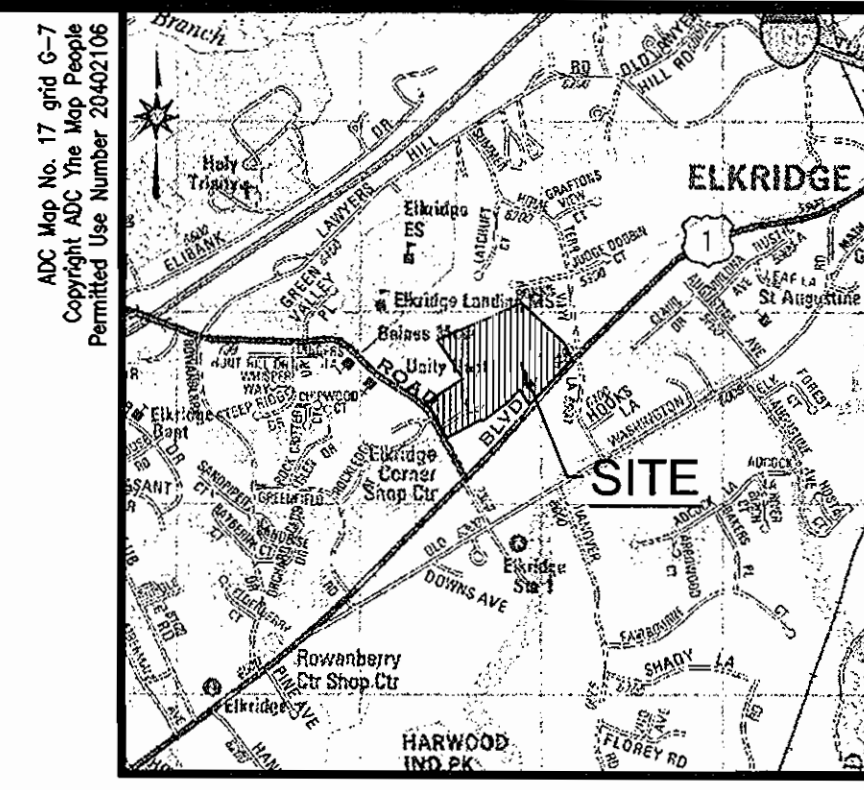


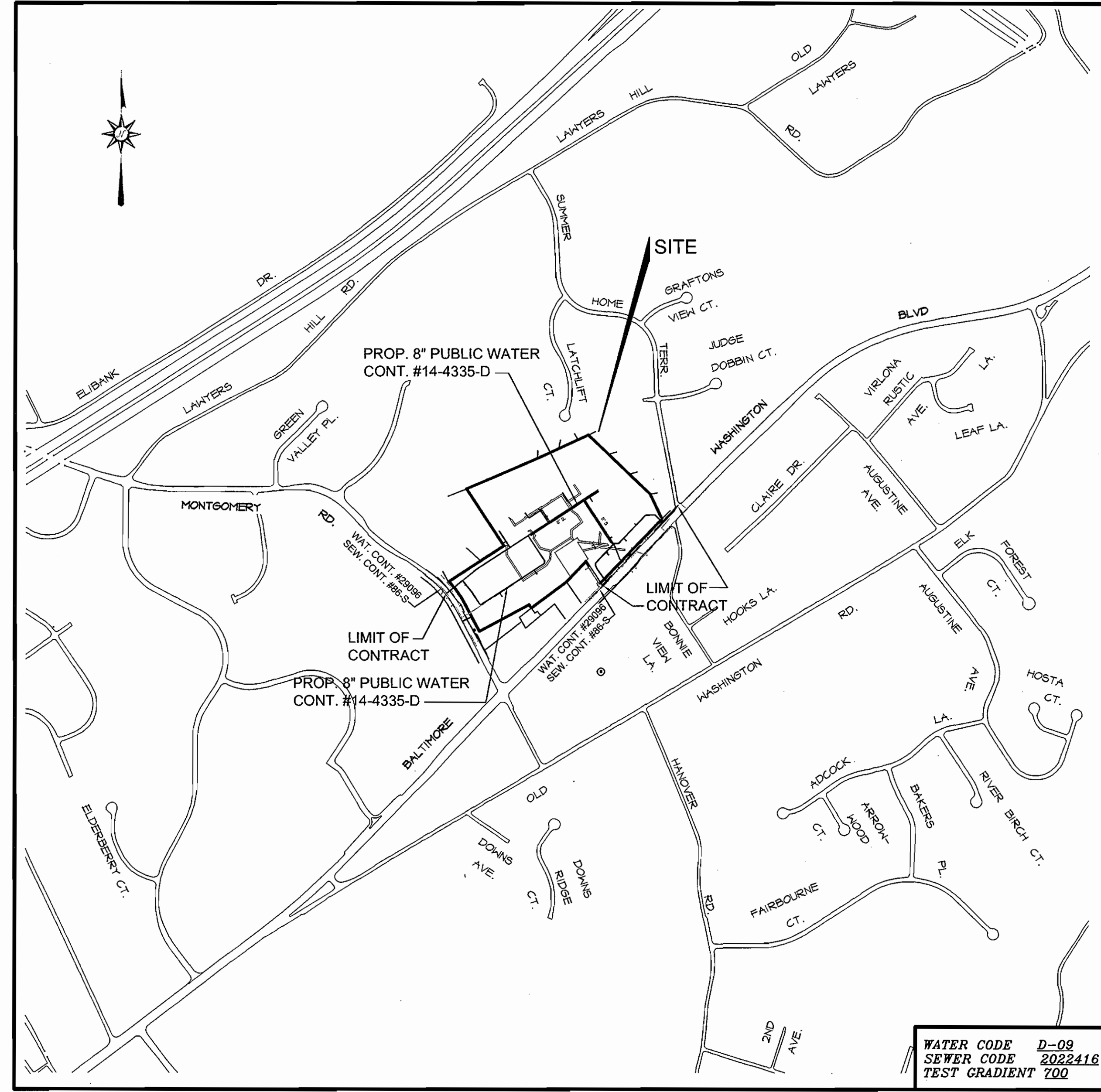
ELKRIDGE CROSSING MONTGOMERY ROAD & WASHINGTON BOULEVARD (U.S. RTE. #1) WATER & SEWER PLAN HOWARD COUNTY, MARYLAND CONTRACT No. 14 - 4335 - D



QUANTITIES				
NAME OF UTILITY CONTRACTOR: AMERICAN INFRASTRUCTURE				
SURVEY AND DRAFTING DIVISION AS-BUILT DATE: OCTOBER 2007				
ITEMS	QUANTITIES ESTIMATED	AS-BUILT		
		QUANTITIES	TYPE	MANUFACTURER/SUPPLIER
8" P.V.C. C-900	4,140 LF	4,078 L.F.	P.V.C. C-900	NORTH AMERICAN/FERGUSON
6" P.V.C. C-900	501 LF	389 L.F.	P.V.C. C-900	NORTH AMERICAN/FERGUSON
6" FM METER	1 EA.	2 EA.	—	MUELLER CO./FERGUSON
8" FM METER	2 EA.	2 EA.	—	MUELLER CO./FERGUSON
FIRE HYDRANT	11 EA.	11 EA.	A-423	MUELLER CO./FERGUSON
12" x 8" T.S. & V.	1 EA.	1 EA.	S/S No. 663	SMITH BLAIR/FERGUSON
8" x 8" TEE	10 EA.	10 EA.	MJ C153	TYLER PIPE/FERGUSON
8" x 6" TEE	9 EA.	9 EA.	MJ C153	TYLER PIPE/FERGUSON
12" x 6" T.S. & V.	1 EA.	1 EA.	S/S No. 663	SMITH BLAIR/FERGUSON
8" VALVE	14 EA.	15 EA.	GV OR	MUELLER CO./FERGUSON
6" VALVE	15 EA.	14 EA.	GV OR	MUELLER CO./FERGUSON
8" CAP & BUTTRESS	7 EA.	5 EA.	MJ C153	TYLER PIPE/FERGUSON
1/64 H.B. 8"	2 EA.	2 EA.	MJ C153	TYLER PIPE/FERGUSON
1/32 H.B. 8"	3 EA.	3 EA.	" "	" / "
1/16 H.B. 8"	1 EA.	1 EA.	" "	" / "
1/8 H.B. 8"	11 EA.	11 EA.	" "	" / "
1/8 V.B. 8"	4 EA.	4 EA.	" "	" / "
1/16 V.B. 8"	22 EA.	22 EA.	" "	" / "
1/32 V.B. 8"	1 EA.	1 EA.	" "	" / "
1/64 V.B. 8"	1 EA.	1 EA.	" "	" / "
1" BALL VALVE	88 EA.	88 EA.	H15425	MUELLER CO./FERGUSON
3/4" INSIDE METER	88 EA.	—	—	— / —
1 1/2" COPPER	872 LF	880 L.F.	COPPER TYPE K	MUELLER CO./FERGUSON
8" P.V.C. SEWER	1,378 LF	1,358 L.F.	P.V.C. SDR35	NORTH AMERICAN/FERGUSON
MANHOLES 4'	11 EA.	11 EA.	CONC. PRECAST	FREDERICK PRECAST CONC. INC.
8" x 4" TEE	8 EA.	8 EA.	MJ C153	TYLER PIPE/FERGUSON
4" VALVE	8 EA.	8 EA.	GV OR	MUELLER CO./FERGUSON
4" PVC C-900	480 LF	229 L.F.	P.V.C. C-900	NORTH AMERICAN/FERGUSON

HOWARD COUNTY BENCHMARKS				
NO.	NORTHING	EASTING	ELEV.	DESCRIPTION
3849	561,056.341	1,389,634.145	223.417	BRASS DISK ON CONC. MONUMENT IN GRASS PLOT ON SOUTHEAST SIDE OF U.S. RTE. #1 AND MONTGOMERY ROAD.
361B	562,553.293	1,390,967.941	166.939	BRASS DISC ON CONC. MONUMENT ON WEST SIDE OF RTE. #1 APPROXIMATELY 100' NORTH OF BONNIE VIEW LANE.

1" COPPER	453 LF	449 L.F.	COPPER TYPE K	MUELLER INR./FERGUSON
1 1/2" x 1" WYE	40 EA.	40 EA.	TWIN SER. CONN.	MUELLER CO./FERGUSON



- 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.
 - TOPOGRAPHIC FIELD SURVEYS WERE PERFORMED ON APRIL, 2004 BY HILDENBERG-BOENDER ASSOCIATION SURVEY FIRM.
 - HORIZONTAL AND VERTICAL SURVEY CONTROLS: THE COORDINATES SHOWN ON THE DRAWINGS ARE BASED ON MARYLAND STATE REFERENCE SYSTEM AND '83/91 AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATIONS NO. 3849, NO. 361A.
 - ALL VERTICAL CONTROLS ARE BASED ON NAVD '88. VERTICAL CONTROLS PROVIDED ON THE DRAWINGS ARE BRASS DISKS ON CONCRETE MONUMENTS.
 - 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 DETAILS 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 'E' AT THE LOCATIONS OF THE TEST PITS. 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 MADE 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
 - BCE (CONSTRUCTION SERVICES).....410-850-4620
 - BCE (EMERGENCY).....410-885-1400
 - BUREAU OF UTILITIES.....410-313-4900
 - COLONIAL PIPELINE CO.....410-795-1390
 - MSS UTILITY.....1-800-227-7777
 - 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 18.11(A) OF THE HOWARD COUNTY CODE.

- PART II WATER
- ALL WATER MAINS SHALL BE AWWA C900 P.V.C. UNLESS OTHERWISE NOTED.
 - TOPS 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 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 SECTION 1005 OF THE STANDARD SPECIFICATIONS.
 - THE CONTRACTOR SHALL NOT OPERATE ANY WATER MAIN VALVES ON THE EXISTING WATER SYSTEM.
 - FOR SPRINKLER SYSTEM FOR ALL TOWNHOMES OR MULTI-FAMILY DWELLING UNITS SHOULD HAVE A 1 1/2" CONNECTION WITH A 1" METER.
- PART III SEWER
- ALL SEWER MAINS SHALL BE D.I.P. OR 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 18" WALLS ARE FOR BRICK MANHOLES ONLY.
 - MANHOLES DESIGNATED W.T. IN PLAN AND PROFILE SHALL HAVE WATER TIGHT FRAME AND COVER, STANDARD DETAIL 05.52. WHERE WATER TIGHT MANHOLE FRAMES AND COVERS ARE 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 THE CELLAR CANNOT BE SERVED.

- THE GENERAL NOTES ARE AMENDED TO INCLUDE THE FOLLOWING
- ALL DUCTILE IRON PIPES TO BE USED ON THE PUBLIC WATER SYSTEM SHALL BE CLASS 54. DUCTILE IRON FITTINGS SHALL MEET THE REQUIREMENTS OF THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION AND SHALL BE EXTERIOR EPOXY COATED IN ACCORDANCE WITH AWWA C106.
 - ALL WATER HOUSE CONNECTIONS SHALL BE COPPER MEETING THE REQUIREMENTS OF AND CONSTRUCTED IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
 - ALL FIRE HYDRANT LEADS INCLUDING THE TEE SHALL BE DUCTILE IRON CLASS 54 MEETING THE REQUIREMENTS OF AND CONSTRUCTED IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
 - ALL WATER MAINS CONSTRUCTED IN FILL AREAS 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.
 - 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 ANCHORAGES FOR VERTICAL BENDS. "WHEN ANCHORING PVC PIPE, THE STRAPPING IN CONTACT WITH THE PIPE SURFACE SHALL BE 1-INCH WIDE BY 1/4-INCH THICK STEEL. THE REMAINING PORTION OF THE STRAP SHALL BE REINFORCING BAR SIZED IN ACCORDANCE WITH THE PERTINENT CHART SHOWN ON THE DETAIL."
 - EXCEPT AS INDICATED ON THE PLANS AND NOTED ABOVE, ALL PUBLIC WATER MAINS SHALL BE POLYVINYL CHLORIDE (PVC) PIPE MEETING THE REQUIREMENTS OF AWWA C900 PIPE PRESSURE CLASS 150 AND THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION AND ALL SUBSEQUENT AMENDMENTS THERETO.

TYPE OF BUILDING.....	RESIDENTIAL\COMMERCIAL
No. OF UNITS\PARCELS.....	130
No. OF WATER HOUSE CONNECTIONS.....	100
No. OF SEWER HOUSE CONNECTIONS.....	2
DRAINAGE AREA.....	PATAPSCO
TREATMENT PLANT.....	PATAPSCO

NOTE: THE MATERIAL TO BE USED FOR THE WATER MAIN CONSTRUCTION IS C-900 PVC. ALL DEFLECTIONS, VERTICAL & HORIZONTAL, MUST BE USING BENDS & AND NOT CRIMPS. THE JOINTS IN C-900 PIPE CANNOT BE DEFLECTED.

SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED IN ACCORDANCE WITH SECTION 219 OF THE SPECIFICATIONS AND WITH SITE DEVELOPMENT PLAN SDP-04-017

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

REVIEWED FOR HOWARD COUNTY SOIL CONSERVATION DISTRICT AND MEETS TECHNICAL REQUIREMENTS.

John K. Roberts 6/29/06
SOIL CONSERVATION DISTRICT DATE

Jim Myer 6/29/06
U.S. SOIL CONSERVATION DISTRICT DATE

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

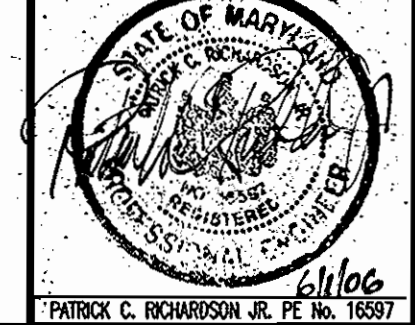
DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND

Robert Benner 6.9.06
CHIEF, BUREAU OF UTILITIES DATE

[Signature] 6/29/06
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Richardson Engineering, LLC

110 Old Podonia Road, Suite 1C
Cockeysville, Maryland 21030
Phone: 410-560-1502 Fax: 410-560-0827



DES: CND	PCR	1	BUILDINGS A, B & TOWNHOUSE CONN.	4/23/07
DRN: CND				
CHK: PCR				
DATE: 2006	BY	NO.	REVISION	DATE

WATER & SEWER PLAN
COVER SHEET

ELKRIDGE CROSSING
CONTRACT #14-4335-D

AS BUILT
DATE: OCTOBER 2007

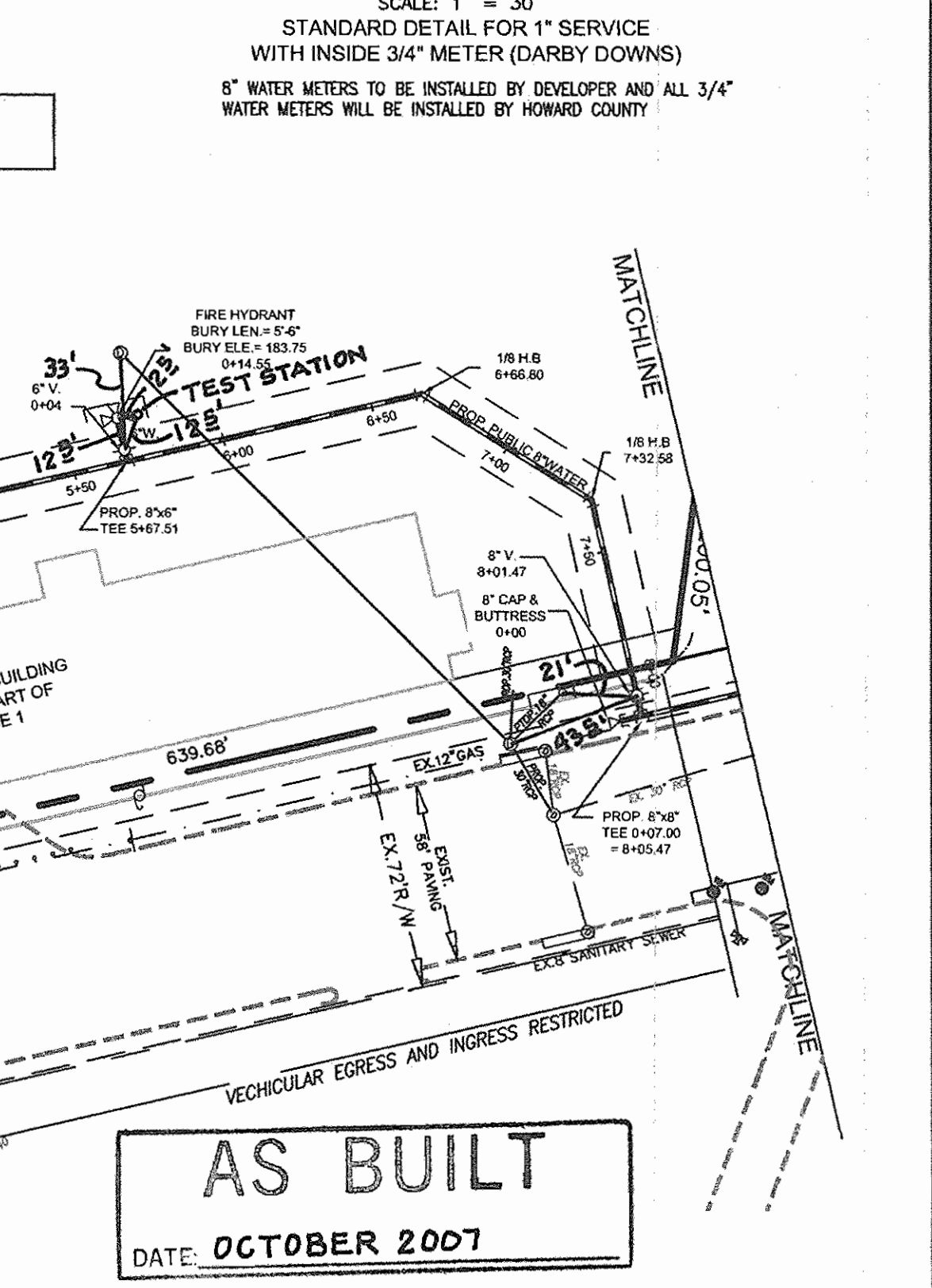
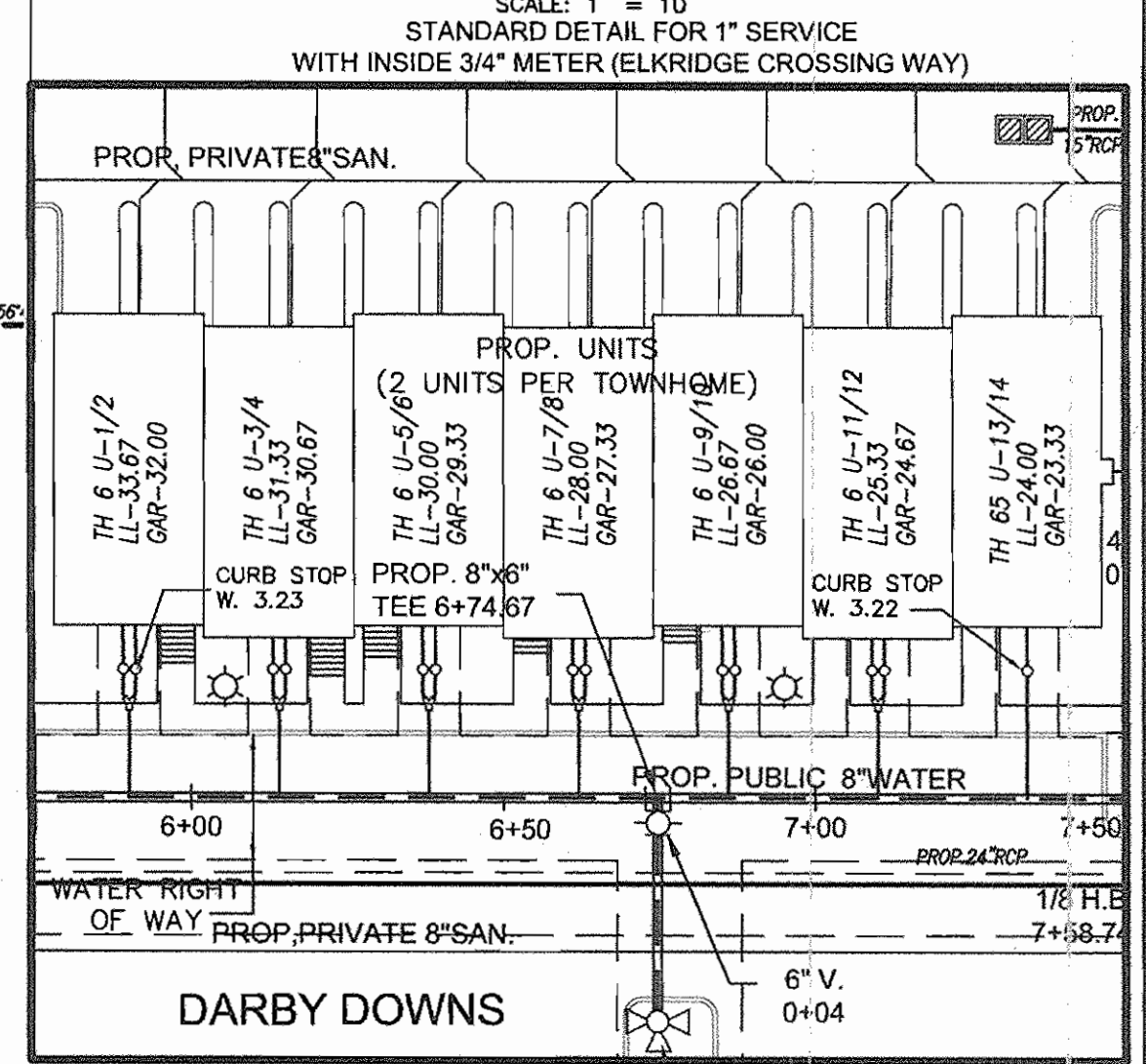
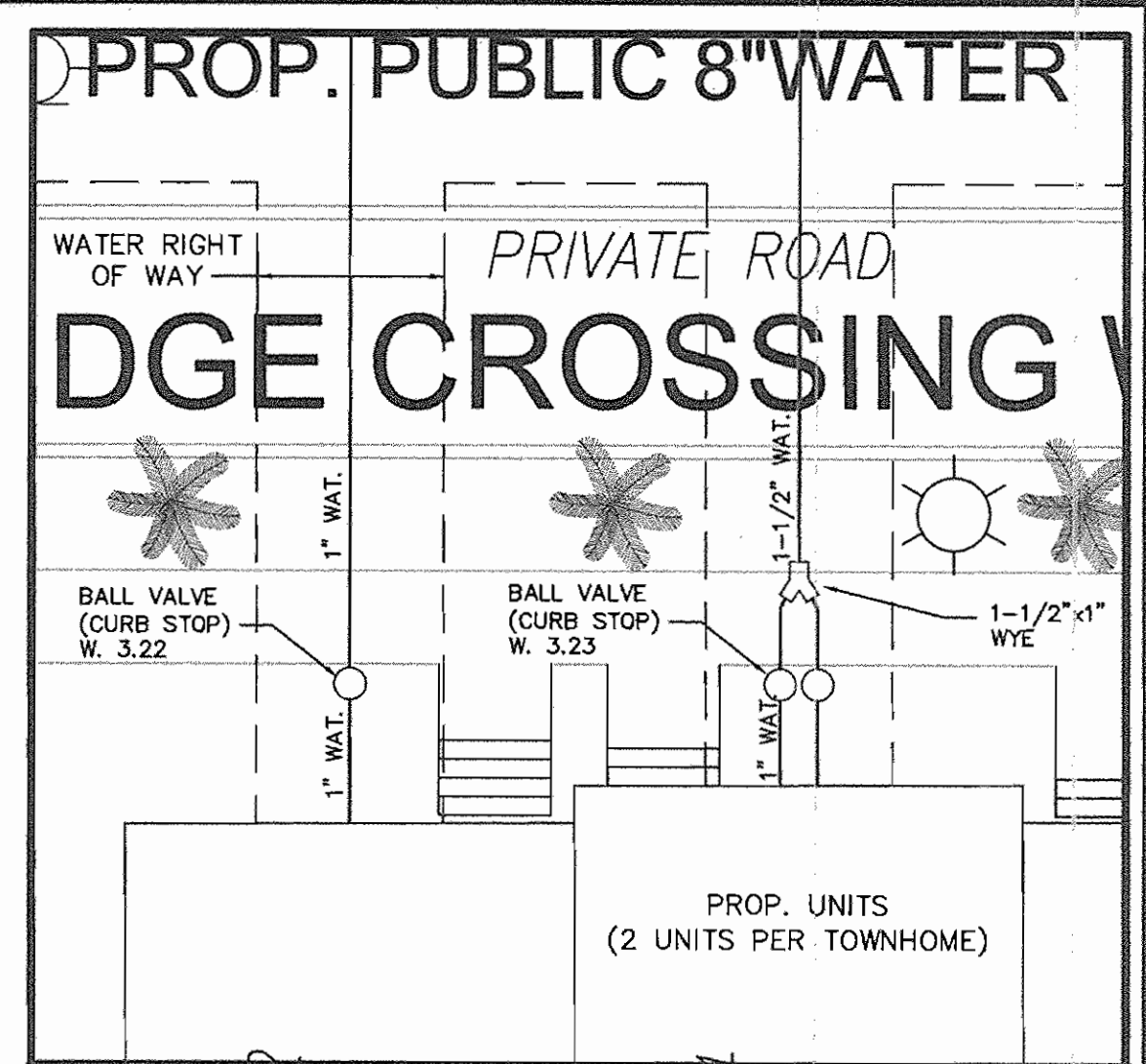
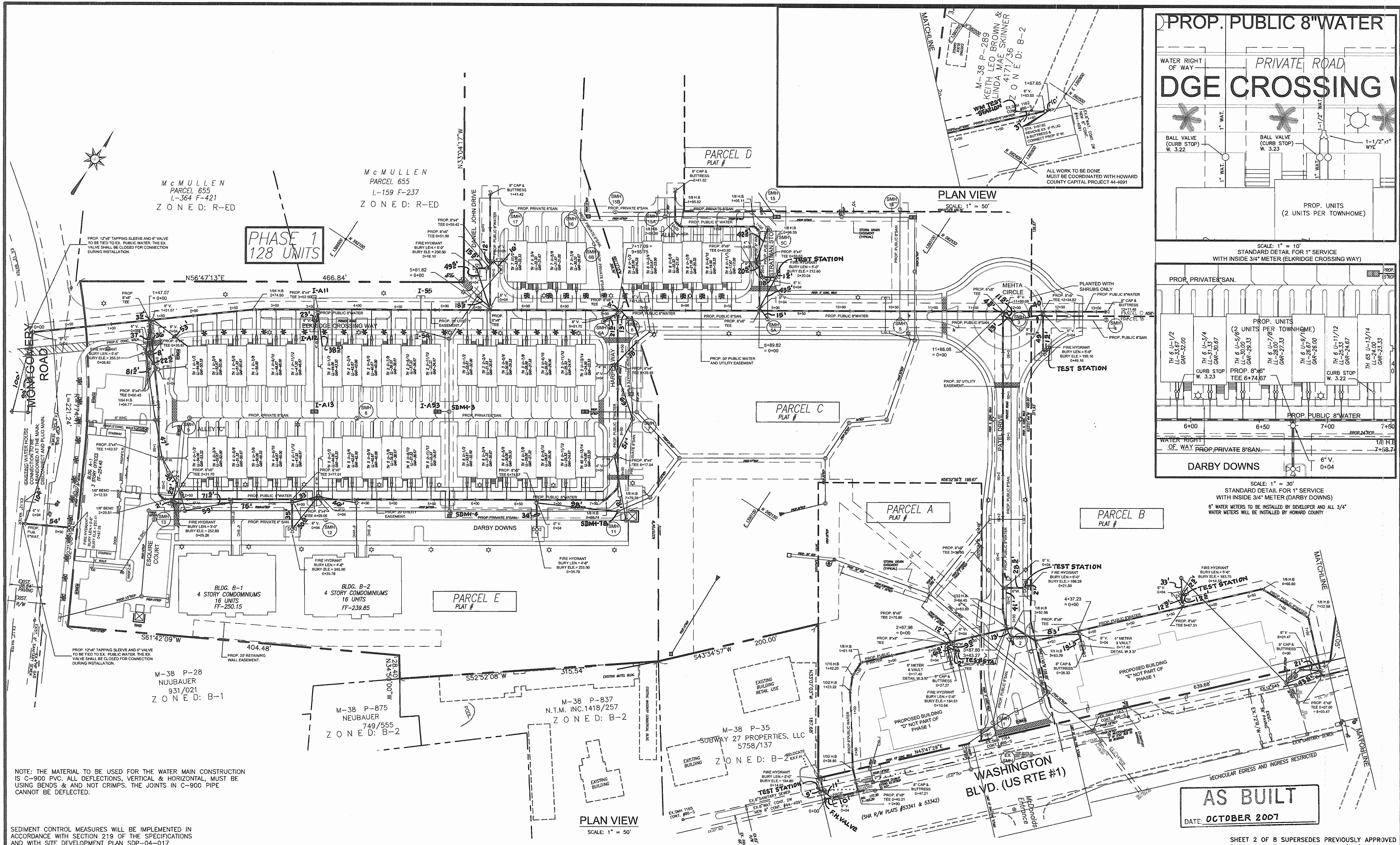
DEVELOPER
BRANTLY DEVELOPMENT GROUP, INC.
8835-P COLUMBIA 100 PARKWAY
COLUMBIA, MARYLAND 21045

SCALE:
AS SHOWN
SHEET:
1 OF 8

TAX MAP #38
1ST ELECTION DISTRICT

PARCEL #30 & 38
HOWARD COUNTY, MARYLAND

600' SCALE MAP #38
BLOCK #2&3



NOTE: THE MATERIAL TO BE USED FOR THE WATER MAIN CONSTRUCTION IS C-900 PVC. ALL DEFLECTIONS, VERTICAL & HORIZONTAL, MUST BE USING BENDS & AND NOT CRIMPS. THE JOINTS IN C-900 PIPE CANNOT BE DEFLECTED.

SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED IN ACCORDANCE WITH SECTION 219 OF THE SPECIFICATIONS AND WITH SITE DEVELOPMENT PLAN SDP-04-017

SHEET 2 OF 8 SUPERSEDES PREVIOUSLY APPROVED SHEET 2 THAT WAS SIGNED ON 06/29/06.

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

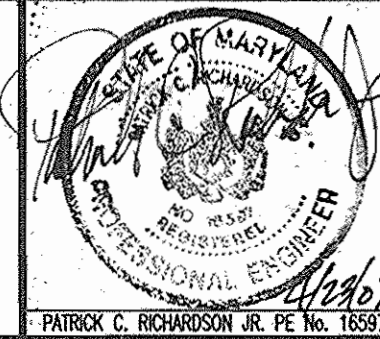
Ruth B.
7-10-07
DATE

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND

Richardson
1/13/07
DATE

Richardson Engineering, LLC

110 Old Patuxent Road, Suite LC
Cockeysville, Maryland 21030
Phone: 410-560-1502 Fax: 410-560-0827



DES: CND	PCR 1	BUILDINGS A,B & TOWNHOUSE CONNECTIONS	4/23/07
DRN: CND	PCR 2	PARCEL LINE PH B&D	10/25/07
CHK: PCR			
MAY 2008	BY NO.	REVISION	DATE

WATER & SEWER
UTILITY PLAN

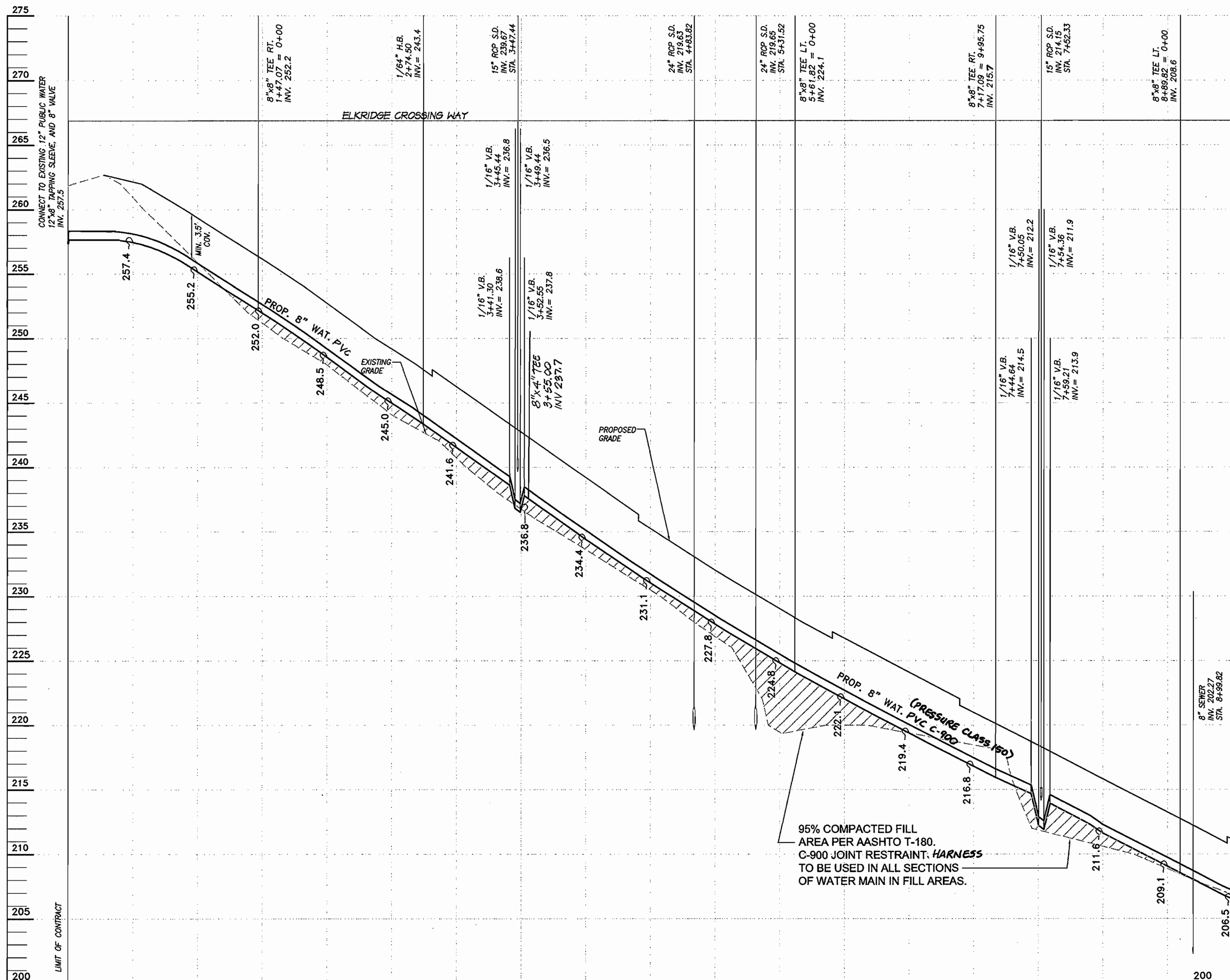
600' SCALE MAP #38
BLOCK #2&3

ELKRIDGE CROSSING MONTGOMERY
ROAD & WASHINGTON BOULEVARD
(U.S. RTE. #1)
CONTRACT #14-4336-D

TAX MAP #38
1ST ELECTION DISTRICT

PARCEL #30 & 38
HOWARD COUNTY, MARYLAND

SCALE: AS SHOWN
SHEET: 2 OF 8



LOT No.	FROM	TO	DISTANCE	LOT No.	FROM	TO	DISTANCE	LOT No.	FROM	TO	DISTANCE
TH2 U 1/2	I-A13	SMH 8	35.7'	TH2 U 10	I-54	WHC	10'	TH3 U 5	SDMH-1	WHC	62'
	SMH 8	SHC	38.3'		I-55	WHC	54.5'		8"V 0+04	WHC	45'
									D.J.D.		
TH2 U 3/4	I-A13	SMH 8	60.7'	TH2 U 11	I-54	WHC	10'	TH3 U 6	SDMH-1	WHC	64.3'
	SMH 8	SHC	28.0'		I-55	WHC	54.5'		8"V 0+04	WHC	47'
									D.J.D.		
TH2 U 5/8	I-A13	SMH 8	81.8'	TH2 U 12	I-54	WHC	18.5'	TH3 U 7	SDMH-1	WHC	77.5'
	SMH 8	SHC	37.8'		I-55	WHC	50.5'		8"V 0+04	WHC	59.3'
									D.J.D.		
TH2 U 7/8	SMH 8	SHC	50.5'	TH3 U 1/2	SDMH 3	SHC	32.9'	TH3 U 8	SDMH-1	WHC	80'
	TH2 U 5/8 SHC	SHC	25'		TH3 U 3/4 SHC	SHC	27.7'		8"V 0+04	WHC	61'
									D.J.D.		
TH2 U 9/10	SMH 8	SHC	77.1'	TH3 U 3/4	SDMH 3	SHC	50'	TH3 U 9	SMH-6A	WHC	71'
	TH2 U 7/8 SHC	SHC	25.3'		TH3 U 1/2 SHC	SHC	27.7'		TH3 U 9 WHC	WHC	4'
									D.J.D.		
TH2 U 1 1/2	TH3 U 1/2 SHC	SHC	40.3'	TH3 U 5/8	SDMH 3	SHC	79.0'	TH3 U 10	SMH-6A	WHC	75'
	TH2 U 3/4 SHC	SHC	25.3'		TH3 U 3/4 SHC	SHC	25.5'		TH3 U 9 WHC	WHC	4'
									D.J.D.		
TH2 U 1/2	4"V 3+52	WHC	38'	TH3 U 7/8	TH3 U 5/8 SHC	SHC	25.5'	TH3 U 11	SMH-6A	WHC	52.3'
	I-A12	WHC	20.0'		TH3 U 9/10 SHC	SHC	25.5'		TH3 U 10 WHC	WHC	20.5'
									D.J.D.		
TH2 U 3	4"V 3+52	WHC	50.5'	TH3 U 9/10	I-A5	SHC	49.5'	TH3 U 12	SMH-6A	WHC	48.0'
	I-A12	WHC	40.0'		TH3 U 1 1/2 SHC	SHC	25.4'		TH3 U 11 WHC	WHC	4'
									D.J.D.		
TH2 U 4	4"V 3+52	WHC	53'	TH3 U 1 1/2	I-A5	SHC	28'	TH3 U 13/4	SMH-6A	WHC	39'
	I-A12	WHC	49.0'		TH3 U 1 3/4 SHC	SHC	25'		TH3 U 12 WHC	WHC	24'
									D.J.D.		
TH2 U 5	4"V 3+52	WHC	69.5'	TH3 U 1 3/4	I-A5	SHC	19.7'	TH4 U 1/2	SMH-9	SHC	15.5'
	I-A12	WHC	69'		TH3 U 1 1/2 SHC	SHC	25'		TH4 U 1/4 SHC	SHC	25.8'
									D.J.D.		
TH2 U 6	4"V 3+52	WHC	73'	TH3 U 1	SDMH-1	WHC	55'	TH4 U 3/4	SMH-9	SHC	30'
	I-A12	WHC	73'		8"V 0+04	WHC	51.3'		TH4 U 1/2 SHC	SHC	25.0'
									D.J.D.		
TH2 U 7	I-54	WHC	40'	TH3 U 2	SDMH-1	WHC	54.5'	TH4 U 5/8	SMH-9	SHC	64.7'
	I-55	WHC	65.5'		8"V 0+04	WHC	45'		TH4 U 3/4 SHC	SHC	20'
									D.J.D.		
TH2 U 8	I-54	WHC	30'	TH3 U 3	SDMH-1	WHC	54'	TH4 U 7/8	SMH-9	SHC	89.4'
	I-55	WHC	63'		8"V 0+04	WHC	41'		TH4 U 5/8 SHC	SHC	24.0'
									D.J.D.		
TH2 U 9	I-54	WHC	18'	TH3 U 4	SDMH-1	WHC	55'	TH4 U 9/10	TH4 U 1/2 SHC	SHC	20.2'
	I-55	WHC	55'		8"V 0+04	WHC	40'		TH4 U 3/8 SHC	SHC	24'
									D.J.D.		

D.J.D. = DANIEL JOHN DRIVE

ELKRIDGE CROSSING WAY WATERLINE

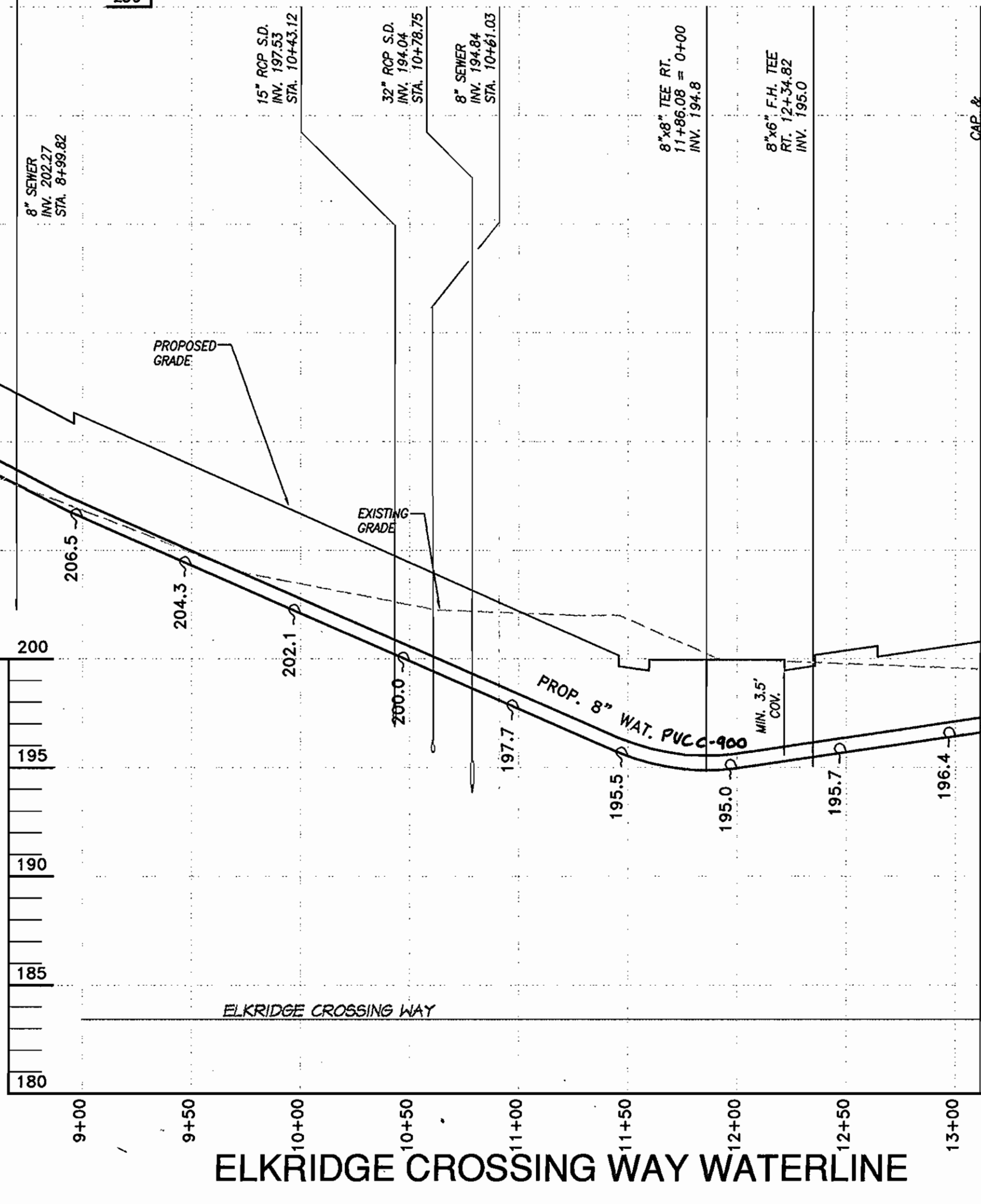
LOT No.	FROM	TO	DISTANCE	LOT No.	FROM	TO	DISTANCE
TH1 U 1/2	SMH 9	SHC	30.5'	TH1 U 1/2	8"V 1+51	WHC	63.7'
	TH1 U 3/4 SHC	SHC	38.4'		8"V 0+04	WHC	63'
TH1 U 3/4	SMH 9	SHC	52'	TH1 U 3	8"V 1+51	WHC	83.0'
	TH1 U 1/2 SHC	SHC	25.5'		8"V 0+04	WHC	85'
TH1 U 5/8	SMH 9	SHC	74'	TH1 U 4	8"V 1+51	WHC	87.02'
	TH1 U 3/8 SHC	SHC	24.3'		8"V 0+04	WHC	88.5'
TH1 U 7/8	I-A13	SHC	69'	TH1 U 5	TH1 U 4 WHC	WHC	20'
	TH1 U 5/8 SHC	SHC	24.3'		TH1 U 4 WHC	WHC	4'
TH1 U 9/10	I-A13	SHC	45.5'	TH1 U 6	4"V 3+52	WHC	100'
	TH1 U 7/8 SHC	SHC	25.0'		I-A12	WHC	93.7'
TH1 U 1 1/2	I-A13	SHC	25'	TH1 U 7	4"V 3+52	WHC	87'
	TH1 U 9/10 SHC	SHC	25.0'		I-A12	WHC	73.8'

LOT No.	FROM	TO	DISTANCE
TH1 U 8	4"V 3+52	WHC	83.7'
	I-A12	WHC	70'
TH1 U 9	4"V 3+52	WHC	65'
	I-A12	WHC	49.8'
TH1 U 10	4"V 3+52	WHC	67'
	I-A12	WHC	45.8'

PROFILES

LOT No.	FROM	TO	DISTANCE
TH1 U 11	4"V 3+52	WHC	40.4'
	I-A12	WHC	27'
TH1 U 12	4"V 3+52	WHC	43.4'
	I-A12	WHC	23.4'

SCALE:
HOR: 1" = 50'
VERT: 1" = 5'



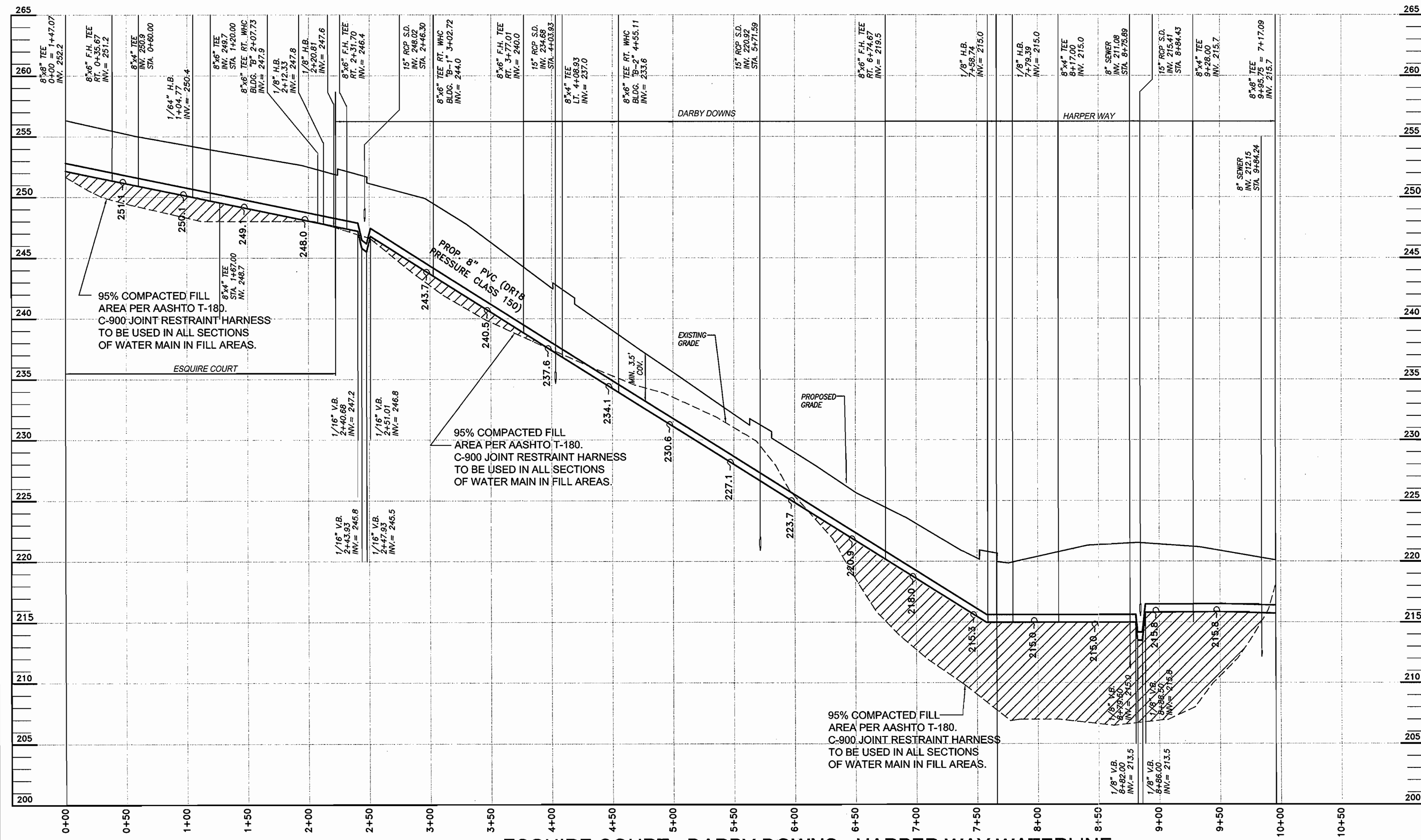
LOT No.	FROM	TO	DISTANCE
TH4 U 1/2	I-A13	SHC	27.5'
	TH4 U 9/10 SHC	SHC	20.2'
TH4 U 1/2	SDMH-9	WHC	40'
	6"V WHC TOB-1	WHC	40'
TH4 U 3	SDMH-9	WHC	53'
	6"V WHC TOB-1	WHC	29'
TH4 U 4	SDMH-9	WHC	50'
	6"V WHC TOB-1	WHC	20.5'
TH4 U 5	6"V WHC TOB-1	WHC	22.5'
	6"V FHV 3+77	WHC	72'
TH4 U 6	6"V WHC TOB-1	WHC	25'
	6"V FHV 3+77	WHC	68.5'
TH4 U 7	6"V WHC TOB-1	WHC	37'
	6"V FHV 3+77	WHC	50'
TH4 U 8	6"V WHC TOB-1	WHC	40.5'
	6"V FHV 3+77	WHC	40'
TH4 U 9	6"V WHC TOB-1	WHC	58'
	6"V FHV 3+77	WHC	29.0'
TH4 U 10	6"V WHC TOB-1	WHC	61.5'
	6"V FHV 3+77	WHC	20.4'
TH4 U 11	6"V WHC TOB-1	WHC	81.5'
	6"V FHV 3+77	WHC	20.5'
TH4 U 12	6"V WHC TOB-1	WHC	85.5'
	6"V FHV 3+77	WHC	22'
TH5 U 1/2	SMH-8	SHC	25.9'
	I-A13	SHC	30'
TH5 U 3/4	SMH-8	SHC	11.3'
	I-A13	SHC	52.0'
TH5 U 5/8	SMH-8	SHC	23.0'
	I-A13	SHC	25.7'
TH5 U 7/8	SMH-8	SHC	44.3'
	TH5 U 5/8 SHC	SHC	25.3'
TH5 U 9/10	SMH-8	SHC	68.7'
	TH5 U 7/8 SHC	SHC	24'
TH5 U 1 1/2	SDMH-3	SHC	29.3'
	I-A53	SHC	19'

AS BUILT
OCTOBER 2007

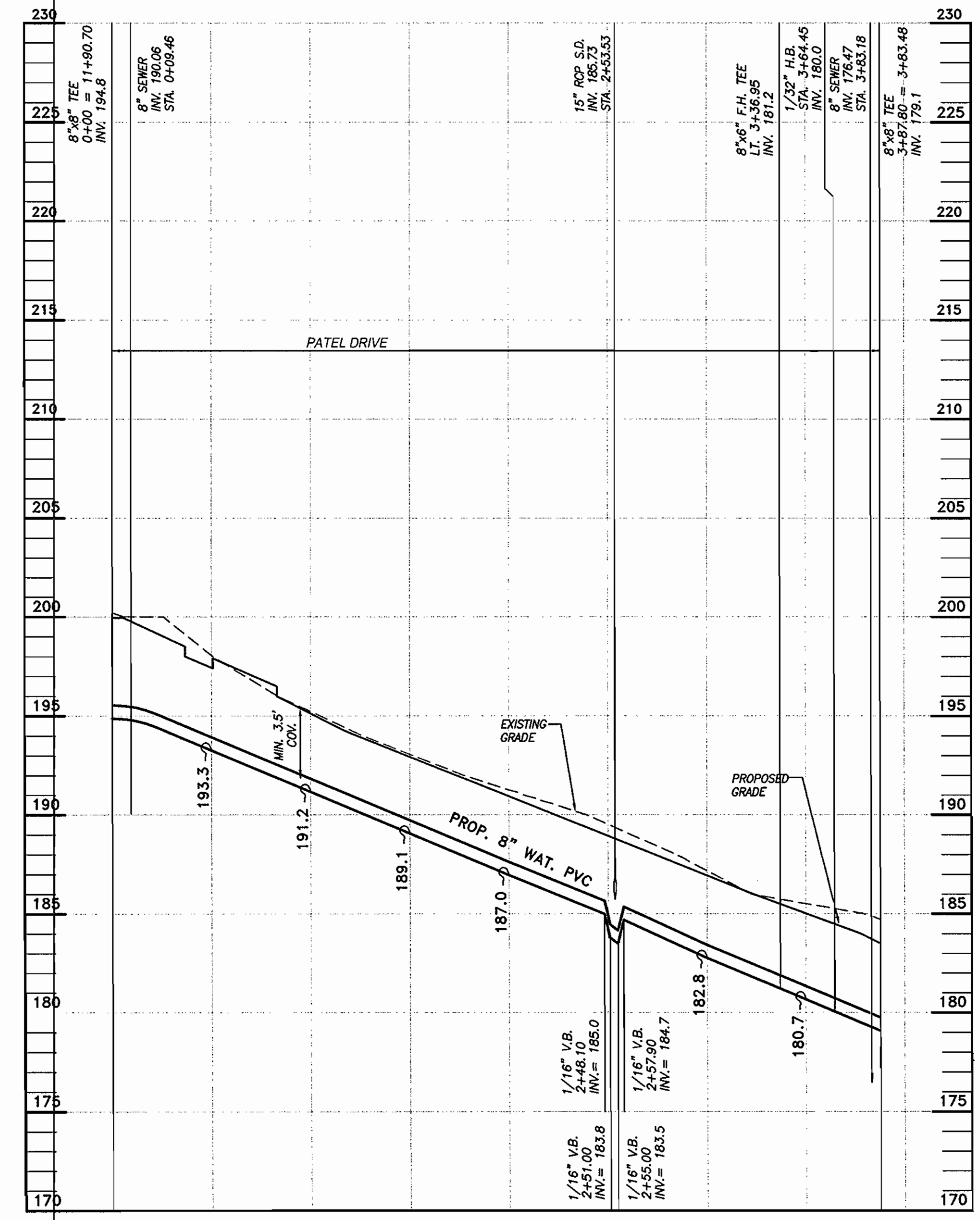
NOTE: THE MATERIAL TO BE USED FOR THE WATER MAIN CONSTRUCTION IS C-900 PVC. ALL DEFLECTIONS, VERTICAL & HORIZONTAL, MUST BE USING BENDS & AND NOT CRIMPS. THE JOINTS IN C-900 PIPE CANNOT BE DEFLECTED.

SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED IN ACCORDANCE WITH SECTION 219 OF THE SPECIFICATIONS AND WITH SITE DEVELOPMENT PLAN SDP-04-017

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND R. J. B... 6-9-06 CHIEF, BUREAU OF UTILITIES	DEPARTMENT OF PLANNING AND ZONING HOWARD COUNTY, MARYLAND [Signature] 6/2/06 CHIEF, DEVELOPMENT ENGINEERING DIVISION	Richardson Engineering, LLC 110 Old Padonia Road, Suite LC Cockeysville, Maryland 21030 Phone: 410-560-1502 Fax: 410-560-0827	DES: CND DRN: CND CHK: PCR MAY 2006 DATE: 2006 BY NO.	PCR 1 BUILDINGS A, B & TOWNHOUSE CONNECTIONS 4/23/07 WATER & SEWER PLAN PROFILES 600' SCALE MAP #38 BLOCK #2&3	ELKRIDGE CROSSING MONTGOMERY ROAD & WASHINGTON BOULEVARD (U.S. RTE. #1) CONTRACT #14-4335-D TAX MAP #38 1ST ELECTION DISTRICT HOWARD COUNTY, MARYLAND PARCEL #30 & 38	SCALE: AS SHOWN SHEET: 3 OF 8
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ESQUIRE COURT - DARBY DOWNS - HARPER WAY WATERLINE



PATEL DRIVE WATERLINE

LOT No.	FROM	TO	DISTANCE	LOT No.	FROM	TO	DISTANCE
TH5U 1/2	SDMH-8	WHC	42.5'	TH5U 8	6" VWHC B-2	WHC	51'
	SMH-12	WHC	46'		SDMH-4	WHC	77'
TH5U 3	SDMH-8	WHC	57.5'	TH5U 9	6" VWHC B-2	WHC	69'
	SMH-12	WHC	54'		SDMH-4	WHC	60'
TH5U 4	SDMH-8	WHC	61'	TH5U 10	6" VWHC B-2	WHC	73'
	SMH-12	WHC	50.5'		SDMH-4	WHC	50.5'
TH5U 5	6" VWHC B-2	WHC	27.5'	TH5U 11	6" VWHC B-2	WHC	92.5'
	SDMH-4	WHC	102'		SDMH-4	WHC	43'
TH5U 6	6" VWHC B-2	WHC	30.5'	TH5U 12	6" VWHC B-2	WHC	97'
	SDMH-4	WHC	99'		SDMH-4	WHC	41.5'
TH5U 7	6" VWHC B-2	WHC	47'				
	SDMH-4	WHC	80.5'				

PROFILES

SCALE:
HORZ: 1" = 50'
VERT: 1" = 5'

LOT No.	FROM	TO	DISTANCE	LOT No.	FROM	TO	DISTANCE
TH5U 1/2	SDMH-3	SHC	30.5'	TH5U 8	6" FHV 6+74	WHC	25'
	TH3U 1/2 SHC	SHC	37.8'		SDMH-4	WHC	102'
TH5U 3/4	SDMH-3	SHC	50.7'	TH5U 9	6" FHV 6+74	WHC	24'
	TH3U 3/4 SHC	SHC	37'		SDMH-7B	WHC	94'
TH5U 5/8	SDMH-3	SHC	74'	TH5U 10	6" FHV 6+74	WHC	20'
	TH3U 5/8 SHC	SHC	24'		SDMH-7B	WHC	91'
TH5U 7/8	I-A5	SHC	75.7'	TH5U 11	6" FHV 6+74	WHC	41'
	TH5U 7/8 SHC	SHC	25'		SDMH-7B	WHC	73'
TH5U 9/10	I-A5	SHC	52.0'	TH5U 12	6" FHV 6+74	WHC	44.5'
	TH5U 9/10 SHC	SHC	23.4'		SDMH-7B	WHC	69'
TH5U 11/12	I-A5	SHC	30.5'	TH5U 13/14	6" FHV 6+74	WHC	64'
	TH5U 11/12 SHC	SHC	25'		SDMH-7B	WHC	51'
TH5U 13/14	I-A5	SHC	19'				
	TH5U 13/14 SHC	SHC	24.0'				

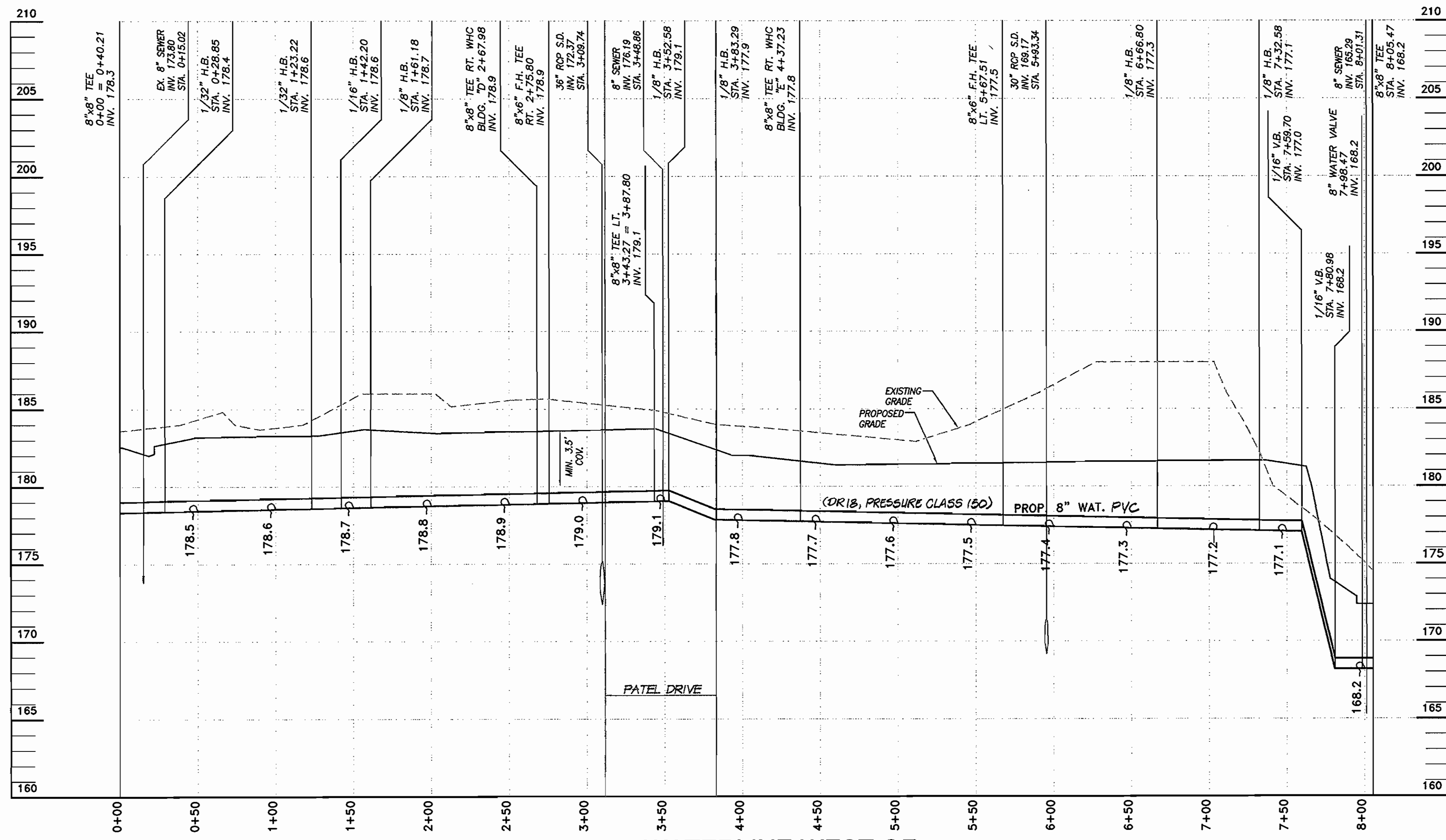
NOTE: THE MATERIAL TO BE USED FOR THE WATER MAIN CONSTRUCTION IS C-900 PVC. ALL DEFLECTIONS, VERTICAL & HORIZONTAL, MUST BE USING BENDS & AND NOT CRIMPS. THE JOINTS IN C-900 PIPE CANNOT BE DEFLECTED.

SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED IN ACCORDANCE WITH SECTION 219 OF THE SPECIFICATIONS AND WITH SITE DEVELOPMENT PLAN SDP-04-017

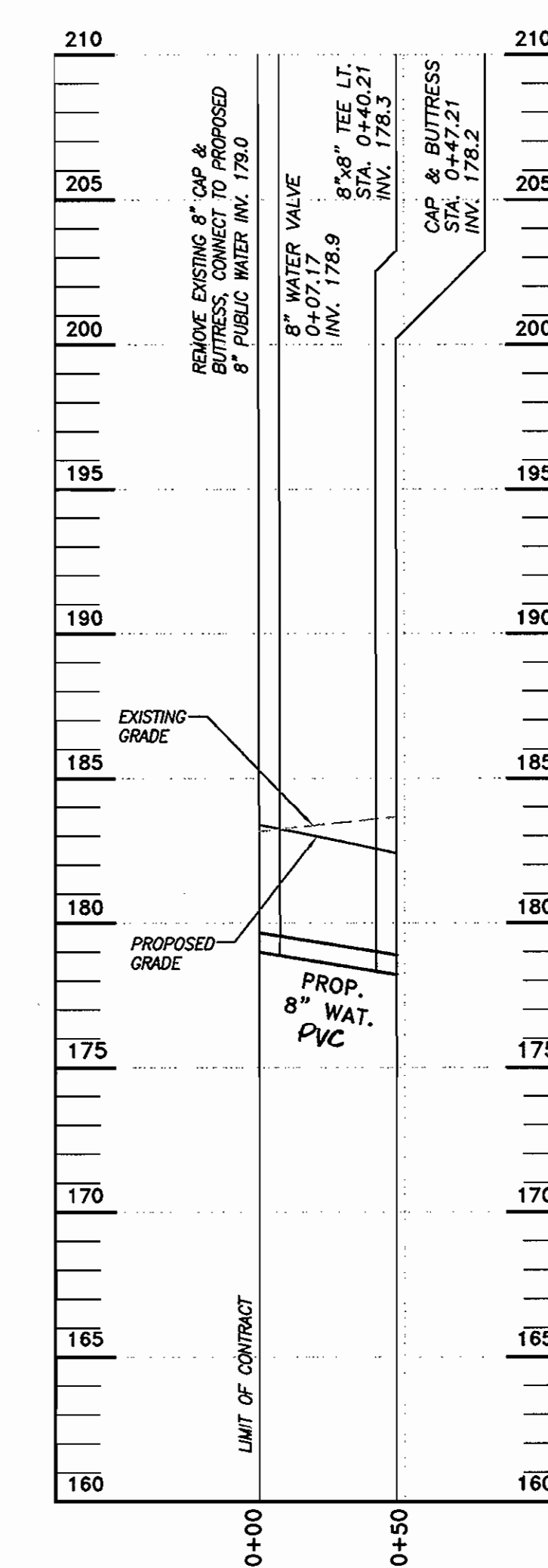
AS BUILT
DATE: OCTOBER 2007

SHEET 4 OF 8 SUPERSEDES PREVIOUSLY APPROVED SHEET 4 THAT WAS SIGNED ON 06/29/06.

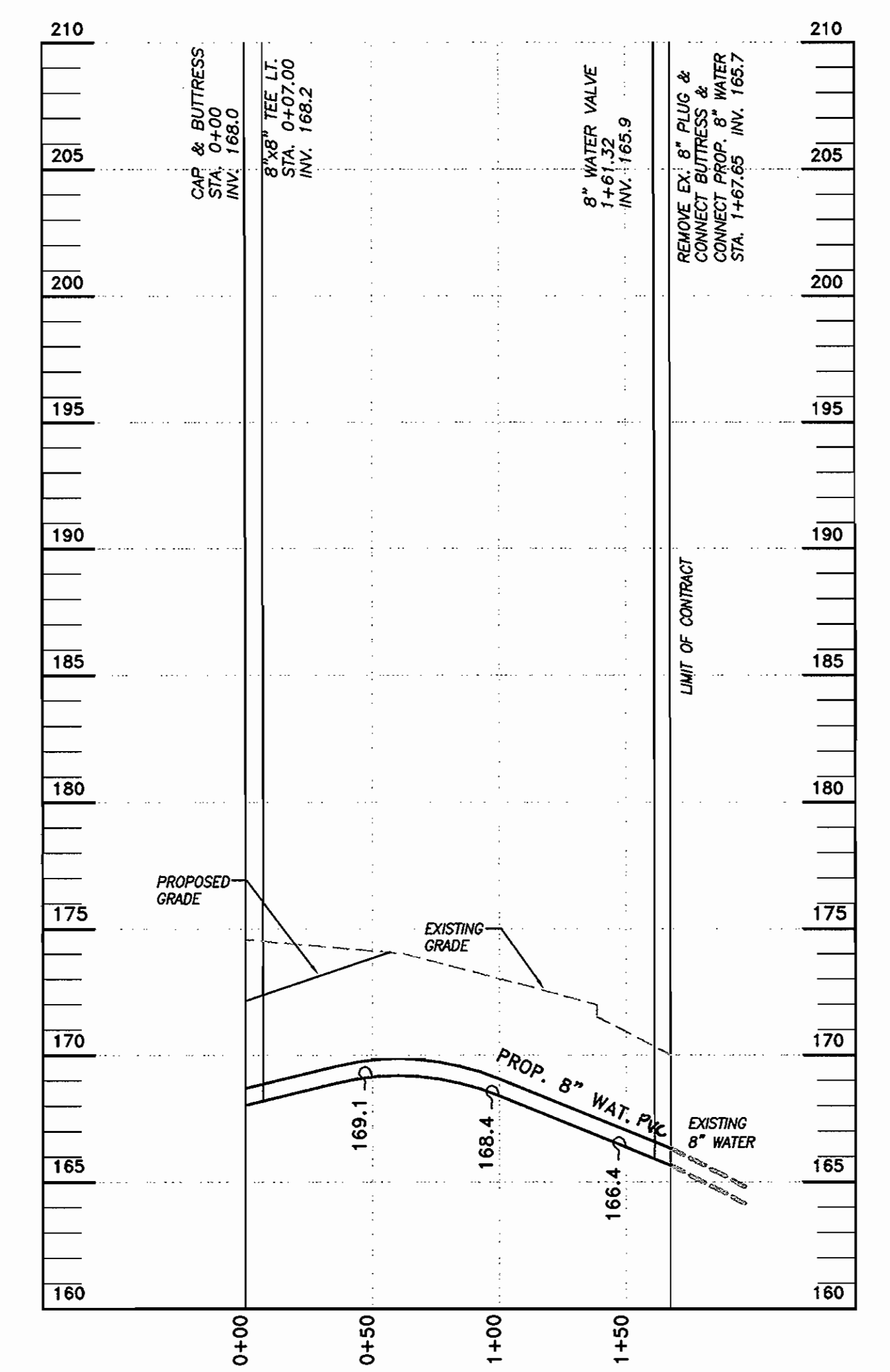
DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND 7-10-07	DEPARTMENT OF PLANNING AND ZONING HOWARD COUNTY, MARYLAND 7/13/07	Richardson Engineering, LLC 110 Old Podonia Road, Suite LC Cockeysville, Maryland 21030 Phone: 410-560-1502 Fax: 410-560-0827		DES: CND DRN: CND CHK: PCR MAY 2006	1 BUILDINGS A,B & TOWNHOUSE CONNECTIONS 4/23/07	WATER & SEWER PLAN PROFILES	ELKCRIDGE CROSSING MONTGOMERY ROAD & WASHINGTON BOULEVARD (U.S. RTE. #1) CONTRACT #14-4335-D	TAX MAP #38 1ST ELECTION DISTRICT HOWARD COUNTY, MARYLAND	SCALE: AS SHOWN SHEET: 4 OF 8
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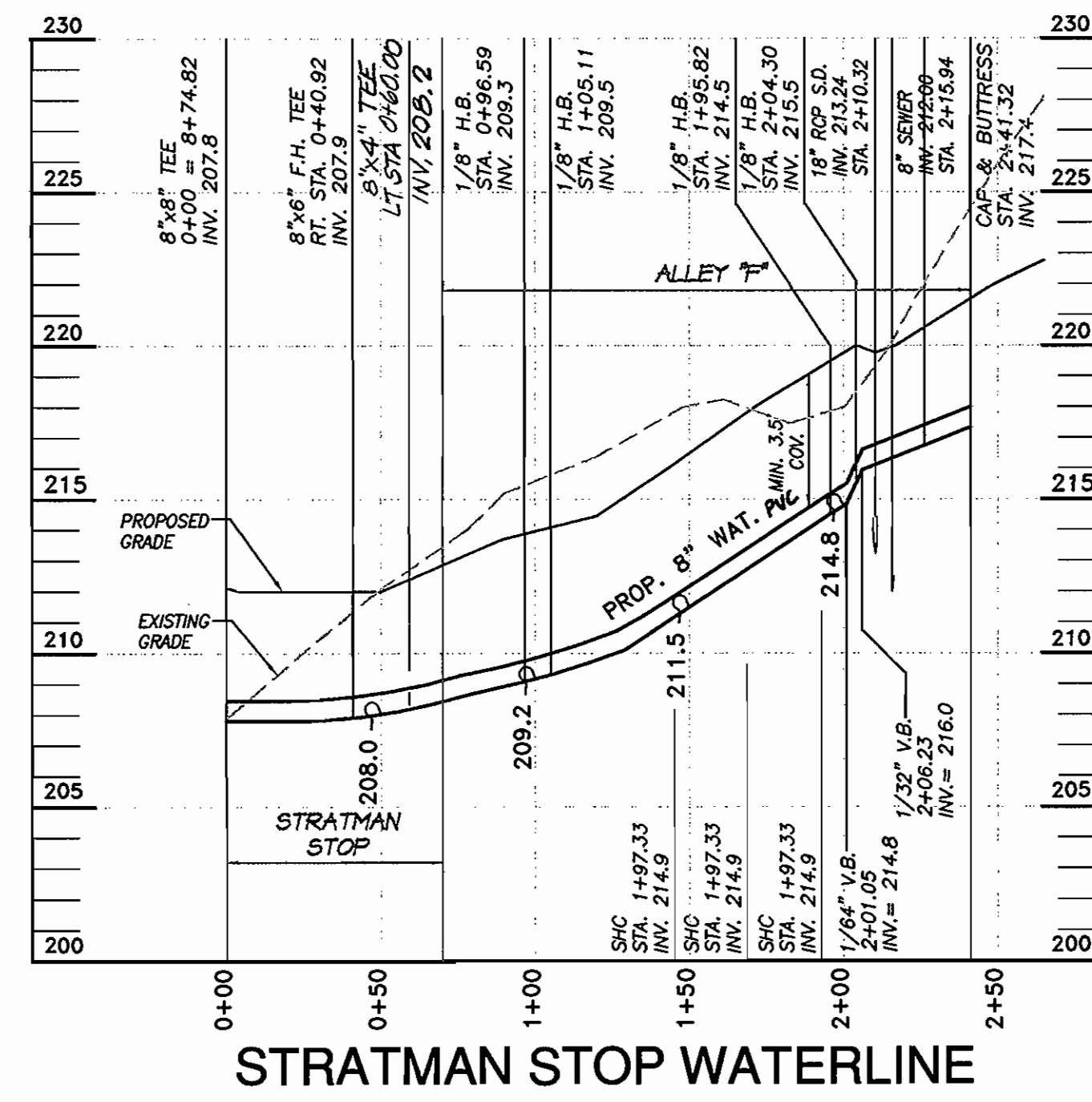
WATERLINE WEST OF WASHINGTON BOULEVARD



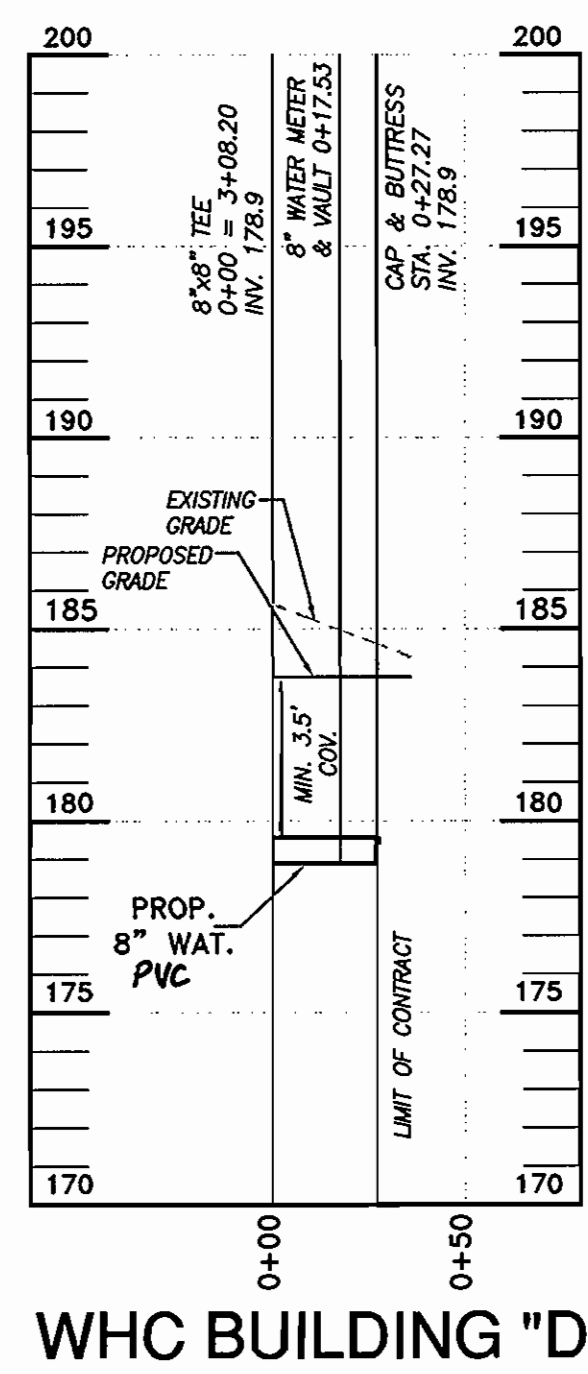
WASHINGTON BOULEVARD WATERLINE (SOUTH OF SITE)



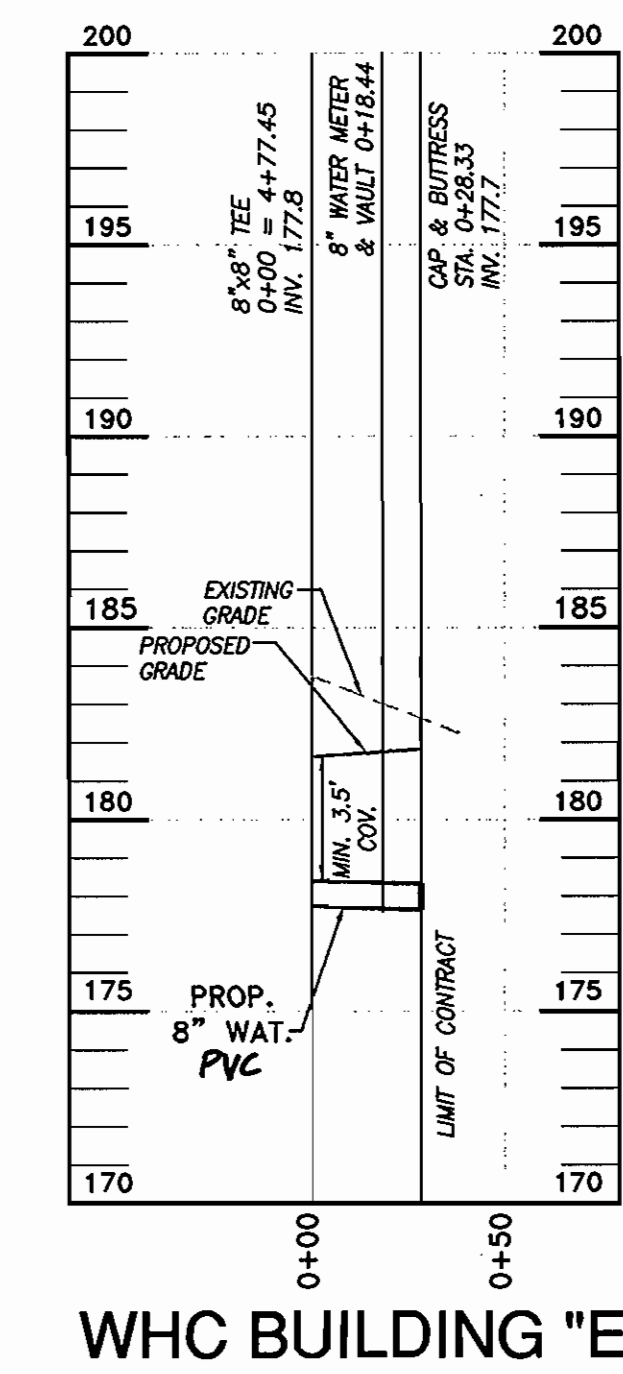
WASHINGTON BOULEVARD WATERLINE (NORTH OF SITE)



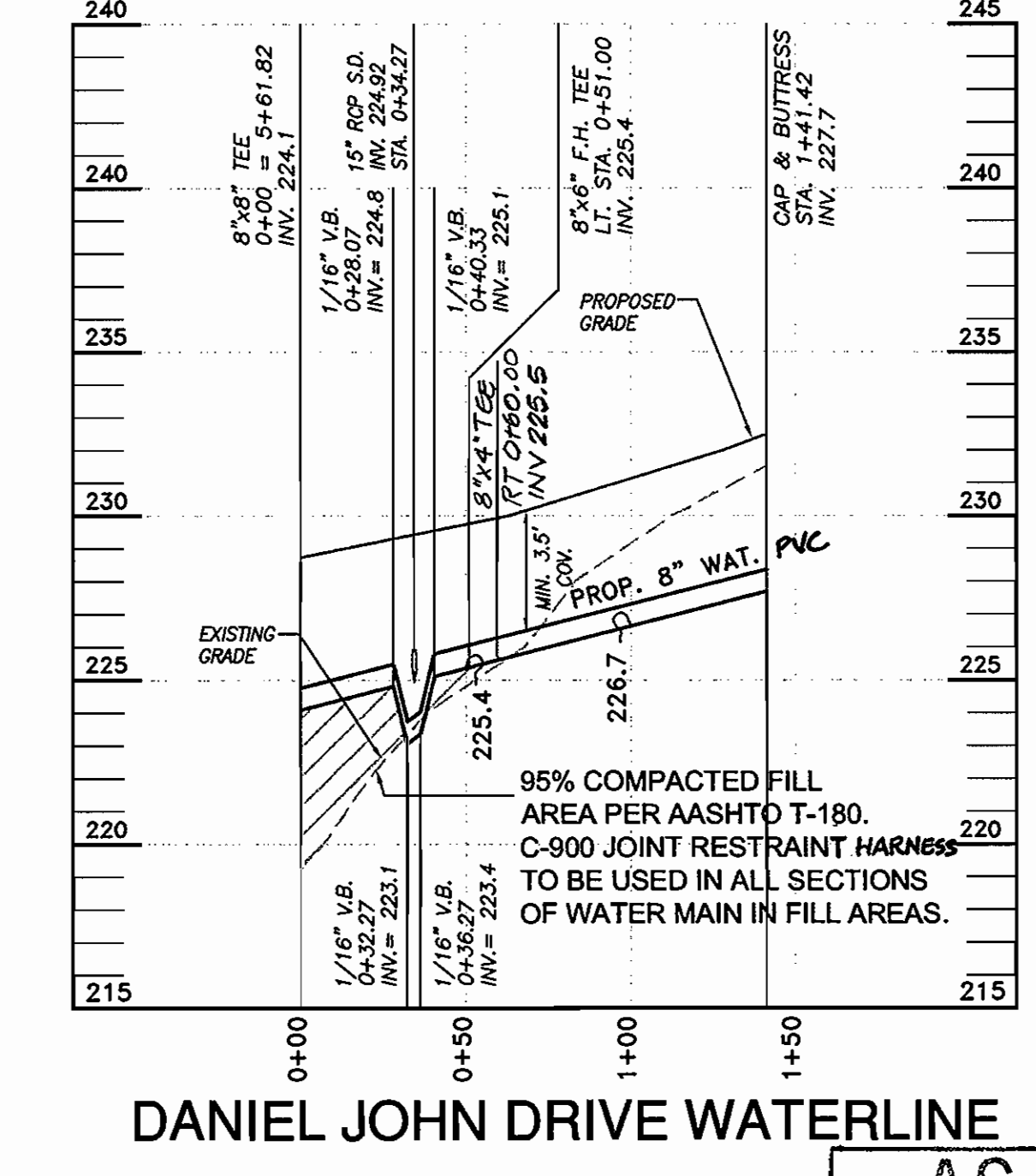
STRATMAN STOP WATERLINE



WHC BUILDING "D"



WHC BUILDING "E"



DANIEL JOHN DRIVE WATERLINE

AS BUILT
DATE: OCTOBER 2007

NOTE: THE MATERIAL TO BE USED FOR THE WATER MAIN CONSTRUCTION IS C-900 PVC. ALL DEFLECTIONS, VERTICAL & HORIZONTAL, MUST BE USING BENDS & AND NOT CRIMPS. THE JOINTS IN C-900 PIPE CANNOT BE DEFLECTED.

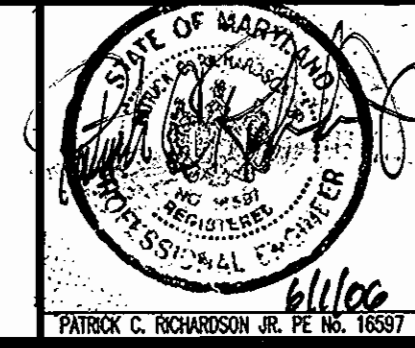
SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED IN ACCORDANCE WITH SECTION 219 OF THE SPECIFICATIONS AND WITH SITE DEVELOPMENT PLAN SDP-04-017

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

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
R. J. B. 6-9-06
CHIEF, BUREAU OF UTILITIES

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND
C. J. B.
CHIEF, DEVELOPMENT ENGINEERING DIVISION

Richardson Engineering, LLC
110 Old Padonia Road, Suite 1C
Cockeysville, Maryland 21030
Phone: 410-560-1502 Fax: 410-560-0827



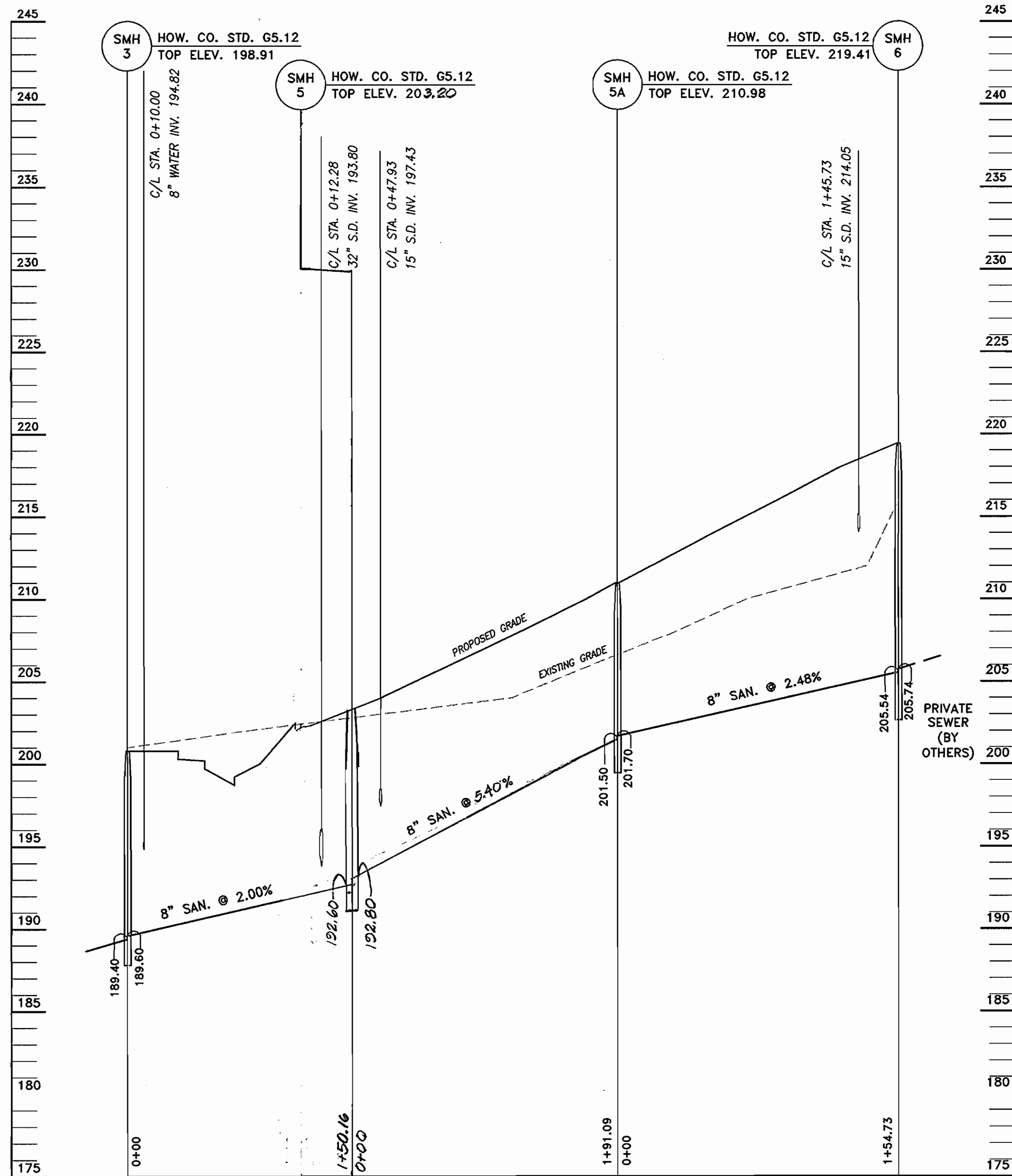
DES: CND	PCR	I	BUILDINGS A, B & TOWNHOUSE CONNECTIONS	4/23/07
DRN: CND				
CHK: PCR				
MAY 2006				
DATE: 2006	BY	NO.	REVISION	DATE

WATER & SEWER PLAN PROFILES

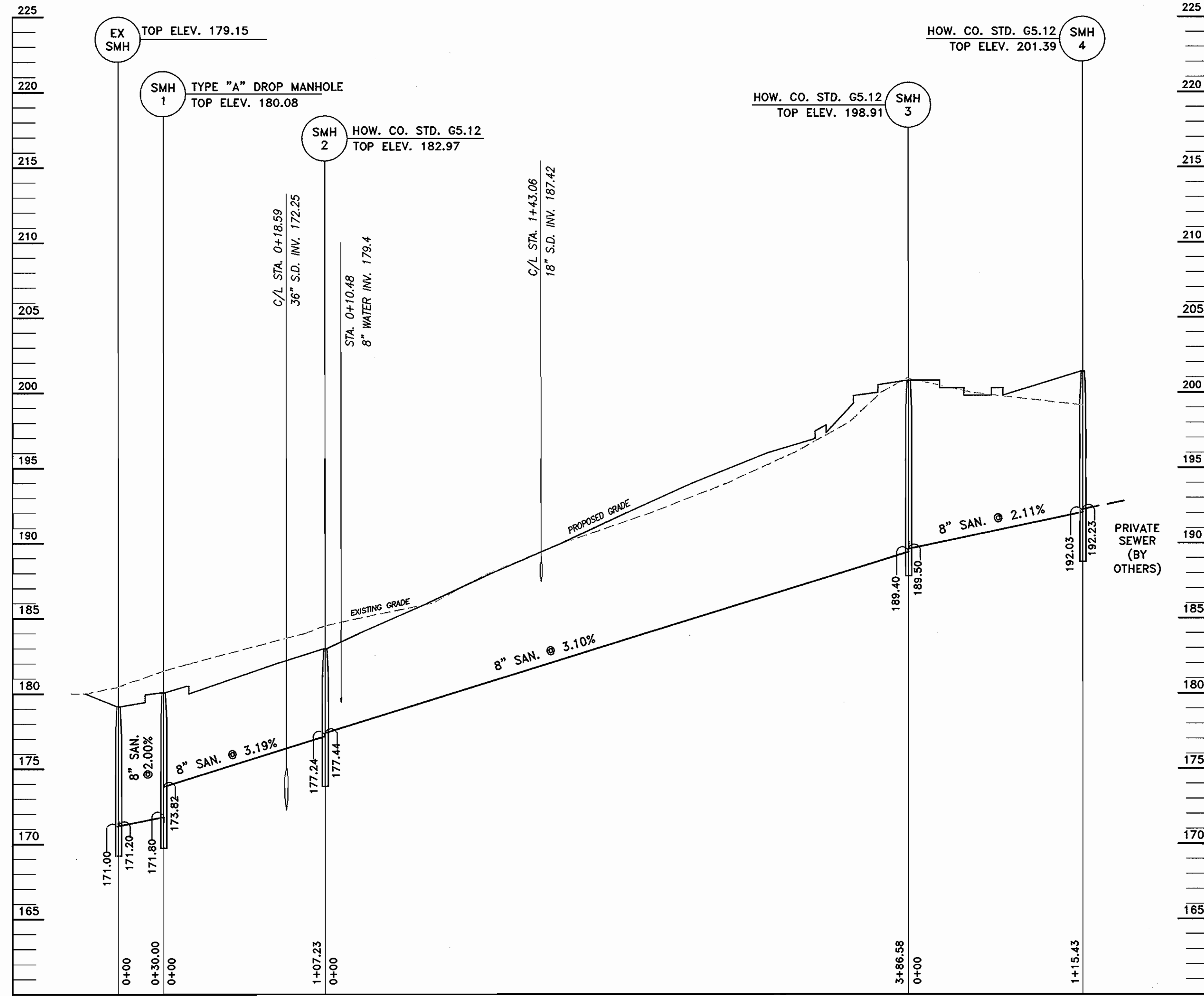
ELKRIDGE CROSSING MONTGOMERY ROAD & WASHINGTON BOULEVARD (U.S. RTE. #1)
CONTRACT #14-4335-D
TAX MAP #38 1ST ELECTION DISTRICT
PARCEL #30 & 38 HOWARD COUNTY, MARYLAND

SCALE: AS SHOWN
SHEET: 5 OF 8

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SMH 3 TO SMH 6



EX SMH TO SMH 4

LOT No.	FROM	TO	DISTANCE
TH 7 U 1/2	SMH-17	SHC	27.3'
	SMH-10	SHC	28.4'
	TH 7 U 3/4 SHC	SHC	27'
TH 7 U 1/2	SDM-1	WHC	49'
	8" V 0+04 J.D.	WHC	41'
1 1/2" WL	TH 7 U 3 WHC	WHC	22'
TH 7 U 3/4	SMH-17	SHC	43.3'
	SMH-10	SHC	31.0'
	TH 7 U 1/2 SHC	SHC	27'
TH 7 U 3	SDM-1	WHC	70'
	8" V 0+04 J.D.	WHC	60'
	TH 7 U 4 WHC	WHC	3'
TH 7 U 5/8	SMH-17	SHC	66.7'
	SMH-10	SHC	49.0'
	TH 7 U 1/8 SHC	SHC	8.5'
TH 7 U 4	8" V 0+04 J.D.	WHC	63'
	TH 7 U 3 SHC	WHC	3'
	SDM-1	WHC	73'

PROFILES

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

LOT No.	FROM	TO	DISTANCE
TH 7 U 3/8	SMH-17	SHC	74.7'
	SMH-10	SHC	74'
	TH 7 U 5/8 SHC	SHC	8.5'
TH 7 U 5	SMH-0A	WHC	72.4'
	TH 7 U 4 WHC	WHC	21.0'
3/4" WL	TH 7 U 6 WHC	WHC	3.7'
TH 7 U 6	SMH-0A	WHC	69.4'
	TH 7 U 5 WHC	WHC	3.7'
	TH 7 U 7 WHC	WHC	20.4'
TH 7 U 7	SMH-0A	WHC	55'
	TH 7 U 8 WHC	WHC	3.5'
	TH 7 U 6 WHC	WHC	20.4'
TH 7 U 8	SMH-0A	WHC	52.8'
	TH 7 U 7 WHC	WHC	3.5'
	TH 8 U 1 WHC	WHC	65'

LOT No.	FROM	TO	DISTANCE
TH 8 U 1/2	SDM-13	SHC	34'
	SMH-15A	SHC	34.5'
	TH 8 U 3/4 SHC	SHC	10.5'
TH 8 U 1	SMH-0	WHC	37'
	8" V 7+21	WHC	31'
TH 8 U 2 WHC	WHC	4.0'	
TH 8 U 3/4	SDM-13	SHC	25.3'
	SMH-15A	SHC	27.5'
	TH 8 U 1/2 SHC	SHC	10.5'
TH 8 U 2	SMH-0	WHC	37.7'
	8" V 7+21	WHC	33.3'
	TH 8 U 1 WHC	WHC	4.0'
TH 8 U 5/8	SDM-13	SHC	19.7'
	SMH-15A	SHC	28'
	TH 8 U 3/4 SHC	SHC	22.3'
TH 8 U 3	SMH-0	WHC	40.0'
	8" V 7+21	WHC	47.3'
	TH 8 U 4 WHC	WHC	4.2'

LOT No.	FROM	TO	DISTANCE
TH 8 U 7/8	SDM-13	SHC	40'
	SMH-15A	SHC	54'
	TH 8 U 5/8 SHC	SHC	35'
TH 8 U 4	SMH-0	WHC	49'
	8" V 7+21	WHC	50.7'
TH 8 U 3 WHC	WHC	4.2'	
TH 8 U 9/10	SDM-13	SHC	69'
	SMH-15	SHC	48.3'
	TH 8 U 7/8 SHC	SHC	24.3'
TH 8 U 5	SMH-0	WHC	64'
	8" V 7+21	WHC	68'
	TH 8 U 6 WHC	WHC	3.5'
TH 8 U 1/2	SDM-13	SHC	91.5'
	SMH-15	SHC	31'
	TH 8 U 9/10 SHC	SHC	23.3'
TH 8 U 6	SMH-0	WHC	67'
	TH 8 U 5 WHC	WHC	3.5'
	8" V 7+21	WHC	71.5'

LOT No.	FROM	TO	DISTANCE
TH 8 U 7	8" V 0+04	WHC	84.0'
	SMH-5A	WHC	100'
TH 8 U 8 WHC	WHC	3.5'	
TH 8 U 8	8" V 0+04	WHC	88'
	SMH-5A	WHC	96.0'
TH 8 U 9 WHC	WHC	3.5'	
TH 8 U 9	SMH-5A	WHC	78'
	STRATMANSTOP 8" V 0+04	WHC	65.5'
TH 8 U 10 WHC	WHC	3.5'	
TH 8 U 10	SMH-5A	WHC	75.3'
	STRATMANSTOP 8" V 0+04	WHC	67'
TH 8 U 11/2 WHC	WHC	24.3'	
TH 8 U 11/2	SMH-5A	WHC	50'
	STRATMANSTOP 8" V 0+04	WHC	41.5'
TH 8 U 10 WHC	WHC	24.3'	

NOTE: THE MATERIAL TO BE USED FOR THE WATER MAIN CONSTRUCTION IS C-900 PVC. ALL DEFLECTIONS, VERTICAL & HORIZONTAL, MUST BE USING BENDS & AND NOT CRIMPS. THE JOINTS IN C-900 PIPE CANNOT BE DEFLECTED.

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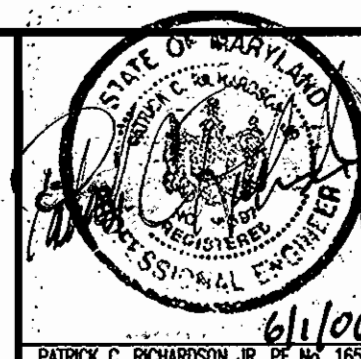
AS BUILT
DATE: OCTOBER 2007

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
R. H. B. 6-9-06
CHIEF, BUREAU OF UTILITIES

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND
[Signature] 6/23/06
CHIEF, DEVELOPMENT ENGINEERING DIVISION

Richardson Engineering, LLC

110 Old Pasadena Road, Suite 1C
Cockeysville, Maryland 21030
Phone: 410-560-1502 Fax: 410-560-0827



DES: CND	PCR	BUILDINGS A, B & TOWNHOUSE CONNECTION	4/23/07
DRN: CND			
CHK: PCR			
MAY 2006	BY NO.	REVISION	DATE

WATER & SEWER PLAN
PROFILES

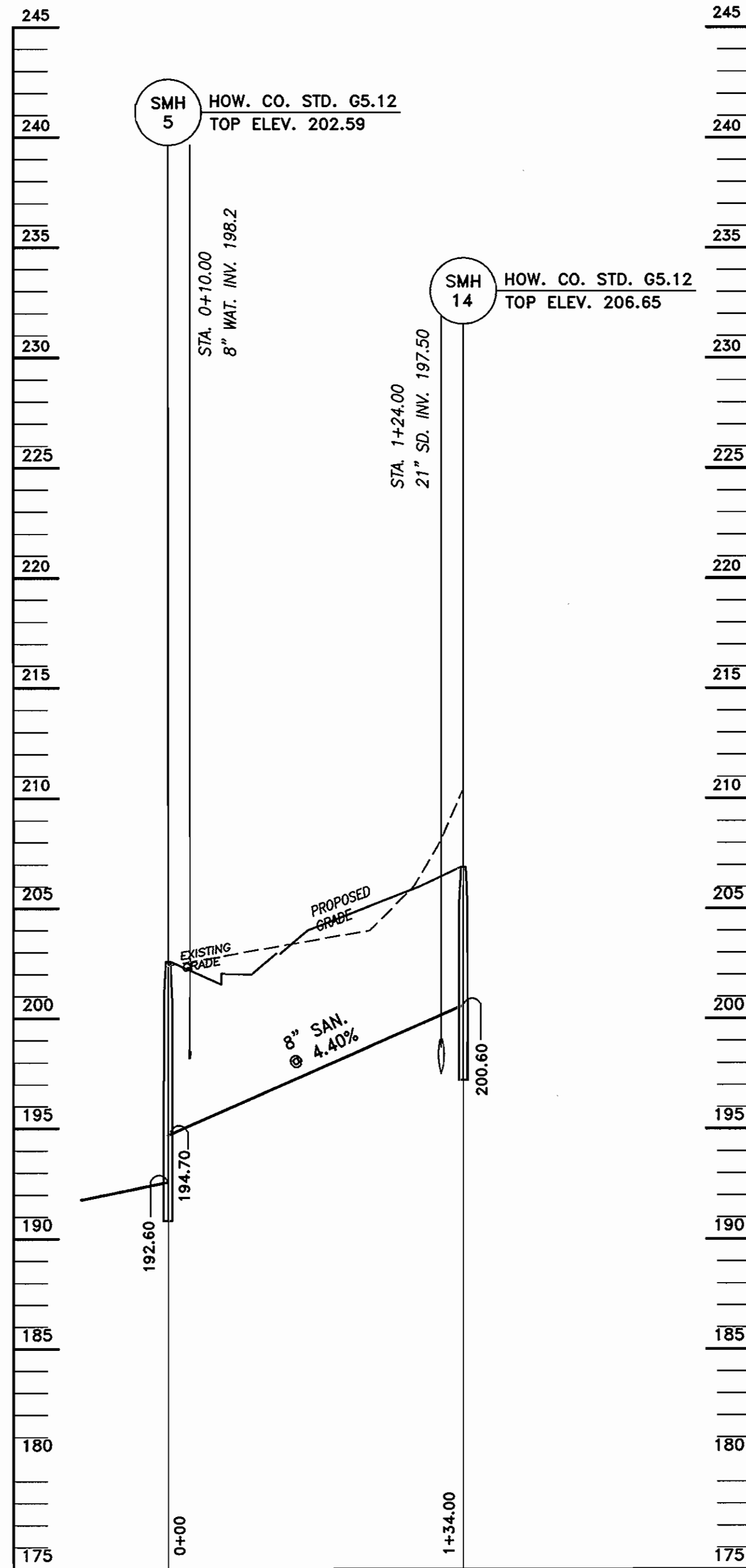
ELKRIDGE CROSSING MONTGOMERY
ROAD & WASHINGTON BOULEVARD
(U.S. RTE. #1)
CONTRACT #14-4335-D

SCALE:
AS SHOWN
SHEET:
6 OF 8

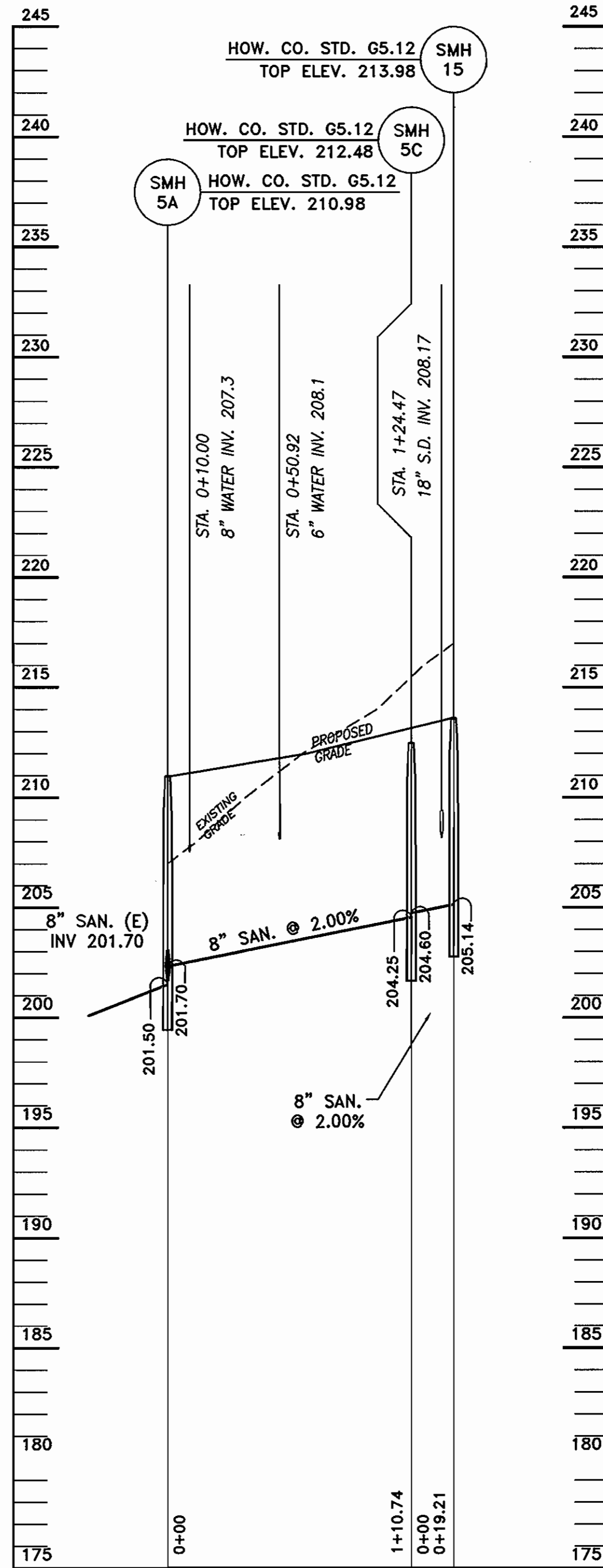
600' SCALE MAP #38

BLOCK #2&3

TAX MAP #38 PARCEL #30 & 38
1ST ELECTION DISTRICT HOWARD COUNTY, MARYLAND



SMH 5 TO SMH 14



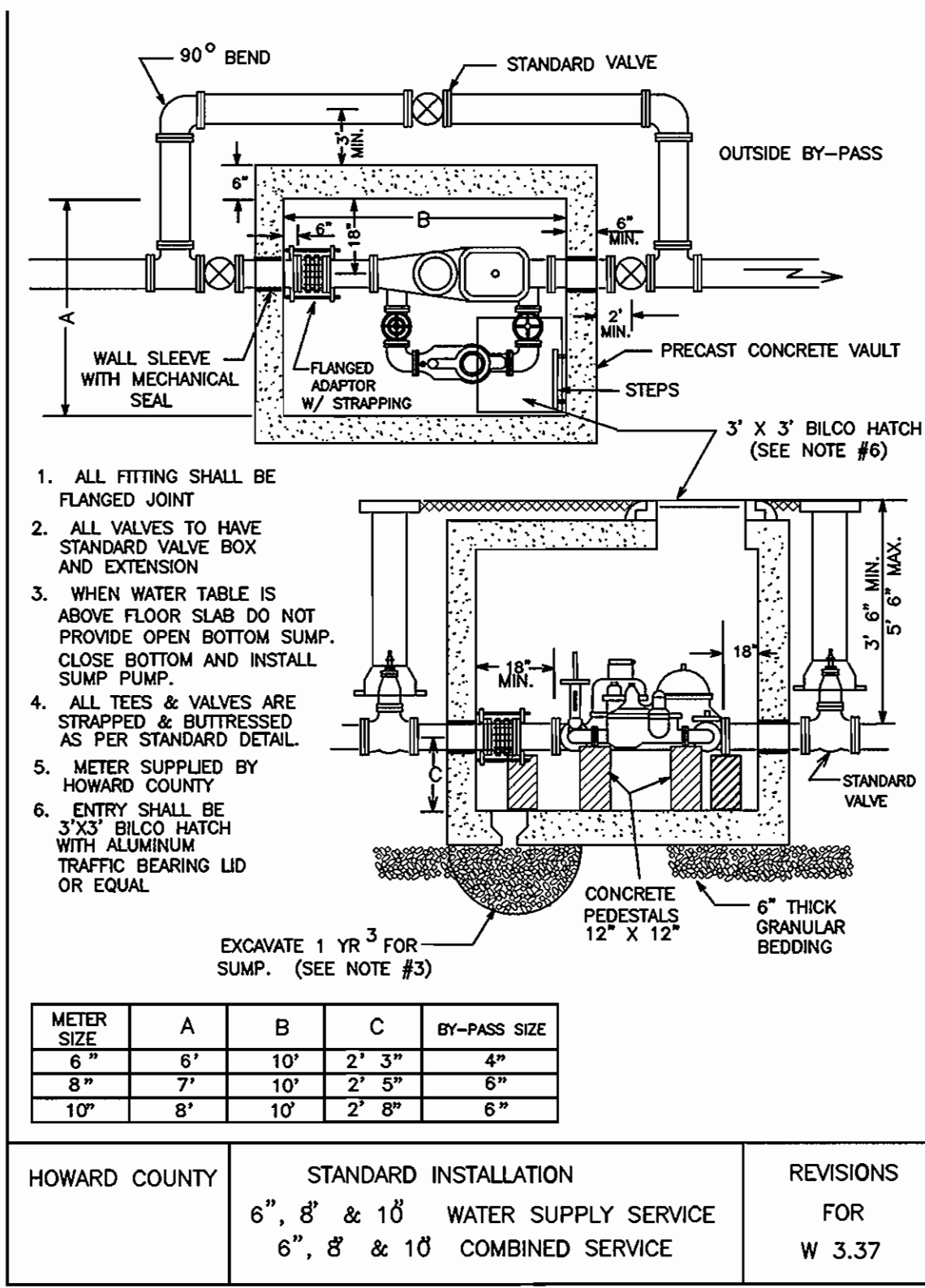
SMH 5A TO SMH 15

PROFILES

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

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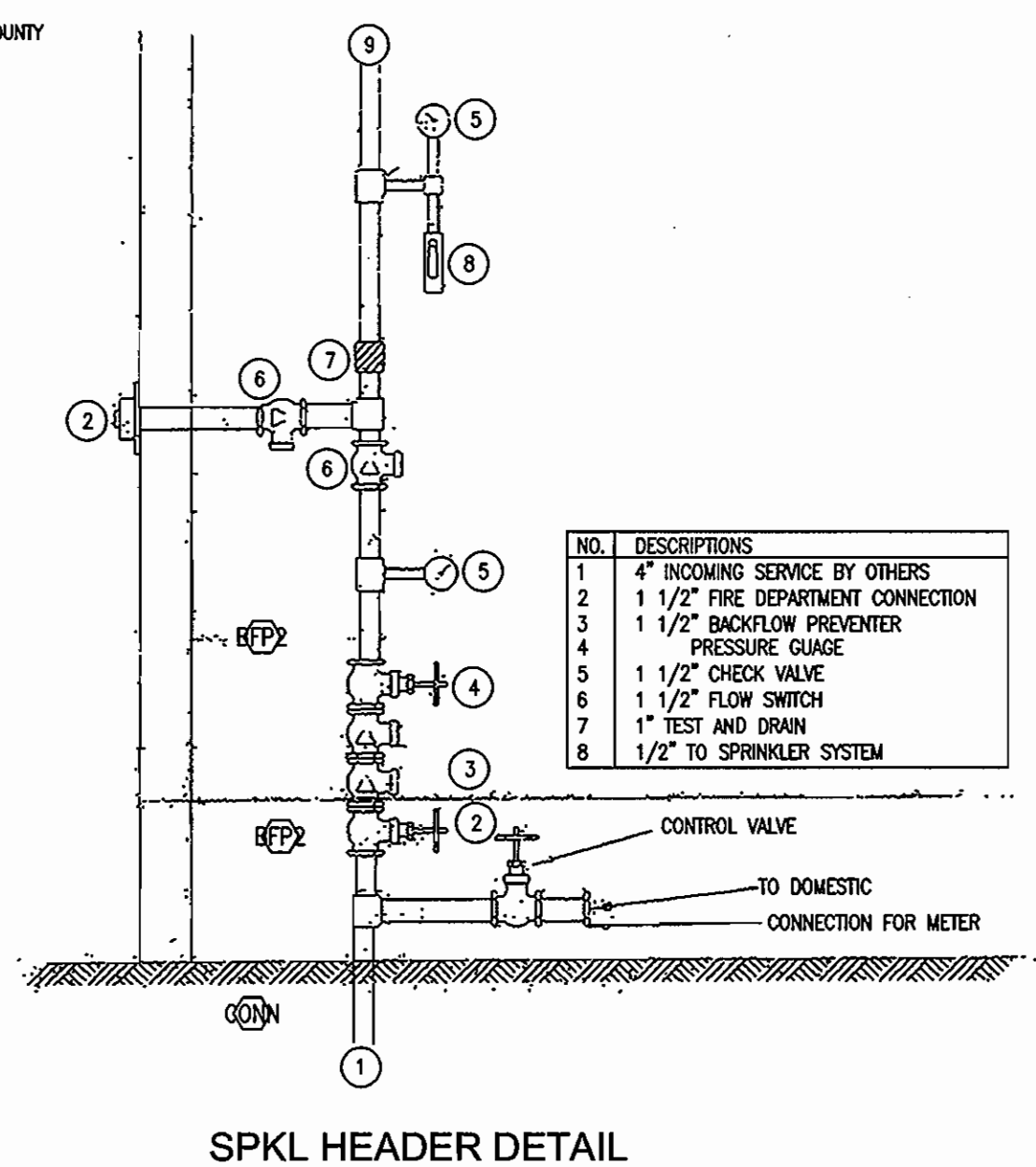
SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED IN ACCORDANCE WITH SECTION 219 OF THE SPECIFICATIONS AND WITH SITE DEVELOPMENT PLAN SDP-04-017



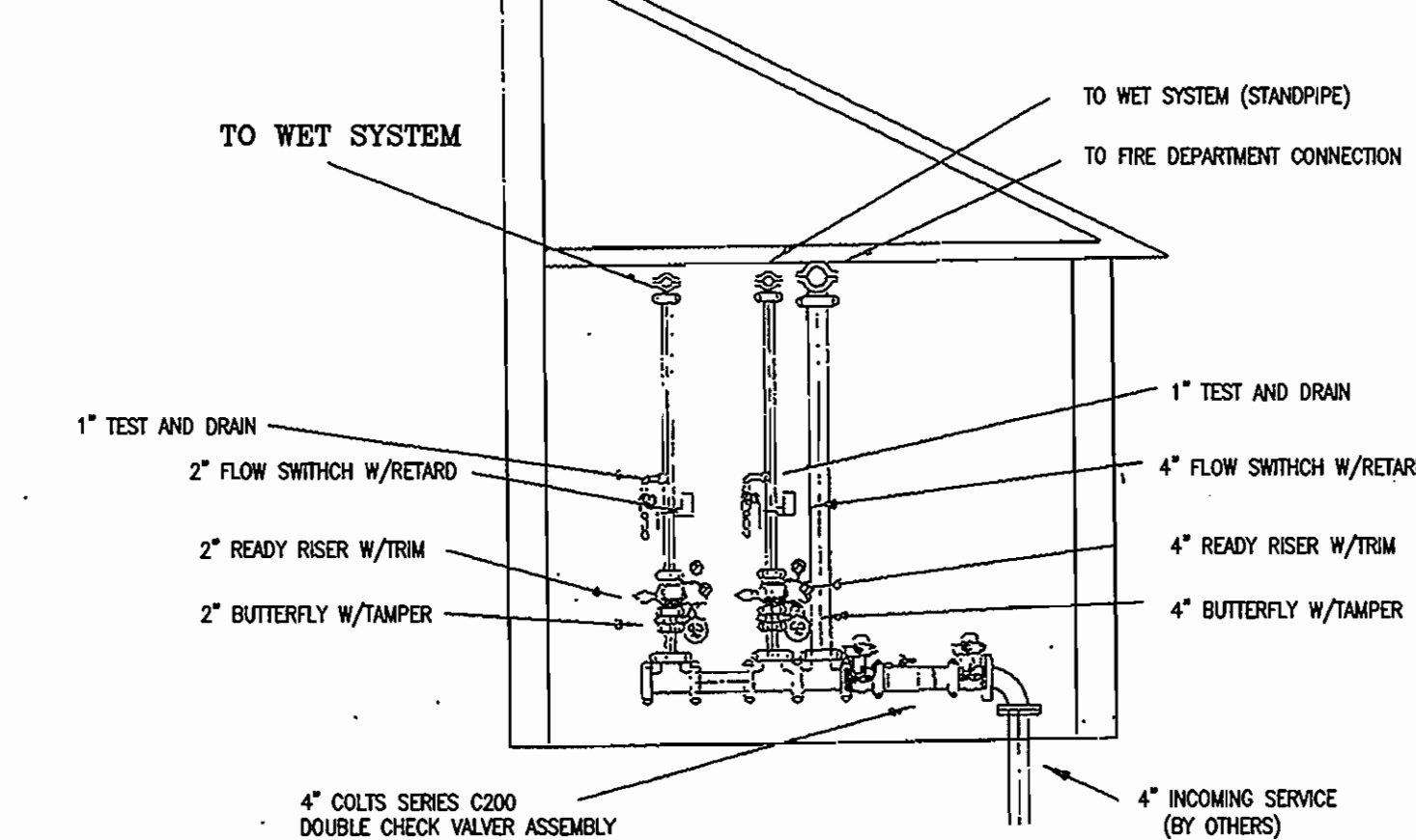
6" & 8" METERS TO BE INSTALLED BY DEVELOPER AND ALL 1" METERS WILL BE INSTALLED BY HOWARD COUNTY

METER SIZE	A	B	C	BY-PASS SIZE
6"	6"	10"	2' 3"	4"
8"	7"	10"	2' 5"	6"
10"	8"	10"	2' 8"	6"

HOWARD COUNTY STANDARD INSTALLATION REVISIONS FOR 6", 8" & 10" WATER SUPPLY SERVICE 6", 8" & 10" COMBINED SERVICE W 3.37



SPKLN HEADER DETAIL



VALVE ROOM NO SCALE

SPECIFICATIONS FOR PIPE JOINT RESTRAINT SYSTEMS

1. SCOPE
This specification covers pipe joint restraint systems to be used on domestic water mains for PVC C-900 pipe sizes 4-inch through 12-inch diameter and PVC C-905 pipe sizes 16-inch diameter, and for Ductile Iron pipe sizes from 4-inch through 24-inch diameter. Joint restraint systems are classified as "compression," "mechanical joint" or "non-metallic restrained joint" for the specific type of pipe joint to be restrained.

2. GENERAL REQUIREMENTS:
A. Underwriter Laboratories (UL) and Factory Mutual (FM) certifications are required on all restraint systems.
B. Unless otherwise noted, restraint systems to be used on PVC C-900 and C-905 pipe shall meet or exceed A.S.T.M. Standard F1574-96, "Standard Test Methods for Joint Restraint Products for Use with PVC Pipes," or the latest revision thereof. Restraint systems used on ductile iron pipe shall meet or exceed U.L. Standard 194.
C. Non-metallic restrained joint pipe and couplings shall be utilized specifically for C-900 PVC pipe and fittings in sizes 4"-12".
D. Each restraint system shall be packaged individually and include installation instructions.

3. SPECIFIC REQUIREMENTS:
A. Restraint for PVC C-900/C-905 & Ductile Iron Push-on Type Connections:
1. Pipe restraints shall be utilized to prevent movement for push-on D.I. or PVC (C900&C905) (compression type) bell and spigot pipe connections or where a flexible coupling has been used to join two sections of plain end O.I. or PVC (C900&C905). The restraint may be adapted to connect a plain end O.I. or PVC pipe to a ductile iron mechanical joint (MJ) bell fitting. The restraint must not be directionally sensitive.
2. The pipe shall be restrained by a split restraint band. The band shall be cast ductile iron, meeting or exceeding ASTM A536-80, Grade 65-45-12. The inside face or contact surface of the band shall be of sufficient width to incorporate cast or machined non-directionally sensitive serration to grip the outside circumference of the pipe. The serration shall provide full (360 degrees) contact and maintain pipe roundness and avoid any localized points of stress. The split band coupling shall be designed to "bottom-out" before clamping bolt forces (11 OR-lb minimum torque) can over-stress the pipe, but will provide full non-directionally sensitive restraint at the rated pressures.
3. Bolts and nuts used to attach the split restraint ring shall comply with ANSI B 18.2/18.2.2, SAE Grade 5. Tee-bolts, nuts and restraining rods shall be fabricated from high-strength, low-alloy steel per AWWA C 11190.
4. The split ring type non-directionally sensitive restraint system shall be capable of a test pressure twice the maximum sustained working pressure listed in section D and be for both D.I. and/or PVC C900.
5. Restraint systems sizes six through twelve inches shall be capable of use for both ductile iron and/or PVC C900.
6. The restraint system may consist of two types: the two split restraint rings and for new construction use only the one split and one solid cast backup ring.
B. Compression Ring Fitting Restraint for Ductile Iron Pipe & PVC C-900.
1. Compression ring with follow gland type of restraint may be utilized in conjunction with Mechanical Joint (MJ) bell end ductile iron pipe fittings for restraining PVC C-900 and ductile iron pipe.
2. The system shall utilize a standard MJ gasket with a color-coded compression ring and replacement gland conforming to ASTM A 536-80, Grade 65-45-12.
3. Standard MJ fitting Tee-bolts and nuts shall be fabricated from high strength steel conforming to AWWA C III / A21.11-90 and AWWA C153/A21.53-88.
4. Standard MJ gasket shall be virgin SBR meeting ASTM D-2000 3 BA 715 or 3 BA 515.
5. The restraint system shall be capable of a test pressure twice the maximum sustained working pressure listed in section D.
C. Non-metallic restrained joint pipe and couplings for PVC C-900 Type Connections:
1. Gasketed restrained coupling connections shall join two sections of factory grooved PVC (C900) pipe. The restraint coupling or must not be directionally sensitive.
2. The coupling shall incorporate two elastomeric sealing gaskets meeting the requirements of ASTM F-477 and shall be OR-14 Class 200 C-900 PVC in all applications, meeting the performance requirements of AWWA C-900, latest revision. The inside face or contact surface of the coupling connection shall be of sufficient width to incorporate a factory machined non-directionally sensitive groove in both pipe and coupling to grip the outside circumference of the pipe. The couplings shall provide full (360 degrees) contact and maintain pipe roundness and avoid any localized points of stress. The coupling shall be designed with an internal stop to align the precision-machined grooves in the coupling and pipe prior to installation of a non-metallic thermoplastic restraint spline, and will provide full non-directionally sensitive restraint at the rated pressures.
3. High-strength flexible thermoplastic splines shall be inserted into mating precision-machined grooves in the pipe and coupling to provide full non-directional restraint with evenly distributed loading.
4. The non-metallic restrained joint pipe and couplings for PVC C-900 type non-directionally sensitive restraint system shall be capable of a test pressure twice the maximum sustained working pressure listed in Section D and be for PVC (C900) pipe sizes four through twelve inch.
5. Non-metallic restrained joint pipe and couplings for PVC C-900 restrained systems sizes four through twelve inches shall be capable of use for both Class 150 (DR 18) and four through eight inches for Class 200 (DR 14) PVC C900 pipe.
6. The non-metallic restrained joint pipe and couplings for PVC C-900 restraint system shall consist of a pipe and couplings system produced by the same manufacturer meeting the performance qualifications of Factory Mutual (FM) and Underwriters Lab (UL).
D. Fitting Restraint for Ductile Iron Pipe (Only):
1. Rigid bolt type restraint systems shall be limited to ductile iron pipe in conjunction with Mechanical Joint (MJ) bell end pipe fittings. The system shall utilize a standard MJ gasket with a ductile iron replacement gland conforming to ASTM A 536-80. The gland dimensions shall conform to Standard MJ bell circle criteria.
2. Individual wedge restrainers shall be ductile iron heat treated to a minimum hardness of 370 BHN. The wedge screws shall be compressed to the outside wall of the pipe using a shoulder bolt and twist-off nuts to insure proper actuating of the restraining system.
3. Standard MJ fitting Tee-bolts and nuts shall be high strength steel conforming to AWWA C111/A21.11-90 and C153/A21.53-88.
4. Standard MJ gasket shall be virgin SBR meeting ASTM D-2000 3 BA 715 or 3 BA 515.
D. Maximum Sustained Working Pressure Requirements:
Nominal Diameter PVC C-900 / C-905 DUCTILE IRON
4 & 6 inch 200 P.S.I. 350 P.S.I.
8 inch 200 P.S.I. 250 P.S.I.
10 & 12 inch 200 P.S.I. 200 P.S.I.
14 & 16 inch 200 P.S.I. 235 P.S.I. 200 P.S.I.
20 & 24 inch 200 P.S.I. 235 P.S.I. 200 P.S.I.

4. TESTS:
The ElkrIDGE Crossing Water System may, at no cost to the manufacturer, subject random joint restraint system products to testing by an independent laboratory for compliance with these standards. Any visible defect of failure to meet the quality standards herein will be ground for rejecting the entire order.

5. PRODUCT LIST:
The attached qualified product list identifies specified manufacturers models approved for installation in SWS water distribution systems.
Approved Manufacturers and Models:
A. Slip on Joint Restraint Systems: PVC C-900/C905 Ductile Iron D.I. 16" Above
Ford/Uni-Flange 1390C 1390C
EBM Iron Sales, Inc. 1500 1700 1700
Romac Industries, Inc. 4-8-inch Model 611 4703J
Star Pipe Products 1100 1100 1100
B. Compression Ring Systems: PVC C-900 Ductile Iron
Romac Industries, Inc. Gripping-J MUR Gland 1
Tyler Corporation MUR Gland 3500 Series
Star Pipe Products Ring Lock 3500 Series
C. Non-Metallic Restraint Joint Pipe and Couplings for PVC C-900 RJ Type Connections:
Certain Teed Corporation, CERTA-LOK C-900/RJ
4" - 12" CLASS 150 (DR-18)
4" - 8" CLASS 200 (DR-14)
D. Fitting Restraint (MJ): PVC C-900 Ductile Iron
EBM Iron Sales, Inc. 2000 PV Megalok 100
Romac Industries, Inc. Not Approved Not Approved Series 1400
Ford/Uni-Flange UFR-1500-CR-24" Series 1400
StarPipe Products 4000 Starlock 4000
Sigma Corporation One Lock SLC One Lock SLD

AS BUILT
DATE: OCTOBER 2007

SHEET 7 OF 8 SUPERSEDES PREVIOUSLY APPROVED SHEET 7 THAT WAS SIGNED ON 06/29/06.

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND

Richardson Engineering, LLC
110 Old Rodonia Road, Suite LC
Cockeysville, Maryland 21030
Phone: 410-560-1502 Fax: 410-560-0827

DATE: 7-10-07
DATE: 7-13-07

Richardson Engineering, LLC

110 Old Rodonia Road, Suite LC
Cockeysville, Maryland 21030
Phone: 410-560-1502 Fax: 410-560-0827

DES:	PCR	1	BUILDINGS A,B & TOWNHOUSE CONNECTIONS	4/23/07
DRN:	CND			
CHK:	PCR			
DATE:	MAY			
BY:	NO.			
REVISION				

WATER & SEWER PLAN
PROFILES

600' SCALE MAP #38
BLOCK #2&3

ELKRIDGE CROSSING MONTGOMERY
ROAD & WASHINGTON BOULEVARD
(U.S. RTE. #1)
CONTRACT #14-4335-D

TAX MAP #38
1ST ELECTION DISTRICT

PARCEL #30 & 38
HOWARD COUNTY, MARYLAND

SCALE:
AS SHOWN
SHEET:
7 OF 8

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**DIVISION 5
SPECIAL PROVISIONS
5.01 UTILIZATION OF PLANS AND SPECIFICATIONS**

- (A) THIS CONTRACT WILL BE CONSTRUCTED UNDER THE PROVISIONS OF THE "HOWARD COUNTY DESIGN MANUAL, VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION", DATED JANUARY, 1991, AND ANY SUBSEQUENT AMENDMENTS WHICH ARE HEREBY INCORPORATED BY REFERENCE; INTO THE CONTRACT DOCUMENTS. IN THE EVENT OF A CONFLICT BETWEEN PORTIONS OF THE CONTRACT DOCUMENTS, THE PROVISIONS OF SECTION 105.04 OF VOLUME IV WILL GOVERN THE ORDER OF WHICH IS:
- SPECIAL PROVISIONS
 - PLANS (DRAWINGS)
 - SUPPLEMENTAL SPECIFICATIONS
 - STANDARD SPECIFICATIONS AND DETAILS

- 5.02 WORK TO BE DONE:**
- (A) THE WORK TO BE DONE UNDER THIS CONTRACT CONSISTS OF THE FURNISHING OF ALL MATERIALS AND THE CONSTRUCTING COMPLETE IN PLACE OF THE WATER AND SEWER PIPELINES, AND ALL APPURTENANCES, FOR THE ABOVE ITEMS, AS SHOWN ON THE CONTRACT DRAWINGS OR AS DIRECTED BY THE ENGINEER.
- (B) THE PLANS AND SPECIFICATIONS ARE INTENDED TO COVER A COMPLETE PROJECT INCLUDING THE TESTING OF THE PIPELINES, EQUIPMENT AND APPURTENANCES. IT SHOULD BE DISTINCTLY UNDERSTOOD THAT FAILURE TO MENTION SPECIFICALLY ANY WORK WHICH WOULD NATURALLY BE REQUIRED TO COMPLETE THE PROJECT SHALL NOT RELIEVE THE DEVELOPER OF HIS RESPONSIBILITY TO PERFORM SUCH WORK.
- (C) THE DRAWINGS ACCOMPANY THESE SPECIFICATIONS AND SHOW THE EXTENT OF THE WORK TO BE DONE UNDER THIS CONTRACT.

- 5.03 ACCESS TO PROJECT:**
- (A) THE DEVELOPER SHALL PERMIT FREE ACCESS TO ALL PARTS OF THE PROJECT AT ALL TIMES FOR INSPECTION PURPOSES FOR REPRESENTATIVES OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES AND FOR REPRESENTATIVES OF THE DEPARTMENT OF HEALTH OF THE STATE OF MARYLAND, AND SHALL PROVIDE PROPER FACILITIES FOR SUCH ACCESS AND INSPECTION WHEREVER IT IS REQUIRED.

- 5.04 DEVELOPER'S PIPE MATERIAL SPECIFICATIONS:**
- (A) ALTHOUGH UNDER THIS CONTRACT THE DEVELOPER HAS THE OPTION OF FURNISHING PIPE OF VARIOUS MATERIALS, IT IS THE INTENT THAT ONCE A MATERIAL FOR PIPE HAS BEEN SELECTED, THIS MATERIAL SHALL BE USED EXCLUSIVELY THROUGHOUT THIS CONTRACT EXCEPT, HOWEVER, WITHIN LIMITS WHERE PIPELINE TYPE AND MATERIAL ARE SPECIFIED ON THE DRAWINGS. THE DEVELOPER SHALL NOT CHANGE MATERIALS DURING THE PROSECUTION OF THIS CONTRACT UNLESS HE IS AUTHORIZED IN WRITING TO DO SO BY THE COUNTY.

- 5.05 TESTING WATER MAINS:**
- (A) THE COMPLETED WATER MAINS SHALL BE FILLED WITH WATER, AND BROUGHT TO A TEST GRADIENT OF ELEVATION 70.00 AS SPECIFIED UNDER PARAGRAPH 1002.04.

- 5.06 TEMPORARY PROTECTIVE CHANNEL COVER:**
- (A) IN ALL SEWER MANHOLES A TEMPORARY PROTECTIVE CHANNEL COVER AS SHOWN ON THE DRAWING ENTITLED TEMPORARY PROTECTIVE CHANNEL COVER SHALL BE PROVIDED.
- (B) THE PROTECTIVE CHANNEL COVER SHALL BE INSTALLED WHEN THE SEWER MAINS HAVE BEEN INSPECTED AND TESTED.

- 5.07 TIE-IN AT WATER MAIN:**
- (A) THE DEVELOPER SHALL NOTIFY THE HOWARD COUNTY BUREAU OF UTILITIES (513-4900) PRIOR TO MAKING ANY TIE TO THE EXISTING SYSTEM.
- (B) THE DEVELOPER SHALL NOT OPERATE ANY WATER MAIN VALVE ON THE EXISTING SYSTEM.
- (C) THE DEVELOPER SHALL NOTIFY ALL WATER CUSTOMERS OF THE COUNTY WHO WILL BE WITHOUT SERVICE A MINIMUM OF FORTY-EIGHT (48) HOURS IN ADVANCE OF THE SCHEDULED SHUTDOWN.

- 5.08 PRECONSTRUCTION MEETING:**
- (A) A PRECONSTRUCTION MEETING WILL BE HELD WITH THE DEVELOPER, HIS CONTRACTOR AND THE COUNTY TO DISCUSS THE PROJECT AND SEQUENCE OF WORK PRIOR TO BEGINNING ANY WORK.

- 5.09 STERILIZATION AND DISINFECTION OF WATER MAINS:**
- (A) STERILIZATION AND DISINFECTION OF WATER MAINS INCLUDING BACTERIOLOGICAL TESTINGS SHALL BE DONE BY THE CONTRACTOR AS SPECIFIED IN SECTIONS 1006 AND 1007.
- (1) DISINFECTING OF WATER MAINS SHALL BE DONE BY THE CONTRACTOR AS SPECIFIED AND DIRECTED WITHOUT ADDITIONAL PAYMENT THEREOF. THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT FOR THE COMPLETE STERILIZING OPERATIONS.
- (2) DISINFECTING OF WATER MAINS SHALL BE DONE IN ACCORDANCE WITH AWWA C651-88 USING THE CONTINUOUS FEED METHOD. THE OPTION OF PLACING CALCIUM HYPO CHLORITE GRANULES IN THE PIPE DURING CONSTRUCTION SHALL NOT BE USED. AN AIR GAP OR A DEVICE TO PREVENT BACKFLOW OF THE CHLORINE SOLUTION INTO THE COUNTY WATER SYSTEM MUST BE APPROVED BY THE COUNTY AND USED DURING THE TESTING PROCEDURES.
- (3) PRIOR TO THE BEGINNING OF DISINFECTING OPERATIONS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL A SCHEDULE LISTING DETAIL OF DISINFECTING PROCEDURES TO BE FOLLOWED.

- 5.10 PERMITS:**
- (A) STATE OF MARYLAND DEPARTMENT OF THE ENVIRONMENT.

- THE GENERAL NOTES ARE AMENDED TO INCLUDE THE FOLLOWING:
- ALL DUCTILE IRON PIPES TO BE USED ON THE PUBLIC WATER SYSTEM SHALL BE CLASS 54. DUCTILE IRON FITTINGS SHALL MEET THE REQUIREMENTS OF THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION AND SHALL BE EXTERIOR EPOXY COATED IN ACCORDANCE WITH AWWA C16.
 - ALL WATER HOUSE CONNECTIONS SHALL BE COPPER MEETING THE REQUIREMENTS OF AND CONSTRUCTED IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
 - ALL FIRE HYDRANT LEADS INCLUDING THE TEE SHALL BE DUCTILE IRON CLASS 54 MEETING THE REQUIREMENTS OF AND CONSTRUCTED IN ACCORDANCE WITH THE HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
 - ALL WATER MAINS CONSTRUCTED IN FILL AREAS 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.
 - ALL WATER MAINS WITH 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 ANCHORAGES FOR VALVES: 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 POLYVINYL CHLORIDE (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 ANY SUBSEQUENT AMENDMENTS THERETO.

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 1002 WATER MAINS OF THE HOWARD COUNTY STANDARD SPECIFICATIONS ARE AMENDED TO INCLUDE THE FOLLOWING REQUIREMENTS.

- GENERAL**
- POLYVINYL CHLORIDE (PVC) PIPE AND COUPLINGS SHALL BE HOMOGENEOUS THROUGHOUT AND FREE FROM VISIBLE CRACKS, BUBBLES, BUSTERS, 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 ± 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 DEFLECT OR BEND.
 - SUBMITTALS: THE FOLLOWINGS 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 EXTENSION 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 ACCEPTED COMPRESSION 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.

- 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 METAL 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 STRAINT FOR THIS JOINT SHALL MEET ASTM D2000 OR NITILE AROUND THE TAP HOLE. SADDLES SHALL BE ONE OF THE FOLLOWING:
 - FORD FC-202
 - MUELLER SERIES DR25
 - ROMAC 2026
 - SMITH BLAR 317 NYLON COATED
 - JCM 406

- 3. TRACER WIRE FOR NON METALLIC PIPELINES:**
- TRACER WIRE SHALL BE 6-GAUGE, 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.
- 4. 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" X 12" METAL FRAME AND COVER AS SHOWN IN THE DETAILS ON THE PLANS. A 1/4-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.

- 5. DETECTION TAPE:**
- VISUAL DETECTION TAPE SHALL BE 3 INCHES WIDE (MINIMUM) METALLIC BLUE PLASTIC TAPE LETTERED "WATER" IN BLACK GRAPHICS.
- 6. CONNECTION TO PVC WATERLINES:**
- CONNECTIONS TO PVC WATERLINES SHALL BE BY USING FITTINGS, SUCH AS TEES, INDICATED ON THE PLANS.
 - SADDLES MAY BE USED FOR 2-INCH AND SMALLER CONNECTIONS TO PVC WATERLINES. SADDLES WITH CLAMPS SHALL PROVIDE FULL SUPPORT AROUND THE CIRCUMFERENCE OF THE PIPE AND SHALL NOT DISTORT, SCRATCH, OR DAMAGE THE PIPE WHEN TIGHTENED. ONLY TAPPING SADDLES MANUFACTURED SPECIFICALLY FOR AWWA C900 PVC PIPE SHALL BE USED. SADDLE AND CLAMP/STRAPS SHALL BE FORMED TO MEET THE CURVATURE OF THE PIPE. SADDLES WITH CLAMPS SHALL BE MANUFACTURED FOR UNDERGROUND SERVICE. SADDLES SHALL BE RATED FOR A MINIMUM SERVICE OF 150 PSI AND SHALL BE BRASS OR BRONZE ALLOY MEETING ASTM B82 OR B84 AND AWWA C800 OR DUCTILE IRON SADDLES MEETING ASTM A536 OR A535 WITH TWO 18-8 STAINLESS STEEL STRAPS AND SHALL BE EPOXY OR NYLON COATED. SADDLES SHALL HAVE WATER-TIGHT GASKETS OF BUNA-N RUBBER MEETING ASTM D2000 OR NITILE AROUND THE TAP HOLE. SADDLES SHALL BE ONE OF THE FOLLOWING:
 - FORD FC-202
 - MUELLER SERIES DR25
 - ROMAC 2026
 - SMITH BLAR 317 NYLON COATED
 - JCM 406

- 3. 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.**
- 4. FIRE HYDRANT LEAD, INCLUDING MANLINE TEE, SHALL BE DUCTILE IRON ONLY.**
- 5. 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.

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- 4. FIRE HYDRANT LEAD, INCLUDING MANLINE TEE, SHALL BE DUCTILE IRON ONLY.**
- 5. 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.
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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 SPOGOT 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 (HARRCO) OR APPROVED EQUAL. PVC 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 FC20 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 METAL 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 STRAINT FOR THIS JOINT SHALL MEET ASTM D2000 OR NITILE AROUND THE TAP HOLE. SADDLES SHALL BE ONE OF THE FOLLOWING:
 - FORD FC-202
 - MUELLER SERIES DR25
 - ROMAC 2026
 - SMITH BLAR 317 NYLON COATED
 - JCM 406
 - WHERE A RESTRAINED JOINT IS REQUIRED FOR PVC PUSH-ON JOINT, JOINT RESTRAINT SHALL BE UNI-BITE 13, JCM 600 SUR-GRP, EBBA IRON SERIES 1600, UNIFLANGE SERIES 1300-C, OR APPROVED EQUAL.

- 3. TRACER WIRE FOR NON METALLIC PIPELINES:**
- TRACER WIRE SHALL BE 6-GAUGE, 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.
- 4. 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" X 12" METAL FRAME AND COVER AS SHOWN IN THE DETAILS ON THE PLANS. A 1/4-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.

- 5. DETECTION TAPE:**
- VISUAL DETECTION TAPE SHALL BE 3 INCHES WIDE (MINIMUM) METALLIC BLUE PLASTIC TAPE LETTERED "WATER" IN BLACK GRAPHICS.
- 6. CONNECTION TO PVC WATERLINES:**
- CONNECTIONS TO PVC WATERLINES SHALL BE BY USING FITTINGS, SUCH AS TEES, INDICATED ON THE PLANS.
 - SADDLES MAY BE USED FOR 2-INCH AND SMALLER CONNECTIONS TO PVC WATERLINES. SADDLES WITH CLAMPS SHALL PROVIDE FULL SUPPORT AROUND THE CIRCUMFERENCE OF THE PIPE AND SHALL NOT DISTORT, SCRATCH, OR DAMAGE THE PIPE WHEN TIGHTENED. ONLY TAPPING SADDLES MANUFACTURED SPECIFICALLY FOR AWWA C900 PVC PIPE SHALL BE USED. SADDLE AND CLAMP/STRAPS SHALL BE FORMED TO MEET THE CURVATURE OF THE PIPE. SADDLES WITH CLAMPS SHALL BE MANUFACTURED FOR UNDERGROUND SERVICE. SADDLES SHALL BE RATED FOR A MINIMUM SERVICE OF 150 PSI AND SHALL BE BRASS OR BRONZE ALLOY MEETING ASTM B82 OR B84 AND AWWA C800 OR DUCTILE IRON SADDLES MEETING ASTM A536 OR A535 WITH TWO 18-8 STAINLESS STEEL STRAPS AND SHALL BE EPOXY OR NYLON COATED. SADDLES SHALL HAVE WATER-TIGHT GASKETS OF BUNA-N RUBBER MEETING ASTM D2000 OR NITILE AROUND THE TAP HOLE. SADDLES SHALL BE ONE OF THE FOLLOWING:
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