

WALNUT GROVE SHARED SEPTIC COLLECTION SYSTEM

QUANTITIES				
ITEMS	QUANTITIES ESTIMATED	AS-BUILT		
		QUANTITIES	TYPE	MANUFACTURER/SUPPLIER
1 1/2" L.P.S.	2,707'	2,643'	PVC J.M. PIPE	L.B. WATER SERVICES
1 1/2" L.P.S.	1,178'	603'	PVC J.M. PIPE	L.B. WATER SERVICES
2" L.P.S.	6,286'	4,364'	PVC J.M. PIPE	L.B. WATER SERVICES
3" L.P.S.	675'	2,551'	PVC J.M. PIPE	L.B. WATER SERVICES
1 1/2" x 1 1/2" T.	14 EA.	9 EA.	PVC	SPEARS
1 1/2" x 1 1/2" T.	11 EA.	10 EA.	PVC	SPEARS
2" x 1 1/2" T.	19 EA.	19 EA.	PVC	SPEARS
2" x 2" T.	4 EA.	1 EA.	PVC	SPEARS
1 1/2" x 1/2" H.B.	6 EA.	3 EA.	PVC	SPEARS
2" x 1 1/2" RED.	3 EA.	5 EA.	PVC	SPEARS
2" x 1 1/2" RED.	2 EA.	4 EA.	PVC	SPEARS
1 1/2" x 1 1/4" RED.	4 EA.	2 EA.	PVC	SPEARS
2" x 3" RED.	3 EA.	1 EA.	PVC	SPEARS
TRANSITION MH	1 EA.			
IN-LINE FLUSH CONN.	17 EA.	20 EA.	PRE-CAST CONCRETE	CONT. PRE-CAST CORP.
TERMINAL FLUSH CONN.	8 EA.	7 EA.	PRE-CAST CONCRETE	CONT. PRE-CAST CORP.
GRINDER PUMPS	50 EA.	50 EA.	PRE-CAST CONCRETE	CONT. PRE-CAST CORP.
EONE CORE	50 EA.	50 EA.	PRE-CAST CONCRETE	CONT. PRE-CAST CORP.
CABLE TESTING STATION	48 EA.	50 EA.	NDS STANDARD SERVICE BOXES	CONT. PRE-CAST CORP.
AIR RELEASE VALVE ST		5 EA.		
3" x 3" CROSS		1 EA.	PVC	SPEARS
3" x 1 1/4" T.		7 EA.	PVC	SPEARS
1 1/2" x 1 1/4" T.		1 EA.	PVC	SPEARS
2" x 3" T.		1 EA.	PVC	SPEARS

NAME OF UTILITY CONTRACTOR: _____

SURVEY AND DRAFTING DIV. CHECKBOX: AS-BUILT DATE: _____

- LEGEND**
- ⊙ CORE No.
 - ⊕ STORM DRAIN STRUCTURE LABEL
 - PROPOSED SEWER
 - ⊠ PROPOSED GRINDER PUMP

- SHEET INDEX**
1. COVER SHEET
 2. SEWER PLAN (PREAKNESS CIRCLE LANE)
 3. SEWER PLAN (PREAKNESS CIRCLE LANE)
 4. SEWER PLAN (PREAKNESS CIRCLE LANE, MATKINS BRIDGE LANE, HOLLY CREEK LANE)
 5. SEWER PLAN (MATKINS BRIDGE LANE, MOUNTAIN LANE, SHEET MEADOW LANE)
 6. SEWER PLAN
 7. SEWER PLAN (RUNNING FENCE LANE)
 8. SEWER PLAN (RUNNING FENCE LANE, PREAKNESS CIRCLE LANE, DANIEL CIRCLE LANE)
 9. SEWER PLAN (RUNNING FENCE LANE, DANIEL CIRCLE LANE)
 10. SEWER PLAN (SHEET MEADOW LANE, MATKINS BRIDGE LANE)
 11. SEWER PROFILES (MATKINS BRIDGE LANE)
 12. SEWER PROFILES (PREAKNESS CIRCLE LANE & SHEET MEADOW LANE)
 13. SEWER PROFILES (HOLLY CREEK LANE & MOUNTAIN LANE)
 14. SEWER PROFILES (RUNNING FENCE LANE & DANIEL CIRCLE LANE)
 15. SEWER DETAILS
 16. SEWER CALCULATIONS AND NOTES

Sediment Control Measures will be implemented in accordance with Section 219 of the Specifications & with Road Drawings Plan F-06-31; Drawings 1-78 for Sediment & Erosion Control.

REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEETS TECHNICAL REQUIREMENT.

Jim Meyer 2/6/07
 SIGNATURE DATE
 U.S.D.A. NATURAL RESOURCES CONSERVATION SERVICE

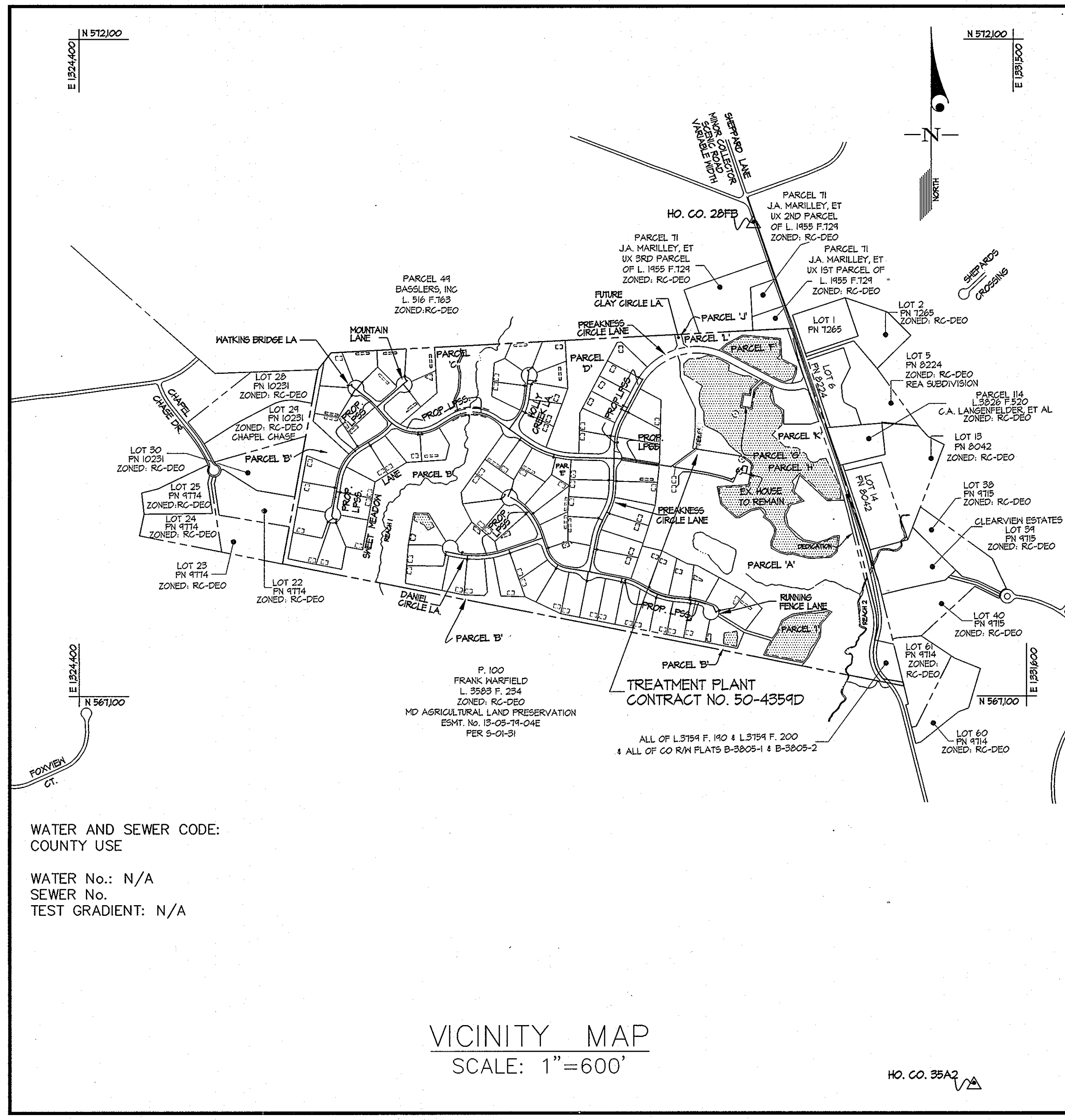
THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

APPROVED: *John R. Roberts* 2/6/07
 HOWARD S.C.D. DATE

APPROVED: FOR PUBLIC SEWERAGE COLLECTION SYSTEMS,
 HOWARD COUNTY HEALTH DEPARTMENT

County Health Officer _____ Date _____

PREPARED FOR OWNER
 WALNUT GROVE HOLDING, L.L.C.
 WALNUT GROVE DEVELOPMENT, INC.
 ROBERT VAN DYKE, PRESIDENT
 10705 CHARTER DRIVE
 SUITE 300
 COLUMBIA, MARYLAND 21044



WATER AND SEWER CODE: COUNTY USE

WATER No.: N/A
 SEWER No.: N/A
 TEST GRADIENT: N/A

VICINITY MAP
 SCALE: 1"=600'

HO. CO. 35A2

CONTRACT No. 50-4330-D
 WALNUT GROVE
 LOTS 1 thru 88, BUILDABLE PRESERVATION PARCEL "A",
 NON-BUILDABLE PRESERVATION PARCELS "B THRU "I", "K" and "L"
 and NON-BUILDABLE BULK PARCEL "J"
 LIBER 572 FOLIO 430
 HOWARD COUNTY, MARYLAND
 DEPARTMENT OF PUBLIC WORKS

TYPE OF BUILDING	RESIDENTIAL
NUMBER OF UNITS	88 + 1 Existing House
NUMBER OF S.H.C.'s	87 INDIVIDUAL SEPTIC FIELDS (LOTS 16 AND 33 HAVE THERE WILL BE A WELL ON EACH INDIVIDUAL LOT)
NUMBER OF W.H.C.'s	N/A
DRAINAGE AREA	COMMUNITY SEPTIC FIELD ON PRESERVATION PARCEL 'A'
TREATMENT PLANT	

GENERAL NOTES

- PART I**
1. APPROXIMATE LOCATIONS OF ALL EXISTING GRAVITY SEWER 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.
 2. TOPOGRAPHIC FIELD SURVEYS WERE PERFORMED IN NOV. 2002 BY GLM PA.
 3. 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. 28FB AND No. 35A2.
 - ALL VERTICAL CONTROLS ARE BASED ON NAVD '29. VERTICAL CONTROLS PROVIDED ON DRAWINGS IS No. 28FB AND No. 35A2.
 - 35A2: NORTHING: 56454.794 ft. 28FB: NORTHING: 57070.155 ft.
 EASTING: 1531201.065 ft. EASTING: 1524525.449 ft.
 ELEVATION: 488.641 ft. ELEVATION: 586.506 ft.
 4. ALL PIPE ELEVATIONS SHOWN ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
 5. 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 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.
 6. 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.
 7. WHERE TEST PITS HAVE BEEN MADE ON EXISTING UTILITIES, THEY ARE NOTED BY THE SYMBOL ⊠ AT THE LOCATIONS OF THE TEST PITS. A NOTE OR NOTES CONTAINING THE RESULTS OF THE TEST PIT OR PITS IS INCLUDED ON THE DRAWINGS. EXISTING UTILITIES IN THE VICINITY OF THE PROPOSED WORKS 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.
 8. THE CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES OR AGENCIES AT LEAST FIVE WORKING DAYS BEFORE STARTING WORK ON THESE PLANS:

AT&T	1-800-252-1133
EGE (CONTRACTOR SERVICES)	410-850-4620
EGE (UNDER GROUND DAMAGE CONTROL)	410-685-1400
BUREAU OF UTILITIES	410-315-4400
COLONIAL PIPELINE CO.	410-745-1940
MISS UTILITY	1-800-251-7771
STATE HIGHWAY ADMINISTRATION	410-531-5533
VERIZON	1-800-749-0033 / 410-224-4210
 9. TREES AND SHRUBS ARE TO BE PROTECTED FROM DAMAGE TO THE MAXIMUM EXTENT. TREES AND SHRUBS LOCATED WITHIN THE CONSTRUCTION AREA STRIP ARE NOT TO BE REMOVED OR DAMAGED BY THE CONTRACTOR.
 10. 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.
 11. THE CONTRACTOR SHALL NOTIFY THE BUREAU OF HIGHWAYS, HOWARD COUNTY, AT (410)-315-1450 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 DPM REQUIREMENTS PER SECTION 18.114(a) OF THE HOWARD COUNTY CODE.

PART II - WATER

1. ALL WATER ON THIS SITE IS TO BE PROVIDED BY PRIVATE WELLS LOCATED ON INDIVIDUAL LOTS.

PART III - SEWER

1. ALL SEWER MAINS SHALL BE P.V.C. UNLESS OTHERWISE NOTED.
2. ALL MANHOLES SHALL BE 4'-0" INSIDE DIAMETER UNLESS OTHERWISE NOTED.
3. LOW PRESSURE FORCE MAINS SHALL BE SDR 21 PVC PIPE OR EQUIVALENT, (L.P.S.=L.P.S.S.+P.S.).
4. MANHOLES SHOWN WITH THE 12" AND 16" WALLS ARE FOR BRICK MANHOLES ONLY.
5. MANHOLES DESIGNATED N.T. IN PLAN AND PROFILE SHALL HAVE MATERTIGHT FRAME AND COVER, STANDARD DETAIL 65.52. WHERE WATERTIGHT MANHOLE FRAMES AND COVERS ARE USED, SET TOP OF FRAME 1'-6" ABOVE FINISHED GRADE UNLESS OTHERWISE NOTED ON THE DRAWINGS.
6. HOUSE(S) WITH THE SYMBOL "C.N.S." INDICATES THE CELLAR CANNOT BE SERVED.
7. ALL FITTINGS SHALL BE BUTTRESSED OR ANCHORED WITH CONCRETE IN ACCORDANCE WITH STANDARD DETAILS UNLESS OTHERWISE PROVIDED ON THE DRAWINGS.

SPECIFIC NOTES

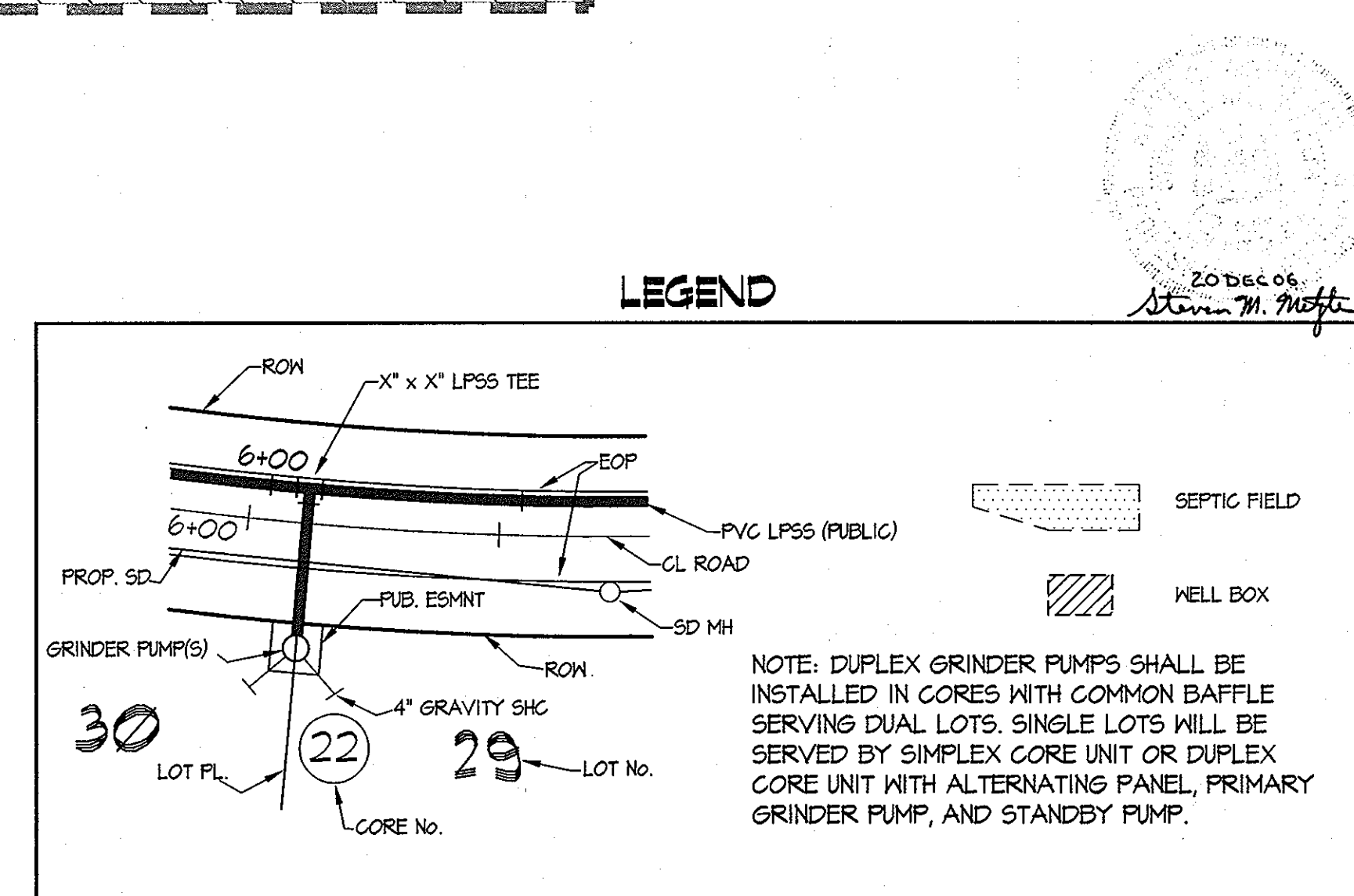
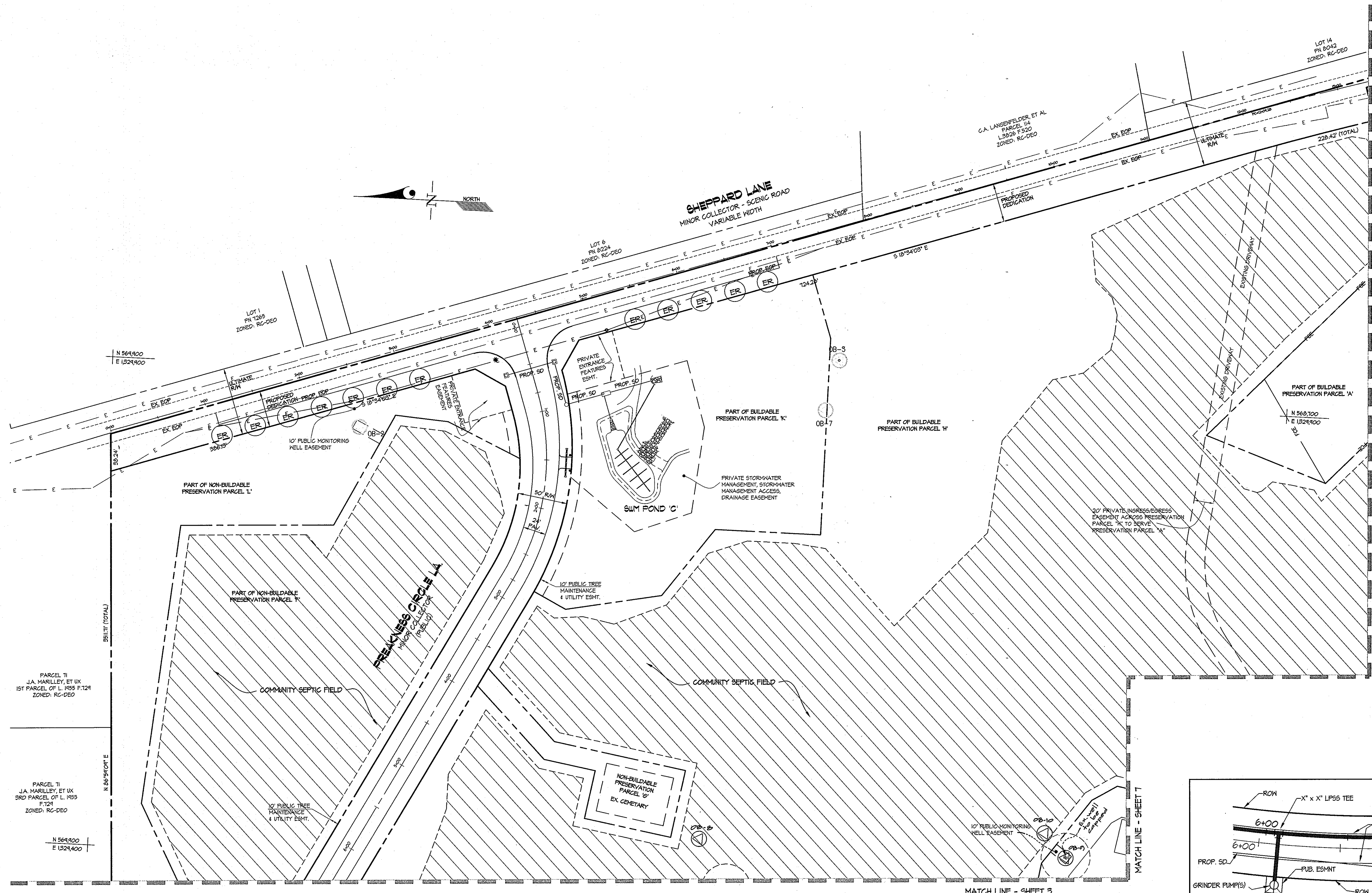
1. ALL SITE IMPROVEMENTS SHOWN WITH THE EXCEPTION OF THE SEPTIC COLLECTION AND TREATMENT SYSTEMS ARE PER HOCO FILE # F-06-031.
2. THE SEPTIC TREATMENT SYSTEM SHOWN IS PER CONTRACT # 50-4359-D.
3. MINIMUM CELLAR ELEVATIONS SHOWN REPRESENT THE LOWEST FINISHED FLOOR ELEVATION SERVICEABLE BY GRAVITY FLOW HOUSE CONNECTION TO THE GRINDER PUMP AT THE RIGHT OF WAY. ALL FINISHED FLOOR ELEVATIONS BELOW THE LISTED MCE ARE TO BE SERVICED BY AN EJECTOR PUMP OR LEFT UNSERVICED.

AS BUILT
 84 DFI DATE: 2-2-12



DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND <i>R. J. B...</i> 1-30-07 CHIEF, BUREAU OF UTILITIES DATE	DEPARTMENT OF PLANNING AND ZONING HOWARD COUNTY, MARYLAND _____ 2/6/07 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE	GLWGUTSCHICK LITTLE & WEBER, P.A. CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS 3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK BURTONSVILLE, MARYLAND 20866 TEL: 301-421-4024 BALT: 410-880-1820 DC/VA: 301-889-2524 FAX: 301-421-4186	SAC Science Applications International Corporation 1129 Business Pkwy South Suite 10 Westminster, MD 21157 phone: 410.876.0280 fax: 410.875.5535	DES: Wsj/BJM DRN: Wsj/KLP CHK: BJM DEC: 2006 BY NO REVISION DATE	SEWER PLAN SCALE: AS SHOWN 600' SCALE MAP NO. 28 BLOCK NO. 17.18	WALNUT GROVE LOTS 1 THRU 88, BUILDABLE PRESERVATION PARCEL "A", NON-BUILDABLE PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND NON-BUILDABLE BULK PARCEL "J" HOWARD COUNTY, MARYLAND ELECTION DISTRICT No. 6 CONTRACT No. 50-4330-D	SCALE AS SHOWN SHEET 1 OF 16
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AS BUILT
 BY: DEJ DATE: 2-2-12

WALNUT GROVE
 LOTS 1 THRU 88, BUILDABLE PRESERVATION PARCEL "A", NON-BUILDABLE PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND NON-BUILDABLE BULK PARCEL "J"
 HOWARD COUNTY, MARYLAND
 ELECTION DISTRICT No. 6
 CONTRACT No. 50-4330-D

GLW FILE #00153

SCALE AS SHOWN
 SHEET 2 OF 16

DEPARTMENT OF PUBLIC WORKS
 HOWARD COUNTY, MARYLAND

Robert M. Beames 1-30-07
 CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING AND ZONING
 HOWARD COUNTY, MARYLAND

[Signature] 2/7/07
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

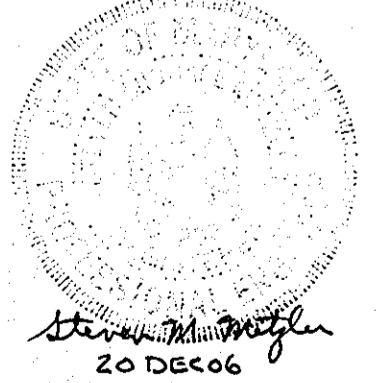
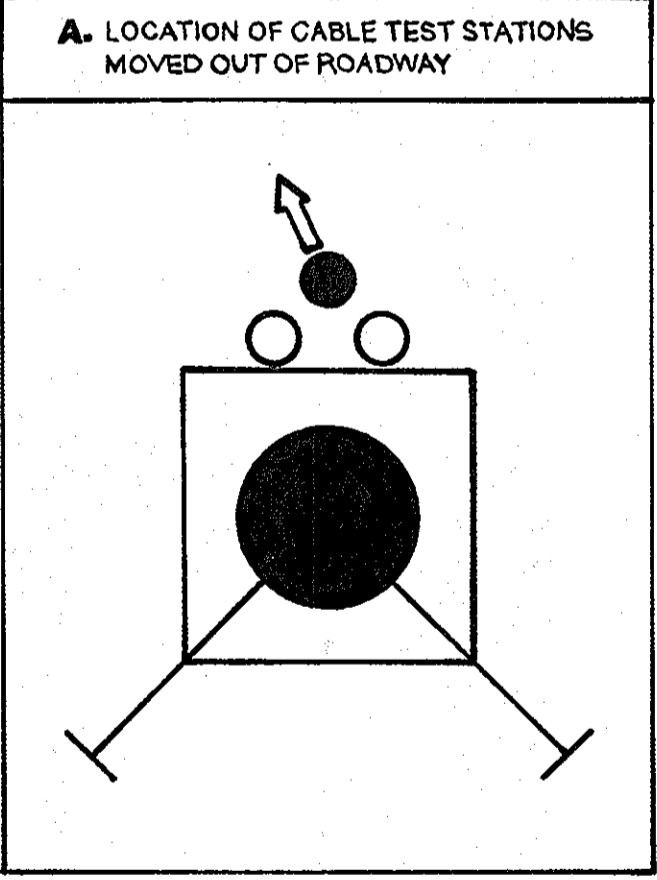
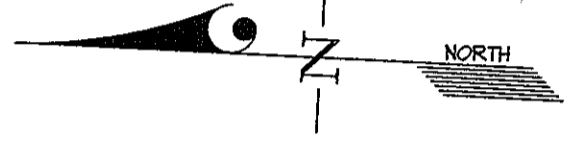
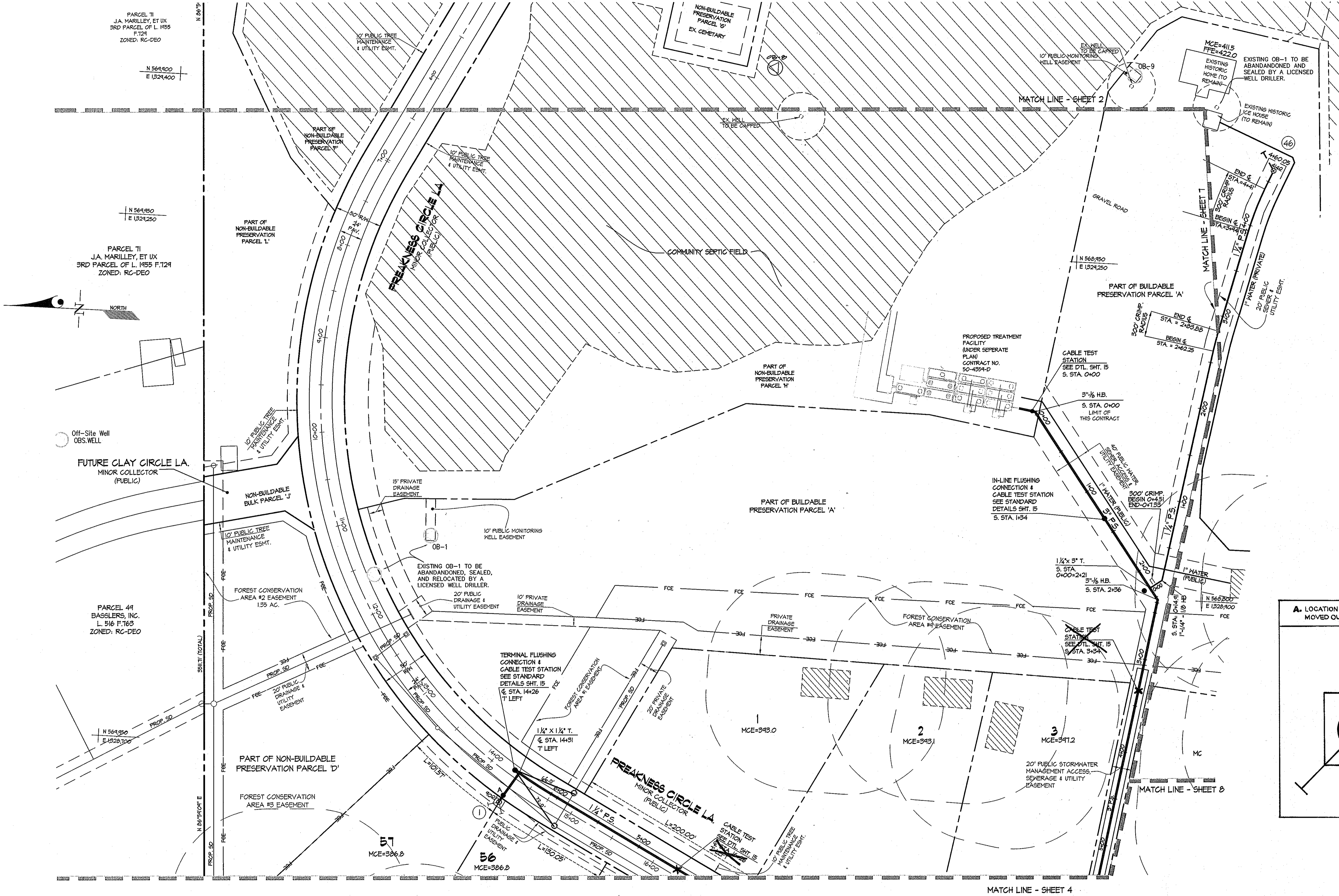
GLW GUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
 BURTONSVILLE, MARYLAND 20886
 TEL: 301-421-4024 BAL: 410-880-1820 DC/WA: 301-989-2524 FAX: 301-421-4186

SAIC Science Applications
 From Science to Solutions - International Corporation
 1129 Business Pkwy South
 Suite 10
 Westminster, MD 21157
 phone: 410.876.0200
 fax: 410.857.5535

DES: BJM/Wsj				
DRN: KLP/Wsj				
CHK:				
DATE: DEC. 2006	BY	NO	REVISION	DATE

SEWER PLAN
 SCALE: 1" = 50'

600' SCALE MAP NO. 28 BLOCK NO. 17.18



AS BUILTS
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GLW FILE #00153

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DEPARTMENT OF PUBLIC WORKS
 HOWARD COUNTY, MARYLAND
Robert W. Baunig 1-30-07
 CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING AND ZONING
 HOWARD COUNTY, MARYLAND
[Signature] 2/1/07
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

GLW GUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
 BURTONSVILLE, MARYLAND 20866
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 1129 Business Pkwy South
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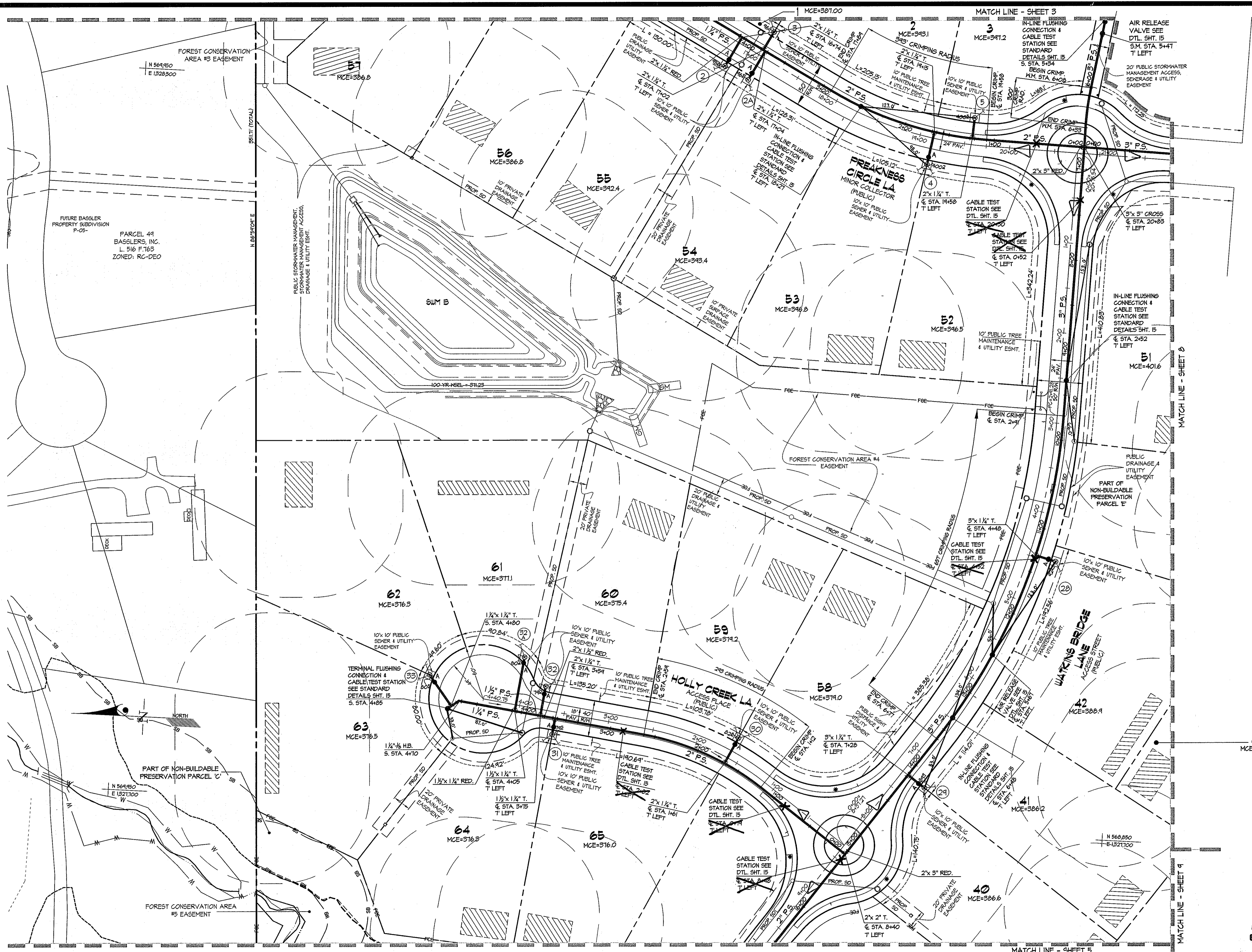
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CHK:					
JUNE 2006	BY	NO	REVISION	DATE	

SEWER PLAN
 SCALE: 1" = 50'
 600' SCALE MAP NO. 28 BLOCK NO. 17.18

WALNUT GROVE
 LOTS 1 THRU 88, BUILDABLE PRESERVATION PARCEL "A", NON-BUILDABLE PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND NON-BUILDABLE BULK PARCEL "J"
 HOWARD COUNTY, MARYLAND
 ELECTION DISTRICT No. 6
 CONTRACT No. 50-4330-D

SCALE AS SHOWN
 SHEET 3 OF 16

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NOTE: FOR DETAIL REGARDING THE LOCATION OF CABLE TEST STATIONS SEE SHEET 2 OF 16.

AS BUILTS
DATE 2-2-12

GLW FILE #00153

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
R. M. Benjamin
1-30-09
DATE

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND
2/2/12
DATE

GLWGUTSCHICK LITTLE & WEBER, P.A.
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
3909 NATIONAL DRIVE - SUITE 250 - BURTNSVILLE OFFICE PARK
BURTNSVILLE, MARYLAND 20868
TEL: 301-421-4024 BAL: 410-880-1820 DC/VA: 301-989-2524 FAX: 301-421-4186

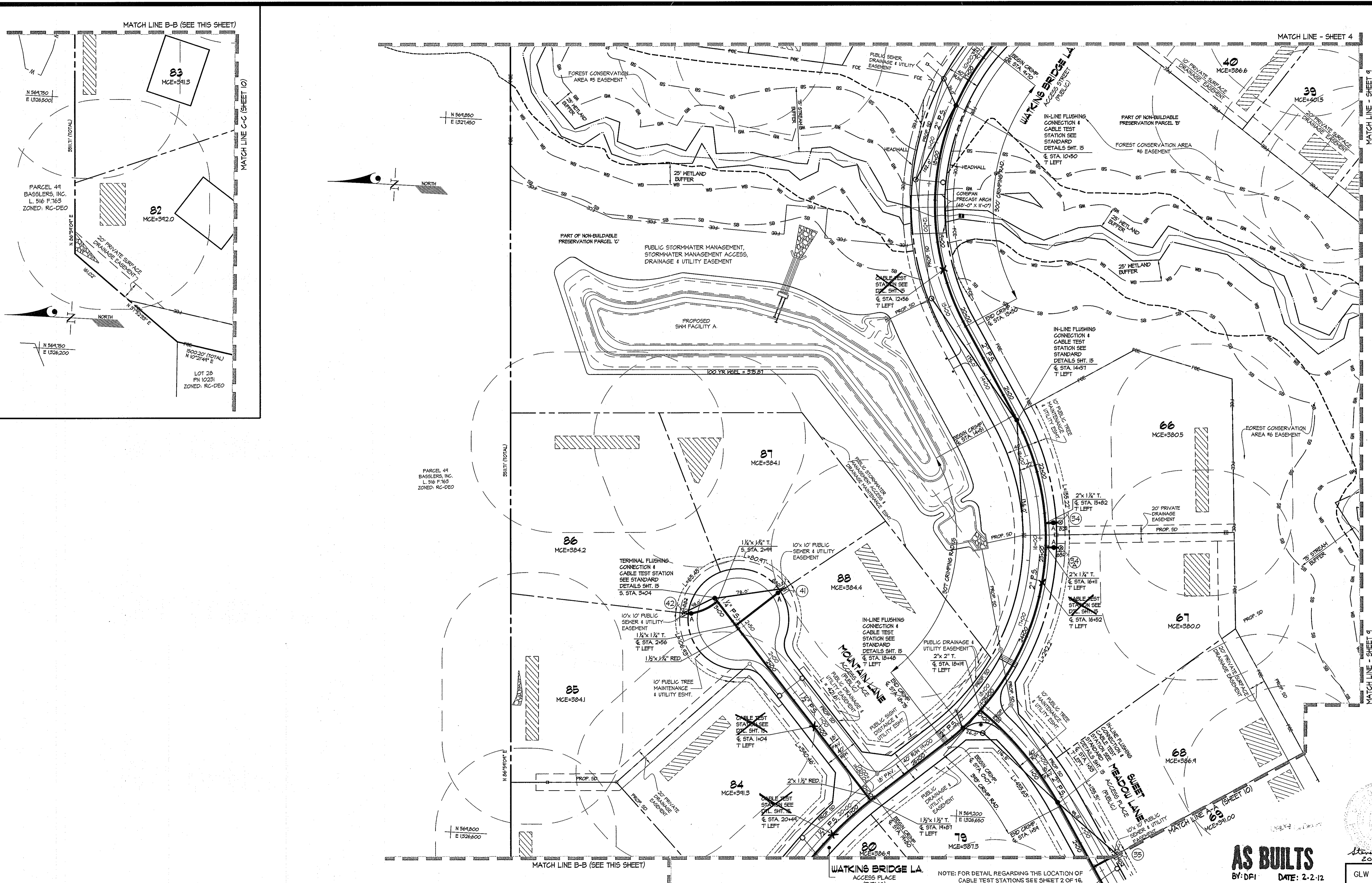
SAI Science Applications
1129 Business Pkwy South
Suite 10
Westminster, MD 21157
phone: 410.576.0290
fax: 410.575.5535

DES: B.M./W.S.J.	
DRN: K.L.P./W.S.J.	
CHK:	
DATE: 2006	
BY	NO
REVISION	
DATE	

SEWER PLAN
SCALE: 1" = 50'
60' SCALE MAP NO. 28 BLOCK NO. 17.18

WALNUT GROVE
LOTS 1 THRU 88, BUILDABLE PRESERVATION
PARCEL "A", NON-BUILDABLE
PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND
NON-BUILDABLE BULK PARCEL "J"
HOWARD COUNTY, MARYLAND
ELECTION DISTRICT No. 6
CONTRACT No. 50-4330-D

SCALE AS SHOWN
SHEET 4 OF 16



DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

Robert B. Bennett
CHIEF, BUREAU OF UTILITIES
1-30-07
DATE

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND

[Signature]
CHIEF, DEVELOPMENT-ENGINEERING DIVISION
3/9/07
DATE

GLWGUTSCHICK LITTLE & WEBER, P.A.
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
Suite 10
3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
BURTONSVILLE, MARYLAND 20866
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an Science & Solutions - International Corporation
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phone: 410.876.0280
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DRN:KLP/Wsj					
CHK:					
DEC. DATE: 2006	BY	NO	REVISION	DATE	

SEWER PLAN
SCALE: 1" = 50'

NOTE: FOR DETAIL REGARDING THE LOCATION OF CABLE TEST STATIONS SEE SHEET 2 OF 16.

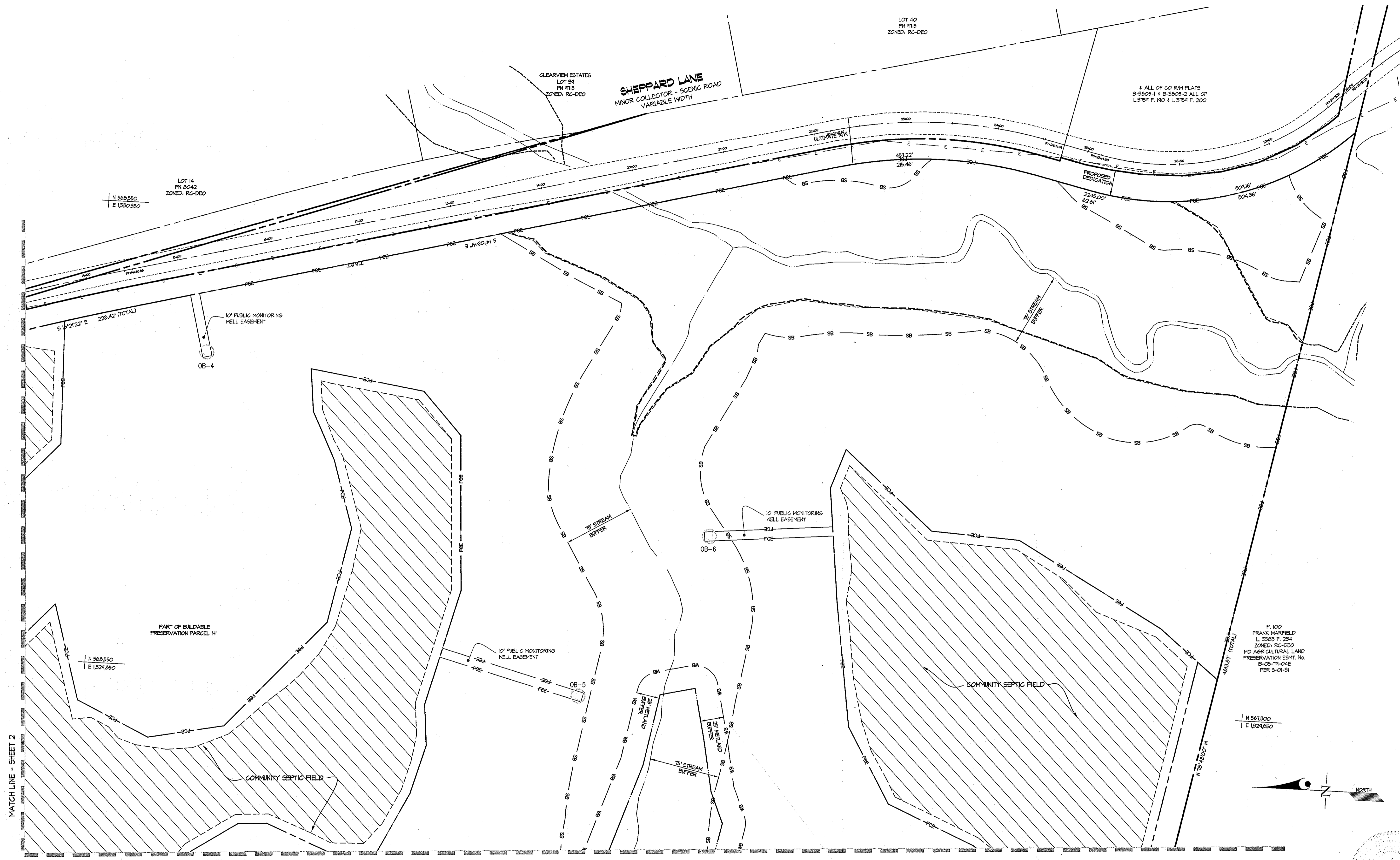
600' SCALE MAP NO. 28 BLOCK NO. 17.18

AS BUILTS
BY:DFI DATE: 2-2-12
GLW FILE #00153

WALNUT GROVE
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ELECTION DISTRICT No. 6
CONTRACT No. 50-4330-D

SCALE AS SHOWN
SHEET 5 OF 16

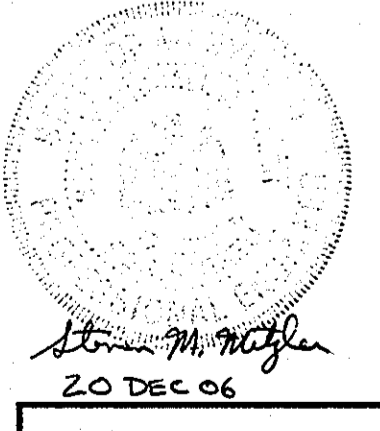
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MATCH LINE - SHEET 2

MATCH LINE - SHEET 7

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DATE: 2.2.12



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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
Robert M. Weber 1-30-07
CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND
Robert M. Weber 12/17/06
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

GLW GUTSCHICK LITTLE & WEBER, P.A.
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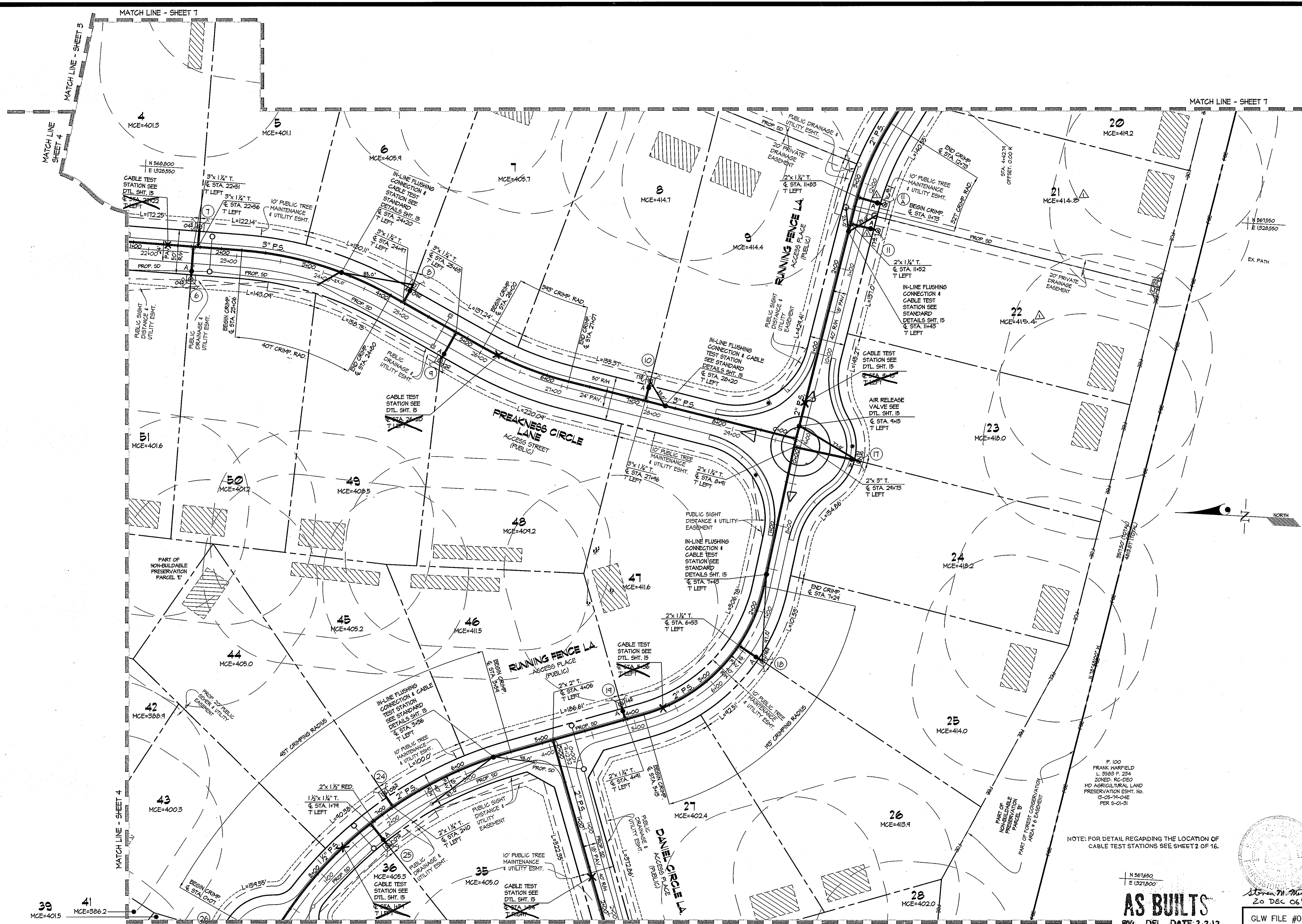
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SCALE: 1" = 50'
600' SCALE MAP NO. 28 BLOCK NO. 17.18

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HOWARD COUNTY, MARYLAND
ELECTION DISTRICT No. 6
CONTRACT No. 50-4330-D

SCALE AS SHOWN
SHEET 6 OF 16



NOTE: FOR DETAIL REGARDING THE LOCATION OF CABLE TEST STATIONS SEE SHEET 2 OF 16.

AS BUILTS
BY: DFI DATE: 2-2-12

Seaman M. Miller
20 DEC 06
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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
R. B. Bunn 1-30-07
CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND
[Signature] 2/1/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

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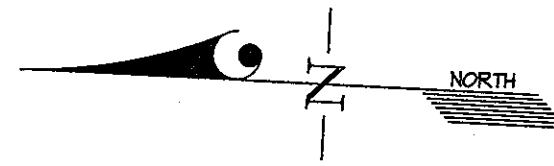
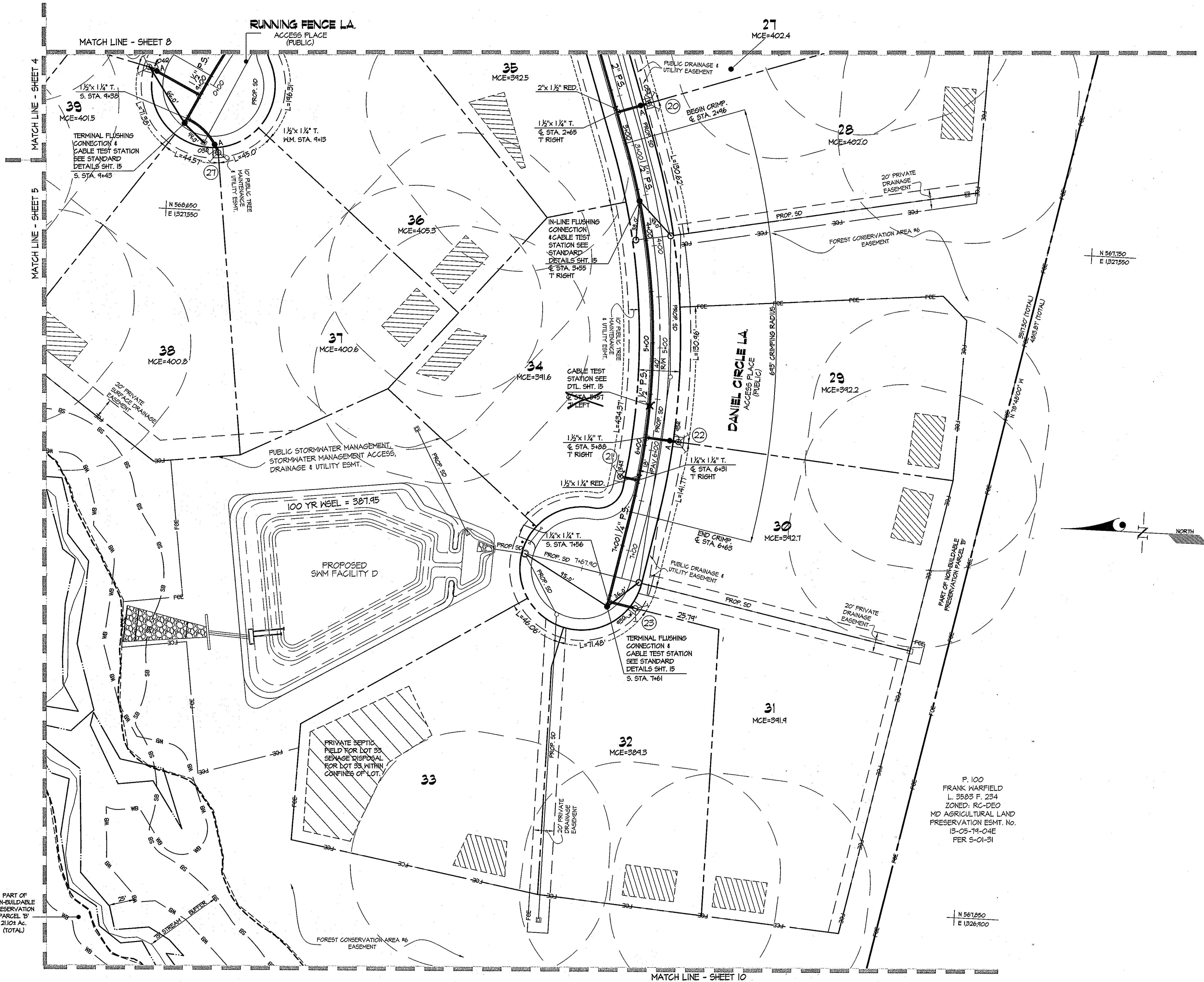
SAC Science Applications
an Equal Opportunity International Corporation
1129 Business Fleety South
Suite 10
Westminster, MD 21157
phone: 410.876.0280
fax: 410.857.5335

DES: BJM/Wsj			
DRN: KLP/Wsj			
CHK:			
DATE: 2006	BY: NO	REVISION	DATE
			11-16-07

SEWER PLAN
SCALE: 1" = 50'
600' SCALE MAP NO. 28 BLOCK NO. 17.18

WALNUT GROVE
LOTS 1 THRU 88, BUILDABLE PRESERVATION PARCEL "A", NON-BUILDABLE PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND NON-BUILDABLE BULK PARCEL "J"
HOWARD COUNTY, MARYLAND
ELECTION DISTRICT No. 6
CONTRACT No. 50-4330-D
SCALE AS SHOWN
SHEET 8 OF 16

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NOTE: FOR DETAIL REGARDING THE LOCATION OF CABLE TEST STATIONS SEE SHEET 2 OF 16.

AS BUILTS
DATE: 2-2-12



GLW FILE #00153

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
R. H. Bunker 1-30-07
CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND
[Signature] 2/1/07
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

GLW GUTSCHICK LITTLE & WEBER, P.A.
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
BURTONSVILLE, MARYLAND 20866
TEL: 301-421-4024 BALT: 410-880-1820 DC/WA: 301-989-2524 FAX: 301-421-4186

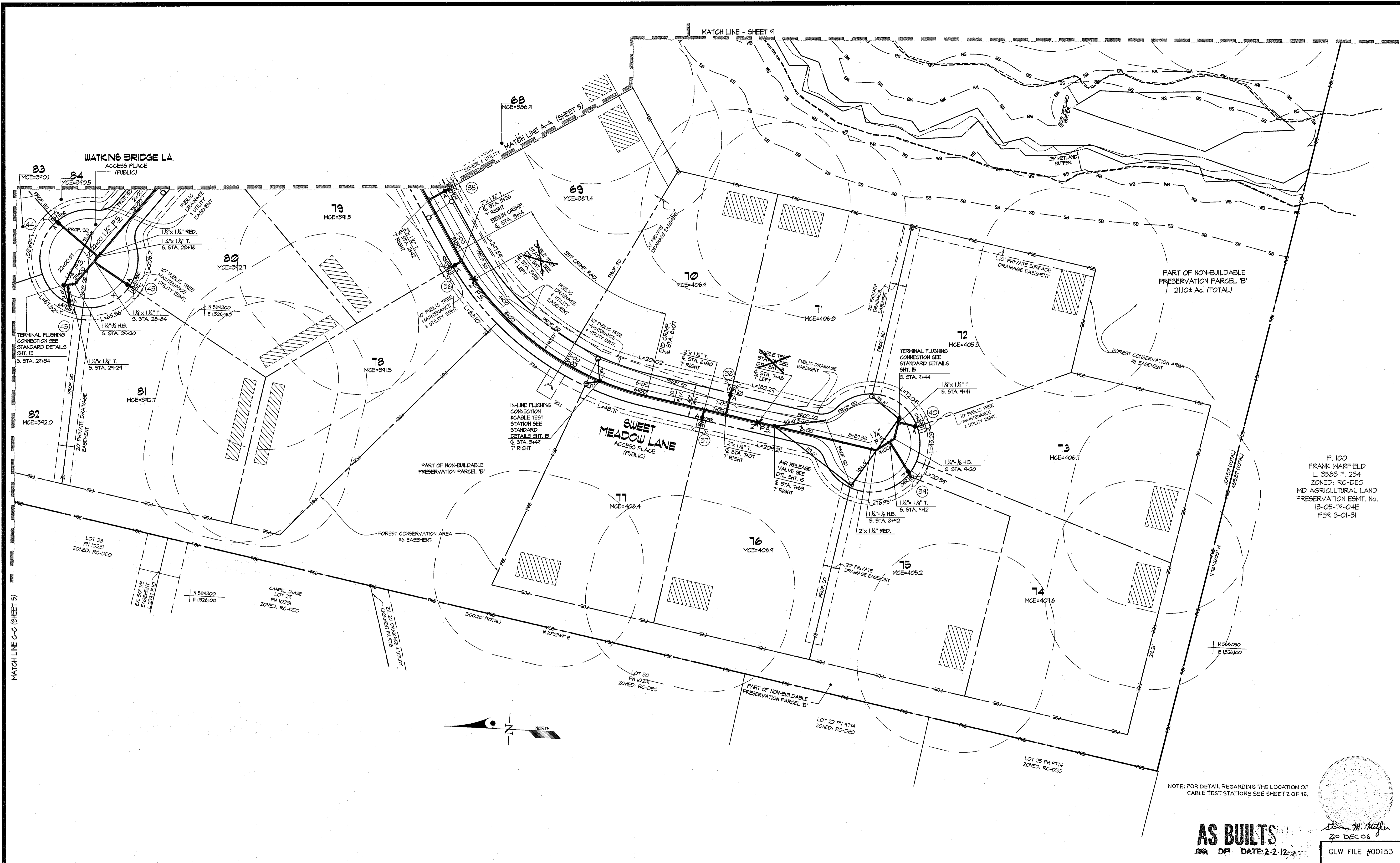
SAIC Science Applications
International Corporation
1129 Business Pkwy South
Suite 10
Westminster, MD 21157
phone: 410-576-0230
fax: 410-857-5535

DES:BJM/Wsj					
DRN:KLP/Wsj					
CHK:					
DATE: 2006	BY	NO	REVISION	DATE	

SEWER PLAN
SCALE: 1" = 50'
600' SCALE MAP NO. 28 BLOCK NO. 17.18

WALNUT GROVE
LOTS 1 THRU 88, BUILDABLE PRESERVATION PARCEL "A", NON-BUILDABLE PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND NON-BUILDABLE BULK PARCEL "J"
HOWARD COUNTY, MARYLAND
ELECTION DISTRICT No. 6
CONTRACT No. 50-4330-D

SCALE AS SHOWN
SHEET 9 OF 16



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MATCH LINE C-C (SHEET 5)

MATCH LINE - SHEET 4

NOTE: FOR DETAIL REGARDING THE LOCATION OF CABLE TEST STATIONS SEE SHEET 2 OF 16.

AS BUILTS
 DATE: 2-2-12
 GLW FILE #00153



DEPARTMENT OF PUBLIC WORKS
 HOWARD COUNTY, MARYLAND
 Chief, Bureau of Utilities
 Date: 1-30-07

DEPARTMENT OF PLANNING AND ZONING
 HOWARD COUNTY, MARYLAND
 Chief, Development Engineering Division
 Date: 2/1/07

GLWGUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
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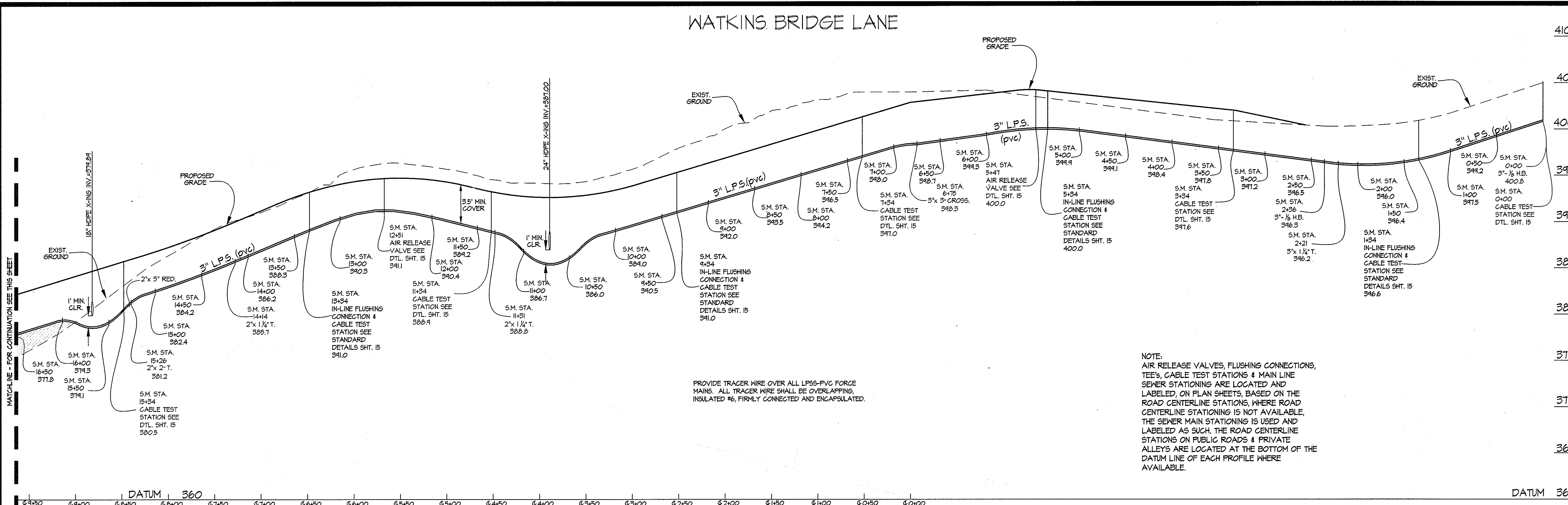
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CHK:					
DATE: DEC. 2006	BY	NO	REVISION	DATE	

SEWER PLAN
 SCALE: 1" = 50'
 600' SCALE MAP NO. 28 BLOCK NO. 17.18

WALNUT GROVE
 LOTS 1 THRU 88, BUILDABLE PRESERVATION PARCEL "A", NON-BUILDABLE PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND NON-BUILDABLE BULK PARCEL "J"
 HOWARD COUNTY, MARYLAND
 ELECTION DISTRICT No. 6
 CONTRACT No. 50-4330-D

SCALE AS SHOWN
 SHEET 10 OF 16

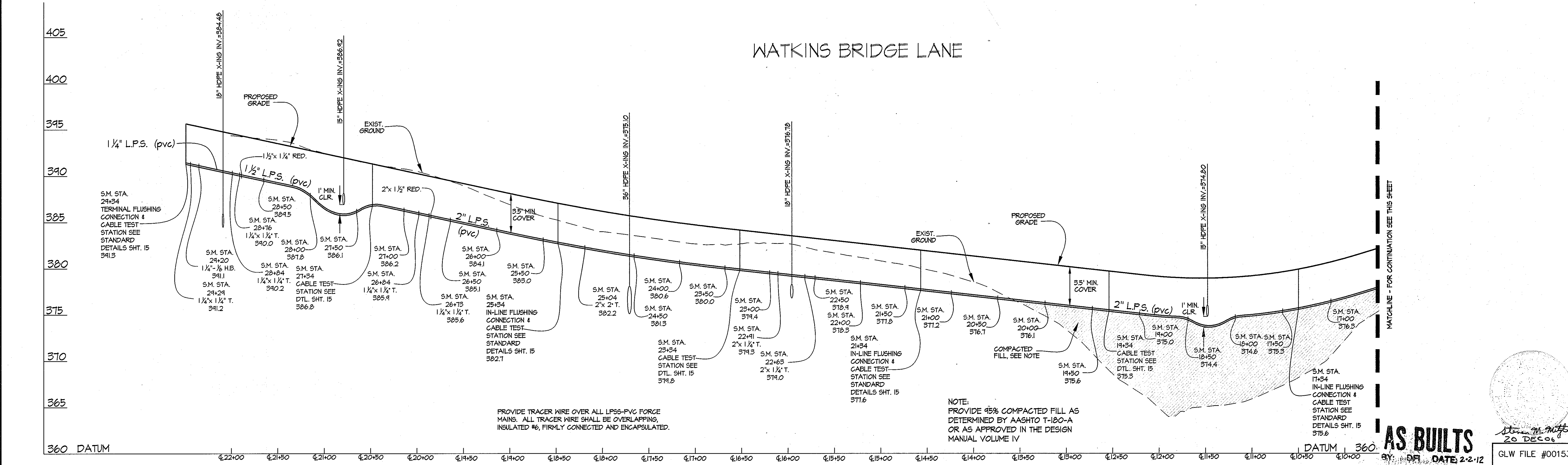
WATKINS BRIDGE LANE



PROVIDE TRACER WIRE OVER ALL LPS-PVC FORCE MAINS. ALL TRACER WIRE SHALL BE OVERLAPPING, INSULATED #6, FIRMLY CONNECTED AND ENCAPSULATED.

NOTE:
AIR RELEASE VALVES, FLUSHING CONNECTIONS, TEE'S, CABLE TEST STATIONS & MAIN LINE SEWER STATIONING ARE LOCATED AND LABELED, ON PLAN SHEETS, BASED ON THE ROAD CENTERLINE STATIONS, WHERE ROAD CENTERLINE STATIONING IS NOT AVAILABLE, THE SEWER MAIN STATIONING IS USED AND LABELED AS SUCH. THE ROAD CENTERLINE STATIONS ON PUBLIC ROADS & PRIVATE ALLEYS ARE LOCATED AT THE BOTTOM OF THE DATUM LINE OF EACH PROFILE WHERE AVAILABLE.

WATKINS BRIDGE LANE



PROVIDE TRACER WIRE OVER ALL LPS-PVC FORCE MAINS. ALL TRACER WIRE SHALL BE OVERLAPPING, INSULATED #6, FIRMLY CONNECTED AND ENCAPSULATED.

NOTE:
PROVIDE 95% COMPACTED FILL AS DETERMINED BY AASHTO T-100-A OR AS APPROVED IN THE DESIGN MANUAL VOLUME IV

AS BUILTS
DATE 2-2-12



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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
Robert J. Adams 1-30-09
CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND
[Signature] 2/1/12
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

GLWGUTSCHICK LITTLE & WEBER, P.A.
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK
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TEL: 301-421-4024 FAX: 410-880-1820 DC/VAC 301-889-2524 FAX: 301-421-4186

SAIC Science Applications
International Corporation
1129 Business Pkwy South
Suite 10
Westminster, MD 21157
phone: 410.876.0280
fax: 410.857.5535

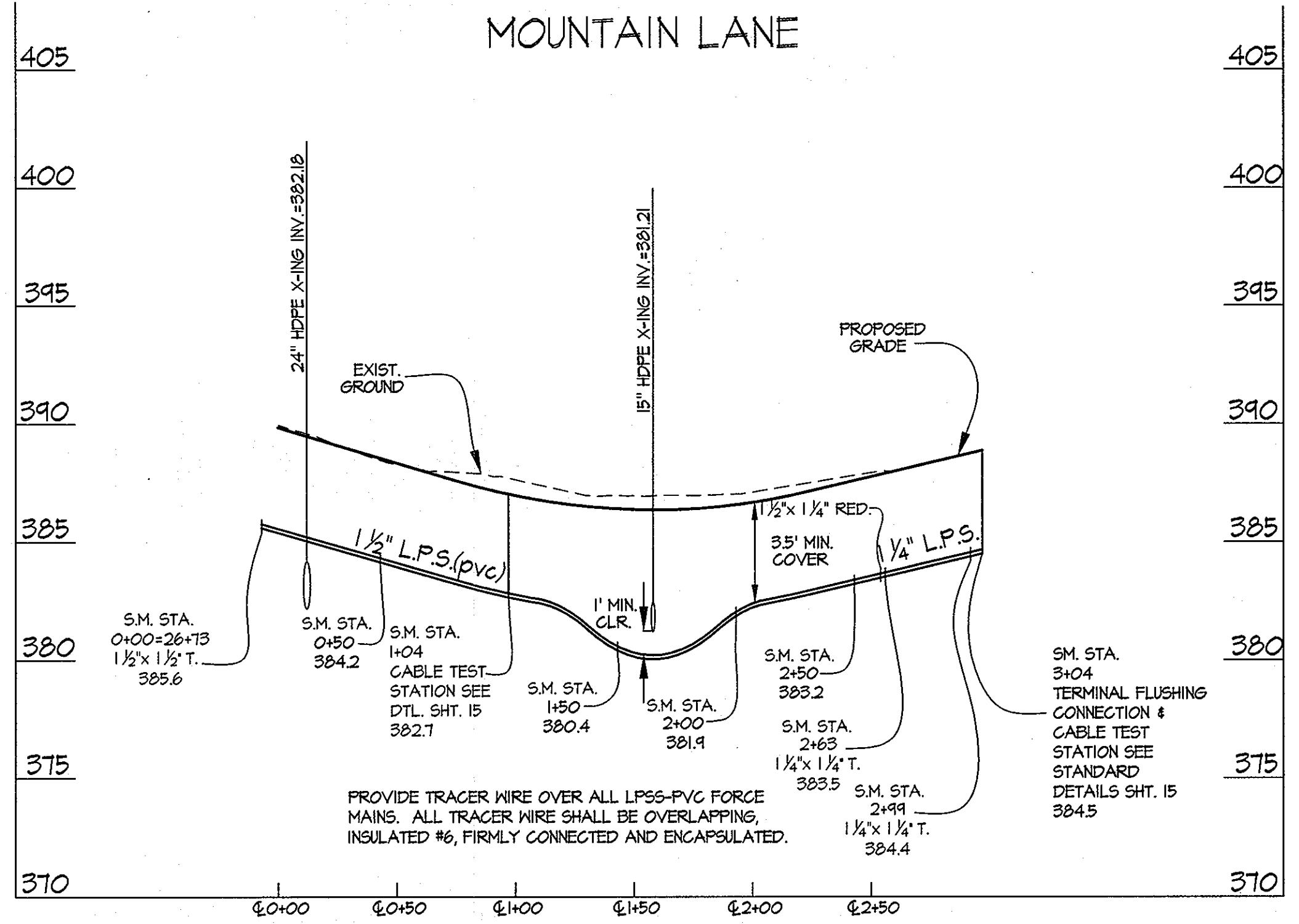
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DRN: WSJ			
CHK:			
DATE: 2006			
BY	NO	REVISION	DATE

SEWER PROFILES
SCALE: 1" = 50" (HORZ.)
1" = 5' (VERT.)
600' SCALE MAP NO. 28 BLOCK NO. 17.18

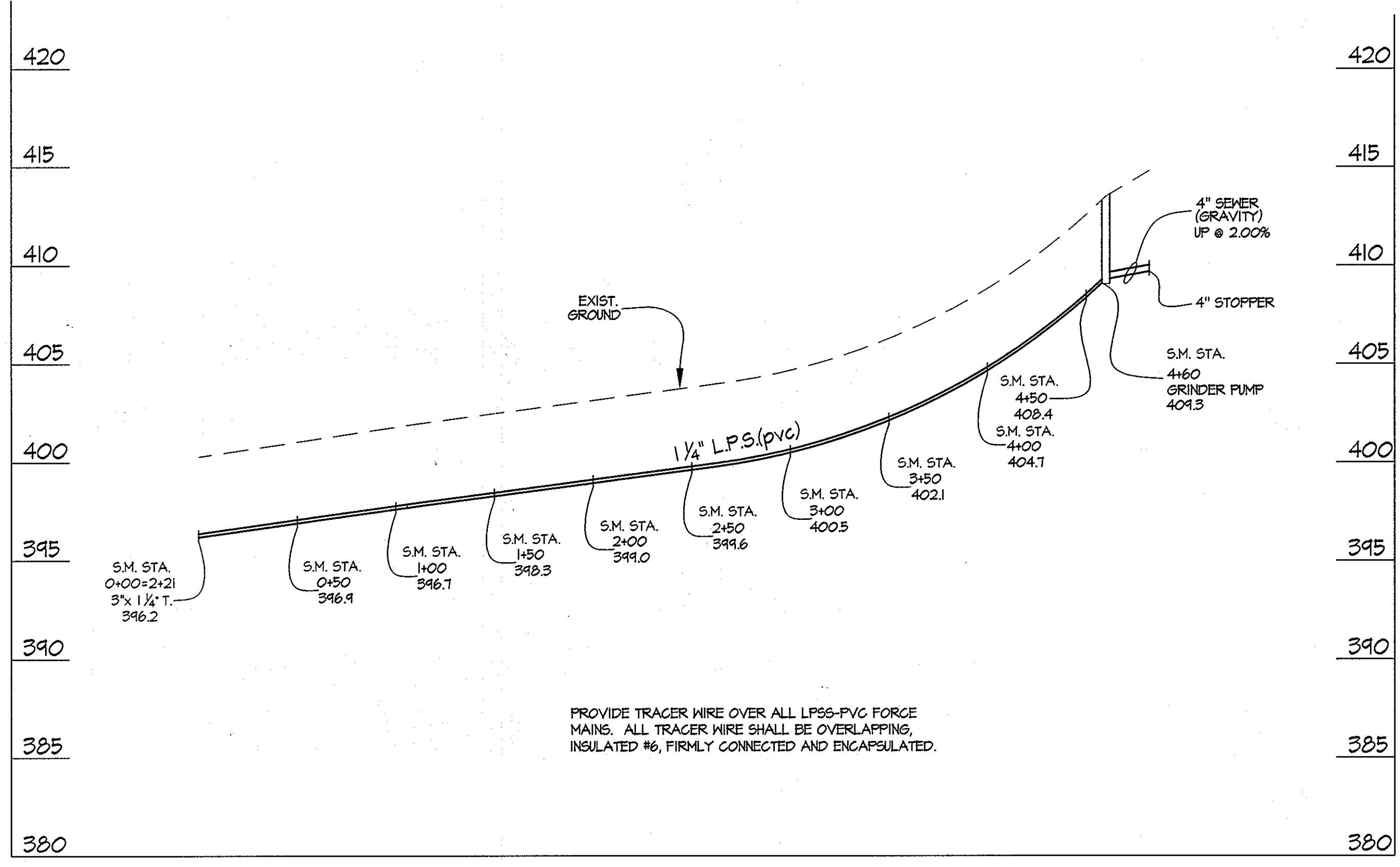
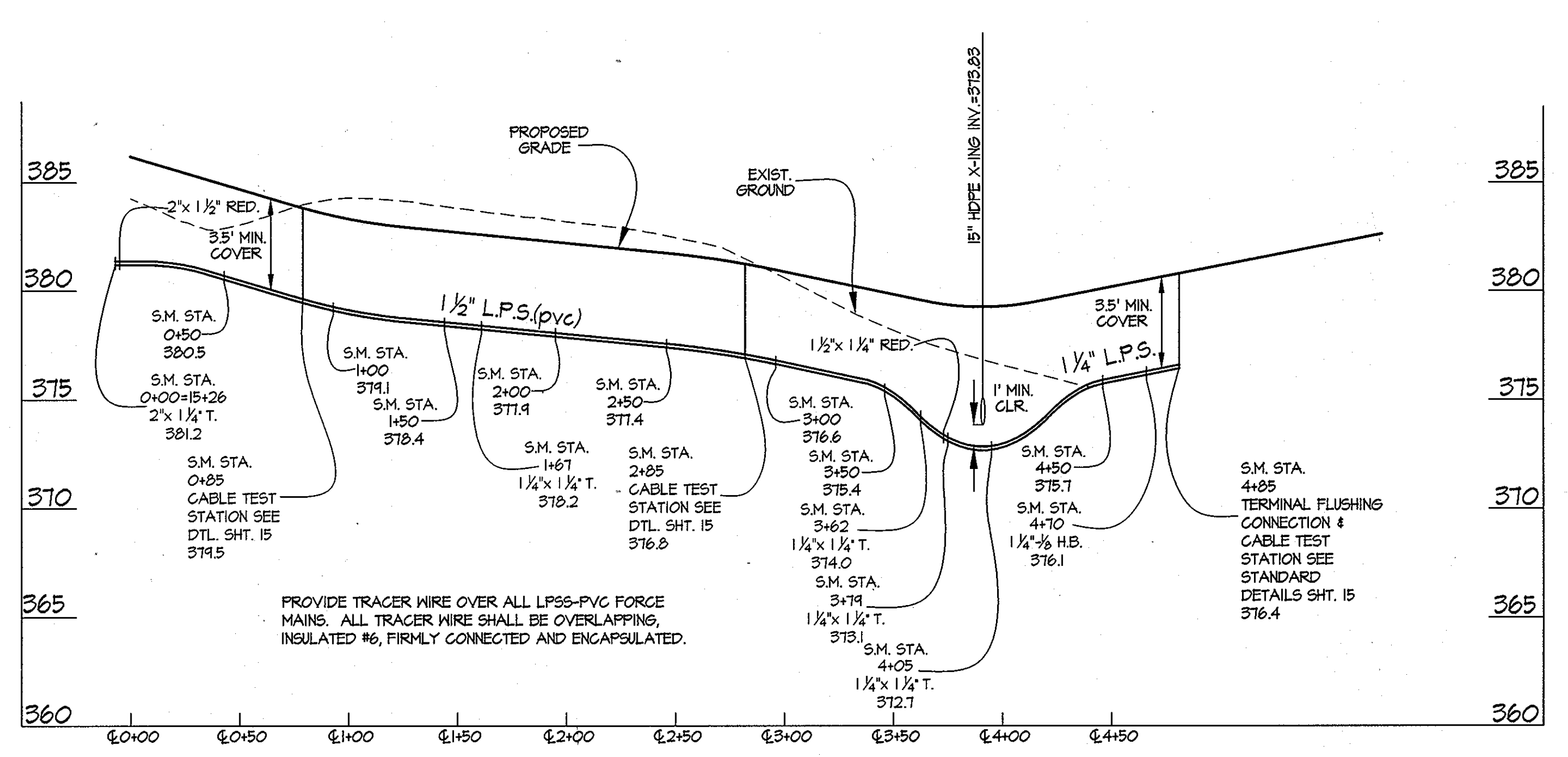
WALNUT GROVE
LOTS 1 THRU 88, BUILDABLE PRESERVATION PARCEL "A", NON-BUILDABLE PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND NON-BUILDABLE BULK PARCEL "J"
HOWARD COUNTY, MARYLAND
ELECTION DISTRICT No. 6
CONTRACT No. 50-4330-D

SCALE AS SHOWN
SHEET 11 OF 16

MOUNTAIN LANE



HOLLY CREEK LANE



NOTE:
AIR RELEASE VALVES, FLUSHING CONNECTIONS, TEE'S, CABLE TEST STATIONS & MAIN LINE SEWER STATIONING ARE LOCATED AND LABELED, ON PLAN SHEETS, BASED ON THE ROAD CENTERLINE STATIONS, WHERE ROAD CENTERLINE STATIONING IS NOT AVAILABLE, THE SEWER MAIN STATIONING IS USED AND LABELED AS SUCH. THE ROAD CENTERLINE STATIONS ON PUBLIC ROADS & PRIVATE ALLEYS ARE LOCATED AT THE BOTTOM OF THE DATUM LINE OF EACH PROFILE WHERE AVAILABLE.

AS BUILTS
BY: DFI DATE: 2-2-12

20 DEC 06
GLW FILE #00153

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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
Robert Bennis 1-30-07
CHIEF, BUREAU OF UTILITIES DATE

DEPARTMENT OF PLANNING AND ZONING
HOWARD COUNTY, MARYLAND
[Signature] 2/1/12
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

GLWGUTSCHICK LITTLE & WEBER, P.A.
CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
1129 Business Pkwy South Suite 10
Westminster, MD 21157 phone: 410.876.0280
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SAC Science Applications
From Science to Solutions - International Corporation
1129 Business Pkwy South Suite 10
Westminster, MD 21157 phone: 410.876.0280
fax: 410.857.5535

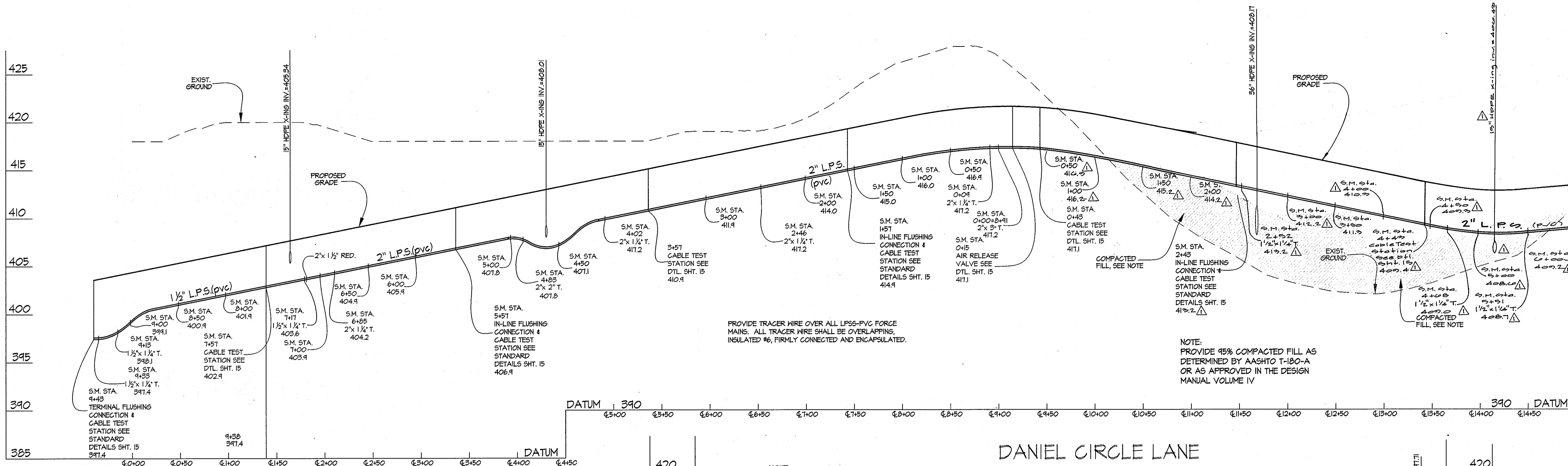
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DRN: Wsj					
CHK:					
DATE: 2006	BY	NO	REVISION	DATE	

SEWER PROFILES
SCALE: 1" = 50' (HORZ.)
1" = 5' (VERT.)
600' SCALE MAP NO. 28 BLOCK NO. 17.18

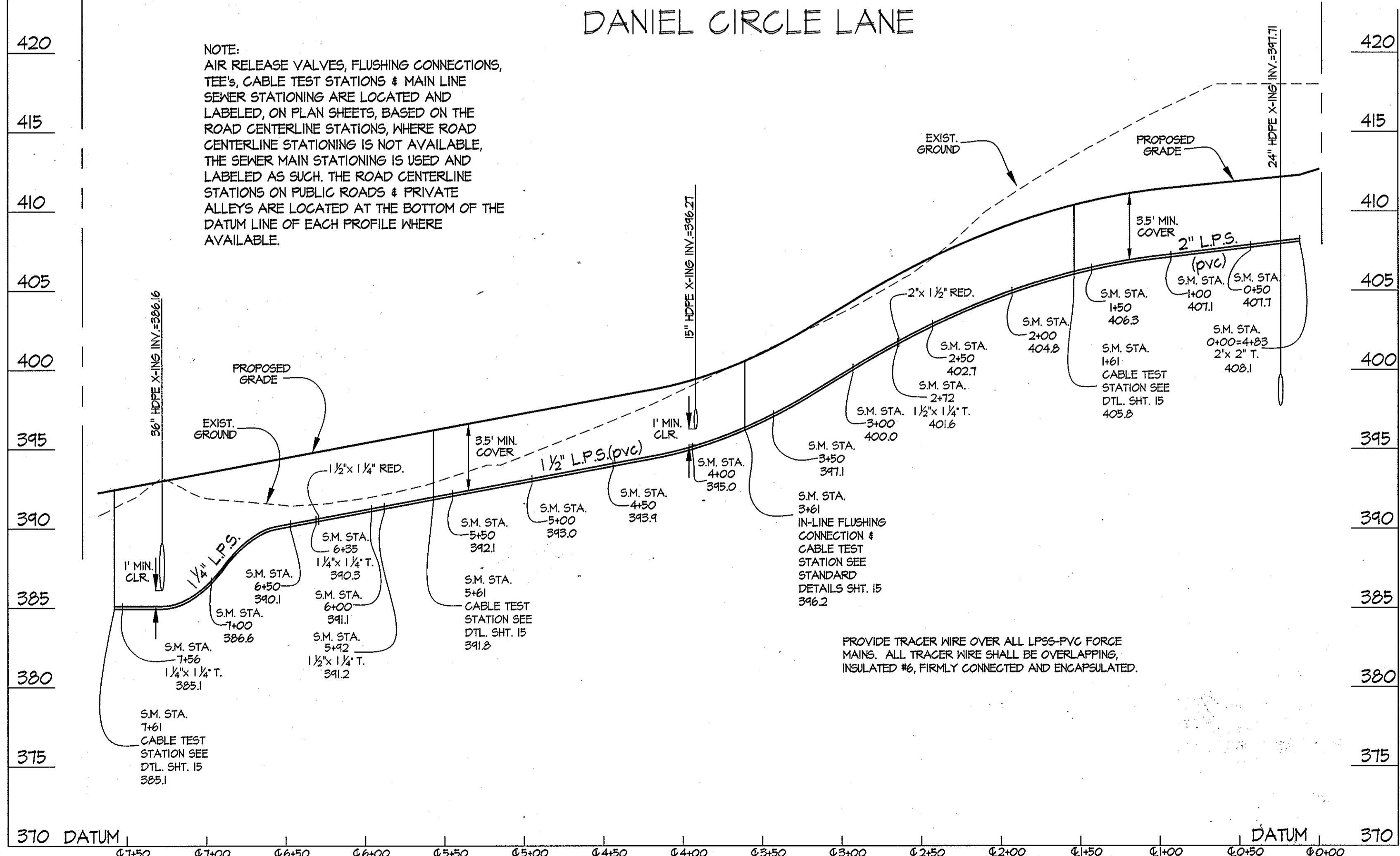
WALNUT GROVE
LOTS 1 THRU 88, BUILDABLE PRESERVATION PARCEL "A", NON-BUILDABLE PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND NON-BUILDABLE BULK PARCEL "J"
HOWARD COUNTY, MARYLAND
ELECTION DISTRICT No. 6
CONTRACT No. 50-4330-D

SCALE AS SHOWN
SHEET 13 OF 16

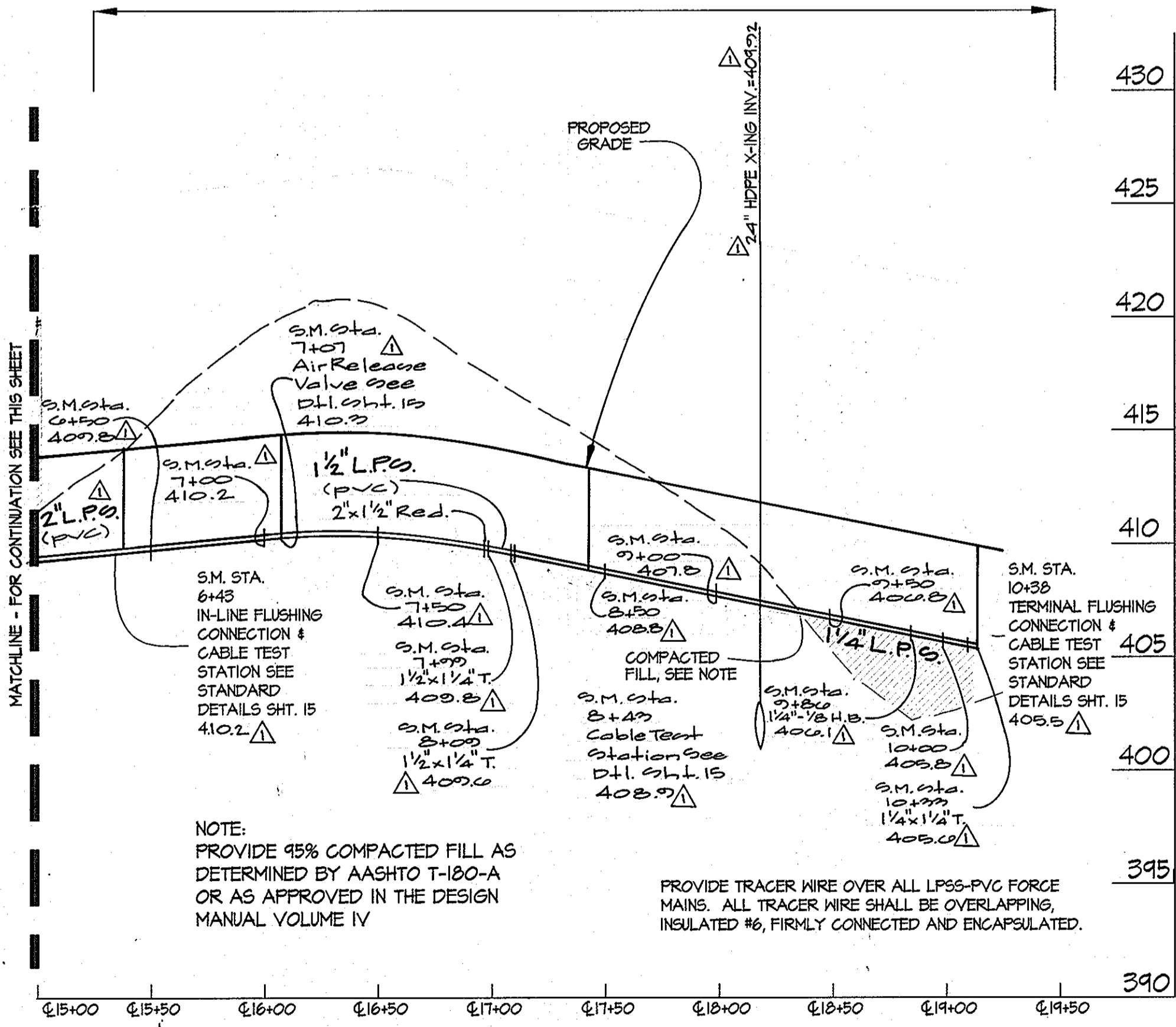
RUNNING FENCE LANE



DANIEL CIRCLE LANE



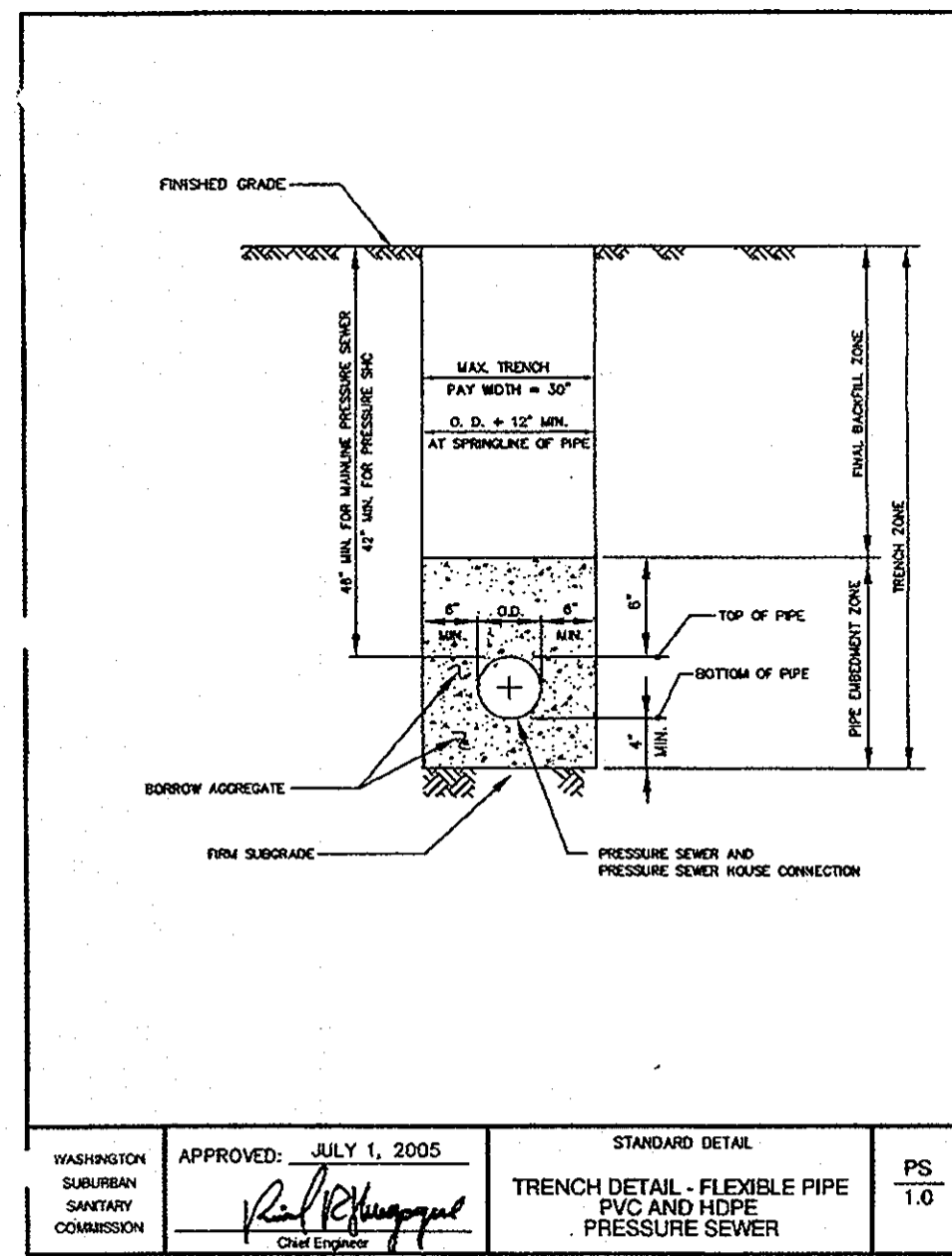
RUNNING FENCE LANE



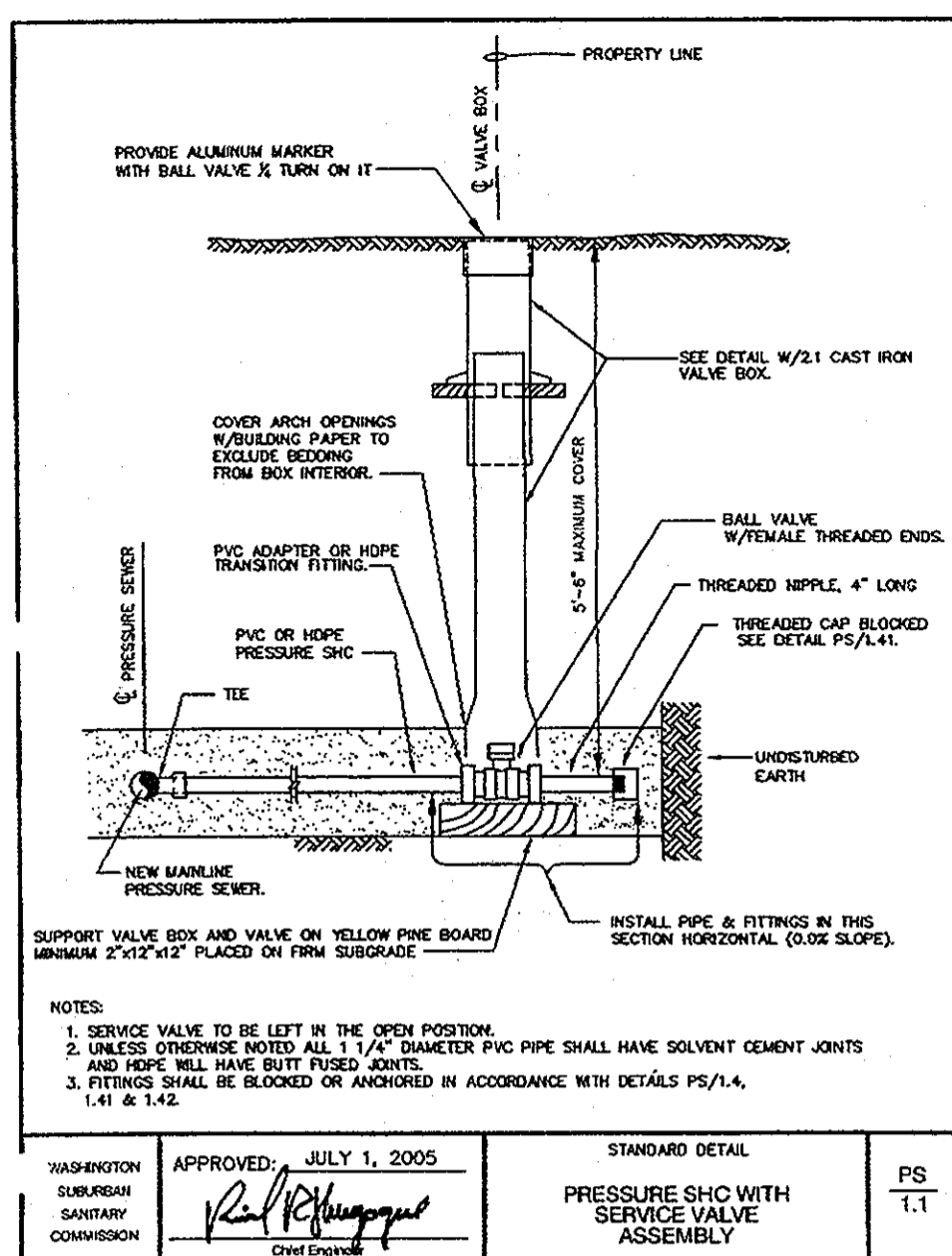
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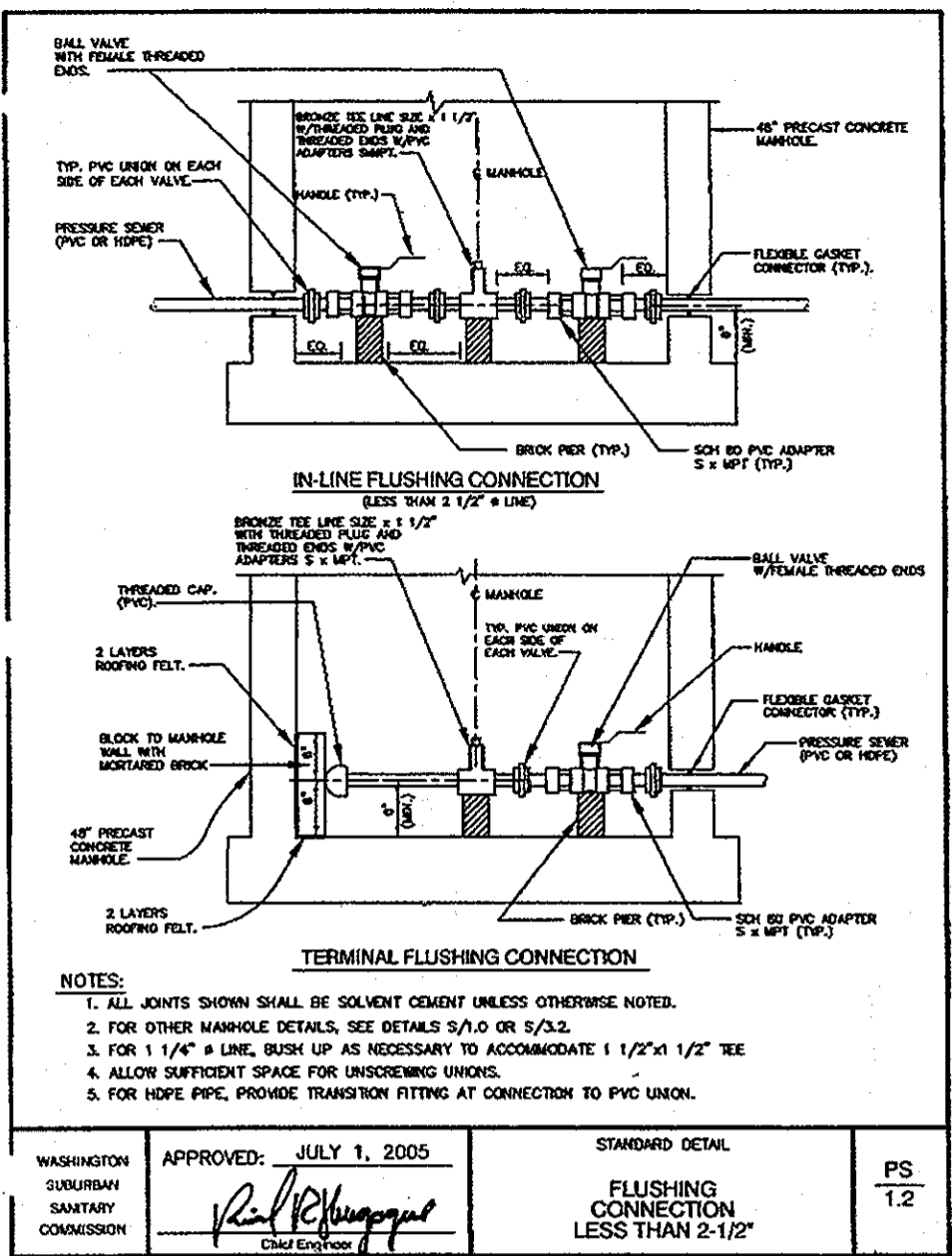
<p>DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND R. J. Bump 1-30-07 CHIEF, BUREAU OF UTILITIES</p>	<p>DEPARTMENT OF PLANNING AND ZONING HOWARD COUNTY, MARYLAND [Signature] 3/1/07 CHIEF, DEVELOPMENT ENGINEERING DIVISION</p>	<p>GLWGUTSCHICK LITTLE & WEBER, P.A. CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS 3909 NATIONAL DRIVE - SUITE 250 - BURTONSVILLE OFFICE PARK BURTONSVILLE, MARYLAND 20886 TEL: 301-421-4024 BAL: 410-880-1820 DC/VA: 301-989-2524 FAX: 301-421-4188</p>	<p>SAIC Science Applications From Science to Solutions International Corporation 1129 Business Pkwy South Suite 10 Westminster, MD 21157 phone: 410.876.0280 fax: 410.877.5535</p>	<p>DES: BJM/Wsj DRN: Wsj CHK: DATE: DEC. 2006</p>	<p>SEWER PROFILES SCALE: 1" = 50' (HORZ.) 1" = 5' (VERT.) 600' SCALE MAP NO. 28 BLOCK NO. 17.18</p>	<p>WALNUT GROVE LOTS 1 THRU 88, BUILDABLE PRESERVATION PARCEL "A", NON-BUILDABLE PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND NON-BUILDABLE BULK PARCEL "J" HOWARD COUNTY, MARYLAND ELECTION DISTRICT No. 6 CONTRACT No. 50-4330-D</p>	<p>SCALE AS SHOWN SHEET 14 OF 16</p>
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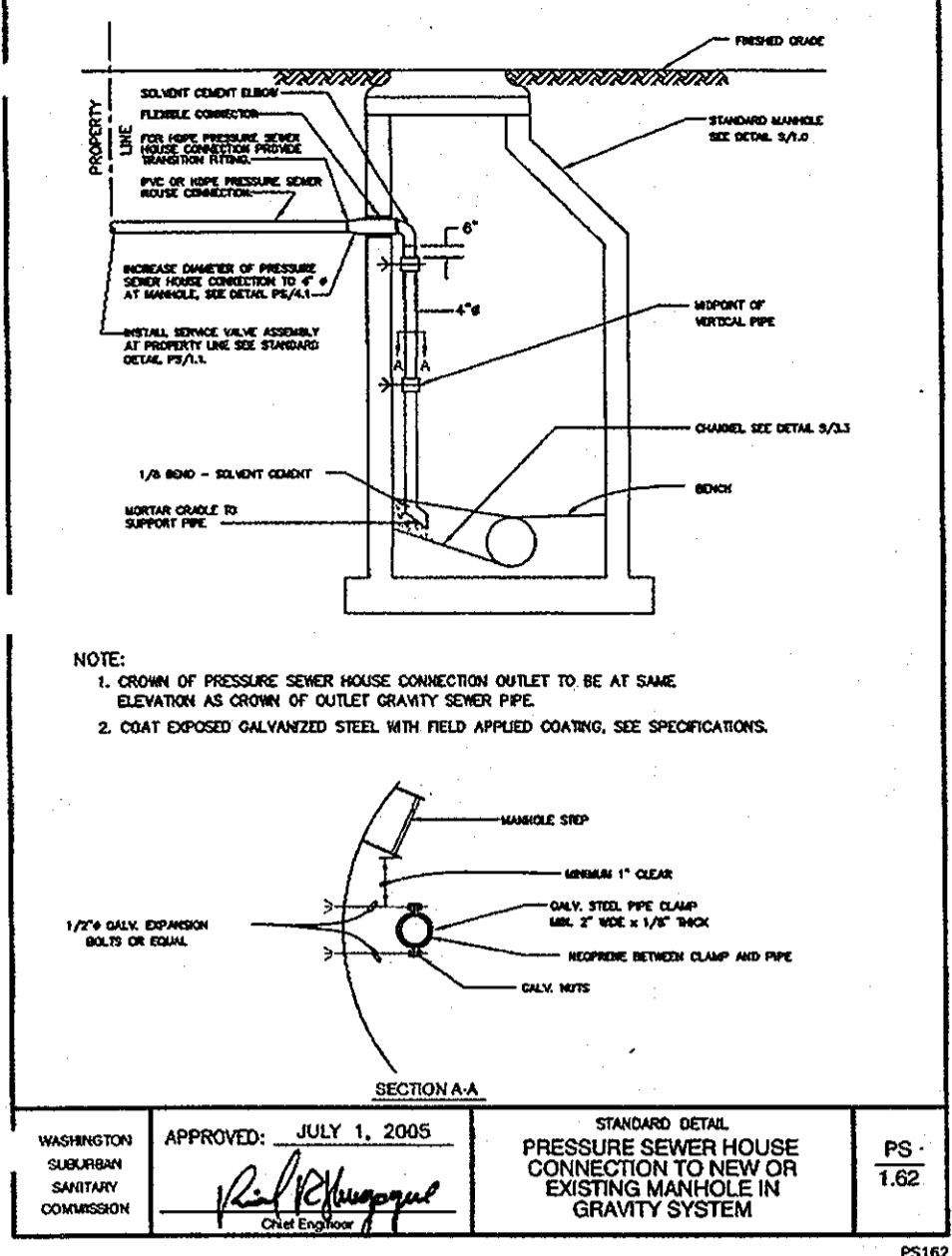
APPROVED: JULY 1, 2005
 STANDARD DETAIL
 TRENCH DETAIL - FLEXIBLE PIPE PVC AND HDPE PRESSURE SEWER
 PS 1.0



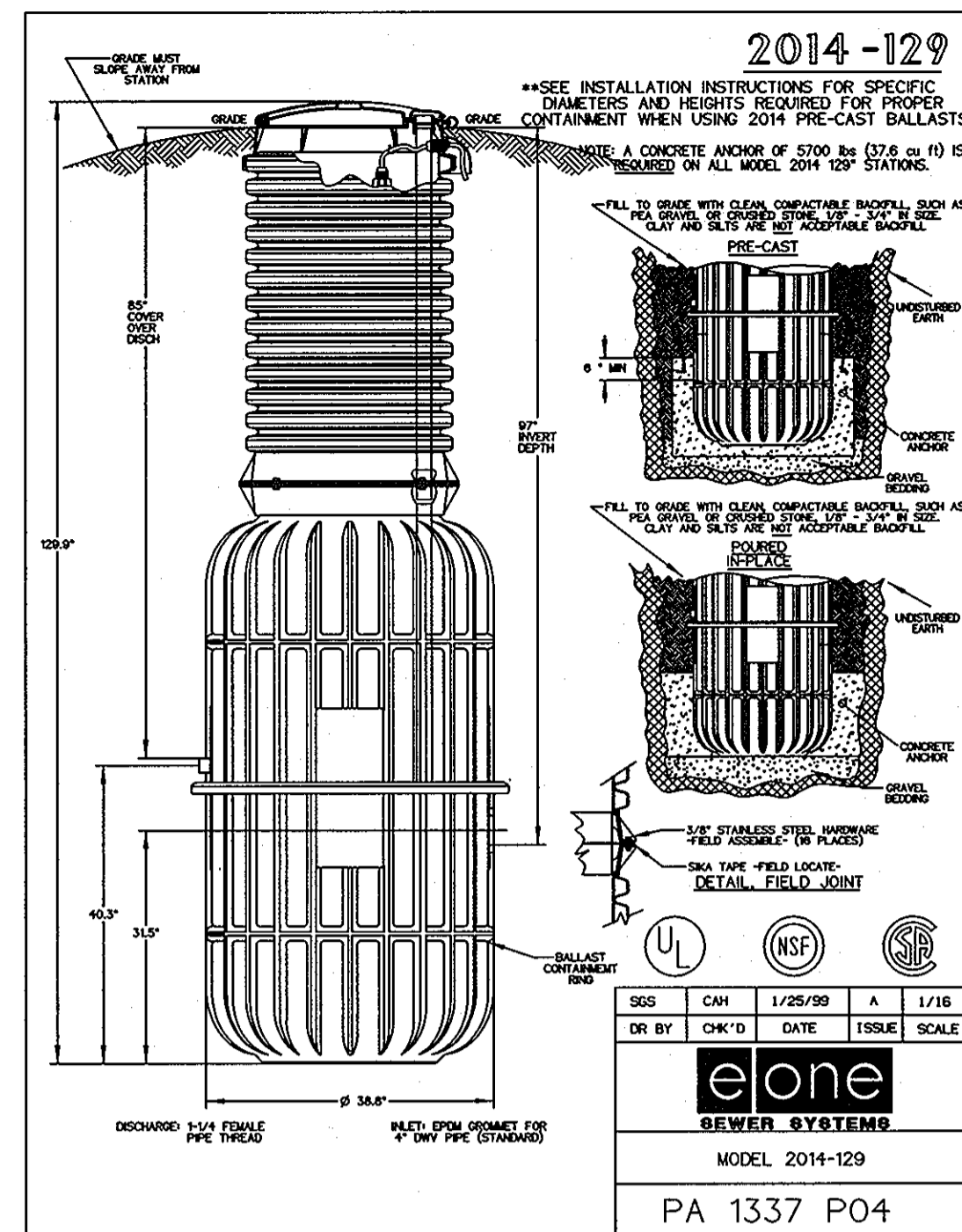
APPROVED: JULY 1, 2005
 STANDARD DETAIL
 PRESSURE SHC WITH SERVICE VALVE ASSEMBLY
 PS 1.1



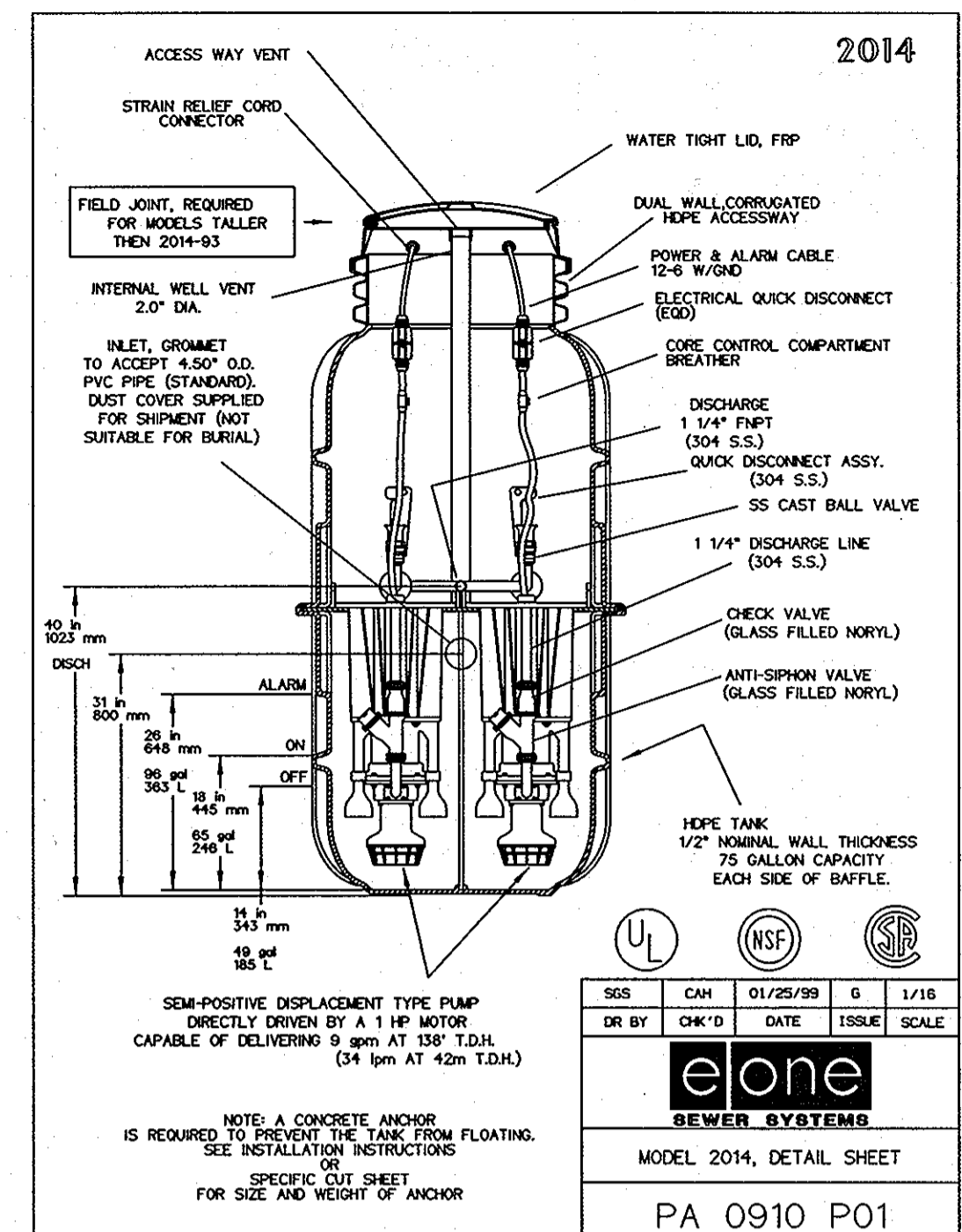
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 FLUSHING CONNECTION LESS THAN 2-1/2\"/>



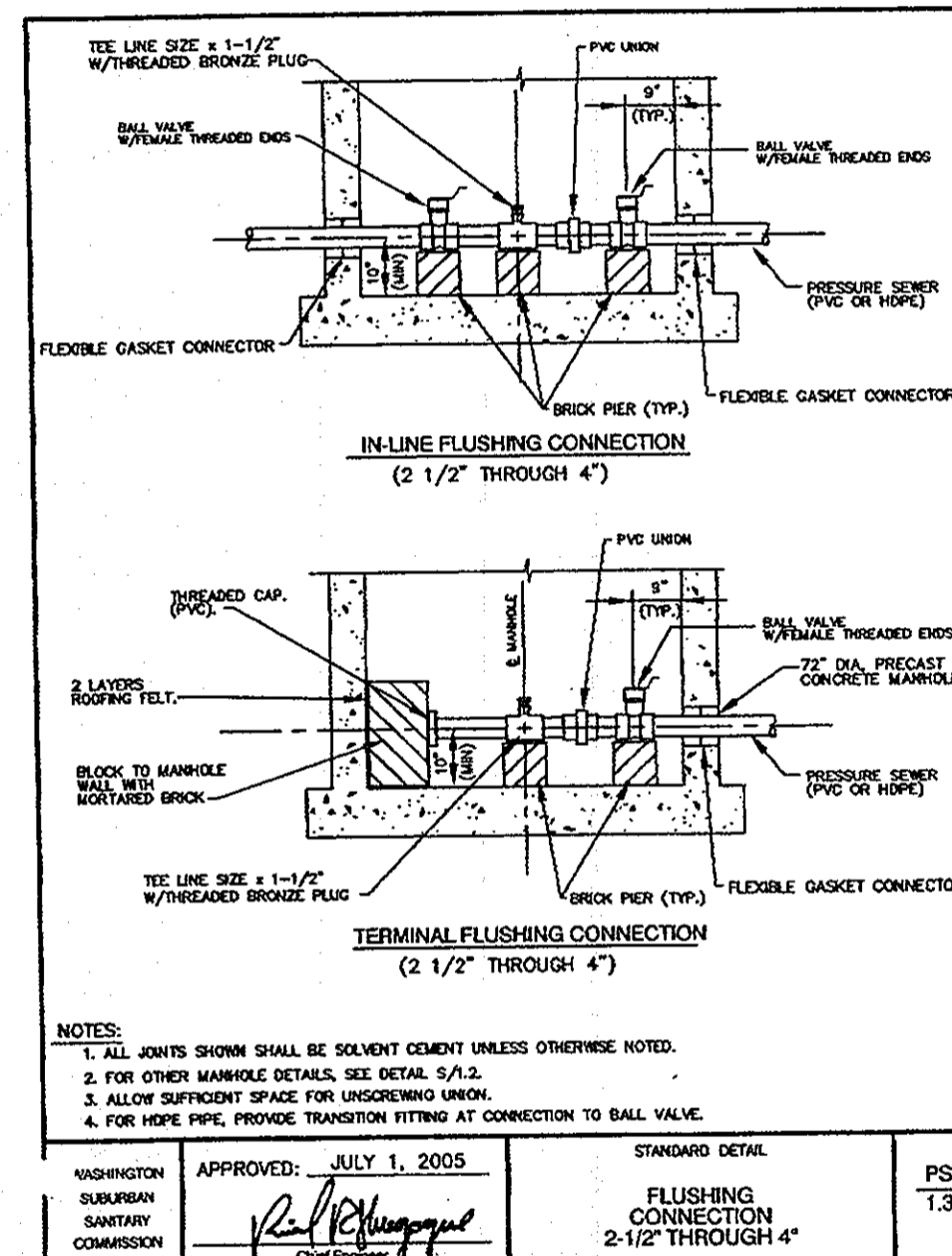
APPROVED: JULY 1, 2005
 STANDARD DETAIL
 PRESSURE SEWER HOUSE CONNECTION TO NEW OR EXISTING MANHOLE IN GRAVITY SYSTEM
 PS 1.2



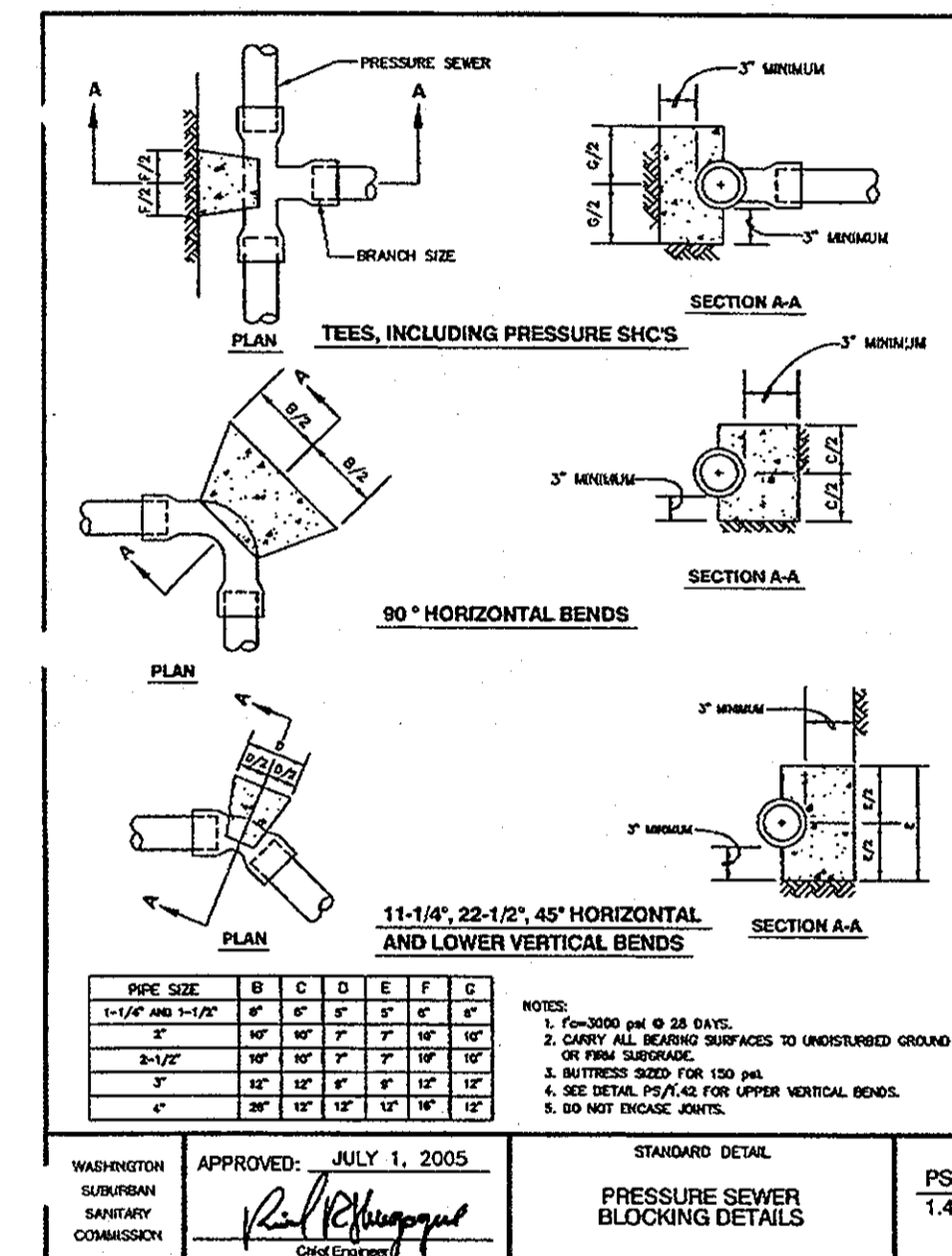
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 STANDARD DETAIL
 PRESSURE SEWER HOUSE CONNECTION TO NEW OR EXISTING MANHOLE IN GRAVITY SYSTEM
 PS 1.62



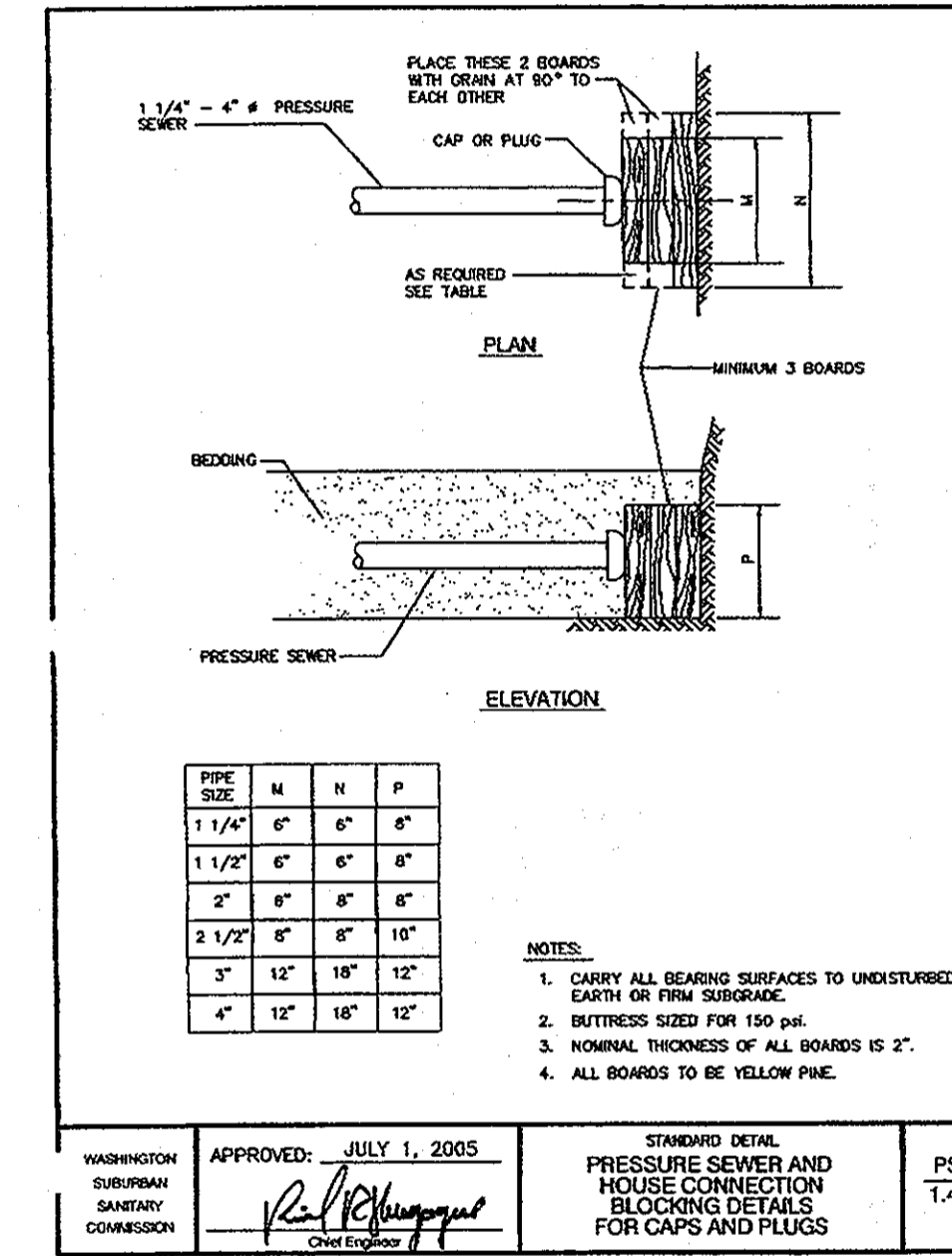
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 STANDARD DETAIL
 SEMI-POSITIVE DISPLACEMENT TYPE PUMP
 PS 1.7



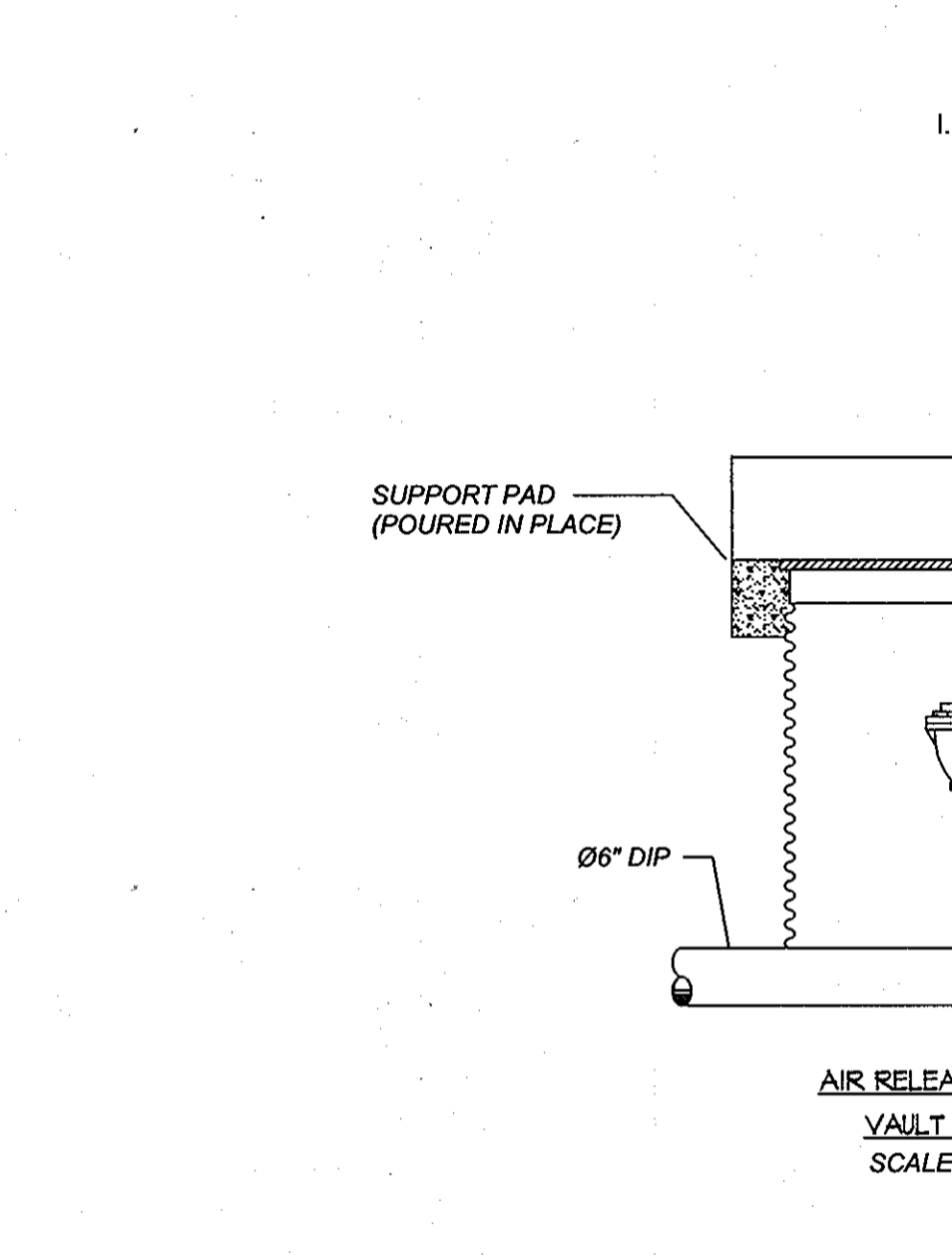
APPROVED: JULY 1, 2005
 STANDARD DETAIL
 FLUSHING CONNECTION 2-1/2\"/>



APPROVED: JULY 1, 2005
 STANDARD DETAIL
 PRESSURE SEWER BLOCKING DETAILS
 PS 1.4

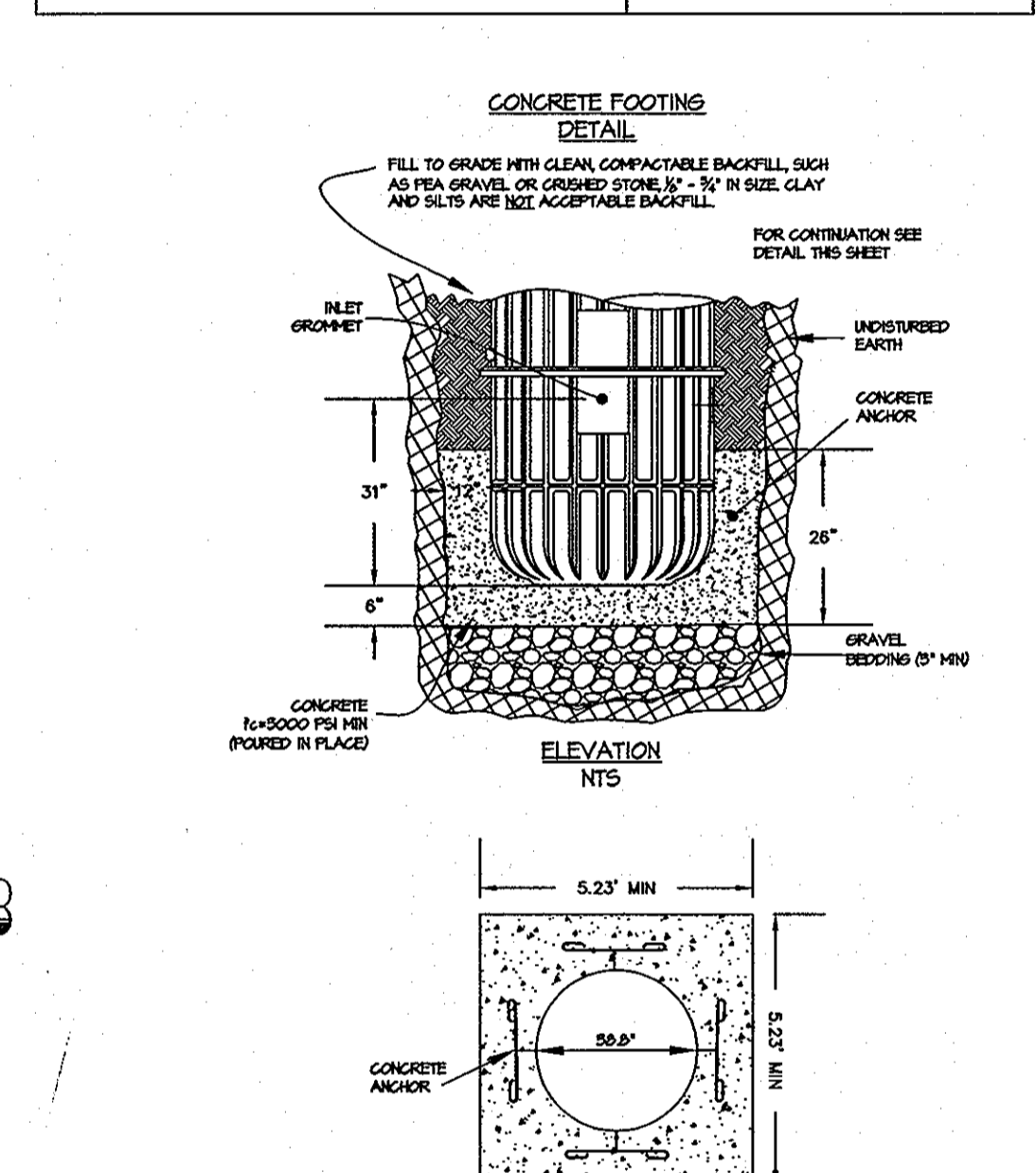


APPROVED: JULY 1, 2005
 STANDARD DETAIL
 PRESSURE SEWER AND HOUSE CONNECTION BLOCKING DETAILS FOR CAPS AND PLUGS
 PS 1.41

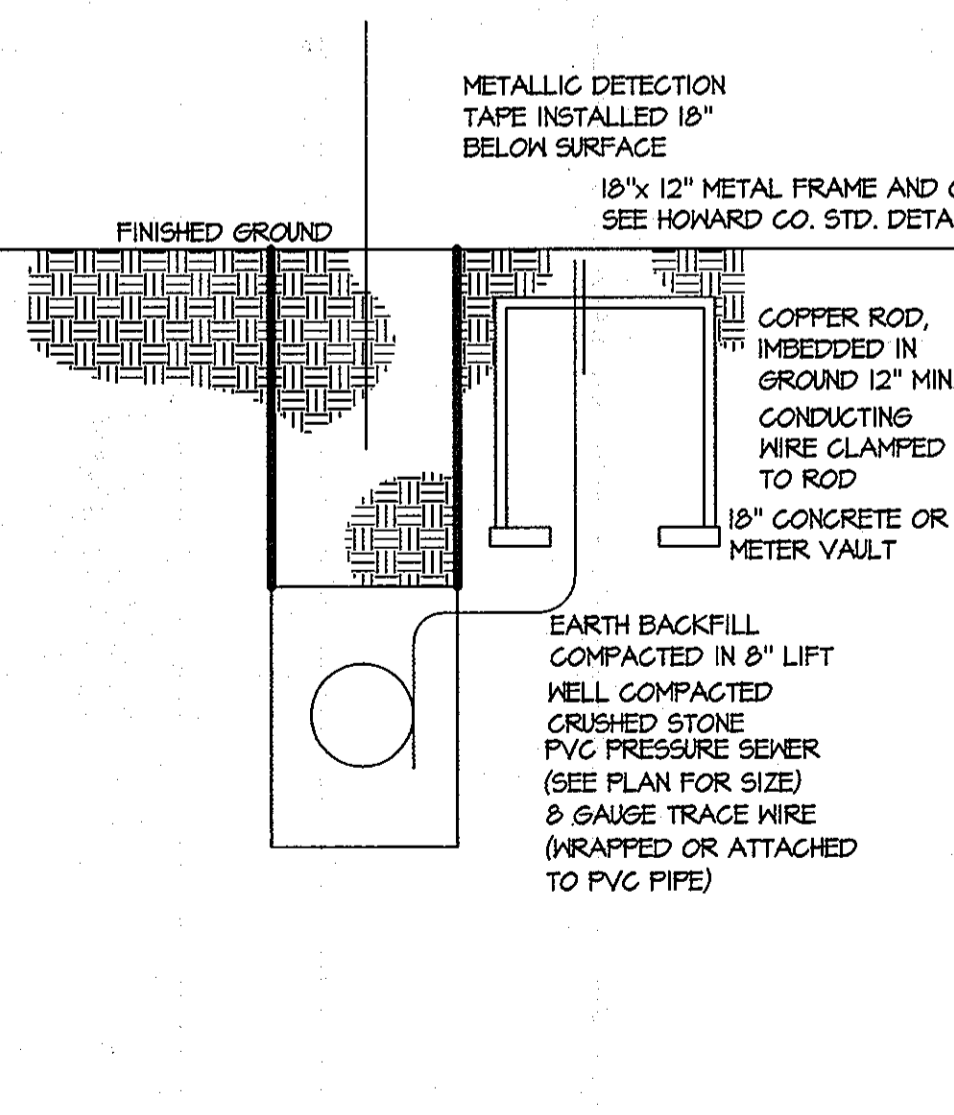


APPROVED: JULY 1, 2005
 STANDARD DETAIL
 AIR RELEASE VALVE VAULT DETAIL
 SCALE = 1 : 24
 PS 1.41

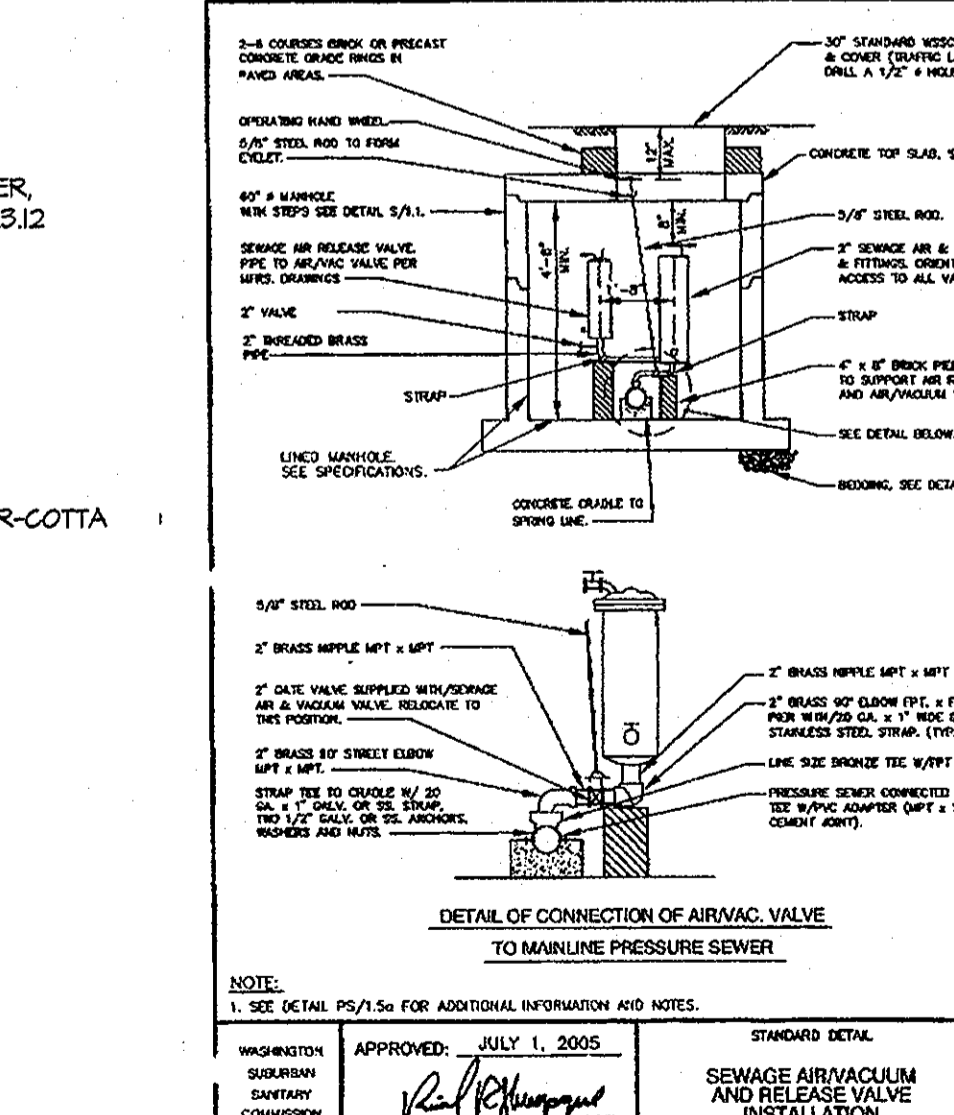
NOTES:
 1. Water tightness for all cores shall be ensured by filling each core with water - in place & following backfill. The water level within the core shall be recorded. Following a 24 hour period, the observed water level must be within 1/2 inch of the previously recorded level. Should the 24-hr water level fall more than 1/2 inch the contractor will seal all seams, joints, and fittings according to the manufacturer's recommendations.



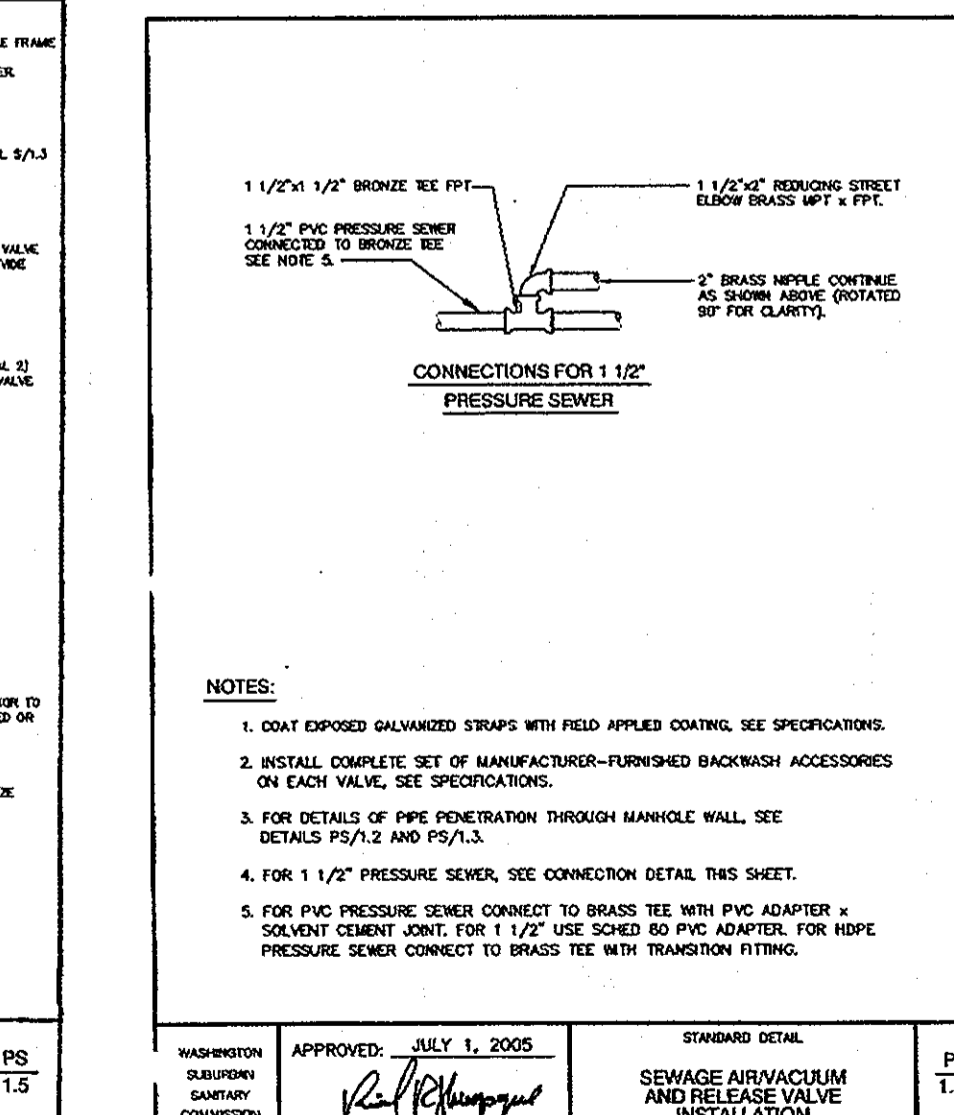
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 STANDARD DETAIL
 CONCRETE FOOTING DETAIL
 PS 1.41



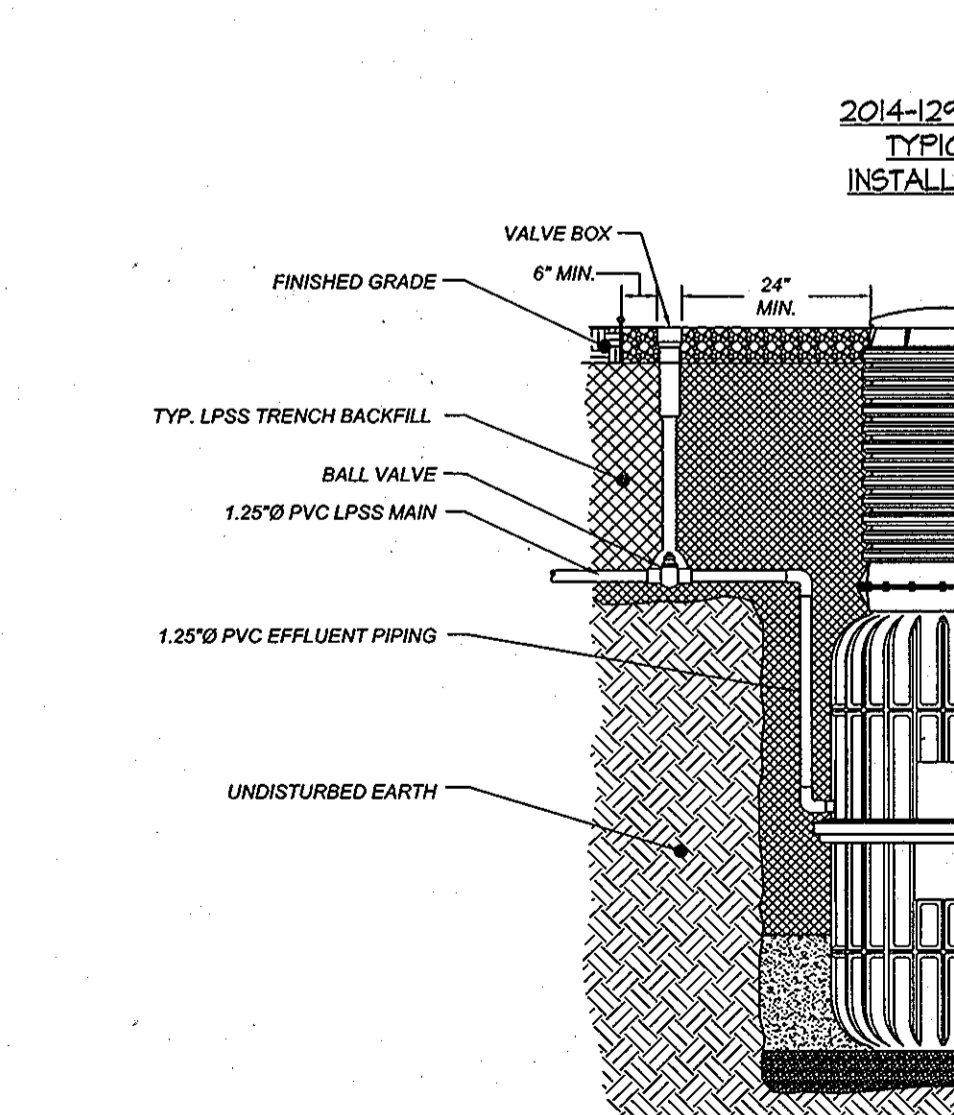
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 STANDARD DETAIL
 METALLIC DETECTION TAPE INSTALLED 18\"/>



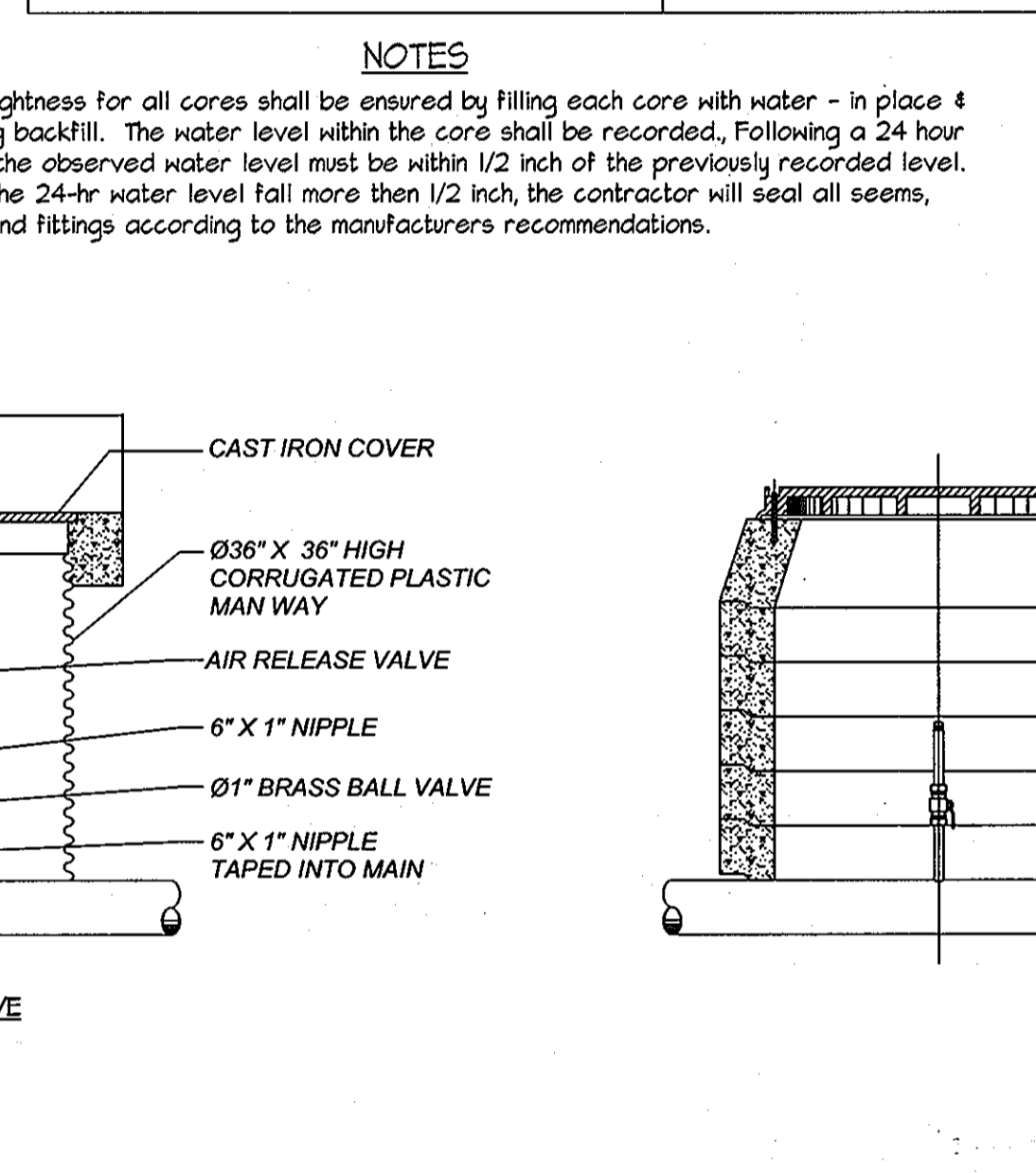
APPROVED: JULY 1, 2005
 STANDARD DETAIL
 DETAIL OF CONNECTION OF AIRVALVE TO MANLINE PRESSURE SEWER
 PS 1.5



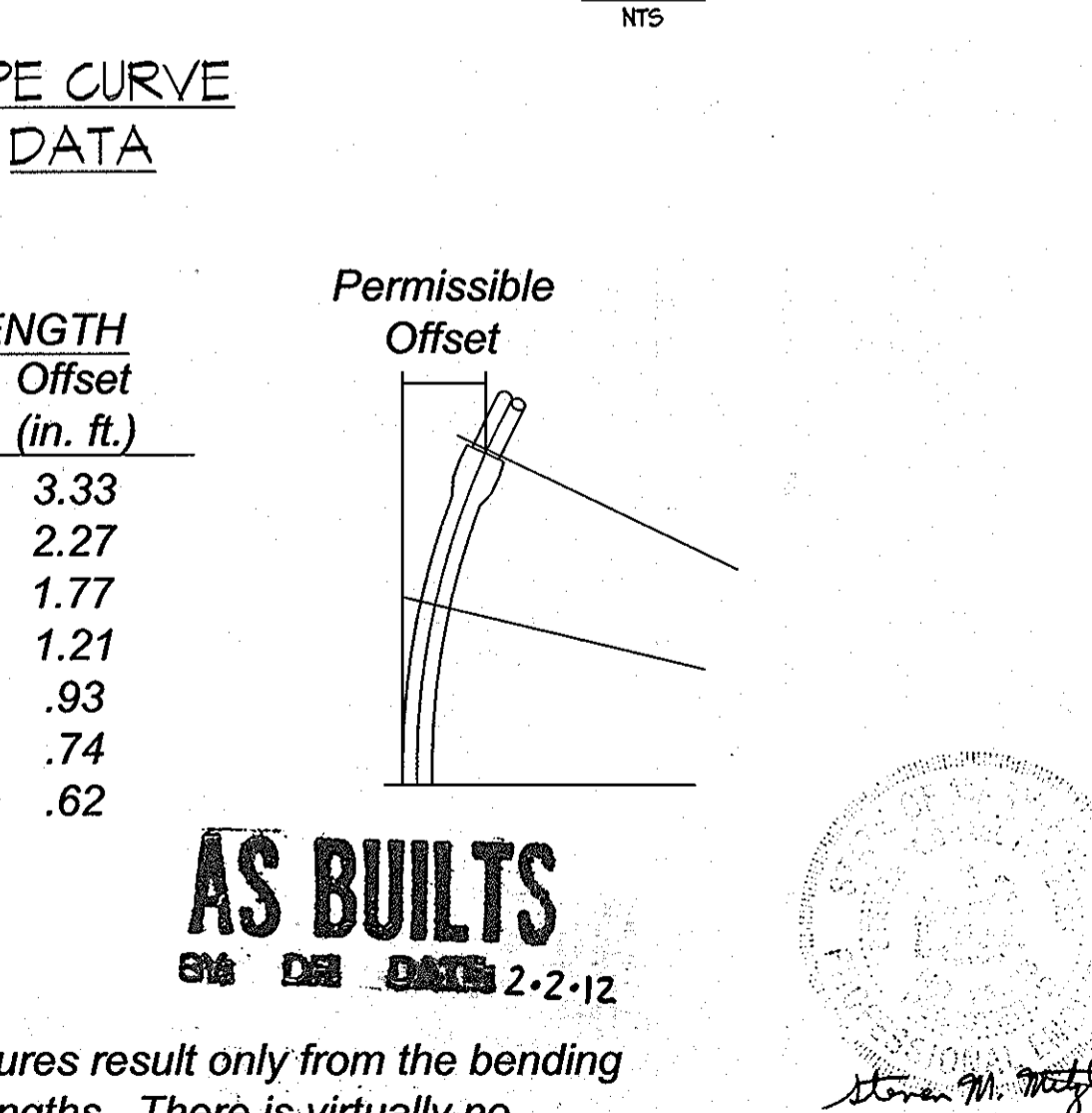
APPROVED: JULY 1, 2005
 STANDARD DETAIL
 CONNECTIONS FOR 1-1/2\"/>



APPROVED: JULY 1, 2005
 STANDARD DETAIL
 2014-129 CORE TYPICAL INSTALLATION
 PS 1.53



APPROVED: JULY 1, 2005
 STANDARD DETAIL
 AIR RELEASE VALVE VAULT DETAIL
 SCALE = 1 : 24
 PS 1.41



APPROVED: JULY 1, 2005
 STANDARD DETAIL
 PIPE CURVE DATA
 PS 1.53

DEPARTMENT OF PUBLIC WORKS
 HOWARD COUNTY, MARYLAND
 R. J. B... 1-30-07
 CHIEF, BUREAU OF UTILITIES

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

GLWGUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3609 NATIONAL DRIVE - SUITE 250 - BURTNSVILLE OFFICE PARK - ...
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SAE Science Applications
 International Corporation
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 Suite 10
 Westminster, MD 21157
 phone: 410.876.0280
 fax: 410.857.5535

DES:	BJM/WSJ		
DRN:	KLP/WSJ		
CHK:			
DATE:	JUNE 2006		
BY	NO	REVISION	DATE

SEWER DETAILS
 SCALE: 1" = 50' (HOR.)
 1" = 5' (VERT.)
 600' SCALE MAP NO. 28
 BLOCK NO. 17.18

WALNUT GROVE
 LOTS 1 THRU 88, BULIDABLE PRESERVATION
 PARCEL "A", NON-BUILDABLE
 PRESERVATION PARCELS "B" THRU "I", "K" & "L" AND
 NON-BUILDABLE BULK PARCEL "J"
 HOWARD COUNTY, MARYLAND
 ELECTION DISTRICT No. 6
 CONTRACT No. 50-4330-D
 SCALE AS SHOWN
 SHEET 15 OF 16

Walnut Grove Low Pressure System Design (v8)
law HC Public LFSS Design Requirements

Prepared by: Steven Metzler, P.E. On: July 13, 2006

Notes:
Introduction: Preliminary analysis dated 23 June 06 (version 7) was optimized for minimum pipe sizes law EOne pressure limits. This Final analysis is optimized for system pressure via pipe diameter changes to comply with Maryland Department of the Environment's Pre-Design Meeting (20 April 06) request for pipeline pressures less than 90-psig.

Summary of Hydraulic Design Modifications:
Addition of Zone 27 for service to an existing house.
Pipe diameter change from 1.25" to 1.5" for Zones 6 & 9.
Pipe diameter change from 1.5" to 2" for Zones 13 & 16.
Pipe diameter change from 2" to 3" for Zones 14 & 25.

A. Sewerage Flow Design Parameters

Wastewater Design Flow Rate = 750 GPD/Lot. Based on Maryland Department of the Environment WMA's Memorandum - "Wastewater Flows for use in Designing On-Site Sewerage Systems", 30 Oct 1990. Maximum Daily Flow = (5-bedroom house) x (150-gpd/bedroom).

B. Grinder Pump Station Design Parameters

Grinder Pump Station (Core) serving two lots: Environment One Corporation's (EOne) Model GP2014-129 or equivalent. Core serving single lots: EOne's Model GP2012-129 or equivalent (Core No. 2, 2-A, 5, 11, 11-A, 21, 28, 32, 32-A, 34, 34-A, 45, and 46). All Core discharge piping: SDR21 PVC, 1.25" Diameter. Provide Vacuum Breaker & Air Release Valve (ARV) Units within each Core.

C. Low Pressure Piping System Design Parameters

Pipe C Value = 140 Reference: Howard County Design Manual - Volume II, Chapter 8 Alternate Sewer Systems, Section 8.2 Public Low Pressure Sewer Systems and Robert K. Brinley, R. Douglas Olmstead, Steven M. Wilkinson, "Design Manual for Pressure Sewer Systems", Peabody Barnes 651 North Main Street, Mansfield, Ohio 44902, Page 6-7, Section 6.5.4 Hazen-Williams Flow Coefficient.

Maximum fluid velocity = 6.0 FPS. Minimum fluid velocity = 2.0 Feet Per Second (FPS). Piping design notes: Install Clean Out (Flushing Stations) on pipes every 400-LF. Install Cable Test Stations every 200-LF.

D. Low Pressure Piping System Appurtenances

ARV Locations:
i. Sweet Meadow Lane, Zone 3, high elevation point @ 07+80.
ii. Running Fence Lane, Zone 18, high elevation point @ 06+65.

==== END OF NOTES =====

I:\Projects\Walnut Grove (Heritage)\LFSS Collection & Pumping Design\Final Design\Zip File of WG 750-GPD v8.MDB

Walnut Grove Low Pressure System Design (v8)
law HC Public LFSS Design Requirements

Prepared by: Steven Metzler, P.E. On: July 13, 2006

Notes:
iii. South Preakness Circle Lane, Zone 25, high elevation point @ center of traffic circle (after connections with Running Fence Lane mains and Grinder Pump No. 17).
iv. Watkins Bridge Lane, Zone 14, high elevation point at 06+00 (Optional).

E. Budget LFSS Cost Notes

Pricing worksheet does NOT include costs for individual lot materials and installation of gravity sewer piping, electrical power wiring, or electrical conduits between houses and Cores.

Budgetary Low Pressure Sewer System Costs

Walnut Grove Low Pressure System Design (v8)
law HC Public LFSS Design Requirements

Quantity	Description	Unit Cost	Sub Total
45	Install Corp. Box, Stem	\$300.00	\$13,500.00
45	Lateral Corp. Box, Stem	\$275.00	\$12,375.00
4	ARV & Vault	\$2,000.00	\$8,000.00
4	Install ARV & Vault	\$1,000.00	\$4,000.00
45	Shutoff Valve 1" & Box	\$120.00	\$5,400.00
45	Install shutoff valve & box	\$350.00	\$15,750.00
6	CO & Vault	\$850.00	\$5,100.00
26	Install CO & Vault	\$1,000.00	\$26,000.00
48	Install CO & MH	\$1,000.00	\$48,000.00
			\$128,125.00
12	2012-129	\$5,000.00	\$60,000.00
38	2014-129	\$7,993.00	\$303,834.00
0	2012-93	\$3,835.00	\$0.00
0	2014-93	\$7,051.00	\$0.00
87	Duplex Back Boost Transformer 2	\$300.00	\$26,100.00
0	Electrical Conduit (House to Core)	\$0.47	\$0.00
822	1.25" Core Lateral to Force Main	\$0.47	\$388.34
30	Install Core Station	\$1,000.00	\$30,000.00
87	Install supplied Core Control Panel	\$100.00	\$8,700.00
0	2010-93	\$0.00	\$0.00
0	ARV at each Core	\$0.00	\$0.00
9,500	Install Force Main Pipes	\$13.75	\$130,625.00
0	2012-100	\$0.00	\$0.00
822	Install Core Lateral Pipes to Mains	\$3.50	\$2,877.00
80	Install Bolts	\$150.00	\$12,000.00
0	Lateral Kits	\$0.00	\$0.00
			\$589,723.34
1,203	1.25" Pipe	\$0.75	\$902.25
735	1.50" Pipe	\$0.60	\$441.00
5,183	2.00" Pipe	\$0.75	\$3,887.25
2,420	3.00" Pipe	\$1.45	\$3,509.00
			\$8,749.50
10	Contractor Overhead		\$72,158.69
15	Contingencies		\$109,138.03
			\$181,896.72
			Total Per Home \$63.22 Total Including Other \$772,866.54
			Grand Total Per Home \$79.03 Total Including Other \$999,483.56

Note: The System Costs above are based on piping sized for, and Grinder Pumps manufactured by Environment One Corporation.

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GRINDER PUMP DATA SUMMARY TABLE

Core Number	Lots Served		Core Surface Grade (E1)	Inlet Inv. Elevation (E1)	Pump Setting (E1)	Core Bottom Elevation (E1)	Lateral Distance (LF)		MCE to Core Drop @ 2% Slope (FT)		Min. Cover	Required MCE Elevation (E1)		LOCATION
	A	B					Lot A	Lot B	Lot A	Lot B		Lot A	Lot B	
1	56	57	390.0	382.0	381.0	379.5	115	105	2.3	2.1	2.5	386.8	386.6	PCL STA: 14+31.65, 30.00 R
2		55	395.8	387.8	386.8	385.3		106		2.12	2.5		392.4	PCL STA: 16+74.24, 30.00 R
2-A	54		396.5	388.5	387.5	386.0	120		2.4		2.5	393.4		PCL STA: 17+04.24, 30.00 R
3	1	2	396.1	388.1	387.1	385.6	120	125	2.4	2.5	2.5	393.0	393.1	PCL STA: 17+01.83, 30.00 L
4	52	53	400.2	392.2	391.2	389.7	90	103	1.8	2.06	2.5	396.5	396.8	PCL STA: 19+14.77, 30.00 R
5	3		400.5	392.5	391.5	390.0	112		2.24	0	2.5	397.2	395.0	PCL STA: 19+58.09, 30.00 L
6	50	51	404.5	396.5	395.5	394.0	110	130	2.2	2.6	2.5	401.2	401.6	PCL STA: 22+50.52, 30.00 R
7	4	5	404.5	396.5	395.5	394.0	115	105	2.3	2.1	2.5	401.3	401.1	PCL STA: 22+55.79, 30.00 L
8	6	7	409.0	401.0	400.0	398.5	120	110	2.4	2.2	2.5	405.9	405.7	PCL STA: 24+97.13, 30.00 L
9	48	49	412.0	404.0	403.0	401.5	135	100	2.7	2	2.5	409.2	408.5	PCL STA: 25+65.21, 30.00 R
10	8	9	417.8	409.8	408.8	407.3	120	105	2.4	2.1	2.5	414.7	414.4	PCL STA: 27+96.39, 30.00 L
11		22	417.4	409.4	408.4	406.9		150		3.0	2.5		416.4	RFL STA: 11+52.21, 25.00 R
11-A	21		416.8	408.8	407.8	406.3	150		3.0		2.5	414.8		RFL STA: 11+83.04, 25.00 R
12	10	11	419.1	409.1	408.1	406.6	110	105	2.2	2.1	2.5	419.9	419.7	RFL STA: 13+66.01, 25.00 L
13	19	20	419.4	409.4	408.4	406.9	120	110	2.4	2.2	2.5	419.9	419.7	RFL STA: 14+49.65, 25.00 R
14	12	13	414.0	404.0	403.0	401.5	110	80	2.2	1.6	2.5	411.2	410.9	RFL STA: 16+99.37, 25.00 L
15	17	18	419.8	409.8	408.8	407.3	145	120	2.9	2.4	2.5	411.7	411.4	RFL STA: 17+09.00, 25.00 R
16	14	15	409.7	402.7	401.7	399.2	75	80	1.5	1.6	2.5	409.2	409.1	N = 567751.6452, E = 1329266.8770
17	23	24	421.0	413.0	412.0	410.5	127	135	2.54	2.7	2.5	418.0	418.2	RFL STA: 8+90.84, 67.96 R
18	25	26	416.5	408.5	407.5	406.0	150	143	3	2.86	2.5	414.0	413.9	RFL STA: 6+53.44, 25.00 R
19	46	47	414.5	406.5	405.5	404.0	125	130	2.5	2.6	2.5	411.5	411.6	RFL STA: 4+90.51, 25.00 L
20	27	28	405.5	397.5	396.5	395.0	120	100	2.4	2	2.5	402.4	402.0	DCL STA: 2+65.00, 25.00 L
21	34		394.9	386.9	385.9	384.4	110		2.2		2.5	391.6		DCL STA: 6+30.96, 25.00 R
22	29	30	395.8	387.8	386.8	385.3	95	120	1.9	2.4	2.5	392.2	392.7	DCL STA: 5+88.26, 25.00 L
23	31	32	393.0	385.0	384.0	382.5	220	90	4.4	1.8	2.5	391.9	389.3	N = 568174.8426, E = 1327184.6535
24	44	45	408.3	400.3	399.3	397.8	110	120	2.2	2.4	2.5	405.0	405.2	RFL STA: 2+10.42, 25.00 L
25	36	35	407.5	399.5	398.5	397.0	165	150	3.3	3	2.5	405.3	405.0	RFL STA: 1+79.17, 25.00 R
26	43	39	404.0	396.0	395.0	393.5	90	150	1.8	3	2.5	400.3	401.5	N = 568673.4814, E = 1327686.6483
27	37	38	403.8	395.8	394.8	393.3	115	123	2.3	2.46	2.5	400.6	400.8	N = 568602.2361, E = 1327606.8726
28	42		392.5	384.5	383.5	382.0	95		1.9	0	2.5	388.9	387.0	WBL STA: 4+47.39, 30.00 L
29	40	41	389.9	381.9	380.9	379.4	110	90	2.2	1.8	2.5	386.6	386.2	WBL STA: 7+28.27, 30.00 L
30	58	59	382.8	374.8	373.8	372.3	85	95	1.7	1.9	2.5	379.0	379.2	HCL STA: 1+61.46, 25.00 R
31	64	65	379.5	371.5	370.5	369.0	115	100	2.3	2	2.5	376.3	376.0	HCL STA: 3+58.64, 25.00 L
32	60		379.0	371.0	370.0	368.5	95		1.9		2.5	375.4		HCL STA: 3+75.21, 26.11 R
32-A	61		380.2	372.2	371.2	369.7		120		2.4	2.5		377.1	HCL STA: 4+03.97, 53.59 R
33	62	63	380.5	372.5	371.5	370.0	65	73	1.3	1.46	2.5	376.3	376.5	N = 569601.9137, E = 1327844.9297
34	66		382.5	374.5	373.5	372.0	150		3.0		2.5	380.0		WBL STA: 16+10.50, 25.00 L
34-A	67		383.0	375.0	374.0	372.5		150		3.0	2.5		380.5	WBL STA: 15+82.60, 25.00 L
35	68	69	390.2	382.2	381.2	379.7	112	133	2.24	2.66	2.5	386.9	387.4	SML STA: 2+41.62, 25.00 L
36	78	79	393.0	385.0	384.0	382.5	190	200	3.8	4.0	2.5	391.3	391.5	SML STA: 3+26.33, 25.00 R
37	76	77	409.6	401.6	400.6	399.1	140	115	2.8	2.3	2.5	406.9	406.4	SML STA: 6+79.99, 25.00 R
38	70	71	410.1	402.1	401.1	399.6	115	110	2.3	2.2	2.5	406.9	406.8	SML STA: 7+06.99, 25.00 L
39	74	75	409.0	401.0	400.0	398.5	205	85	4.1	1.7	2.5	407.6	405.2	N = 568427.8481, E = 1326289.3324
40	72	73	409.2	401.2	400.2	398.7	80	150	1.6	3	2.5	405.3	406.7	N = 568419.6875, E = 1326353.0863
41	87	88	388.0	380.0	379.0	377.5	80	95	1.6	1.9	2.5	384.1	384.4	N = 569419.1447, E = 1326909.6858
42	85	86	388.2	380.2	379.2	377.7	70	75	1.4	1.5	2.5	384.1	384.2	N = 569536.1604, E = 1326874.8530
43	80	81	395.0	387.0	386.0	384.5	160	160	3.2	3.2	2.5	392.7	392.7	WBL STA: 21+93.33, 64.60 L
44	83	84	393.8	385.8	384.8	383.3	150	150	3.0	3.0	2.5	391.3	391.3	WBL STA: 21+91.59, 64.38 R
45	82		394.5	386.5	385.5	384.0	150		3.0		2.5	392.0		N = 569464.3285, E = 1326443.4252
46	E-HOUSE		414.0	406.0	405.0	403.5	150		3.0					