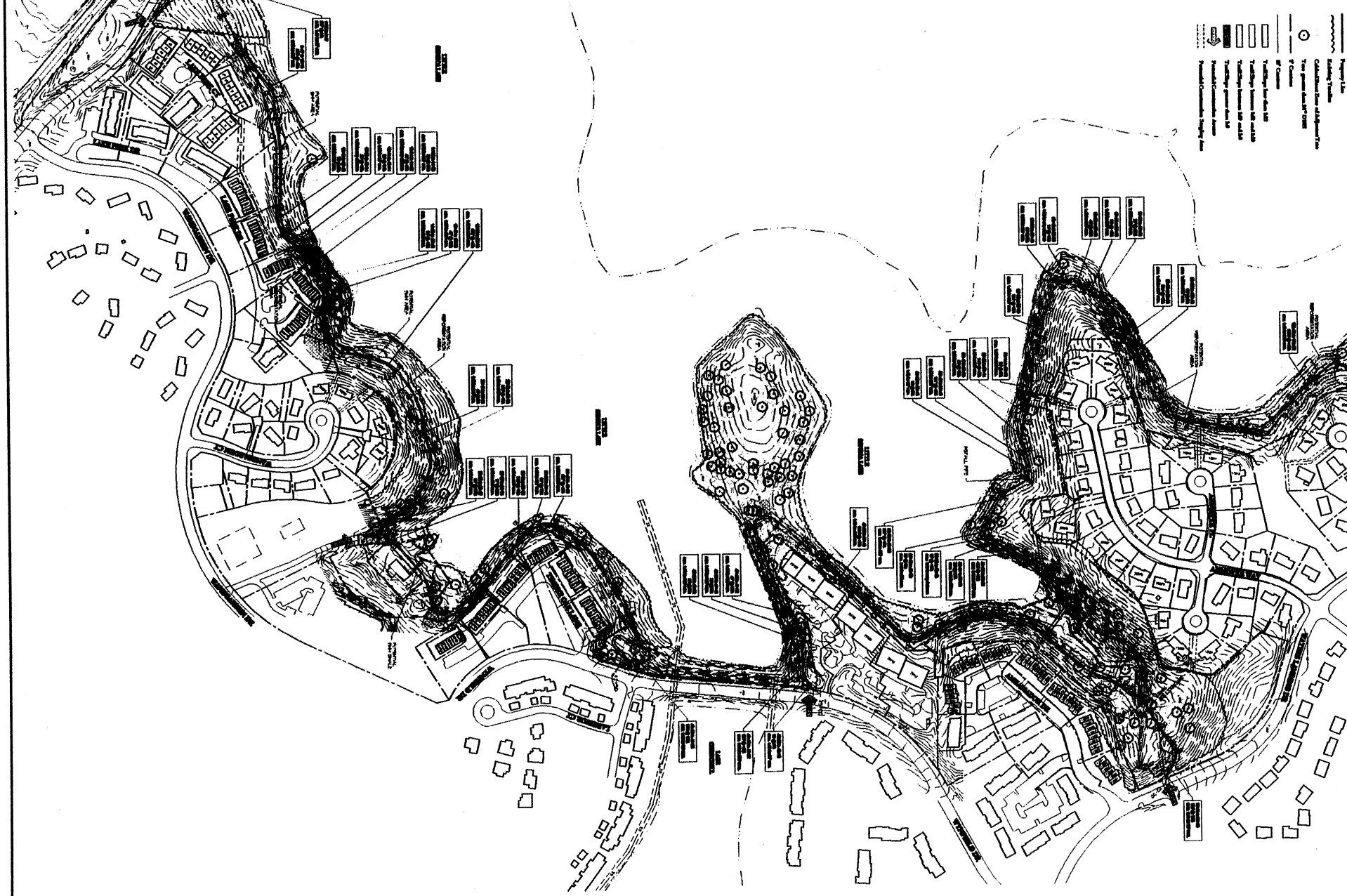
Appendix A:

Inventory and Analysis Plan



Appendix B:

Geotechnical Report

ENGINEERING • CONSULTATION •
E/2 C/R inc.
CONSTRUCTION • REMEDIATION •

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Baltimore, Maryland 21237
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November 21, 2002

Mr. John Heinrichs, P.E.
Phoenix Engineering, Inc.
1420-A Joh Avenue
Baltimore, Maryland 21227

Re: Preliminary Geotechnical Investigation Report
Renovations to Existing Hard Surface Trail
Black Hill Regional Park
Montgomery County, Maryland
E2CR Project No. 02571-04

Dear Mr. Heinrichs:

In accordance with our proposal dated April 8, 2002 and your authorization, we have completed the geotechnical investigation for the referenced project. This letter report presents the results of our findings and our recommendations.

The site is located to the east of Wisteria Drive and to the north of Wanegarden Drive and Winfield Drive, in Black Hill Regional Park, Montgomery County, Maryland, as shown on Figure 1 – Site Vicinity Map.

Based on the information provided, the project consists of rehabilitating an existing 6-foot wide, 2 mile long ± paved trail path. It appears that the pavement has failed at many locations. It is proposed to renovate and widen the trail path to a width of 8 feet and construct a pre-fabricated bridge.

The purpose of this study was to determine the general subsurface conditions within the project limits and evaluate these subsurface conditions for the design and construction aspects of the project.

The scope of our services, as defined by PEI, included:

- Drilling 2 borings to depths of about 20' each, at the location of the bridge,
- Drilling 6 shallow borings to depths of 5 feet each, along the existing trail path,
- Conducting laboratory tests on representative soils,
- Preparing a preliminary geotechnical report of our findings, evaluations and recommendations pertaining to the 30% design of the project.

The field investigation was conducted in October 2002. Eight borings (B-1 through B-8) were drilled at the locations shown on Figures 2, 3 and 4 (Boring Location Plan). Borings B-1 through B-8, except B-3 and B-4, were drilled to depths of 5-feet each. Borings B-3 and B-4 (for the bridge) were drilled to depths of 20-feet each. All borings were drilled using an ATV (All Terrain Vehicle) drill rig. The holes were advanced using hollow stem augers. Standard penetration tests were conducted and split spoon samples were obtained in every boring at depth intervals of about 2.5-ft. Representative portions of each sample were placed in a glass jar and were appropriately marked. Bulk (bag) samples were obtained off the auger flights in some borings, representing different soil types. All samples were sent to our laboratory for testing.

The groundwater level was monitored in each boring during and after completion of drilling. After the water readings were obtained, the boreholes were backfilled with auger cuttings and the borings located in paved areas were patched with bituminous concrete (cold patch).

Even though auger refusal was not encountered in any boring, hard drilling through decomposed rock was encountered in several borings. The edited logs of the borings are included in the Appendix.

All samples were visually classified in the laboratory by a geologist to modify or corroborate the field classifications. Selected samples were tested for their percent fines, Atterberg limits, and moisture density relationship (Modified Proctor). The results of the laboratory test results are included in Table 1, in the Appendix.

Geologically the site lies in the Eastern Piedmont Physiographic Province. The bedrock at the site is primarily a Schist belonging to the Upper Pelitic Schist Formation. The surficial soils are residual and have been derived by the weathering and/or chemical decomposition of the underlying parent rock.

The borings indicate that the subsurface conditions at the site generally consist of up to about 3-ft. of fill in borings B-2 & B-5, and up to 9-ft. of fill in Boring B-3. The fill was not encountered in borings B-1, B-2 and B-6 through B-8. The fill generally consists of reddish brown to greenish brown Clayey SILT to Sandy SILT, with trace to some Gravel. The standard penetration resistance varies from about 2 blows/foot to about 37 blows/foot. The fill is underlain by the residual soil consisting of greenish brown to orange brown Clayey SILT to sandy SILT with trace to some decomposed rock fragments. The standard penetration resistance of the residual soil varies from about 29 blows/foot to over 100 blows/foot and generally increases with depth.

Groundwater was encountered in borings B-3 and B-4 at depths of 5.3-feet and 5.6-feet, respectively. No groundwater was encountered in the other six borings.

The available data was analyzed based on the proposed construction and is discussed below:

Bridge Structure:

The existing wooden bridge at the site will be replaced with a new pre-designed bridge. The new bridge will be about 8-feet wide and will be required to safely pass a light truck. The loads on the bridge are not known, but it is anticipated that the bridge will generally be a pedestrian bridge with occasional light pick-up truck traffic for maintenance purposes.

Borings B-3 and B-4 were drilled at the location of the bridge. These two borings indicate that the subsurface conditions vary significantly at each of the abutments. The south abutment (boring B-3) has up to 9-ft. of fill or very loose soil, and the water table is at a depth of about 5-ft. At the north abutment (boring B-4), the soils are medium dense to dense from the surface down.

The borings indicate that the north abutment can be founded on a shallow spread footing at a depth of 3-ft., for front protection. An allowable bearing capacity of 3,000 psf should be used to design the footing. The minimum width of the footing should be 18 inches.

At the south abutment, three alternatives were considered. i) Place the footing at a depth of about 12-ft. on the dense residual soil and use an allowable bearing capacity of 3,000 psf to design the footing. ii) Use 8-inch diameter auger cast poles, 15-ft. long. The piles could be installed using a test boring drill rig. The pile capacity would be 5 tons. iii) Partially undercut the loose soil (or fill) to a depth of 7-ft.; backfill with No. 57 Stone, and place the footing on the No. 57 Stone, using an allowable bearing capacity of 1,500 psf. The settlement would be about ½-inch. It is recommended that alternative (iii) i.e. partial undercut and backfill with No. 57 Stone be used at the south abutment.

Trail Pavement:

The existing bituminous concrete pavement of the trail is about 6-feet wide and exhibits mild to severe alligatoring, rutting, raveling, cracking and frequent failures. The borings indicate that the existing pavement over most of the trail consists of about 2-inches to about 4-inches of bituminous concrete underlain by up to about 3-inches of gravel base. In several borings the gravel base was not encountered.

The proposed pavement will be about 8-feet wide. The borings indicate that the subgrade soils generally consist of Clayey SILT to Sandy SILT. CBR (California Bearing Ratio) tests were

not conducted on the on-site soils, but considering the nature of the on-site soils, the soils are considered to be poor subgrade soils with low CBR values.

The traffic on the trail is anticipated to generally be pedestrian traffic with occasional pick-up trucks for maintenance work. Considering the available data and the site conditions it is recommended that the proposed pavement for the trial should be as follows,

Bituminous Concrete Surface Course	3-inches
CR-6 or DGA	4-inches
Subgrade firm and compacted	

Prior to placement of the pavement, the subgrade should be proof-rolled with a loaded pick-up truck, if possible, and soft or pumping areas should be undercut. The undercut areas should be backfilled with approved fill.

The trail should be crowned and graded to prevent ponding of the surface water on the pavement.

Earthwork:

The soils in the excavation are anticipated to vary from Sandy SILT to Clayey SILT. The optimum water content (based on the Modified Proctor Test) of the soils is about 13.8%. The natural water content in the upper 5-ft., over most of the trail area varies from about 5% to about 14%, except near boring B-3, where the moisture contents were about 20% to 24%. Therefore, in most of the soils the natural water content of the excavated soils is anticipated to be within the range in which the required 92% compaction (based on modified Proctor) can be obtained. Some aeration (drying) of the clayey soils will be required. Because of the nature of the construction, it will not be practical to lower the water content of the wet soils by air-drying. If offsite fill is required, the imported fill should have a USCS classification of SP or SM.

The borings did not encounter auger refusal, however, several borings encountered hard drilling through decomposed rock. Therefore hard digging through decomposed rock should be anticipated in deeper excavations.

All excavations deeper than 4 feet should be sloped at a minimum temporary slope of 1.5H:1V, or the excavation should be provided with temporary earth support system. All excavations should be performed in accordance with OSHA guidelines.

Groundwater was encountered in borings B-3 and B-4 at depths of 5.3-ft and 5.6-ft respectively. The water level could fluctuate by up to about 3 feet, depending on the season and rainfall. Therefore, dewatering during construction of the bridge should be anticipated.

We appreciate the opportunity to work with you on this project. If you have any questions or need more information, please call us.

Truly yours,
E2CR, Inc.

Neeraj Singh, P.E.
Project Manager

Siva Balu, P.E.
Chief Executive Officer

APPENDIX

ENGINEERING · CONSULTATION ·

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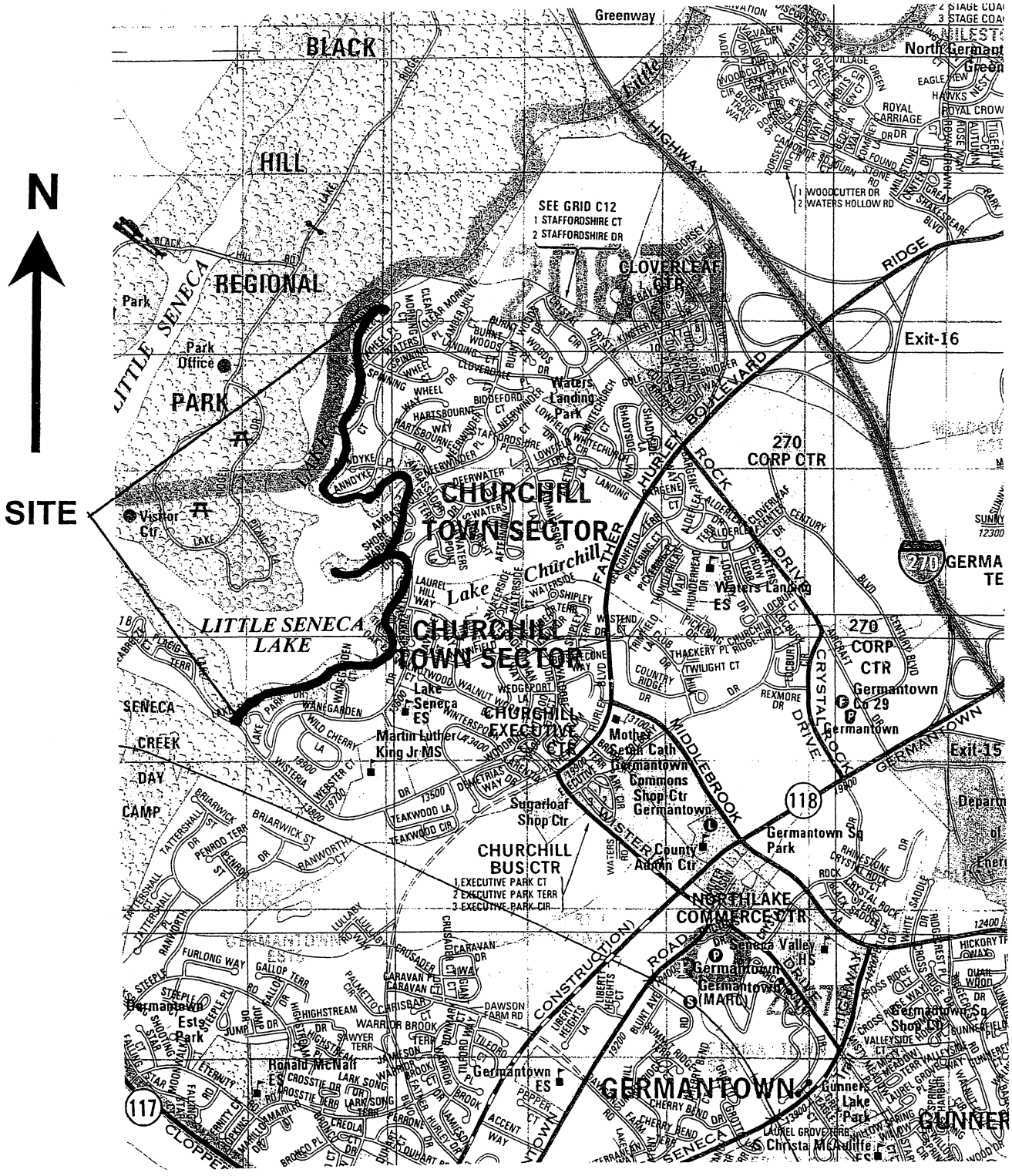
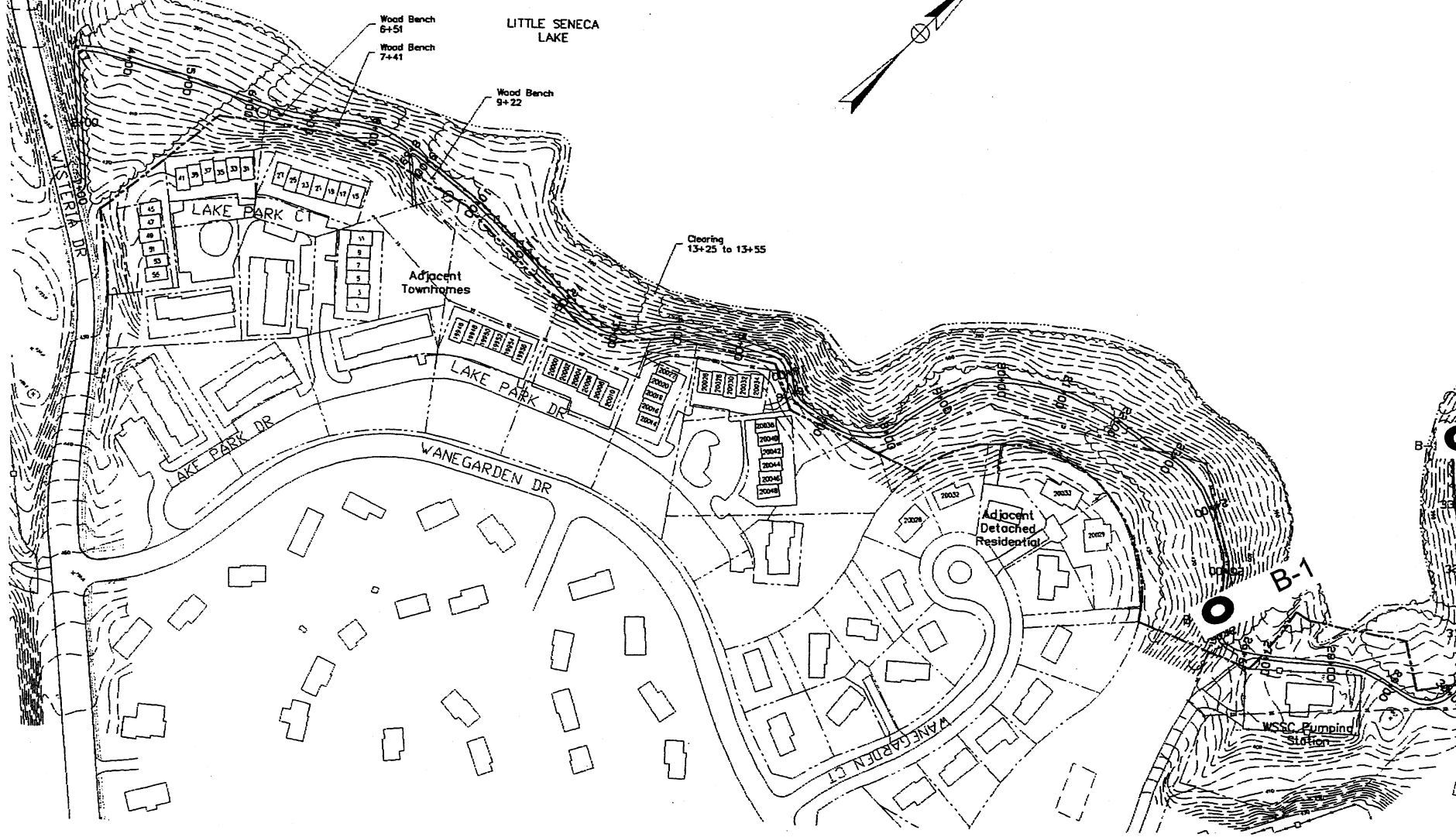
CONSTRUCTION · REMEDIATION ·

SITE VICINITY MAP
BLACK HILL PARK TRAIL
MONTGOMERY COUNTY, MD

FIGURE: 1	DRAWN BY: NS	CHECKED BY:
DATE: NOV, 02	JOB NO: 02571-04	





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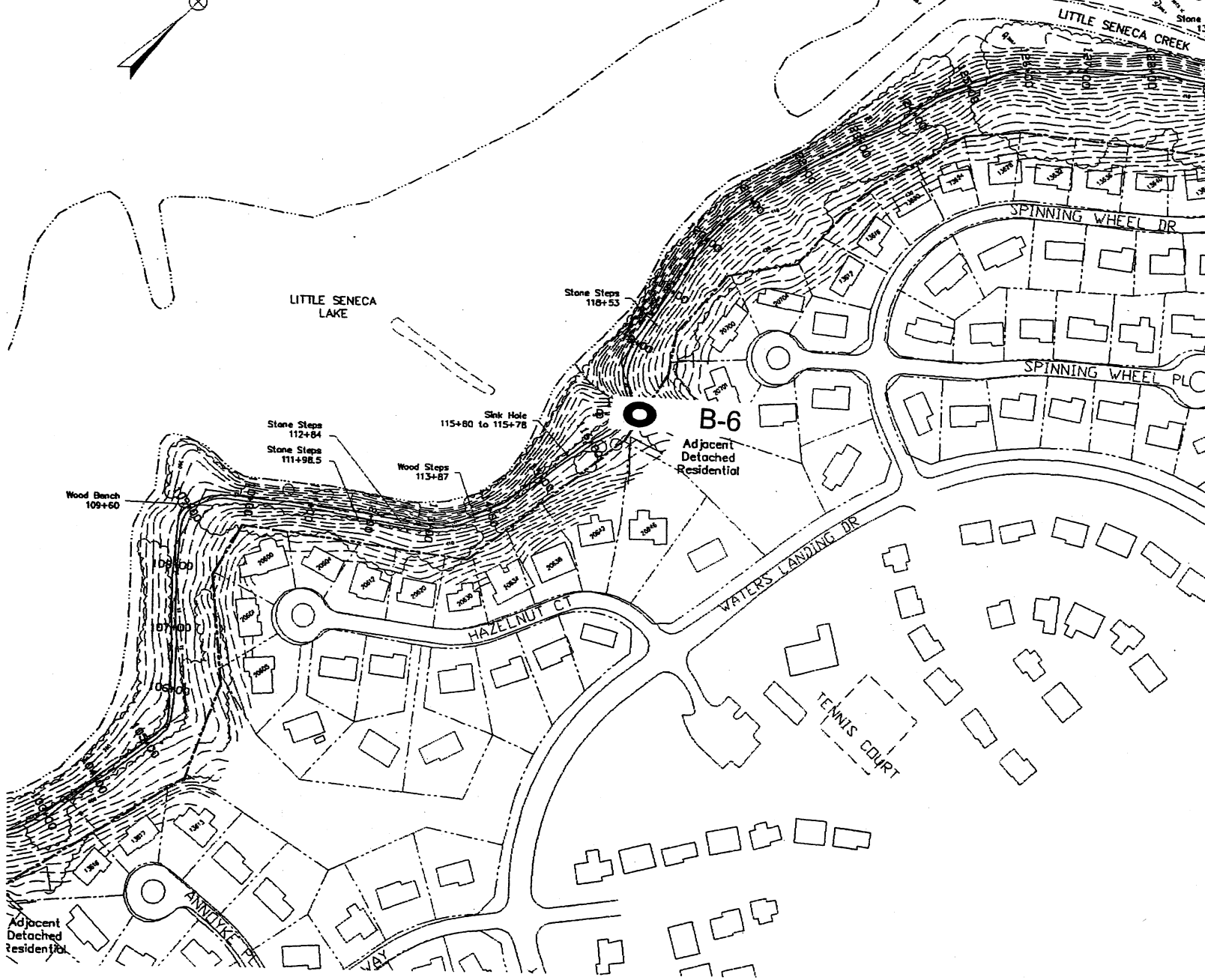

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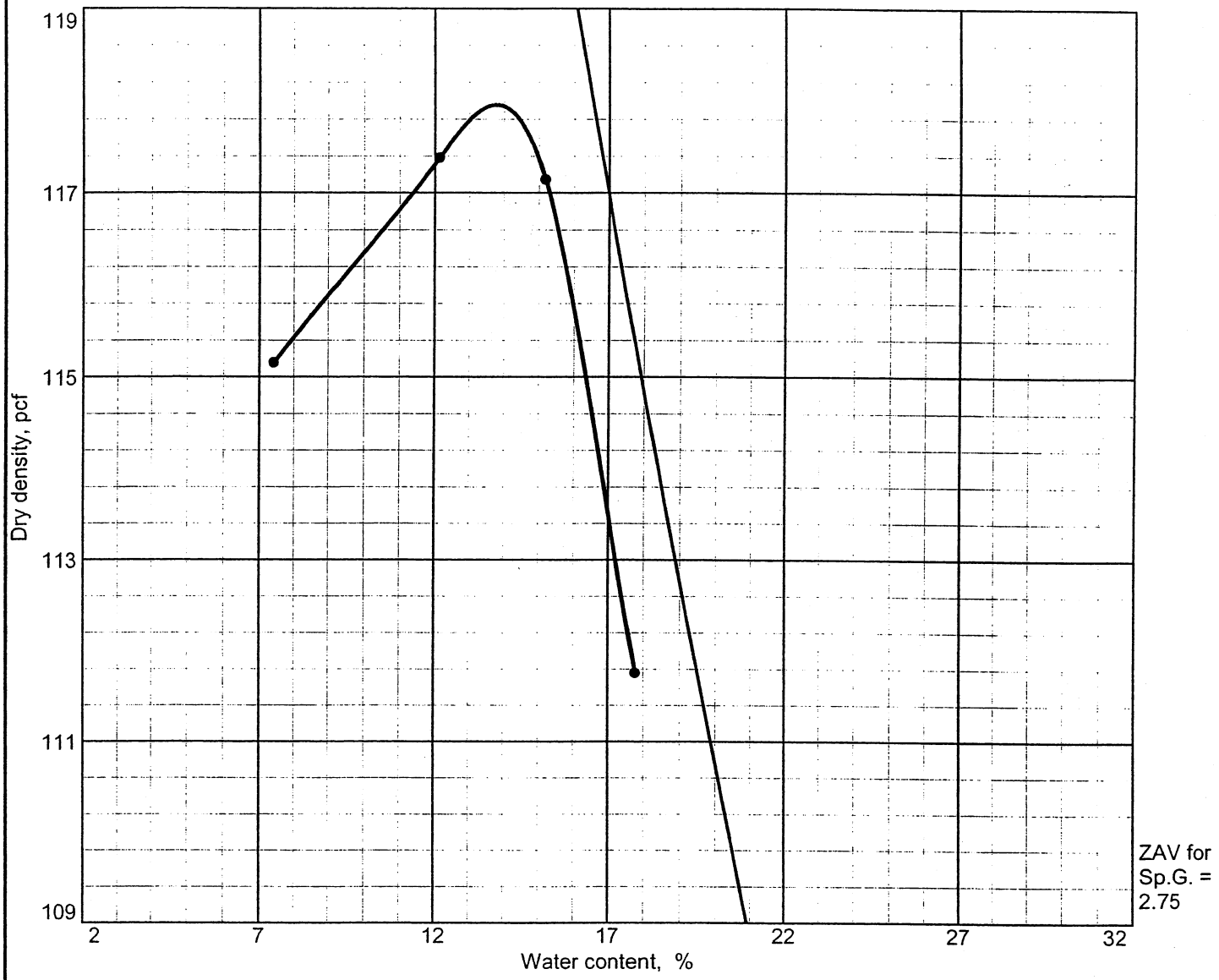
TABLE-1: SUMMARY OF LABORATORY TEST RESULTS

Black Hill Park Trail

E2CR Project No. 02571-04

BORING NO	SAMPLE NO	DEPTH (FEET)	NATURAL MOISTURE CONTENT,%	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE DISTRIBUTION				MODIFIED PROCTOR		USCS CLASSIFICATION
						GRAVEL (%)	SAND (%)	SILT (%)	CLAY (%)	MAX. DRY DENSITY,PCF	OPTIMUM MOISTURE,%	
B-1	S-1	1.0-2.5	11.0									
	S-2	3.5-5.0	8.8									
B-2	BAG		12.3									
B-3	S-1	1.0-2.5	20.9					48				
	S-2	3.5-5.0	23.7									
	S-3	6.0-7.5	16.7	37	12			22				GM-GC
	S-4	8.5-10.0	32.7									
	S-5	11.0-12.5	18.8	NP	NP			50				ML
B-4	S-1	1.0-2.5	14.3									
	S-2	3.5-5.0	10.6									
	S-4	8.5-10.0	15.5									
	BAG	0.0-5.0	26.8	40	13			69		118.0	13.8	ML
B-7	S-1	1.0-2.5	9.8									
	S-2	3.5-5.0	5.2									
B-8	BAG		13.6									

COMPACTION TEST REPORT



Test specification: ASTM D 1557-78 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
0.0'-5.0'	ML	A-4(1)	26.8%		40	13	17.9	69

TEST RESULTS

Maximum dry density = 118.0 pcf

Optimum moisture = 13.8 %

MATERIAL DESCRIPTION

Orange brown SILT, little fine to medium Sand and Rock Fragments

Project No. 02571-04 **Client:** Phoenix Engineering

Project: Black Hill Park Trail

● **Source:** B-4 **Sample No.:** Bag **Elev./Depth:** 0.0'-5.0'

Remarks:

Date Sampled: 10/29/02

COMPACTION TEST REPORT

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Plate

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BORING LOG

PROJECT				PROJECT NO.	BORING NO.
Black Hill Park Trail				02571-04	B - 1
SITE	BEGUN	COMPLETED	HOLE SIZE		GROUND ELEVATION
Montgomery County, Maryland	10/29/02	10/29/02			
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS		CAVED DEPTH
	None	Dry			2.3'
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE		DEPTH OF BORING
E. Taylor	140 lbs.				5
TYPE OF DRILL RIG & METHOD	DEPTH TO ROCK	LOGGED BY:			PAGE NO.
					1 OF 1

DEPTH	STRATA ELE./ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA: SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE TYPE AND DIAMETER	SAMPLE RECOVERY	REMARKS:
0			Pavement						2.25" Black top 1.5" Gravel Base
			Reddish brown, moist, SILT, trace to little fine Sand and Decomposed Rock fragments (ML)	S-1	18"	22- 35- 56	DS	12"	
5			Reddish brown and green, slightly moist, DECOMPOSED ROCK	S-2	18"	60- 64- 100/5"	DS	16"	
			Bottom of boring @ 5.0 feet						
10									
15									
20									
25									
30									

E2CR, Inc.

BORING LOG

PROJECT			PROJECT NO.	BORING NO.
Black Hill Park Trail			02571-04	B - 2
SITE	BEGUN	COMPLETED	HOLE SIZE	GROUND ELEVATION
Montgomery County, Maryland	10/29/02	10/29/02		
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS	CAVED DEPTH
	None	Dry		2.5'
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE	DEPTH OF BORING
E. Taylor	140 lbs.			5
TYPE OF DRILL RIG & METHOD	DEPTH TO ROCK	LOGGED BY:		PAGE NO. 1 OF 1

DEPTH	STRATA ELE./ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA: SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE TYPE AND DIAMETER	SAMPLE RECOVERY	REMARKS:
0			Pavement						2.25" Black top
			Reddish brown and green, moist, SILT and fine to medium SAND, trace fine to medium Gravel and Decomposed Rock fragments (Possible Fill) (ML)	S-1	18"	12- 21- 16	DS	12"	2.0" Gravel Base
				S-2	18"	14- 28- 43	DS	14"	
5			Reddish brown to orange, moist, SILT, trace fine Sand and Decomposed Rock fragments (Residual) (ML)						
			Bottom of Boring @ 5.0 feet						
10									
15									
20									
25									
30									

E2CR, Inc.

BORING LOG

PROJECT			PROJECT NO.	BORING NO.
Black Hill Park Trail			02571-04	B - 3
SITE	BEGUN	COMPLETED	HOLE SIZE	GROUND ELEVATION
Montgomery County, Maryland	10/29/02	10/29/02		
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS	CAVED DEPTH
	6.0'	5.3'	5.3'	13.7'
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE	DEPTH OF BORING
E. Taylor	140 lbs.			20
TYPE OF DRILL RIG & METHOD	DEPTH TO ROCK	LOGGED BY:		PAGE NO. 1 OF 1

DEPTH	STRATA ELE./ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA: SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE TYPE AND DIAMETER	SAMPLE RECOVERY	REMARKS:
0			Pavement						9" Black top No Gravel Base
			Greenish brown, moist, fine to medium SAND and SILT, trace to little Gravel (Possible Fill) (SM)	S-1	18"	3- 4- 4	DS	16"	
5			Reddish brown, moist, SILT, trace fine Sand and Decomposed Rock fragments (Possible Fill) (ML)	S-2	18"	2- 2- 2	DS	8"	
			Orange brown, wet, fine to coarse Clayey GRAVEL (Possible Fill) (GC)	S-3	18"	1- 1- 1	DS	8"	
10			Orange brown, moist, SILT, trace Decomposed Rock fragments (ML)	S-4	18"	1- 3- 5	DS	10"	
			Orange brown and green, moist to very moist, SILT and DECOMPOSED ROCK layers	S-5	18"	12- 24- 44	DS	16"	
15				S-6	18"	14- 15- 20	DS	14"	
				S-7	18"	13- 15- 14	DS	16"	
20				S-8	18"	14- 16- 23	DS	14"	
			Bottom of Boring @ 20.0 feet						
25									
30									

E2CR, Inc.

BORING LOG

PROJECT				PROJECT NO.	BORING NO.
Black Hill Park Trail				02571-04	B - 4
SITE	BEGUN	COMPLETED	HOLE SIZE		GROUND ELEVATION
Montgomery County, Maryland	10/28/02	10/28/02			
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS		CAVED DEPTH
	11.75'	10.2'	5.6'		15.1'
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE		DEPTH OF BORING
E. Taylor	140 lbs.				20
TYPE OF DRILL RIG & METHOD	DEPTH TO ROCK	LOGGED BY:			PAGE NO. 1 OF 1

DEPTH	STRATA ELE./ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA: SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE TYPE AND DIAMETER	SAMPLE RECOVERY	REMARKS:
0			Pavement						16" Black top No Gravel Base
			Orange brown, moist, SILT, trace to little fine Sand and Decomposed Rock fragments (Residual) (ML)	S-1	18"	9- 12- 15	DS	12"	
				S-2	18"	10- 18- 19	DS	18"	Obtained bulk sample @ 0-5'
5				S-3	18"	12- 16- 22	DS	18"	
			Yellowish brown, moist, SILT and fine to medium SAND (Residual) (ML)	S-4	18"	14- 12- 10	DS	18"	
10				S-5	18"	15- 88- 80	DS	18"	
			Orange brown to greenish brown, moist to occasionally wet, DECOMPOSED ROCK (with layers of Silt to Sand)	S-6	12"	36- 100/4"	DS	10"	
15				S-7	18"	25- 18- 19	DS	14"	
				S-8	18"	36- 97- 100/4"	DS	15"	
20			Bottom of Boring @ 20.0 feet						
25									
30									

E2CR, Inc.

BORING LOG

PROJECT				PROJECT NO.	BORING NO.
Black Hill Park Trail				02571-04	B - 5
SITE	BEGUN	COMPLETED	HOLE SIZE		GROUND ELEVATION
Montgomery County, Maryland	10/28/02	10/28/02			
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS		CAVED DEPTH
	None	Dry			3.0'
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE		DEPTH OF BORING
E. Taylor	140 lbs.				5
TYPE OF DRILL RIG & METHOD	DEPTH TO ROCK	LOGGED BY:			PAGE NO.
					1 OF 1

DEPTH	STRATA ELE./ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA					REMARKS:
				SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE TYPE AND DIAMETER	SAMPLE RECOVERY	
0			Pavment						1.5" Black top
			Brown, moist, SILT and fine to medium SAND, trace Decomposed Rock fragments (Possible Fill) (ML)	S-1	18"	12- 15- 14	DS	16"	1.0" Gravel Base
			Greenish to light brown, moist, SILT and DECOMPOSED ROCK fragments	S-2	18"	14- 17- 23	DS	16"	
5			Bottom of Boring @ 5.0 feet						
10									
15									
20									
25									
30									

E2CR, Inc.

BORING LOG

PROJECT				PROJECT NO.	BORING NO.
Black Hill Park Trail				02571-04	B - 6
SITE	BEGUN	COMPLETED	HOLE SIZE		GROUND ELEVATION
Montgomery County, Maryland	10/28/02	10/28/02			
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS		CAVED DEPTH
	None	Dry			2.3'
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE		DEPTH OF BORING
E. Taylor	140 lbs.				5
TYPE OF DRILL RIG & METHOD	DEPTH TO ROCK	LOGGED BY:			PAGE NO.
					1 OF 1

DEPTH	STRATA ELE./ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA					REMARKS:
				SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE TYPE AND DIAMETER	SAMPLE RECOVERY	
0			Pavement						4.0" Black top No Gravel Base
			Greenish brown to orange brown, moist, SILT, trace to little fine Sand and Decomposed Rock fragments (Residual) (ML)	S-1	18"	7- 9- 13	DS	18"	
5				S-2	18"	5- 4- 5	DS	10"	
			Bottom of Boring @ 5.0 feet						
10									
15									
20									
25									
30									

E2CR, Inc.

BORING LOG

PROJECT	PROJECT NO.	BORING NO.
Black Hill Park Trail	02571-04	B - 7

SITE	BEGUN	COMPLETED	HOLE SIZE	GROUND ELEVATION
Montgomery County, Maryland	10/28/02	10/28/02		
COORDINATES	**DEPTH WATER ENC.**	**AT END DRILL**	**AT 24 HRS**	**CAVED DEPTH**
	None	Dry		1.9'
DRILLER	**WEIGHT OF HAMMER**	**HEIGHT OF FALL**	**TYPE OF CORE**	**DEPTH OF BORING**
E. Taylor	140 lbs.			5
TYPE OF DRILL RIG & METHOD	**DEPTH TO ROCK**	**LOGGED BY:**		**PAGE NO.**
				1 OF 1

DEPTH	STRATA ELE./ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA: SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE TYPE AND DIAMETER	SAMPLE RECOVERY	REMARKS:
0			Pavement						3" Black top 3" Gravel Base
			Greenish brown, moist, SILT and fine to medium SAND and DECOMPOSED ROCK FRAGMENTS (ML)	S-1	18"	12- 13- 34	DS	16"	
5			Bottom of Boring @ 5.0 feet	S-2	18"	42- 50- 38	DS	16"	
10									
15									
20									
25									
30									

E2CR, Inc.

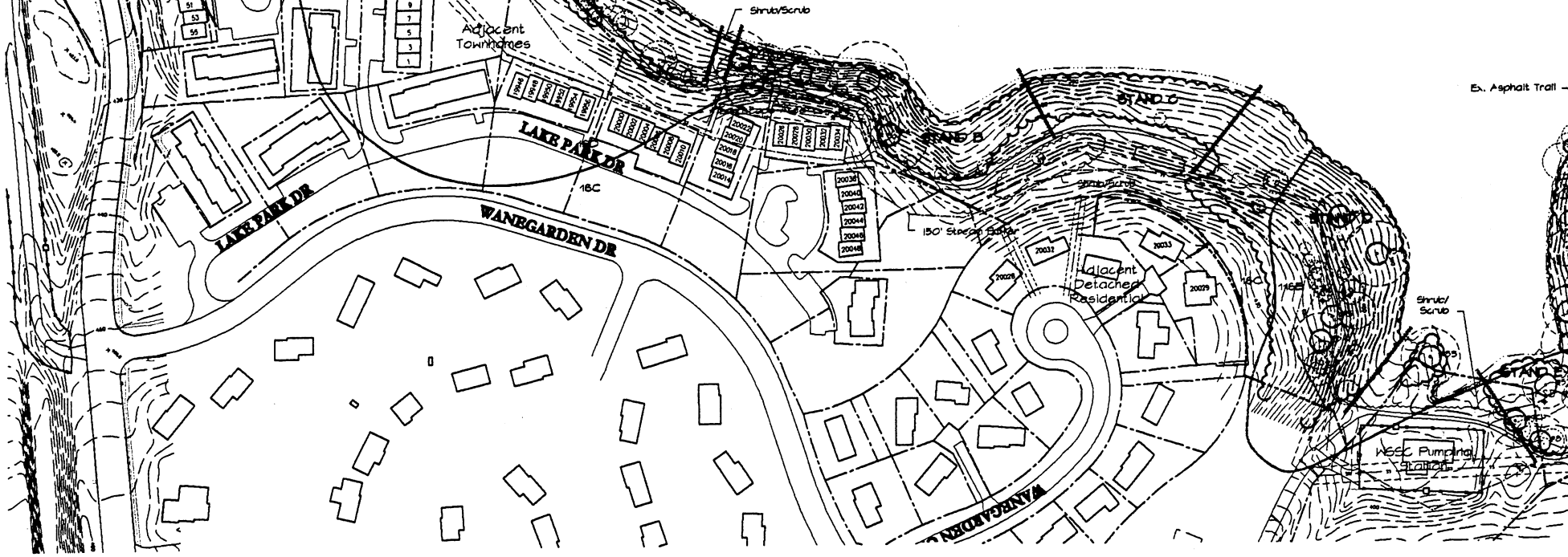
BORING LOG

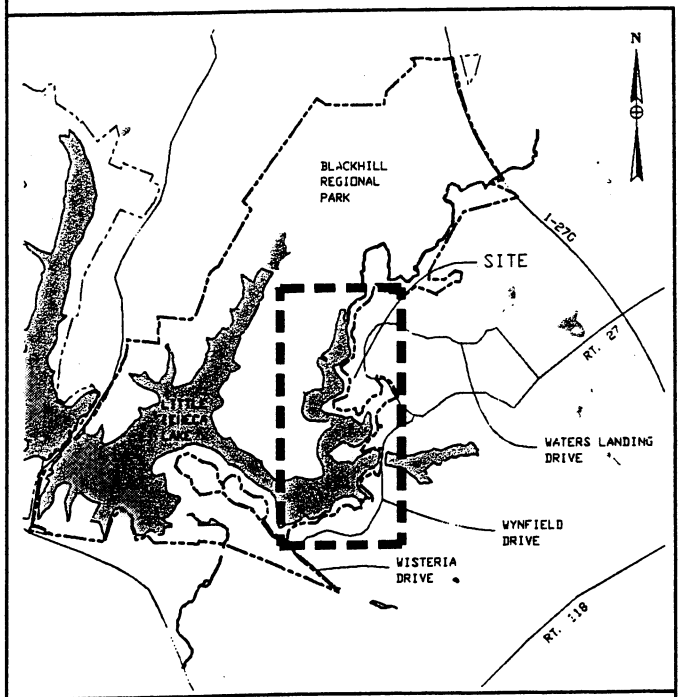
PROJECT				PROJECT NO.	BORING NO.
Black Hill Park Trail				02571-04	**B - 8**
SITE	BEGUN	COMPLETED	HOLE SIZE		GROUND ELEVATION
Montgomery County, Maryland	10/28/02	10/28/02			
COORDINATES	DEPTH WATER ENC.	AT END DRILL	AT 24 HRS		CAVED DEPTH
	None	Dry			1.7'
DRILLER	WEIGHT OF HAMMER	HEIGHT OF FALL	TYPE OF CORE		DEPTH OF BORING
E. Taylor	140 lbs.				5
TYPE OF DRILL RIG & METHOD	DEPTH TO ROCK	LOGGED BY:			PAGE NO.
					1 OF 1

DEPTH	STRATA ELE./ DEPTH	GRAPHIC LOG	DESCRIPTION	SAMPLE DATA					REMARKS:
				SAMPLE NO.	SAMPLE LENGTH	N-VALUE/ RQD (%)	SAMPLE TYPE AND DIAMETER	SAMPLE RECOVERY	
0			Pavement						2.0" Black top
			Greenish brown, moist, SILT, fine to medium SAND and DECOMPOSED ROCK fragments (ML)	S-1	18"	13- 31- 23	DS	14"	2.5" Gravel Base
				S-	18"	43- 97- 100/4"	DS	16"	
5			Bottom of Boring @ 5.0 feet						
10									
15									
20									
25									
30									

Appendix C:

Approved NRI/FSD Summary Map





VICINITY MAP 1" = 2000'

Legend

- Limit of Forest Unit
- Slopes 15-25% on erodible soils
- Slopes greater than 25%
- Soil Unit
- Existing Tree Line
- #2 — Tree greater than 24" DBH
- 5' Contour
- 1' Contour
- Property Line
- Adjacent property line
- Sanitary sewer
- FSD #2 — Delineation Sample Points
- Stream
- Stream Buffer
- 100-Year Floodplain
- Non-tidal Wetland (Approximate)

SOILS DESCRIPTIONS

7UB - GAILA-URBAN LAND COMPLEX, 0-5% SLOPES
16C - BRINKLOW-BLOCKTOWN CHANNERY SILT LOAMS, 5-15% SLOPES
16D+ - BRINKLOW-BLOCKTOWN CHANNERY SILT LOAMS, 15-25% SLOPES
17B - OCCOQUAN LOAM, 3-5% SLOPES
116D - BLOCKTOWN CHANNERY SILT LOAMS, 5-15% SLOPES, VERY ROCKY
116E* - BLOCKTOWN CHANNERY SILT LOAMS, 15-25% SLOPES, VERY ROCKY

* DENOTES ERODIBLE SOIL

SIGNIFICANT TREES LIST

1 - CHESTNUT OAK, 27.5' DBH
2 - RED OAK, 27' DBH
3 - CHESTNUT OAK, 26' DBH
4 - ROYAL PAULOWNIA, 36' DBH
5 - CHESTNUT OAK, 28' DBH
6 - RED OAK, 27.5' DBH
7 - WHITE OAK, 26' DBH
8 - WHITE OAK, 26' DBH
9 - RED MAPLE, 29' DBH
10 - WHITE OAK, 25' DBH
11 - WHITE OAK, 25' DBH
12 - RED OAK, 27' DBH
13 - RED OAK, 24' DBH
14 - RED OAK, 26.5' DBH
15 - AMERICAN BEECH, 28' DBH
16 - RED OAK, 25' DBH
17 - SYCAMORE, 65' DBH
18 - RED OAK, 29.5' DBH
19 - WHITE OAK, 26.5' DBH
20 - RED OAK, 27' DBH
21 - RED OAK, 30' DBH
22 - RED OAK, 45' DBH
23 - RED OAK, 36' DBH
24 - RED OAK, 37' DBH
25 - RED OAK, 39' DBH
26 - RED OAK, 29' DBH
27 - RED OAK, 28' DBH
28 - SHAGBARK HICKORY, 29' DBH
29 - RED OAK, 26' DBH
30 - RED MAPLE, 28' DBH
31 - RED OAK, 28' DBH
32 - AMERICAN BEECH, 24' DBH
33 - RED OAK, 34' DBH
34 - RED OAK, 32' DBH
35 - AMERICAN BEECH, 25' DBH
36 - TULIP POPLAR, 33' DBH
37 - TULIP POPLAR, 34' DBH
38 - TULIP POPLAR, 26' DBH
39 - TULIP POPLAR, 29' DBH
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41 - TULIP POPLAR, 28' DBH
42 - RED OAK, 34' DBH
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44 - RED OAK, 23.5' DBH
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46 - RED OAK, 27' DBH
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52 - TULIP POPLAR, 23' DBH
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54 - WHITE OAK, 32' DBH
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56 - SCARLET OAK, 36' DBH
57 - PIGNUT HICKORY, 23' DBH
58A - WHITE OAK, 23' DBH
58B - TULIP POPLAR, 23' DBH
59 - RED OAK, 22' DBH
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79 - WHITE OAK, 23' DBH
80 - WHITE OAK, 25' DBH
81 - WHITE OAK, 2[illegible]' DBH
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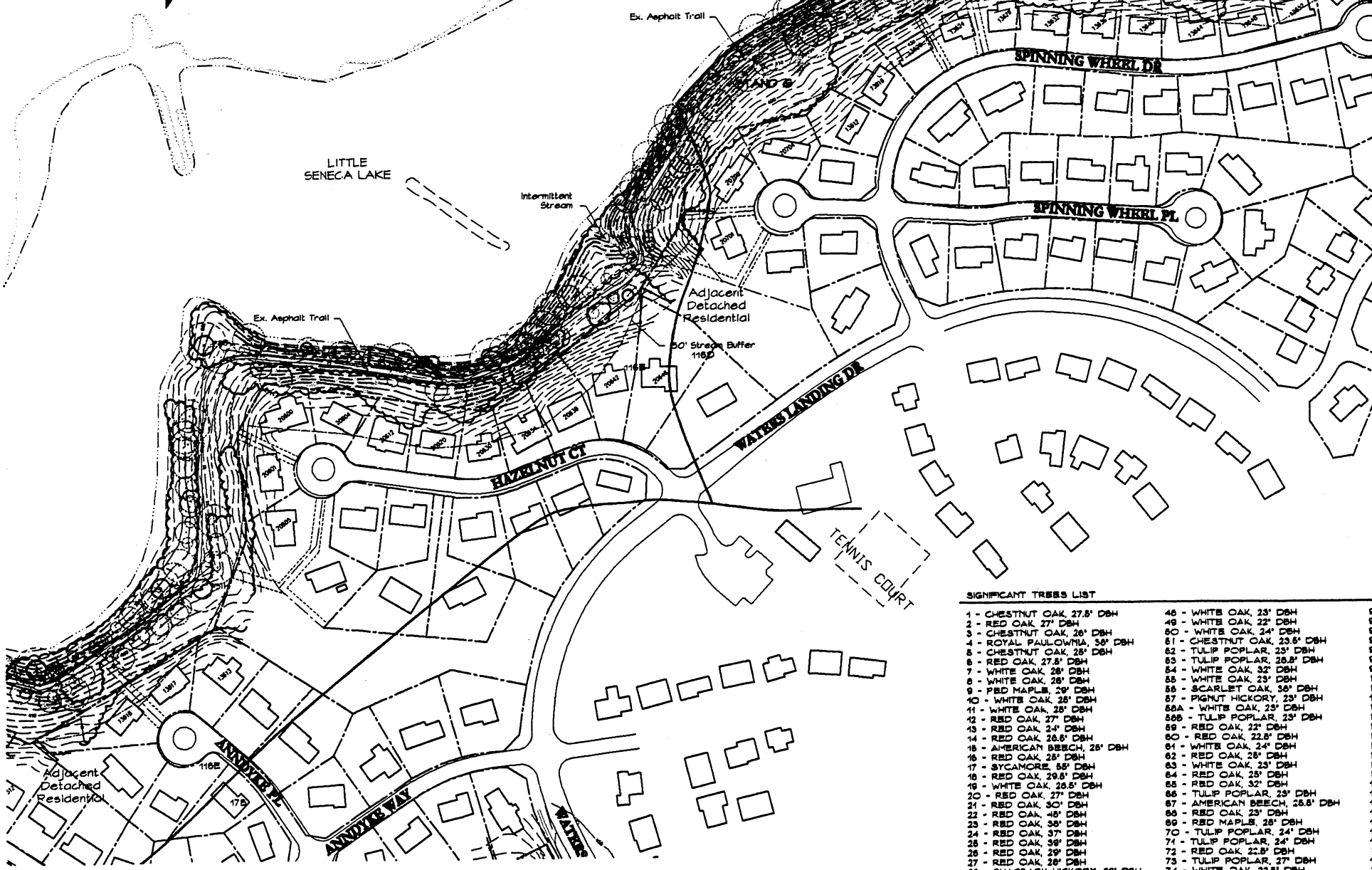
89 - AMERICAN BEECH, 23.5' DBH
90 - CHESTNUT OAK, 25' DBH
91 - WHITE OAK, 28.5' DBH
92A - WHITE OAK, 25' DBH
92B - TULIP POPLAR, 29' DBH


STAND B
Adjacent Detached Residential
ANNDYKE PL
ANNDYKE WAY
WATERS LANDING DR
150' Stream Buffer
N
STAND A
Wetland
Perennial Stream
LITTLE SENECA LAKE
STAND C
Ex. Asphalt Trail
Adjacent Condominiums
Shrub/Scrub
LITTLE SENECA LAKE
Adjacent AMBASSADOR DR
WYNFIELD DR



SOILS DESCRIPTIONS

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16C - BRINKLOW-BLOCKTOWN CHANNERY SILT LOAMS, 6-15% SLOPES
16D* - BRINKLOW-BLOCKTOWN CHANNERY SILT LOAMS, 15-25% SLOPES
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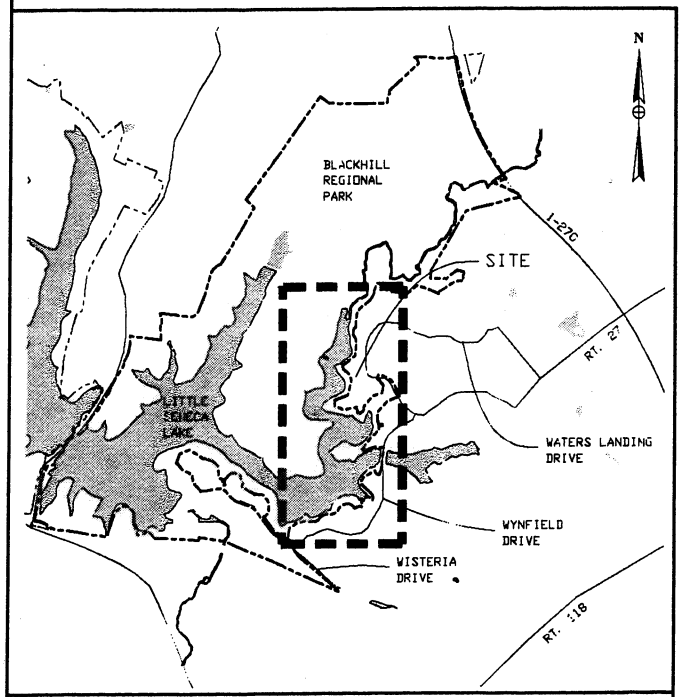
Appendix D:

Preliminary Forest Conservation Plan

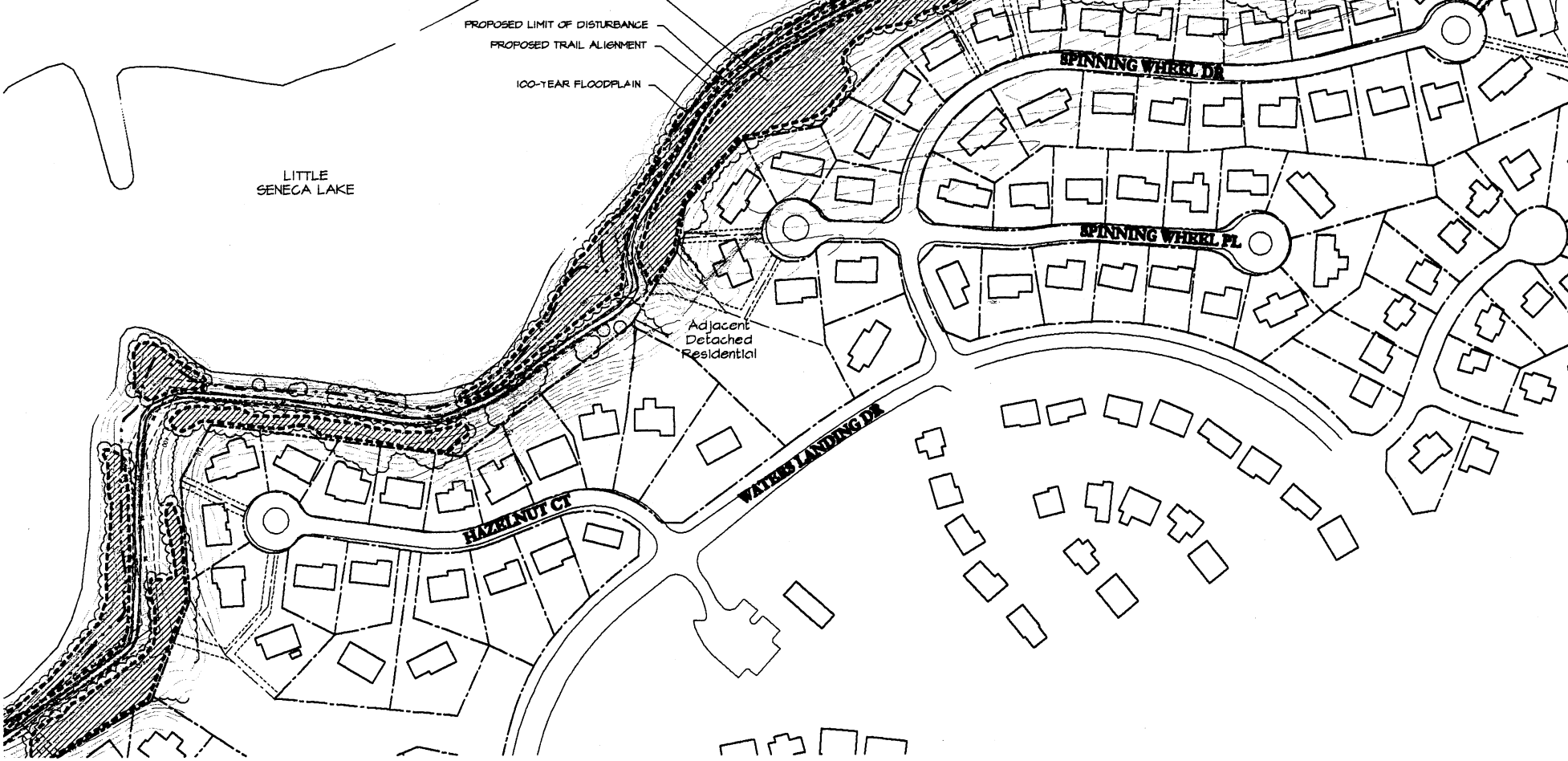


VICINITY MAP 1" = 2000'

Forest Conservation Worksheet

A.	Total Area of Tract:	1,964,835	sf	45.1	acres
B.	Area within 100 year Floodplain:	528,612	sf	12.1	acres
C.	Area of Land to be Used for Agriculture:	0	sf	0.0	acres
D.	Areas within ROW/EASEMENT for which WSSC or MCDOT/SHA will be responsible:	255,078	sf	5.9	acres
E.	Net Tract Area *(A - B - C - D)*	1,181,145	sf	27.1	acres
F.	Land Use Catagory (from Table 2)	Institutional		Institutional	
G.	Afforestation Threshold: (15 % from Table 3 x E)	177,172	sf	4.1	acres
H.	Conservation Threshold: (20 % from Table 3 x E)	236,229	sf	5.4	acres
I.	Existing Forest Cover:	970,001	sf	22.3	acres
J.	Forest Cover Above Afforestation Threshold: (I - G)	792,829	sf	18.2	acres
K.	Forest Cover Above Conservation Threshold: (I - H)	733,772	sf	16.8	acres
	Calculation of Break-Even Point.				
L.	If K ≤ 0 and I ≥ G, Break even point = I *(If I< G ther is no Break Even Point and Afforestation Planting is Required Refer to P, below)*	N/A	sf	N/A	acres
	If K > 0 , Break even point = (K x 20%) + H	382,983	sf	8.8	acres
M.	Forest Cover to be Retained	963,912	sf	22.1	acres
N.	Total Area of Forest to be Cleared *(If N> I-L, reforestation planting is required . See Q-W below.)*	6,089	sf	0.1	acres
	Calculation of Afforestation Requirement				
P.	Afforestation Requirement: *(G - I)*	0	sf	0.0	acres
	Calculation of Reforestation Requirement				
Q.	Area of Forest **ABOVE** Conservation Threshold to be Cleared: *(If K > N, use K)*	0	sf	0.0	acres
R.	Area of Forest **BELOW** Conservation Threshold to be Cleared: *(N - Q)*	0	sf	0.0	acres
S.	Forested Area Above Conservation Threshold to be Saved: *(M - H)*	0	sf	0.0	acres
T.	Planting Required for Clearing above Threshold: (Q x 1/4)	0	sf	0.0	acres
U.	Planting Required for Clearing Below threshold: (R x 2)	0	sf	0.0	acres
V.	Credit for Forest Saved Above Conservation Threshold: (S)	0	sf	0.0	acres
W.	Totoal Reforestation Requirement (T + U - V)	0	sf	0.0	acres
	Total Planting Requirement				
X	Afforestation and Reforestation (P + W)	0	sf	0.0	acres
Y.	Credit for Trees and Landscaping	0	sf	0.0	acres
Z	Total Forest Planting Requirement	0	sf	0.0	acres


EXISTING FOREST
TO REMAIN - TYPICAL
PROPOSED LIMIT OF DISTURBANCE
PROPOSED TRAIL ALIGNMENT
100-YEAR FLOODPLAIN
Adjacent
Detached
Residential
ANNDYKE PL
ANNDYKE WAY
WATERS LANDING DR
LITTLE
SENECA LAKE
Adjacent
AMBASSADOR DR
Adjacent
Condominiums
LITTLE
SENECA LAKE
WYNFIELD DR


PROPOSED LIMIT OF DISTURBANCE
PROPOSED TRAIL ALIGNMENT
100-YEAR FLOODPLAIN
LITTLE
SENECA LAKE
SPINNING WHEEL DR
SPINNING WHEEL PL
Adjacent
Detached
Residential
WATERS LANDING DR
HAZELNUT CT

Appendix E:

Stormwater Management

Concept Approval

PHOENIX ENGINEERING, INC.
1420-A Joh Avenue • Baltimore, MD 21227-1046 / CONSULTING ENGINEERS

BLACK HILL REGIONAL PARK
HARD SURFACE TRAIL REHABILITATION
CONCEPTUAL STORMWATER MANAGEMENT NARRATIVE

INTRODUCTION

Black Hill Regional Park is centrally located in Montgomery County, north of Germantown and west of Interstate 270. The project consists of the renovation of an existing ±2 mile hard surface (asphalt) trail and wooden bridge along the eastern shore line of Little Seneca Lake from Wisteria Drive to Spinning Wheel Drive. The Park in this area consists of a narrow band of trees, bordered by the Lake on the west and residential development on the east. Large portions of the existing trail were constructed in the clearing formed during the construction of an existing WSSC sanitary sewer line; so, it is not uncommon to find manhole covers in or near the pathway.

Generally the site slopes toward the Lake; however, the topography in the area is quite undulating. A significant portion of the site contains slopes greater than 15%; some of which are on erodible soils, and some locations contain slopes greater than 25%. In most instances there is a significant wooded buffer between the pathway and the Lake.

THE PROJECT

The Maryland-National Capital Park and Planning Commission, M-NCPPC, is planning to rehabilitate the existing pathway, which was constructed by private developers as they constructed the adjoining residential developments. The pathway is 6-7'' wide and has a varying depth asphalt surface, with little or no base. The pathway was constructed to no particular standard and as such numerous areas of the trail are failing and require extensive and regular patching and repair. . Since the pathway was not constructed as a single project, its existing condition varies depending on length of service, quality of the paving section, and subsurface conditions. The scope of this project is to remove and replace the current pathway with an 8' wide section, except in those areas where extensive clearing and grading would be required, and replace the wooden foot bridge. While the pathway will not be designed for vehicular traffic, the new paving section will accommodate light vehicle access for routine maintenance.

The horizontal alignment of the trail will generally follow the existing alignment, except in four areas where an alignment change is necessary to achieve conformance with current ADA grading guidelines. In these areas the trail will be graded so as to minimize trapping runoff and concentrating flows.

Telephone: 410-247-8833 • Fax: 410-247-9397
Website: www.phoenixengineeringinc.net • Email: pei2000@bellatlantic.net

CONCEPTUAL STORMWATER MANAGEMENT

The linear nature of this project combined with the environmental sensitivity of the area requires a unique approach in providing stormwater management. The Park itself is approximately 1700 acres; while the eastern shore, where the project is located comprises approximately 44 acres. The existing 6' pathway occupies 1.74 acres and the proposed 8' pathway will occupy 2.32 acres. This results in an increase in impervious area of 0.58 acres spread out as a 2 foot strip over two miles of pathway.

The forested buffer between the pathway and the Lake provides an existing non-structural stormwater management facility, creating a natural "sheet flow to buffer credit". The existing pathway is designed so that the runoff from the pathway enters the buffer area as sheet flow. Under these current conditions, the wooded buffer edge is stable and no areas of erosion within the buffer. The park and shoreline of the lake is managed by MNCPPC and the natural buffer is regularly observed and protected from outside disturbance.

In addition to this credit, efforts will be made during the final design phase to identify areas for small shallow vernal pools, bio-retention areas, or grassed swales in existing clearings adjacent to, and downstream from, the pathway. These simple low maintenance facilities can be constructed where practically feasible to further retard flow and treat first flush runoff while providing new habitat for a diversity of forest life. The contractor will need to have several staging areas along the pathway for material and equipment. Restoration of the staging areas, upon completion of the pathway, will likely provide some opportunity for these facilities.

CONCLUSION

Sheet flow through the existing forested buffer between the pathway and the lake already provides the minimum stormwater management protection required by the state and local regulations. Opportunities also exist to provide additional protection by constructing small pools, bio-retention areas, or grassed swales in existing cleared areas adjacent to the pathway.

DEPARTMENT OF PERMITTING SERVICES

Douglas M. Duncan
County Executive

February 5, 2003

Robert C. Hubbard
Director

John R. Heinrichs
Phoenix Engineering, Inc.
1420-A Joh Avenue
Baltimore, MD 21227

Re: Stormwater Management ***CONCEPT*** Request
for Black Hill Regional Park
SM File #: 207265
Tract Size/Zone: 44 acres/Regional Park
Total Concept Area: 3.9 acres
Watershed: Little Seneca Creek

Dear Mr. Heinrichs:

Based on a review by the Department of Permitting Services Review Staff, the stormwater management concept for the above mentioned site is **acceptable**. The stormwater management concept consists of on-site channel protection and on-site water quality control, and recharge via nonstructural measures. The project consists of trail renovations adjacent to Little Seneca Lake.

The following **items** will need to be addressed **during** the detailed sediment control/stormwater management plan stage:

1. All development must be designed to avoid concentration of flows as much as possible.
2. An engineered sediment control plan must be submitted for this development.

This list may not be all-inclusive and may change based on available information at the time.

Payment of a stormwater management contribution in accordance with Section 2 of the Stormwater Management Regulation 4-90 is not required.

This letter must appear on the sediment control/stormwater management plan at its initial submittal. Any divergence from the information provided to this office; or additional information received during the development process; or a change in an applicable Executive Regulation may constitute grounds to rescind or amend any approval actions taken, and to reevaluate the site for additional or amended stormwater management requirements. If there are subsequent additions or modifications to the development, a separate concept request shall be required.

If you have any questions regarding these actions, please feel free to contact Mark Etheridge at 240-777-6338.

Sincerely,

Richard R. Brush, Manager
Water Resources Section
Division of Land Development Services

RRB:enm mce
cc: M. Shaneman
S. Federline
SM File # 207265
QN -ON; Acres: 2.9
QL - ON; Acres: 2.9
Recharge is provided.

AN ALL-AMERICA COMMUNITY

PHOENIX ENGINEERING, INC.
1420-A Joh Avenue
Baltimore, Maryland 21227
(410) 247-8833 fax: (410) 247-9397

letter of transmittal

To: Montgomery Co. Permitting Service
Division of Land Development
255 Rockville Pike, 2nd Floor
Rockville, Maryland 20850-4153

Date: January 29, 2003
From John Heinrichs
Job # 02-012
Re: Black Hill Park Hard Surface Trails Rehab

Attention: Rick Brush or Mark Ethridge

We are sending you
__x__ Attached
_____ Under Separate cover via UPS O.N. the following items:

_____ Shop Drawings _____ Prints _____ Plans _____ Samples
_____ Specifications _____ Copy of letter _____ Change Order _____ Other:

Copies	Date	Description
1	1/29/2003	Application for SWM concept approval
1	1/27/2003	11x17 color plan of project
1	10/1/2002	NRI/NFD Summary Map w/preliminary layout & grading (3 sheets)
1	1/29/2003	Narrative explaining project and SWM approach

These are transmitted as checked below:

____ For Approval
__x__ For your use
____ Approved as submitted
____ Return for corrections
____ Approved as noted
____ Resubmit
____ As Requested
____ For review and comment

FOR BIDS DUE _____ 19 _____

Remarks: Mr. Brush, I have spoken with Richard Gee and Mark Ethridge about this project. We are under a little crunch to get the preliminary plans approved so we can apply for funding for the project. Mark suggested that I ask you if we can include it in the overtime review process. If you have any questions please contact me or the project manager at M-NCPPC is Linda Komes. Anything we can do to speed up the review will be appreciated. Thank you. John

Copy to: Linda Komes, M-NCPPC, 9500 Brunett Ave, Silver Spring, MD 20901
Bob Turnbull,M-NCPPC, 1109 Spring Street, Suite 800, Silver Spring, MD 20901

E-mail address: pei2000@bellatlantic.net **Visit our website @ www.phoenixengineeringinc.net**

Montgomery County Maryland
Department of Permitting Services

Division of
Land Development
Services

255 Rockville Pike, 2nd Floor
Rockville, Maryland 20850-4153
(240) 777-6320 Fax (240) 777-6339

Application for Stormwater Management Concept

Project Name: Black Hill Regional Park Hard Surface Trail Renovations

Property Size/Area: ±44 Acres
Property Address / Location: Eastern Shoreline of Little Seneca Lake

Owner/Applicant Information:
Name: Maryland-National Capital Parks and Planning Commission
Firm Name and/or Contact Person

Mailing Address Attn: Ms. Linda Komes, 9500 Brunett Avenue
City Silver Spring State MD Zip 20901- Phone 301-650-2860

Engineer Information:
Name: John R. Heinrichs, P.E. Phoenix Engineering, Inc.
Firm Name and/or Contact Person

Mailing Address 1420-A Joh Avenue
City Baltimore State MD Zip 21227- Phone 410-247-8833

Type of Application:

[X] ***New*** [ ] ***Resubmittal*** [ ] ***Revision*** [ ] ***Reconfirmation***

Stormwater Management Provided:

[X] **Onsite Management** SHEET FLOW TO BUFFER CREDIT N/A
Onsite Quality Acres
Onsite Quantity Acres N/A

[ ] **Waiver Request**
Waive Quality Acres
Waive Quantity Acres

[ ] **Onsite Management/Waiver Combination**
Onsite Quality Acres Waive Quality Acres
Onsite Quantity Acres Waive Quantity Acres

[ ] **SPA Preliminary Water Quality Plan** [ ] **SPA Final Water Quality Plan**

Total Disturbed Area (in acres): 2.90 Ac Proposed Impervious Area (in acres): 2.32 Ac
Preliminary Plan No.: N/A Tax Map No.: Multiple WSSC Map Grid: 227 NW 13 - 229 NW 13
Lot(s): Multiple Lots & Parcels Block(s):
Parcel(s): Subdivision: Churchill Town Sector
Watershed: Seneca Lake Tributary: Little Seneca Creek Class:
Municipality: M-NCPPC Liber: Folio: Election District: 2
Current Zoning: Proposed Zoning:
Current Land Use: Regional Park Proposed Land Use: Regional Park

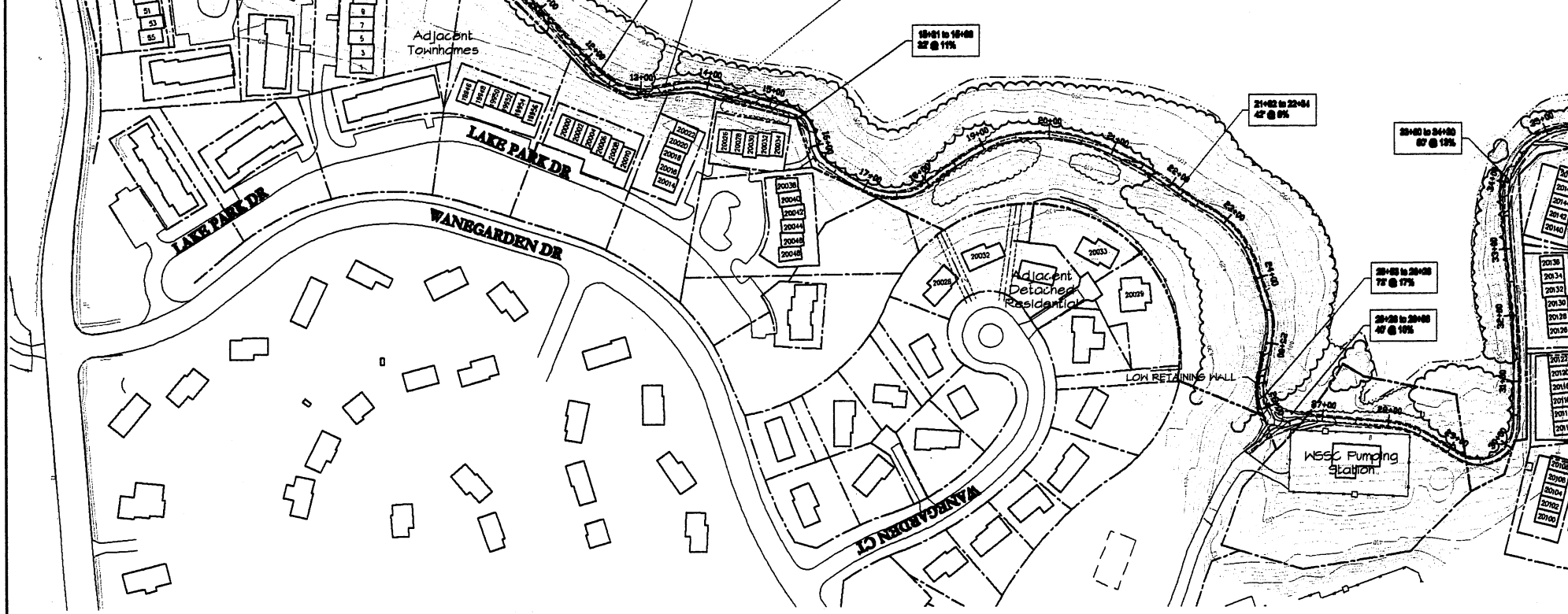
I declare and affirm, under penalty of perjury, that to the best of my knowledge, information and belief all matters and facts in this application are correct. I declare that I am the owner of the property or duly authorized to make this application on behalf of the owner.

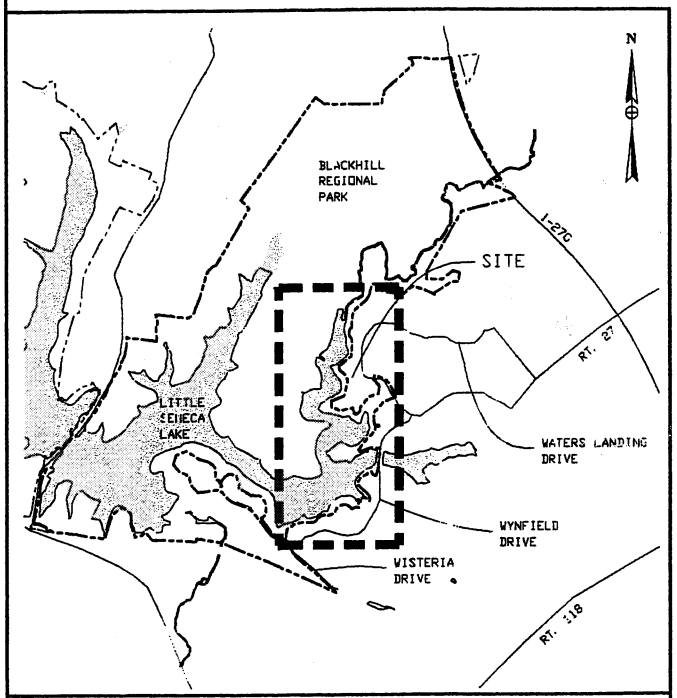
Signature: John Heinrichs FOR MNCPPC 1-29-03
Signature of Applicant (Property Owner or Authorized Agent) Printed Name Date

Stormwater Concept Project #:

Appendix F:

Proposed Conceptual Trail Alignment





VICINITY MAP 1" = 2000'

NOTE:

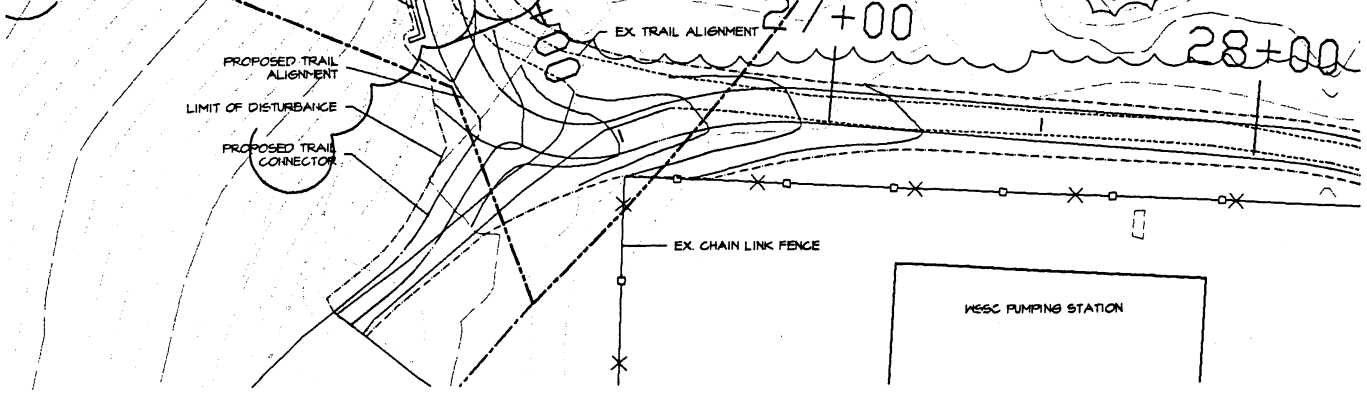
For the maj
alignment st
vertically an
alignment d
accessible t
accordance

Slope

Lege

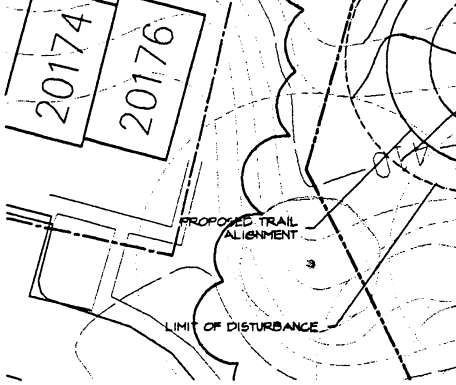

HAZELNUT CT
ANNDYKE PL
ANNDYKE WAY
WATKINS LANDING DR
Adjacent Detached Residential
INSTALL 18" CMP
LITTLE SENECA LAKE
Adjacent AMBASSADOR DR
Adjacent
N


LITTLE
SENECA LAKE
INSTALL 36" CMP
Adjacent
Detached
Residential
SPINNING WHEEL DR
SPINNING WHEEL PL
WATERS LANDING DR
HAZELNUT CT
TENNIS COURT
ANNDYKE PL
Adjacent
Detached
Residential



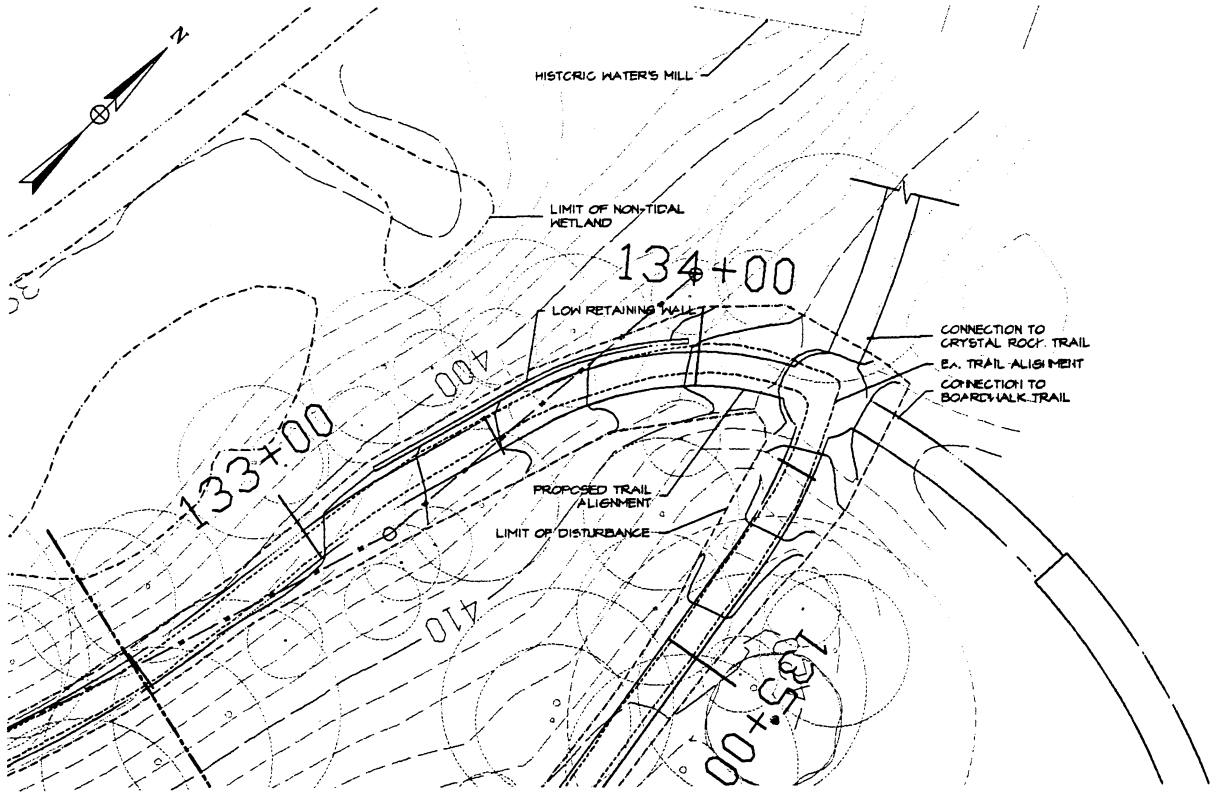
Proposed Conceptual Trail Alignment (Sta. 25+00 to 28+00)

Scale: 1"= 20'-0"



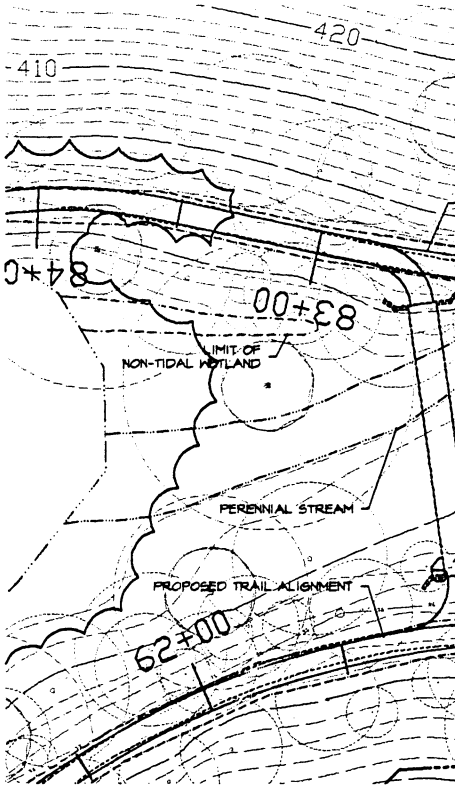
Proposed Conceptual Trail A

Scale: 1"= 20'-0"



Proposed Conceptual Trail Alignment (Sta. 133+00 to 135+00)

Scale: 1"= 20'-0"



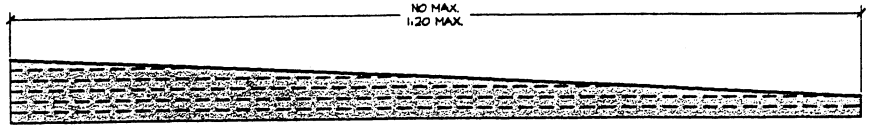
Conceptual Alternate Stream

Scale: 1"= 30'-0"

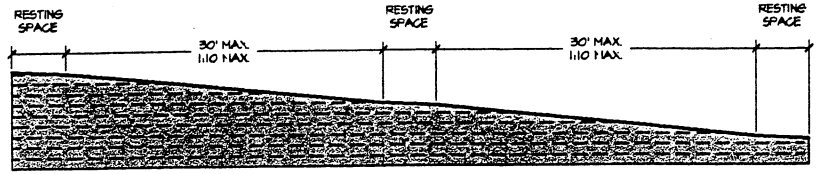
8" min. compacted CR-6

1 Typical Trail Cross Section

Scale: 1/2"= 1'-0"



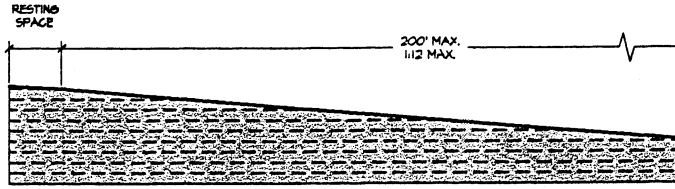
Running Slope 1 - less than 1:20 slope - no maximum



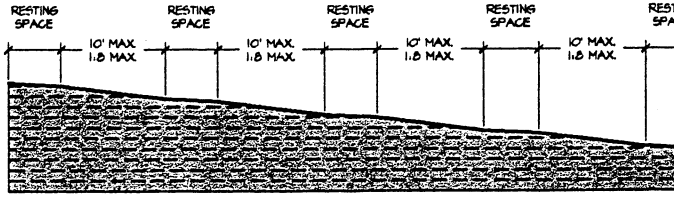
Running Slope 3 - greater than 1:12 less than 1:10 slope - 30' maximum between resting spaces

2 Typical Wall Section (Cut)

Scale: 1/2"= 1'-0"



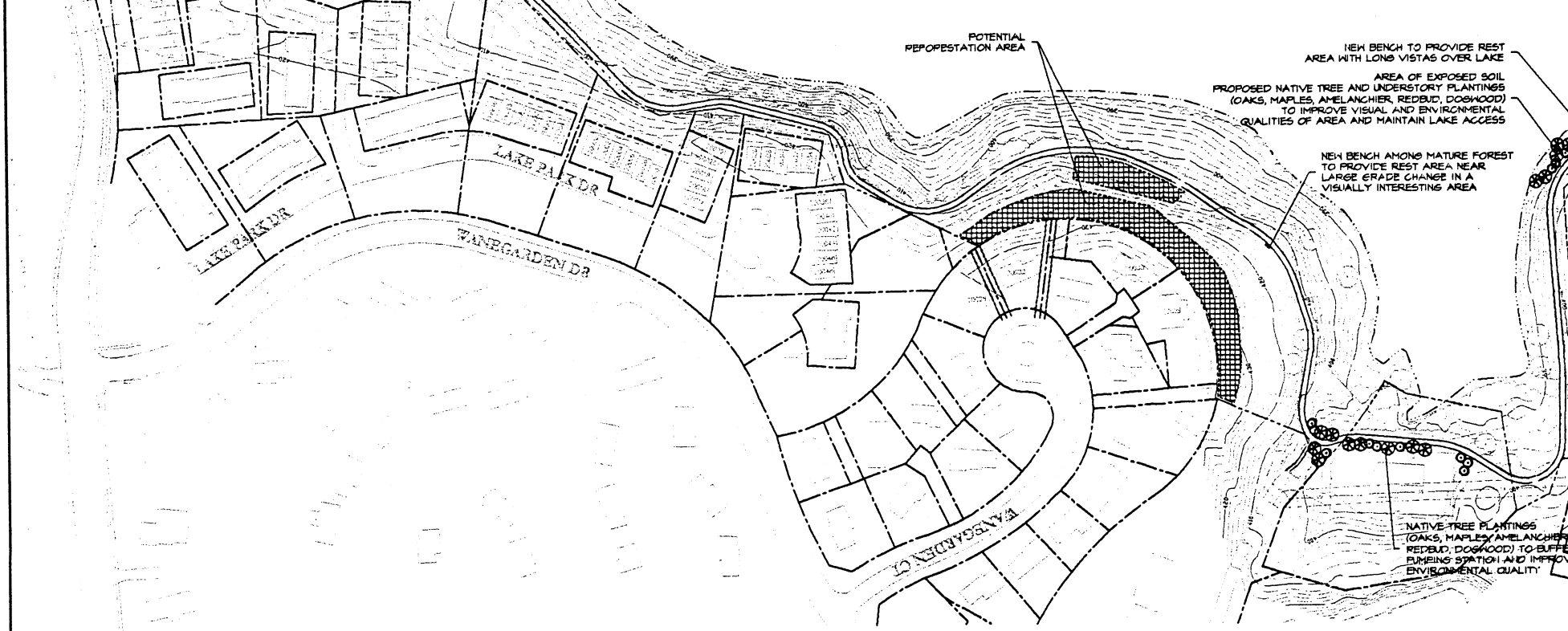
Running Slope 2 - greater than 1:20 less than 1:12 slope - 200' maximu

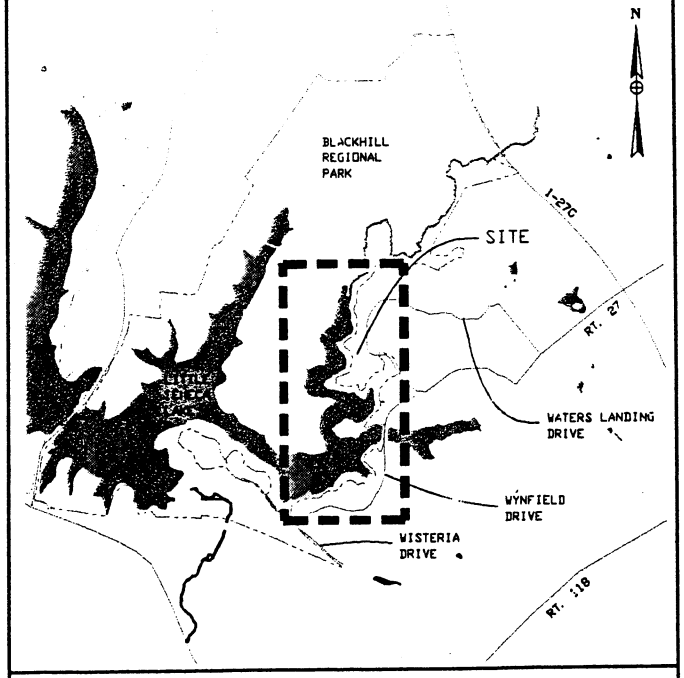


Running Slope 4 - greater than 1:10 less than 1:8 slope - 10' maximum b

Appendix G:

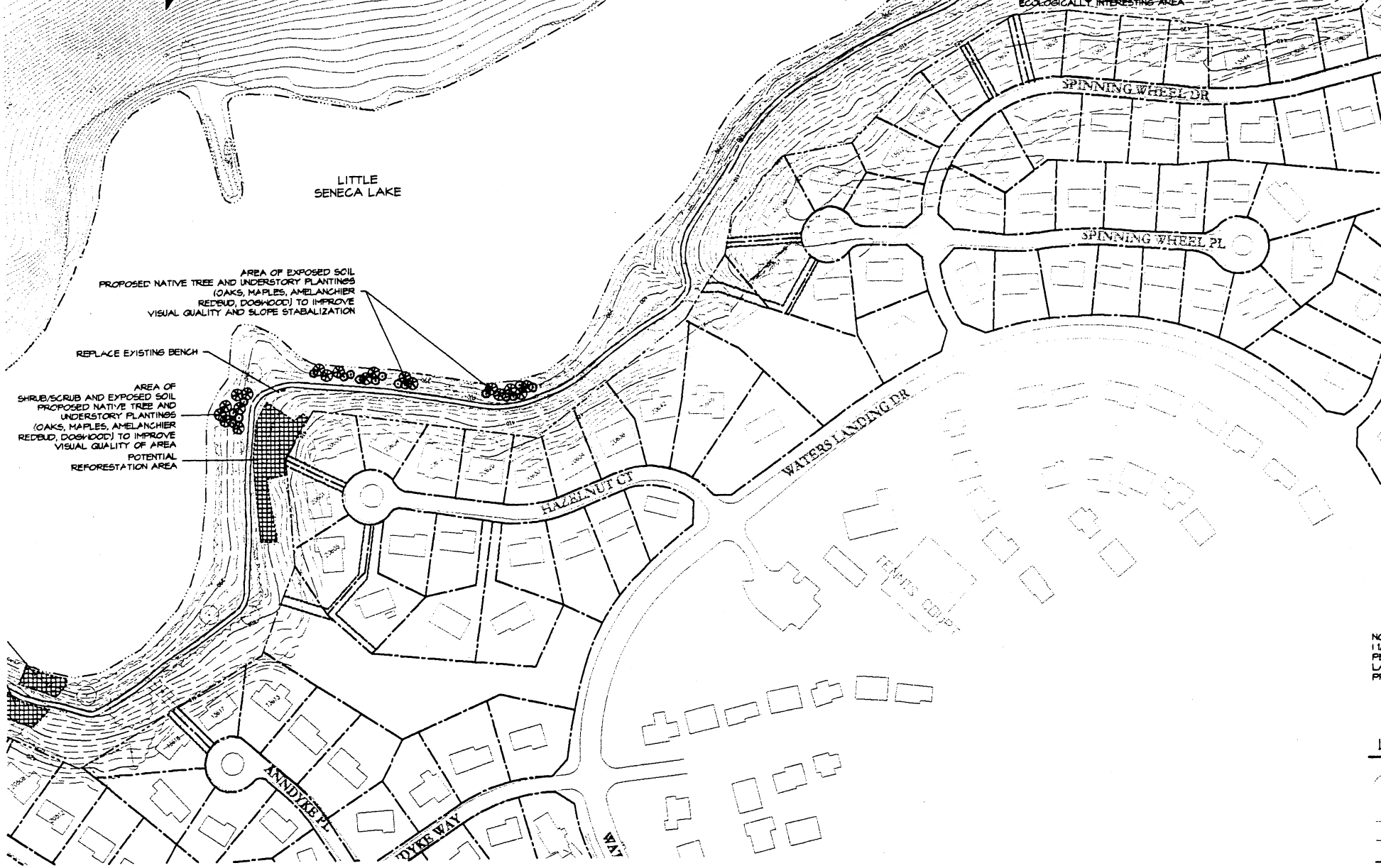
Conceptual Landscape, Signage And Site Furnishings Plan

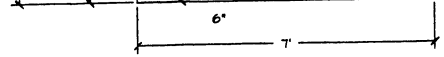




VICINITY MAP 1" = 2000'

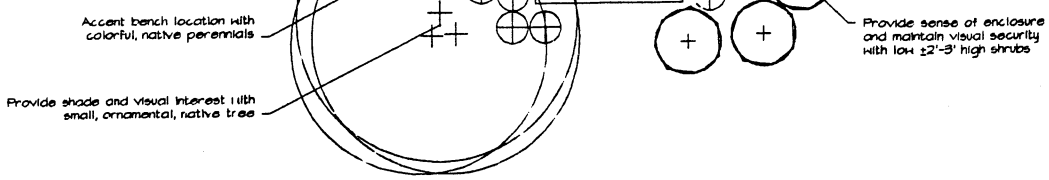

POTENTIAL REFORESTATION AREA
HAZELNUT CT
POTENTIAL REFORESTATION AREA
NEW BENCH TO PROVIDE REST AREA WITH LONG VISTAS OVER LAKE
ANNDYKE CT
ANNDYKE WAY
WATERS LANDING DR
N
LITTLE SENECA LAKE
NEW BENCH TO PROVIDE REST AREA NEAR LARGE GRADE CHANGE IN A VISUALLY INTERESTING AREA
AREAS OF EXPOSED SOIL PROPOSED NATIVE TREE AND UNDERSTORY PLANTINGS (OAKS, MAPLES, AMELANCHIER REDBUD, DOGWOOD) TO IMPROVE VISUAL QUALITY OF AREA
TRAIL IDENTIFICATION SIGN
AMBASSADOR DR
NEW BENCH TO PROVIDE REST AREA NEAR LARGE GRADE CHANGE


ECOLOGICALLY INTERESTING AREA
SPINNING WHEEL DR
SPINNING WHEEL PL
LITTLE
SENECA LAKE
AREA OF EXPOSED SOIL
PROPOSED NATIVE TREE AND UNDERSTORY PLANTINGS
(OAKS, MAPLES, AMELANCHIER
REDBUD, DOGWOOD) TO IMPROVE
VISUAL QUALITY AND SLOPE STABALIZATION
REPLACE EXISTING BENCH
AREA OF
SHRUB/SCRUB AND EXPOSED SOIL
PROPOSED NATIVE TREE AND
UNDERSTORY PLANTINGS
(OAKS, MAPLES, AMELANCHIER
REDBUD, DOGWOOD) TO IMPROVE
VISUAL QUALITY OF AREA
POTENTIAL
REFORESTATION AREA
HAZELNUT CT
WATERS LANDING DR
TENNIS COURT
ANNDYKE PL
DYKE WAY



1 Typical Bench Layout Plan

Scale: 1/2"= 1'-0"



2 Typical Bench Landscape Plan

Scale: 1/4"= 1'-0"