CERTIFICATE OF AUTHENTICITY

THIS IS TO CERTIFY THAT THE FOLLOWING ELECTRONIC RECORDS ARE TRUE AND ACCURATE REPRODUCTIONS OF THE ORIGINAL RECORDS OF JAMES CITY COUNTY GENERAL SERVICES DEPARTMENT- STORMW ATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HAVE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

BMP NUMBER: **CC030**

DATE VERIFIED: **September 20, 2019**

QUALITY ASSURANCE TECHNICIAN: **Charles E. Lovett II**

Charles E. Lovett II

LOCATION: WILLIAMSBURG, VIRGINIA

NOTES: Certified and Upload

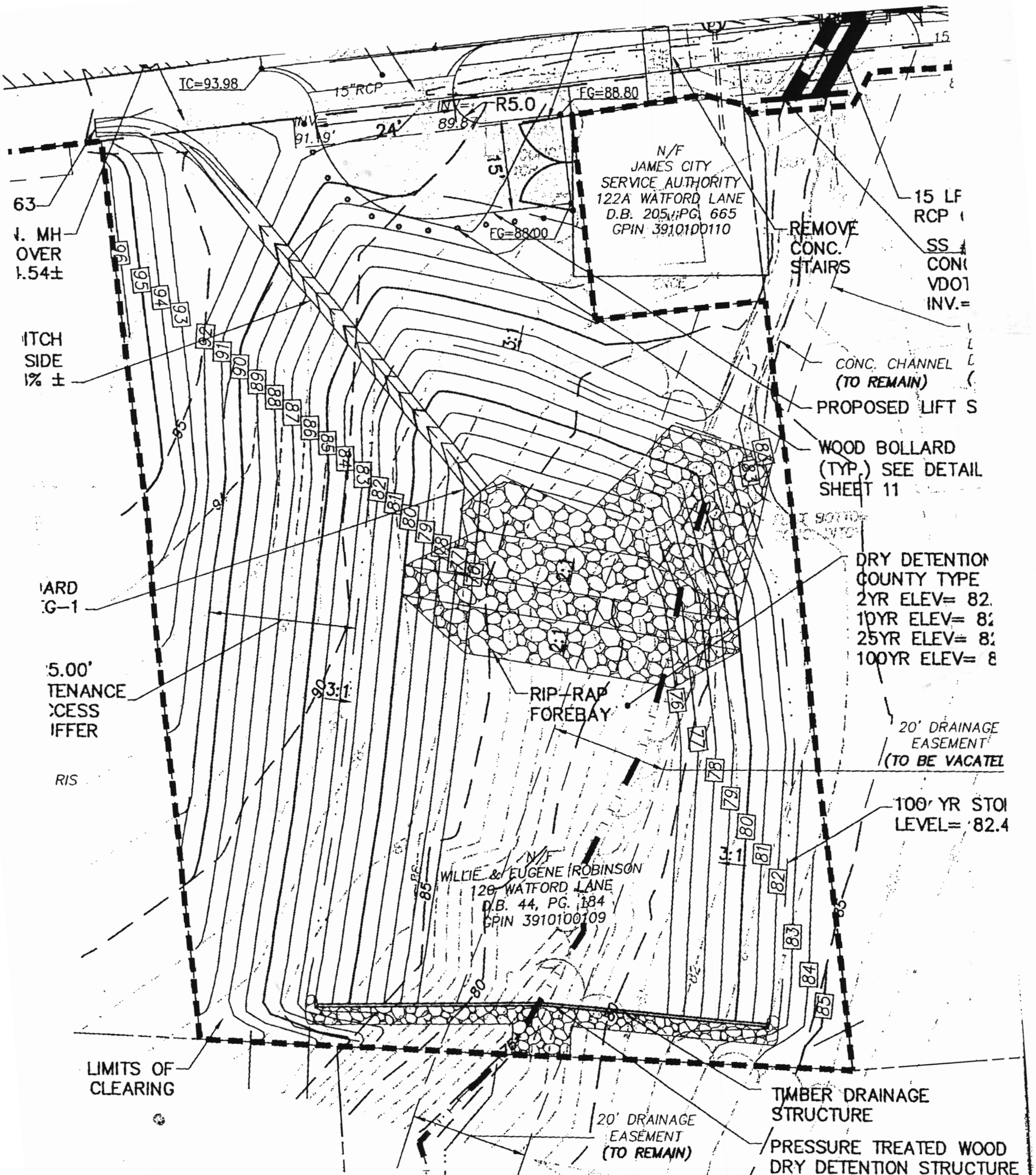
1. Maintenance Agreement

2. Deeds/Easements/Agreements/Property Records

3. Construction Certificate

4. Record Drawing (as-built plan)

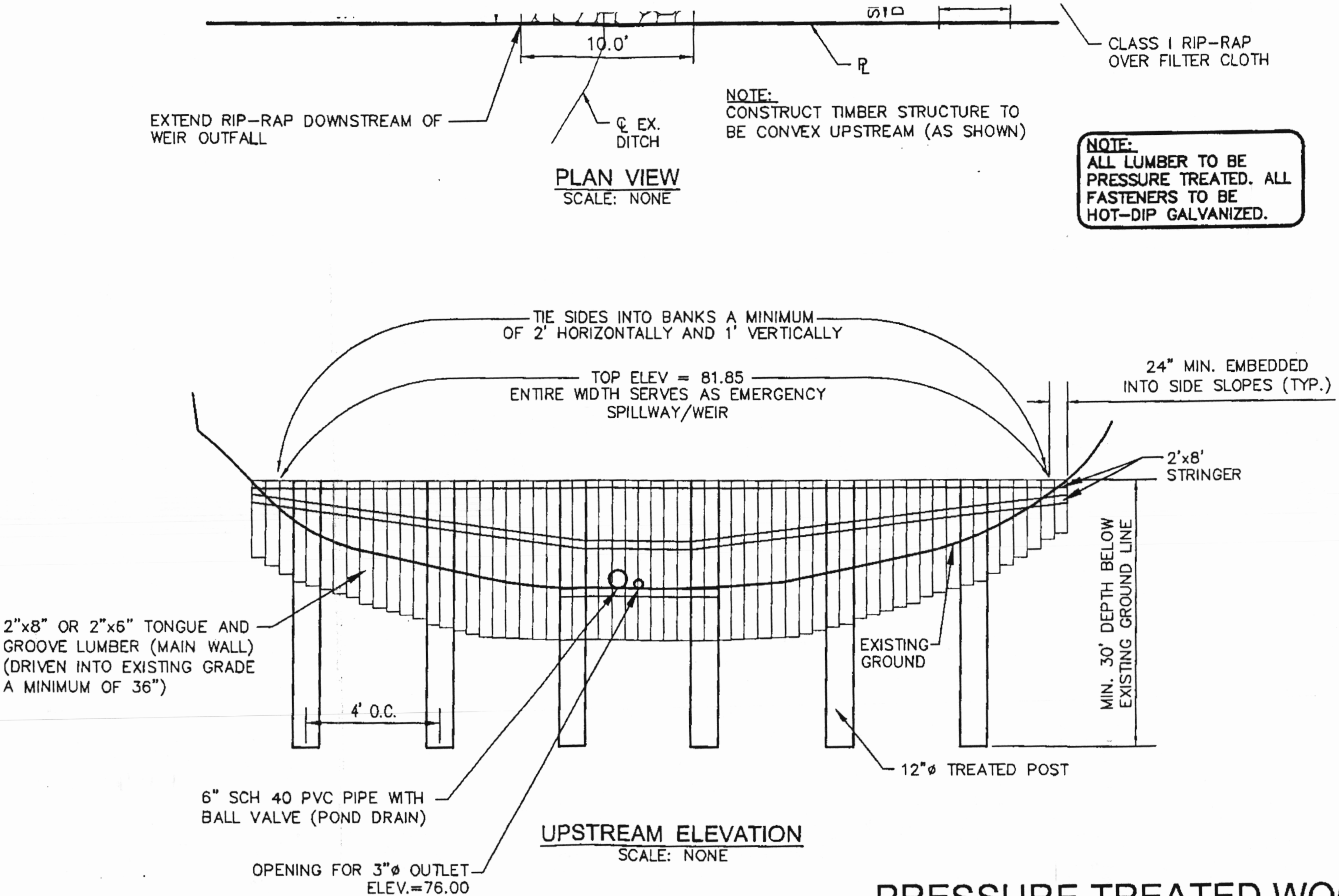
5. Construction Drawings



DIMENTATION CONTROL LEGEND

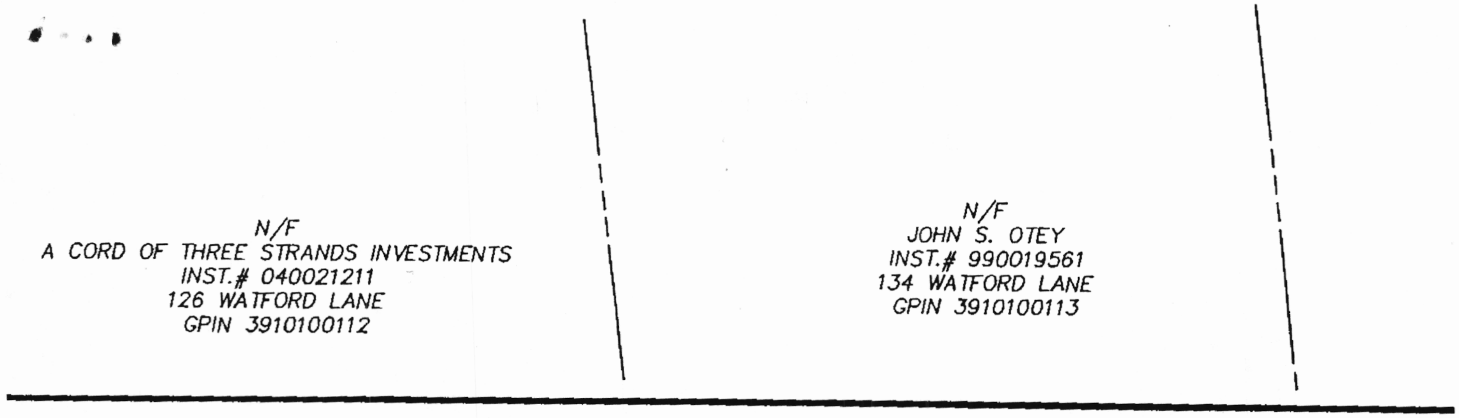
EE PROTECTION (SPEC. 3.38)

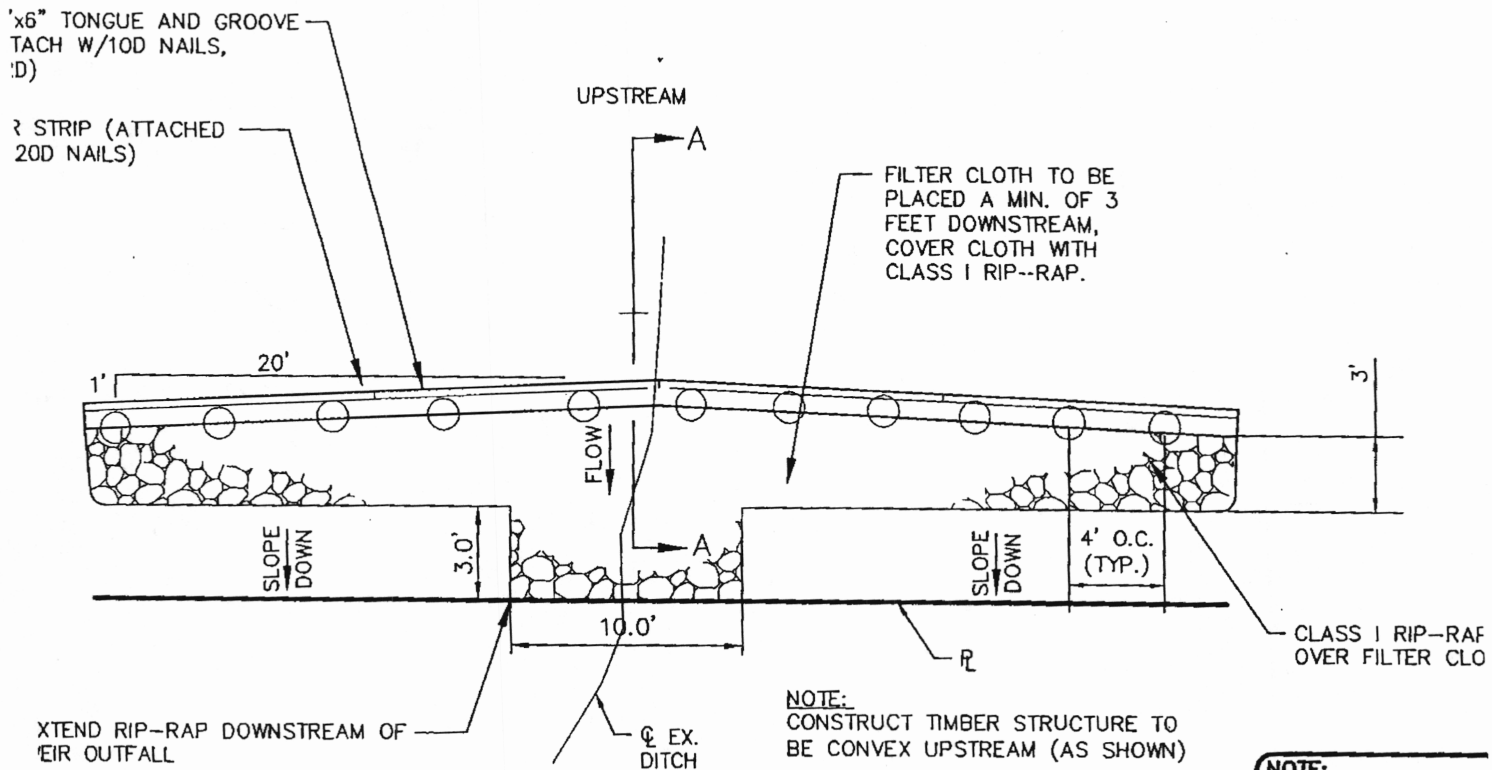
TLET PROTECTION (SPEC. 3.18)



PRESSURE TREATED WOOD I

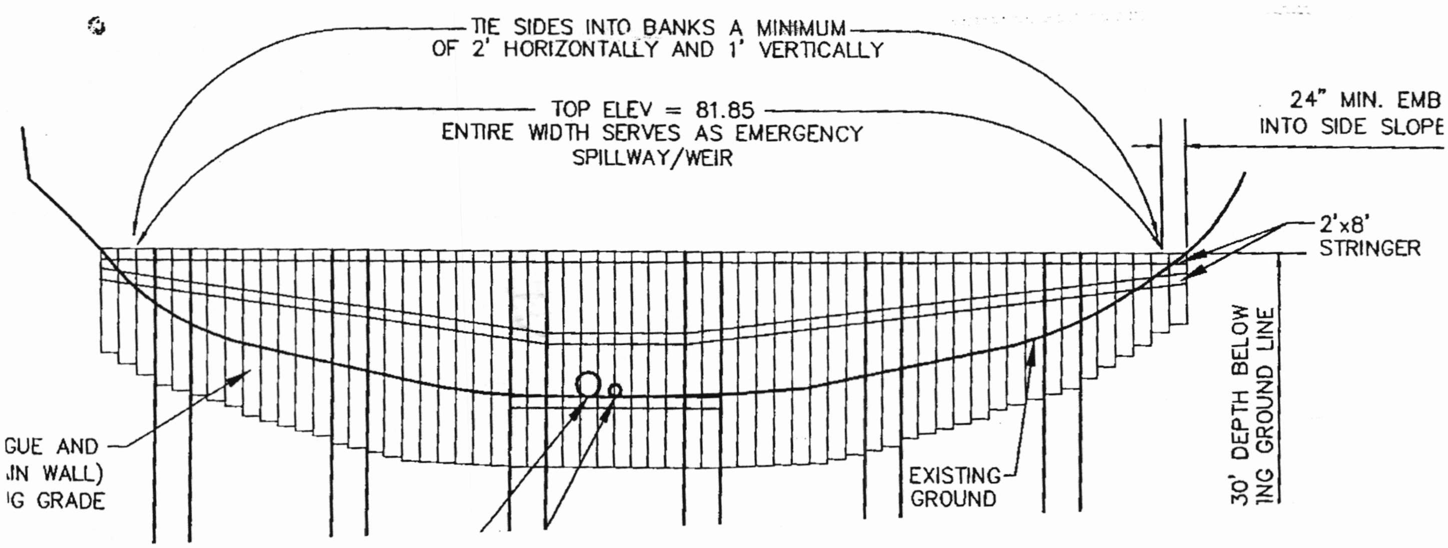
NOT TC
COUNTY TYF

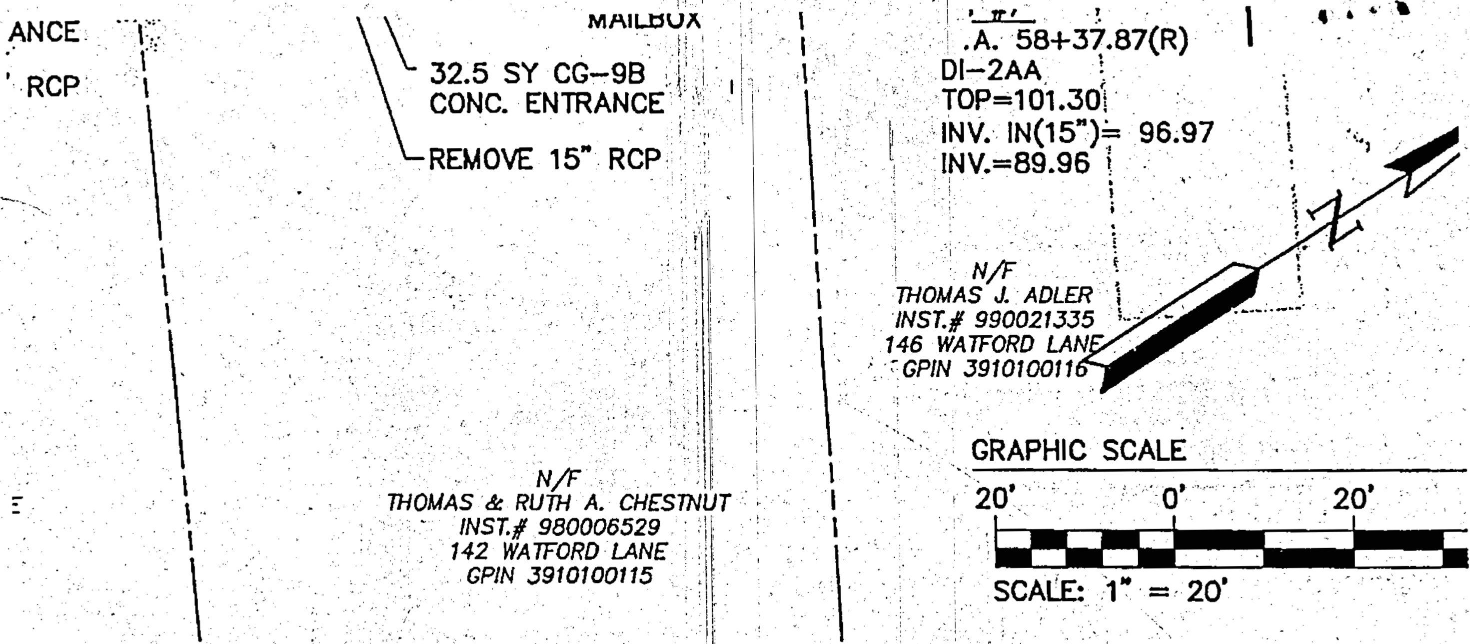


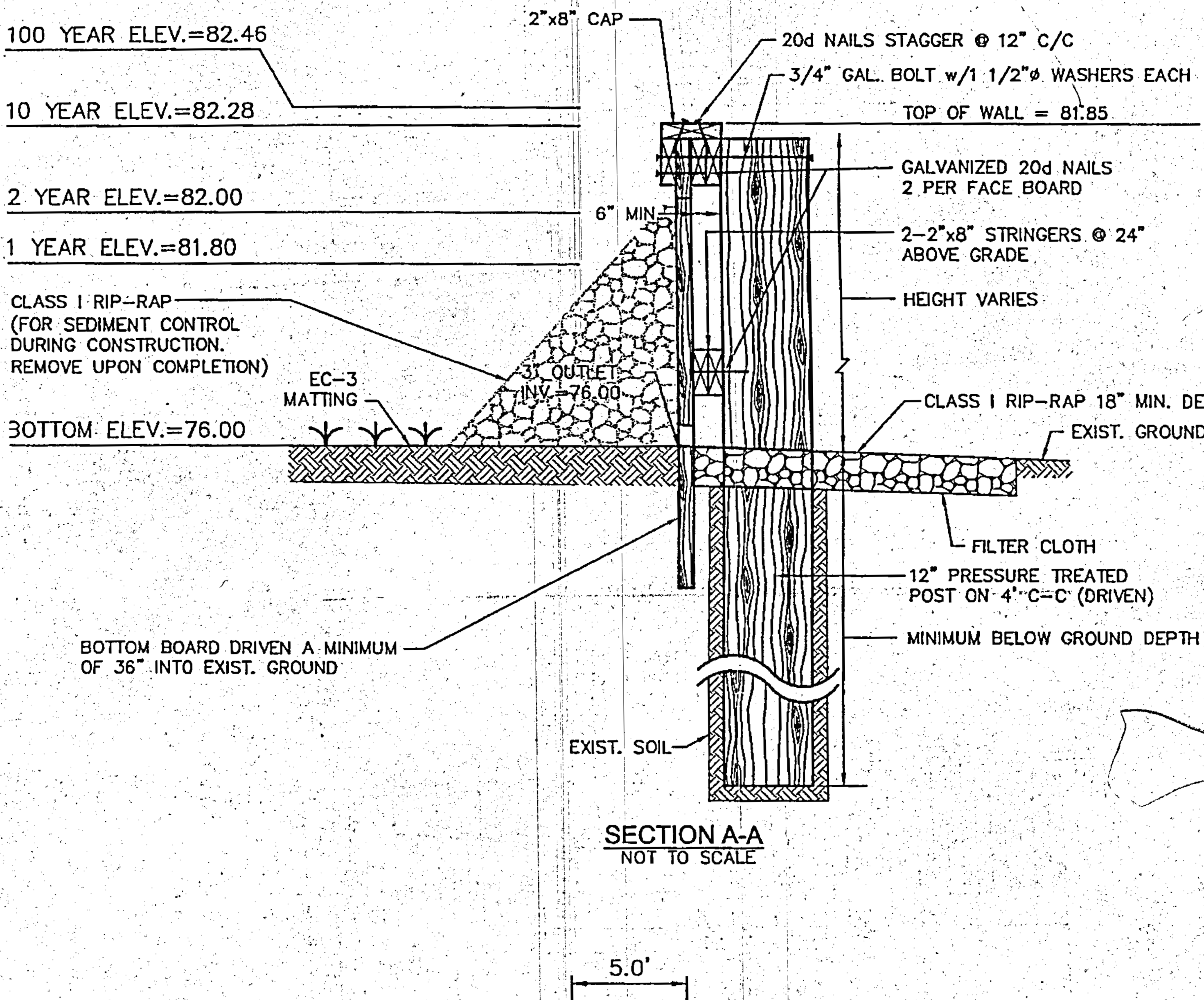


PLAN VIEW

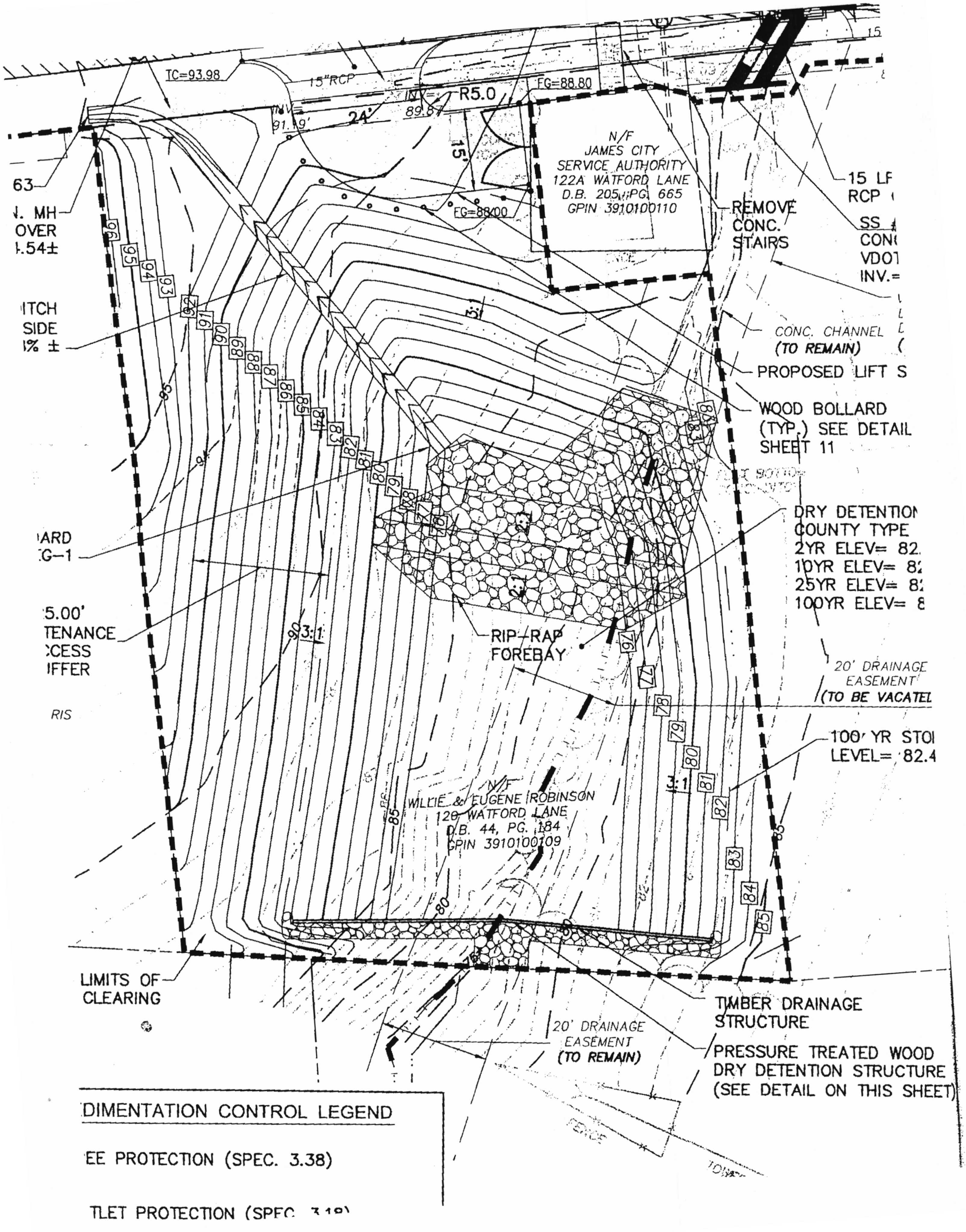
SCALE: NONE



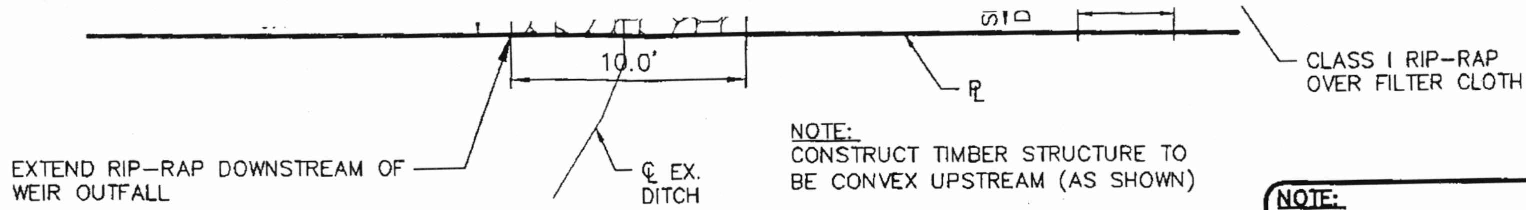




SECTION A-A
NOT TO SCALE

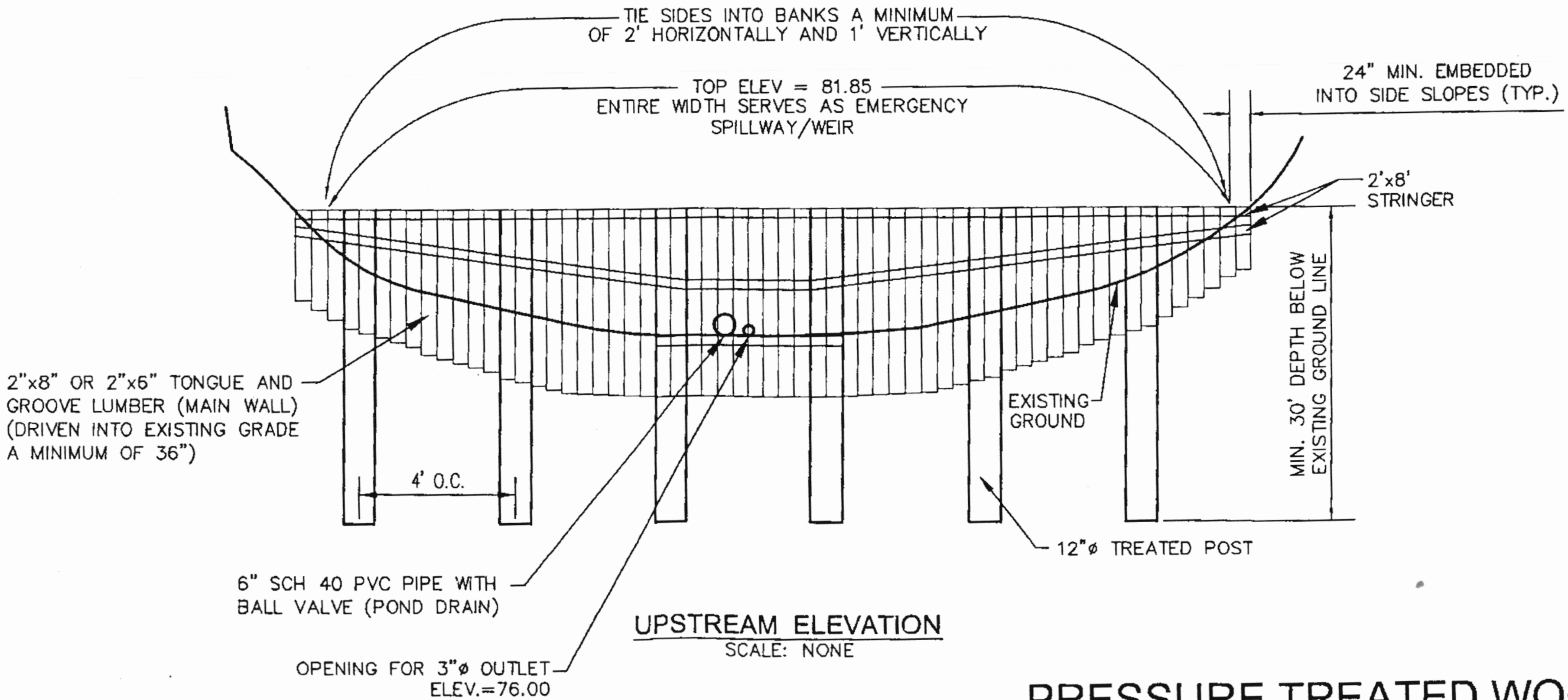


TC=93.98
15"RCP
FG=88.80
INV=
91.79'
24'
INV=
89.8
R5.0
15'
N/F
JAMES CITY
SERVICE AUTHORITY
122A WATFORD LANE
D.B. 205, PG. 665
GPIN 3910100110
FG=88.00
REMOVE
CONC.
STAIRS
15 LF
RCP
SS
CONC
VDOT
INV.=
63
N. MH
OVER
.54±
ITCH
SIDE
% ±
CONC. CHANNEL
(TO REMAIN)
PROPOSED LIFT S
WOOD BOLLARD
(TYP.) SEE DETAIL
SHEET 11
DRY DETENTION
COUNTY TYPE
2YR ELEV= 82.
10YR ELEV= 82
25YR ELEV= 8
100YR ELEV= 8
ARD
G-1
5.00'
TENANCE
CESS
FFER
3:1
RIP-RAP
FOREBAY
20' DRAINAGE
EASEMENT
(TO BE VACATED
RIS
100' YR STO
LEVEL= 82.4
N/F
WILLIE & EUGENE ROBINSON
120 WATFORD LANE
D.B. 44, PG. 184
GPIN 3910100109
3:1
LIMITS OF
CLEARING
TIMBER DRAINAGE
STRUCTURE
20' DRAINAGE
EASEMENT
(TO REMAIN)
PRESSURE TREATED WOOD
DRY DETENTION STRUCTURE
(SEE DETAIL ON THIS SHEET)
DIMENTATION CONTROL LEGEND
EE PROTECTION (SPEC. 3.38)
TLET PROTECTION (SPEC. 3.18)



PLAN VIEW
SCALE: NONE

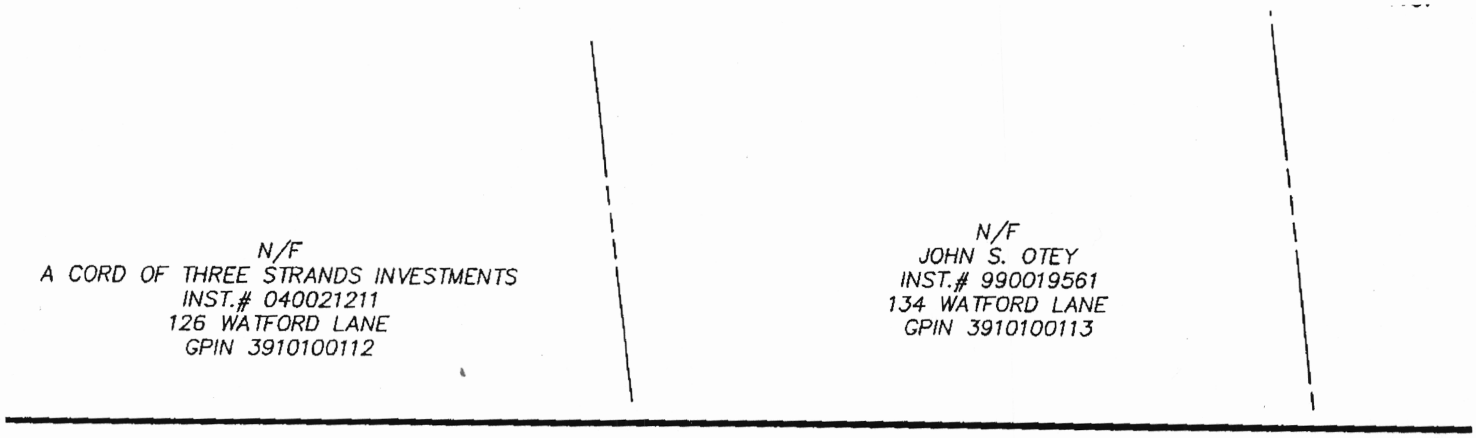
NOTE:
ALL LUMBER TO BE PRESSURE TREATED. ALL FASTENERS TO BE HOT-DIP GALVANIZED.

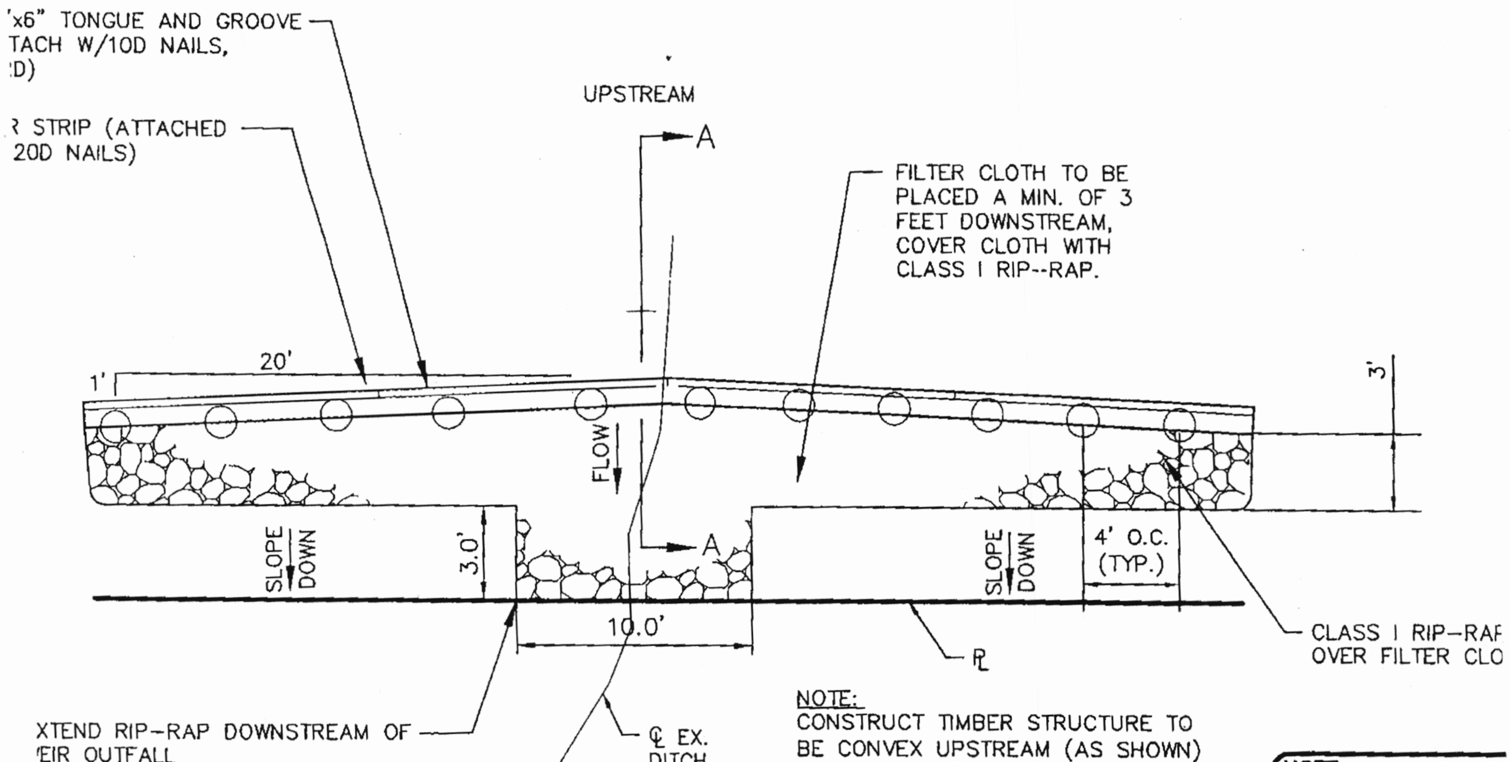


UPSTREAM ELEVATION
SCALE: NONE

PRESSURE TREATED WOOD [

NOT TC
COUNTY TYF

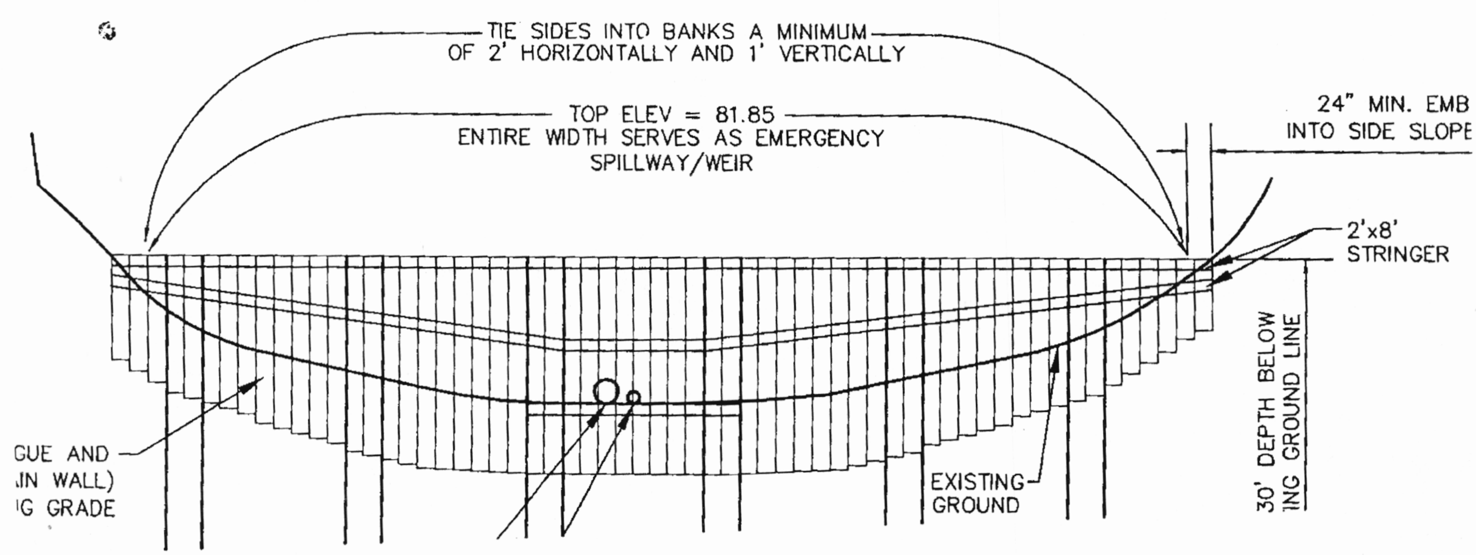


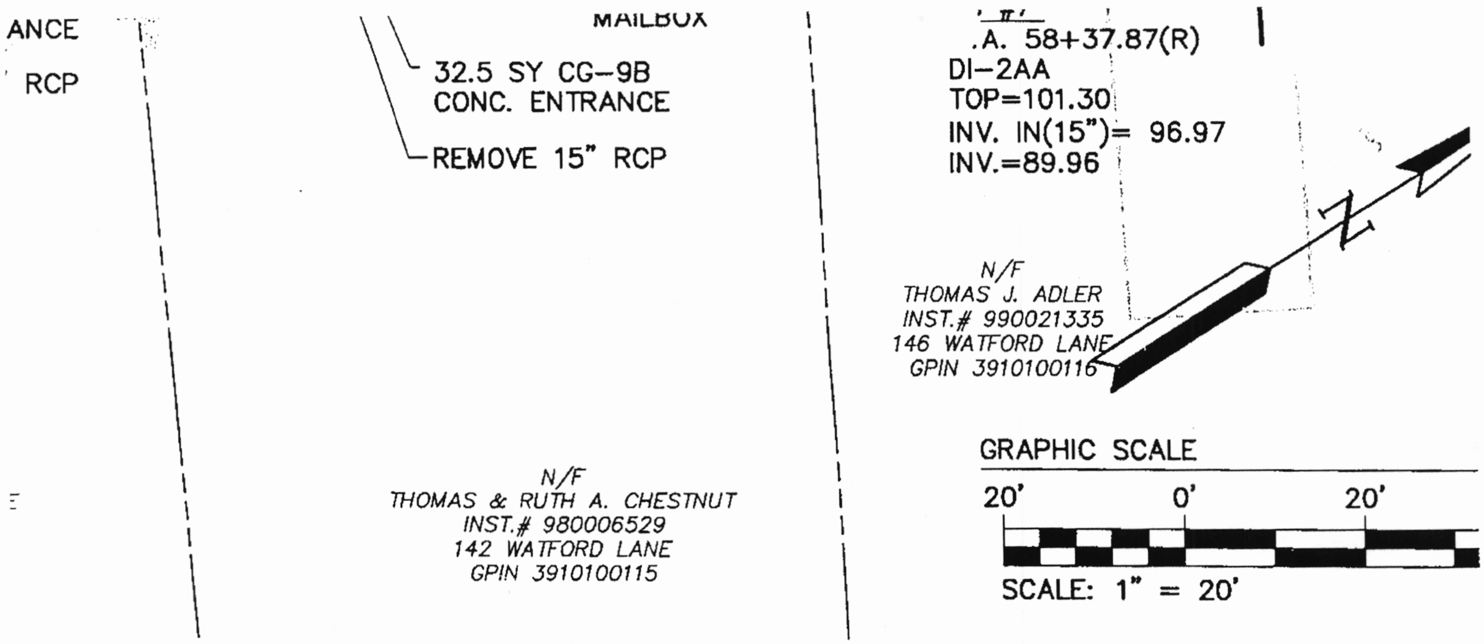


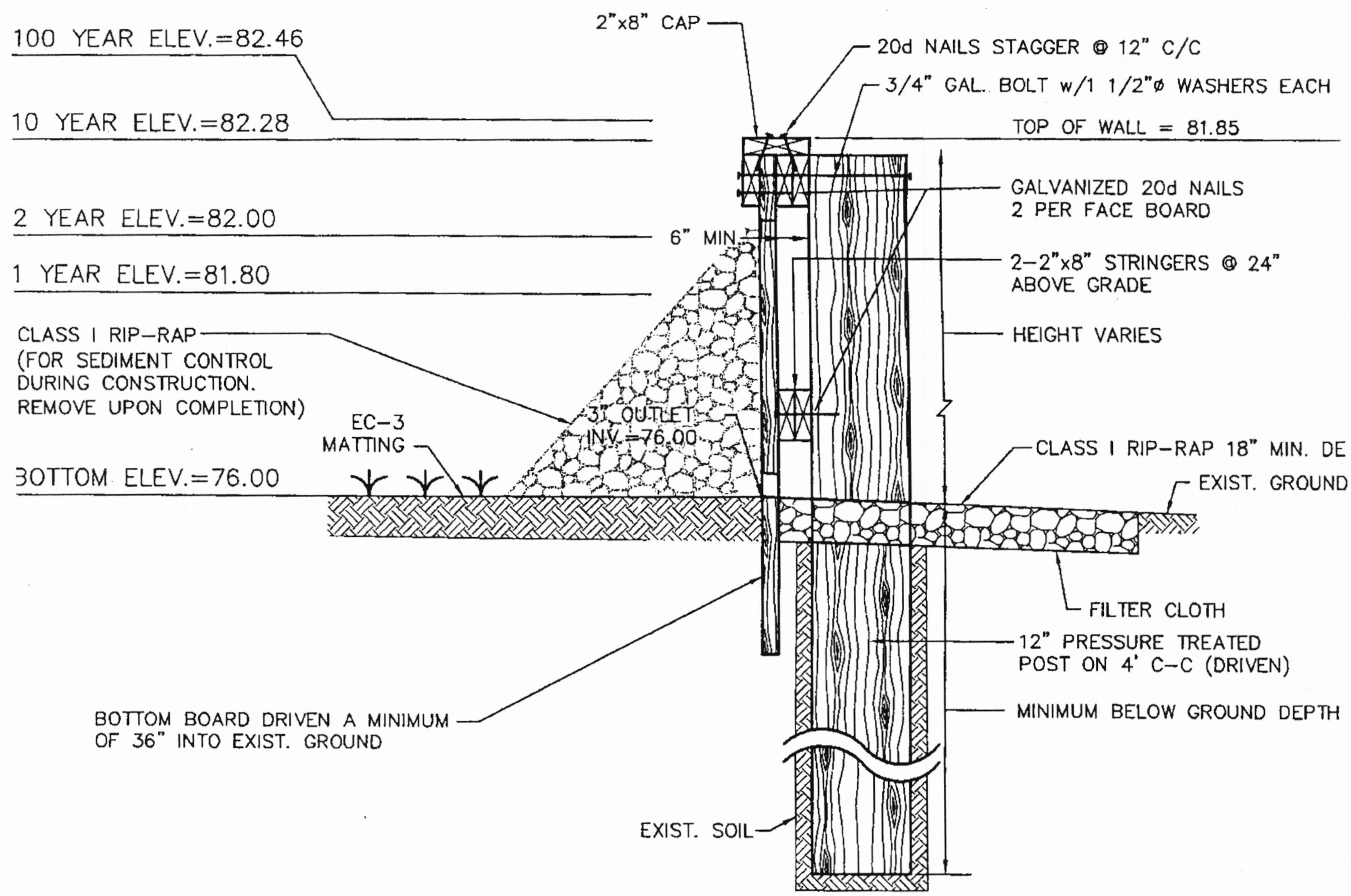
NOTE:
CONSTRUCT TIMBER STRUCTURE TO
BE CONVEX UPSTREAM (AS SHOWN)

PLAN VIEW
SCALE: NONE

NOTE:
ALL LUMBER TO BE PRESSURE TREATED. FASTENERS TO BE HOT-DIP GALVANIZE







SECTION A-A
NOT TO SCALE

5.0'

6. Design Calculations

7. Reports

ECS LLC
MID-ATLANTIC

REPORT OF

SUBSURFACE EXPLORATION AND GEOTECHNICAL ENGINEERING ANALYSIS

IRONBOUND SQUARE BMP
DRY DETENTION STRUCTURE
JAMES CITY COUNTY, VIRGINIA
ECS PROJECT NO. 07:10578

PREPARED FOR

Mr. Wayland Bass, P.E.
James City County Stormwater Division
287 McLaws Circle Suite 1
Williamsburg, VA 23185-5649

JUNE 4, 2010

ECS MID-ATLANTIC, LLC
Geotechnical • Construction Materials • Environmental • Facilities

June 4, 2010

Mr. Wayland Bass, P.E.
James City County Stormwater Division
287 McLaws Circle Suite 1
Williamsburg, VA 23185-5649

ECS Project No. 07:10578

Reference: Report of Subsurface Exploration and Geotechnical Engineering Analysis
Ironbound Square BMP Dry Detention Structure
James City County, Virginia

Dear Mr. Bass:

Pursuant to your request, ECS Mid-Atlantic, LLC (ECS M-A) has conducted an evaluation of the erosion affecting the timber Dry Detention Structure at the Ironbound Square BMP site. The purpose of this evaluation was to ascertain the nature of erosion affecting the timber structure and provide recommendations for erosion repair as well as to evaluate its lateral capacity.

Project Description:

The existing structure is a timber wall approximately 80 feet in length intended to dissipate stream energy before stormwater passes to the natural stream channel. The wall is approximately 6.5 feet tall above the stream channel and is assumed to have been constructed in general accordance with the original project drawings entitled *Ironbound Square Revitalization Roadway Improvements – Phase I*, Sheet 6, Section A-A prepared by AES Consulting Engineers, Inc. dated 10/19/05, with the exception that the vertical posts (piles) are 30 feet in length. In this regard, the piles are assumed to have an embedment on the order of 23.5 feet. The center portion of the timber wall through which the stream channel passes is free standing, while the shoulders of the wall are laterally supported on their downstream face by an earthen embankment.

At times during storm events, there is a hydraulic imbalance as water collects on the upstream side. It appears that water has forced a channel below the vertical timber wall planks, which the original project drawings indicate are embedded 3 feet below grade, to boil out just downstream of the wall. In this regard, the planks have been undermined and the rock protection on the downstream side of the wall has been degraded. Furthermore, the wall will be required to temporarily support the hydrostatic pressure of a storm event with a pool level at the top of the wall, or about 6.5 feet above the stream channel.

The client desires to correct the undermining of the planks and evaluate the capability of the wall to withstand full hydrostatic pressures.

Purpose and Scope:

The purpose of this exploration was to investigate the soil and groundwater conditions at the site to develop soils related engineering recommendations to guide design of a repair to the undermining of the vertical planks and to aid in the evaluation of the suitability of the timber piles for support of the design loading. ECS accomplished these purposes by drilling a soil test boring, performing laboratory tests to ascertain pertinent engineering properties, and analyzing the results of the field and laboratory tests. On this basis we developed our geotechnical engineering recommendations. No other warranties are expressed or implied.

The conclusions and recommendations contained in this report are based upon one (1) soil test boring drilled to a depth of 29.5 feet below the existing grade, a site reconnaissance performed by an ECS engineer, laboratory test results of boring samples, and pile load data provided by the Civil Engineer. In addition, limited subsurface information for the site obtained by Draper Aden Associates for the original BMP improvements as well as a Geotechnical Report prepared by ECS M-A for the expansion of the BMP were available to us.

The recommendations contained herein were developed from the data obtained in the soil test boring which indicates subsurface conditions at this specific location at the time of the exploration. If during the course of construction variations appear evident, the Geotechnical Engineer should be informed so that the conditions can be addressed. Our analysis was developed based on pile loading characteristics provided by the Civil Engineer. Should project characteristics or elevations differ from those discussed herein, this company should be informed such that a review of these conditions can be performed.

Investigative Procedures

One (1) soil test boring was completed on May 13, 2010. The boring was extended to a depth of 29.5 feet below the existing site grade before meeting refusal on what appeared to be a naturally occurring concretion. The boring was performed with an ATV mounted drill rig which utilized continuous-flight, solid-stem augers to advance the boreholes. Drilling fluid was not used in this process. Drilling services were provided by SDS, LLC, of Toano, Virginia. The boring was located in the stream channel a few feet downstream of the timber wall. The approximate boring location is indicated on the Boring Location Diagram included as Enclosure I.

Representative samples were obtained by means of the split-barrel sampling procedure in accordance with ASTM Specification D-1586-08. In this procedure, a 2-inch O.D., split barrel sampler is driven into a soil a distance of 24 inches by a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler through a 12-inch interval is termed the

Standard Penetration Test (SPT) value and is indicated for each sample on the boring logs. This value can be used as a qualitative indication of the in-place relative density of cohesionless soils. In a less reliable way, it also indicates the consistency of cohesive soils. This indication is qualitative, since many factors can significantly affect the Standard Penetration resistance value and thus prevent a direct correlation between drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies.

Samples were taken continuously to a depth of 10 feet and at 5-foot intervals thereafter. After recovery, representative portions of each sample were removed from the sampler, sealed in glass jars, and returned to our laboratory for further visual examination and laboratory analysis.

An experienced Geotechnical Engineer visually classified each soil sample from the test borings on the basis of texture and plasticity in accordance with the Unified Soil Classification System (USCS) and ASTM D-2488-06 (Description and Identification of Soils-Visual/Manual Procedures). Selected samples from the borings were subjected to natural moisture content and gradation analyses. The soil samples will be retained in our laboratory for a period of 60 days, after which they will be discarded unless other instructions are received as to their disposition.

A log of the soil boring is included as Enclosure II. The Geotechnical Engineer grouped the various soil types into the major zones noted on the boring logs. The group symbols for each soil type are indicated in parentheses following the soil descriptions on the boring logs. The stratification lines designating the interfaces between earth materials on the boring logs are approximate; in-situ, the transitions may be gradual. A description of the soil classification system and a reference to the boring log are included as Enclosure III. Laboratory test results are summarized in Enclosure IV.

Recommendations

1. In order to reduce the potential for undermining of the timber detention structure retaining 6.5 feet of water, we recommend a sheet pile cut-off be installed along and flush to its upstream face. It is expected that a PVC product would be an economical sheet pile.

2. We recommend a minimum penetration of about 13 feet below the stream channel surface. In this regard, a 20-foot sheet pile length should be appropriate.

3. The undermining of the vertical timber wall planks is occurring in the stream channel. No seepage or flow paths were observed through the earthen embankment behind the wall either side of the stream channel. However, if seepage or flow paths were to develop along the smooth surface of the sheet pile, they could potentially make their way around the end of the sheet pile cut-off and compromise its effectiveness. Therefore, we recommend the sheet pile cut-off extend the full length of the timber wall.

4. We performed a lateral pile analysis to ascertain maximum deflection of the pile butt. The basis of our assumptions is as follows:

   - Total pile length – 30 feet.
   - Unsupported height above grade – 6.5 feet.
   - Resultant horizontal force due to 6.5-foot head of water applied at 1/3 the height (26" above grade) – 5,273 lbs.
   - Axial load – 0.0 lbs.
   - Lateral resistance from walers to adjacent piles ignored.

   Our analysis of lateral deflection of the pile indicates that under a pressure of 6.5 feet of water, the pile could deflect about 1.5 inches at the centroid of the pressure distribution, or 26 inches above grade. This would result in a deflection at the top of the pile of approximately 3 inches. Therefore, connections between the sheet pile and the wall should allow for this movement without the sheet pile being subject to tension at the connection.

5. Evaluation of maximum tolerable pile deflections and stresses was not within the scope of this investigation. Our estimates of deflection, bending moment, and shear, all plotted with the load applied at 26 inches above the surface, are included in Enclosure V. Should these be determined to be unacceptable, lateral bracing could be provided for the piles by installing Class II rip-rap behind the wall. Horizontal planks installed across the back of the timber piles and in contact with the rip-rap mass which is tracked in place using a light dozer could be employed to engage the dead weight of the rip-rap as resisting lateral force.

6. It appears that the rip-rap and fabric along the downstream toe of the timber wall have deteriorated in that fabric does not appear to be present below all the rock. As part the work, we recommend the rip-rap be removed and replaced over new fabric, as per the original drawings. The fabric employed below the rip-rap on the down stream side of wall should consist of a Non-UV Sensitive, Medium Duty, Non-Woven Geotextile Fabric. The contractor should issue a fabric submittal to the Civil Engineer for approval before using on site.

Closing:

This report has been prepared for the client for use in developing geotechnical related design and construction specifications for the project. The report scope is limited to the specific project and location described, and the project description represents our understanding of the significant aspects relevant to soil and foundation characteristics. Should project characteristics differ from those anticipated herein or should unforeseen conditions be encountered during construction, ECS Mid-Atlantic, LLC should be informed so that the conditions can be reviewed. The findings of such a review should be received as an addendum to this report.

We recommend that the construction activities, to include sheet pile installation and materials placement, be monitored by a qualified Geotechnical Engineering firm to provide the necessary overview and to evaluate conformance of the work to the project requirements.

We appreciate the opportunity to be of assistance to James City County during the design phase of this project and look forward to continuing our relationship during the construction phase. If you should have any questions regarding the information and recommendations contained in the accompanying report, or if we can be of further assistance, please do not hesitate to contact us.

Respectfully,

ECS MID-ATLANTIC, LLC

COMMONWEALTH OF VIRGINIA
ROBERT C. MOSS, III
Lic. No. 019982
PROFESSIONAL ENGINEER

Robert C. Moss, P. E.
Principal Engineer

David J. Gordinier, P.E.
Senior Geotechnical Engineer

Enclosures
- I Boring Location Diagram
- II Soil Test Boring Log
- III Unified Soil Classification System and Reference Notes for Boring Log
- IV Summary of Laboratory Test Data
- V Pile Deflection, Bending Moment, and Shear Stress Curves

Distribution:
(1) Client via e-mail [wnbass@james-city.va.us ; bmoses@james-city.va.us]
(1) Mr. Aaron Small, P.E. via email [asmall@aesva.com]

ENCLOSURES

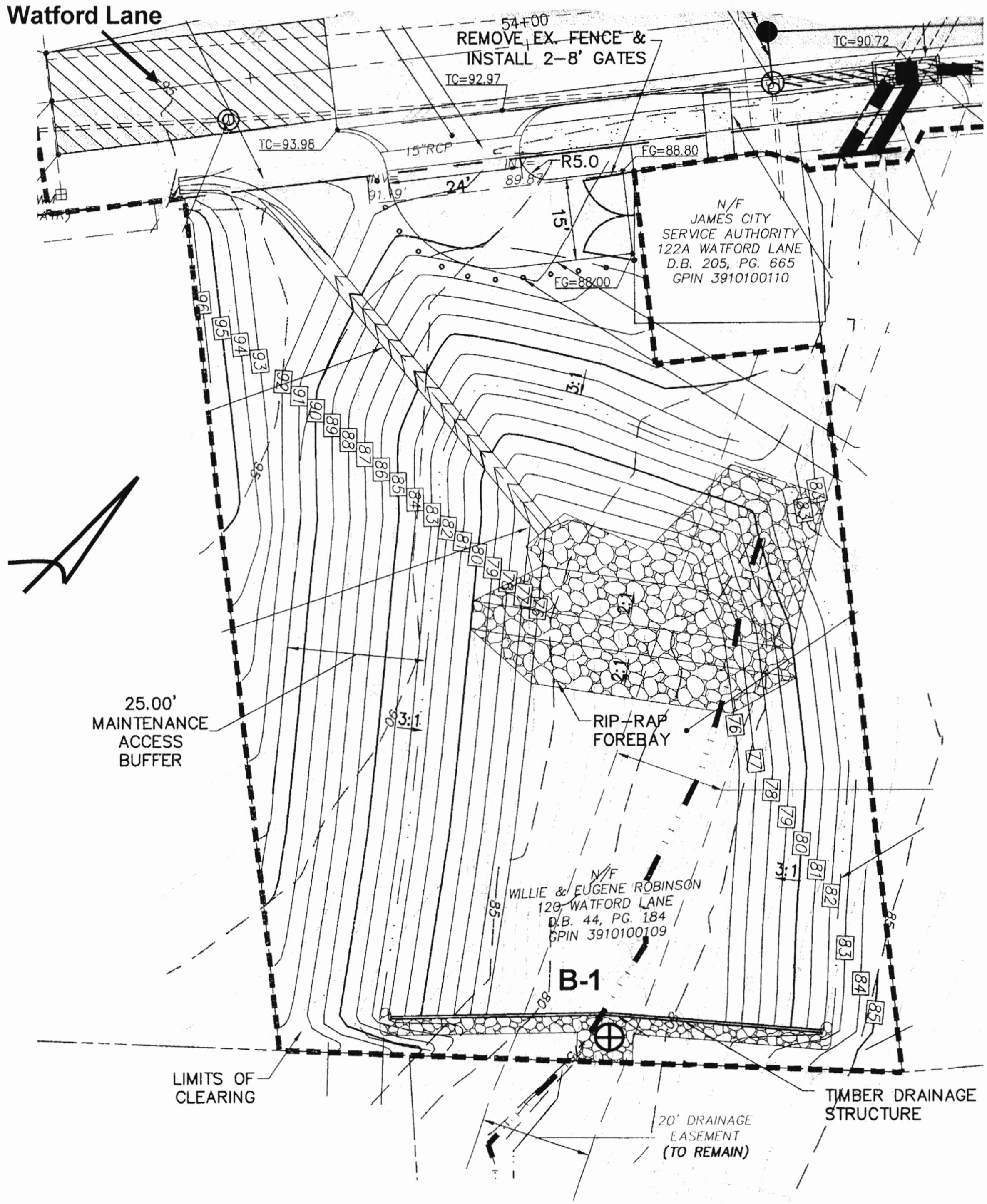
I. Boring Location Diagram

II. Soil Boring Log

III. Unified Soil Classification System and
Reference Notes for Boring Logs

IV. Summary of Laboratory Test Data

V. Pile Deflection, Bending Moment, and Shear Stress Curves



No Scale – Locations are approximate

ENCLOSURE I
BORING LOCATION DIAGRAM

Ironbound Square BMP Dry Detention Structure
James City County, Virginia
ECS Project No. 07:10578

ENCLOSURE II

SOIL BORING LOG

CLIENT	JOB #	BORING #	SHEET
James City County Stormwater Division	10578	B-1	1 OF 1

ECS LLC MID-ATLANTIC

PROJECT NAME	ARCHITECT-ENGINEER
Ironbound Road BMP Forebay Wall	AES Consulting Engineers, Inc.

SITE LOCATION
James City County, VA

CALIBRATED PENETROMETER TONS/FT.^{2}: 1, 2, 3, 4, 5+

PLASTIC LIMIT % X — WATER CONTENT % ● — LIQUID LIMIT % △

ROCK QUALITY DESIGNATION & RECOVERY: RQD% — — — REC.% ——— 20% 40% 60% 80% 100%

⊗ STANDARD PENETRATION BLOWS/FT.: 10, 20, 30, 40, 50+

DESCRIPTION OF MATERIAL — ENGLISH UNITS

BOTTOM OF CASING — LOSS OF CIRCULATION 100%

SURFACE ELEVATION

DEPTH (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	STANDARD PENETRATION (BLOWS/FT.)	WATER CONTENT %
0					Water				
	1	SS	24	4	Clayey Fine to Medium SAND, Trace Clay Lenses, Orange Brown, Saturated, Very Loose, (SC)			1 (0-0-1-1)	
	2	SS	24	14				2 (1-1-1-1)	
5	3	SS	24	17	Clayey Fine SAND [Striated], With Iron Concretions, Orange Brown, Dark Brown, and Gray, Wet, Very Loose, (SC)			3 (1-1-2-2)	44.2
	4	SS	24	20				3 (1-2-1-2)	
	5	SS	24	24	Clayey Fine SAND, Trace Clay Lenses, Brown with Gray [Striated], Wet, Very Loose, (SC)			3 (1-1-2-1)	38.2
10									
	6	SS	24	24				2 (1-1-1-2)	39.6
15									
	7	SS	18	18	Clayey Fine SAND, Trace Sand Lenses, Brown, Tan, and Gray [Striated], Wet, Very Loose, (SC-CL)			3 (1-1-2-50/0")	40.6
20					AUGER REFUSAL @ 19.50'				
25									
30									

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES IN-SITU THE TRANSITION MAY BE GRADUAL

WL Surface — WS OR WD	BORING STARTED 5/13/10	
WL(BCR) — WL(ACR)	BORING COMPLETED 5/13/10	CAVE IN DEPTH @ 4 FT
WL	RIG SDS — FOREMAN Mike	DRILLING METHOD SSA

RMOSS (05-19-10) RMOSS (05-19-10) RMOSS (05-21-10) RMOSS (05-21-10) RMOSS (05-26-10) RMOSS (05-26-10) RMOSS (05-26-10)

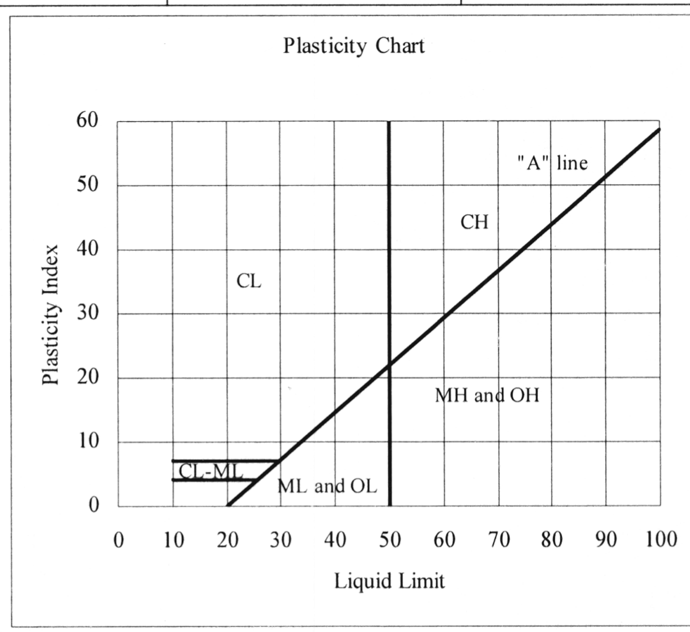
RMoss(05/19/2010 04:29:54 pm)

ENCLOSURE III

UNIFIED SOIL CLASSIFICATION SYSTEM AND REFERENCE NOTES FOR BORING LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

Major Divisions			Group Symbols		Typical Names	Laboratory Classification Criteria		
Coarse-grained soils (More than half of material is larger than No. 200 Sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW		Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP; More than 12 percent GM, GC, SM, SC; 5 to 12 percent Borderline cases requiring dual symbols [b]	$C_u = D_{60}/D_{10}$ greater than 4 $C_c = (D_{30})^2/(D_{10}xD_{60})$ between 1 and 3	
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines		Not meeting all gradation requirements for GW	
		Gravels with fines (Appreciable amount of fines)	GM[a]	d	Silty gravels, gravel-sand mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			GC		Clayey gravels, gravel-sand-clay mixtures		Atterberg limits below "A" line or P.I. less than 7	
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines		$C_u = D_{60}/D_{10}$ greater than 6 $C_c = (D_{30})^2/(D_{10}xD_{60})$ between 1 and 3	
			SP		Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM[a]	d	Silty sands, sand-silt mixtures		Atterberg limits above "A" line or P.I. less than 4	Limits plotting in CL-ML zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
				u				
			SC		Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils (More than half material is smaller than No. 200 Sieve)	Silts and clays (Liquid limit less than 50)		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL		Organic silts and organic silty clays of low plasticity			
	Silts and clays (Liquid limit greater than 50)		MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH		Inorganic clays of high plasticity, fat clays			
			OH		Organic clays of medium to high plasticity, organic silts			
	Highly Organic soils		Pt		Peat and other highly organic soils			



[a] Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

[b] Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder. (From Table 2.16 - Winterkorn and Fang, 1975)

REFERENCE NOTES FOR BORING LOGS

I. Drilling Sampling Symbols

SS	Split Spoon Sampler	ST	Shelby Tube Sampler
RC	Rock Core, NX, BX, AX	PM	Pressuremeter
DC	Dutch Cone Penetrometer	RD	Rock Bit Drilling
BS	Bulk Sample of Cuttings	PA	Power Auger (no sample)
HSA	Hollow Stem Auger	WS	Wash sample
REC	Rock Sample Recovery %	RQD	Rock Quality Designation %

II. Correlation of Penetration Resistances to Soil Properties

Standard Penetration (blows/ft) refers to the blows per foot of a 140 lb. hammer falling 30 inches on a 2-inch OD split-spoon sampler, as specified in ASTM D 1586. The blow count is commonly referred to as the N-value.

A. Non-Cohesive Soils (Silt, Sand, Gravel and Combinations)

Density		*Relative Properties*	
Under 4 blows/ft	Very Loose	Adjective Form	12% to 49%
5 to 10 blows/ft	Loose	With	5% to 12%
11 to 30 blows/ft	Medium Dense		
31 to 50 blows/ft	Dense		
Over 51 blows/ft	Very Dense		

Particle Size Identification		
Boulders		8 inches or larger
Cobbles		3 to 8 inches
Gravel	Coarse	1 to 3 inches
	Medium	½ to 1 inch
	Fine	¼ to ½ inch
Sand	Coarse	2.00 mm to ¼ inch (dia. of lead pencil)
	Medium	0.42 to 2.00 mm (dia. of broom straw)
	Fine	0.074 to 0.42 mm (dia. of human hair)
Silt and Clay		0.0 to 0.074 mm (particles cannot be seen)

B. Cohesive Soils (Clay, Silt, and Combinations)

Blows/ft	*Consistency*	*Unconfined Comp. Strength Q_p (tsf)*	*Degree of Plasticity*	*Plasticity Index*
Under 2	Very Soft	Under 0.25	None to slight	0 – 4
3 to 4	Soft	0.25-0.49	Slight	5 – 7
5 to 8	Medium Stiff	0.50-0.99	Medium	8 – 22
9 to 15	Stiff	1.00-1.99	High to Very High	Over 22
16 to 30	Very Stiff	2.00-3.00		
31 to 50	Hard	4.00–8.00		
Over 51	Very Hard	Over 8.00		

III. Water Level Measurement Symbols

WL	Water Level	BCR	Before Casing Removal	DCI	Dry Cave-In
WS	While Sampling	ACR	After Casing Removal	WCI	Wet Cave-In
WD	While Drilling	▽	Est. Groundwater Level	▼	Est. Seasonal High GWT

The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in a granular soil. In clay and plastic silts, the accurate determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally applied.

ENCLOSURE IV

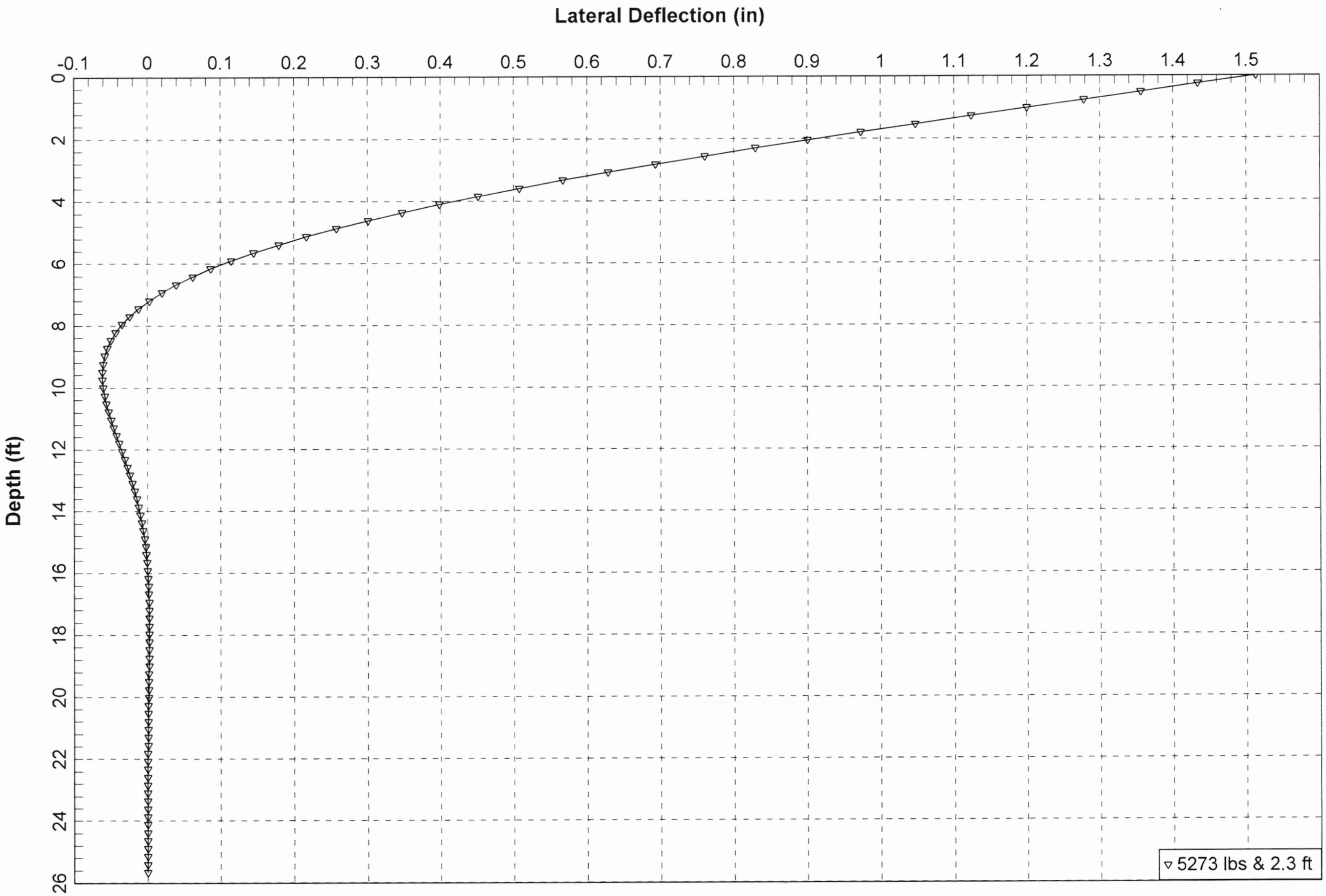
SUMMARY OF LABORATORY TEST DATA

Ironbound Square BMP Dry Detention Structure
James City County, Virginia
ECS Project No. 07:10578

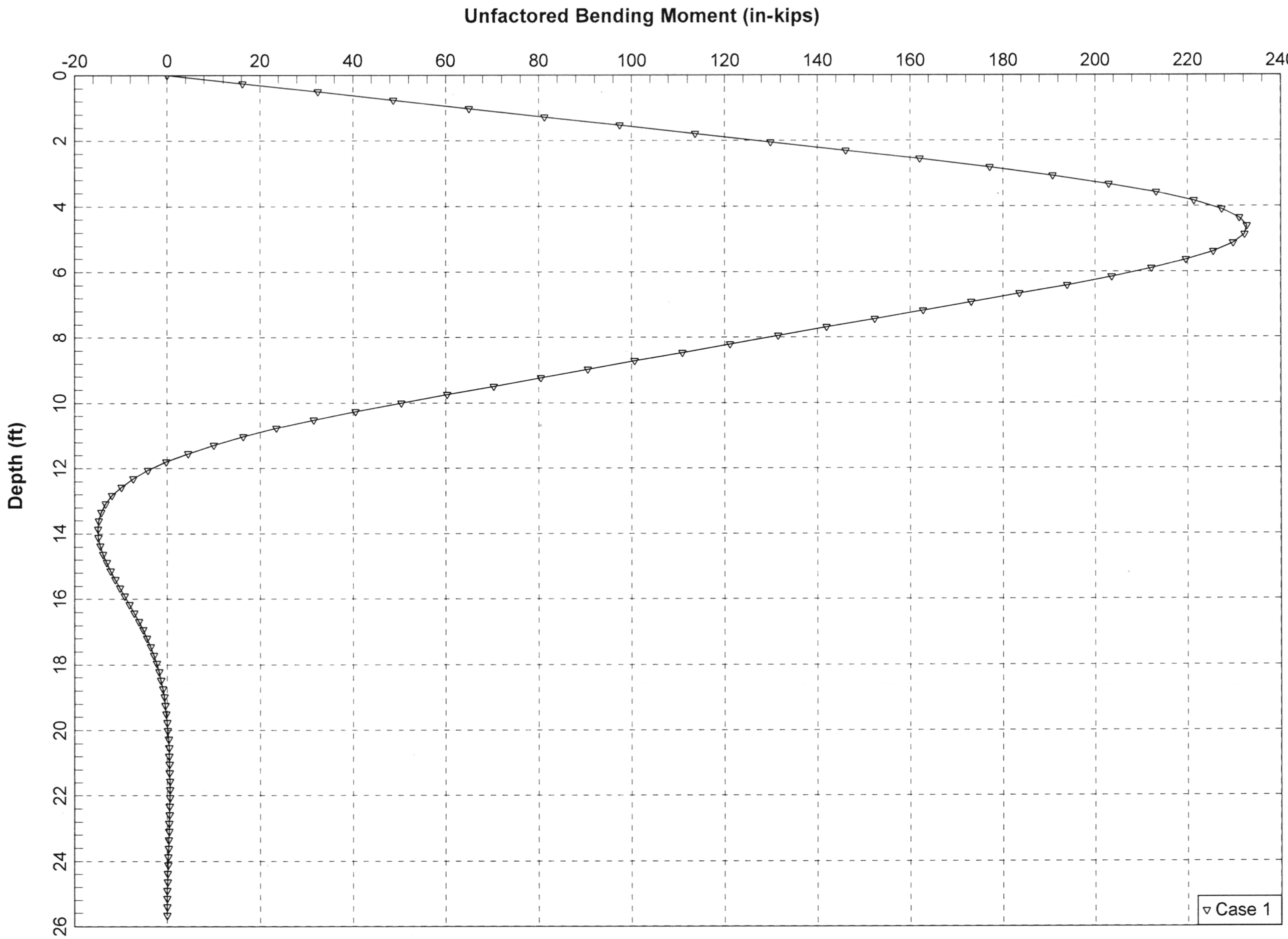
Boring Number	Sample Number	Depth (feet)	Moisture Content (%)	Silt or Clay Fraction (%)	Atterberg Limits		Unified Soil Class.
					Liquid Limit (%)	Plasticity Index (%)	
B-1	S-3	4-6	44.2	40.5	-	-	SC
B-1	S-5	8-10	38.2	38.2	-	-	SC
B-1	S-6	13-15	39.6	40.2	-	-	SC
B-1	S-7	18-20	40.6	47.6	-	-	SC

ENCLOSURE V

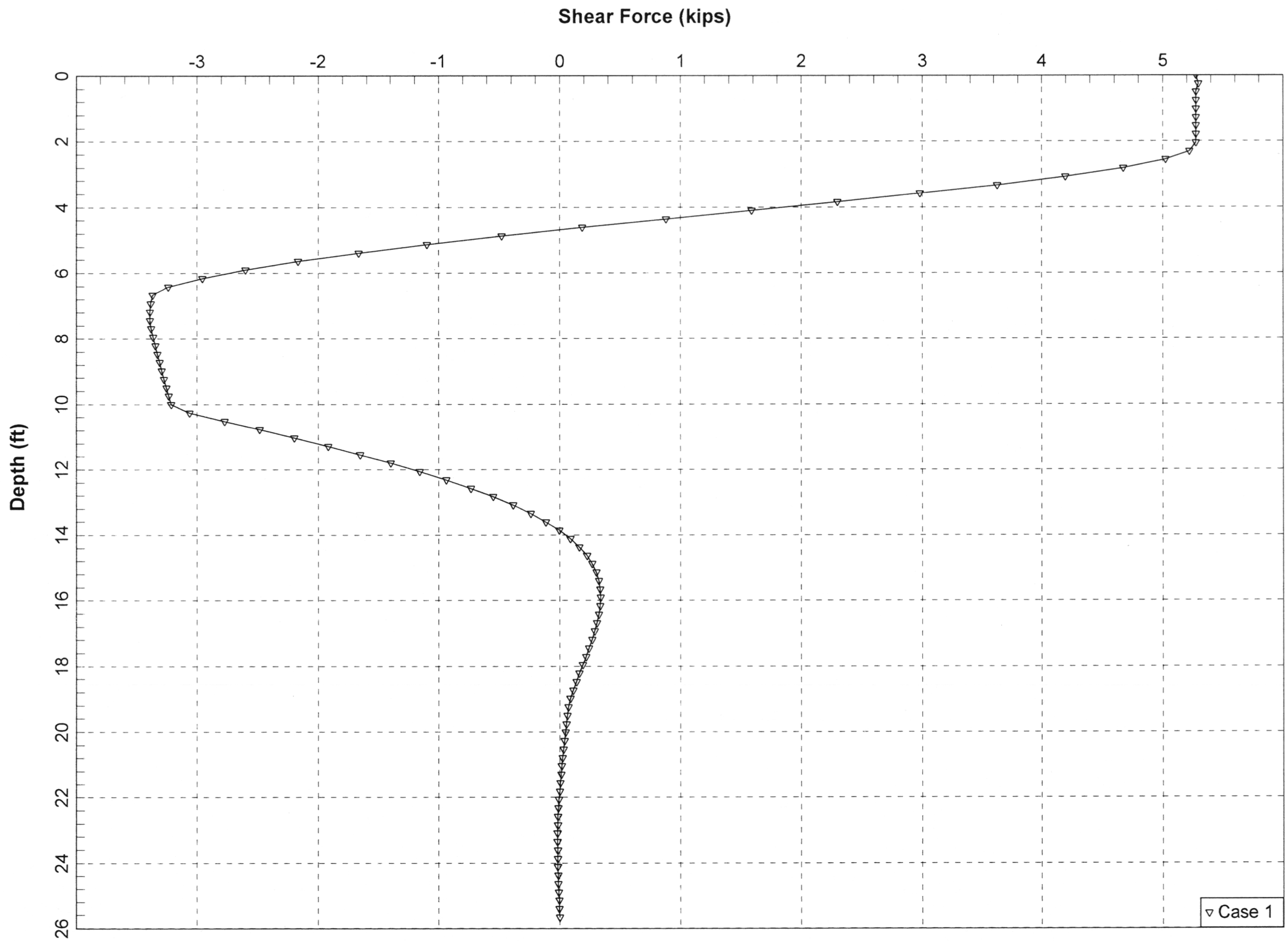
PILE DEFLECTION, BENDING MOMENT, AND SHEAR STRESS CURVES



Baffle Wall Solder Piles



Unfactored Bending Moment (in-kips)
-20
0
20
40
60
80
100
120
140
160
180
200
220
240
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
Case 1


Shear Force (kips)
-3
-2
-1
0
1
2
3
4
5
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
Case 1

8. Correspondence

9. Inspection Records

10. Misc. (ex. photos)