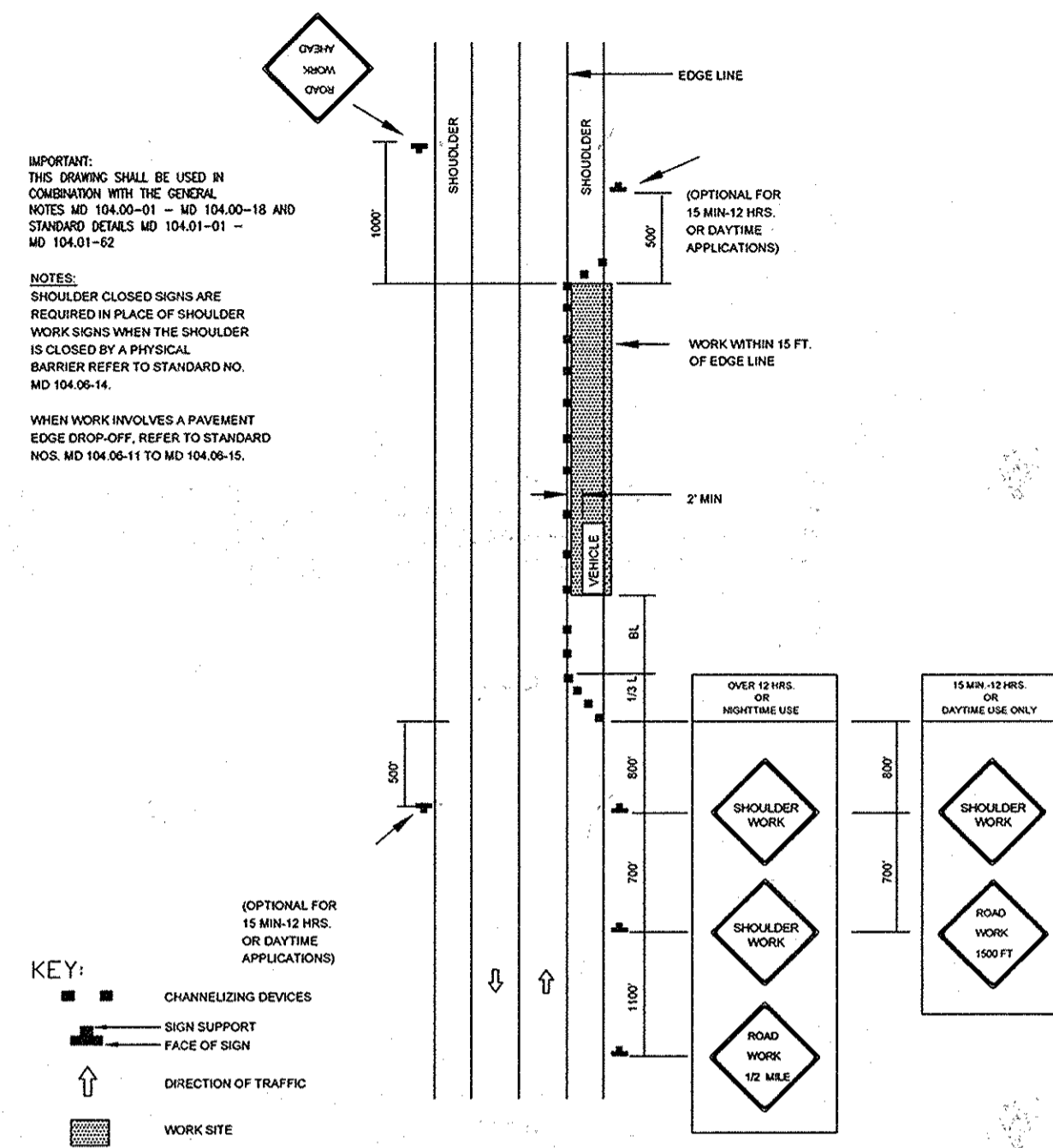
PLAN

SCALE: HORIZ. 1" = 20'

**12-28-15
ASBUILT**

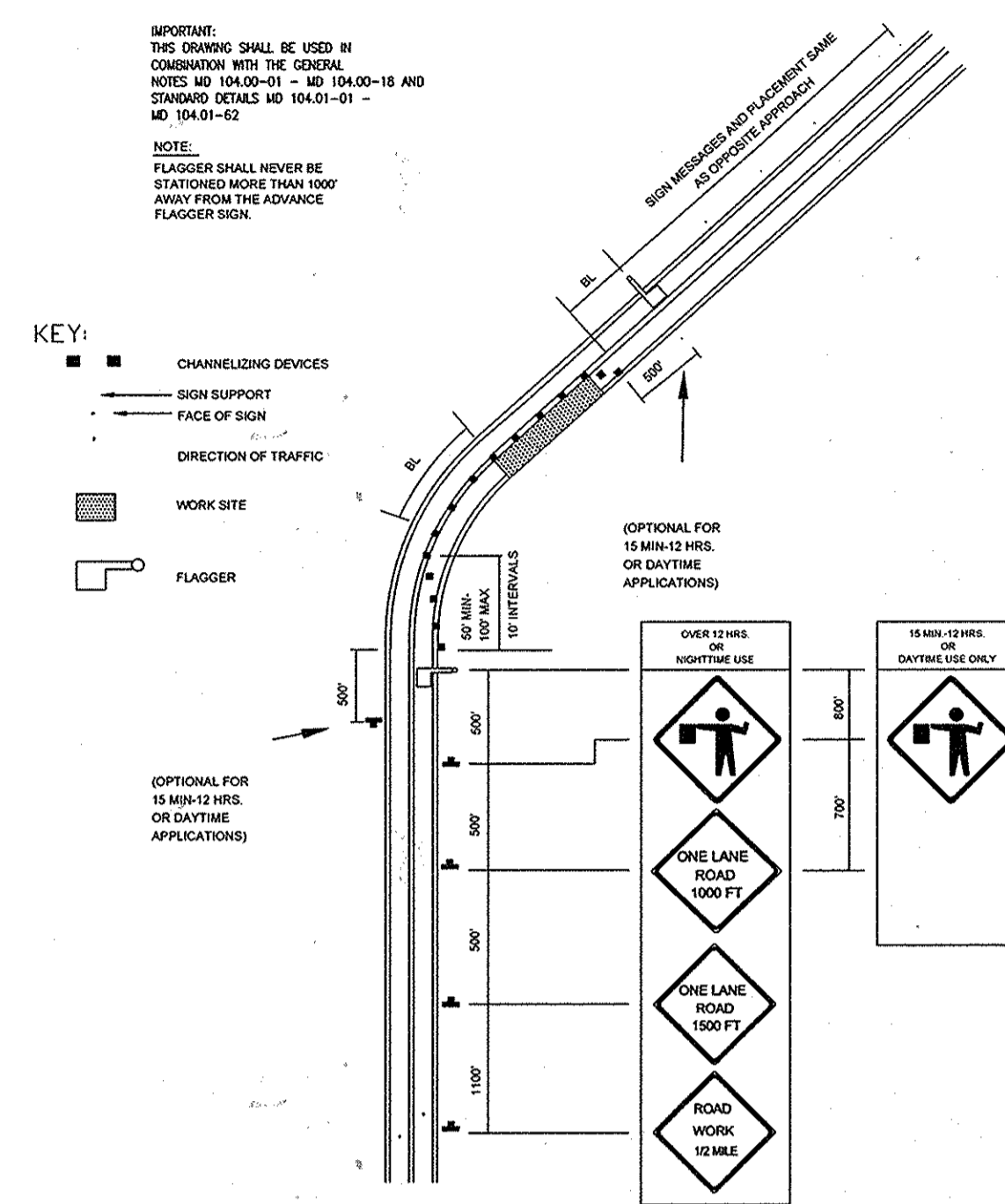
DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND Director: [Signature] 1/15/15 Chief, Bureau of Utilities: [Signature] 1/15/15	Dewberry Dewberry Consultants, LLC 3100 LORD BALTIMORE DRIVE SUITE 110 BALTIMORE, MD 21244-2662 410.285.9500 FAX: 410.285.8875		DES: LAL	ADDED CONTINUITY TEST STATION	7/15	RT # 60 WESTMEATH LANE, CLARKSVILLE, MD 21029	UNDERGROUND WATER STORAGE TANKS FOR FIRE SUPPRESSION CAPITAL PROJECT NO. F-5972, CONTRACT NO. 65-4908	SCALE: SHOWN
			DRN: RLI	CHK: TND	DATE: 1/2015			BY NO.
						ELECTION DISTRICT NO. 4	HOWARD COUNTY, MARYLAND	

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



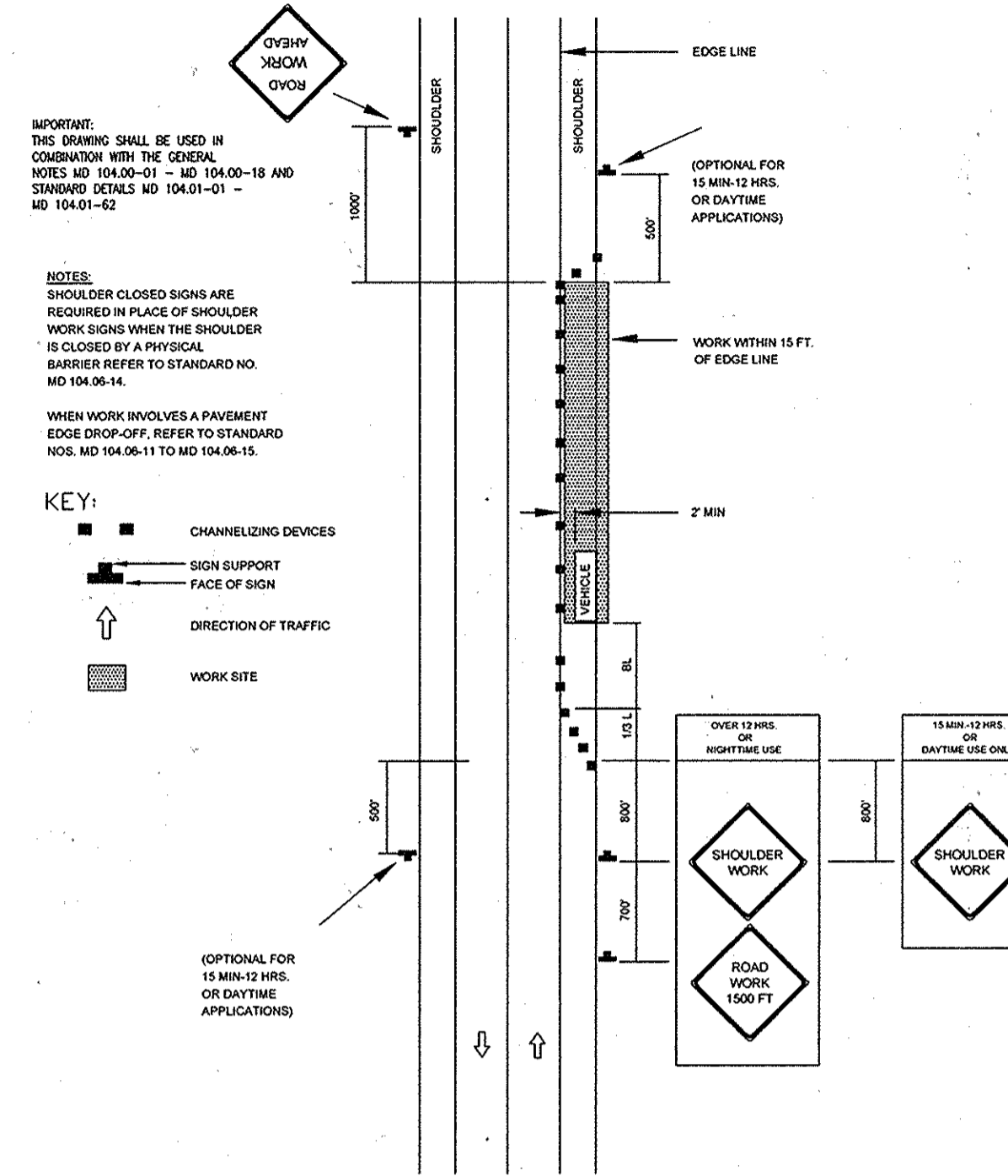
SHOULDER WORK / 2-LANE, 2-WAY
EGL/ LESS THAN 40 MPH
MD 104.02-01

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION

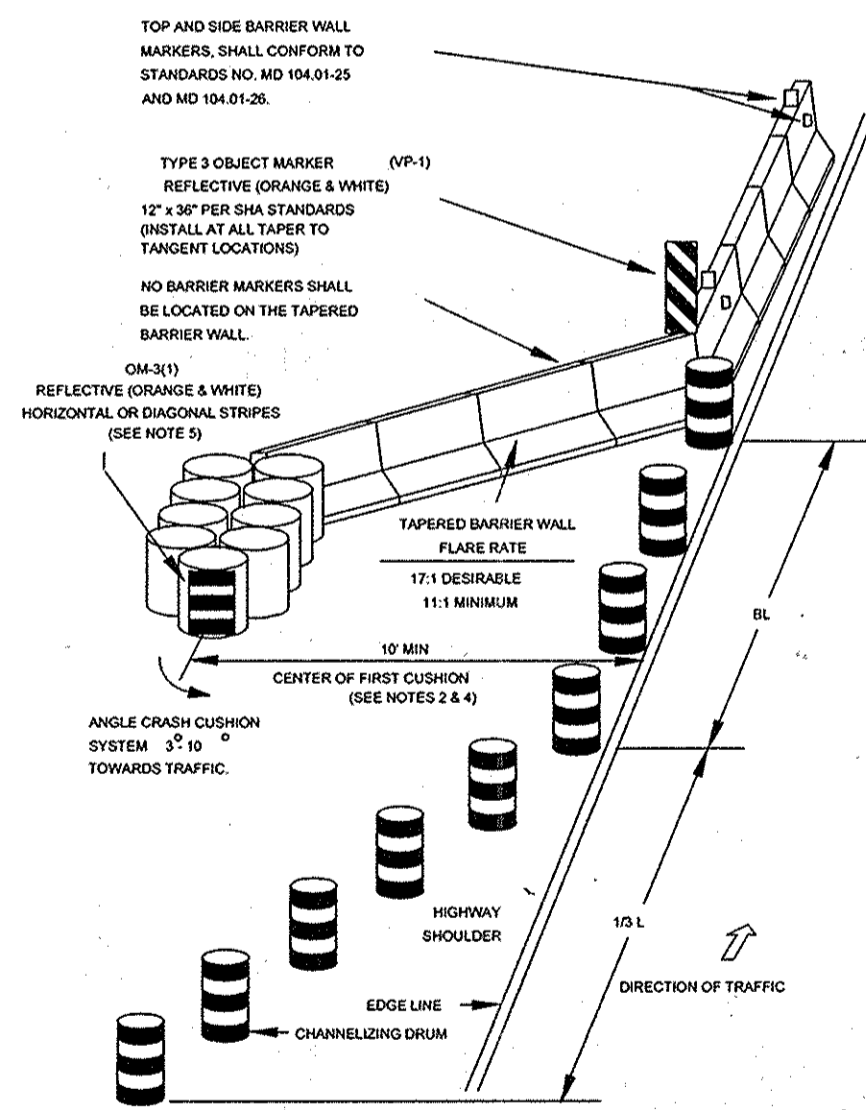


FLAGGING OPERATION / 2-LANE, 2-WAY
EGL/ LESS THAN 40 MPH
MD 104.02-10

TEMPORARY TRAFFIC CONTROL TYPICAL APPLICATION



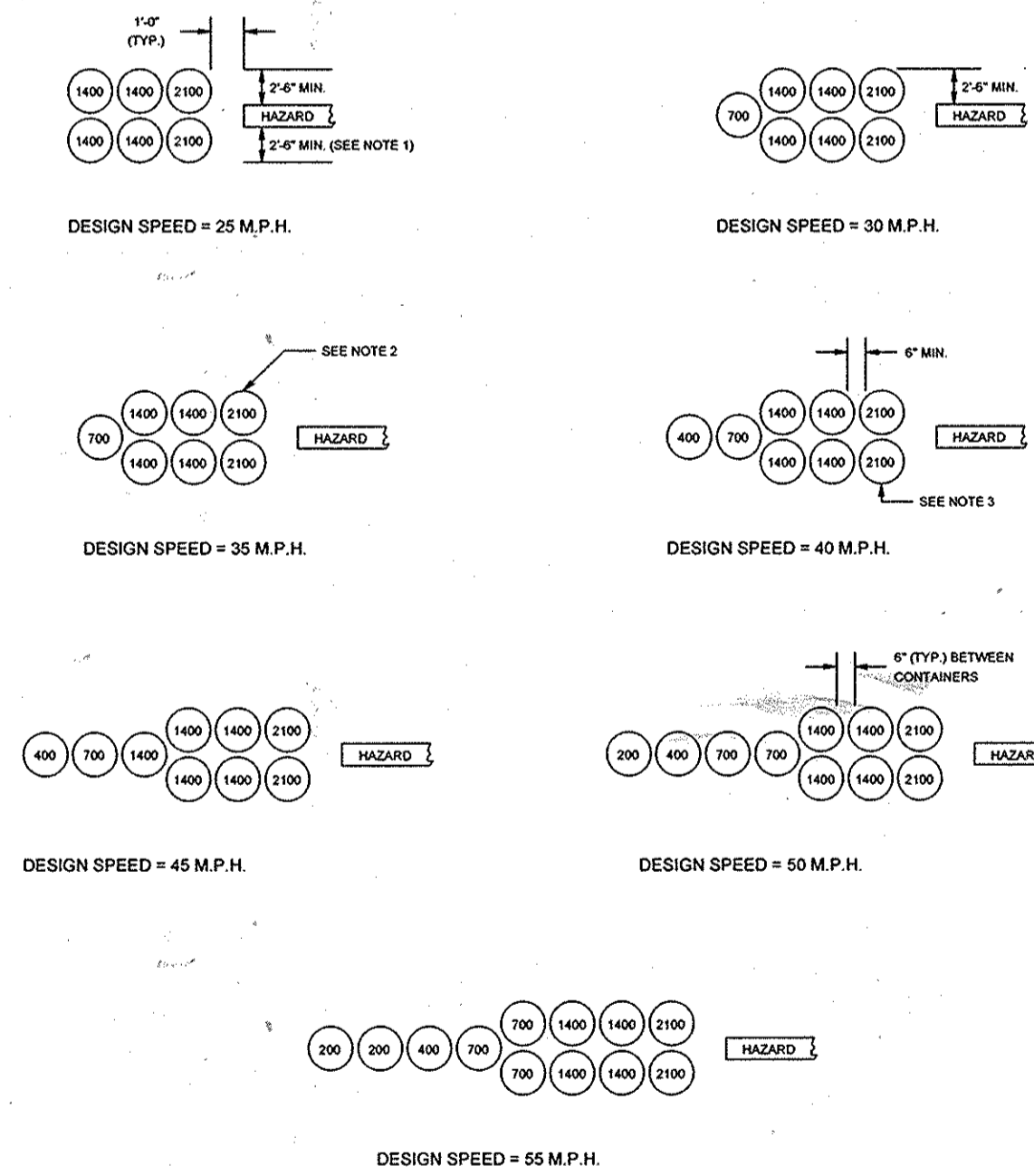
SHOULDER WORK / 2-LANE, 2-WAY
EGL/ LESS THAN 40 MPH
MD 104.02-02



ADVANCE CHANNELIZATION AND PROTECTION
FOR BARRIER FLARE SECTION
MD 104.01-23 A

- NOTES:
- TEMPORARY EDGE LINE STRIPING:
 - TEMPORARY EDGE LINE STRIPING IS OPTIONAL ALONG THE ENTIRE LENGTH OF TANGENT BARRIER WALL UNLESS OTHERWISE SPECIFIED.
 - THE EDGE LINE SHALL BE REQUIRED WHERE BARRIER WOULD NOT BE TANGENT TO, OR WOULD BE TANGENT TO, BUT NOT WITHIN 2' OF PROJECTED EDGE LINE.
 - TEMPORARY EDGE LINE STRIPING SHALL BE REQUIRED ALONG THE TANGENT BARRIER WALL FOR A DISTANCE OF 100' PAST THE BEGINNING OF THE TANGENT SECTIONS.
 - THE EDGE LINE SHOULD BE PLACED 8" - 12" FROM AND ALONG THE THE BARRIER, WHEN POSSIBLE.
 - WHERE SPACE IS LIMITED AN END TREATMENT MAY BE INSTALLED AS APPROVED BY THE ENGINEER.
 - THE SLOPED END BARRIER TRANSITION IS NOT PERMITTED ON ANY ROADWAY WHERE THE TRAVEL SPEED IS GREATER THAN 25 MPH.
 - UNLESS CONDITIONS DETERMINE OTHERWISE, AS DETERMINED BY THE ENGINEER.
 - REFLECTORIZATION IS REQUIRED ON WITHIN CRASH CUSHION (SEE 04-11) WITH HORIZONTAL STRIPES IF CUSHION IS GREATER THAN OR EQUAL TO 10 FEET FROM THE EDGE LINE AND ONLY WITH DIAGONAL STRIPES IF LESS THAN 10 FEET.
 - REFER TO STANDARD NO. MD 104.01-24 FOR BARRIER FLARE SECTIONS ON TWO-LANE, TWO-WAY ROADWAYS.
 - TAPERED BARRIER WALL MAY BE CONNECTED TO EXISTING W BEAM AS DIRECTED BY THE ENGINEER. REFER TO CATEGORY 6 OF THE BOOK OF STANDARDS FOR RELEVANT STANDARD DETAILS.
 - THERE SHALL BE A MINIMUM OF SEVEN CHANNELIZING DEVICES IN THE SHOULDER TAPER.

C. TYPICAL DESIGN LAYOUT



CRASH CUSHION
SAND FILLED PLASTIC BARRELS
(TEMPORARY OR PERMANENT)
STANDARD NO. MD 104.01-71

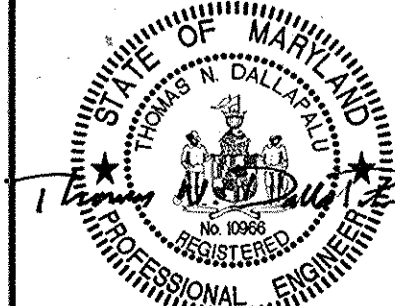
AS-BUILTS
DEC 28 2015

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Plot Date: 1/5/15 1:43pm

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

Director of Public Works: *[Signature]* DATE: 1/15/15
Chief, Bureau of Engineering: *[Signature]* DATE: 1/15/15
Chief, Bureau of Utilities: *[Signature]* DATE: 1/15/15
Chief, Utility Design Division: *[Signature]* DATE: 1/15/15

Dewberry
Dewberry Consultants, LLC
3106 LORD BALTIMORE DRIVE
SUITE 110
BALTIMORE, MD 21244-2602
410.265.9500
FAX: 410.265.8875



DES: LAL			
DRN: RLI			
CHK: TND			
DATE: 1/2015	BY: NO.	REVISIONS	DATE

MAINTENANCE OF TRAFFIC DETAILS

600' SCALE MAP NO. 22,21,21,34 BLOCK NO. 8,17,21,9

UNDERGROUND WATER STORAGE TANKS
FOR FIRE SUPPRESSION
CAPITAL PROJECT NO. F-5972, CONTRACT NO. 65-4908

ELECTION DISTRICT NO. 4

HOWARD COUNTY, MARYLAND

SCALE:
SHOWN
SHEET
11 OF 11
12 12