

SHEET INDEX

1	TITLE SHEET
2	PLAN VIEW OF WATER AND SEWER MAINS
3	PROFILE OF WATER AND SEWER MAINS
4	PVC WATER LINE SPECIFICATIONS AND DETAILS

BENCHMARKS

HOWARD COUNTY CONTROL
STATION 3805
N 558,378.575
E 1,386,524.158
ELEV. 193.726

HOWARD COUNTY CONTROL
STATION 3806
N 557,155.459
E 1,384,992.262
ELEV. 175.228

FINAL WATER AND SEWER EXTENSIONS

TIMBER RIDGE

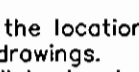
LOTS 683-688 & 707-720 AND OPEN SPACE LOTS 704-A & 706-A

1st ELECTION DISTRICT

HOWARD COUNTY, MARYLAND

CONTRACT NO. 14-4360-D

GENERAL NOTES

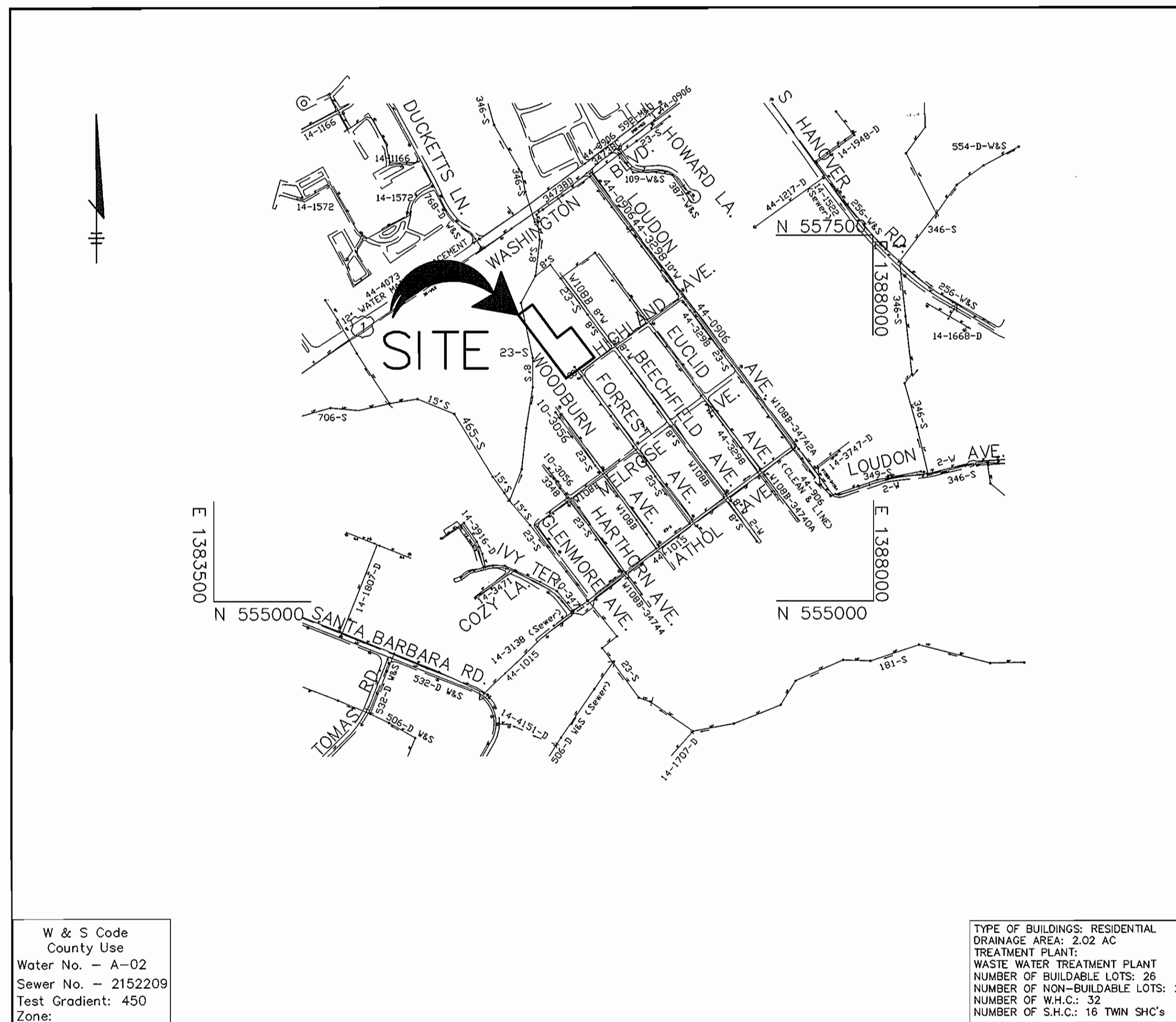
- Approximate location of existing mains are shown. The contractor shall take all necessary precautions to protect existing mains and services and maintain uninterrupted service. Any damage incurred shall be repaired immediately to the satisfaction of the Engineer at the Contractor's expense.
- Topographic field surveys were performed on FEBRUARY 2003 by PATTON HARRIS RUST & ASSOCIATES.
- 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. 3805 and No. 3806. All vertical controls are based on NAVD 88. Vertical controls provided on the drawings are ELEVATION 193.726 AND ELEVATION 175.228.
- All pipe elevations shown are invert elevations unless otherwise noted on the plans.
- Clear all utilities by a minimum of 12 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 the bracing of additional poles or damages shall be deducted from monies owed the contractor. The contractor shall coordinate with the utility companies to schedule the bracing of the poles.
- For details not shown on the drawings, and for materials and construction methods, use Howard County Design Manual, Volume IV, Standard Specifications and Detail for Construction (Latest Edition). The contractor shall have a copy of Volume IV on the job.
- Where test pits have been made on existing utilities, they are noted by the symbol  at the location of the test pit. A note or notes containing the results of the test pit or pits is 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 1-800-252-1133
 - BGE (Contractor Services) 410-850-4620
 - BGE (Emergency) 410-685-1400
 - Bureau of Utilities 410-313-4800
 - Colonial Pipeline Co. 410-795-1390
 - Miss Utility 1-800-257-7777
 - State Highway Administration 410-531-5533
 - Verizon 1-800-743-0033 / 410-224-9210
- 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. 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.

WATER NOTES

- All water mains shall be C-900 PVC unless otherwise noted.
- Taps of all water mains shall have a minimum of 3'-6" of cover unless otherwise noted.
- Valves adjacent to tees shall be strapped to tees.
- All fittings shall be buttressed or 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 elevations 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 1005 of the Standard Specifications.
- The contractor shall not operate any water main valves on the existing water system.
- All PVC pipes to be used on the public water system shall be AWWA C900.
- 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 C-900 PVC meeting the requirements of and constructed in accordance with the Howard County Design Manual Volume IV-Standard Specifications and Details for Construction.
- All water mains constructed in fill areas shall be restrained C-900 PVC meeting the requirements of and constructed in accordance with the Howard County Design Manual Volume IV-Standard Specifications and Details for Construction.
- All water mains within casing pipes shall be restrained ductile iron 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.
- The following note is added to Howard County Standard Detail W2.22, Buttresses and Anchors 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, all public water mains shall be polyvinylchloride (PVC) pipe meeting the requirements of AWWA C900 DR18, pressure Class 150 and the Howard County Design Manual Volume IV-Standard Specifications and Details for Construction and all the subsequent amendments thereto.
- W.H.C. are 1 1/2" with 1" outside meter settings.

SEWER NOTES

- All sewer mains shall be D.I.P. and P.V.C. unless otherwise noted.
- All manholes shall be 4'-0" inside diameter unless otherwise noted.
- Force mains shall be D.I.P. only.
- Manholes shown with 12" and 16" walls are for brick manholes only.
- Manholes designated W.T. in plan and profile shall have watertight frame and covers, Standard Detail G5.52. Where watertight manhole frames and covers is used, set top of frame 1'-6" above finished grade unless otherwise noted on the drawings.
- House(s) with the symbol "C.N.S." indicates that cellar cannot be served.



W & S Code
County Use
Water No. - A-02
Sewer No. - 2152209
Test Gradient: 450
Zone:

TYPE OF BUILDINGS: RESIDENTIAL
DRAINAGE AREA: 2.02 AC
TREATMENT PLANT:
WASTE WATER TREATMENT PLANT
NUMBER OF BUILDABLE LOTS: 25
NUMBER OF NON-BUILDABLE LOTS: 2
NUMBER OF W.H.C.: 32
NUMBER OF S.H.C.: 16 TWN S.H.C.'S

VICINITY MAP
SCALE : 1"=600'

QUANTITIES

ITEMS	QUANTITIES ESTIMATED	AS-BUILT		
		QUANTITIES	TYPE	MANUFACTURER / SUPPLIER
8" C-900 PVC WATER	659 LF			
6" C-900 PVC WATER	26 LF			
8" VALVE	1 EA.			
6" VALVE	2 EA.			
8"x6" TEE	2 EA.			
FIRE HYDRANTS	2 EA.			
8" PLUG & BUTTRESS	1 EA.			
1 1/2" W.H.C.	648 LF			
BALL VALVE	32 EA.			
1" METER BOXES	32 EA.			
8" SEWER	568 LF			
SEWER MANHOLES	5 EA.			
4" SHC	192 LF			
6" SHC	208 LF			

NAME OF UTILITY CONTRACTOR :

Sediment control measures for this contract will be implemented in accordance with Section 219 of the Specifications and as shown on F-92-178 F-06-133

CHECKBOX
AS-BUILT DATE
SURVEY AND DRAFTING DIVISION

Review for Howard Soil Conservation District and meets technical requirements.

Jim M... 6/2/07
NATURAL RESOURCES CONSERVATION SERVICE DATE

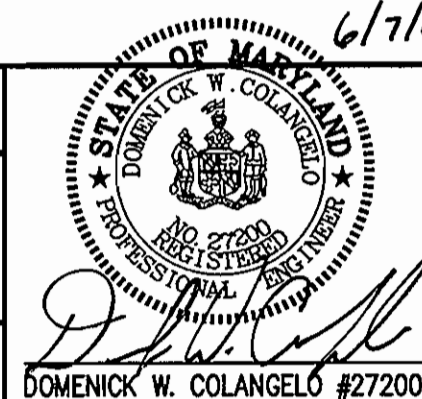
This plan is approved for soil erosion and sediment control by the Howard Soil Conservation District.
John R. P... 6/2/07
HOWARD SOIL CONSERVATION DISTRICT DATE

OWNER / DEVELOPER
MARK PRITCHETT
MEADOWLARK, LLC
P.O. BOX 484
HANOVER, MARYLAND 21076
410-796-6505

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DEPARTMENT OF PLANNING & ZONING
HOWARD COUNTY, MARYLAND

Patton Harris Rust & Associates, PC
Engineers, Surveyors, Planners, Landscape Architects.
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T 410.997.8900
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DES: DWC
DRN: EMR
FILE:
DATE: 6/07/07

BY	NO.	REVISION	DATE

TITLE SHEET

600' SCALE MAP NO. 38 BLOCK NO. 12

TIMBER RIDGE
LOTS 683-688 & 707-720 AND
OPEN SPACE LOTS 704-A & 706-A
1st ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
CONTRACT NO. 14-4360-D

SCALE AS SHOWN

SHEET 1 OF 4

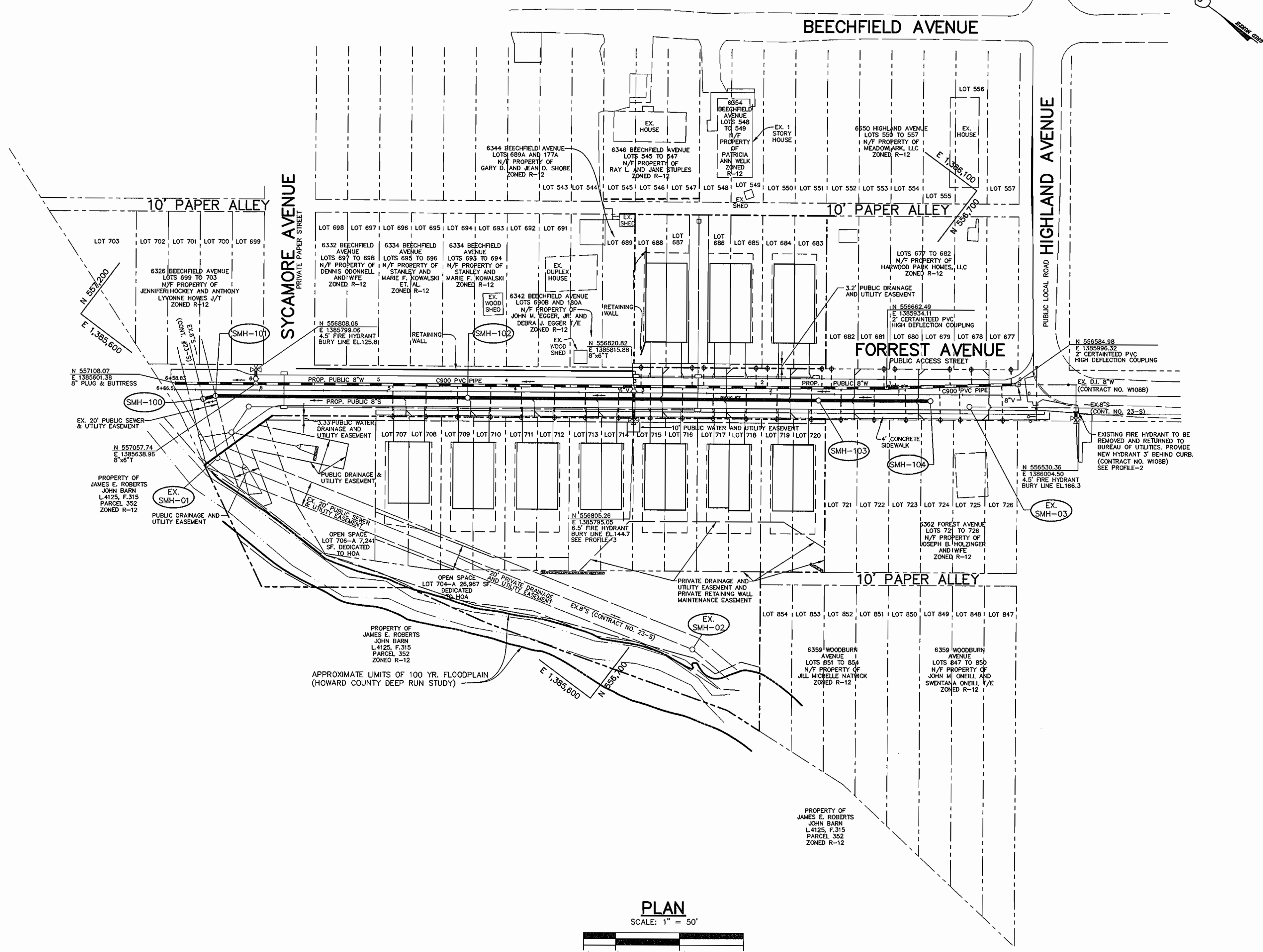
Ruth B... 6-18-07
CHIEF, BUREAU OF UTILITIES DATE

Mark P... 6/22/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

LEGEND

- PROPERTY LINE
- LOT LINE
- PROPOSED WATER MAIN
- PROPOSED TEE
- PROPOSED VALVE
- PROPOSED FIRE HYDRANT
- PROPOSED SEWER MAIN
- PROPOSED WHC
- PROPOSED BALL VALVE
- PROPOSED SHC
- PROPOSED SEWER MANHOLE
- EXISTING WATER MAIN
- EXISTING SEWER MAIN
- EXISTING STORM DRAIN PIPE

LOT INFORMATION							
LOT NO.	SQUARE FOOTAGE	FINISHED FLOOR ELEV.	BASEMENT FLOOR ELEV.	MIN. CELLAR ELEV.	PROP. HOUSE w/GARAGE	4" SHC SLOPE	4" SHC INV. PROP. LINE
677	---	---	---	160.0	NO	5%	156.44
678	---	---	---	160.1	NO	5%	156.54
679	---	---	---	157.4	NO	2%	154.50
680	---	---	---	157.4	NO	2%	154.46
681	---	---	---	153.8	NO	5%	150.25
682	---	---	---	153.7	NO	5%	150.15
683	3,000	161.0	151.0	148.4	YES	5%	144.85
684	3,000	161.0	151.0	148.3	YES	5%	144.75
685	3,000	159.0	149.0	147.3	YES	5%	143.75
686	3,000	159.0	149.0	147.2	YES	5%	143.65
687	3,000	158.0	148.0	145.3	YES	5%	141.75
688	3,000	158.0	148.0	145.2	YES	5%	141.65
707	3,017	137.0	125.0	124.4	YES	2%	121.43
708	3,017	137.0	125.0	124.4	YES	2%	121.47
709	3,000	141.0	129.0	127.5	YES	4%	124.15
710	3,000	141.0	129.0	127.5	YES	4%	124.23
711	3,000	143.0	131.0	129.7	YES	4%	126.34
712	3,000	143.0	131.0	129.7	YES	4%	126.42
713	3,000	145.5	133.5	131.8	YES	4%	128.49
714	3,000	145.5	133.5	131.9	YES	4%	128.57
715	3,000	147.0	135.0	134.5	YES	2%	131.60
716	3,000	147.0	135.0	134.6	YES	2%	131.64
717	3,000	149.5	137.5	136.9	YES	2%	134.00
718	3,000	149.5	137.5	137.0	YES	2%	134.04
719	3,000	152.6	140.6	139.8	YES	2%	136.90
720	3,000	152.6	140.6	139.9	YES	2%	136.94
721	---	---	---	145.3	NO	2%	142.40
722	---	---	---	145.4	NO	2%	142.44
723	---	---	---	149.5	NO	2%	146.60
724	---	---	---	149.6	NO	2%	146.64
725	---	---	---	158.6	NO	2%	155.63
726	---	---	---	158.5	NO	2%	155.59



PLAN
SCALE: 1" = 50'

NOTES

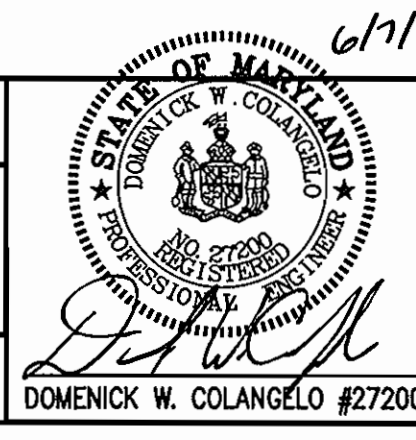
1. ALL EXISTING SEWER MAINS ARE V.C.P.X., C.S.P.X., OR ASBESTOS CEMENT CLASS 2400.
2. ALL WHC SHALL BE SINGLE CONNECTIONS.
3. WHC'S ARE 1 1/2" WITH 1" OUTSIDE METER SETTINGS.

<p>DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND</p> <p><i>[Signature]</i> CHIEF, BUREAU OF UTILITIES</p>	<p>DEPARTMENT OF PLANNING & ZONING HOWARD COUNTY, MARYLAND</p> <p><i>[Signature]</i> CHIEF, DEVELOPMENT ENGINEERING DIVISION</p>
--	--

6/7/07

Patton Harris Rust & Associates, pc
Engineers, Surveyors, Planners, Landscape Architects.

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DES: DW					
DRN: EMR					
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DATE: 6/07/07	BY:	NO.	REVISION	DATE	

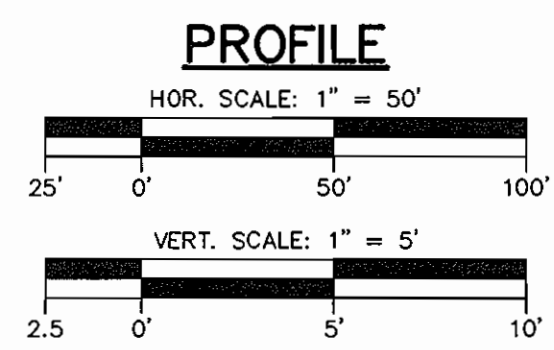
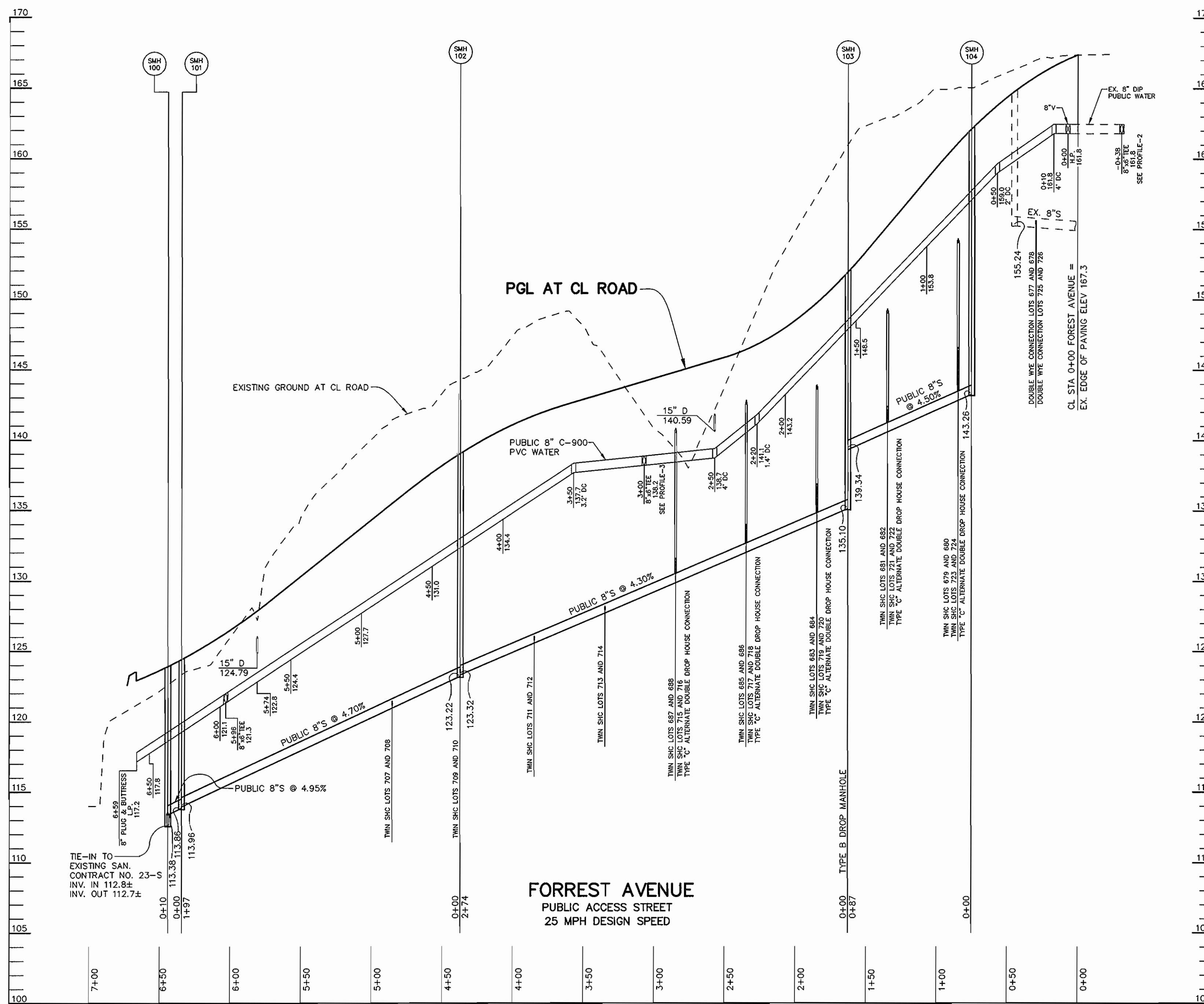
PLAN VIEW OF WATER AND SEWER MAINS

600' SCALE MAP NO. 38 BLOCK NO. 12

TIMBER RIDGE
LOTS 683-688 & 707-720 AND
OPEN SPACE LOTS 704-A & 706-A
1st ELECTION DISTRICT
HOWARD COUNTY, MARYLAND
CONTRACT NO. 14-4360-D

SCALE AS SHOWN
SHEET 2 OF 4

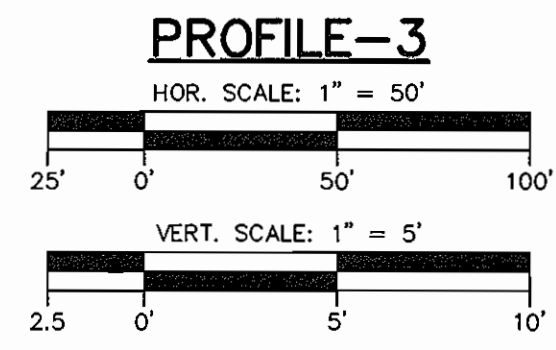
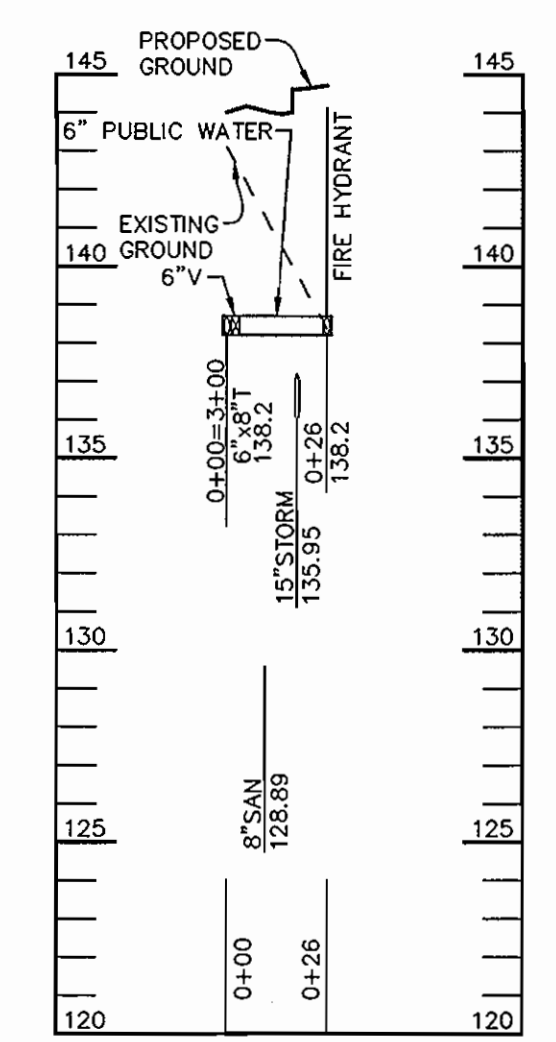
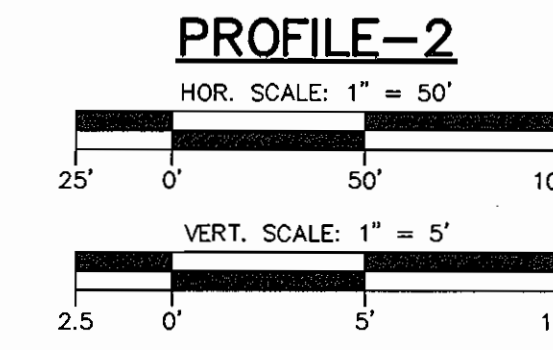
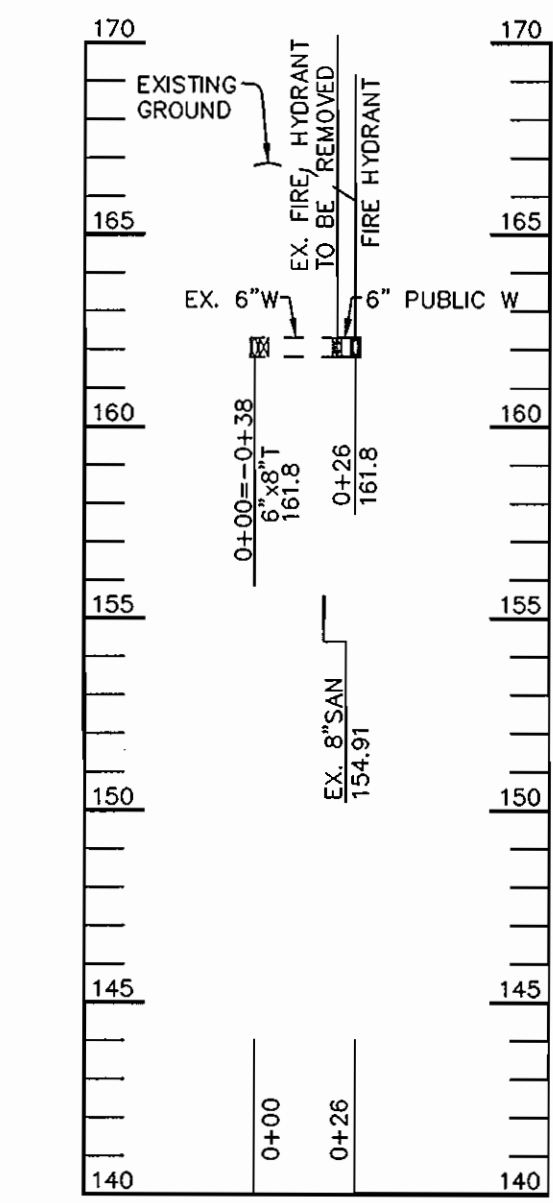
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4" SHC INFORMATION

LOT NO.	ROAD STATION	SEWER MAIN INV. @ SHC	SHC INV. MAIN	SHC INV. PL	BASEMENT FLOOR ELEV.	CONNECTION TYPE	HOWARD COUNTY STANDARD DETAIL
677	0+30	155.12	155.29	156.44	--	TWIN SHC/DOUBLE WYE	S-2.14/*
678	0+30	155.12	155.29	156.54	--	TWIN SHC/DOUBLE WYE	S-2.14/*
725	0+30	155.12	155.29	155.63	--	TWIN SHC/DOUBLE WYE	S-2.14/*
726	0+30	155.12	155.29	155.59	--	TWIN SHC/DOUBLE WYE	S-2.14/*
679	0+85	142.83	154.00	154.50	--	**	S-2.13 & S-2.14
680	0+85	142.83	154.00	154.46	--	**	S-2.13 & S-2.14
723	0+85	142.83	146.30	146.60	--	**	S-2.13 & S-2.14
724	0+85	142.83	146.30	146.64	--	**	S-2.13 & S-2.14
681	1+35	140.58	149.00	150.25	--	**	S-2.13 & S-2.14
682	1+35	140.58	149.00	150.15	--	**	S-2.13 & S-2.14
721	1+35	140.58	142.10	142.40	--	**	S-2.13 & S-2.14
722	1+35	140.58	142.10	142.44	--	**	S-2.13 & S-2.14
683	1+85	134.17	143.60	144.85	151.0	**	S-2.13 & S-2.14
684	1+85	134.17	143.60	144.75	151.0	**	S-2.13 & S-2.14
719	1+85	134.17	136.60	136.90	140.6	**	S-2.13 & S-2.14
720	1+85	134.17	136.60	136.94	140.6	**	S-2.13 & S-2.14
685	2+35	132.02	142.50	143.75	149.0	**	S-2.13 & S-2.14
686	2+35	132.02	142.50	143.65	149.0	**	S-2.13 & S-2.14
717	2+35	132.02	133.70	134.00	137.5	**	S-2.13 & S-2.14
718	2+35	132.02	133.70	134.04	137.5	**	S-2.13 & S-2.14
687	2+85	129.88	140.50	141.75	148.0	**	S-2.13 & S-2.14
688	2+85	129.88	140.50	141.65	148.0	**	S-2.13 & S-2.14
715	2+85	129.88	131.30	131.60	135.0	**	S-2.13 & S-2.14
716	2+85	129.88	131.30	131.64	135.0	**	S-2.13 & S-2.14
713	3+35	127.72	127.89	128.49	133.5	TWIN SHC	S-2.14
714	3+35	127.72	127.89	128.57	133.5	TWIN SHC	S-2.14
711	3+85	125.57	125.74	126.34	131.0	TWIN SHC	S-2.14
712	3+85	125.57	125.74	126.42	131.0	TWIN SHC	S-2.14
709	4+35	N/A	123.55	124.15	129.0	MANHOLE	-
710	4+35	N/A	123.55	124.23	129.0	MANHOLE	-
707	4+85	120.96	121.13	121.43	125.0	TWIN SHC	S-2.14
708	4+85	120.96	121.13	121.47	125.0	TWIN SHC	S-2.14

* SEE DETAIL ON SHEET 4 FOR DOUBLE WYE SEWER HOUSE CONNECTION
 ** TWIN SHC/ALTERNATE DOUBLE DROP HOUSE CONNECTION



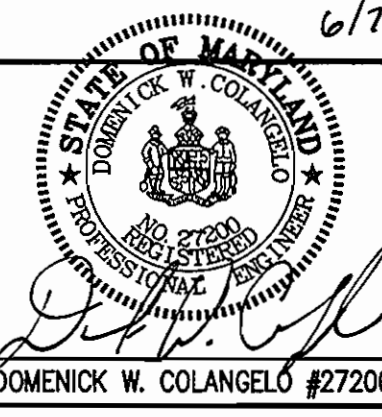
STRUCTURE SCHEDULE

STRUCTURE	TYPE	LOCATION	TOP	REMARKS
SMH 104	4" DIA MANHOLE	N 556629 E 1385947	162.1	HOCO. STD. DETAIL G-5.11
SMH 103	TYPE B DROP MANHOLE	N 556699 E 1385894	151.9	HOCO. STD. DETAIL S-1.32
SMH 102	4" DIA MANHOLE	N 556919 E 1385730	139.0	HOCO. STD. DETAIL G-5.11
SMH 101	4" DIA MANHOLE	N 557077 E 1385612	124.4	HOCO. STD. DETAIL G-5.11
SMH 100	4" DIA MANHOLE	N 557083 E 1385605	123.9	HOCO. STD. DETAIL G-5.14

DEPARTMENT OF PUBLIC WORKS
 HOWARD COUNTY, MARYLAND
 Chief, Bureau of Utilities
 DATE: 6-18-07

DEPARTMENT OF PLANNING & ZONING
 HOWARD COUNTY, MARYLAND
 Chief, Development Engineering Division
 DATE: 6/22/07

Patton Harris Rust & Associates, pc
 Engineers, Surveyors, Planners, Landscape Architects
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 Columbia, MD 21045
 T 410.997.8900
 F 410.997.9282



DES: DWC
 DRN: EMR
 FILE:
 DATE: 6/07/07
 BY: NO.
 REVISION
 DATE

PROFILE OF WATER AND SEWER MAINS
 600' SCALE MAP NO. 38 BLOCK NO. 12

TIMBER RIDGE
 LOTS 683-688 & 707-720 AND
 OPEN SPACE LOTS 704-A & 706-A
 1st ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND
 CONTRACT NO. 14-4360-D

SCALE AS SHOWN
 SHEET 3 OF 4

AMENDMENT TO THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION

Except as indicated herein, all work shall be in accordance with the pertinent sections of the Howard County Design Manual Volume IV-Standard Specifications and Details for Construction. Article 9, Sections 908 Nonmetallic Pipes and Drainage Tiles and Article 10, Section 102 Water Mains of the Howard County Standard Specifications are amended to include the following requirements.

GENERAL

- Polyvinylchloride (PVC) pipe and couplings shall be homogeneous throughout and free from visible cracks, bubbles, blisters, holes, foreign inclusions, cuts, or scrapes on inside or outside surfaces, or other imperfections, which may impair the performance or life of the pipe. Each pipe shall be straight to within 1/4-inch per 20-foot length of pipe when uniformly supported along its entire length, and shall have a true circular cross-section to within a 1/64-inch.
- PVC pipe manufactured more than six months prior to work site inspection will not be accepted.
- Loading, unloading, handling, inspection and storage of PVC pipe and fittings shall be in accordance with AWWA C605. PVC pipe shall be stored such that it does not deform or bend.
- Submittals: The following items shall be submitted for review and approval prior to installation. Materials not approved will not be accepted.
 - PVC Pipe: Submit manufacturer's literature and certificates of compliance for PVC pipe along with the manufacturer's identification codes for nominal size, dimension ratio, pressure class, production record code and date of manufacture. Submit manufacturer's written transcript of test results, for sustained pressure, pipe dimension, burst pressure, flattening resistance, and extrusion quality test. Frequency of performing the tests and the methods of selecting test specimens shall be in accordance with AWWA C900.
 - PVC Pipe Fittings: Submit manufacturer's literature and certificates of compliance for PVC pipe fittings along with the manufacturer's identification codes for nominal size, pressure class, production record code and date of manufacture. Submit manufacturer's written transcript of results for accelerated-regression test, burst pressure and heat-reversion test in accordance with AWWA C907.
 - Miscellaneous for PVC water pipe: Submit manufacturer's literature and certificates of compliance, for joint restraint devices, pipe couplings, tracer wire, wire connector splice kits, detection tape, and service saddles.
 - Submit manufacturer's installation instructions for PVC pipe and fittings, joint restraint devices, pipe couplings, wire connector splice kits, service saddles, and manufacturer's instructions for tapping pipe.

- Installation of PVC Water Mains:
 - PVC pipe and fittings shall be handled in accordance with AWWA C605.
 - Bedding: Provide 6 inches of stone bedding under the pipe in accordance with Standard Detail G2.01 and the detail shown on the Plans for Trench for PVC Pipe using AASHTO M 43, size number 57 aggregate. The stone bedding shall be installed to grade prior to laying pipe. Excavate bell holes in bedding at each joint to assemble the joint and to insure that the entire length of each pipe barrel, fitting and valve is supported on firm bedding.
 - Install PVC AWWA C900 pressure pipe: Installation shall be in accordance with the Standard Specifications and the manufacturer's installation instructions and recommendations except as modified herein. Changes in horizontal and vertical alignment and curved alignments shown on the Plans shall be made by using fittings. Deflecting PVC pipe joints or bending PVC pipe will not be permitted.

EXECUTION

All construction methods and details shall be in accordance with the Howard County Design Manual Volume IV-Standard Specifications and Details for Construction and the following Criteria.

- Whenever a pipe requires cutting, the work shall be done in a manner that leaves a smooth, square end. Cut PVC pipe ends shall have burrs removed and the end beveled to match factory bevel. To ensure the proper length of insertion of the spigot into the bell, PVC pipe cut in the field shall be beveled and marked on the spigot end to the dimensions specified by the manufacturer prior to assembly.
- Prior to making gasketed joints, both mating pipe ends and the gasket shall be cleaned of all foreign material. The rubber gasket shall then be inserted in or stretched over the clean gasket seat and lubricant applied to the gasket and mating pipe end. The method for inserting the spigot into the bell shall be as recommended by the manufacturer and approved by the County. The pipe ends shall be carefully aligned and pushed together to meet the required manufacturer's insertion depth. Insertion of the spigot end of the pipe shall be made to a point where the factory mark is even with the face of the bell.
- Tracer Wires: Install tracer wires with the pipe. Tape wire to the top of the pipe with minimum 2-inch wide x 1/2-pipe-circumference long PVC tape every 4 feet along the pipe. The copper wire shall be continuous for the full length of the pipeline including all fire hydrant leads and shall terminate at continuity test stations. Continuity test stations shall be located adjacent to all fire hydrants. All splicing shall be done at test station, no direct bury splicing is allowed.

- Connections to PVC pipe for Water House Connections:
 - Perform taps on PVC pipe in accordance with AWWA C605, the pipe manufacturer's recommendations, and as indicated herein.
 - Install a service saddle when tapping a PVC water main. Maintain a minimum of 24 inches between taps and PVC pipe bells.
 - For PVC water pipe, use only cutting/tapping tools and machines made specifically for cutting AWWA C900 pipe and as described in AWWA C605. The cutting/tapping machine shall be installed so that it does not distort the pipe. The machine shall be supported so that its weight is not carried by the pipe. When tapping PVC pipe, follow the manufacturer's safety precautions and the safety precautions cited in AWWA C605.
 - Multiple taps in a single pipe shall be staggered around the pipe circumference so they are not on a common line parallel to the longitudinal axis of the pipe and be at least 18-inches apart when measured longitudinally.
 - Ford FC-202
 - Mueller Series DR2S
 - Romac 202N
 - Smith Blair 317 Nylon Coated
 - JCM 406

Connections to continuity test stations shall be in accordance with the detail shown on the Plans.

After backfilling, the Contractor shall test the tracer wire in the presence of the County to demonstrate electrical continuity between test stations through the length of the PVC pipeline installed. The Contractor shall notify the County 48 hours in advance of the tests. Any discontinuity shall be located, repaired and retested at the Contractor's expense until continuity is achieved.

- Backfill: Backfill over the PVC pipe in accordance with Standard Detail G2.01 and the detail shown on the Plans for Trench for PVC Pipe using well-compacted AASHTO M 43, size number 57 aggregate to a minimum of 6 inches over the crown of the pipe. Trench backfill shall proceed thereafter in 8-inch layers. Contractor shall provide full trench compaction density of 95% as determined by AASHTO T-180-A.
- Detection Tape: Install detection tape directly over the centerline of the water mains on compacted backfill not less than 18 inches or more than 24 inches below finished surface. Tape shall be installed with minimal splices. Splices shall overlap a minimum of 6 inches.

- Joints:
 - Mechanical Joints: For PVC plain-end to be connected to ductile iron mechanical joint bell, assemble the joint in accordance with the Standard Specifications, as modified in AWWA C605, the pipe manufacturer's recommendations and as specified herein. For PVC pipe plain ends to be inserted into mechanical joint bells, cut off the bevel so the plain-end is square cut. Do not deflect PVC pipe at connection to cast or ductile iron pipe or fittings.
 - Push-on Joints: For PVC pipe plain ends to be inserted in ductile iron or cast iron push-on bell, the spigot taper shall be cut to 1/4-inch long. Place an identifying mark on pipe that is not furnished with a depth mark on the plain end to show the depth of the socket and to verify that pipe is properly set in the bell. Assemble joints in accordance with AWWA C600 and C605, the manufacturer's recommendations, and as specified herein.

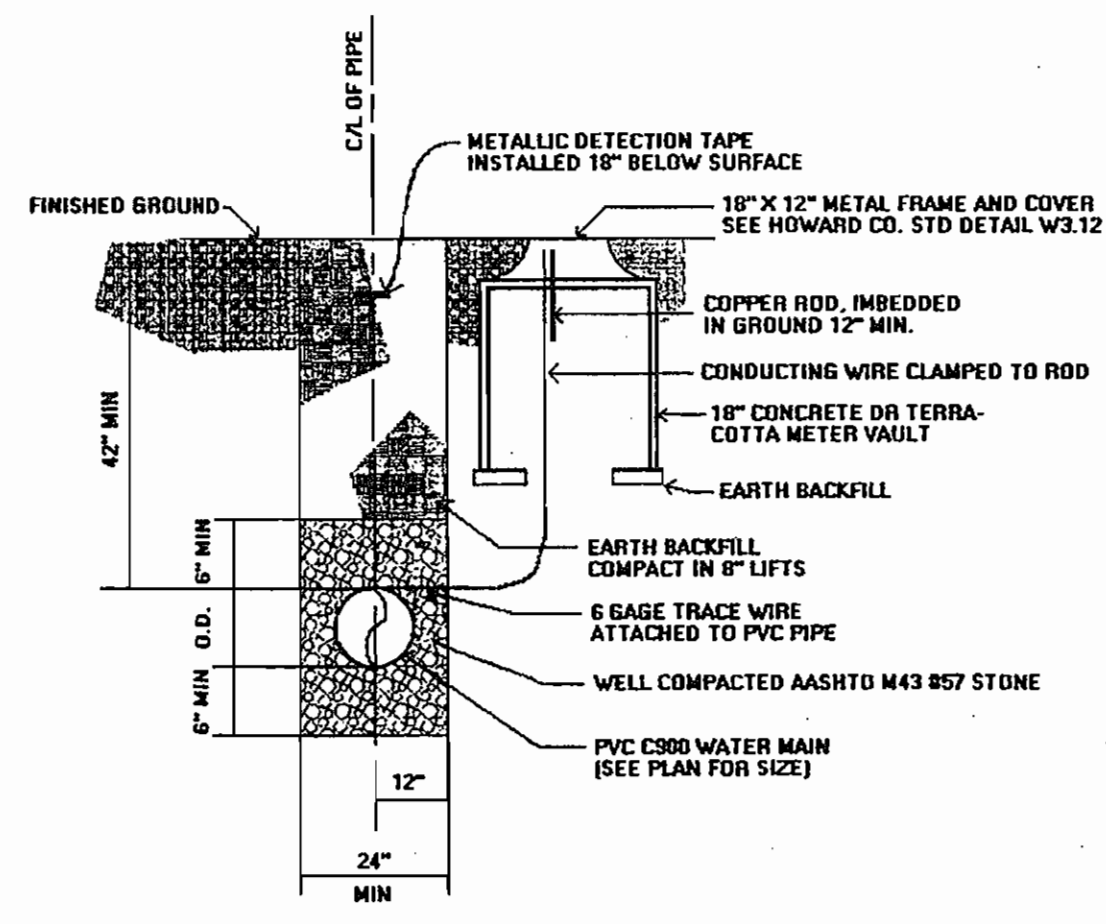
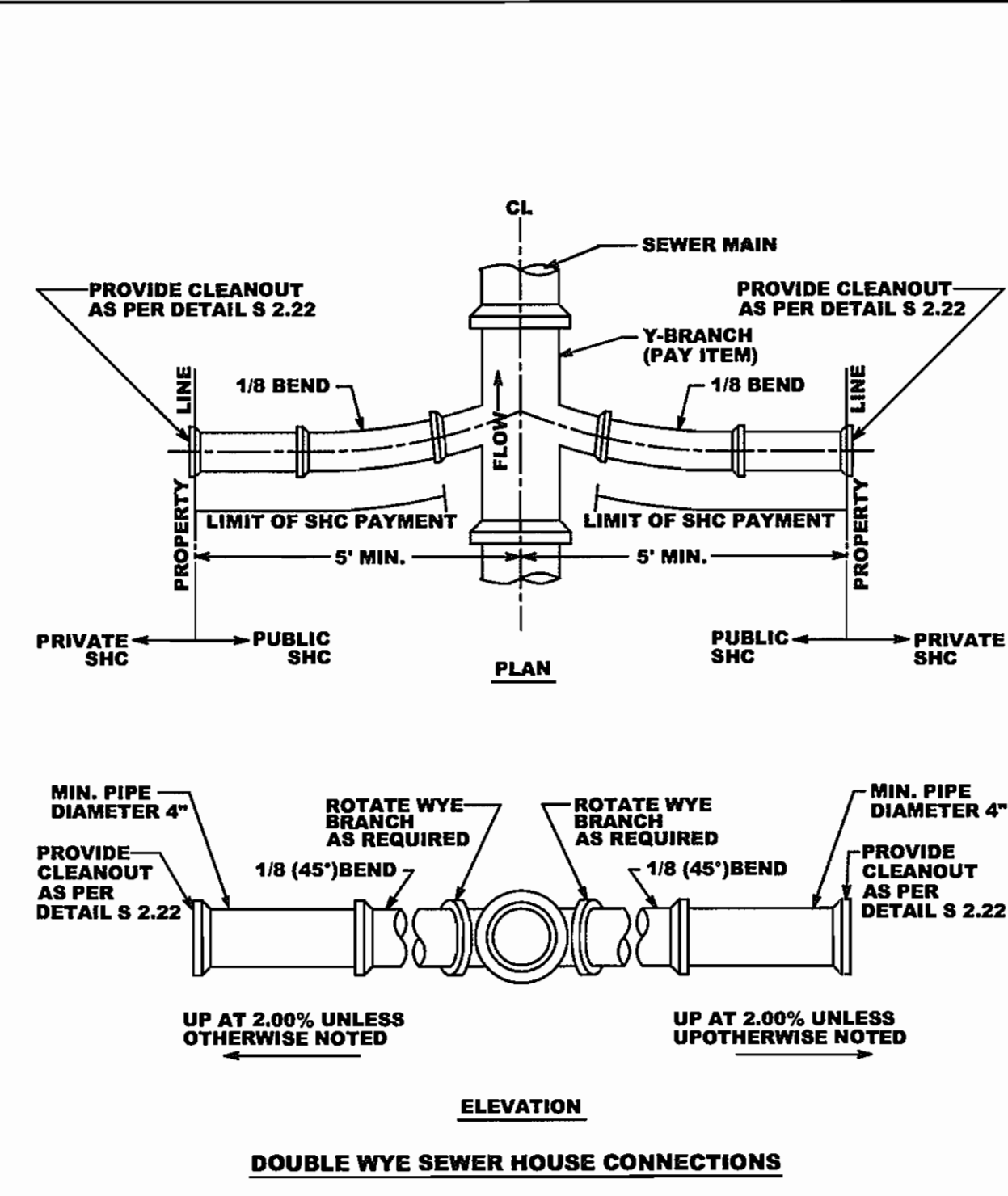
- Do not deflect PVC pipe at connection to cast or ductile iron pipe or fittings. The Contractor shall achieve change in alignment as indicated elsewhere herein. Assembly of the plain end into the bell shall be done in accordance with manufacturer's recommendations. The spigot shall not be inserted deeper than manufacturer's recommendations. Install push-on restrained joints in accordance with manufacturer's recommendations.
- Restrainted Joint: In a restrained joint, PVC pipe shall not be deflected. If deflection is required in a restrained joint, use restrained ductile iron pipe.

- Where the Contractor chooses to use PVC fittings, the pressure class of the fitting shall be the same as, or greater than, the pressure class of the pipe to which it connects. If the pressure class is not available, the Contractor shall use a ductile iron fitting. Where a fitting with restrained joints is required, a ductile iron mechanical joint shall be used.
- Fire Hydrant lead, including mainline tee, shall be ductile iron only.

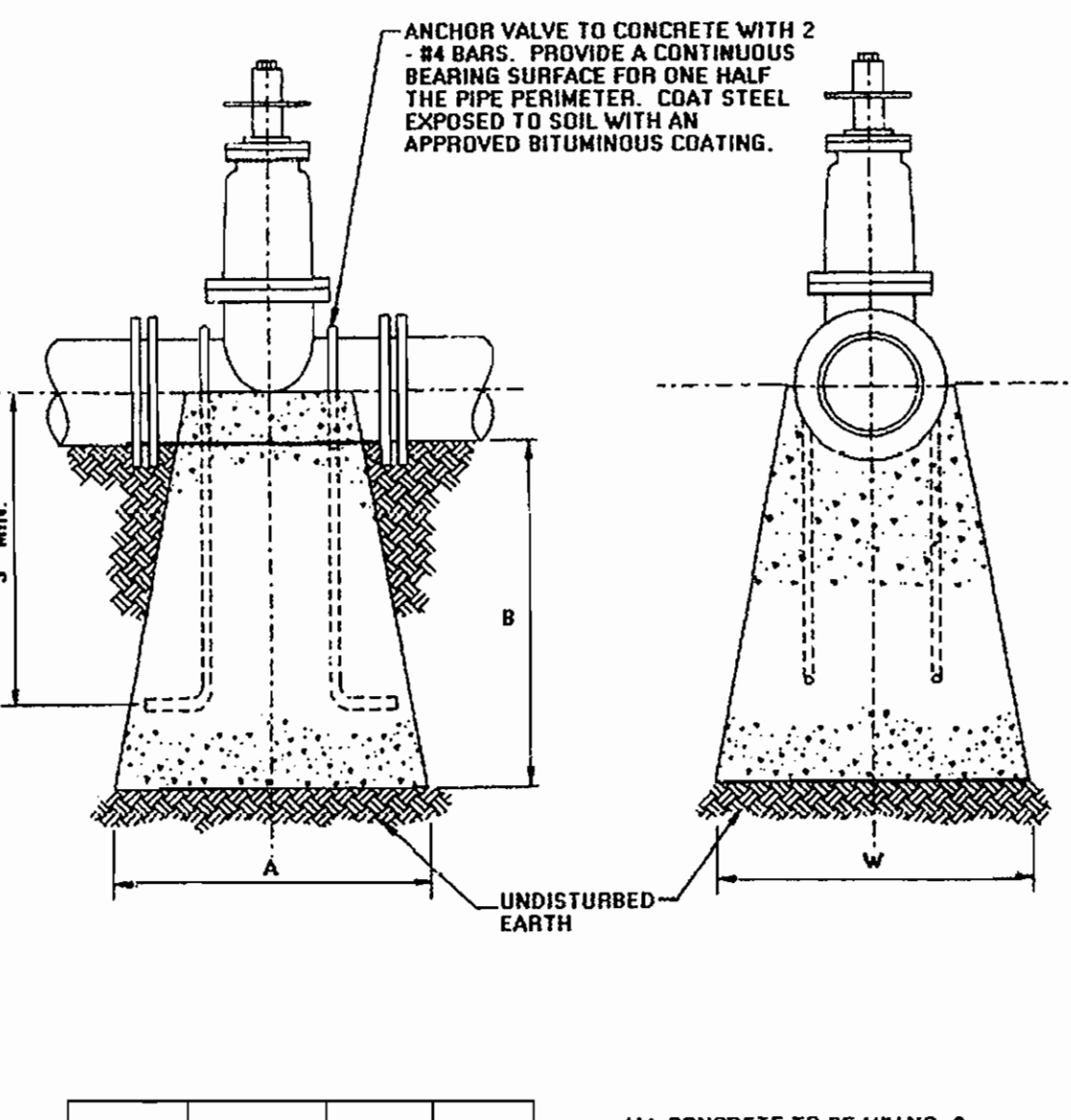
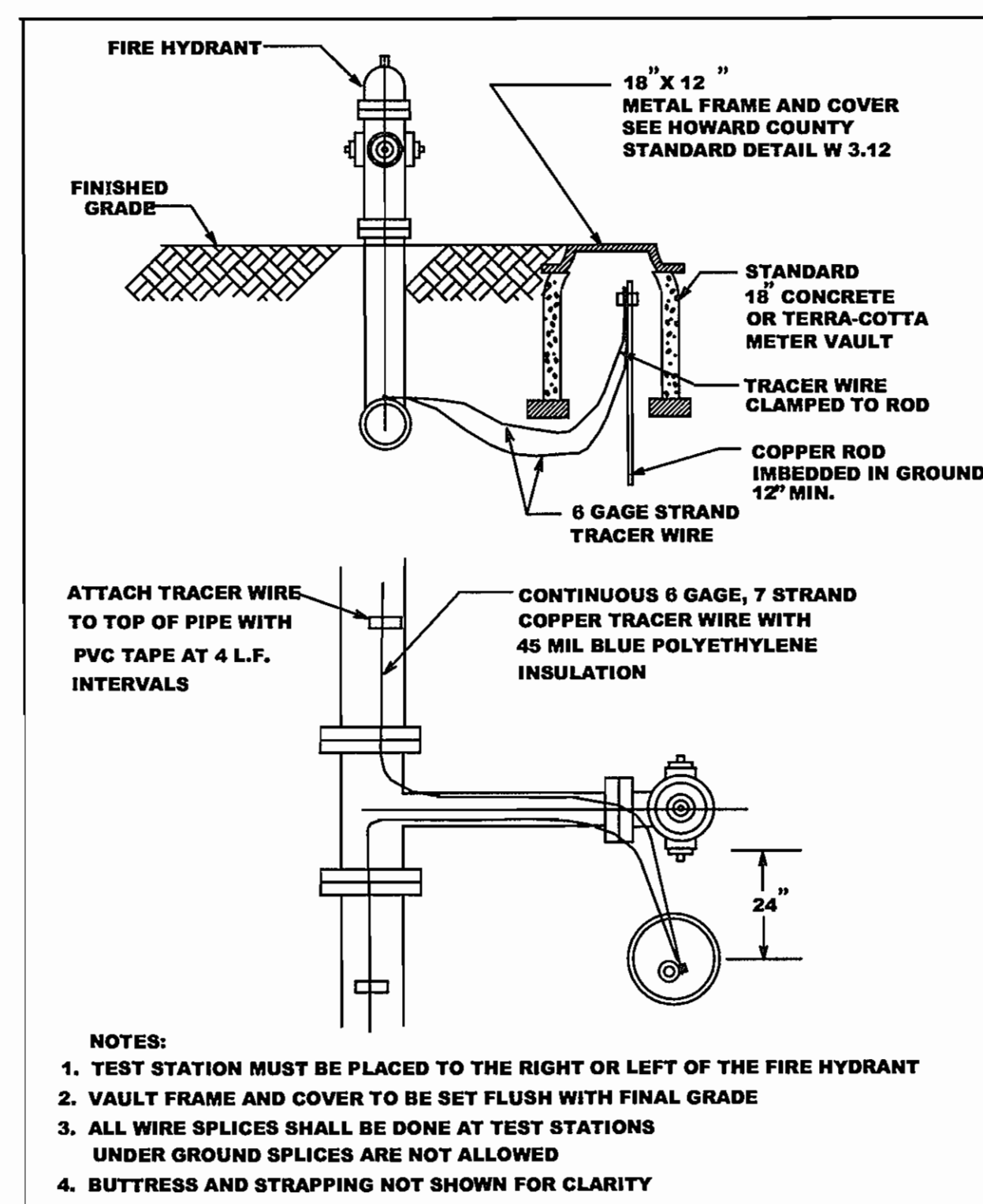
MATERIALS

The Engineer will inspect all materials before, during and after installation to ensure compliance with the Contract Documents. When specific tests of materials are called for in the referenced standards and specifications, the Engineer has the option of requiring that any or all of these tests be performed for the specified materials.

- PVC pipe and fittings:
 - PVC pipe 4 inches through 12 inches in diameter shall be manufactured in 20-foot lengths in accordance with AWWA C900 with cast/ductile iron pipe equivalent outside diameters. Pipe shall have a dimension ratio (DR) of 18, pressure class of 150 psi, and shall utilize elastomeric-gasketed push-on joints for joining pipes in accordance with AWWA C900. Pipe, gaskets, and gasket lubricant shall be suitable for potable water systems and shall meet NSF 61. All PVC pipe shall be factory marked on the spigot end for depth of insertion into the bell and factory tested in accordance with AWWA C900. PVC pipe shall be manufactured by one of the following:
 - Uponor ETI
 - J-M Pipe
 - Diamond Plastics Corp
 - National Pipe and Plastics, Inc.
 - Fittings for use with PVC water mains shall be ductile iron in accordance with the Standard Specifications or PVC fittings. PVC fittings shall have push-on rubber gasketed joints, be injection-molded meeting AWWA C907, pressure class 150; or fabricated meeting AWWA C900, Class 200. PVC fittings shall be manufactured by the Harrington Corporation (Harco) or approved equal. Pipe joints shall be in accordance with the standards specified for the pipe and fittings.
 - Pipe couplings for PVC and ductile iron water mains shall be suitable for potable water service and shall have epoxy or nylon coated ductile iron center and end rings. Pipe couplings shall be Romac Style 501, Ford FC2W or approved equal.
- Joint restraining materials for PVC pipe:
 - Horizontal and vertical bends, tees, caps and fittings shall be buttressed or anchored in accordance with the Plans, the Standard Specifications and Details for Construction, or as directed by the Engineer. Valves, when connected to PVC pipe, shall be iron body resilient seat gate valves and anchored in accordance with the detail shown on the Plans and shall have one full length of pipe on each side of the valve.
 - Joint restraints for harnessing joints shall be in accordance with the Standard Specifications and the requirements below:
 - All joint restraint devices shall be Factory Mutual approved.
 - In restrained joints, PVC pipe shall not be deflected. If deflection is required in a restrained joint, use ductile iron pipe or fittings.
 - Where a restrained joint is required between PVC pipe and a fitting, the fitting shall be ductile iron mechanical joint. Joint restraint for this joint shall meet ASTM F1674 and shall be UniFlange Series 1500, EBAA Iron series 2000PV, or approved equal.
 - Where a restrained joint is required for PVC push-on joint, joint restraint shall be Uni-B-13, ICM 620 Sur-Orip, EBBA Iron Series 1600, UniFlange Series 1390-C, or approved equal.
- Tracer Wire for Non Metallic Pipelines:
 - Tracer wire shall be 6-gage, 7-strand continuous copper wire with a 45-mil polyethylene insulation. The wire shall be blue, have "UL" markings and suitable for direct bury applications.
- Continuity Test Station:
 - Continuity test stations shall be located adjacent to each fire hydrant within the public easement for locating PVC water mains. The test station shall be housed in a standard Howard County 18-inch diameter meter vault with an 18"x12" metal frame and cover as shown in the details on the Plans. A 1-inch diameter by 30-inch long copper grounding rod imbedded a minimum of 12 inches into the ground shall be used for the attachment of the tracer wire. The tracer wire shall be fastened to the copper rod using two copper clamps.
 - Detection Tape: Visual Detection Tape shall be 3 inches wide (minimum) metallic blue plastic tape lettered "water" in black graphics.



TRENCH FOR PVC PIPE AND CONTINUITY TEST STATION DETAIL



PIPE SIZE	A	B	W
4"	9"	1'-0"	1'-0"
6"	10"	1'-6"	1'-0"
8"	1'-0"	2'-0"	2'-0"
12"	1'-0"	2'-0"	3'-0"

ALL CONCRETE TO BE MIX NO. 2

NOTES:
 1. TEST STATION MUST BE PLACED TO THE RIGHT OR LEFT OF THE FIRE HYDRANT
 2. VAULT FRAME AND COVER TO BE SET FLUSH WITH FINISHED GRADE
 3. ALL WIRE SPLICES SHALL BE DONE AT TEST STATIONS UNDER GROUND SPLICES ARE NOT ALLOWED
 4. BUTTRESS AND STRAPPING NOT SHOWN FOR CLARITY

ANCHORAGES FOR VALVES WITH PVC PIPE

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
 Chief, Bureau of Utilities
 Date: 6/18/07

DEPARTMENT OF PLANNING & ZONING
HOWARD COUNTY, MARYLAND
 Chief, Development Engineering Division
 Date: 6/22/07

Patton Harris Rust & Associates, PC
Engineers, Surveyors, Planners, Landscape Architects.
 PHRA
 8818 Centre Park Drive
Columbia, MD 21046
 T 410.997.8900
 F 410.997.9282

DOMENICK W. COLANGELO #27200
 Date: 6/07/07

DES: DWC					
DRN: EMR					
FILE:					
DATE: 6/07/07	BY NO.	REVISION	DATE	600' SCALE MAP NO. 38	BLOCK NO. 12

PVC WATER LINE SPECIFICATIONS AND DETAILS

TIMBER RIDGE
 LOTS 683-688 & 707-720 AND
 OPEN SPACE LOTS 704-A & 706-A
 1st ELECTION DISTRICT
 HOWARD COUNTY, MARYLAND
 CONTRACT NO. 14-4360-D

SCALE AS SHOWN
 SHEET 4 OF 4

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