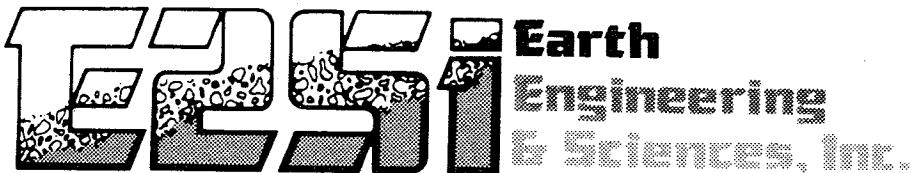


**PAVEMENT INVESTIGATION - FINAL REPORT
ROCK CREEK PARKWAY IMPROVEMENTS
WASHINGTON D.C.
E2Si PROJECT NO. 02-200**

JANUARY 19, 2004



3401 CARLINS PARK DRIVE

BALTIMORE, MARYLAND 21215

(410) 466-1400

FAX: (410) 466-7371

e-mail: e2si@erols.com

January 19, 2004

Phoenix Engineering , Inc.
1420-A Joh Avenue
Baltimore, Maryland 21227

Attention: Mr. John Heinrichs, P.E.
Executive Vice President

Re: Pavement Investigation (Final Report)
Rock Creek Parkway Improvements
Washington, D.C.
E2Si Project No. 02-200

Dear Mr. Heinrichs:

In accordance with our proposal dated July 11, 2002, we have completed the pavement investigation for the Rock Creek and Potomac Parkway Improvement Project. The investigation included a visual survey of the pavement, non-destructive testing with a falling-weight deflectometer, obtaining pavement cores, and sampling and testing the subgrade soils. Our report with our findings and recommendations is attached.

We appreciate the opportunity to have performed this investigation. Please contact us if you have any questions or wish to further discuss the project.

Very truly yours,

EARTH ENGINEERING AND SCIENCES, INC.

A handwritten signature in black ink, appearing to read "Paul A. D'Amato".

Paul A. D'Amato, P.E.
Vice President

PAD:lm

e:Proj/Rock Creek & Potomac Parkway Improvements – January 19, 2004

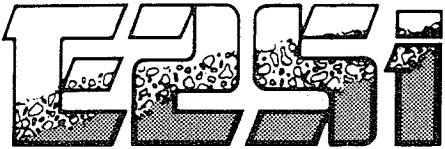
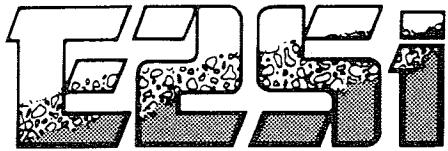


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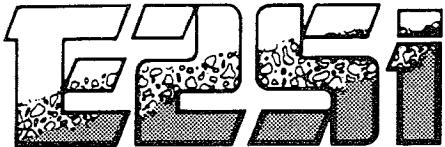
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INTRODUCTION

Earth Engineering & Sciences, Inc. has completed the pavement investigation for the Rock Creek and Potomac Parkway improvements project. The project will involve the rehabilitation of Rock Creek and Potomac Parkway between Virginia Avenue and the P Street overpass (see Site Vicinity Map – Figure 1). Also included are the access road and parking lot at the Thompson Boat Center and the entrance and exit ramps at P Street. The proposed improvements include rehabilitating the pavements for the Parkway, access road, ramp and parking lot; replacing the Off-Road Trail for the entire length of the project; repairing or replacing curbs, inlets and guard rails. Site plans are shown on Figures 2A to 2G included in Appendix A.

Available records indicate that the Parkway and the Thompson Boat Center parking lot and access road were constructed during the 1950's (see Figures 3 and 4). The Parkway pavement was originally constructed with a curb to curb width of 40'- 0". The original pavement section consisted of 2" bituminous surface course overlying a 6 to 8 inch thick Portland cement concrete (PCC) base course. The base course is reinforced with wire mesh. The available drawings do not provide any information regarding the transverse joint spacing or reinforcement. No information is available regarding any widening or rehabilitation made to the pavements since they were originally constructed.



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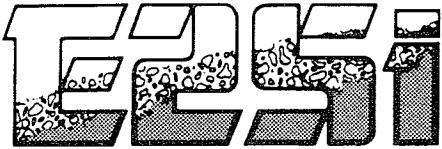
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The original parking lot pavement was constructed using 2.5 inches of bituminous concrete over 6 inches of bank run gravel base. The original pavement for the access road was constructed using 3 inches of bituminous concrete over 6 inches of bank run gravel base.

PROCEDURES

Purpose and Scope: The purpose of the investigation is to determine the most appropriate and cost-effective means for rehabilitating the pavements. A visual survey of the pavements was first performed to evaluate the types and severity of distress such as reflective and shrinkage cracking of the overlay, spalling, rutting and base failures. Non-destructive testing was then performed using a falling weight deflectometer. Measurements made with the deflectometer are used to assess the soundness of the pavement and to estimate the modulus of the subgrade. The subgrade modulus is a necessary parameter for use of the AASHTO pavement design methods. The visual survey and deflectometer data were used to select locations for obtaining core samples of the pavement and samples of the subgrade soil. Laboratory testing was performed to classify and determine the California Bearing Ratio (CBR) of representative samples of subgrade soil. The AASHTO pavement design methods for rigid and flexible pavements along with traffic data (provided by others) was used to determine the requirements for new pavements and overlays.

Visual Survey: The visual surveys were performed during January and March, 2003. Several photographs were taken to document the condition of the pavements throughout the project. The location of each photograph is shown on the Site Plans (Figures 2-A to 2-G) and the photographs are shown on Figures 5 and 6 included in Appendix A. Our observations are summarized below and on the Roadway Condition Survey Forms included in Appendix D.



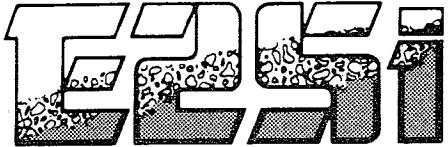
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Thompson Boat Center: The parking lot pavement appears to have been overlayed with a thin (1"±) asphaltic surface course, and is in generally poor condition as shown on Photos #1 and #2. The pavement exhibits a moderate degree of block cracking over most of its area and localized spalling of the overlay and patch deterioration. The access road between the entrance and the bridge (Photo #3) has experienced moderate to severe block cracking and severe spalling of the overlay. The access road between the bridge and the boat house appears to be in better condition. There is moderate block cracking over this section of pavement. The bridge has a concrete deck with a bituminous overlay that has experienced reflective cracking along the slab joints at the piers as well as moderate block cracking. There are some localized areas with broken or misaligned curbs that will need to be repaired. The PCC pavement at the parking lot entrance and right turn lane has experienced substantial deterioration and has been designated to be replaced with bituminous pavement.

Parkway: This section of pavement is generally in fair condition (see Photos #4 to #8). Most of the pavement has experienced a low to moderate degree of transverse reflective cracking of the overlay along the joints of the underlying PCC slabs. The overlay at these joints has experienced little or no spalling. Some areas have transverse reflective cracks with spacing as close as 15 feet, which is presumed to be the length of the PCC slabs. There are also longitudinal cracks in the overlay along the middle of the roadway in both the north and southbound lanes (see Photo #6). These cracks represent either reflective cracking along a longitudinal joint in the PCC slabs or a shrinkage crack at a longitudinal joint in the overlay. There is some broken and misaligned curbs and damaged storm drain inlets (Sta. 15+40 to Sta. 16+20) along this section of roadway.

Between Pennsylvania Avenue and P Street, the roadway appears that it has been widened on its west side by about 3 to 4 feet. There is a longitudinal reflection crack in the right southbound lane along most of this section (see Photos #9 to #11). It is believed that this longitudinal crack is at the edge of the PCC slabs of the original pavement and that the widened strip was probably



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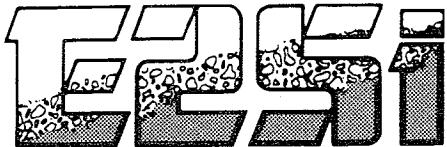
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constructed using bituminous pavement. This condition also suggests that the entire pavement was probably overlayed since its original construction. Overall, the pavement is in fair to poor condition and exhibits greater distress than the section south of Pennsylvania Avenue. There are moderate to severe transverse reflective cracks in the overlay as shown on Photos #8 to #12. Longitudinal cracking is also present in the middle of the roadway in both the north and southbound lanes. There is a localized area (10'x 20') at Sta. 21+50 southbound where the overlay is severely cracked (Photo #9). There is also a relatively wide transverse reflective crack at Sta. 42+40 (Photo #13). It appears that the concrete slab is broken at this location. There are a few damaged storm drain inlets in the vicinity of Sta. 30+00 northbound and Sta. 34+00 southbound.

P Street Ramps: The ramp pavement is in very poor condition (Photos #14 to #16). There are large areas where the overlay is severely cracked and spalled. The overlay has also experienced severe reflective cracking with some spalling at the PCC slab joints. The PCC slabs also exhibit corner failures (Photo #16).

Non-Destructive Testing: A falling weight deflectometer was used to evaluate the condition of the pavement and to evaluate the properties of the subgrade. The firm of Roy D. McQueen and Associates, which utilized a JILS Heavy Weight Deflectometer, was contracted for this work. The equipment uses a weight that is lifted to a given height on a guide system and then dropped. The falling weight strikes a set of rubber dampers mounted to a 12" diameter loading plate, which transmits the force to the pavement. Sensors are used to measure the deflection of the pavement at distances of 0", 8", 12", 24", 36", 48" and 60" from the load plate. A typical falling weight deflectometer set-up is shown on Figure 7.

Test measurements were made along the north and southbound lanes of the Parkway at intervals of 100 feet. All tests were performed in the right lanes. A total of 84 locations were tested along



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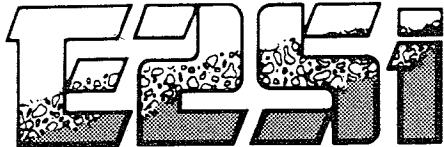
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the Parkway and 13 locations were tested in the Thompson Boat House parking lot. A loading of 12 to 18 kips was used for the tests performed in the parking lot. The tests performed along the Parkway used a loading of 31 to 41 kips. The deflectometer measurements are included in Appendix D.

Traffic Counts: A study to determine the traffic volume and vehicle mix was performed by Daniel Consultants, Inc. Traffic counts were made at entrances and exits and along the mainline of the Parkway during January and February, 2003. The original traffic count data indicated the presence of several types of multi-axle trucks. Since the Parkway is closed to most truck traffic, the truck counts were attributed to possible machine errors. A manual survey of vehicle type was performed in May, 2003 and the original traffic count data was revised. The manual survey indicated the following vehicle mix for the Parkway.

<u>Vehicle Type</u>	<u>Percent of Total Traffic</u>
Motorcycle	0.57
Passenger Car	94.97
Truck (2 axle/4 tire)	4.02
Bus	0.33
Delivery truck (2 axle/4 tire)	0.11
	<hr/>
	100.0%

The traffic volumes for Parkway, Thompson Boat House entrance, and P Street entrance and exit ramps were as follows:

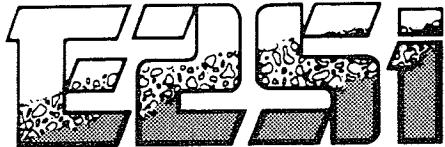


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<u>Location</u>	<u>Date</u>	<u># Vehicles</u>	<u>Total</u>
#1 – Thompson Boat Center Entrance	1/28/03	345	
	1/29/03	<u>318</u>	
	Avg. =	332	
#7 – Parkway Northbound	1/29/03	22,823	
	1/30/03	<u>23,821</u>	
	Avg. =	23,322	
#7 – Parkway Southbound	1/29/03	24,119	
	1/30/03	<u>25,833</u>	
	Avg. =	24,976	
#8 – P Street Entrance Ramp	2/4/03	5,720	
	2/5/03	<u>6,041</u>	
	Avg. =	5,880	
#9 – P Street Exit Ramp	1/29/03	2,319	
	1/30/03	<u>2,499</u>	
	Avg. =	2,409	

Traffic count data for the month of April, 2003 was also obtained from the National Park Service for Rock Creek Parkway at Waterside Drive, which is north of the project site. This data indicated average daily traffic of 29,000 vehicles northbound and 25,700 vehicles southbound. The traffic counts obtained by Daniel Consultants for two days in January were considered to be reasonably consistent with the Park Service counts that were obtained over the one month period.



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ANALYSIS

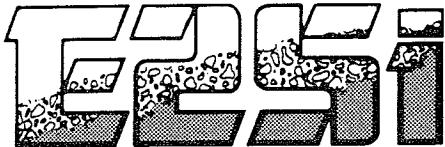
Traffic Analysis: The traffic count data was used to calculate the design traffic volumes for the Parkway, P Street ramps and boat center using AASHTO pavement design procedures. The number of 18 kip equivalent single axle loads was determined based on a 30 year design period, 2 percent annual growth and the vehicle mix determined from the traffic data. The design traffic volumes are summarized below (see calculations in Appendix E).

Design Traffic Volume

<u>Location</u>	<u>(#18 kip ESAL)</u>
Parkway	936,000
Thompson Boat Center	14,000
P Street Ramps	270,000

Although the volume of vehicles for the Parkway is very high, the design traffic volume expressed in 18 kip equivalent single axle loads is relatively low because truck use is prohibited and because there are relatively few buses.

Falling Weight Deflectometer Data: Characteristics of the pavement deflections measured with the falling weight deflectometer can be used to obtain qualitative information about the pavement structure as well as quantitative information about the modulus of the subgrade soils. Research has shown that each component layer of a pavement has a particular stress zone, which is related to the stiffness of each layer. Pavement deflections from beyond the zone (or radius) of influence of the surface and base layers can therefore be used as a measurement of the stress-strain properties of the subgrade and can be used to calculate the subgrade modulus. For bituminous pavements, deflections at radial distances of 24, 36 and 48 inches are typically used to calculate the subgrade modulus. A radial distance of 48 inches is typically used for PCC pavement. The following equation is used to relate pavement deflection to subgrade modulus.



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$$\text{Design } M_R = C \left(\frac{.024P}{d_r \times r} \right)$$

where M_R = Resilient Modulus of Subgrade (psi)
 C = Constant (between 0.25 to 0.33)
 P = Applied Load (lbs)
 d_r = Deflection at Radial Distance
 "r" from Applied Load (inches)
 r = Radial Distance from Deflection to Center of Load (inches)

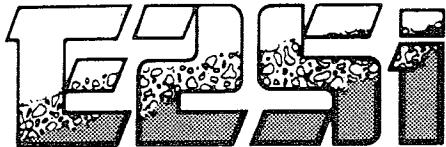
A tabulation of the computed subgrade moduli is included in Table 1 of Appendix E. In the parking lot area, the subgrade moduli ranged from 1.5 to 6.6 ksi and averaged 3.4 ksi. For the Parkway, the average subgrade modulus was 3.7 ksi for the northbound lanes and 4.1 ksi for the southbound lanes.

The area of the deflection basin produced by the FWD can be used as an indication of the relative soundness of a PCC pavement. The following equation is used to calculate the area value.

$$\text{Area} = 6 \times \left[1 + 2\left(\frac{d_{12}}{d_o}\right) + 2\left(\frac{d_{24}}{d_o}\right) + \left(\frac{d_{36}}{d_o}\right) \right]$$

where

Area = Area of slice taken through deflection basin divided by
 deflection at center of test load (inches)
 d_o = Deflection at center of test load (inches)
 d_i = Deflections at 12, 24, and 36 inches from plate center (inches)



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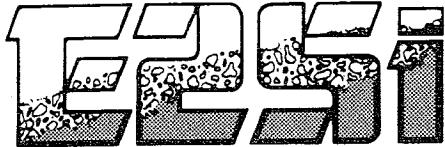
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Area values in the range of 29 to 32 are an indication of a sound PCC pavement. A tabulation of calculated deflection basin area values are shown in Table 1 of Appendix E. For the northbound lanes, the area values ranged from 21.5 to 33.6 and averaged 29.2. For the southbound lanes, the range was 19.5 to 33.1 with an average of 26.5.

The area value along with the pavement deflection at the point of load application can also be used as an indication of the general condition of the pavement and subgrade. A combination of relatively low area value and low deflection is an indication of a weak pavement and a strong subgrade. A low area value and high deflection indicates a weak pavement and a weak subgrade. Conversely, a high area value and low deflection is an indication of a sound pavement and a strong subgrade. Pavement areas where the readings gave an indication of either a weak pavement or subgrade are shown on Table 1. Most of these areas appear to be localized for the northbound lanes. For the southbound lanes, the pavement section between Sta. 20+00 to Sta. 40+00 has readings which are an indication of a weak pavement and a weak subgrade.

Pavement Cores and Borings: A total of 18 locations along the Parkway and at the boat house and P Street ramps were selected to obtain pavement cores and sample the subgrade soils. The pavement was cored at each location and standard penetration testing and sampling of the subgrade was performed to a depth of approximately 6 feet. The pavement cores had diameters of 4 inches and 8 inches. At locations where it was desired to collect a bag sample of the subgrade to perform laboratory tests for compaction and CBR, an 8 inch diameter core was taken to allow for an auger to collect the bag sample. The 4 inch diameter cores were taken at the other locations that did not require a bag sample. Photographs of the pavement core samples are shown on Figures 8 and 9 in Appendix A and the boring logs are included in Appendix B.

Laboratory Testing: Laboratory testing was performed to determine the natural moisture content, classification and California Bearing Ratio for representative samples of the subgrade.



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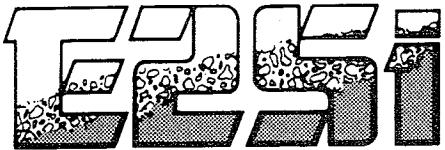
A total of 41 moisture content tests and 5 classification, modified proctor compaction, and CBR tests were performed. The test results are included in Appendix C.

Existing Pavement Section: Various area of the Parkway pavement have been overlayed and repaired as well as widened. This has resulted in a highly variable pavement section over the 4,300 foot length of the project. Most of the pavement has a variable thickness (2" to 15") of bituminous surfacing over 6 to 8 inches of Portland cement concrete (PCC) base course. Localized sections of the pavement do not have a PCC base course. The pavement section for cores P-2, P-8 and P-13 consisted of 5 to 13 inches of bituminous concrete. These cores could represent areas where the pavement was widened using a bituminous rather than a PCC pavement. Cores P-3, P-6 and P-14 were drilled on surface cracks in areas that appear to have been repaired. Most of the cores with a PCC base have a bituminous surface course that is either poorly bonded or delaminated. A few of the cores (P-6 and P-12) had loose aggregate or broken concrete between the bituminous surface and PCC base.

The parking lot pavement at the boat house (cores P-15 and P-16) was found to consist of 3.5 inches of bituminous concrete with about 2 inches of sand and gravel base (versus a 6" thick base indicated on the plans). The access road near the boat house (P-17) consisted of 8 inches of bituminous concrete.

The pavement at the P Street ramps consists of 3 inches of bituminous surface with a 6 inch PCC base, which is similar to the original pavement.

Cores A and B were taken to determine the thickness of the bituminous overlay for the deck of the bridge over Rock Creek (Sta. 12+50). The overlay thickness for both cores was 2.5 inches.



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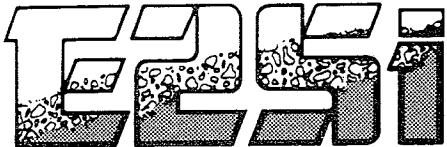
Subgrade Conditions: The subgrade for the Parkway consists predominantly of fill. The soils are mostly silty sands with some clay, gravel, brick pieces and occasionally cinders. The fill is typically loose to medium dense and has standard penetration test blow counts of 4 to 14 blows per foot. The AASHTO classifications are A-2-4 and A-4 and the CBR values ranged from 8 to 11. At the south end of the project in the vicinity of the parking lot (P-14, P-15 and P-16), the subgrade fill consists of silty clay with sand. These soils have an AASHTO classification of A-6 and a CBR value of 4 to 6.

The natural moisture content of the subgrade is typically in the range of 10 to 20 percent with an average of 15 percent. The groundwater table in the area is below a depth of 6 feet.

Pavement and Overlay Design:

Parkway: The required pavement section for the Parkway was evaluated based on AASHTO design methods and analysis period of 30 years. For design purposes, the subgrade was considered to have a CBR value of 5, a resilient modulus of 5,000 psi, and a modulus of subgrade reaction of 200 pci. These values represent the low end of the subgrade strength values determined from the laboratory testing and are generally consistent with the subgrade moduli values determined from the falling-weight deflectometer data. For a design traffic volume of 936,000 18-kip equivalent single axle loads, a PCC pavement would require a thickness of 6.5 inches. This indicates that the existing pavement, which generally has a 6 to 8 inch PCC base, has sufficient thickness and structural capacity for the design traffic loading.

To further evaluate the adequacy of the existing pavement, the AASHTO flexible pavement design method was used to determine the required structural number for the pavement section. It was determined that the pavement should have a structural number of at least 4.0. The structural number for the pavement section at each core location was then computed using



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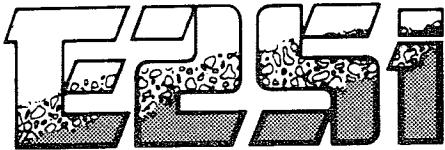
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Asphalt Institute conversion factors that convert cracked or damaged thicknesses of asphalt concrete and Portland cement concrete to an equivalent thickness of asphalt concrete. The structural number of the pavement section based on this equivalent thickness was then computed. It was determined that most areas of the existing pavement have a structural number in the range of 4.0 to 8.8. Some localized areas with either damaged or unusually thin pavement sections, as represented by cores P-7, P-8, P-12 and P-14, have a structural number less than 4.0. These areas would require full-depth base repairs to achieve the required structural capacity.

P Street Ramps: The pavement at the P Street ramps is in much poorer condition than the parkway. There is severe transverse reflective cracking at the PCC slab joints and many of the areas near the joints exhibit spalling and broken corners. This is an indication that load transfer between the slabs is poor and that a new overlay would experience rapid deterioration. The ramp pavement should therefore be replaced with a new pavement. For 30 year design life, the pavement section would require either 5.0 inches of PCC base with 2" bituminous overlay or 6 inches of bituminous concrete over 6 inches of crushed stone base.

Thompson Boat Center: The pavement of the parking lot and access road from the entrance to the bridge is relatively thin and in poor condition. Milling the pavement is not considered to be worthwhile because it would leave a thin, broken layer of bituminous concrete that would weaken and reduce the service life of the pavement. The preferred approach would be to remove and replace the bituminous surfacing. The parking lot and access road have relatively light traffic volumes. A typical pavement section for this intended use would consist of 4 inches of bituminous concrete over 6 inches of crushed stone base.

The pavement between the bridge and boat house is thicker (8" bituminous concrete) and in better condition. The pavement in this area could be rehabilitated by milling and overlaying.



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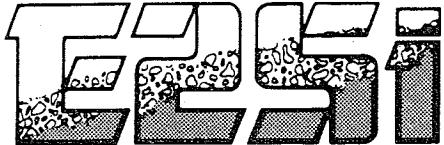
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Southbound Right Turn Lane: The PCC pavement of the southbound right turn lane and entrance into the boat center will be replaced with bituminous pavement. Given the very low design traffic for the boat center, the thickness of the pavement section should be based on matching the thickness of the Parkway pavement. A bituminous pavement section consisting of 8 inches of bituminous concrete (2" surface course with 6" base course) could be used.

CONCLUSIONS AND RECOMMENDATIONS:

Parkway: Milling and overlaying the pavement and making full-depth base repairs for localized areas with damaged or unusually thin pavement is recommended for the north and southbound lanes of the Parkway. Given the highly variable thickness (2" to 15") of the bituminous concrete surface, it is recommended that the surfacing be milled to the top of the PCC base or to a maximum depth of 6 inches (if no PCC base is present). Milling to a depth of 6 inches in areas with a thick bituminous surface or without a PCC base is necessary to ensure that thin, broken or delaminated layers of surface course are removed and that areas without a PCC base are exposed.

Full-depth base repairs should be made for all pavement areas for which the PCC base is either damaged or missing. Some exploratory coring after the pavement is milled will probably be required to fully delineate the areas for full-depth repairs. Either a bituminous or PCC pavement section should be used for the areas with full depth repairs. The recommended bituminous section would consist of 2 inches of surface course (which would be the overlay for the entire pavement), a minimum of 6 inches of bituminous base course and 6 inches of crushed stone base. The PCC section could be constructed the same as the original pavement with a minimum of 6 inch PCC base and a 2 inch bituminous surface. The PCC base should be doweled into the existing PCC base and welded wire fabric should be used for temperature reinforcement.



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The pavement after milling and base repairs will require various thicknesses of bituminous surfacing to establish the finished grade. A variable thickness bituminous concrete leveling course should be used to build-up low areas to 2 inches below final grade. The final course should consist of a 2 inch bituminous overlay of the entire pavement.

P Street Ramps: Replacement is recommended due to the deteriorated condition of the existing pavement. Either a PCC or bituminous pavement section could be used. The recommended PCC section is 2 inches of bituminous surface course over 6 inches of PCC base (same as existing section). The recommended bituminous section is 6 inches of bituminous concrete (2" surface course, 4" base course) over 6 inches of crushed stone base.

Thompson Boat Center: Pavement replacement is recommended for the parking lot and access road between the entrance and bridge. The new pavement section should consist of 4 inches of bituminous concrete (1.5" surface course, 2.5" base course) over 6 inches of crushed stone base. The access road past the bridge and the parking lot at the boat house could be milled to a depth of 2 inches and overlaid with 2" of bituminous surface course.

For the right turn lane into the boat center, the existing PCC pavement should be removed and replaced with 8 inches of bituminous concrete (2" surface course with 6" of base course in 2 lifts).

Pavement and Subgrade Preparation: The existing pavement after milling should be inspected by a pavement engineer to delineate the areas that require full-depth base repairs. The subgrade for all new pavement and full-depth repairs should also be inspected and proof-rolled. Subgrade that is considered to be unsuitable should be undercut and backfilled with crusher run material (CR-6) compacted to a minimum of 95 percent of modified proctor (AASHTO T-180) maximum dry density.

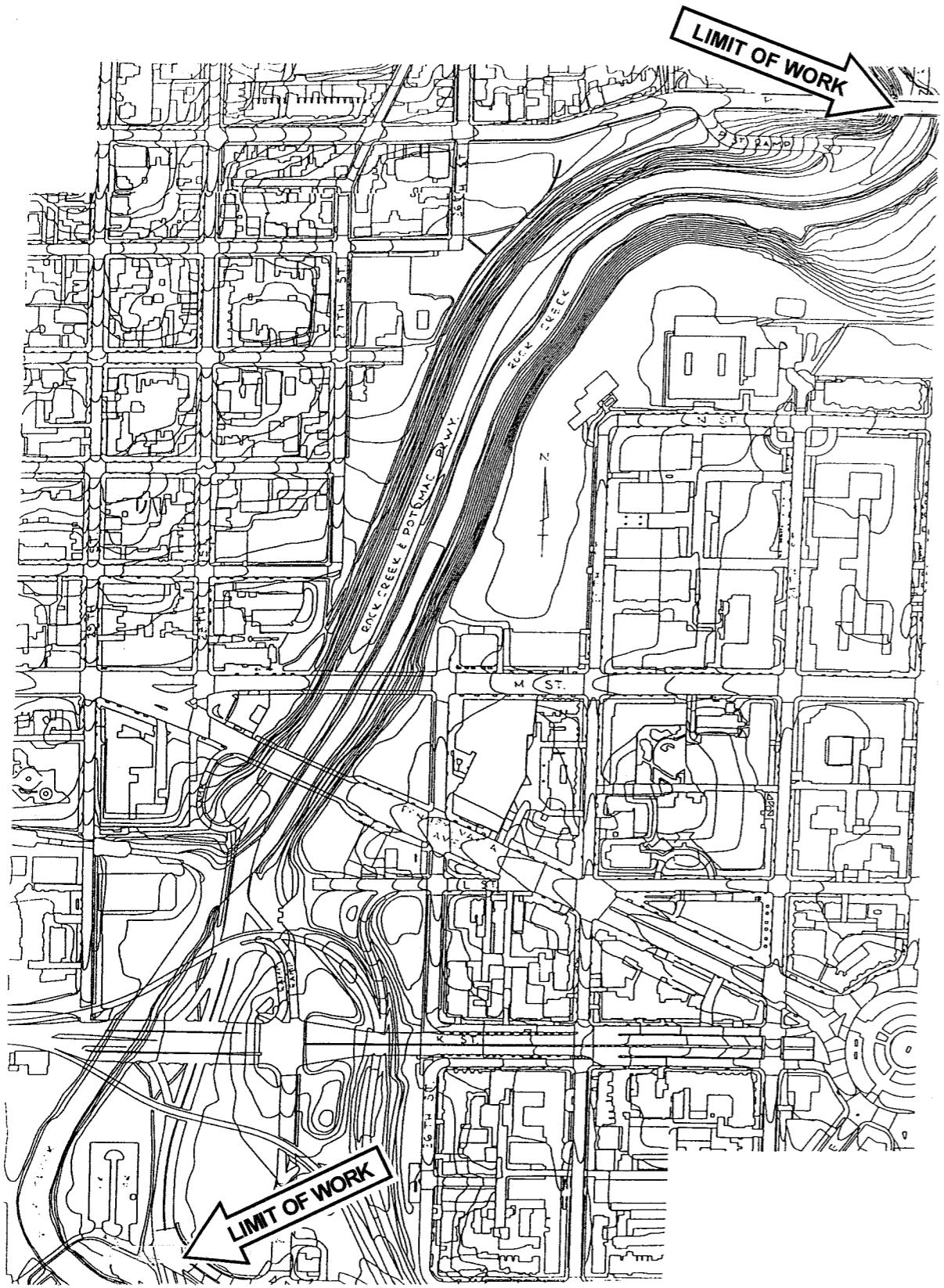
APPENDIX A

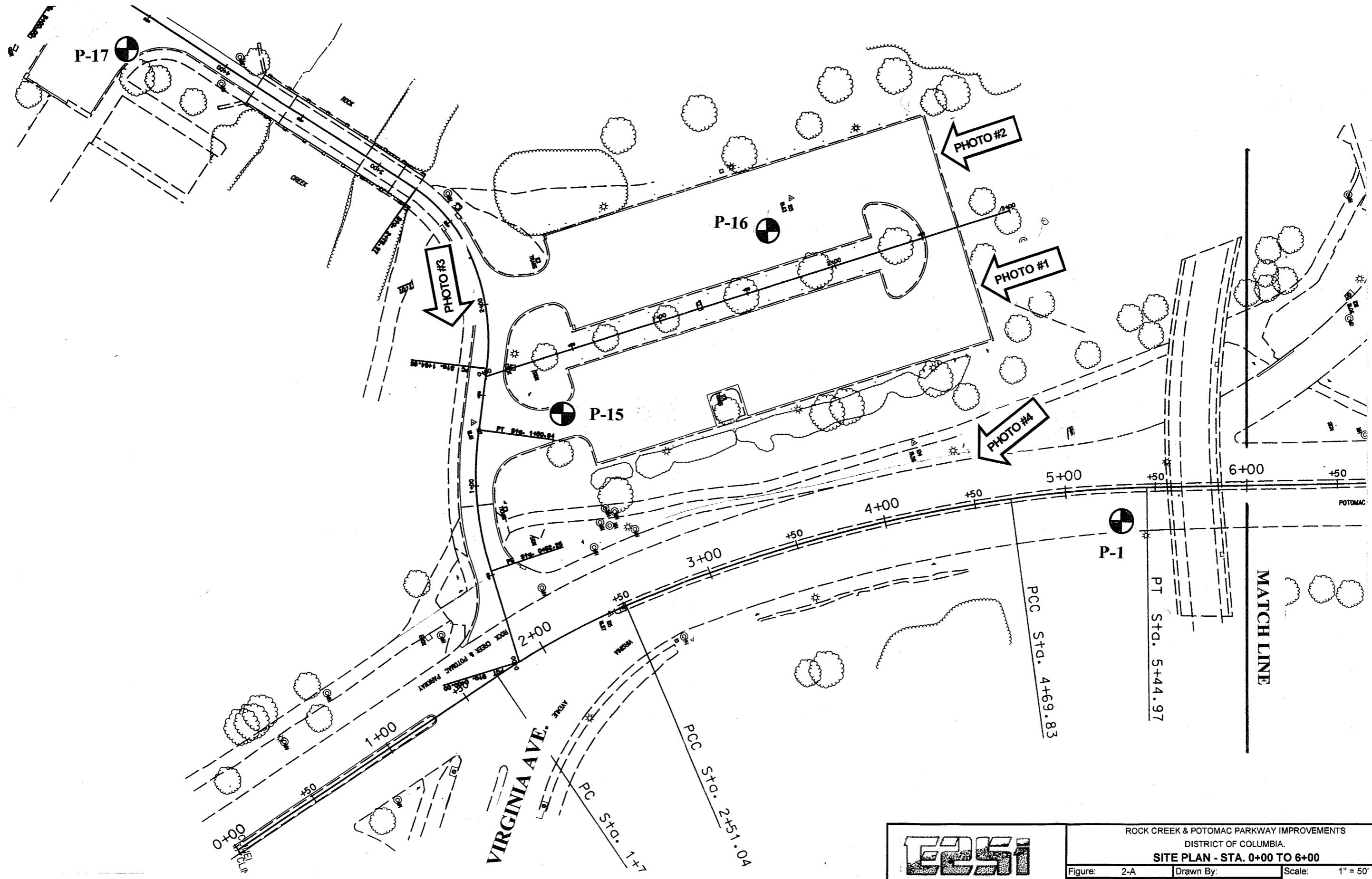
FIGURES
PHOTOS

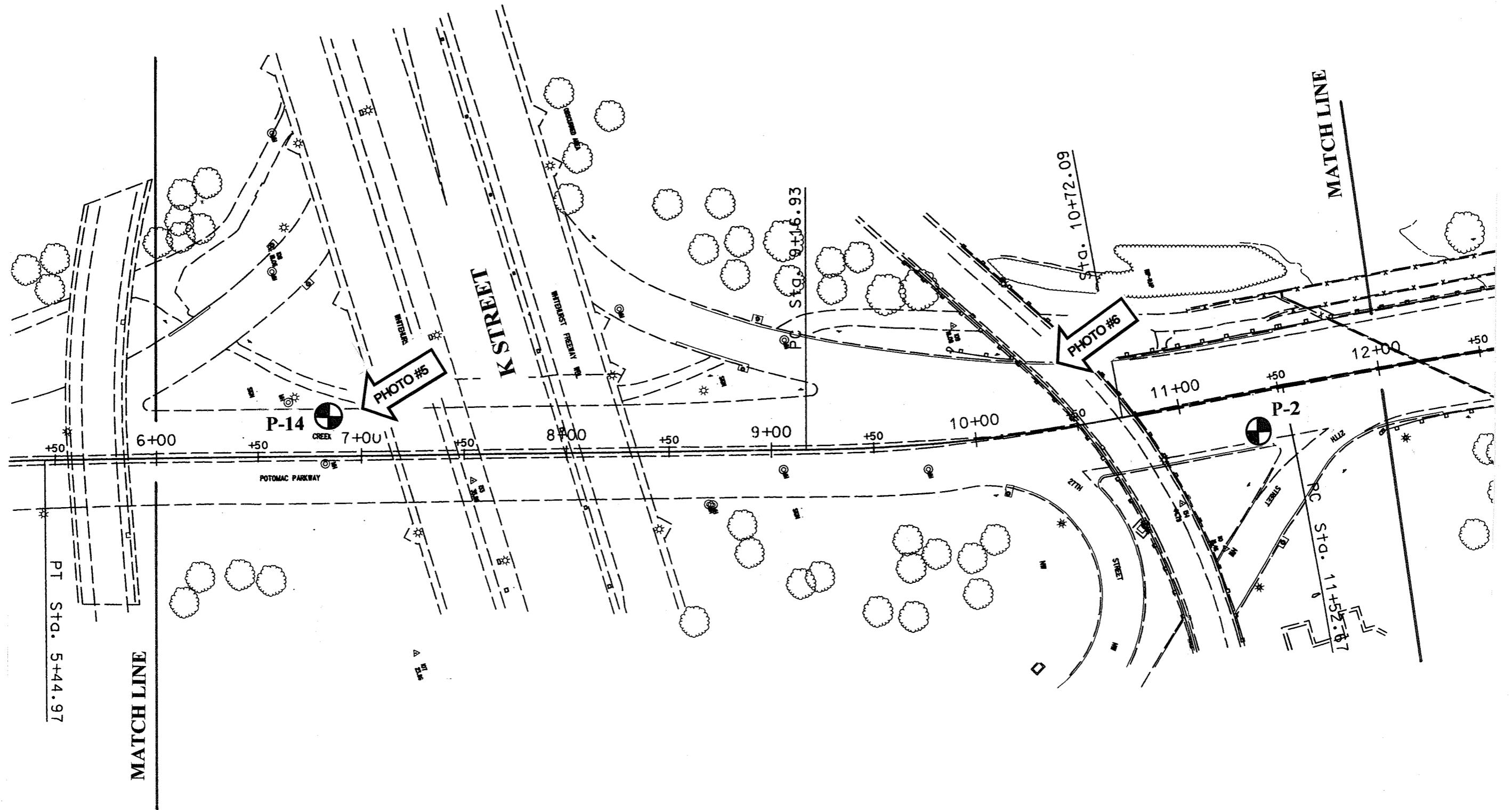


ROCK CREEK & POTOMAC PARKWAY
VIRGINIA AVE. TO P STREET
SITE VICINITY MAP

Figure: 1 Date: 3/20/03 Project No: 02-200





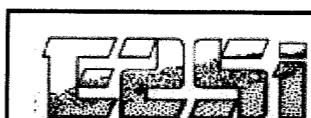
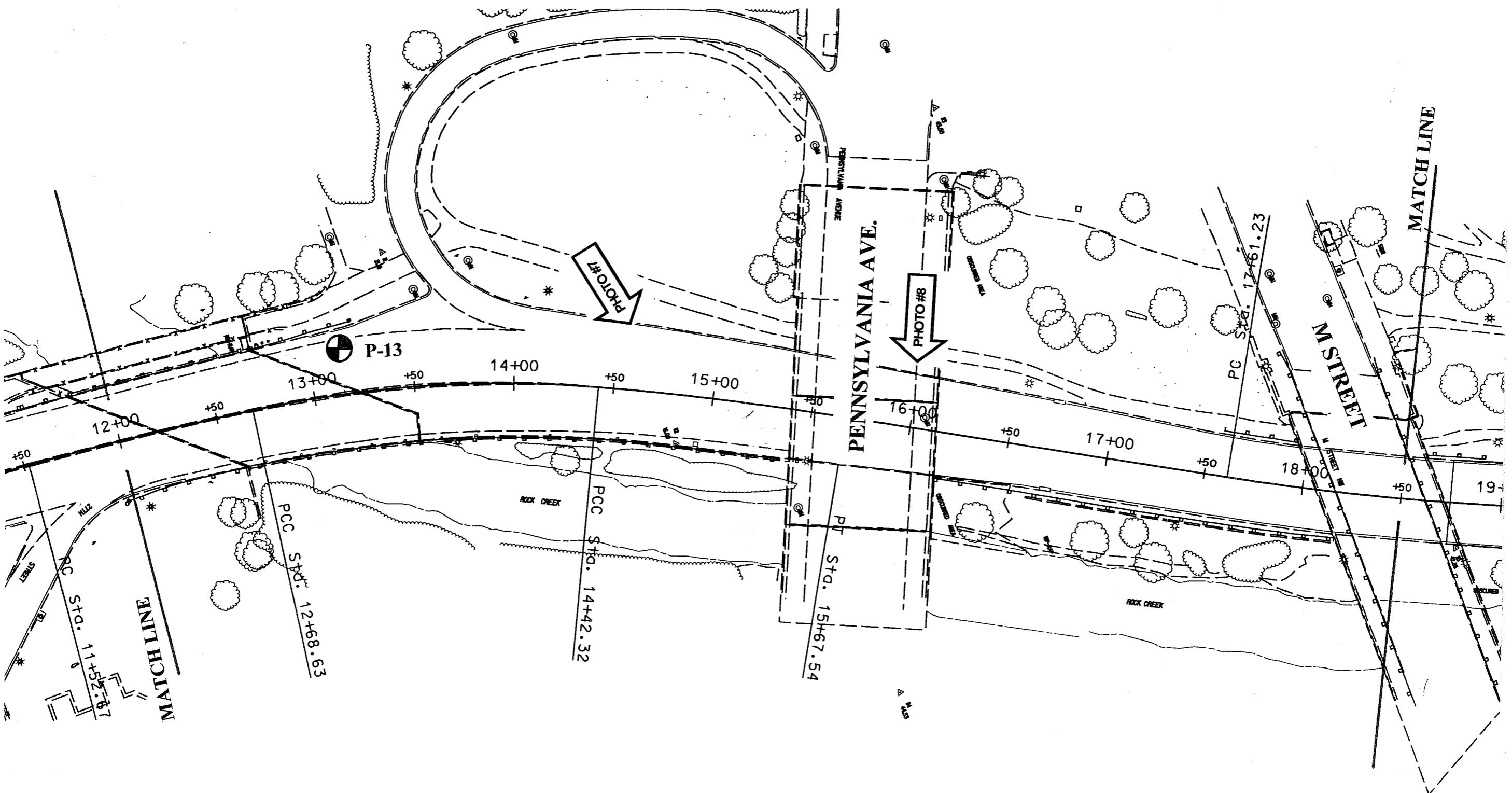


ROCK CREEK & POTOMAC PARKWAY IMPROVEMENTS

DISTRICT OF COLUMBIA.

SITE PLAN - STA. 6+00 TO 12+00

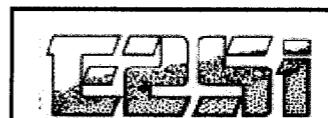
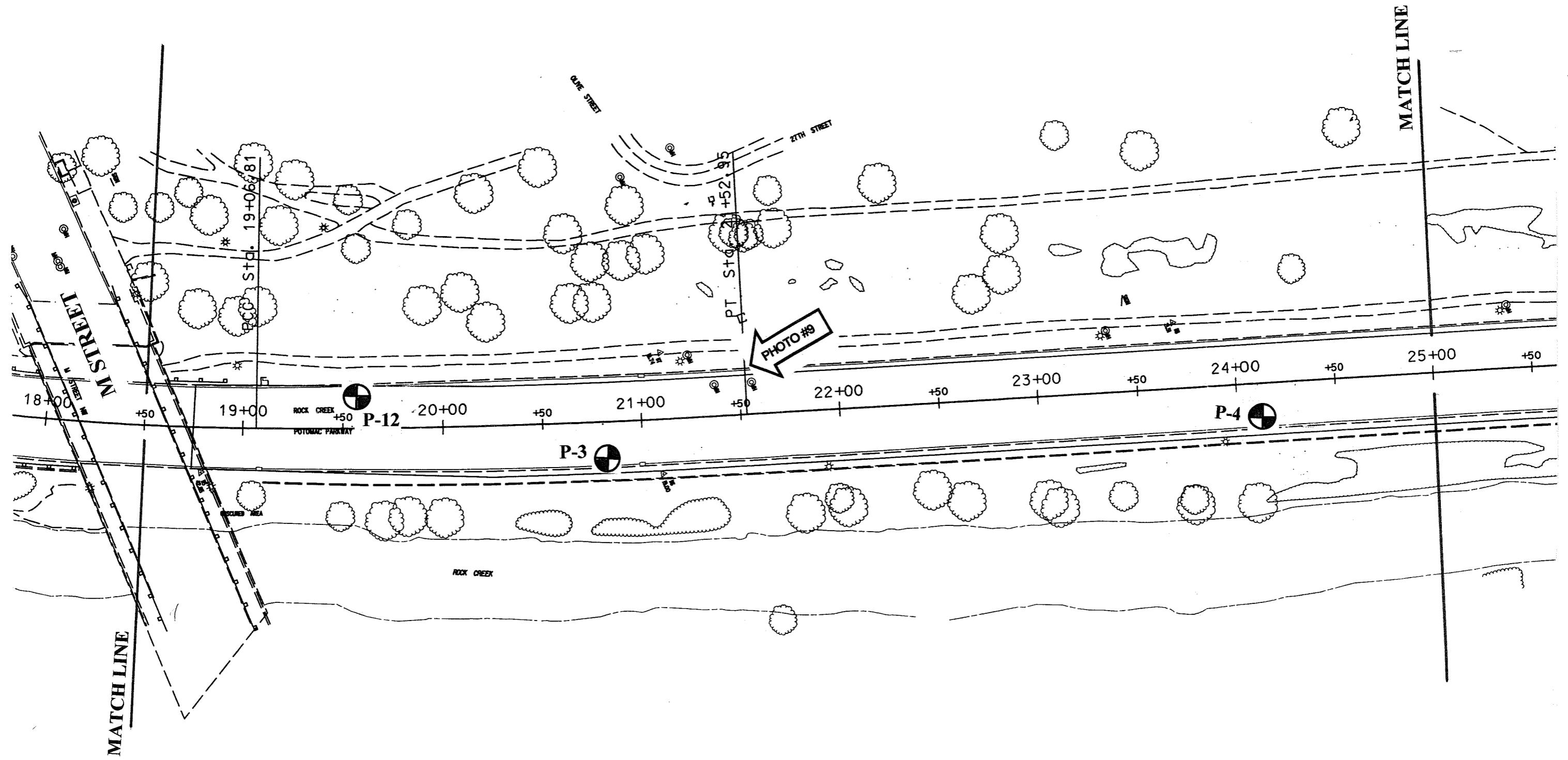
Figure:	2-B	Drawn By:	Scale:	1" = 50'
Date:	3/13/03	Project No:	02-200	



ROCK CREEK & POTOMAC PARKWAY IMPROVEMENTS
DISTRICT OF COLUMBIA.

SITE PLAN - STA. 12+00 TO 18+50

Figure:	2-C	Drawn By:	Scale:
Date:	3/13/03	Project No:	02-200

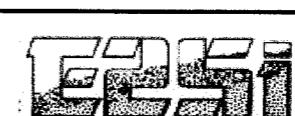
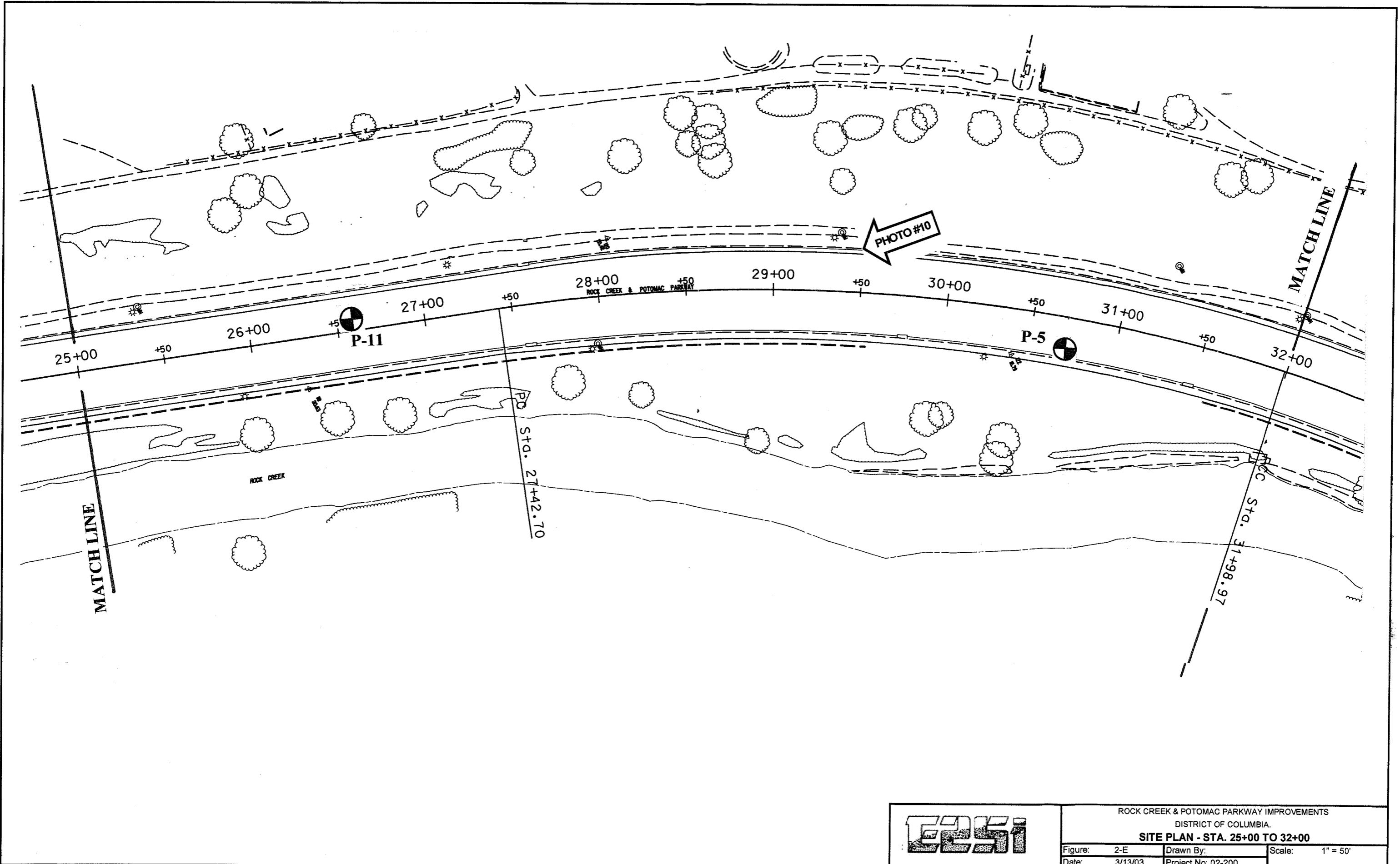


ROCK CREEK & POTOMAC PARKWAY IMPROVEMENTS

DISTRICT OF COLUMBIA.

SITE PLAN - STA. 18+50 TO 25+00

Figure:	2-D	Drawn By:	Scale:
Date:	3/13/03	Project No: 02-200	1" = 50'

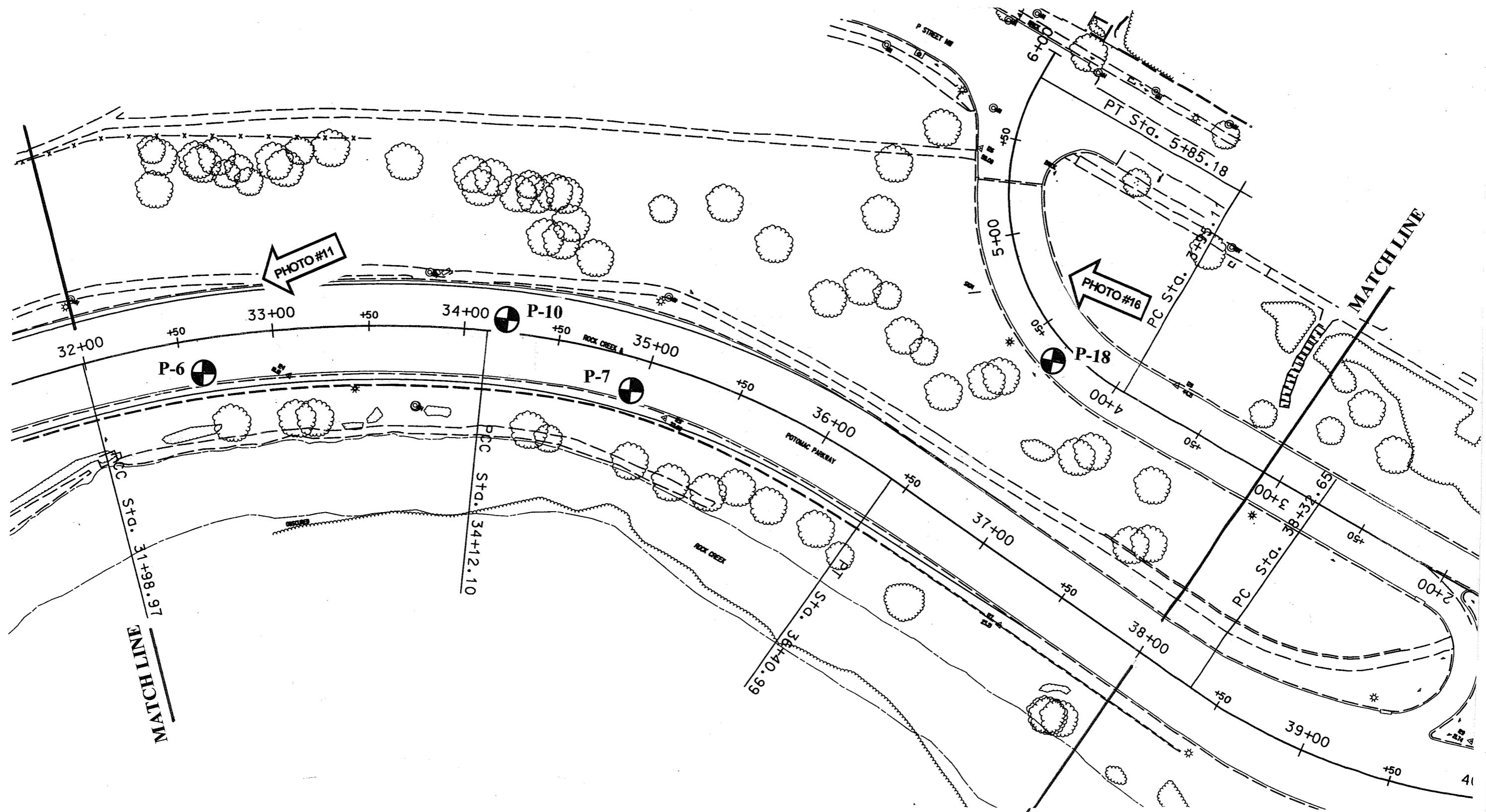


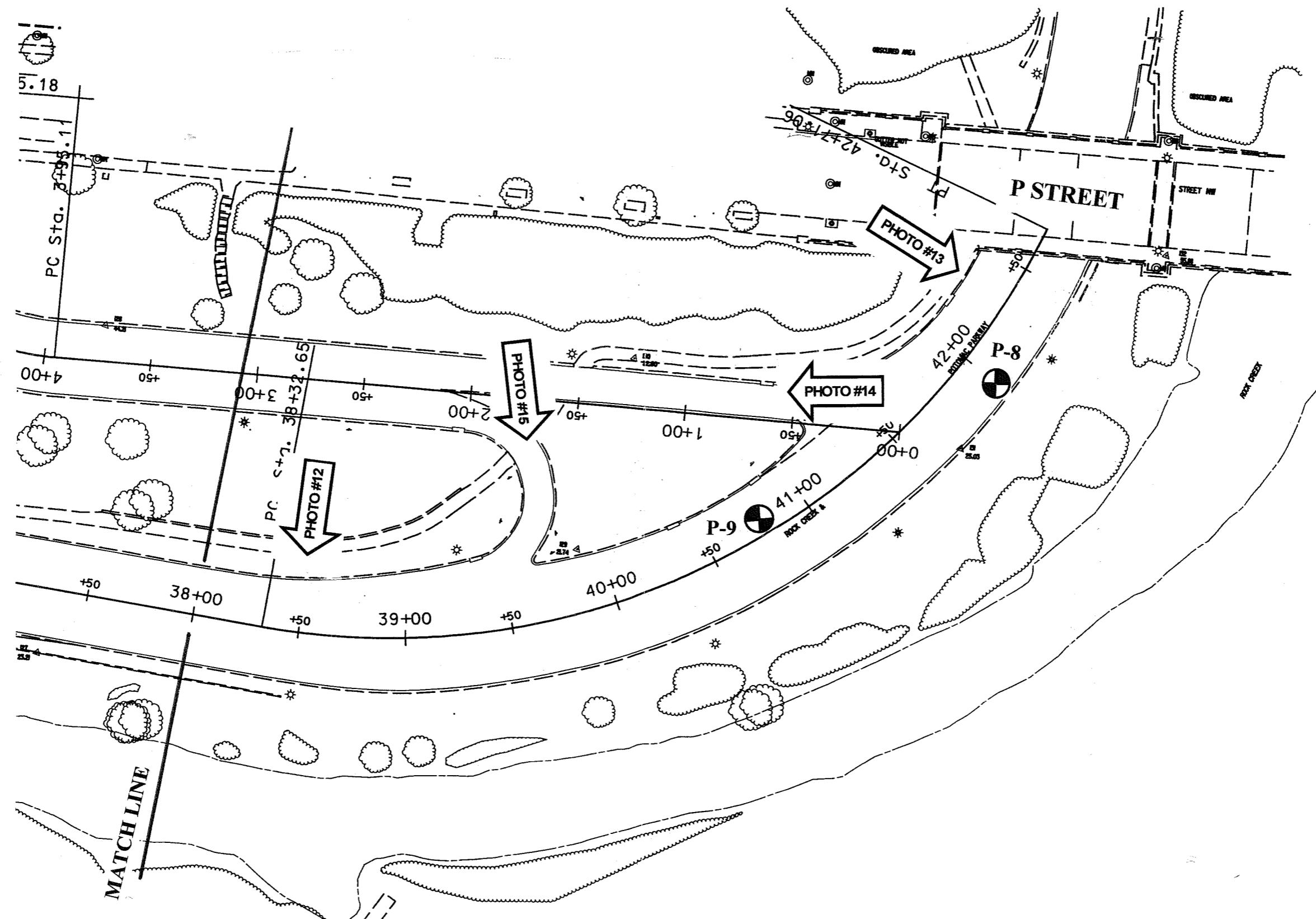
ROCK CREEK & POTOMAC PARKWAY IMPROVEMENTS

DISTRICT OF COLUMBIA.

SITE PLAN - STA. 25+00 TO 32+00

Figure:	2-E	Drawn By:	Scale:
Date:	3/13/03	Project No: 02-200	1" = 50'





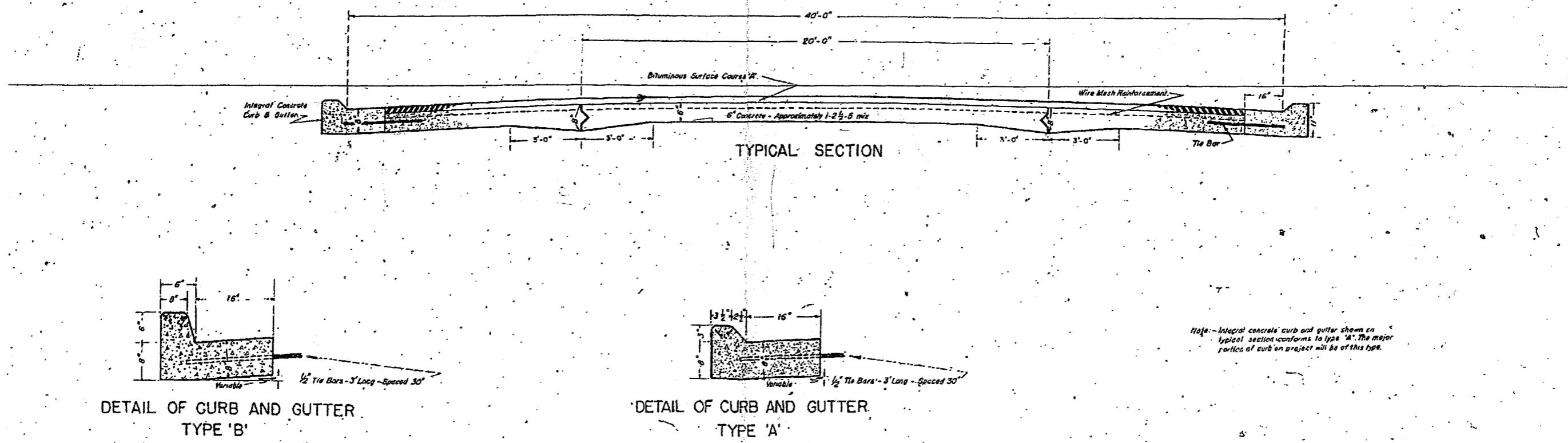
ROCK CREEK & POTOMAC PARKWAY IMPROVEMENTS

DISTRICT OF COLUMBIA.

SITE PLAN - STA. 38+00 TO 42+50

Figure: 2-G Drawn By: Scale: 1" = 50'
Date: 3/13/03 Project No: 02-200

**ROCK CREEK & POTOMAC PARKWAY IMPROVEMENTS
FROM 3 STREET TO 9 STREET.**



CROWN SECTION

DEPARTMENT OF HIGHWAYS
DISTRICT OF COLUMBIA

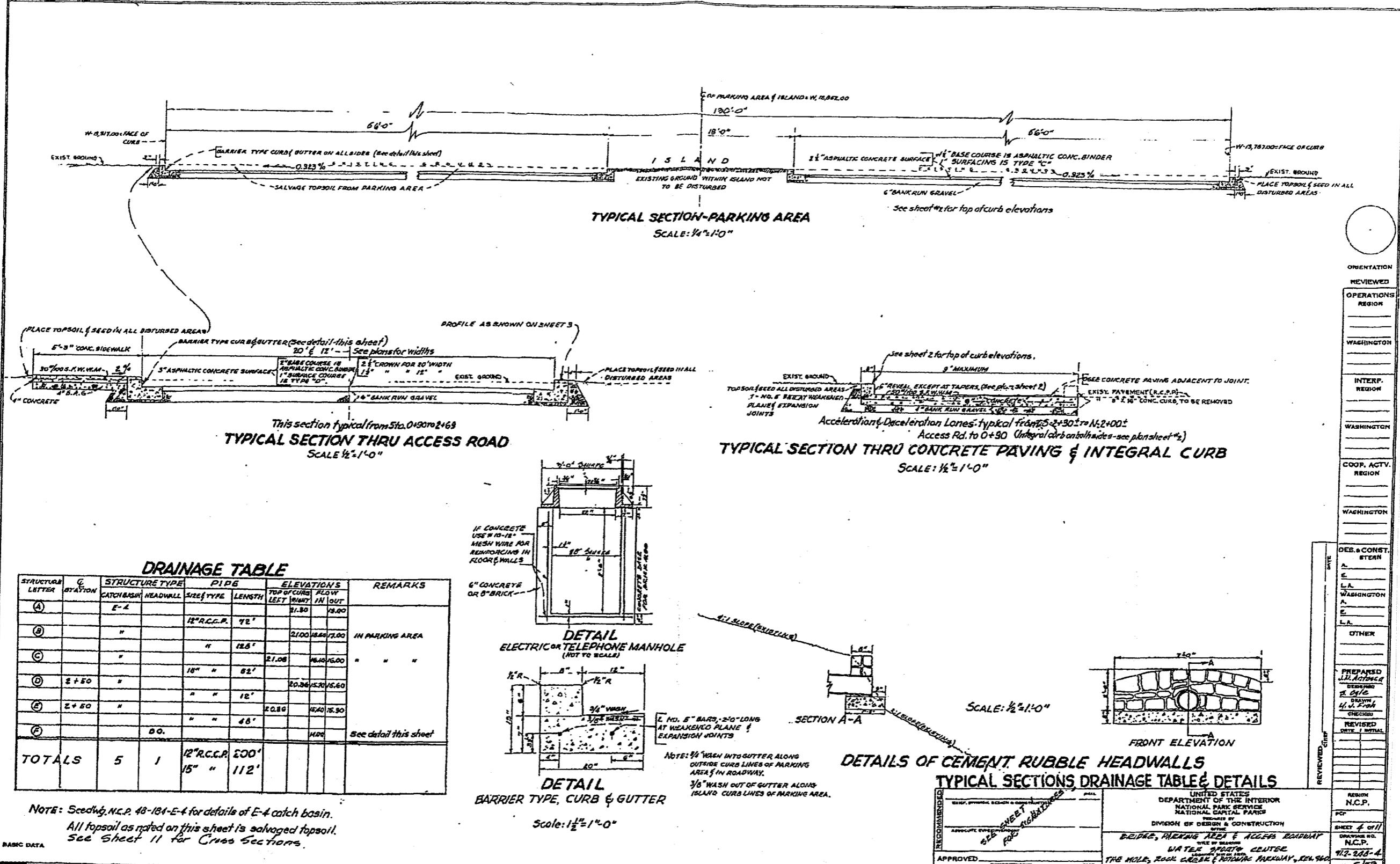


ROCK CREEK & POTOMAC PARKWAY IMPROVEMENTS

DISTRICT OF COLUMBIA

ORIGINAL PAVEMENT SECTION

Figure: 3	Drawn By:	Scale: As Shown
Date: 3/13/03	Project No: 02-200	



ROCK CREEK & POTOMAC PARKWAY IMPROVEMENTS

DISTRICT OF COLUMBIA.

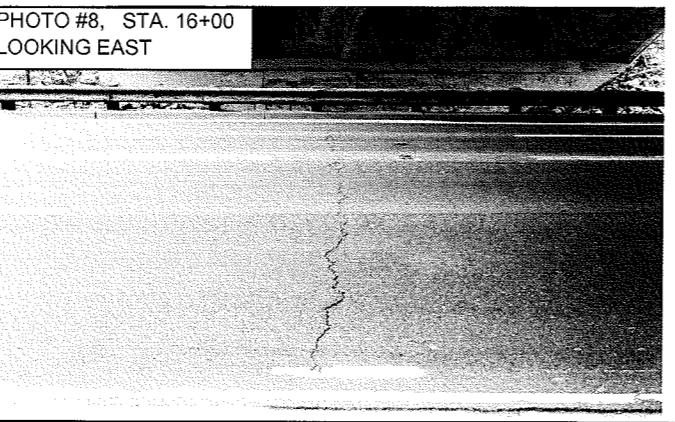
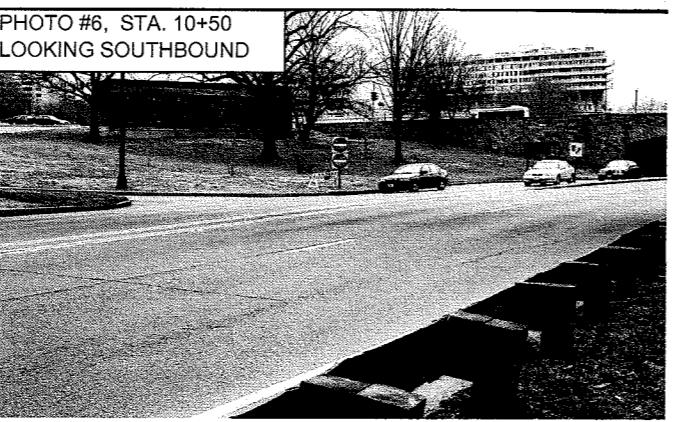
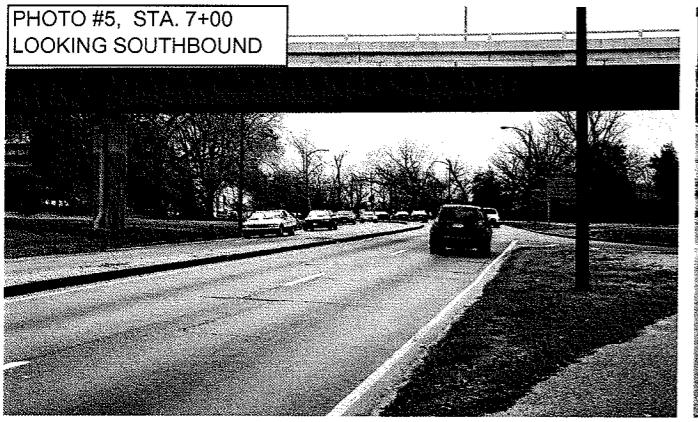
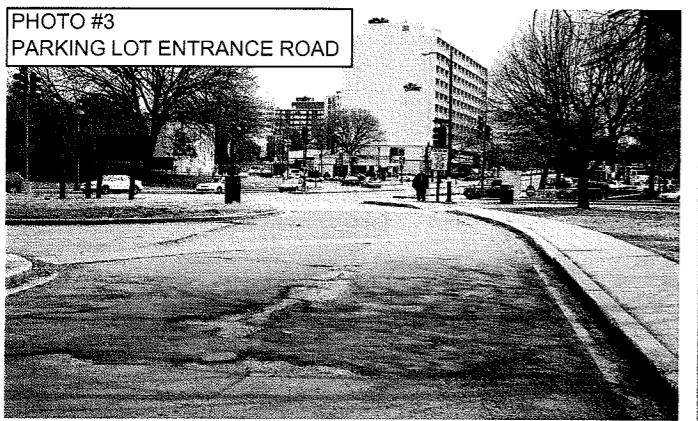
ORIGINAL PARKING LOT PAVEMENT

Figure: 4	Drawn By:	Scale: As Shown
Date: 3/13/03	Project No: 02-200	



ROCK CREEK & POTOMAC PARKWAY
VIRGINIA AVE. TO P STREET
PAVEMENT INVESTIGATION

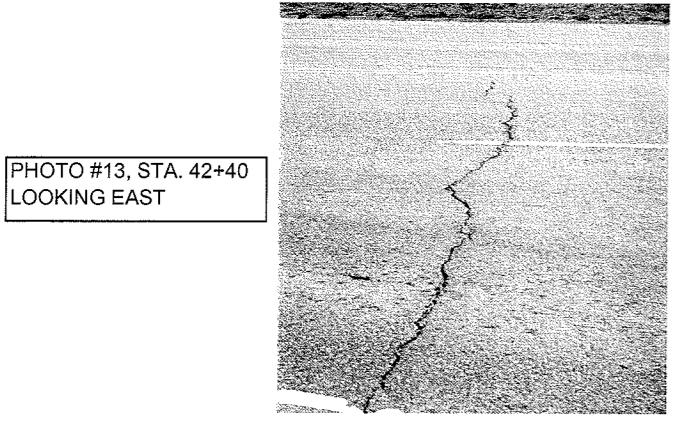
Figure: 5 Date: 3/20/2003 Project No: 02-200





ROCK CREEK & POTOMAC PARKWAY
VIRGINIA AVE. TO P STREET
PAVEMENT INVESTIGATION

Figure: 6 Date: 3/20/2003 Project No: 02-200





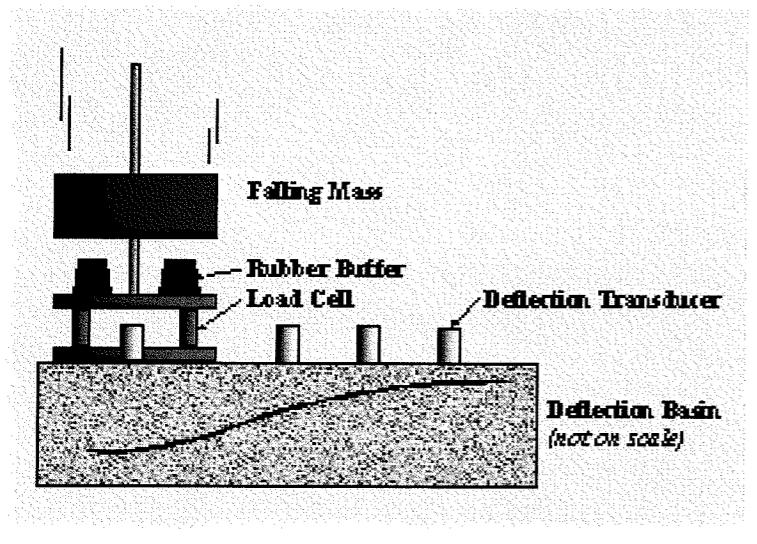
**Earth
Engineering
& Sciences, Inc.**

ROCK CREEK & POTOMAC PARKWAY
VIRGINIA AVE. TO P STREET
FALLING WEIGHT DEFLECTOMETER

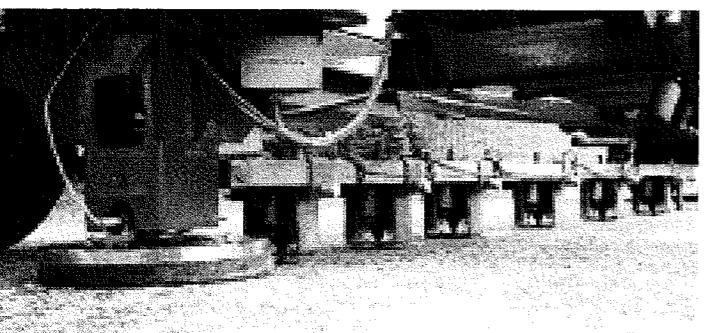
Figure: 7 Date: 3/20/2003 Project No: 02-200



TYPICAL FALLING - WEIGHT
DEFLECTOMETER
EQUIPMENT



METHOD FOR
APPLYING LOAD
AND MEASURING
PAVEMENT DEFLECTIONS

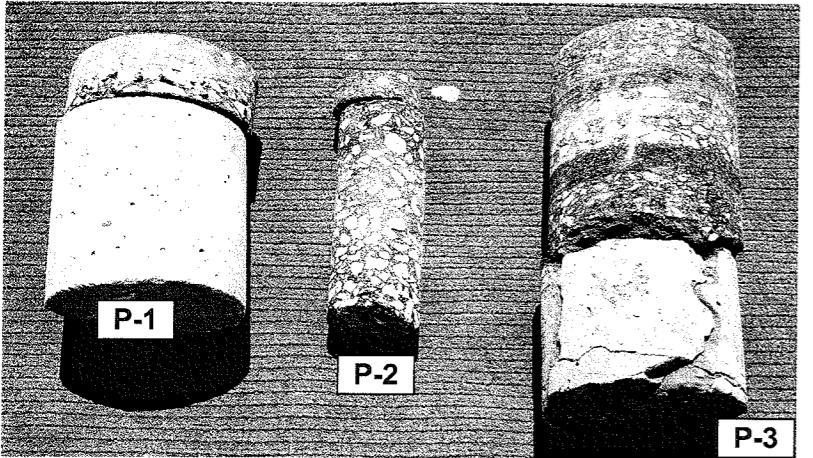


LOADING PLATE
AND DEFLECTION
TRANSDUCERS

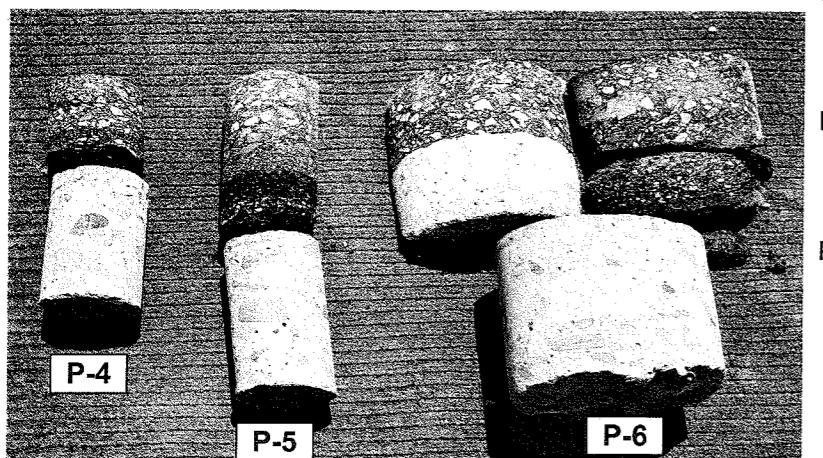


ROCK CREEK & POTOMAC PARKWAY
ROADWAY IMPROVEMENTS
PAVEMENT CORES

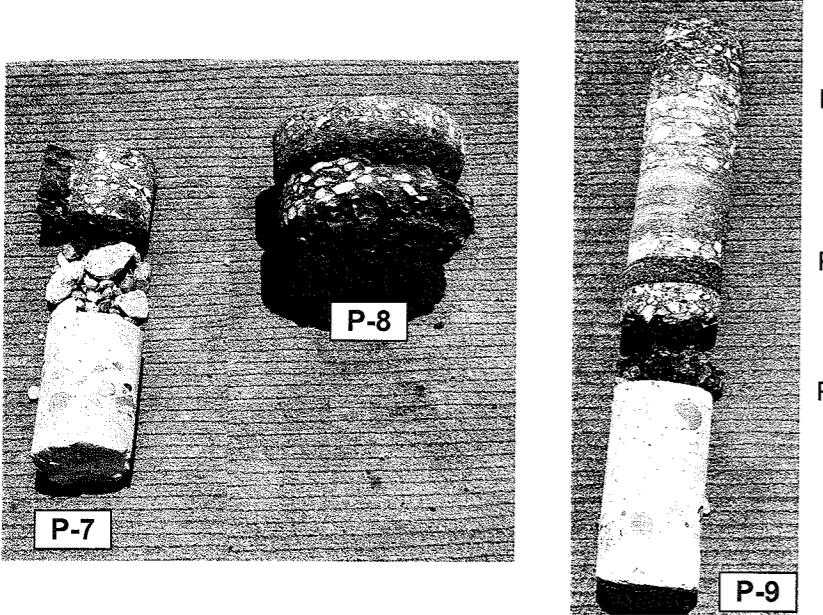
Figure: 8 Designed By: Drawn By:
Date: 6/6/2003 Proj. #02-200 Scale:



- P-1: Parkway Northbound, Sta. 5+30, 20' R
3" Asphalt (Delaminated)
8.5" Concrete
- P-2: Parkway Northbound, Sta. 11+37, 22' R
12" Asphalt (Surf.Course Delaminated)
- P-3: Parkway Northbound, Sta. 20+80, 18' R
10" Asphalt (Delaminated)
7" Concrete (Cracked)



- P-4: Parkway Northbound, Sta. 24+10, 18' R
5" Asphalt (Delaminated)
6" Concrete
- P-5: Parkway Northbound, Sta. 30+70, 18' R
8" Asphalt (Delaminated)
7" Concrete
- P-6: Parkway Northbound, Sta. 32+60, 18' R
Curb Side: 4" Asphalt
4" Concrete (Delaminated)
6" Concrete
Road Side 4" Asphalt (Delaminated)
4" Asphalt (Broken)
6" Concrete



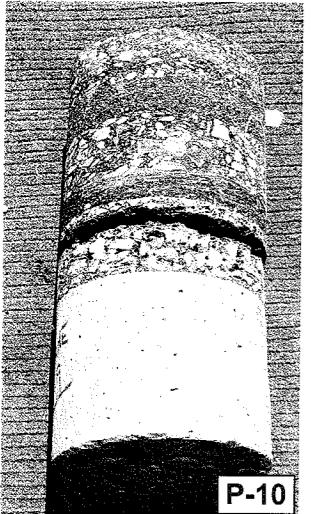
- P-7: Parkway Northbound, Sta. 34+92, 18' R
4" Asphalt (Delaminated)
4" Concrete (Broken)
6" Concrete
- P-8: Parkway Northbound, Sta. 42+98, 20' R
5" Asphalt (Surf.Course Delaminated)
6" Sand & Gravel Base
- P-9: Parkway Southbound, Sta. 40+75, 5' L
15" Asphalt (Delaminated)
8" Concrete



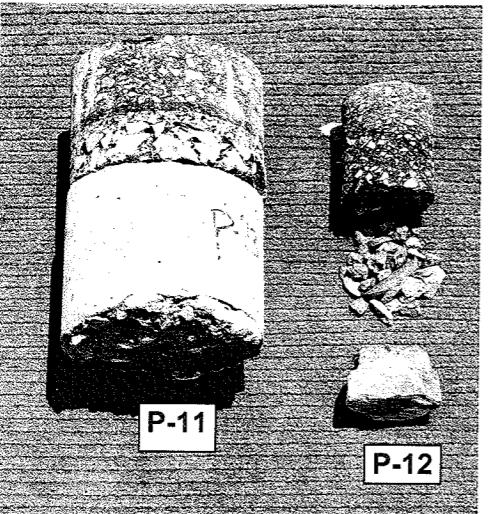
**Earth
Engineering
& Sciences, Inc.**

ROCK CREEK & POTOMAC PARKWAY
ROADWAY IMPROVEMENTS
PAVEMENT CORES

Figure: 9	Designed By:	Drawn By:
Date: 6/6/2003	Proj. #02-200	Scale:



P-10



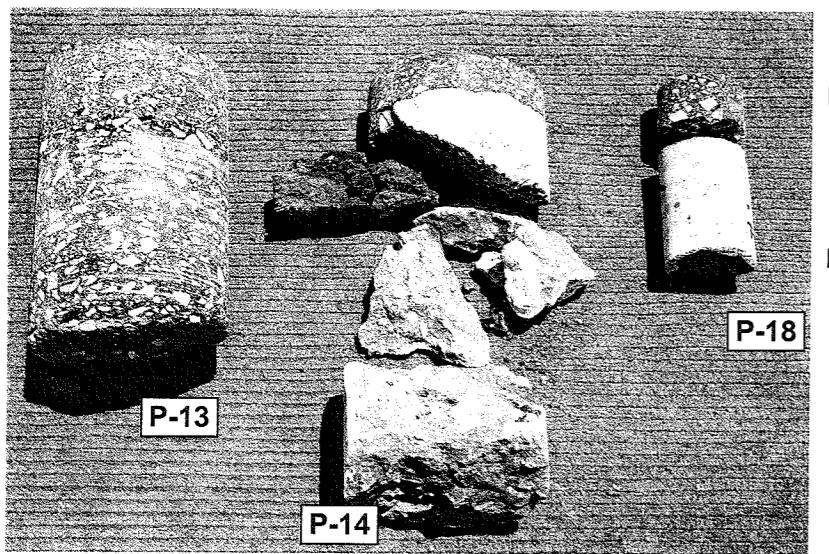
P-11

P-12

P-10: Parkway Southbound, Sta. 34+20, 5' L
11" Asphalt
7" Concrete

P-11: Parkway Southbound, Sta. 26+56, 5' L
6" Asphalt (Delaminated)
7" Concrete

P-12: Parkway Southbound, Sta. 19+55, 15' L
5" Asphalt
6" Concrete (Broken)



P-13

P-14

P-13: Parkway Southbound, Sta. 13+15, 23' L
13" Asphalt

P-14: Parkway Southbound, Sta. 6+85, 20' L
2" Asphalt
4" Broken Asphalt & Concrete
6" Concrete (Broken)

P-18: P-Street On-Ramp, Sta. 4+30, 13' L
3" Asphalt (Delaminated)
6" Concrete

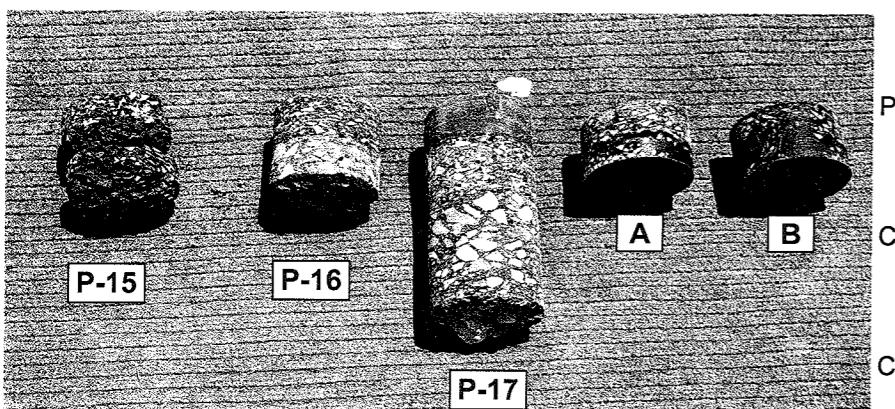
P-15: Boat House Parking Lot
Sta. 0+32, 31' R
3.5" Asphalt (Surface Delaminated)

P-16: Boat House Parking Lot
Sta. 1+73, 30' L
3.5" Asphalt

P-17: Boat House Access Road
Sta. 4+50, 25' L
8" Asphalt

Core A: Parkway Bridge Over Rock Creek
Sta 12+50 Southbound
2.5" Asphalt Overlay

Core B: Parkway Bridge Over Rock Creek
Sta. 12+90 Northbound
2.5" Asphalt Overlay



P-15

P-16

A

B

P-17

APPENDIX B

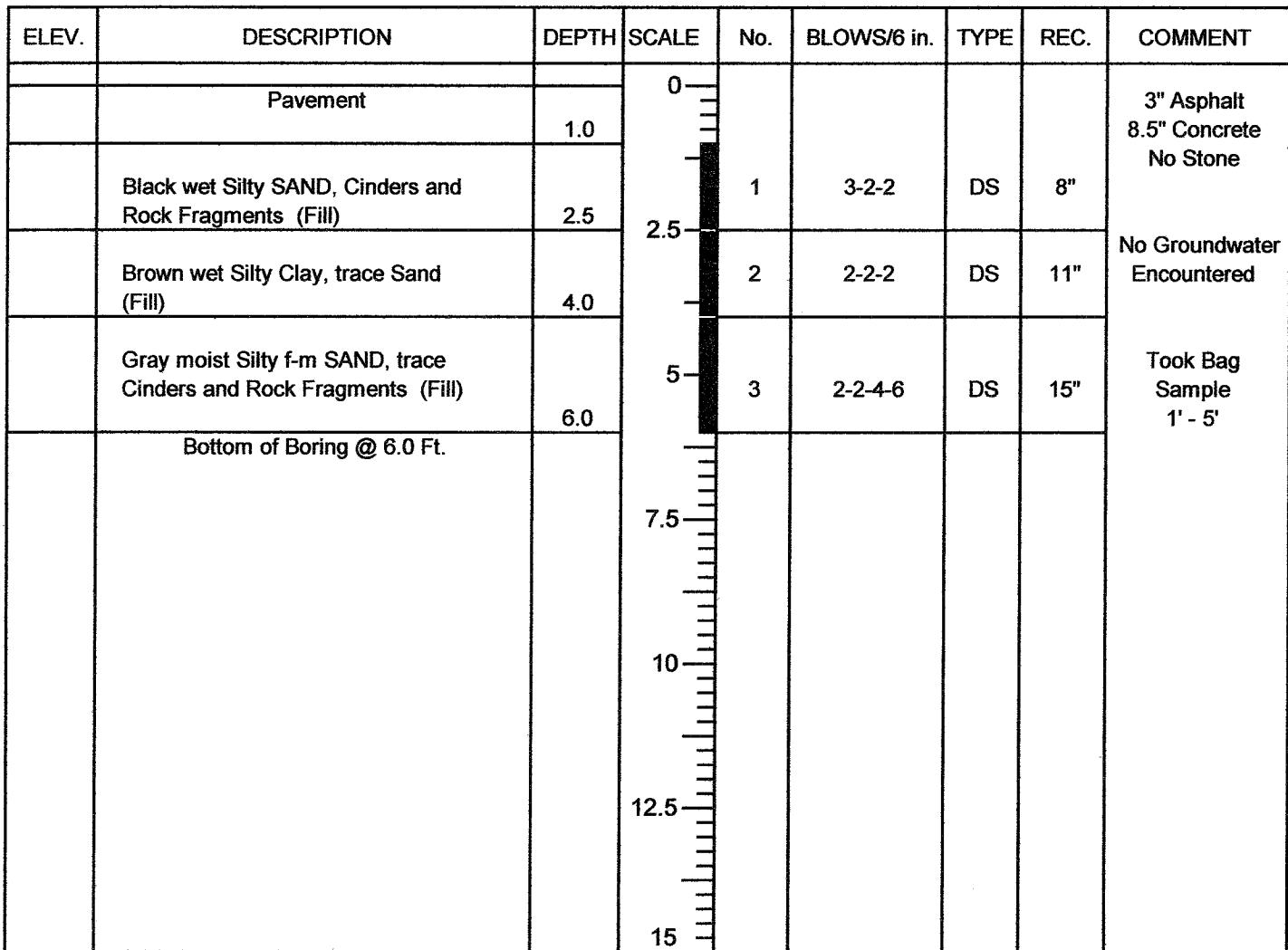
BORING LOGS



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway	BORING No.	P-1
	Roadway Improvements	PROJECT No.	02-200
LOCATION:	Parkway Northbound - Sta. 5+30, 20' Right		
ELEV.:	DATE START: 5/22/03	FINISH: 5/22/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

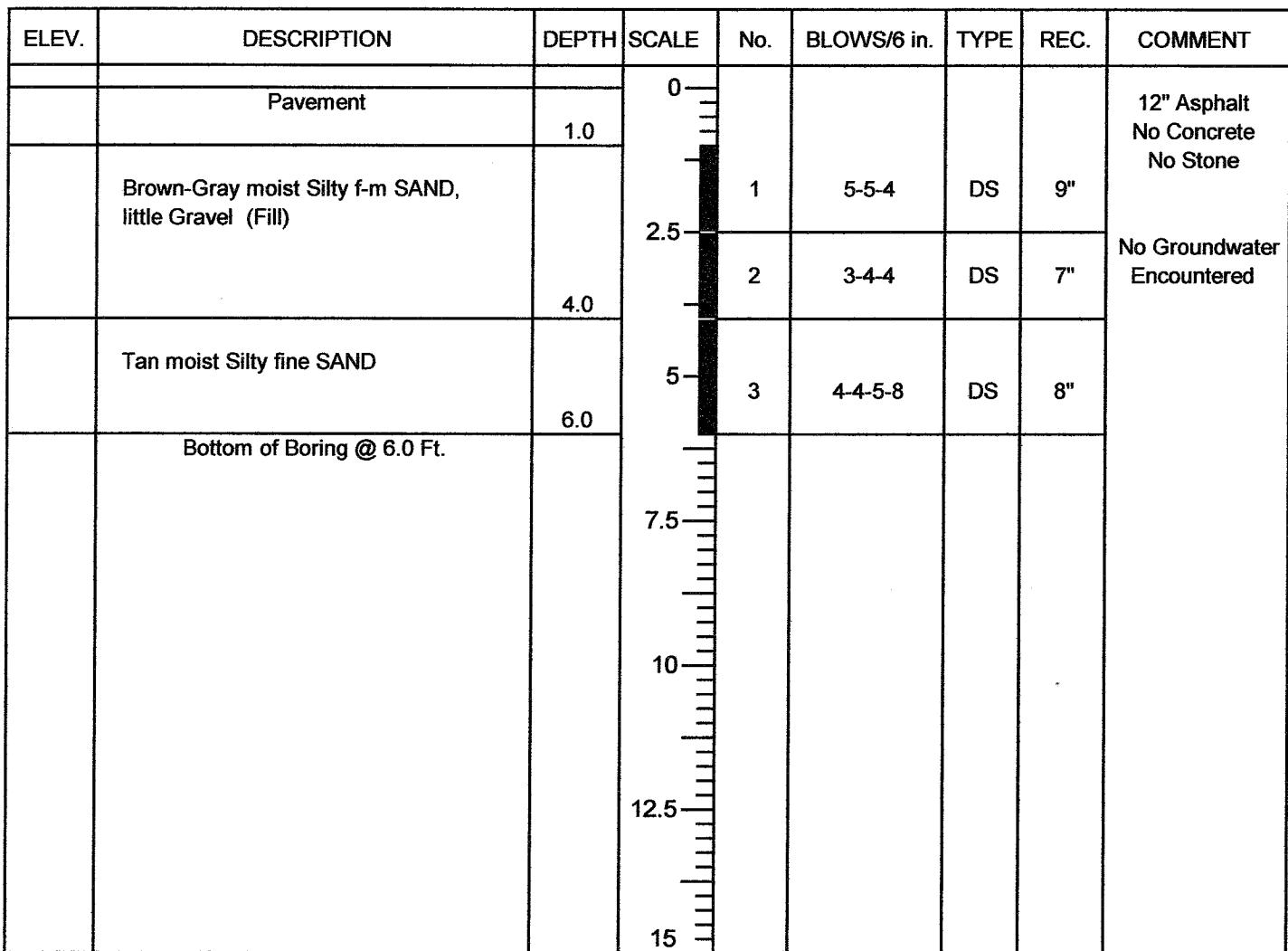
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 4.6 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway			BORING No.	P-2
	Roadway Improvements			PROJECT No.	02-200
LOCATION:	Parkway Northbound - Sta. 11+37, 22' Right				
ELEV.:	DATE START:	5/22/03	FINISH:	5/22/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D.	2.0 IN.	DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA:	NA	HAMMER TYPE:	X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

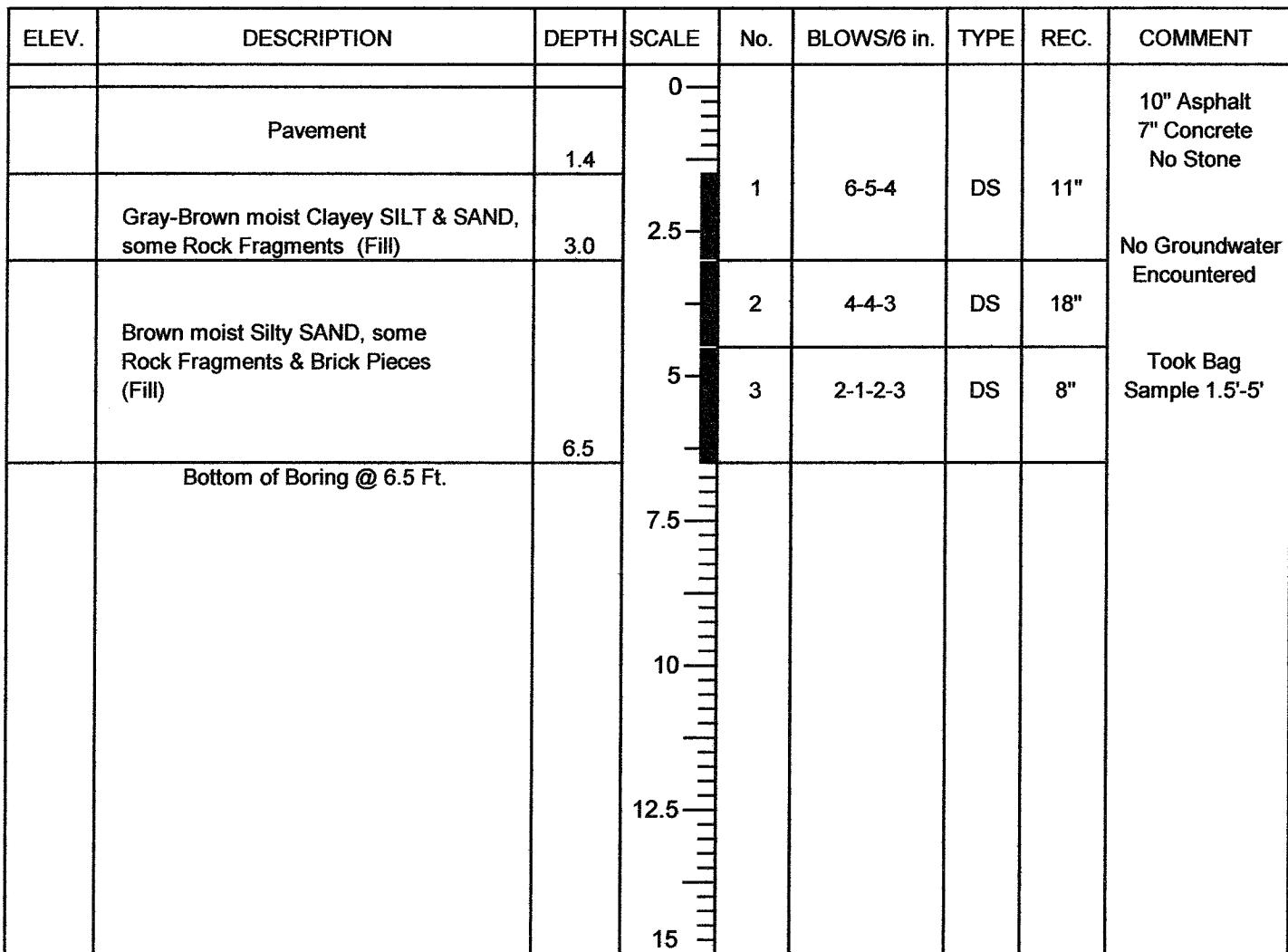
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 6.0 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway			BORING No.	P-3
	Roadway Improvements			PROJECT No.	02-200
LOCATION:	Parkway Northbound - Sta. 20+80, 18' Right				
ELEV.:	DATE START:	5/22/03	FINISH:	5/22/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D.	2.0 IN.	DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA:	NA	HAMMER TYPE:	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

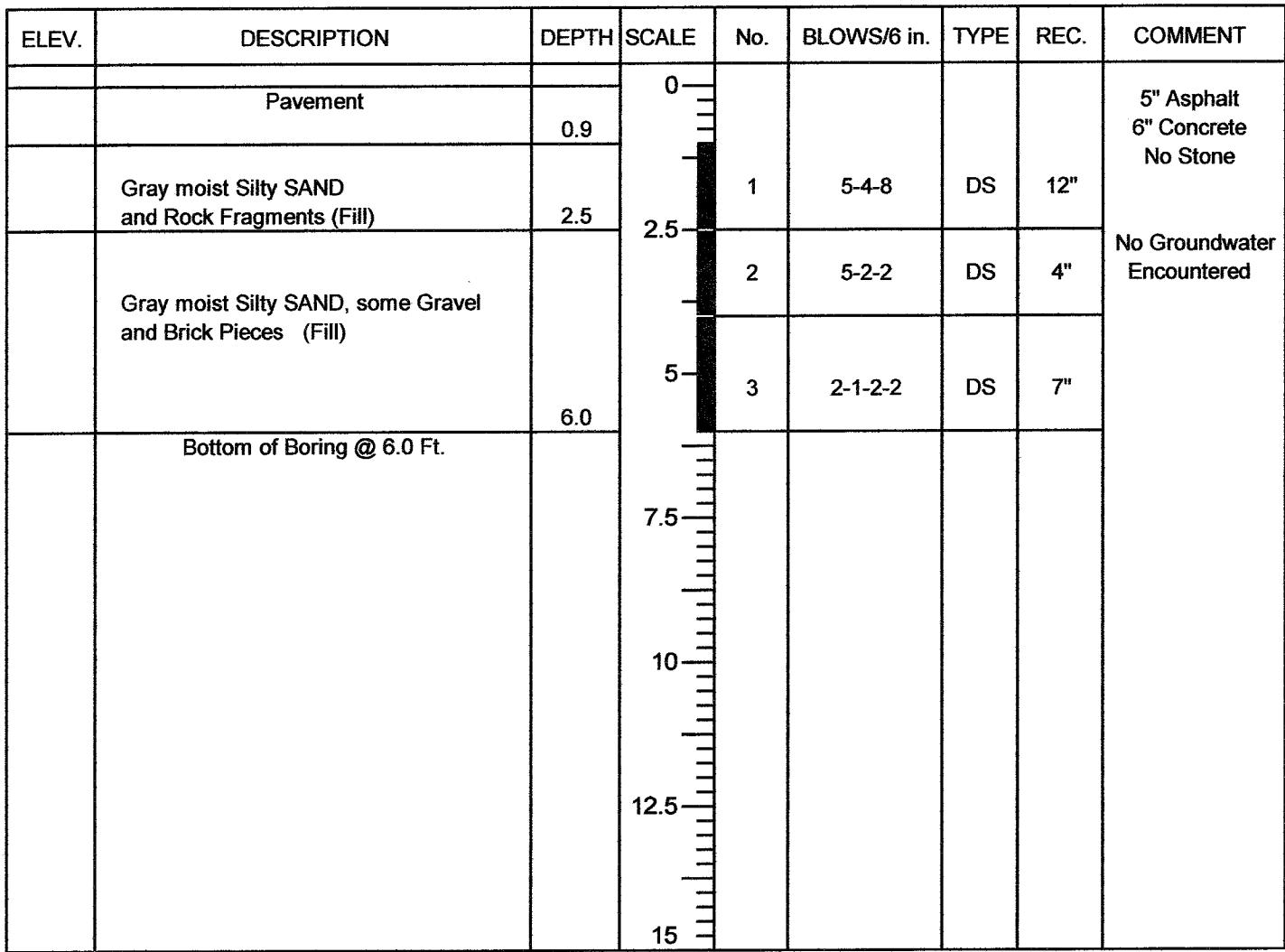
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 4.7 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway	BORING No.	P-4
	Roadway Improvements	PROJECT No.	02-200
LOCATION:	Parkway Northbound - Sta. 24+10, 18' Right		
ELEV.:	DATE START: 5/22/03	FINISH: 5/22/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

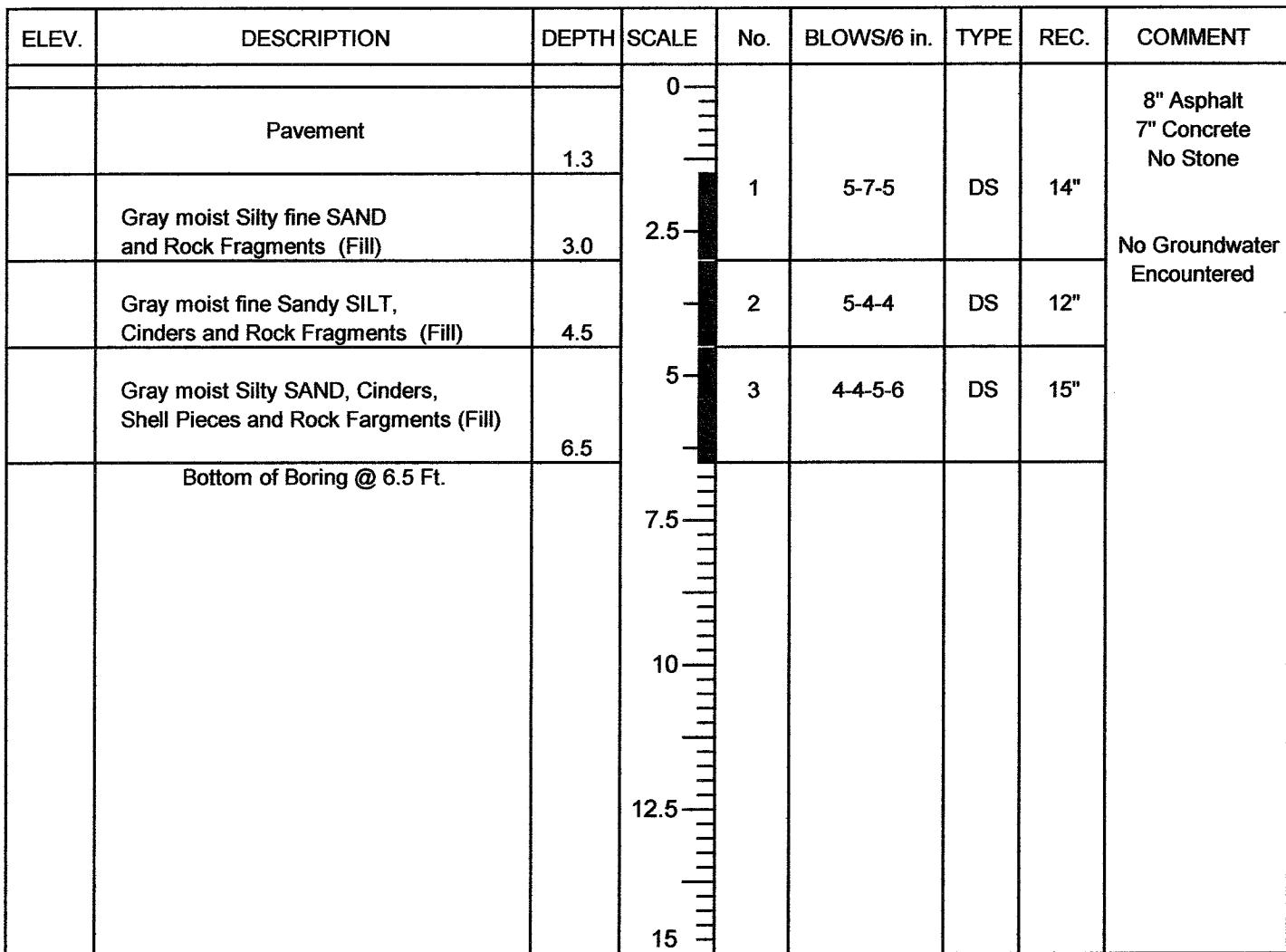
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 5.3 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway	BORING No.	P-5
	Roadway Improvements	PROJECT No.	02-200
LOCATION:	Parkway Northbound - Sta. 30+70, 18' Right		
ELEV.:	DATE START: 5/22/03	FINISH: 5/22/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: <input checked="" type="checkbox"/> Auto <input type="checkbox"/> Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

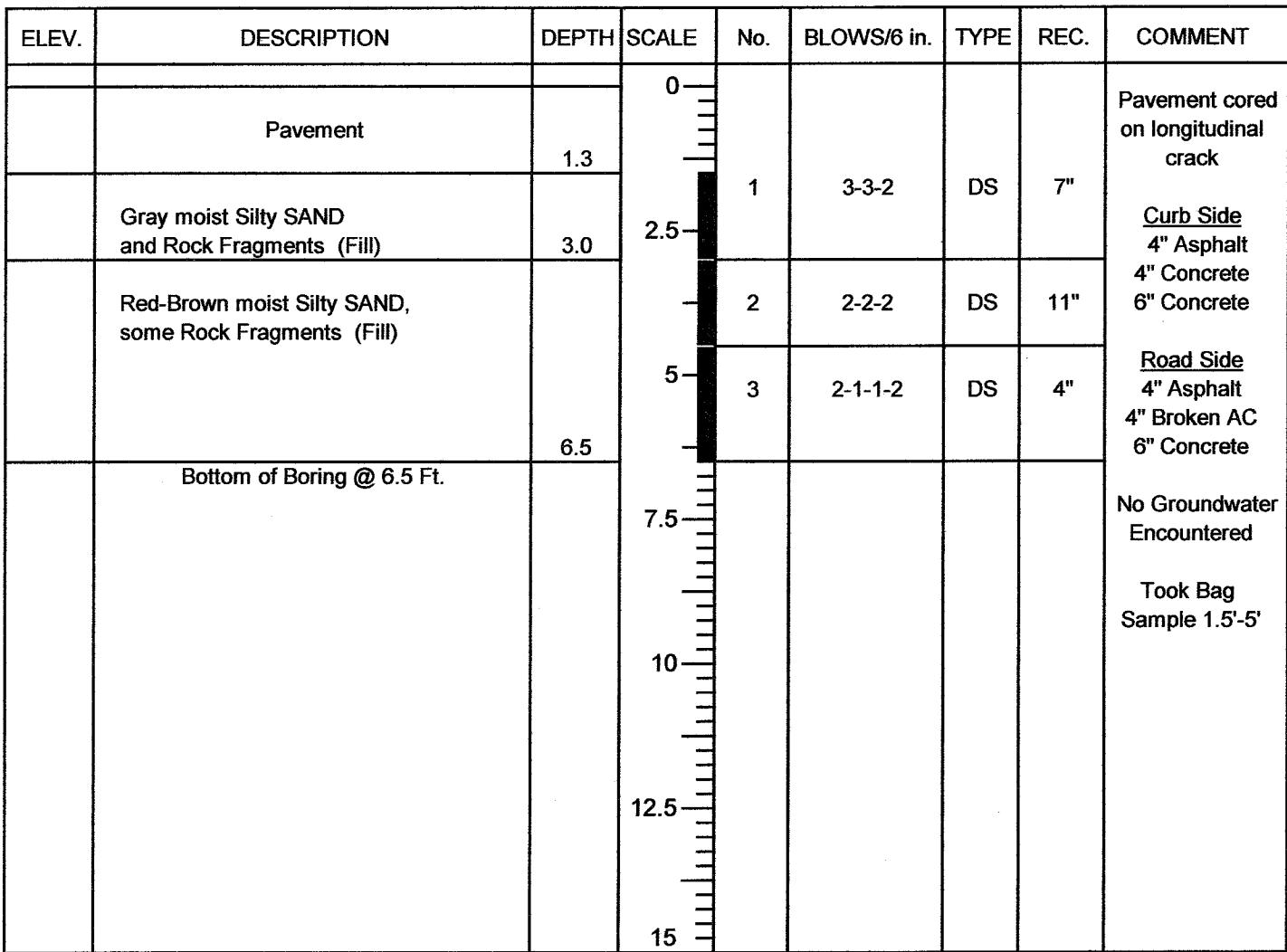
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 6.3 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway Roadway Improvements			BORING No.	P-6	
LOCATION:	Parkway Northbound - Sta. 32+60, 18' Right			PROJECT No.	02-200	
ELEV.:	DATE START:	5/22/03	FINISH:	5/22/03	FOREMAN:	T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D.	2.0 IN.	DRILL RIG:	CME-45
BORING METHOD:	HSA	ROCK CORE DIA:	NA	HAMMER TYPE:	<input checked="" type="checkbox"/> Auto <input type="checkbox"/> Cathead	



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 4.5 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.

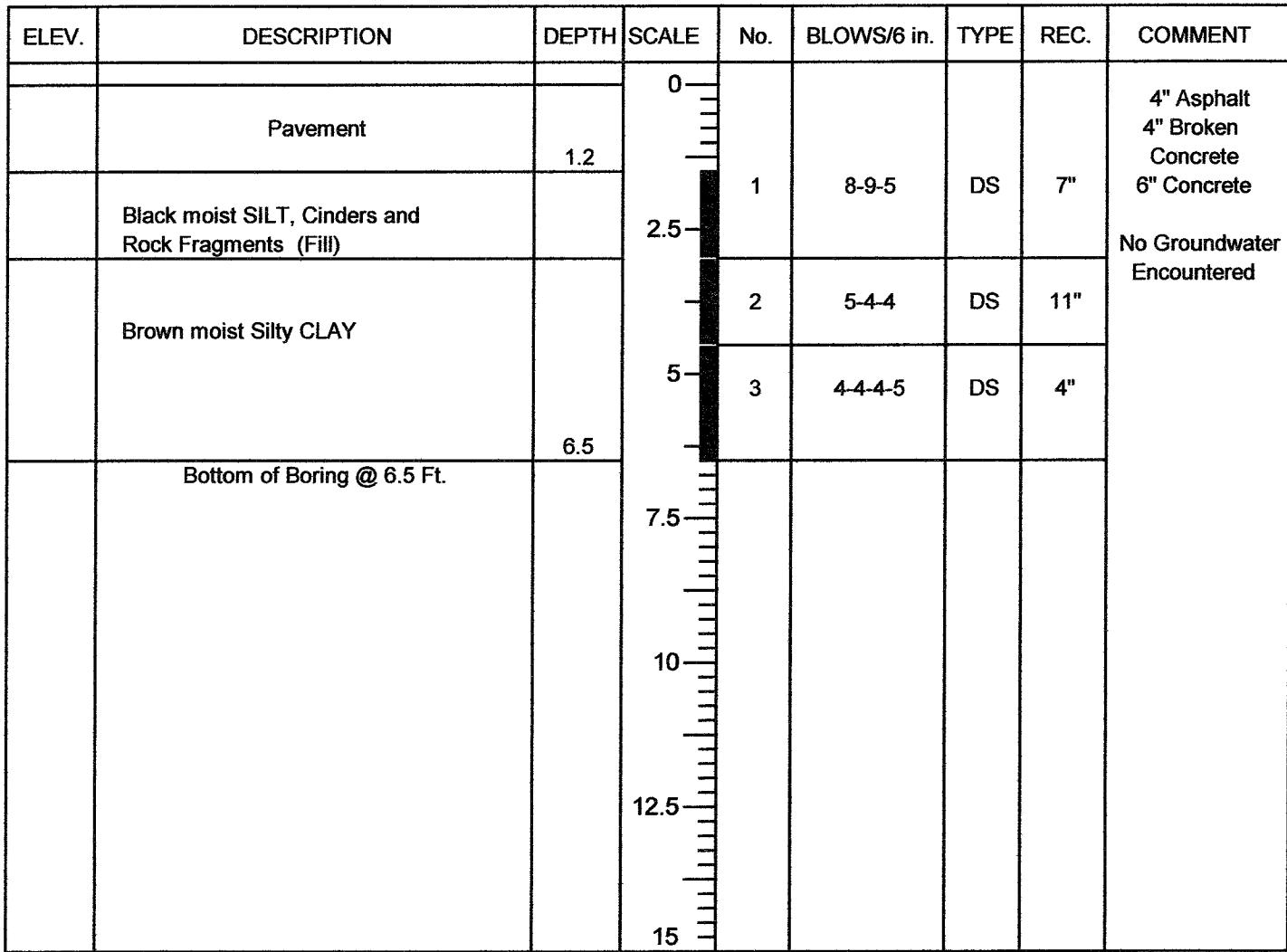


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Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway	BORING No.	P-7
	Roadway Improvements	PROJECT No.	02-200
LOCATION:	Parkway Northbound - Sta. 34+92, 18' Right		
ELEV.:	DATE START: 5/22/03	FINISH: 5/22/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 6.0 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.

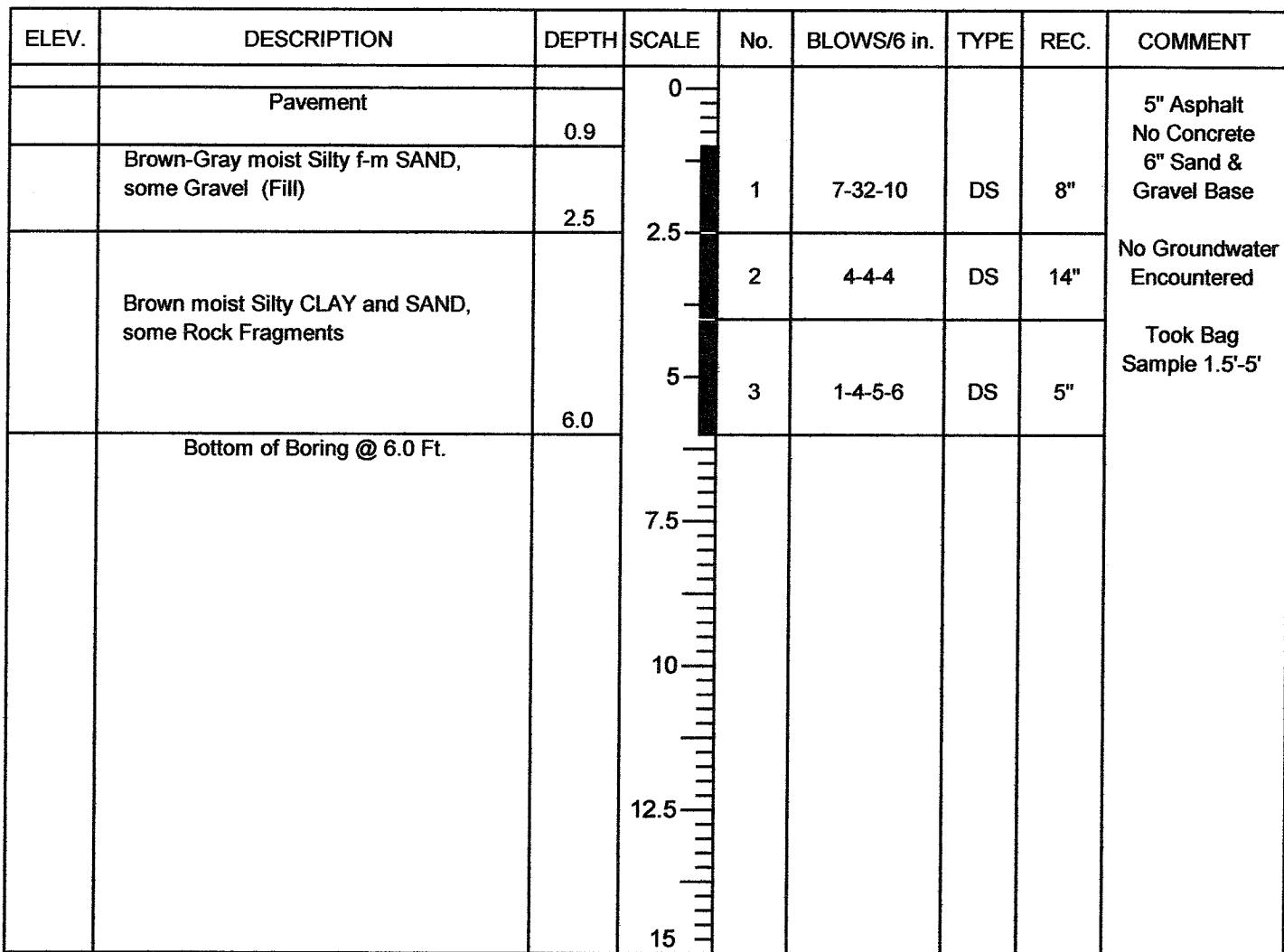


**Earth
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Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway	BORING No.	P-8
	Roadway Improvements	PROJECT No.	02-200
LOCATION:	Parkway Northbound - Sta. 41+98, 20' Right		
ELEV.:	DATE START: 5/22/03	FINISH: 5/22/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

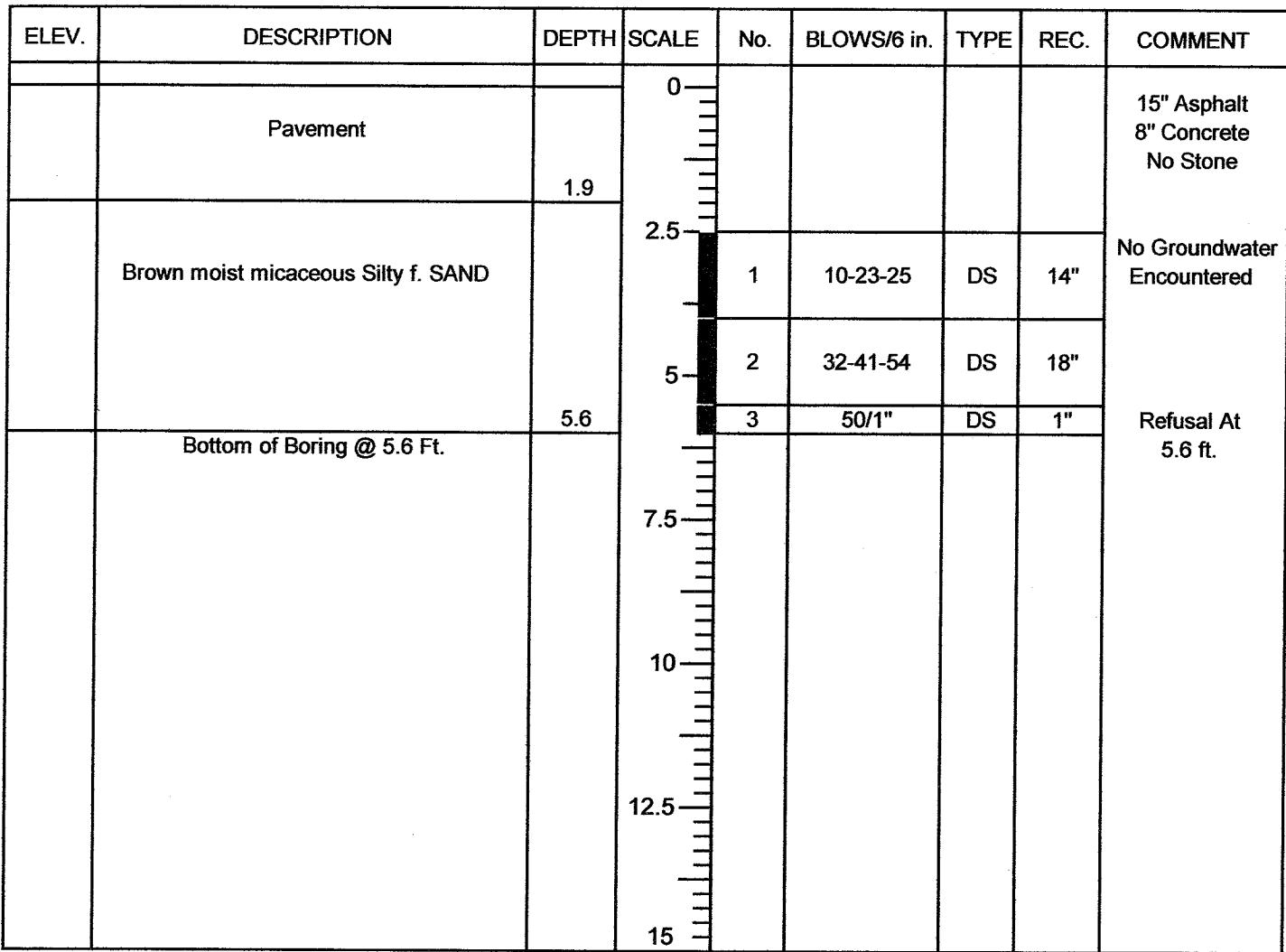
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 4.5 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway Roadway Improvements			BORING No.	P-9	
LOCATION:	Parkway Southbound - Sta. 40+75, 5' Left			PROJECT No.	02-200	
ELEV.:	DATE START:	5/27/03	FINISH:	5/27/03	FOREMAN:	T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D.	2.0 IN.	DRILL RIG:	CME-45
BORING METHOD:	HSA	ROCK CORE DIA:	NA	HAMMER TYPE:	X Auto	Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

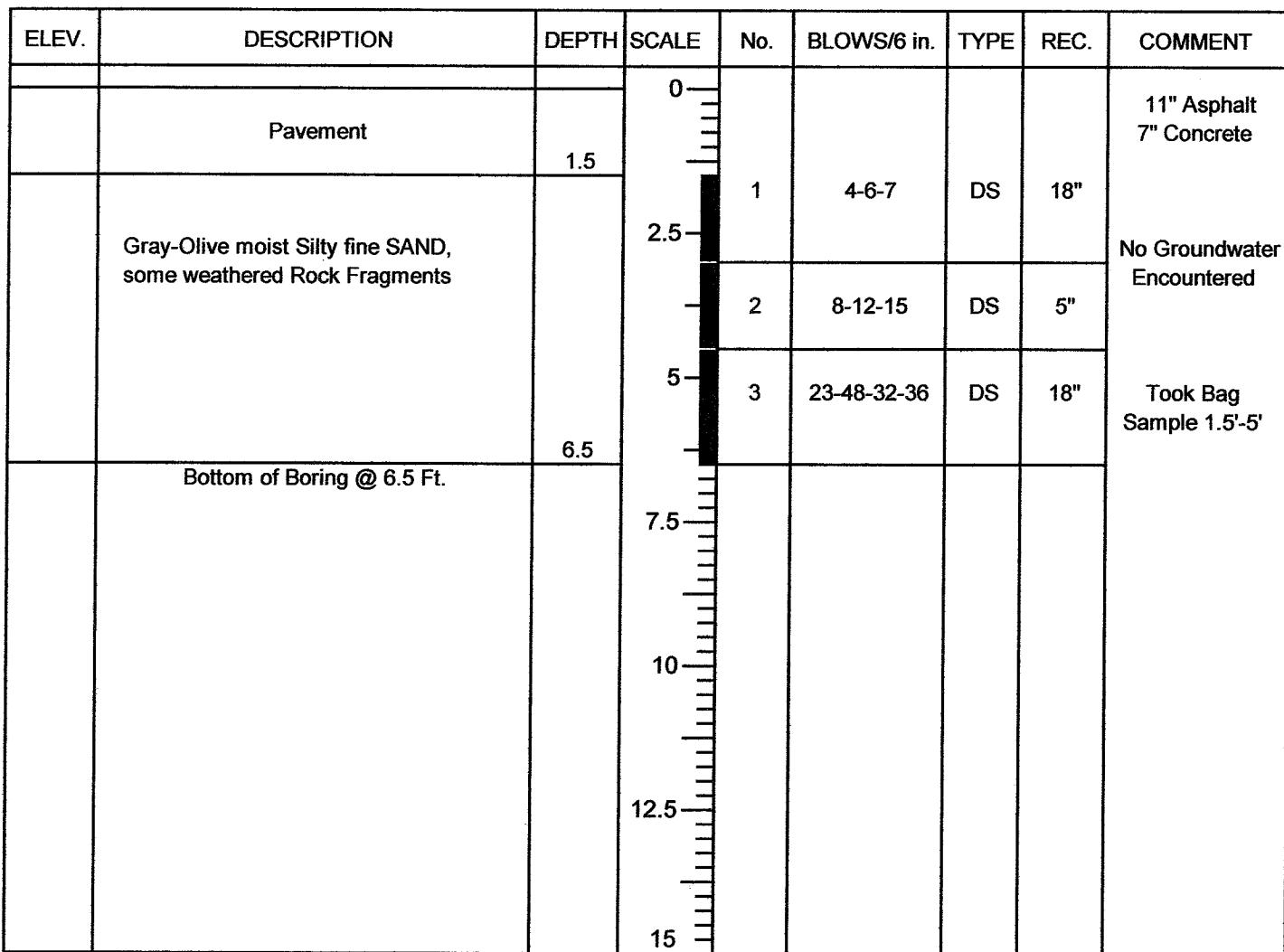
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 5.6 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway	BORING No.	P-10
	Roadway Improvements	PROJECT No.	02-200
LOCATION:	Parkway Southbound - Sta. 34+20, 5' Left		
ELEV.:	DATE START: 5/27/03	FINISH: 5/27/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: X Auto Cathead

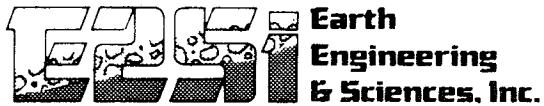


LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

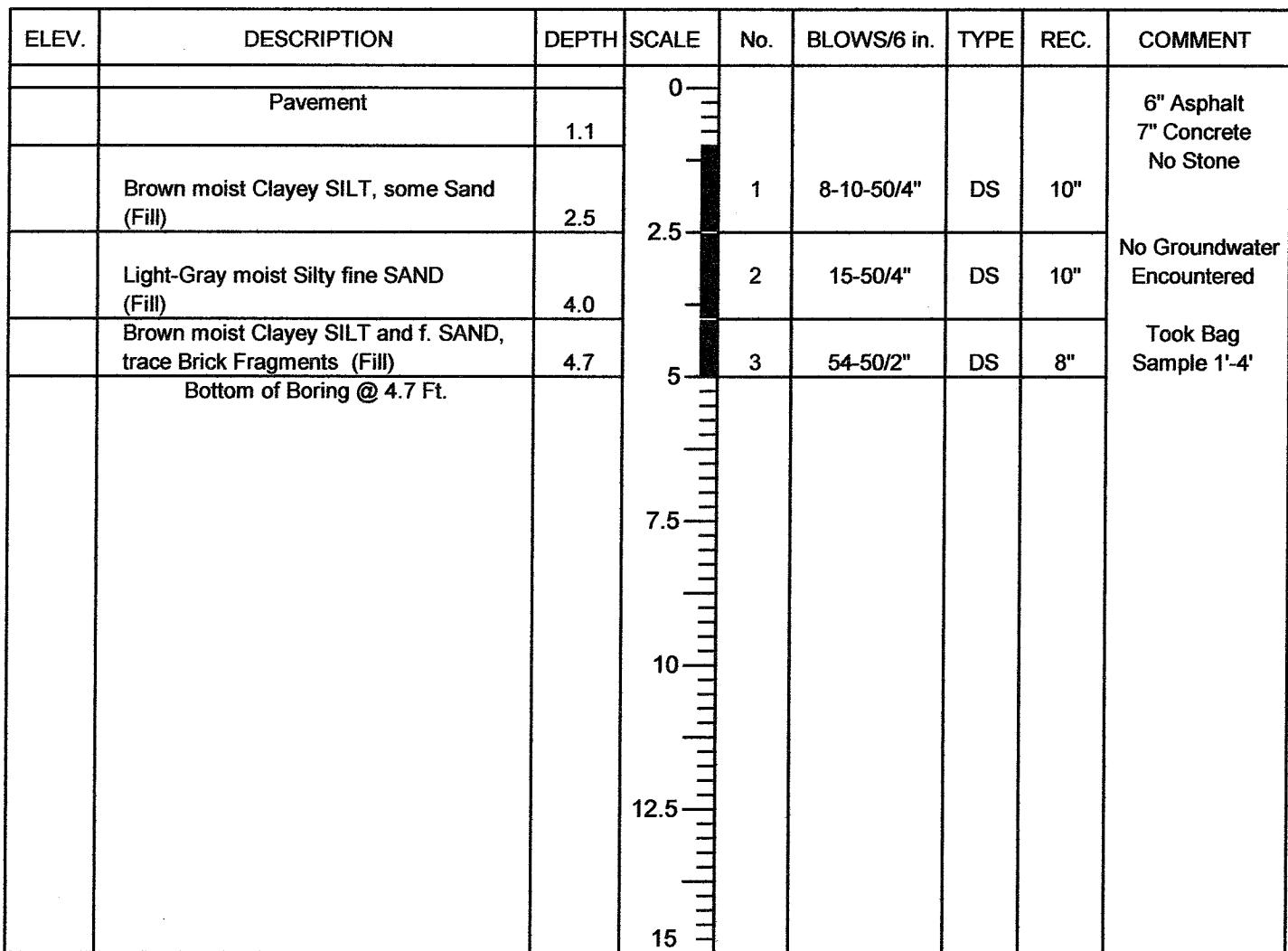
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 4.2 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway Roadway Improvements	BORING No.	P-11
LOCATION:	Parkway Southbound - Sta. 26+56, 5' Left	PROJECT No.	02-200
ELEV.:	DATE START: 5/27/03	FINISH: 5/27/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

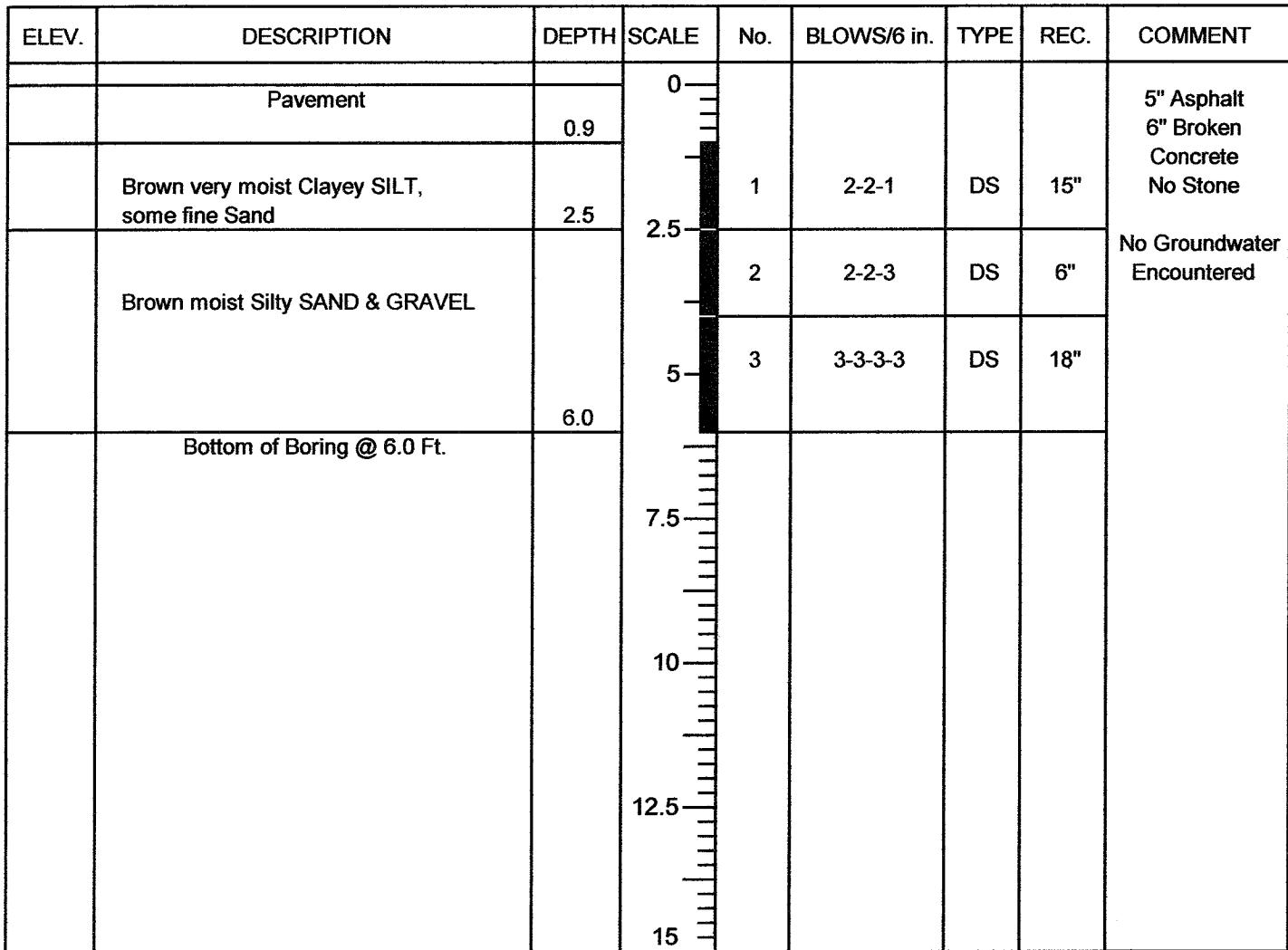
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 3.5 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway	BORING No.	P-12
	Roadway Improvements	PROJECT No.	02-200
LOCATION:	Parkway Southbound - Sta. 19+55, 15' Left		
ELEV.:	DATE START: 5/27/03	FINISH: 5/27/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

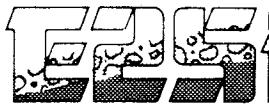
GROUNDWATER

WATER ON RODS: None ft.

AT COMPLETION: Dry ft. CAVED: 6.0 ft.

AT: _____ hours

WATER AT: _____ ft. CAVED: _____ ft.

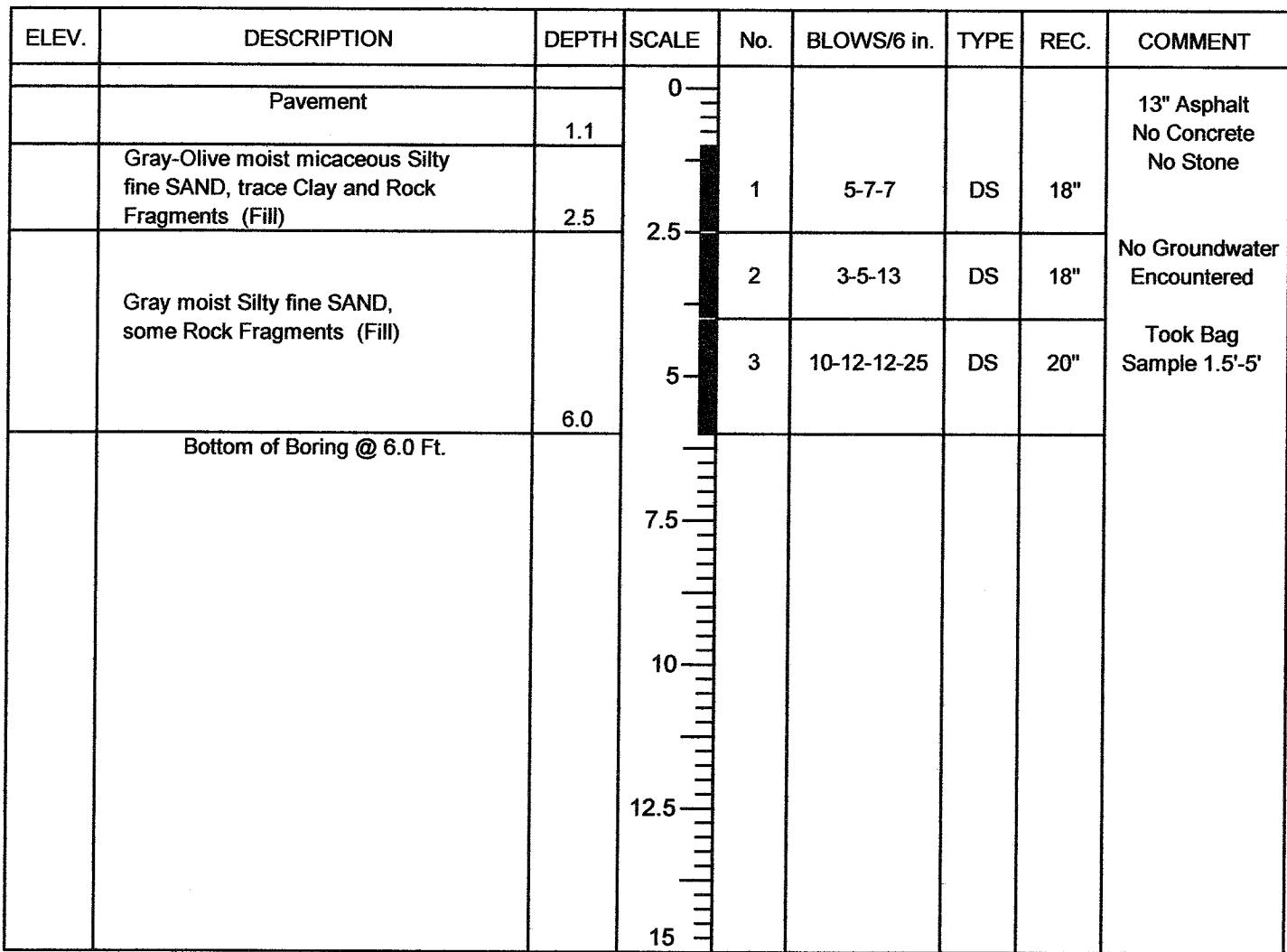


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Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway	BORING No.	P-13
	Roadway Improvements	PROJECT No.	02-200
LOCATION:	Parkway Southbound - Sta. 13+15, 23' Left		
ELEV.:	DATE START: 5/27/03	FINISH: 5/27/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

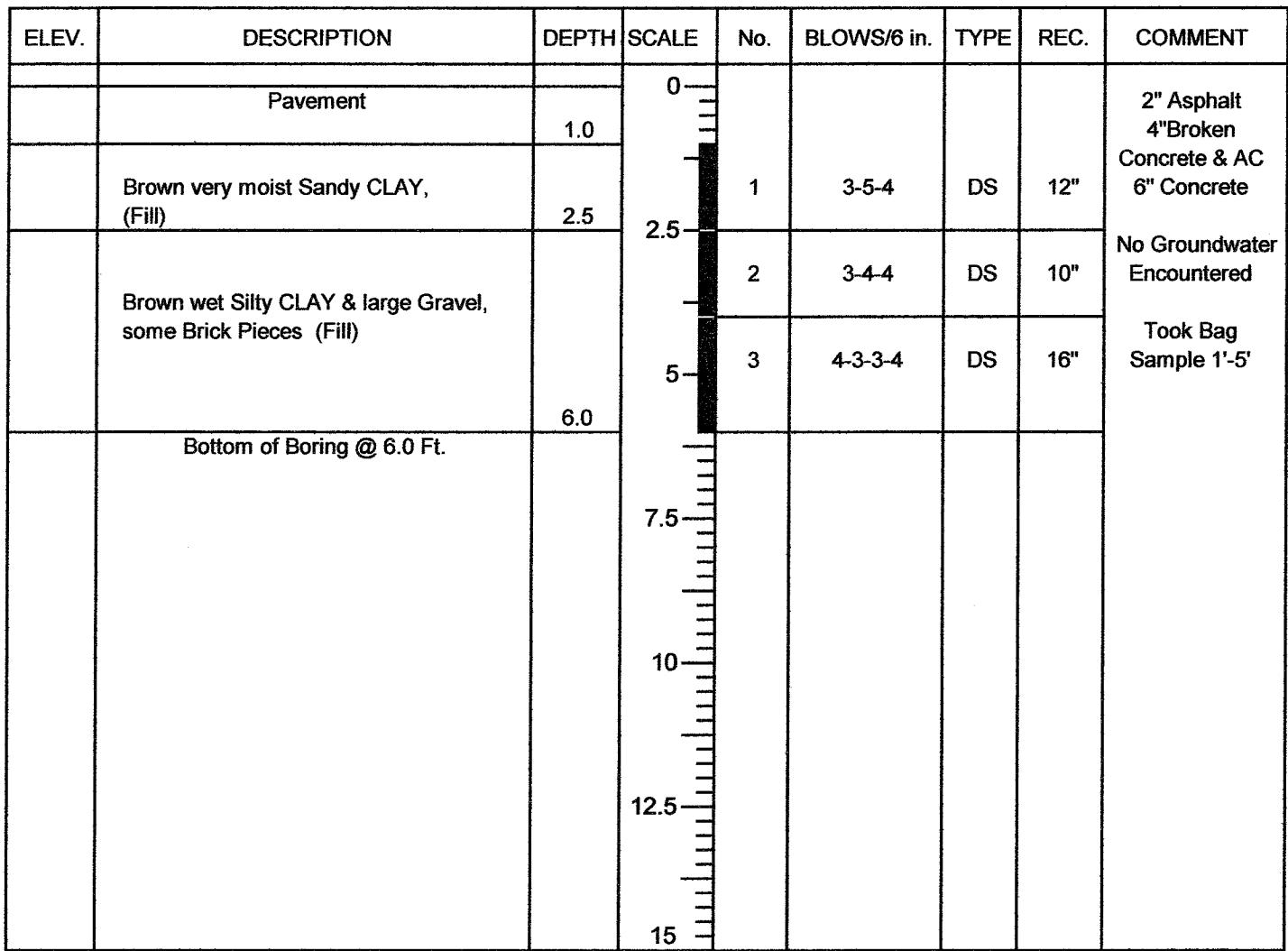
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 4.0 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway			BORING No.	P-14
	Roadway Improvements			PROJECT No.	02-200
LOCATION:	Parkway Southbound - Sta. 6+85, 20' Left				
ELEV.:	DATE START:	5/28/03	FINISH:	5/28/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D.	2.0 IN.	DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA:	NA	HAMMER TYPE:	X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

WATER ON RODS: None ft.

AT COMPLETION: Dry ft. CAVED: 3.4 ft.

AT: _____ hours

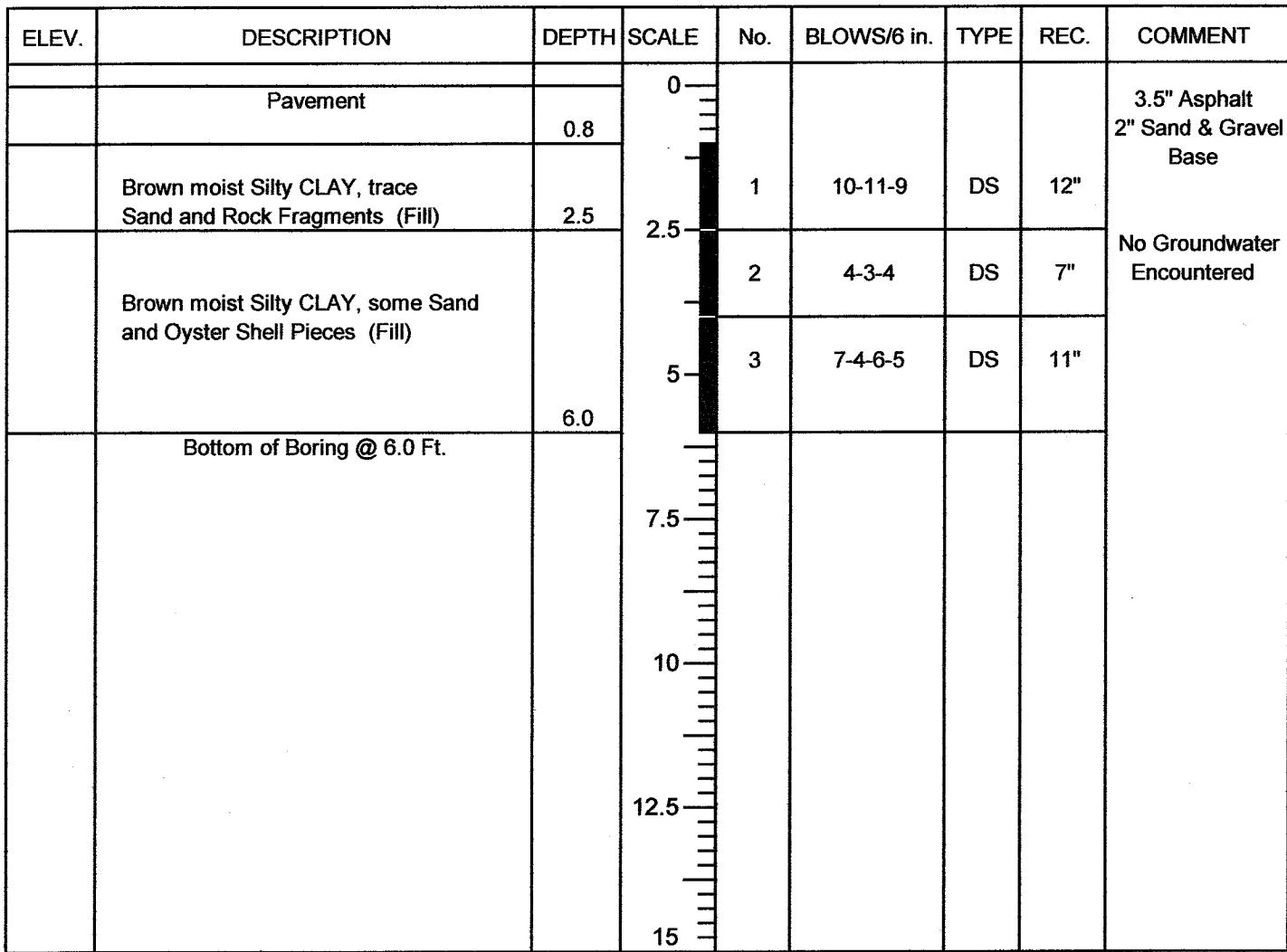
WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway Roadway Improvements	BORING No.	P-15
LOCATION:	Boat House Parking Lot, Sta. 0+32, 31' Right	PROJECT No.	02-200
ELEV.:	DATE START: 5/20/03 FINISH: 5/20/03	FOREMAN:	T. Oleszczuk
HAMMER:	140 Lbs. HAMMER DROP: 30 IN.	SPOON O.D.	2.0 IN.
BORING METHOD:	HSA ROCK CORE DIA: NA	DRILL RIG:	CME-45
	HAMMER TYPE: X Auto		Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

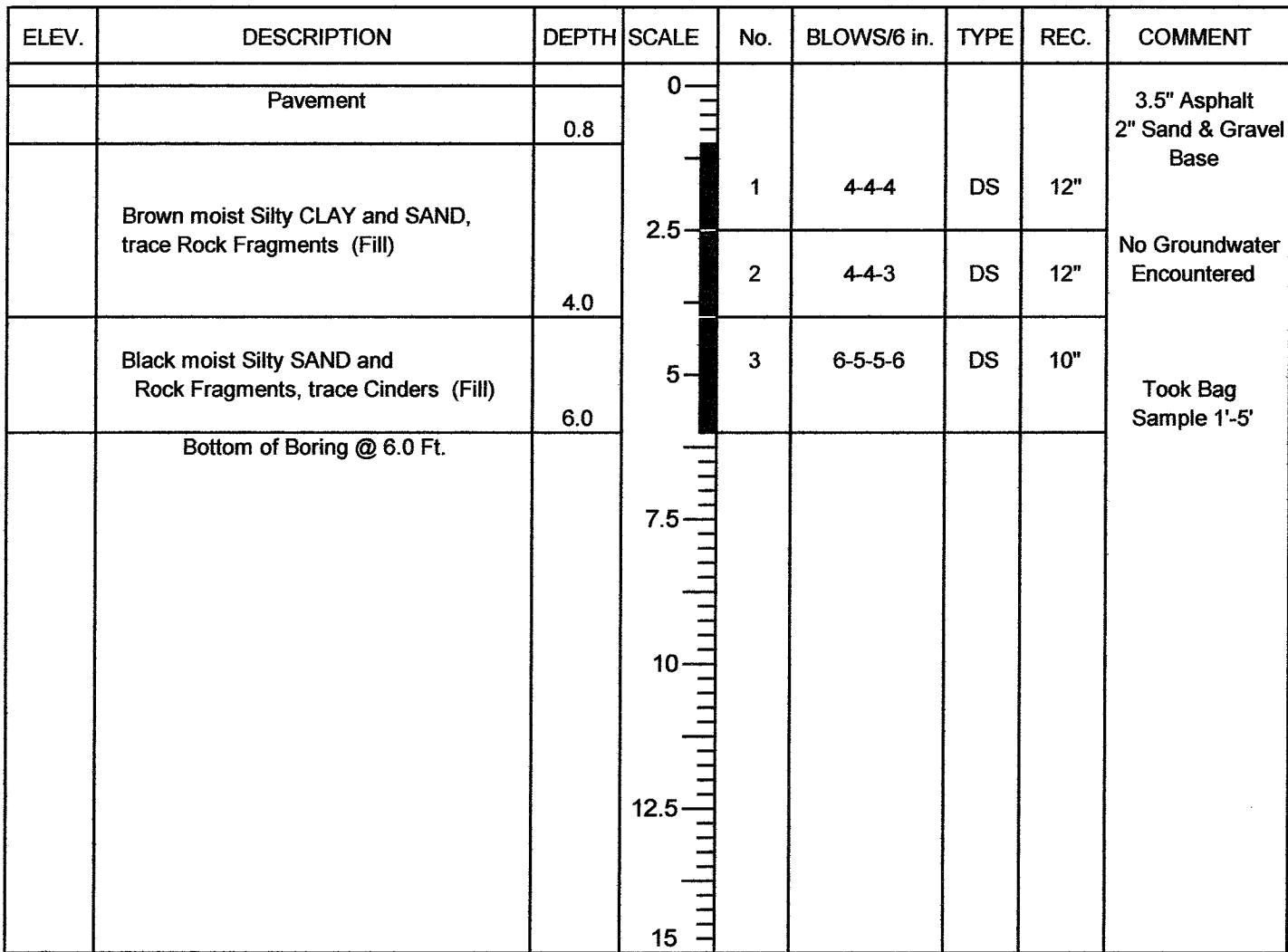
- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 6.0 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway			BORING No.	P-16
	Roadway Improvements			PROJECT No.	02-200
LOCATION:	Boat House Parking Lot, Sta. 1+73, 30' Left				
ELEV.:	DATE START:	5/20/03	FINISH:	5/20/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D.	2.0 IN.	DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA:	NA	HAMMER TYPE:	X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

WATER ON RODS: None ft.

AT COMPLETION: Dry ft. CAVED: 5.0 ft.

AT: _____ hours

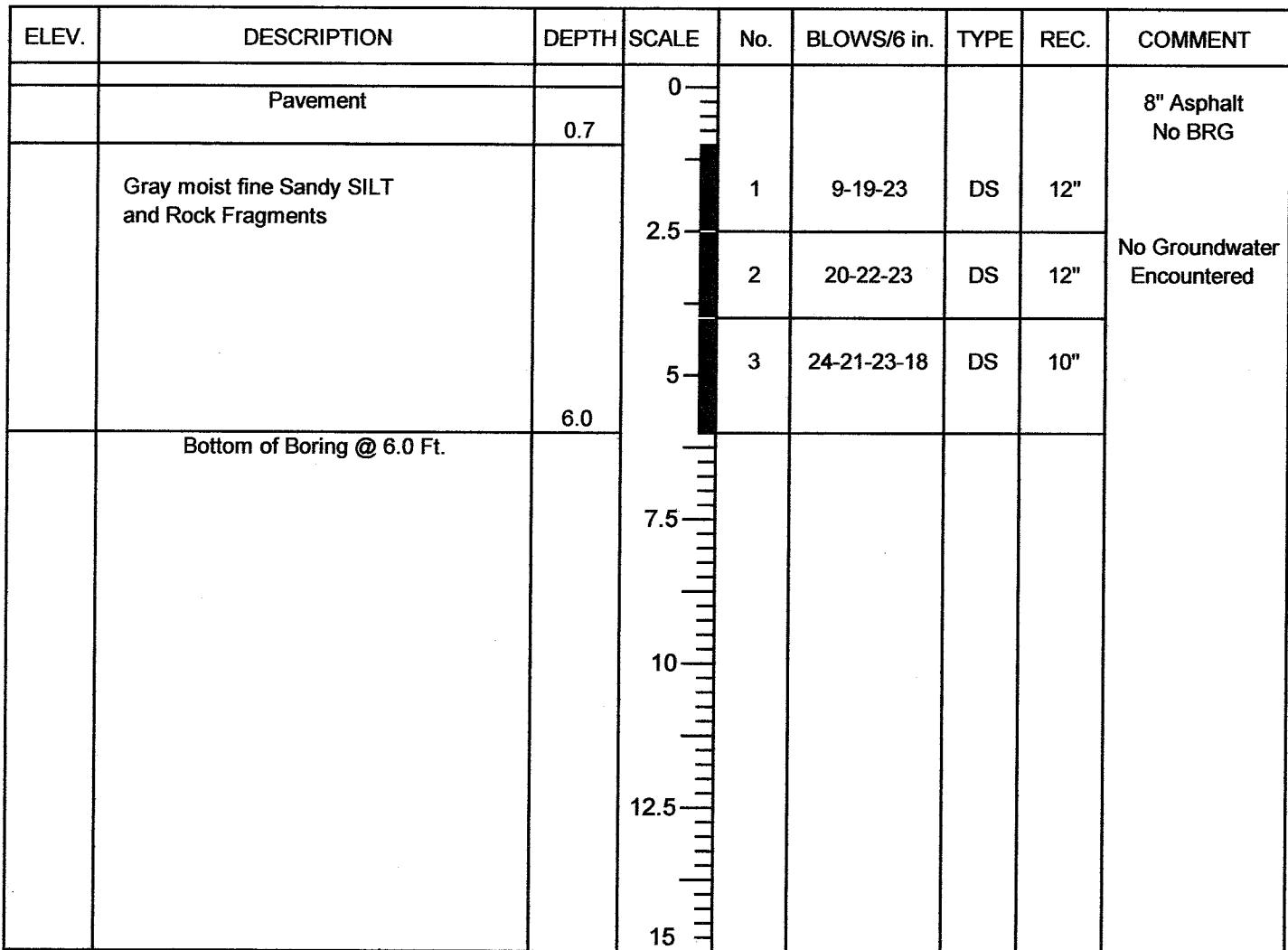
WATER AT: _____ ft. CAVED: _____ ft.



Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway			BORING No.	P-17
	Roadway Improvements			PROJECT No.	02-200
LOCATION:	Boat House Access Road, Sta. 4+50, 25' Left				
ELEV.:	DATE START:	5/20/03	FINISH:	5/20/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D.	2.0 IN.	DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA:	NA	HAMMER TYPE: <input checked="" type="checkbox"/> Auto	<input type="checkbox"/> Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 6.0 ft.
- AT: hours
- WATER AT: ft. CAVED: ft.

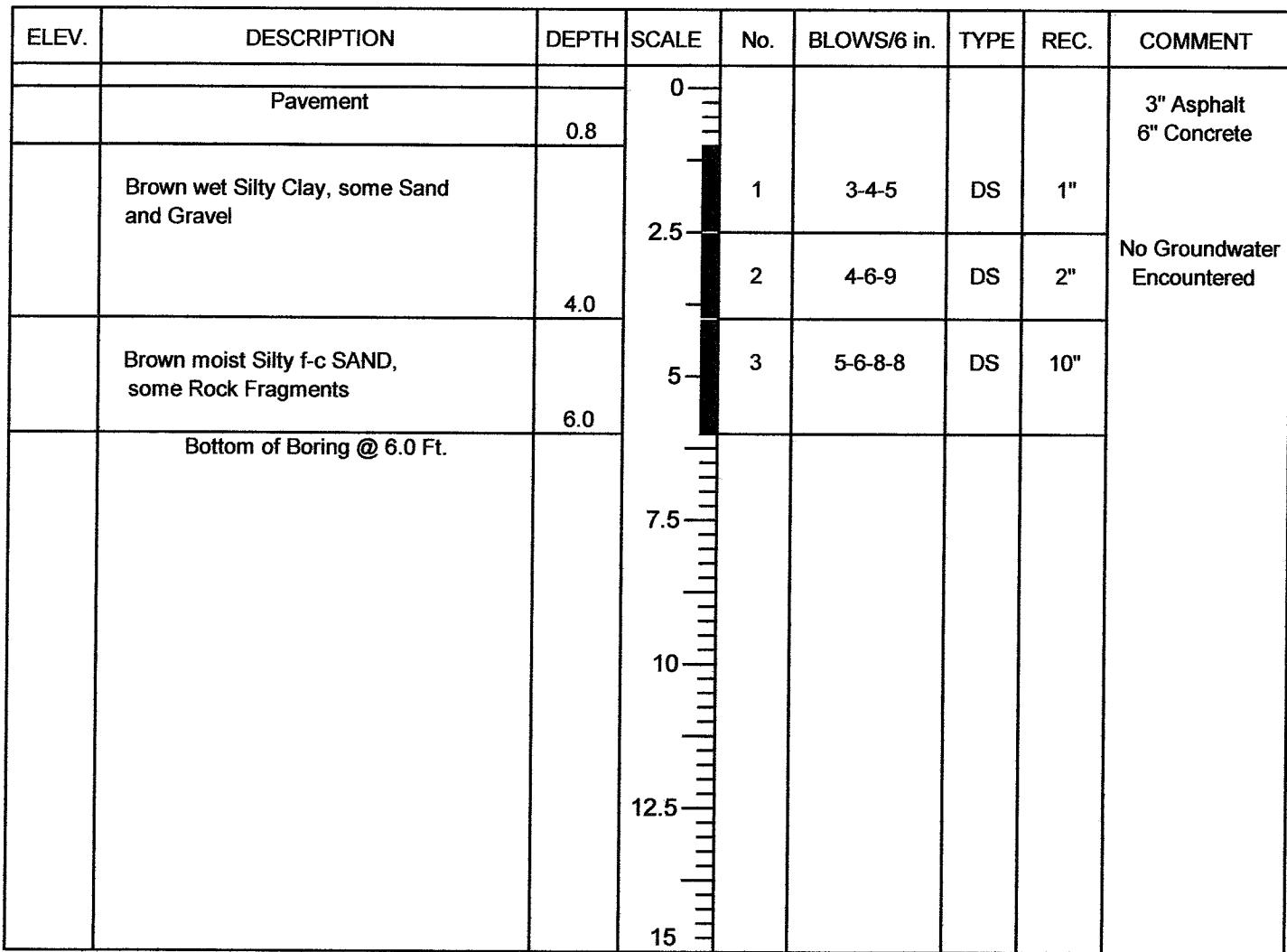


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Boring Log

Page 1 of 1

PROJECT:	Rock Creek and Potomac Parkway	BORING No.	P-18
	Roadway Improvements	PROJECT No.	02-200
LOCATION:	P Street On-Ramp, Sta. 4+30, 13' Left		
ELEV.:	DATE START: 5/22/03	FINISH: 5/22/03	FOREMAN: T. Oleszczuk
HAMMER:	140 Lbs.	HAMMER DROP: 30 IN.	SPOON O.D. 2.0 IN. DRILL RIG: CME-45
BORING METHOD:	HSA	ROCK CORE DIA: NA	HAMMER TYPE: X Auto Cathead



LEGEND

- DS DRIVEN SPOON
- ST SHELBY TUBE
- PS PISTON SAMPLE
- RC ROCK CORE
- HSA HOLLOW STEM AUGERS
- DC DRIVEN CASING
- MD MUD DRILLING
- WOH WEIGHT-OF-HAMMER

GROUNDWATER

- WATER ON RODS: None ft.
- AT COMPLETION: Dry ft. CAVED: 6.0 ft.
- AT: _____ hours
- WATER AT: _____ ft. CAVED: _____ ft.

APPENDIX C

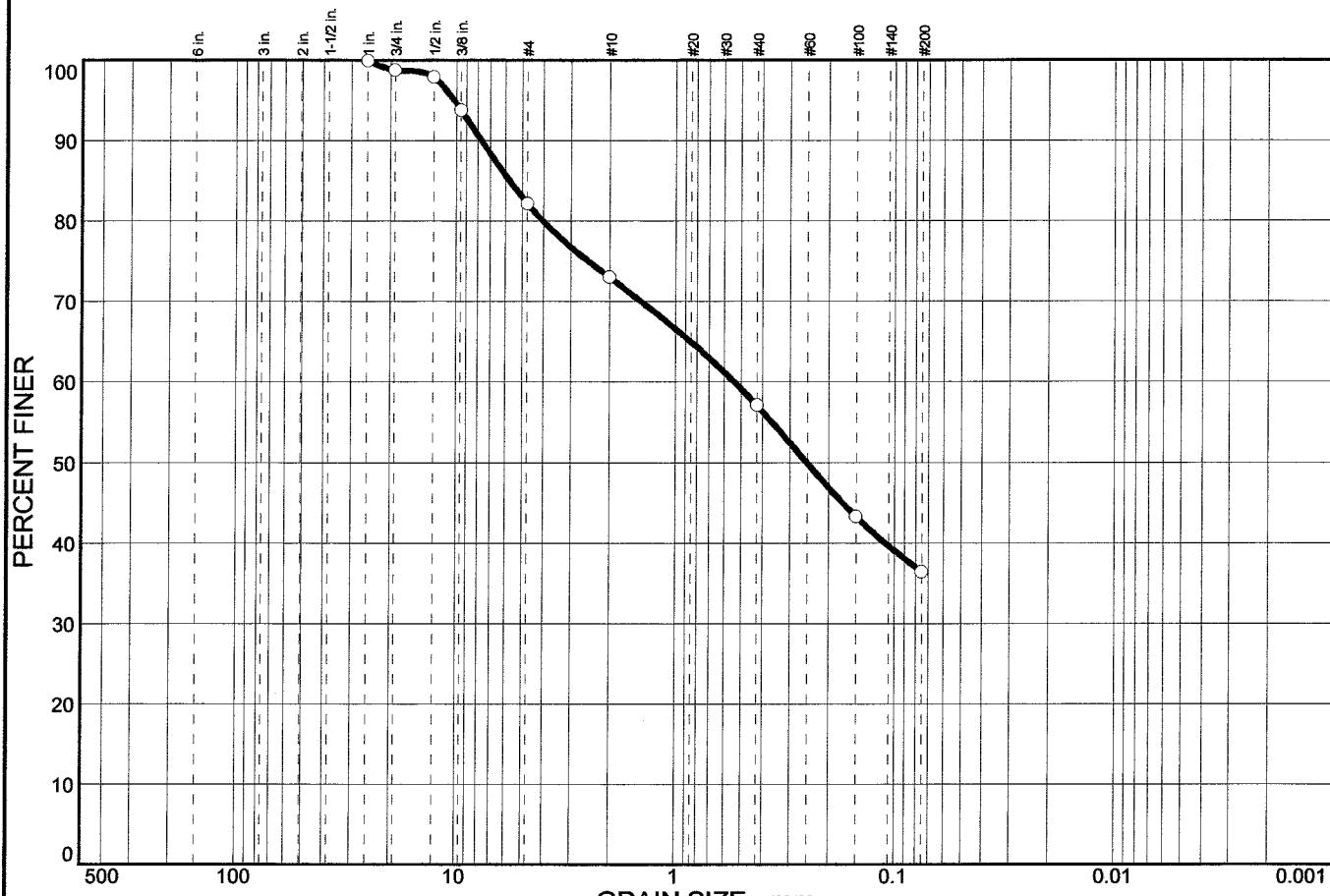
LABORATORY TESTING



ROCK CREEK AND POTOMAC PARKWAY
ROADWAY IMPROVEMENTS
LABORATORY TEST SUMMARY

<u>Boring#</u>	<u>Sample#</u>	<u>Depth (ft.)</u>	<u>Moisture Content (%)</u>	<u>Percent</u>		<u>Liquid Limit</u>	<u>Plasticity Index</u>	<u>Soil Classification</u>	<u>CBR</u>
				<u>Fines</u>	<u>< #200 Sieve</u>				
P-1	S-1	1-2.5	19.0						
	S-2	2.5-4	22.5						
P-2	S-1	1-2.5	10.0						
	S-2	2.5-4	23.2						
P-3	S-1	1.5-3	17.8						
	S-2	3-4.5	18.0						
	Bag	1.5-5	19.1	36.4		26	3	SM (A-4)	10
P-4	S-1	1-2.5	23.3						
	S-2	2.5-4	13.2						
P-5	S-1	1.5-3	22.9						
	S-2	3-4.5	16.7						
P-6	S-1	1.5-3	10.5						
	S-2	3-4.5	33.6						
P-7	S-1	1.5-3	13.1						
	S-2	3-4.5	15.3						
P-8	S-1	1-2.5	12.0						
	S-2	2.5-4	12.4						
	Bag	1.5-5	9.7	35.4		NP	NP	SM (A-2-4)	8
P-9	S-1	2.5-4	8.9						
	S-2	4-5.5	8.6						
P-10	S-1	1.5-3	5.6						
	S-2	3-4.5	3.5						
P-11	S-1	1-2.5	18.9						
	S-2	2.5-4	6.9						
	Bag	1-4	6.6	31.4		25	4	SM-SC (A-2-4)	11
P-12	S-1	1-2.5	19.9						
	S-2	2.5-4	11.0						
P-13	S-1	1-2.5	10.5						
	S-2	2.5-4	14.7						
P-14	S-1	1-2.5	17.1						
	S-2	2.5-4	15.9						
	Bag	1-5	21.8	59.5		30	11	CL (A-6)	4
P-15	S-1	1-2.5	14.7						
	S-2	2.5-4	16.1						
P-16	S-1	1-2.5	17.7						
	S-2	2.5-4	14.9						
	Bag	1-5	12.5	52.7		28	11	CL (A-6)	6
P-17	S-1	1-2.5	6.1						
	S-2	2.5-4	9.6						
P-18	S-1	1-2.5	28.5						
	S-2	2.5-4	22.5						

Particle Size Distribution Report



SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	98.8		
.5 in.	97.9		
.375 in.	93.8		
#4	82.2		
#10	73.0		
#40	57.1		
#100	43.3		
#200	36.4		

<u>Soil Description</u>		
Gray-Brown Silty SAND, little Rock Fragments		
Atterberg Limits	PL= 23	LL= 26
		PI= 3
Coefficients	D ₈₅ = 5.71	D ₆₀ = 0.538
	D ₃₀ =	D ₁₅ =
	C _u =	C _c =
Classification	USCS= SM	AASHTO= A-4
<u>Remarks</u>		

* (no specification provided)

Sample No.: Bag Sample
Location:

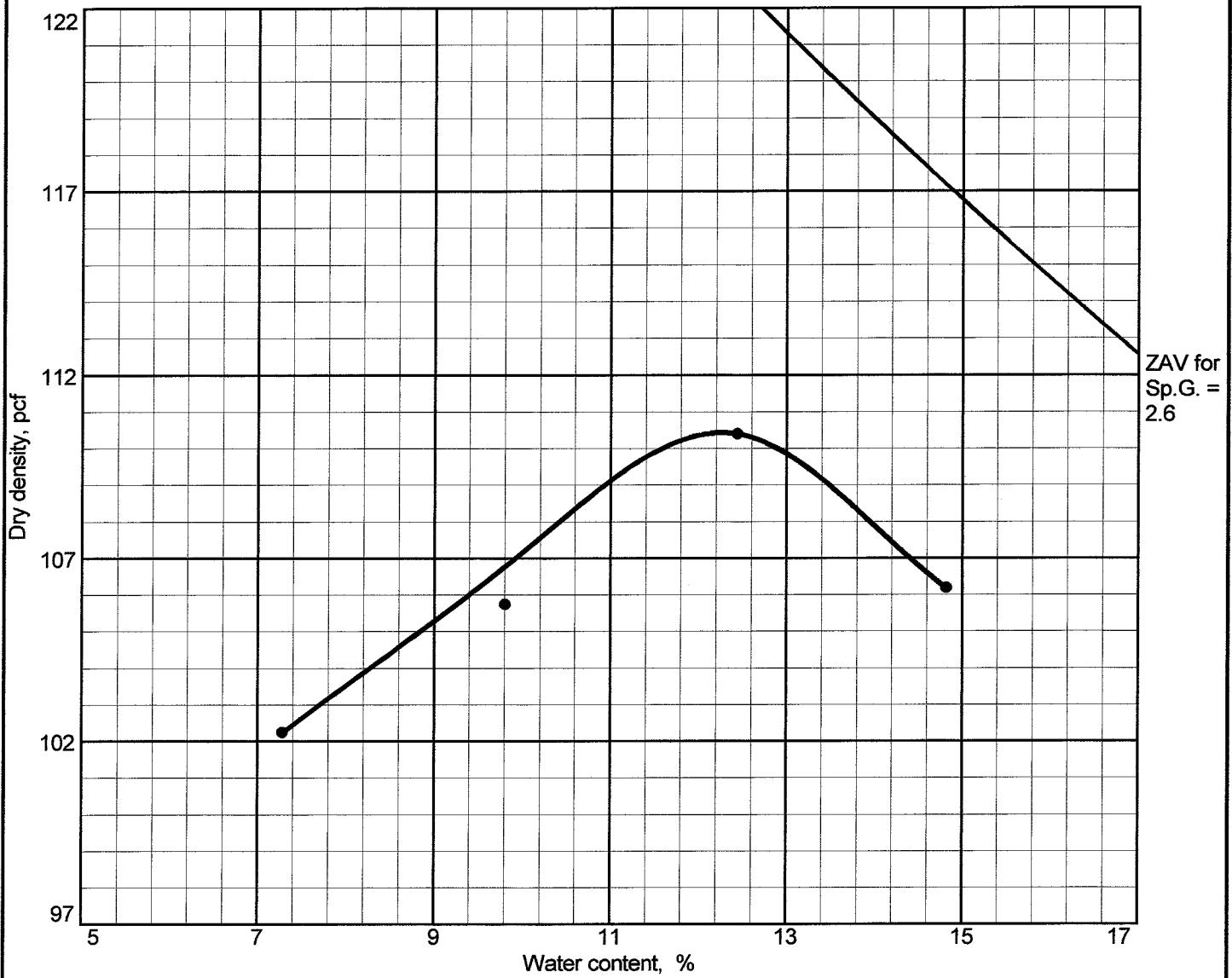
Source of Sample: Boring P-3

Date: 6/5/03
Elev./Depth: 1.5' - 5.0'

E2SI

Client: Phoenix Engineering
Project: Rock Creek & Potomac Parkway
Roadway Improvement Project
Project No: 02-200

Figure



Test specification: AASHTO T 180 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
1.5' - 5.0'	SM	A-4	19.1%		26	3	17.8	36.4

TEST RESULTS				MATERIAL DESCRIPTION
Maximum dry density = 110.4 pcf				Gray-Brown Silty SAND, little Rock Fragments
Optimum moisture = 12.3 %				
Project No. 02-200 Client: Phoenix Engineering Project: Rock Creek & Potomac Parkway Roadway Improvement Project ● Source: Boring P-3 Sample No.: Bag Elev./Depth: 1.5' - 5.0'				Remarks:
COMPACTION TEST REPORT				
EARTH ENGINEERING & SCIENCES, INC.				Figure

Project Rock Creek and Potomac Parkway

Contract No. 02-200

Location Boring P-3 (1.5'-5' depth)

Date Sampled 5/22/03

Sample Location Parkway Northbound = Sta. 20+80, 18' Right

Sample Description Gray-Brown Silty SAND, little Gravel (SM/A-4)

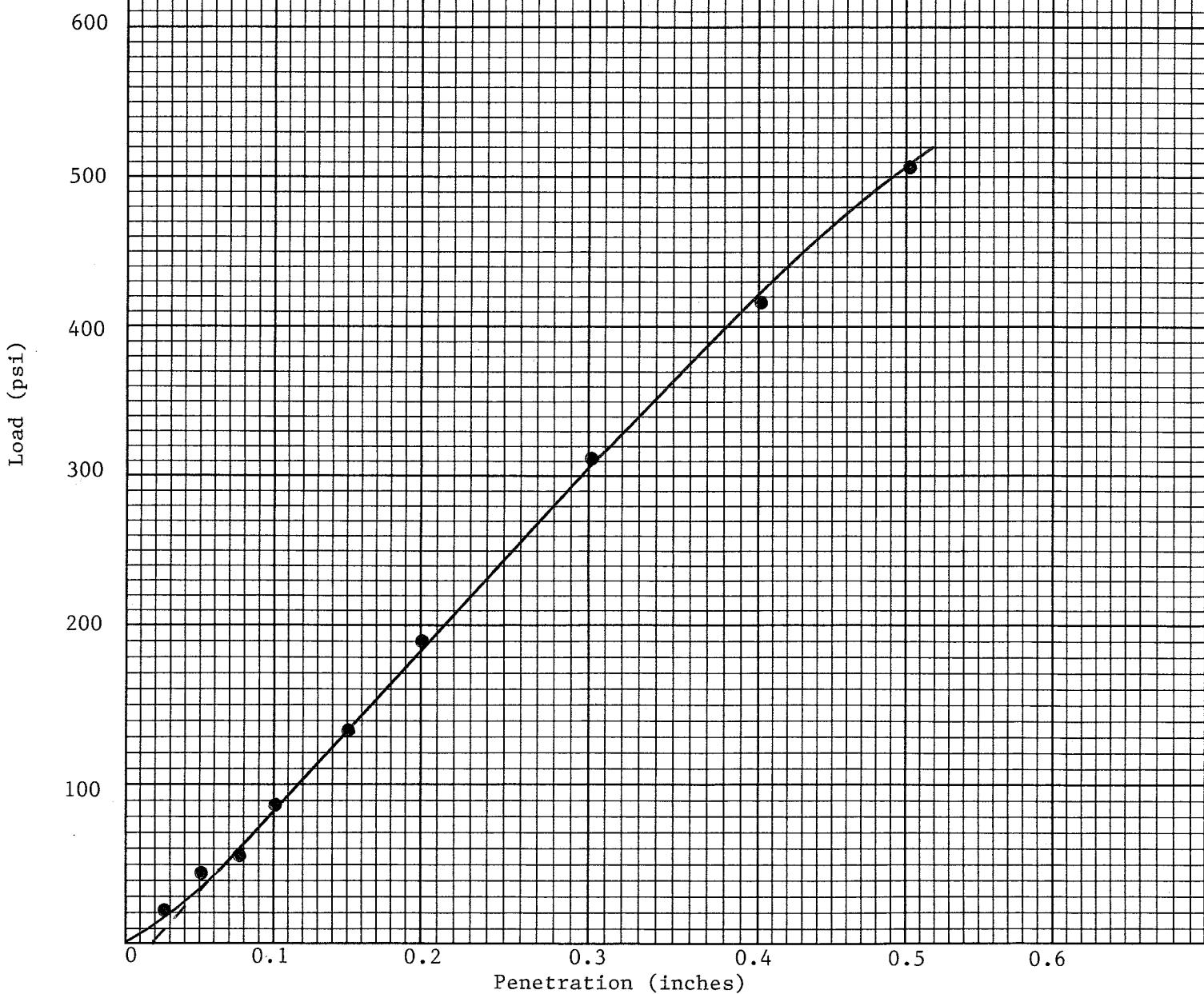
Method AASHTO T-193, Soaked 96 hrs. Compacted to 95% of AASHTO T-180

CALIFORNIA BEARING RATIO

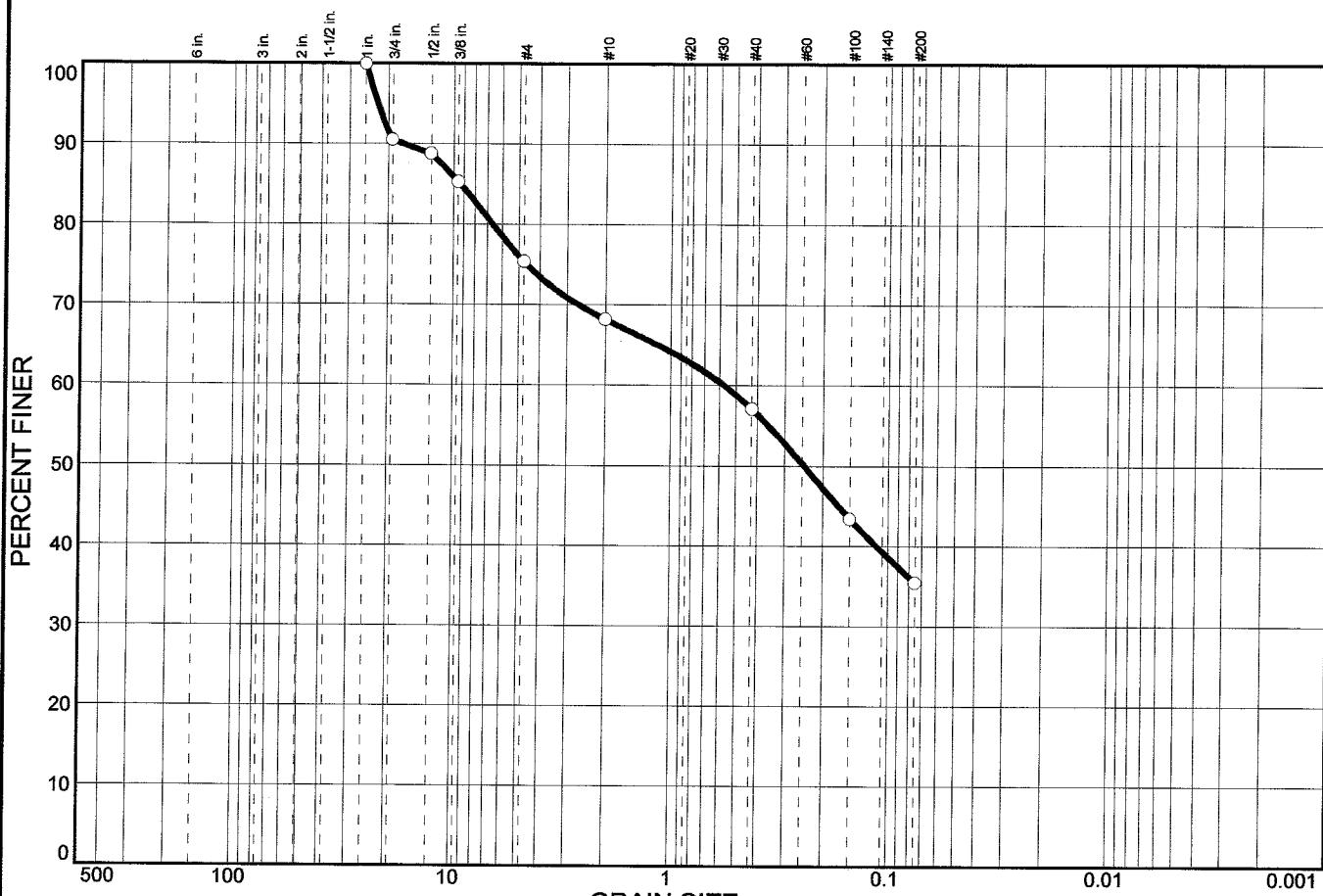
Unit Wt. = 106.4pcf (dry) @ 13.3%
 % swell = 0.3%

CBR @ 0.1" = 10

CBR @ 0.2" = 13



Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	24.6	40.0	35.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	90.5		
.5 in.	88.8		
.375 in.	85.3		
#4	75.4		
#10	68.2		
#40	57.1		
#100	43.4		
#200	35.4		

Soil Description	
Brown-Gray Silty SAND, some Rock Fragments	
Atterberg Limits	
PL= NP	LL= NP
	PI= NP
Coefficients	
D ₈₅ = 9.31	D ₆₀ = 0.569
D ₃₀ =	D ₅₀ = 0.244
C _u =	D ₁₀ =
C _c =	
Classification	
USCS= SM	AASHTO= A-2-4
Remarks	

* (no specification provided)

Sample No.: Bag Sample
Location:

Source of Sample: Boring P-8

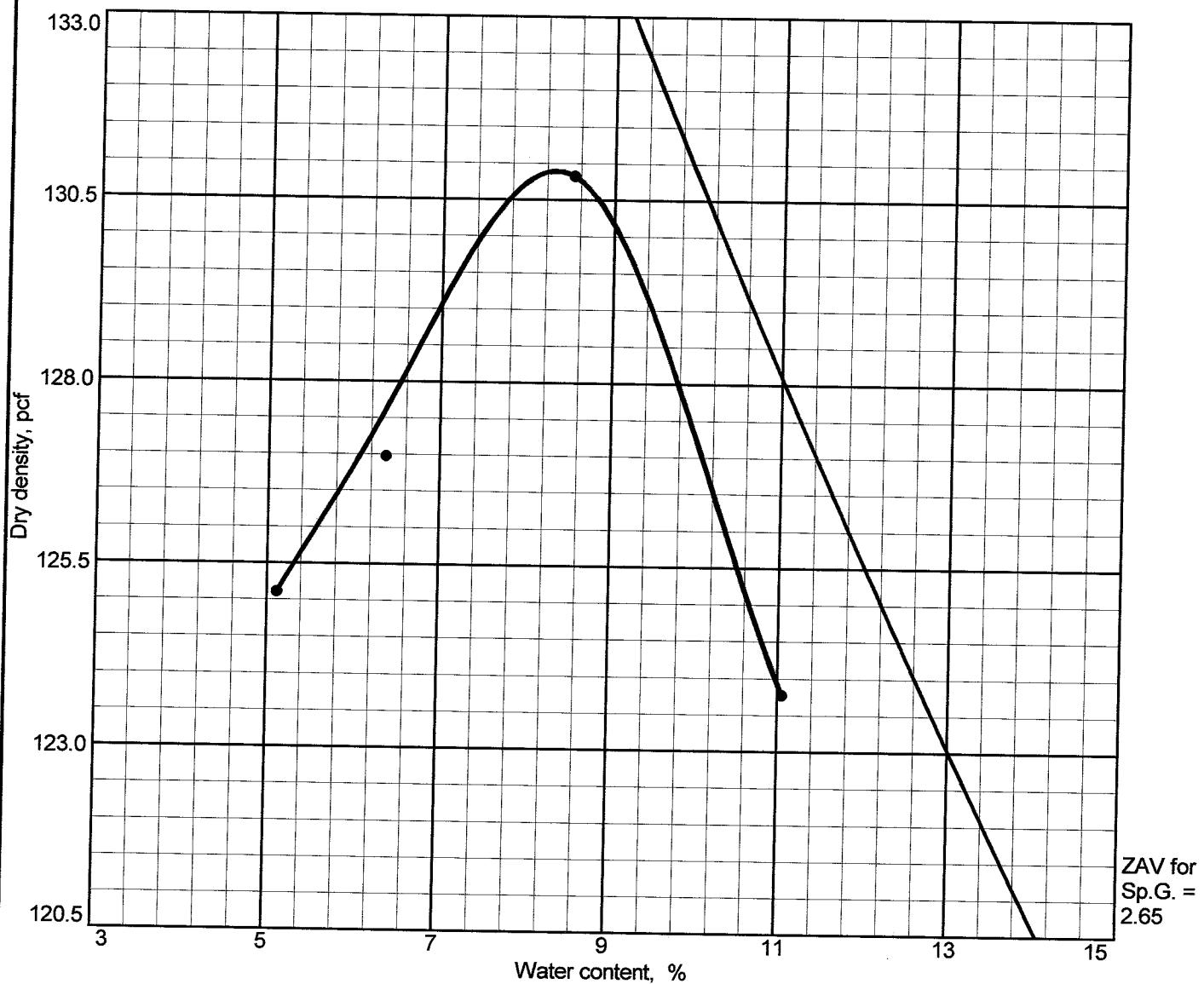
Date: 6/5/03
Elev./Depth: 1.5'-5'

E2SI

Client: Phoenix Engineering
Project: Rock Creek & Potomac Parkway
Roadway Improvement Project
Project No: 02-200

Figure

COMPACTION TEST REPORT



Test specification: AASHTO T 99 Method D Standard

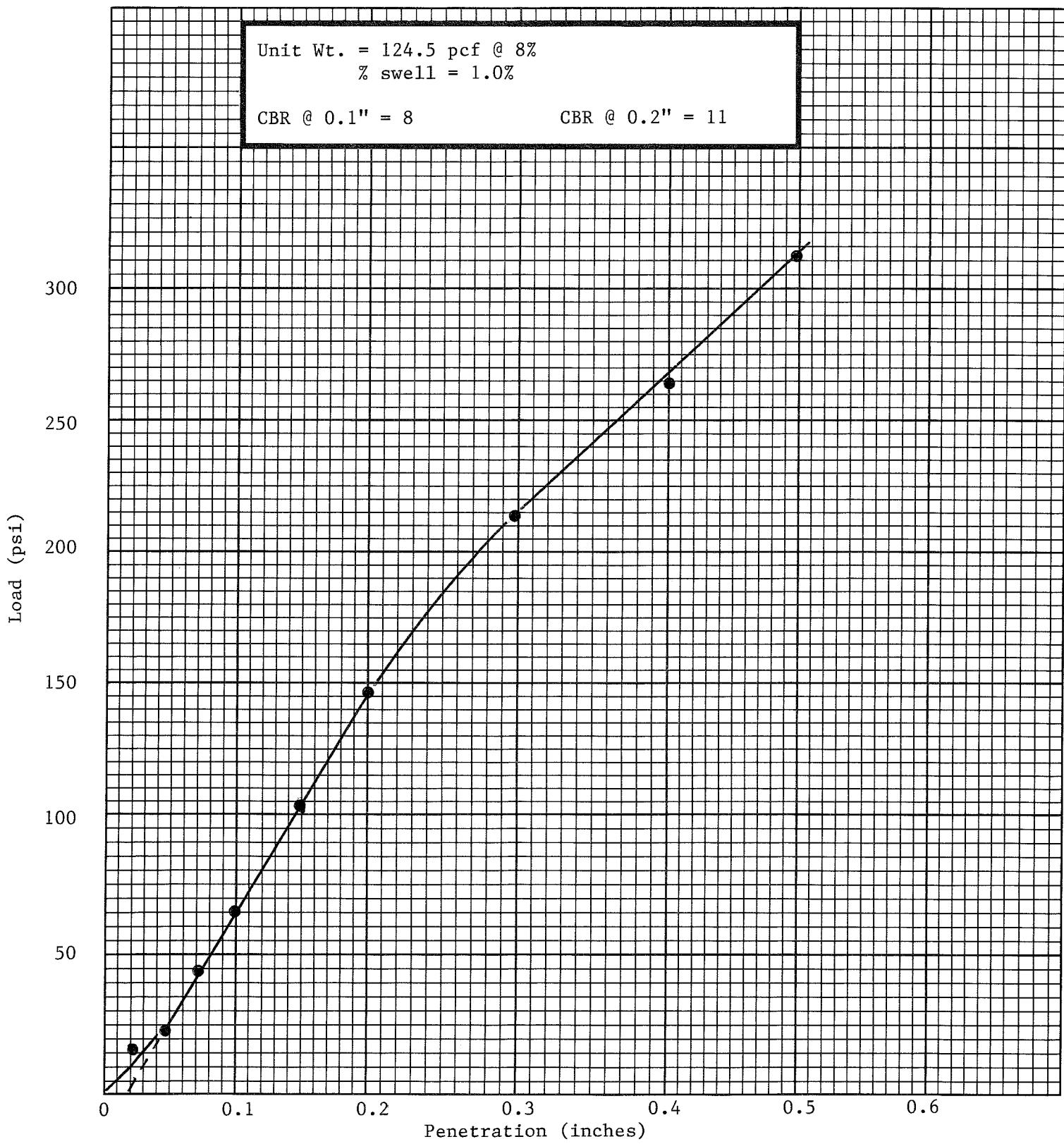
Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
1.5'-5-	SM	A-2-4	9.7		NP	NP	9.5	35.4

TEST RESULTS				MATERIAL DESCRIPTION
Maximum dry density = 130.9 pcf				Brown-Gray Silty SAND, some Rock Fragments
Optimum moisture = 8.3 %				
Project No. 02-200 Client: Phoenix Engineering Project: Rock Creek & Potomac Parkway Roadway Improvement Project ● Source: Boring P-8 Sample No.: Bag Elev./Depth: 1.5'-5-				Remarks:
COMPACTION TEST REPORT				Figure
EARTH ENGINEERING & SCIENCES				

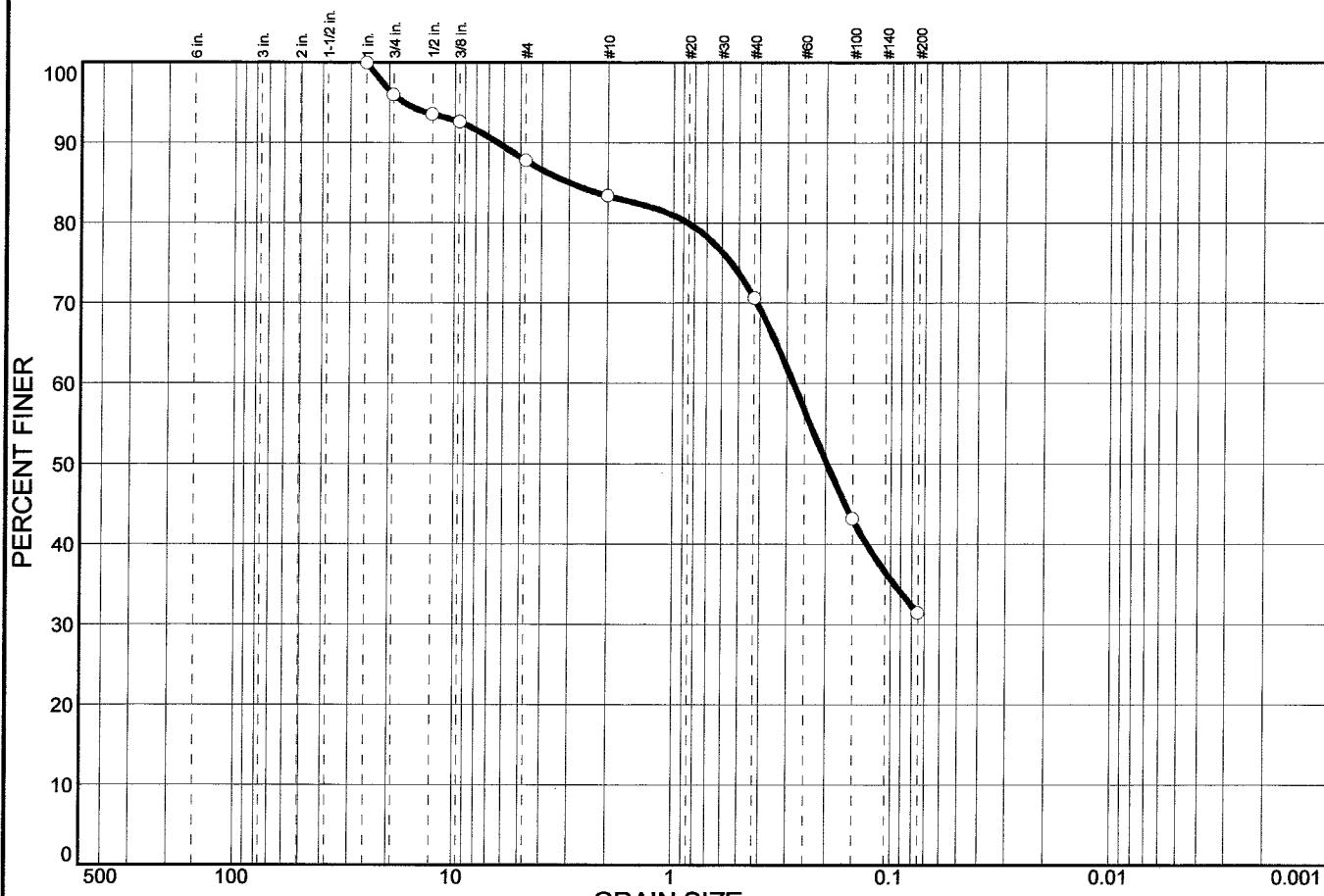
Project Rock Creek and Potomac Parkway
 Location Boring P-8 (1.5'-5' depth)
 Sample Location Parkway Northbound - Sta. 41+98, 20' Right
 Sample Description Brown-Gray Silty SAND, some Rock Fragments (SM/A-2-4)
 Method AASHTO T-193, Soaked 96 hrs. Sample Compacted to 95% of AASHTO T-180

Contract No. 02-200
 Date Sampled 5/22/03

CALIFORNIA BEARING RATIO



Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	12.2	56.4	31.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	96.0		
.5 in.	93.6		
.375 in.	92.6		
#4	87.8		
#10	83.4		
#40	70.6		
#100	43.1		
#200	31.4		

<u>Soil Description</u>		
Brown Silty SAND, trace Clay and Brick Pieces		
Atterberg Limits		
PL= 21	LL= 25	PI= 4
Coefficients		
D ₈₅ = 2.98	D ₆₀ = 0.280	D ₅₀ = 0.197
D ₃₀ =	D ₁₅ =	D ₁₀ =
C _u =	C _c =	
Classification		
USCS= SM-SC	AASHTO= A-2-4	
Remarks		

* (no specification provided)

Sample No.: Bag Sample
Location:

Source of Sample: Boring P-11

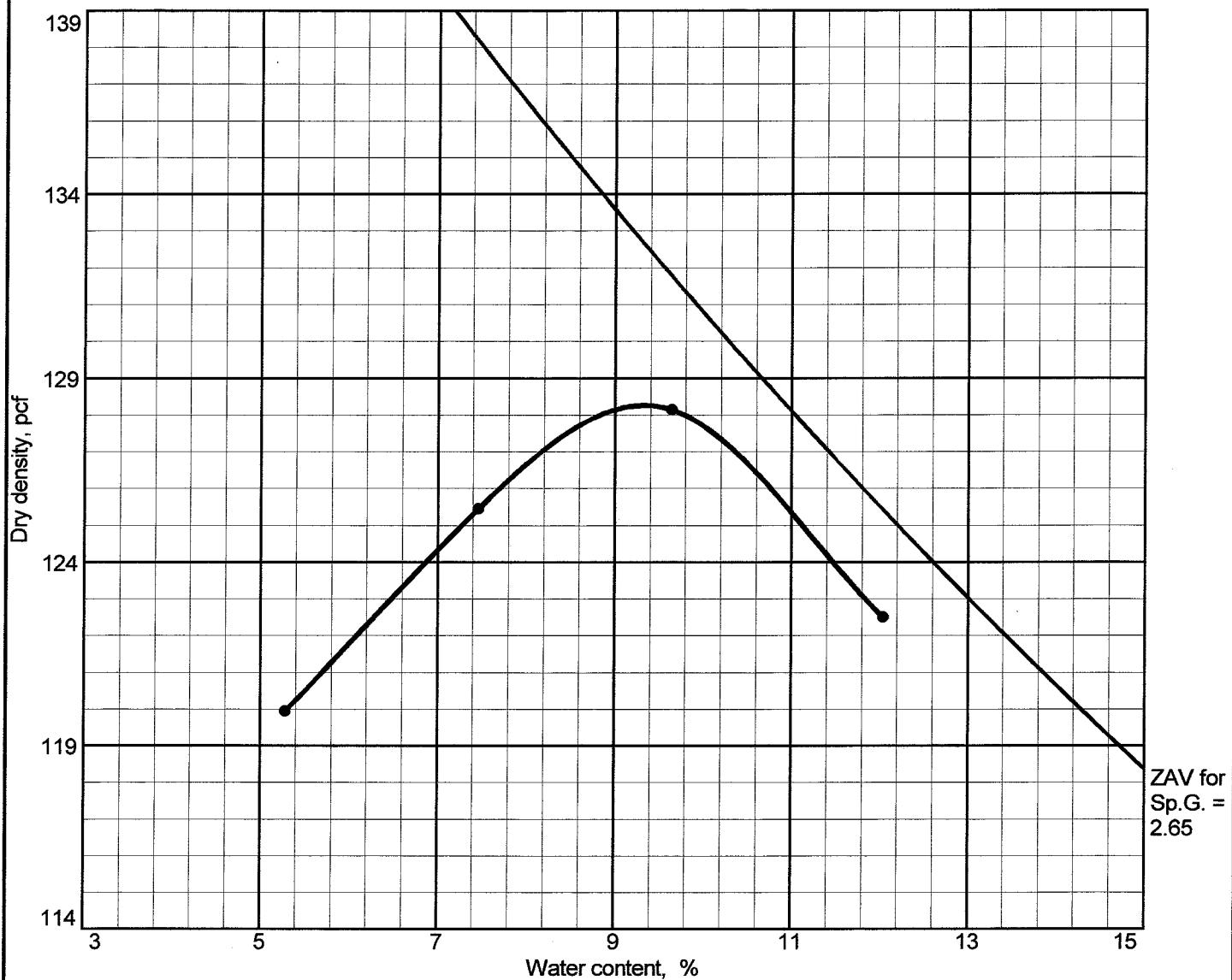
Date: 6/5/03
Elev./Depth: 1'-4' Depth

E2SI

Client: Phoenix Engineering
Project: Rock Creek & Potomac Parkway
Roadway Improvement Project
Project No: 02-200

Figure

COMPACTION TEST REPORT



Test specification: AASHTO T 99 Method A Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
1'-4' Depth	SM-SC	A-2-4	6.6		25	4	12.2	31.4

TEST RESULTS				MATERIAL DESCRIPTION
Maximum dry density = 128.3 pcf				Brown Silty SAND, trace Clay and Brick Pieces
Optimum moisture = 9.3 %				

Project No. 02-200	Client: Phoenix Engineering	Remarks:
Project: Rock Creek & Potomac Parkway		
Roadway Improvement Project		
● Source: Boring P-11	Sample No.: Bag	Elev./Depth: 1'-4' Depth
COMPACTION TEST REPORT		
EARTH ENGINEERING & SCIENCES, INC.		

Figure

Project Rock Creek and Potomac Parkway

Contract No. 02-200

Location Boring P-11 (1'-4' depth)

Date Sampled 5/27/03

Sample Location Parkway Southbound - sta. 26+56, 5' Left

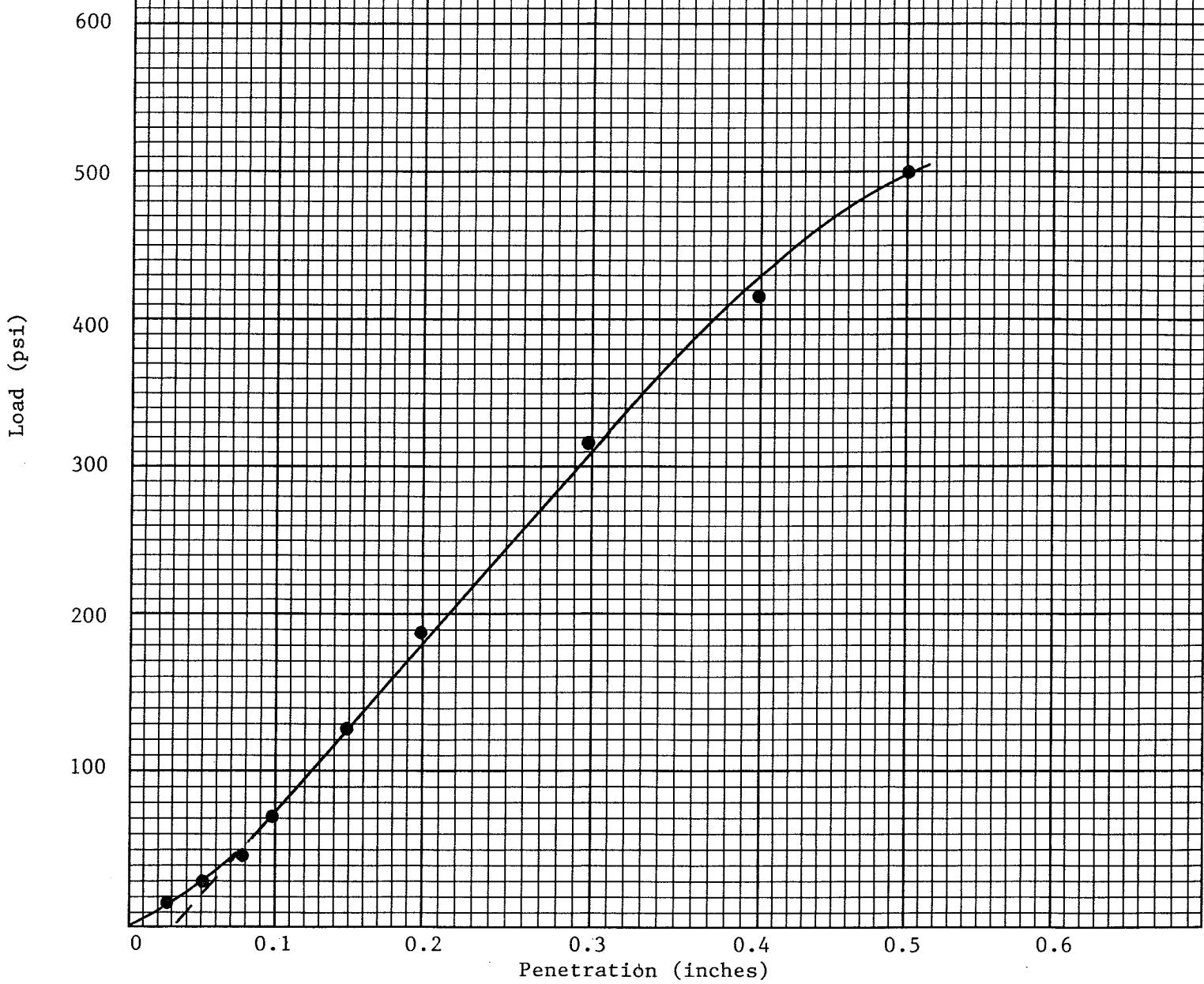
Sample Description Brown Silty SAND, trace Clay and Brick Fragments (SM-SC/A-2-4)

Method AASHTO T-193, Soaked 96 hrs. Compacted to 95% of AASHTO T-180

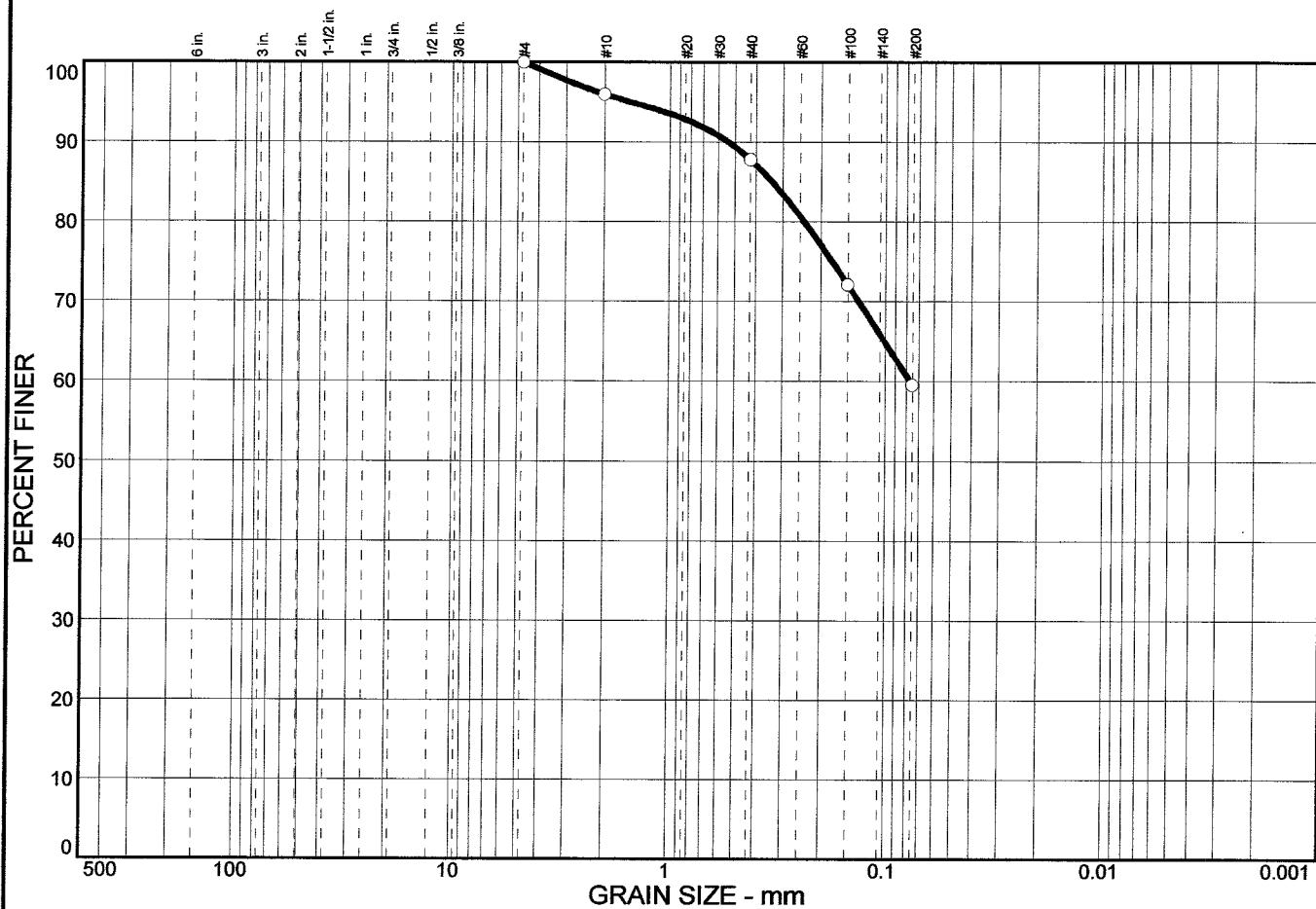
CALIFORNIA BEARING RATIO

Unit Wt. = 121.9 pcf (dry) @ 9.3%
 % swell = 0.3%

CBR @ 0.1" = 11 CBR @ 0.2" = 14



Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	40.5	59.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	96.0		
#40	87.8		
#100	72.1		
#200	59.5		

Soil Description		
Brown Sandy CLAY		
Atterberg Limits		
PL= 19	LL= 30	PI= 11
Coefficients		
D ₈₅ = 0.336	D ₆₀ = 0.0771	D ₅₀ =
D ₃₀ =	D ₁₅ =	D ₁₀ =
C _u =	C _c =	
Classification		
USCS= CL	AASHTO= A-6	
Remarks		

* (no specification provided)

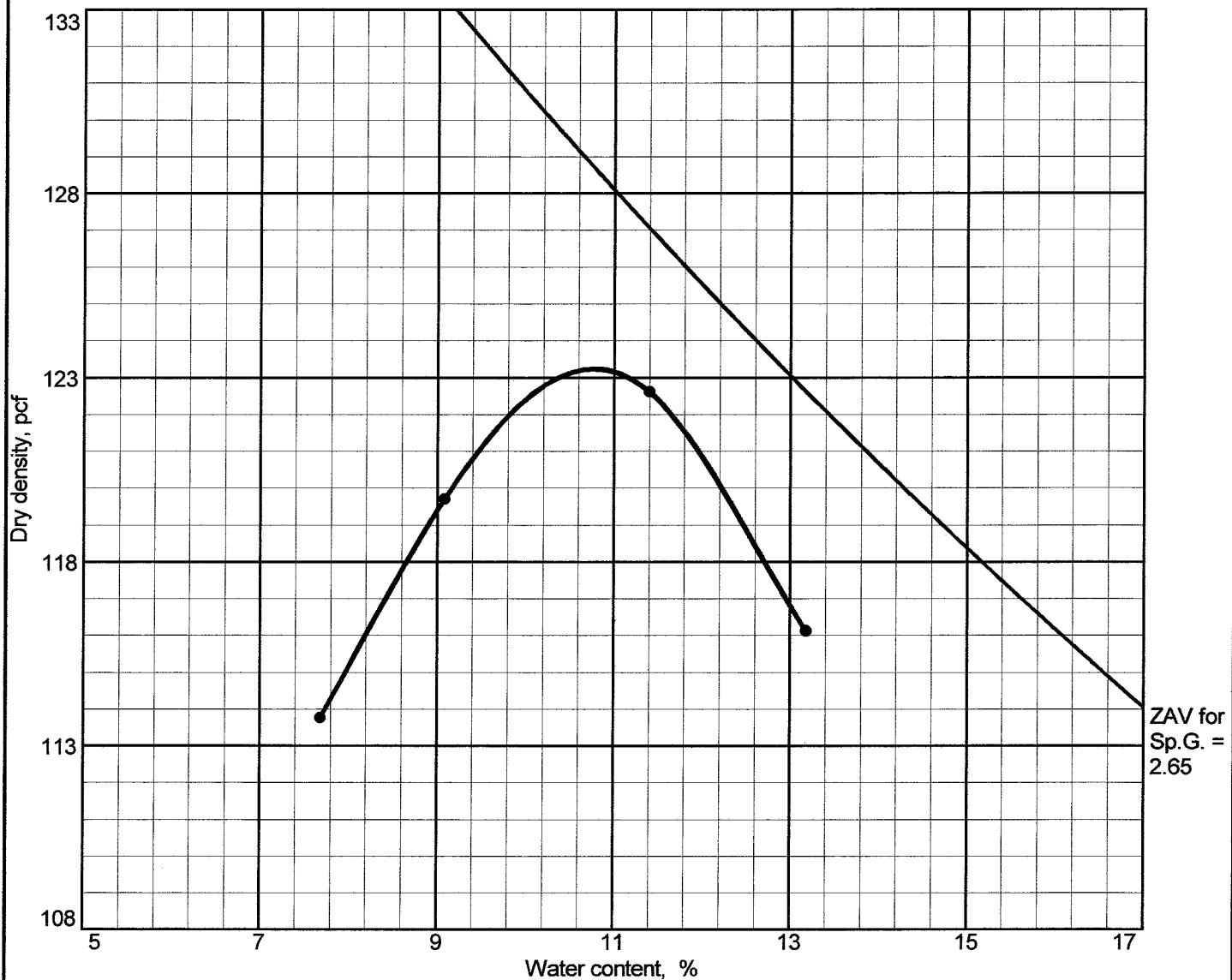
Sample No.: Bag Sample
Location:

Source of Sample: Boring P-14

Date: 6/5/03
Elev./Depth: 1'-5'

E2SI	Client: Phoenix Engineering Project: Rock Creek & Potomac Parkway Roadway Improvement Project Project No: 02-200	Figure
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COMPACTION TEST REPORT



Test specification: AASHTO T 180 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
1'-5'	CL	A-6	21.8		30	11	0.0	59.5

TEST RESULTS			MATERIAL DESCRIPTION
Maximum dry density = 123.2 pcf			Brown Sandy CLAY
Optimum moisture = 10.8 %			

Project No. 02-200 Client: Phoenix Engineering Project: Rock Creek & Potomac Parkway Roadway Improvement Project ● Source: Boring P-14 Sample No.: Bag Elev./Depth: 1'-5'	Remarks:
COMPACTION TEST REPORT	
EARTH ENGINEERING & SCIENCES	

Figure



Project Rock Creek and Potomac Parkway

Contract No. 02-200

Location Boring P-14 (1'-5' depth)

Date Sampled 5/28/03

Sample Location Parkway Southbound, Sta. 6+85, 20' Left

Sample Description Brown Sandy CLAY

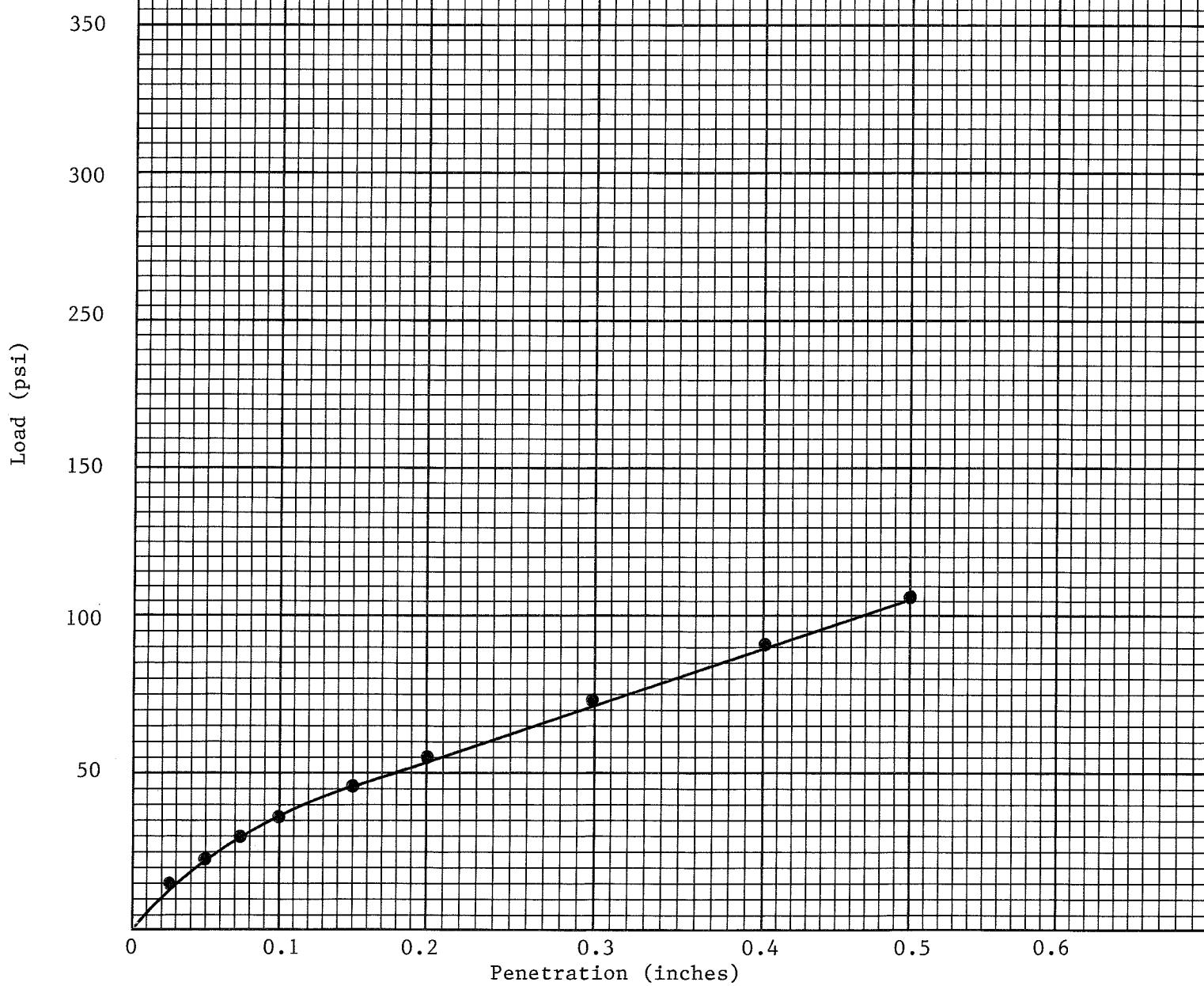
Method AASHTO T-193, Soaked 96 hrs. Compacted to 95% of AASHTO-T180

CALIFORNIA BEARING RATIO

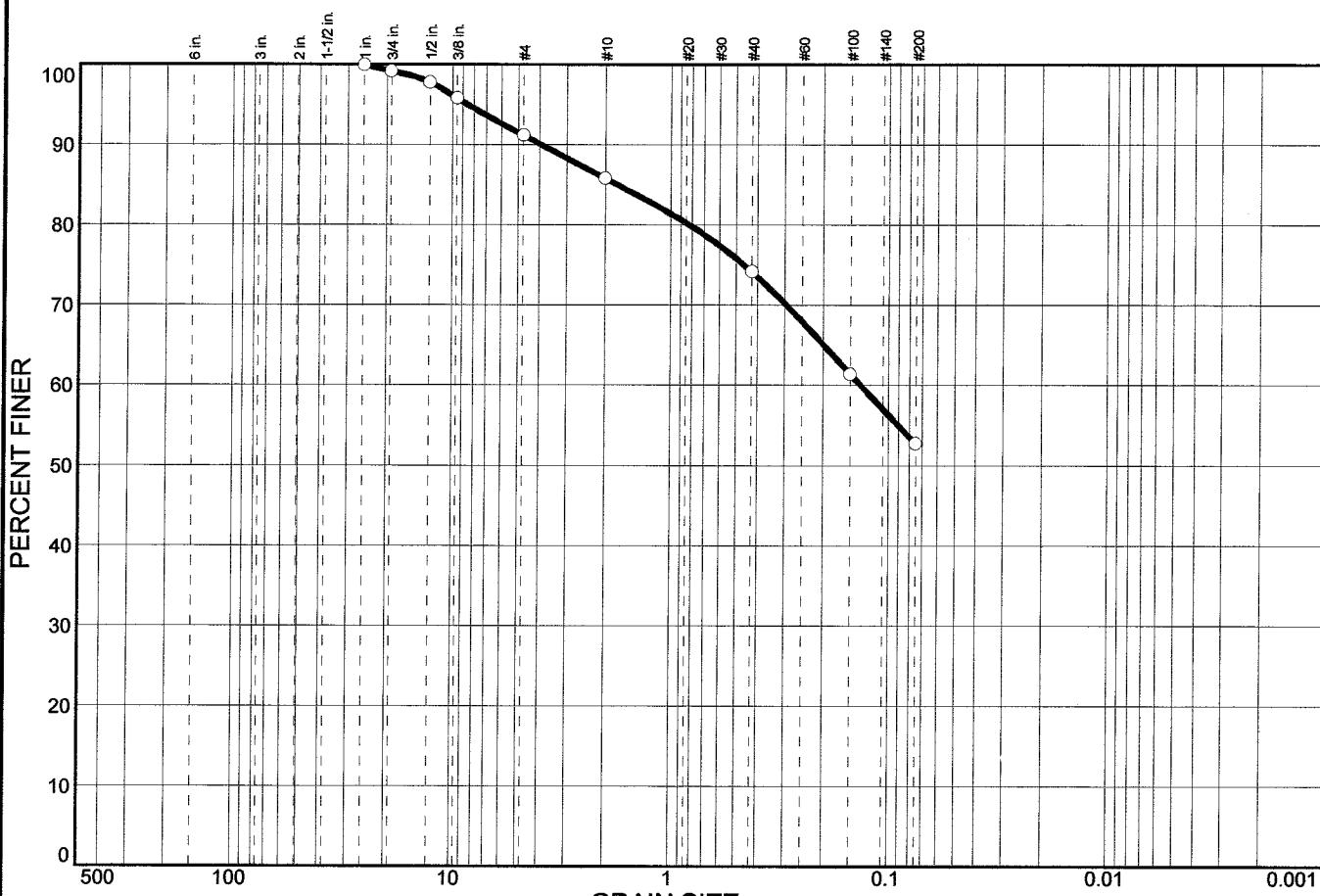
Unit Wt. = 114.8 pcf @ 12.8%
% swell = 1.1%

CBR @ 0.1" = 4

CBR @ 0.2" = 4



Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	8.8	38.5	52.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	99.2		
.5 in.	97.8		
.375 in.	95.8		
#4	91.2		
#10	85.8		
#40	74.2		
#100	61.4		
#200	52.7		

<u>Soil Description</u>		
Brown Silty CLAY and SAND, trace Rock Fragments		
Atterberg Limits		
PL= 17	LL= 28	PI= 11
Coefficients		
D ₈₅ = 1.76	D ₆₀ = 0.134	D ₅₀ =
D ₃₀ =	D ₁₅ =	D ₁₀ =
C _u =	C _c =	
Classification		
USCS= CL	AASHTO= A-6	
Remarks		

* (no specification provided)

Sample No.: Bag Sample
Location:

Source of Sample: Boring P-16

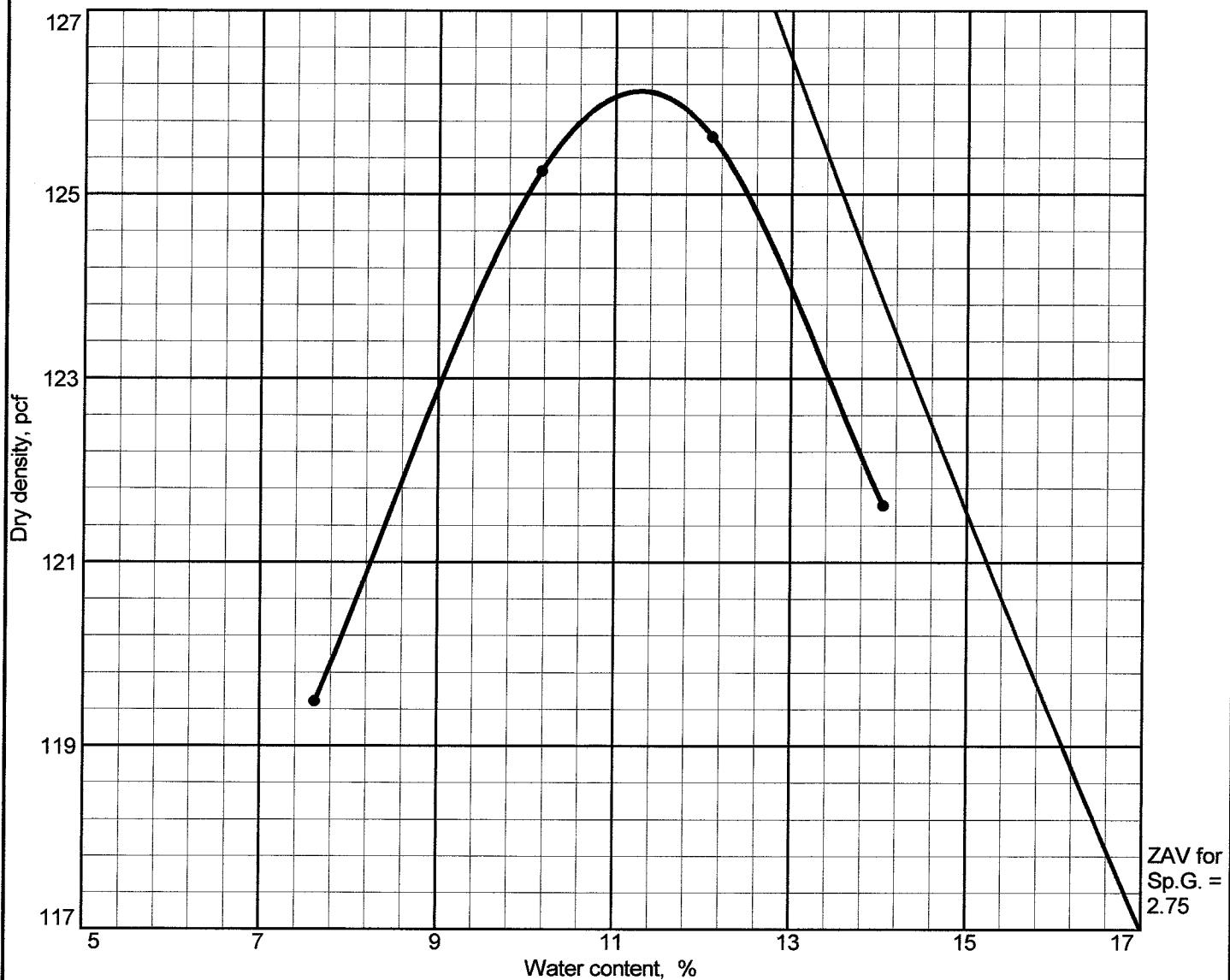
Date: 6/5/03
Elev./Depth: 1'-5'

E2SI

Client: Phoenix Engineering
Project: Rock Creek & Potomac Parkway
Roadway Improvement Project
Project No: 02-200

Figure

COMPACTION TEST REPORT



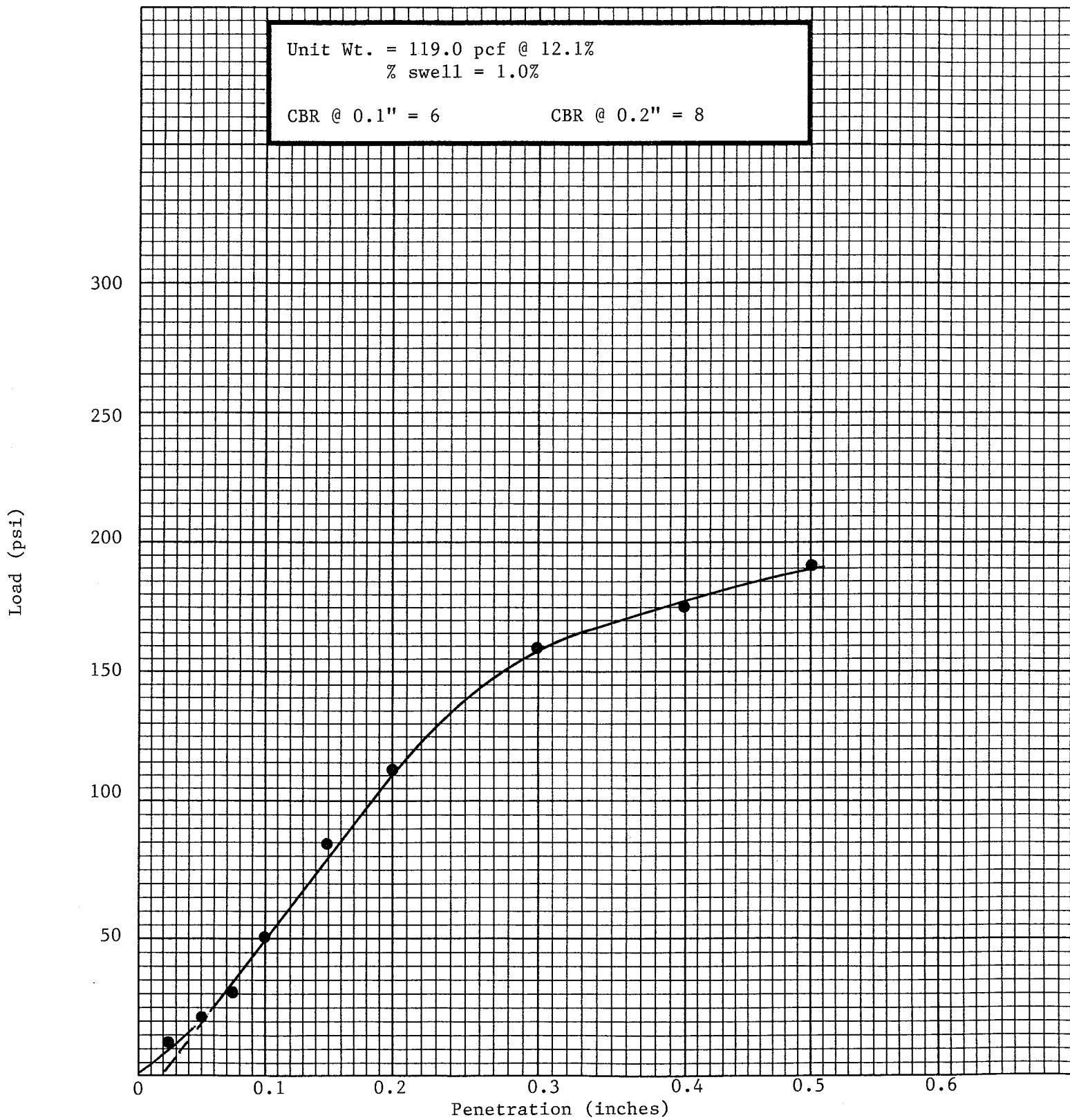
Test specification: AASHTO T 180 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
1'-5'	CL	A-6	12.5		28	11	8.9	52.7

TEST RESULTS				MATERIAL DESCRIPTION
Maximum dry density = 126.1 pcf				Brown Silty CLAY and SAND, trace Rock Fragments
Optimum moisture = 11.3 %				
Project No. 02-200 Client: Phoenix Engineering Project: Rock Creek & Potomac Parkway Roadway Improvement Project ● Source: Boring P-16 Sample No.: Bag Elev./Depth: 1'-5'				Remarks:
COMPACTION TEST REPORT				Figure
EARTH ENGINEERING & SCIENCES, INC.				

Project Rock Creek and Potomac Parkway Contract No. 02-200
 Location Boring P-16 (1'-5' depth) Date Sampled 5/20/03
 Sample Location Boat House Parking Lot, Sta. 1+73, 30' Left
 Sample Description Brown Silty CLAY and SAND, trace Rock Fragments (CL/A-6)
 Method AASHTO T-193, Soaked 96 hrs. Compacted to 95% of AASHTO T-180

CALIFORNIA BEARING RATIO



APPENDIX D

**PAVEMENT CONDITION SURVEY FORMS
FALLING WEIGHT DEFLECTOMETER DATA
TRAFFIC COUNT DATA**

Asphaltic Concrete Pavement Condition Survey*

Project: Rock Creek Parkway Improvements, Washington DC

Beginning Reference Location: From Stop Bar Near Thompson Boat Center Entrance

Direction: North Bound

Logged By: MAA Date: 01/02/03

South Bound

Station	Left Lane	Right Lane
2+25	—	—
2+29	—	—
2+55	10 M	10 M
2+73	10 M	10 M
2+89	10 M	10 M
3+03	10 M	10 M
3+21	10 M	10 M
3+37	10 M	10 M
3+51	10 M	10 M
3+67	10 M	10 M
3+83	10 M	10 M
3+98	10 M	10 M
4+15	10 M	10 M
4+30	10 M	10 M
4+46	10 M	10 M
4+50	—	10 M
4+62	10 M	10 M
4+78	10 M	10 M
4+93	10 M	10 M
5+09	10 M	10 M
5+25	10 M	10 M
5+41	—	—
5+56	10 M	10 M
5+71	10 M	10 M
6+00	10 M	10 M
6+15	10 M	10 M
6+30	10 M	9M,10H
6+45	10 M	10 M
6+60	10 M	10 M
6+67	10 M	—
6+74	10 M	10 M
6+90	10 M	10 M
7+05	10 L	10L
7+22	10 M	9 H
7+52	10 M	10 M
7+67	—	—
7+82	10 M	10 M
8+10	—	—
8+40	10 M	10 M
8+44	10 M	—
8+58	10 M	10 M

Station	Left Lane	Right Lane
2+25	10 M	10 M
2+29	10 M	10 M
2+55	10 M	—
2+73	10 M	10 M
2+89	—	—
3+03	—	10 M
3+21	10 M	—
3+37	10 M	—
3+51	10 M	10 L
3+67	—	—
3+83	10 M	10 M
3+98	10 M	—
4+15	10 M	10 M
4+30	10 M	10 M
4+46	10 M	10 M
4+50	—	—
4+62	10 M	10 M
4+78	10 M	10 M
4+93	10 M	10 M
5+09	10 M	10 M
5+25	10 M	10 M
5+41	10 M	10 M
5+56	10 M	10 M
5+71	10 M	10 M
6+00	10 M	10 M
6+15	10 M	10 M
6+30	10 M	10 M
6+45	10 M	10 M
6+60	10 M	10 M
6+67	—	—
6+74	—	—
6+90	10 M	10 M
7+05	10 L	10L
7+22	10 M	10 M
7+52	—	—
7+67	10 M	10 M
7+82	10 M	—
8+10	11 M	11M
8+40	—	—
8+44	10 M	10 M
8+58	10 M	10 M

Key:
 Severity Code
 High H
 Medium M
 Low L

Distress Types*	Code
Alligator Cracking	1
Block Cracking	2
Lane/Shoulder Dropoff or Heave	3
Lane/Shoulder Joint Separation	4
Longitudinal Cracks	5
Patching	6
Pothole	7
Ravelling	8
Rutting	9
Transverse Cracks	10
Transverse & Diagonal Cracks	11
	12

Remarks

5M Started near the outer edge of SB right lane @ Sta.5+09 and ended @Sta.5+41

11 M occurred in between Sta.8+05 & 8+10

*See Highway Pavement Distress Identification Manual

Asphaltic Concrete Pavement Condition Survey*

Project: Rock Creek Parkway Improvements, Washington DC

Beginning Reference Location: From Stop Bar Near Thompson Boat Center Entrance

Direction: North Bound

Logged By: MAA Date: 01/02/03

South Bound

Station	Left Lane	Right Lane
8+72	10 M	10 M
8+82	10 M	10 M
9+00	10 M	10 M
9+45	10M @ K St.Ramp	
9+85	10 M	10 M, 5M
10+01	10 M	10 M
10+15	10 M	10 M
10+34	10 M	10 M
10+50	10 M	10 M
10+67	10 M	10 M
10+96	10 M	10 M
11+03	—	—
11+40	10H	10H
12+91	11 M	11 M
13+49	10 H	10 H
13+68	10 M	10 M
14+16	10 M	10 M
14+65	10 M	—
14+70	—	—
14+77	10 M	—
15+01	10 M	—
15+16	—	—
15+31	2 M	2 M
15+47	10 M	10 M
15+65	—	—
16+07	10 M	10 M
16+68	10 L	10 L
16+83	10 L	10 L
16+99	10 L	10 L
17+28	10 L	10 L
17+44	10 L	10 L
17+58	10 L	10 L
17+88	10 L	10 L
18+06	10 L	10 L
18+18	—	—
18+77	—	—
19+35	10 L	10 L
20+01	10 L	10 L
20+27	10 L	10 L
20+57	10 M	10 M

Station	Left Lane	Right Lane
8+72	10 M	10 M
8+82	10 M	10 M
9+00	10 M	10 M
9+45	10M @ K St.Ramp	
9+85	10 M	10 M
10+01	10 M	10 M
10+15	10 M	10 M
10+34	10 M	10 M
10+50	10 M,1L	10 M
10+67	10M,5M	10 M
10+96	—	—
11+03	10 M	10 M
11+40	—	—
12+91	11 M	11 M
13+49	—	—
13+68	—	—
14+16	—	—
14+65	—	—
14+70	10 M	10 M
14+77	10 M	10 M
15+01	10 M	10 M
15+16	10 M	—
15+31	2 M	2 M
15+47	10M	10M
15+65	—	—
16+07	10M	10 M
16+68	10 L	10 L
16+83	10 L	10 L
16+99	10 L	10 L
17+28	10 L	10 L
17+44	—	—
17+58	10 L	10 L
17+88	10 L	10 L
18+06	8 L	8 L
18+18	10 L	—
18+77	10 L	10 L
19+35	10 L	10 L
20+01	10 L	10 L
20+27	10 L	—
20+57	10 M	10 M

Key:
Severity Code
High H
Medium M
Low L

Distress Types*	Code
Alligator Cracking	1
Block Cracking	2
Lane/Shoulder Dropoff or Heave	3
Lane/Shoulder Joint Separation	4
Longitudinal Cracks	5
Patching	6
Pothole	7
Ravelling	8
Rutting	9
Transverse Cracks	10
Transverse & Diagonal Cracks	11
	12

Remarks

5M Started near the outer edge of SB right lane @ Sta.8+38 and ended @Sta.9+35

5M is from Sta.14+77to Sta.15+65

2M is @ Sta.15+29 & @ Sta.15+47

Construction Joint of two different pvt.s is @ Sta.16+55

8 L & 9L seen in between stations 19+35 & 20+27

5M extended from Sta.20+57to 21+02

*See Highway Pavement Distress Identification Manual

Asphaltic Concrete Pavement Condition Survey*

Project: Rock Creek Parkway Improvements, Washington DC

Beginning Reference Location: From Stop Bar Near Thompson Boat Center Entrance

Direction: North Bound

Logged By: MAA Date: 01/02/03

South Bound

Station	Left Lane	Right Lane
20+72	10 M	10 M
20+86	10 M	10 M
21+02	10 M	10 M
21+17	10 M	10 M
21+30	10 L	10 L
21+46	10 M	10 M
21+64	10 M	10 M
21+90	10 L	10 L
22+06	10 L	10 L
22+22	10 L	10 L
22+37	10 M	10 M
22+51	10 M	10 M
22+66	10 L	10 L
22+82	10 M	10 M
22+96	—	—
23+12	10 M	10 M
23+27	10 L	10 L
23+42	10 L	10 L
23+57	10 L	10 L
23+85	—	—
24+01	10 L	10 L
24+16	10 L	10 L
24+31	10 M	10 M
24+57	10 L	10 L
24+92	10 M	10 M
25+08	10 M	10 M
25+38	10 M	10 M
25+53	10 M	10 M
25+68	10 L	10 L
25+83	10 L	10 L
25+98	10 L	10 L
26+12	10 L	10 L
26+27	10 L	10 L
26+43	—	—
26+58	—	—
26+72	10 L	10 L
26+87	10 L	10 L
27+02	10 L	10 L
27+32	10 L	10 L
27+46	10 L	10 L

Station	Left Lane	Right Lane
20+72	10 M	10 M
20+86	10 M	10 M
21+02	10 M	10 M
21+17	10 M	10 M
21+30	10 L	—
21+46	10 M,1M	10 M
21+64	10 M	10 M
21+90	10 L	10 L
22+06	10 L	10 L
22+22	10 L	10 L
22+37	10 M	10 M
22+51	10 M	10 M
22+66	10 L	10 L
22+82	10 M	10 M
22+96	—	10 H
23+12	10 M	10 M
23+27	10 L	10 L
23+42	10 L	10 L
23+57	10 L	10 L
23+85	10 L	10 L
24+01	10 L	10 L
24+16	10 L	10 L
24+31	10 M	10 M
24+57	10 L	10 L
24+92	10 M	10 M
25+08	10 M	10 M
25+38	10M,2M	10 M
25+53	—	—
25+68	10 L	10 L
25+83	10 L	—
25+98	10 L	10 L
26+12	—	—
26+27	10 L	10 L
26+43	10 L	—
26+58	10 L	10 L
26+72	10 L	10 L
26+87	10 L	10 L
27+02	10 L	10 L
27+32	10 L	10 L
27+46	—	—

Key:

Severity	Code
High	H
Medium	M
Low	L

Distress Types*

Distress Type	Code
Alligator Cracking	1
Block Cracking	2
Lane/Shoulder Dropoff or Heave	3
Lane/Shoulder Joint Separation	4
Longitudinal Cracks	5
Patching	6
Pothole	7
Ravelling	8
Rutting	9
Transverse Cracks	10
Transverse & Diagonal Cracks	11
	12

Remarks

1M @Sta.21+46 to Sta.21+90

*See Highway Pavement Distress Identification Manual

Asphaltic Concrete Pavement Condition Survey*

Project: Rock Creek Parkway Improvements, Washington DC

Beginning Reference Location: From Stop Bar Near Thompson Boat Center Entrance

Direction: North Bound

Logged By: MAA Date: 01/02/03

South Bound

Station	Left Lane	Right Lane
27+61	10 L	10 L
27+90	10 L	10 L
28+06	10 L	10 L
28+19	10 L	10 L
28+33	10 L	10 L
28+48	10 M	10 M
28+64	10 M	10 M
28+78	10 L	10 L
28+91	—	—
29+08	10 L	10 L
29+36	10 M	10 M
29+50	10 L	10 L
29+51	10 L	10 L
29+66	2 M, 10 M	2 M, 10 M
29+80	—	10 L
29+94	—	—
30+09	10 L	10 L
30+39	10 L	10 L
30+53	10 L	10 L
30+68	10 M	10 M
30+83	10 L	10 L
30+84	10 L	10 L
31+14	—	—
31+25	10 L	10 L
31+42	—	—
31+54	10 L	10 L
31+76	—	—
32+13	10 L	10 L
32+28	9 L, 10 L	10 L
32+37	—	—
32+43	10 L	10 L
32+56	10 L	10 L
32+70	10 L	10 L
32+85	10 L	10 L
32+99	10 L	10 L
33+12	—	—
33+28	10 L	10 L
33+42	10 L	10 L
33+84	10H,8L,9L	10H,8L,9L
34+27	10 L	10 L
34+40	10 M	10 M

Station	Left Lane	Right Lane
27+61	10 L	10 L
27+90	10 L	10 L
28+06	10 L	10 L
28+19	10 L	10 L
28+33	10 L	10 L
28+48	—	—
28+64	10 M	10 M
28+78	—	—
28+91	10 L	10 L
29+08	—	—
29+36	—	—
29+50	10 L	10 L
29+51	10 L	10 L
29+66	—	—
29+80	—	—
29+94	10 L	—
30+09	—	—
30+39	—	—
30+53	10 L	10 L
30+68	—	—
30+83	10 L	10 L
30+84	10 L	10 L
31+14	10 L	10 L
31+25	10 L	10 L
31+42	—	10 L
31+54	10 L	10 L
31+76	—	10M,8-9L
32+13	—	—
32+28	10 L	10 L
32+37	10 L	10 L
32+43	—	—
32+56	—	—
32+70	—	—
32+85	10 L	10 L
32+99	—	—
33+12	10 L	10 L
33+28	10 L	10 L
33+42	—	—
33+84	10 M	10 M
34+27	—	—
34+40	10 M	10 M

Key:
Severity Code
 High H
 Medium M
 Low L

Distress Types*	Code
Alligator Cracking	1
Block Cracking	2
Lane/Shoulder Dropoff or Heave	3
Lane/Shoulder Joint Separation	4
Longitudinal Cracks	5
Patching	6
Pothole	7
Ravelling	8
Rutting	9
Transverse Cracks	10
Transverse & Diagonal Cracks	11
	12

Remarks

*See Highway Pavement Distress Identification Manual

Asphaltic Concrete Pavement Condition Survey*

Project: Rock Creek Parkway Improvements, Washington DC

Beginning Reference Location: From Stop Bar Near Thompson Boat Center Entrance

Direction: North Bound

Logged By: MAA Date: 01/02/03

South Bound

Station	Left Lane	Right Lane
34+69	10 M	10 M
34+83	—	—
34+97	10 L	10 L
35+11	10 L	10 L
35+39	10 L	10 L
35+53	10 L	10 L
35+68	—	—
35+83	10 M	10 M
35+87	10 L	10 L
36+11	10 L	10 L
36+27	10 L	10 L
36+42	10 L	10 L
36+55	—	10 L
36+72	10 L	10 L
36+86	10 L	10 L
37+01	10 L	10 L
37+16	10 L	10 L
37+31	10 L	10 L
37+45	10 L	10 L
37+60	10 L	10 L
37+75	10 L	10 L
37+83	10 L	10 L
38+06	10 L	10 L
38+21	10 L	10 L
38+37	10 L	10 L
38+68	10 L	10 L
39+03	10 L	10 L
39+52	—	10 L
40+02	10 L	10 L
40+17	—	—
40+42	—	10 L
40+62	—	—
40+71	10 L	10 L
41+12	10 L	—
41+66	10 L	10 L
41+84	—	10 L
42+11	10 M	10 M
42+64	10 L	10 L
43+24	10 L	10 L

Station	Left Lane	Right Lane
34+69	10 M	10 M
34+83	10 M	10 M
34+97	—	—
35+11	10 L	10 L
35+39	10 L	10 L
35+53	—	—
35+68	10 L	10 L
35+83	10 M	10 M
35+87	—	—
36+11	10 L	10 L
36+27	10 L	10 L
36+42	10 L	10 L
36+55	10 L	10 L
36+72	10 L	10 L
36+86	10 L	10 L
37+01	10 L	10 L
37+16	10 L	10 L
37+31	10 L	10 L
37+45	10 L	10 L
37+60	10 L	10 L
37+75	10 L	10 L
37+83	—	—
38+06	10 L	10 L
38+21	10 L	10 L
38+37	10 L	10 L
38+68	10 L	10 L
39+03	10 L	10 L
39+52	10 L	10 L
40+02	—	—
40+17	10 M	10 M
40+42	—	—
40+62	10 L	10 L
40+71	10 L	10 L
41+12	—	—
41+66	10 L	10 L
41+84	—	—
42+11	10 M	10 M
42+64	10 L	10 L
43+24	10 L	10 L

Key:
Severity Code
 High H
 Medium M
 Low L

Distress Types*	Code
Alligator Cracking	1
Block Cracking	2
Lane/Shoulder Dropoff or Heave	3
Lane/Shoulder Joint Separation	4
Longitudinal Cracks	5
Patching	6
Pothole	7
Ravelling	8
Rutting	9
Transverse Cracks	10
Transverse & Diagonal Cracks	11
	12

Remarks

*See Highway Pavement Distress Identification Manual

NDT DATA
(FALLING WEIGHT DEFLECTOMETER TEST)

FALLING-WEIGHT DEFLECTOMETER DATA

Location: Rock Creek Parking Lot

Temp: 56
Force: 15

NDT No.	Lane No.	Station (ft)	Offset (ft)	Force (kip)	Pavement Deflection (1/1000 inch)							Pvmt. Temp.(F)	Remarks
					d1 (0)	d2 (8")	d3 (12")	d4 (24")	d5 (36")	d6 (48")	d7 (60")		
1	NA	random	0	15.16	61.19	56.21	46.91	23.67	12.77	7.57	5.03	53	
2	NA	random	0	15.31	60.02	56.50	46.36	25.28	14.10	8.05	5.30	53	
3	NA	random	0	16.80	50.29	45.09	38.40	19.41	8.92	6.04	4.30	53	
4	NA	random	0	15.43	65.14	54.17	43.14	19.83	9.62	5.30	3.58	53	
5	NA	random	0	14.04	66.20	61.86	45.55	18.42	7.69	5.12	3.68	53	
6	NA	random	0	14.28	62.84	62.58	52.14	25.54	11.79	6.05	7.87	53	
7	NA	random	0	15.48	57.62	54.39	44.37	20.82	10.08	6.56	5.36	53	
8	NA	random	0	12.45	49.51	45.26	42.89	16.36	6.08	3.26	2.81	53	
9	NA	random	0	12.08	97.77	83.92	62.42	26.38	11.38	6.23	3.32	53	
10	NA	random	0	16.11	56.20	51.87	41.51	19.68	10.08	6.08	4.13	53	
11	NA	random	0	13.67	35.67	37.19	28.34	33.24	78.93	175.11	40.83	53	Bad Test
12	NA	random	0	15.87	50.42	46.91	36.24	15.74	6.95	3.99	2.85	53	
13	NA	random	0	18.07	35.69	33.85	30.78	23.68	17.03	10.98	4.58	53	

Date-Time: 2/4/03 9:40:07 AM
 Location: Rock Creek pkwy
 Temp: 50
 Force: 25

FALLING-WEIGHT DEFLECTOMETER DATA

NDT No.	Lane No.	Station (ft)	Force (kip)	Pavement Deflection (1/1000 inch)							Pvmt. Remarks
				d1 (0)	d2 (8")	d3 (12")	d4 (24")	d5 (36")	d6 (48")	d7 (60")	
1	1	3+25	41.06	18.77	18.44	17.74	16.27	14.14	12.15	9.70	48 0+00 @ edge of Va. Ave
2	1	4+25	39.09	32.50	27.11	23.62	18.80	14.35	11.04	8.05	48 Lane 1 north bound
3	1	5+25	39.16	30.39	30.17	28.82	26.24	23.26	20.19	17.33	48 All tests in Rt. Lane
4	1	6+25	39.97	16.61	15.09	14.33	12.61	10.80	8.87	7.14	48
5	1	7+25	39.45	17.67	16.42	14.65	12.09	9.40	7.19	3.73	48 under bridge
6	1	8+25	39.53	23.24	22.95	22.54	21.25	19.30	17.25	11.17	48 under bridge
7	1	9+25	38.21	21.79	21.65	20.78	18.06	15.09	12.10	9.52	48
8	1	10+25	36.57	27.94	25.84	24.19	21.15	17.67	15.47	12.03	48 exit ramp
9	1	11+25	33.91	55.61	49.05	36.06	28.53	27.59	20.11	10.44	48 South of enter ramp
10	1	12+17	34.38	15.02	14.60	14.14	13.44	12.57	11.29	10.05	48 South of bridge
11	1	13+25	37.11	17.01	16.82	16.11	15.23	14.22	13.48	12.42	48 on bridge
12	1	14+25	37.89	6.07	5.43	5.18	4.83	4.51	4.15	3.70	48
13	1	15+25	36.87	35.38	33.86	32.19	28.05	23.99	19.97	13.48	48 under bridge
14	1	16+25	37.84	24.18	23.06	21.72	18.71	15.96	14.67	11.98	48 South of storm drain
15	1	17+25	37.48	21.53	20.19	19.23	15.97	13.36	12.07	9.63	48
16	1	18+25	36.65	28.01	26.69	25.03	19.90	16.33	13.78	10.12	48 under bridge
17	1	19+25	38.87	13.81	12.88	12.01	10.33	8.86	7.45	6.42	48 North of storm drain
18	1	20+25	38.18	22.18	18.11	17.48	16.16	14.97	13.50	12.43	48
19	1	21+25	37.60	24.19	17.45	15.65	13.34	11.46	9.91	6.15	48
20	1	22+25	37.28	27.23	26.59	25.11	22.70	19.95	16.68	12.07	48
21	1	23+25	37.65	24.24	22.04	20.44	18.07	16.34	14.03	11.96	48
22	1	24+25	37.21	27.47	27.33	26.12	25.58	22.26	16.51	13.80	48
23	1	25+25	37.35	24.57	23.70	21.91	19.95	17.75	15.65	13.07	48
24	1	26+25	37.04	22.46	19.62	17.93	14.08	10.95	8.21	5.90	48
25	1	27+25	36.84	22.77	22.36	20.84	18.93	16.98	15.08	11.65	48 South of storm drain
26	1	28+25	37.06	22.79	21.68	20.08	17.83	15.69	13.72	11.82	48
27	1	29+25	36.55	26.69	25.15	22.41	18.87	15.51	12.63	9.99	48
28	1	30+25	35.06	31.07	25.65	23.42	17.91	14.27	11.28	10.64	48
29	1	31+46	35.94	31.63	28.25	25.95	21.67	18.76	15.68	13.67	48 North of storm drain

Pavmt. No.	Lane No.	Station (ft)	Force (kip)	Pavment Deflection (1/1000 inch)							Temp.(F)	Remarks
				d1 (0")	d2 (8")	d3 (12")	d4 (24")	d5 (36")	d6 (48")	d7 (60")		
30	1	32+25	34.89	34.17	33.56	31.55	28.83	26.28	21.86	11.92	48	
31	1	33+25	33.18	58.48	55.57	51.69	42.48	34.39	27.61	21.17	48	
32	1	34+25	34.01	39.37	38.65	36.31	31.92	27.30	22.84	18.69	48	
33	1	35+25	35.84	27.00	25.63	23.75	20.68	18.43	16.04	13.05	51	
34	1	36+25	36.01	22.28	21.74	20.74	18.86	16.94	14.71	12.56	51	
35	1	37+25	36.01	29.14	21.85	18.67	13.76	10.48	7.88	5.94	51	
36	1	38+25	35.47	18.76	17.98	16.74	14.74	12.95	11.09	9.03	51	
37	1	39+25	35.13	16.28	15.72	14.59	12.30	10.52	9.01	7.40	51	
38	1	40+25	35.33	23.91	22.57	20.92	16.41	13.33	10.91	8.89	51	
39	1	41+25	35.08	24.52	21.96	19.74	13.03	8.67	6.05	4.85	51	
40	1	42+25	34.59	25.98	25.52	22.91	16.48	11.99	8.96	6.75	51	
41	1	43+25	33.84	45.47	44.50	43.69	39.51	33.07	26.31	20.95	51	under bridge
45	2	42+30	35.08	17.67	17.24	16.09	14.38	12.91	11.15	9.39	53	Lane 2 south bound
44	2	41+38	34.62	18.91	18.14	16.40	12.56	8.93	5.99	4.34	53	South of exit ramp
43	2	40+75	34.99	24.96	17.55	15.80	11.11	7.34	4.93	3.09	53	
41	2	38+75	30.91	63.72	56.46	55.85	35.85	22.96	15.40	9.34	53	
39	2	37+75	32.06	57.47	50.17	42.34	25.47	15.42	10.54	7.30	53	
38	2	36+75	31.88	50.40	44.69	37.89	25.52	17.18	12.06	9.36	53	
37	2	35+75	32.25	45.28	40.97	35.43	26.96	20.27	14.38	12.08	53	
36	2	34+75	33.30	40.87	35.81	31.02	22.77	17.63	13.29	9.00	53	
35	2	33+75	34.01	31.67	28.92	25.96	21.05	17.58	14.29	11.58	53	
34	2	32+75	34.30	31.25	28.75	25.80	20.17	14.37	9.61	7.03	53	
33	2	31+75	31.91	56.30	37.62	37.49	22.72	14.95	9.53	4.73	53	
32	2	30+75	33.18	39.77	34.66	29.73	18.41	11.46	8.64	6.21	53	
31	2	29+75	33.06	38.49	32.35	27.42	16.54	10.95	7.61	5.44	53	
30	2	28+75	33.20	45.97	41.18	36.31	24.88	17.80	12.41	8.34	53	
29	2	27+75	32.86	41.98	34.71	31.27	21.29	16.21	12.89	9.70	53	North of storm drain
28	2	26+75	32.25	43.15	38.47	34.36	24.38	18.31	14.14	12.49	53	
27	2	25+75	33.15	31.58	29.76	25.66	18.80	13.87	10.65	7.97	53	

NDT No.	Lane No.	Station (ft)	Force (kip)	Pavement Deflection (1/1000 inch)						Pvmt. Temp.(F)	Remarks
				d1 (0)	d2 (8")	d3 (12")	d4 (24")	d5 (36")	d6 (48")		
26	2	24+75	32.69	36.42	31.95	27.83	18.91	13.74	10.29	7.72	53
25	2	23+75	33.37	29.88	28.12	25.37	19.13	14.45	10.75	8.15	53
24	2	22+75	31.45	35.84	33.25	30.43	22.77	17.20	12.88	9.68	53
23	2	21+75	31.57	57.49	52.28	46.52	25.31	18.11	12.99	9.52	53 North of 2 manholes
22	2	20+75	30.74	61.41	57.31	51.49	35.89	22.48	14.26	4.98	53
21	2	19+75	33.40	32.60	32.43	30.81	27.03	21.28	16.68	12.41	53
20	2	18+75	33.47	28.04	27.12	24.80	21.15	13.89	9.55	7.54	53 under bridge
19	2	17+75	34.86	17.60	16.17	15.12	13.39	11.38	9.55	7.82	53
18	2	16+75	33.25	24.60	22.56	20.82	17.13	13.70	10.91	6.47	53 South of storm drain
17	2	15+75	34.01	24.29	16.94	16.01	14.27	12.44	10.77	5.45	53 under bridge
16	2	14+75	33.91	13.94	12.12	10.88	9.75	8.74	7.64	6.73	53
15	2	13+75	34.74	6.95	4.70	4.18	3.91	3.63	3.30	3.07	53 ramp
14	2	12+93	33.59	26.02	25.82	25.10	23.25	21.66	19.32	17.25	53 North of bridge
13	2	11+73	34.30	12.96	11.77	11.71	11.78	11.63	11.62	10.95	53 South of bridge
12	2	10+75	34.45	18.75	17.70	16.48	15.23	13.79	12.22	9.46	53
11	2	9+75	34.35	15.18	14.43	13.63	12.06	10.44	8.62	7.07	53 Exit ramp
10	2	8+75	33.57	19.49	18.48	17.45	15.40	13.15	10.94	9.02	53
9	2	7+75	34.35	14.73	13.94	13.25	11.53	9.56	7.81	6.39	53
8	2	6+75	31.93	41.01	36.74	33.31	26.21	20.63	15.83	14.25	53
7	2	5+75	32.03	15.00	13.63	12.84	11.46	9.93	8.56	6.95	53 Enter ramp
6	2	4+75	33.72	14.72	12.60	11.55	9.93	8.47	6.99	5.68	53
5	2	3+75	34.59	7.87	7.10	6.72	6.09	5.54	4.93	4.35	53
4	2	2+75	32.84	23.78	18.39	15.23	8.41	6.13	5.06	4.24	53

TRAFFIC COUNT DATA

**CLASSIFICATION COUNTS
AT**

ROCK CREEK PARKWAY NORTH OF M STREET OVERPASS

NOTES:

1. The direction for the lane usage on the Parkway reverses depending on the time of day and day of week. During rush hours on weekdays, it becomes one-way in the direction of the predominant flow. The data presented here represents the directional traffic and the lanes associated with the direction during that time of day. Thus, the traffic data presented here may correspond to 2 lanes or 4 lanes depending on the corresponding time of day.
2. The original vehicle classification data, collected on the Parkway indicated the presence of trucks, especially Type 8 vehicles. As the Parkway does not allow any trucks, this phenomenon was attributed to possible machine errors.

A subsequent manual observation showed only Types 1-5 vehicles on the Parkway and no Types 6-13 vehicles. Therefore, the data was adjusted (i.e., Types 6-13 vehicles were re-assigned to predominant Types 2-3), based on the manual count sample. A 2-step process was used to adjust the data.

- a. Convert Types 6-13 vehicles (recorded by the machine) to 2-axle vehicles. The conversion factor used was determined based on the defined no. of axles in the class. For example, a Type 8 has 3 axles; therefore, a factor 1.5 was chosen to convert it to a 2-axle vehicle. The following table presents the factors.

Conversion Factors

Type 6	Type 7	Type 8	Type 9	Type 10	Type 11	Type 12	Type 13
1.5	2	1.5	2.5	3	2.5	3	3.5

- b. Distribute 2-axle vehicles within Types 2 & 3 based on the distribution observed during the manual counts, as given in the table below.

Distribution Factors

Type 2	Type 3
0.96	0.04

The manual count sample data is presented in the following Table.

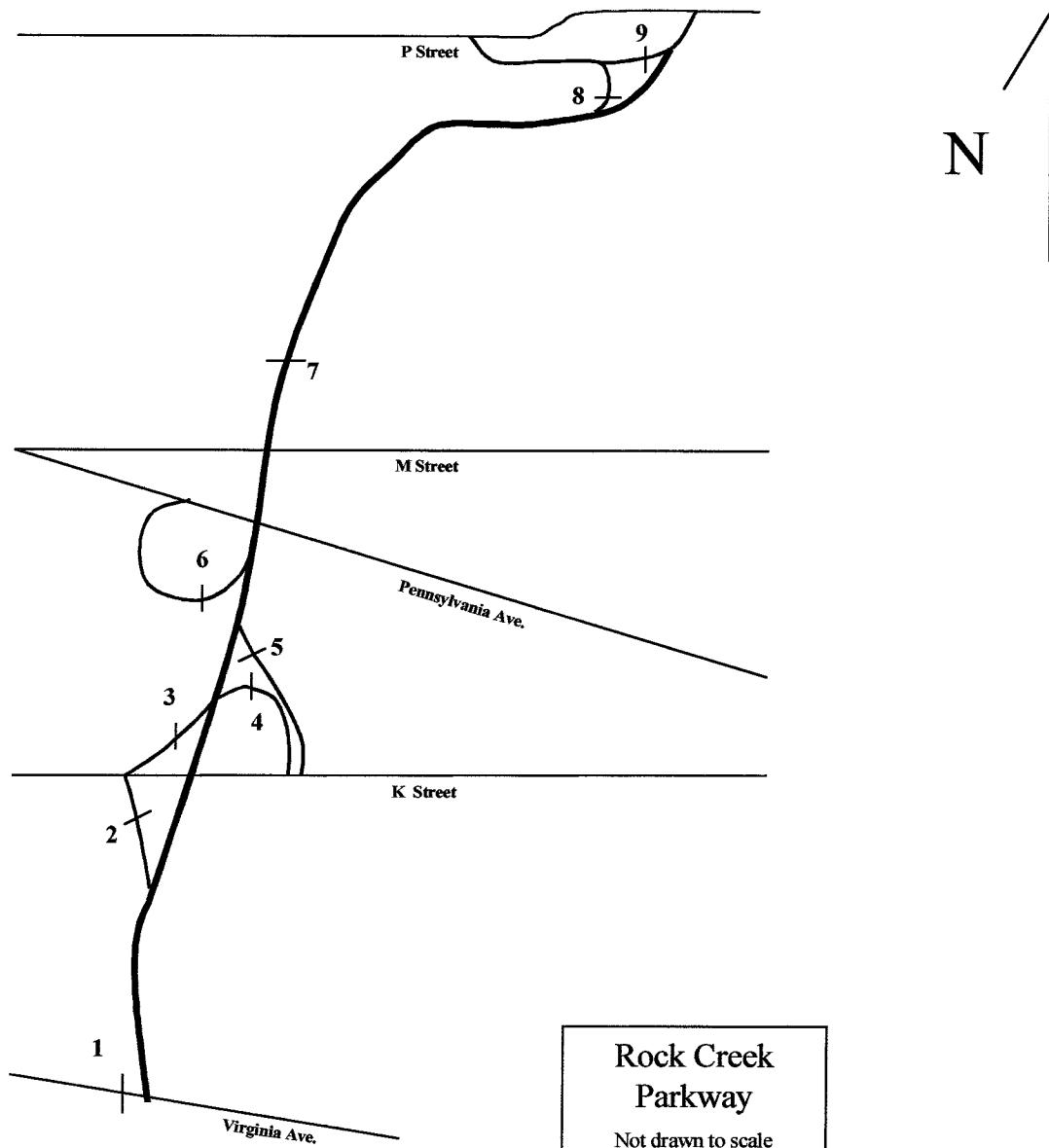
DANIEL CONSULTANTS, INC.

FIELD INFORMATION SHEET



Location: Rock Creek Parkway
Week of: January 26, 2003
Supervisor/Technician: Joe Moulton

**NOTE: ALL DATA PRESENTED HERE ARE FOR PAVEMENT DESIGN
ONLY AND NOT FOR ANY PLANNING PURPOSES.**



Manual Count Sample Data (Date: 5/14/03)

Start Time	Vehicle Class													1/4 Hour Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	
14:00	2	386	19	3	1	-	-	-	-	-	-	-	-	411
14:15	3	421	26	-	1	-	-	-	-	-	-	-	-	451
14:30	2	433	22	4	1	-	-	-	-	-	-	-	-	462
14:45	2	406	29	-	2	-	-	-	-	-	-	-	-	439
Hour Total	9	1,646	96	7	5	-	-	-	-	-	-	-	-	1,763
Percentage	0.51%	93.36%	5.45%	0.40%	0.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
15:00	2	458	20	2	1	-	-	-	-	-	-	-	-	483
15:15	6	471	22	-	2	-	-	-	-	-	-	-	-	501
15:30	3	508	30	1	-	-	-	-	-	-	-	-	-	542
15:45	3	674	22	1	2	-	-	-	-	-	-	-	-	702
Hour Total	14	2,111	94	4	5	-	-	-	-	-	-	-	-	2,228
Percentage	0.63%	94.75%	4.22%	0.18%	0.22%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
16:00	13	663	50	-	-	-	-	-	-	-	-	-	-	726
16:15	6	720	32	4	-	-	-	-	-	-	-	-	-	762
16:30	4	744	25	7	1	-	-	-	-	-	-	-	-	781
16:45	4	810	32	3	-	-	-	-	-	-	-	-	-	849
Hour Total	27	2,937	139	14	1	-	-	-	-	-	-	-	-	3,118
Percentage	0.87%	94.19%	4.46%	0.45%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
17:00	1	904	24	8	-	-	-	-	-	-	-	-	-	937
17:15	3	958	29	2	-	-	-	-	-	-	-	-	-	992
17:30	3	936	27	1	-	-	-	-	-	-	-	-	-	967
17:45	5	916	32	-	1	-	-	-	-	-	-	-	-	954
Hour Total	12	3,714	112	11	1	-	-	-	-	-	-	-	-	3,850
Percentage	0.31%	96.47%	2.91%	0.29%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%
OVERALL	62	10,408	441	36	12	-	10,959							
Percentage	0.57%	94.97%	4.02%	0.33%	0.11%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%

Distribution Factors for Types 2 & 3 alone:

Type 2 Type 3
0.96 0.04

ROCK CREEK PARKWAY NORTH OF M STREET OVERPASS

NORTH BOUND TRAFFIC

CLASSIFICATION COUNT BY DIRECTION

STREET NAME: Rock Creek Parkway North of M Street Overpass
DATE: 01/29/03-01/30/03
Equipment Used: Unicorn Vehicle Traffic Classifier
Model: Traffic Tally 502
Sensor Type: Axle-Pres-Axle
ADJUSTED COUNTS

Weather: Partly Cloudy
Sensor Spacing: 10 Feet
Loop Dimension: 6 FT X 6 FT

ADJUSTED COUNTS

1/29/2003 Wednesday

1/30/2003 Thursday
Classification Count for North Bound Traffic

ROCK CREEK PARKWAY NORTH OF M STREET OVERPASS

SOUTH BOUND TRAFFIC

CLASSIFICATION COUNT BY DIRECTION

STREET NAME: Rock Creek Parkway North of M Street Overpass

Weather:
Sensor Spacing: 10 Feet
Loop Dimension: 6 FT X 6 FT

DATE:01/29/03-01/30/03

Equipment Used: Unicorn V

Model: Traffic Tally 502

Sensor Type: Axle-Pres-Axle

ADJUSTED VOLUME

1/30/2003 Thursday

Classification Count for South Bound Traffic

Volume Count Report

Generated by MSC3000 Version 2.02L Alpha(Nov 29 1995 08:54:16) · Copyright 1990-1993 Mitron

Location THOMPSON BOAT CEN. ENTRANCE EB
Location Code 1-RCP-EB
Jurisdiction
Recorder Set 01/27/03 12:30
Recording Start ... 01/28/ 3 00:00
Recording End 01/29/ 3 00:00
Sample Time 15 Minutes
Operator Number ... 2
Machine Number 11
Channel 1
Divide By 2
Summation No
Two-Way No

Tuesday 01/28/ 3 Channel: 1 Direction: E

0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 Totals

8	1	2	8	0	3	5	1	6	23	53	41	27	20	20	34	9	3	12	5	13	10	9	4	317
3	0	1	8	0	1	2	0	2	0	15	8	7	5	4	10	0	0	1	1	3	4	0	3	
2	0	0	0	0	0	0	0	2	4	16	13	6	4	5	6	2	2	0	1	4	2	6	1	
1	0	0	0	0	0	3	0	0	4	12	9	9	5	5	8	0	0	5	2	2	4	3	0	
2	1	1	0	0	2	0	1	2	15	10	11	5	6	6	10	7	1	6	1	4	0	0	0	

AM Peak Hour 09:45 to 10:45 (58 vehicles)

AM Peak Hour Factor 90.6%

PM Peak Hour 15:00 to 16:00 (34 vehicles)

PM Peak Hour Factor 85.0%

Volume Count Report

Generated by MSC3000 Version 2.021 Alpha(Nov 29 1995 08:54:16) Copyright 1990-1993 Mitron

Location THOMPSON BOAT CENTER ENT. WB
 Location Code 1-RCP-WB
 Jurisdiction
 Recorder Set 01/27/03 12:30
 Recording Start ... 01/28/ 3 00:00
 Recording End 01/30/ 3 00:00
 Sample Time 15 Minutes
 Operator Number ... 2
 Machine Number 8
 Channel 1
 Divide By 2
 Summation No
 Two-Way No

Tuesday 01/28/ 3 Channel: 1 Direction: W

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	--------

4	0	5	4	3	5	2	9	7	39	45	36	28	44	33	22	8	3	7	13	13	3	4	8	345
1	0	3	4	1	1	1	3	2	4	9	6	9	11	5	8	5	0	0	4	9	0	0	0	6
2	0	0	0	0	0	0	0	3	6	15	10	10	7	5	9	2	0	0	4	0	0	2	2	2
0	0	0	0	0	0	1	4	0	6	4	6	8	16	7	4	1	1	5	3	4	0	2	0	0
1	0	2	0	2	4	0	2	2	23	17	14	1	10	16	1	0	2	2	2	0	3	0	0	0

AM Peak Hour 09:30 to 10:30 (53 vehicles)

AM Peak Hour Factor 57.6%

PM Peak Hour 13:00 to 14:00 (44 vehicles)

PM Peak Hour Factor 68.8%

Wednesday 01/29/03 Channel: 1 Direction: W

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	--------

5	1	1	0	3	5	6	9	11	22	32	32	33	29	32	12	8	4	9	24	7	13	11	9	318
1	0	0	0	2	4	5	4	0	1	0	6	3	8	7	4	5	2	0	8	2	1	2	5	
0	1	0	0	1	0	0	3	4	2	10	10	14	7	4	3	0	0	1	5	1	7	0	2	
0	0	1	0	0	0	1	2	3	6	10	10	9	5	12	4	0	2	4	6	1	5	5	2	
4	0	0	0	0	1	0	0	4	13	12	6	7	9	9	1	3	0	4	5	3	0	4	0	

AM Peak Hour 10:15 to 11:15 (38 vehicles)

AM Peak Hour Factor 79.2%

PM Peak Hour 12:15 to 13:15 (38 vehicles)

PM Peak Hour Factor 67.9%

Volume Count Report

Generated by MSC3000 Version 2.02l Alpha(Nov 29 1995 08:54:16) Copyright 1990-1993 Mitron

Location 8-ROCK CREEK PKWY. NB (REVERSIBLE)
 Location Code 8-RCP-NB (P-Street On-Ramp)
 Jurisdiction
 Recorder Set 01/27/03 12:30
 Recording Start ... 02/04/ 3 00:00
 Recording End 02/06/ 3 00:00
 Sample Time 15 Minutes
 Operator Number ... 2
 Machine Number 11
 Channel 1
 Divide By 2
 Summation No
 Two-Way No

Tuesday 02/04/ 3 Channel: 1 Direction: N

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	--------

77	52	34	10	17	66	138	358	589	440	265	295	325	323	371	256	178	291	218	372	268	299	294	184	5720
29	12	13	4	3	7	23	51	125	163	81	64	83	67	114	83	47	66	53	93	81	77	98	53	
25	13	3	2	4	15	32	73	132	117	56	69	58	74	81	89	44	60	0	89	66	71	59	47	
11	9	13	3	5	21	45	113	162	83	76	85	101	85	78	81	43	83	86	104	62	69	86	45	
12	18	5	1	5	23	38	121	170	77	52	77	83	97	98	3	44	82	79	86	59	82	51	39	

AM Peak Hour 08:15 to 09:15 (627 vehicles)

AM Peak Hour Factor 92.2%

PM Peak Hour 13:30 to 14:30 (377 vehicles)

PM Peak Hour Factor 82.7%

Wednesday 02/05/03 Channel: 1 Direction: N

0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	Totals
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	--------

102	79	41	23	20	67	147	449	632	406	286	293	383	302	439	295	157	223	272	336	321	267	274	227	6041
24	22	9	5	3	15	23	92	132	159	90	60	96	71	130	100	25	45	54	98	73	75	78	59	
30	19	15	13	5	16	37	88	154	91	59	84	94	68	105	104	36	51	1	98	84	70	71	61	
23	17	7	3	6	15	51	140	161	75	56	85	97	69	111	86	47	66	135	66	84	68	72	64	
25	21	10	2	6	21	36	129	185	81	81	64	96	94	93	5	49	61	82	74	80	54	53	43	

AM Peak Hour 08:15 to 09:15 (659 vehicles)

AM Peak Hour Factor 89.1%

PM Peak Hour 13:45 to 14:45 (440 vehicles)

PM Peak Hour Factor 84.6%

Volume Count Report

Generated by MSC3000 Version 2.021 Alpha(Nov 29 1995 08:54:16) Copyright 1990-1993 Mitron

Location 9-ROCK CREEK PKWY. SB OUT

Location Code 9-RCP-SB-OUT

Jurisdiction

Recorder Set 01/28/03 12:45

Recording Start ... 01/29/ 3 00:00

Recording End 01/31/ 3 00:00

Sample Time 15 Minutes

Operator Number ... 3

Machine Number 7

Channel 1

Divide By 2

Summation No

Two-Way No

(P Street off-Ramp)

Wednesday 01/29/ 3 Channel: 1 Direction: S0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 Totals

16	5	1	5	7	31	105	250	463	340	198	142	144	137	97	82	1	2	35	82	65	55	36	20	2319
5	1	0	0	1	9	9	36	113	107	57	30	40	29	27	26	0	0	1	18	20	12	6	4	
5	0	0	0	1	4	19	53	111	103	50	35	25	36	22	26	0	0	5	21	13	11	14	5	
1	3	1	2	2	9	33	81	120	81	41	33	33	37	24	29	1	2	15	26	13	14	7	3	
5	1	0	3	3	9	44	80	119	49	50	44	46	35	24	1	0	0	14	17	19	18	9	8	

AM Peak Hour 08:00 to 09:00 (463 vehicles)

AM Peak Hour Factor 96.5%

PM Peak Hour 12:45 to 13:45 (148 vehicles)

PM Peak Hour Factor 80.4%

Thursday 01/30/03 Channel: 1 Direction: S0100 0200 0300 0400 0500 0600 0700 0800 0900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 Totals

17	11	1	7	8	45	98	277	473	379	231	147	134	134	119	78	3	1	46	101	56	48	53	32	2499
8	7	0	0	0	5	13	44	102	136	62	37	35	35	29	37	0	0	0	24	15	17	10	10	
5	2	0	1	3	7	14	64	121	109	64	35	30	33	22	24	0	0	14	27	12	11	18	9	
2	2	1	2	2	12	29	76	118	69	64	35	38	33	37	17	0	1	10	28	16	6	12	4	
2	0	0	4	3	21	42	93	132	65	41	40	31	33	31	0	3	0	22	22	13	14	13	9	

AM Peak Hour 08:15 to 09:15 (507 vehicles)

AM Peak Hour Factor 93.2%

PM Peak Hour 12:30 to 13:30 (137 vehicles)

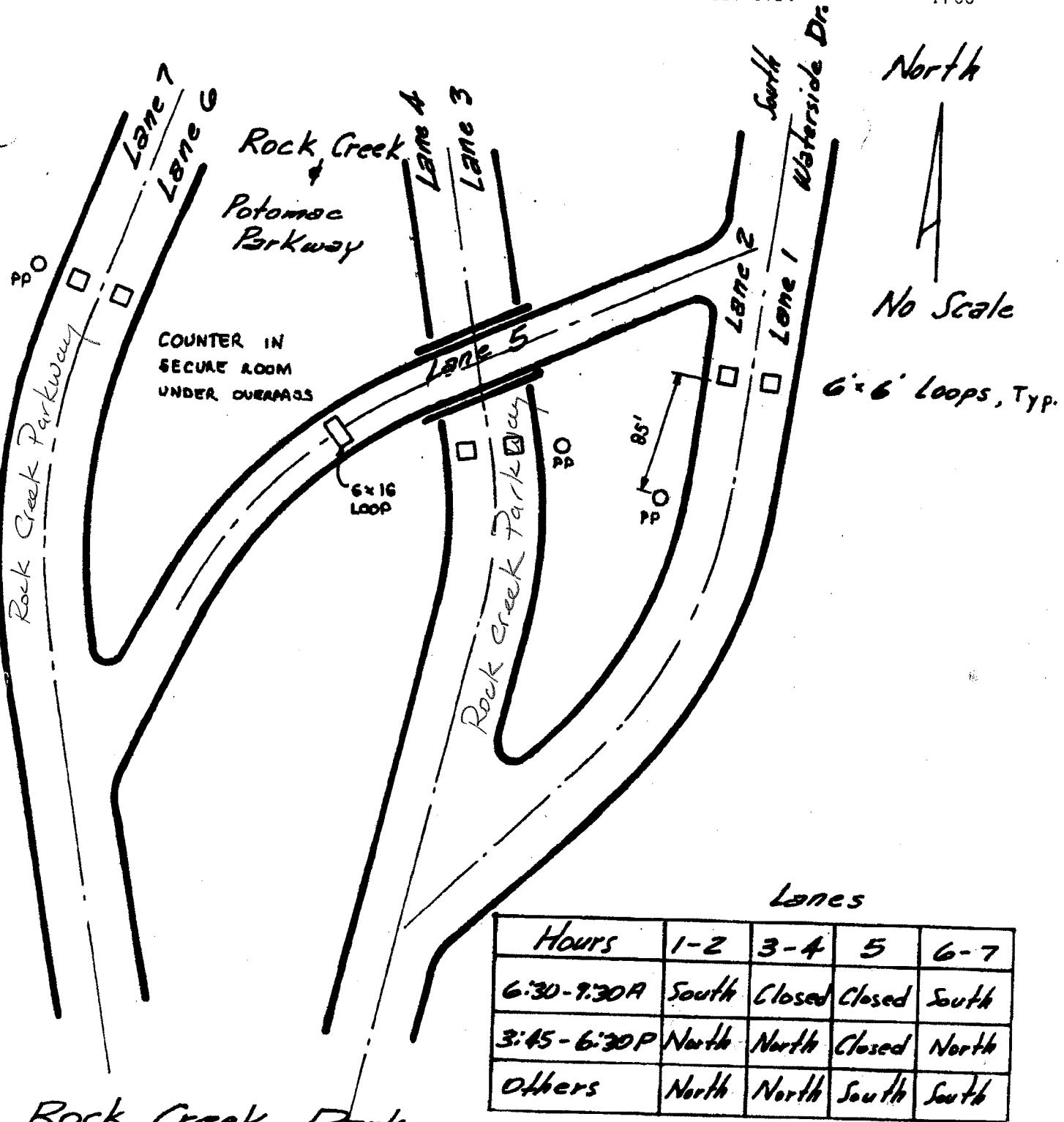
PM Peak Hour Factor 90.1%

ROCK CREEK & POTOMAC PARKWAY TRAFFIC COUNT DATA

This document contains traffic count data for the month of April 2003 for Rock Creek & Potomac Parkway at the following locations:

- 1) Beach Drive, Joyce Road and Morrow Drive Intersection
- 2) Rock Creek & Potomac Parkway and Waterside Drive

The National Park Service contact for this information is:
Katherine Gunderson, 303-969-2177



	Lanes			
Hours	1-2	3-4	5	6-7
6:30-9:30A	South	Closed	Closed	South
3:45-6:30P	North	North	Closed	North
Others	North	North	South	South

Rock Creek Park
Station 5502
Waterside Drive

National Park Service

05-07-2003

*** Monthly Report for April , 2003 ***

13:11 Pg 1

File: M0403039.PRN

Sta: 5502

Id: 55

Commid: 01

City/Town: ROCR

County:

Location: ROCK CREEK & POTOMAC PKWY & WATERSIDE DR

Lane/s: 1-1

Format: Lane

LnL-North

Hour Periods for 24 Hour Clock

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
T 01	29	16	6	5	13	29	65	68	692	937	226	102	74	86	108	119	108	150	235	257	177	91	87	57	3737
W 02	30	14	6	11	10	29	57	65	716	920	189	79	65	72	128	96	116	143	251	242	197	115	106	74	3731
T 03	39	10	4	13	18	20	65	65	718	906	202	86	88	89	89	108	130	159	226	211	171	128	142	101	3786
F 04	54	21	13	8	11	22	78	55	615	838	194	85	95	144	112	96	114	170	216	196	186	110	97	78	3608
S 05	48	38	19	20	18	23	39	29	32	60	70	69	76	98	97	110	94	100	127	133	122	56	88	76	1642
S 06	53	35	19	9	27	34	15	11	0	3	23	44	48	51	50	55	108	255	315	288	89	82	45	42	1701
M 07	13	8	14	12	25	69	63	566	842	190	90	103	80	114	75	76	113	218	186	138	86	101	55	33	3270
T 08	15	4	8	13	24	62	55	624	888	184	99	97	91	104	83	89	148	239	234	196	76	65	71	20	3489
W 09	15	8	14	12	26	89	61	622	837	156	104	86	107	100	141	115	140	258	238	169	121	135	97	37	3688
T 10	16	11	16	16	29	59	55	677	1017	241	94	104	113	97	102	106	174	230	182	176	138	103	85	41	3882
F 11	26	19	17	22	38	71	55	598	893	188	114	87	121	139	106	118	160	239	188	134	76	77	77	64	3627
S 12	27	23	16	3	18	33	28	38	39	50	66	64	84	118	78	103	133	153	106	140	131	113	93	75	1732
S 13	30	27	23	19	12	49	20	27	53	60	96	75	72	88	174	124	155	160	115	134	87	97	74	39	1810
M 14	14	10	5	16	25	62	44	642	882	190	86	72	92	97	66	245	150	214	166	153	103	91	66	26	3517
T 15	9	10	4	15	29	67	70	599	901	186	79	73	83	104	94	99	158	282	209	219	147	99	94	41	3571
W 16	14	14	14	11	19	59	55	603	871	203	87	111	99	125	139	141	197	286	196	180	100	125	95	36	3780
T 17	26	12	13	17	25	67	72	611	849	166	78	72	99	126	119	138	158	277	194	157	114	100	73	39	3602
F 18	16	10	14	17	23	54	48	497	656	112	93	100	118	132	119	115	141	199	148	139	87	92	118	50	3098
S 19	35	17	22	6	15	26	37	39	41	74	20	0	52	94	79	72	107	125	111	98	72	77	68	52	1339
S 20	28	18	11	9	11	22	15	55	42	61	81	53	61	93	117	140	145	96	112	132	104	95	54	31	1586
M 21	12	9	9	19	53	57	681	901	151	85	102	119	134	149	88	151	233	172	170	114	79	56	27	3580	
T 22	16	11	5	14	27	68	62	692	887	172	83	85	125	155	131	116	177	271	245	163	115	110	69	43	3842
W 23	11	13	10	15	22	47	77	716	927	176	72	75	85	97	103	69	157	249	201	219	129	95	80	36	3681
T 24	21	8	13	14	32	63	70	668	900	206	84	62	74	109	89	80	164	290	255	191	157	128	87	54	3819
F 25	30	13	17	15	26	72	60	582	861	186	137	96	134	185	147	141	172	230	240	223	171	179	168	124	4209
S 26	60	49	25	10	23	31	31	64	76	107	92	116	139	119	124	163	160	157	193	150	93	86	99	103	2270
S 27	40	16	13	13	13	25	17	21	28	51	78	71	101	121	103	113	263	176	135	119	121	99	94	50	1881
M 28	27	11	10	11	29	72	61	428	922	212	87	86	95	133	116	130	171	276	231	251	161	109	92	44	3765
T 29	18	9	10	16	34	75	71	731	953	220	121	107	123	132	178	194	194	293	238	215	182	136	97	51	4398
W 30	26	12	10	10	29	85	66	717	889	207	93	151	121	147	184	155	191	314	238	210	154	165	115	80	4369

Hour Totals for Month

Aug. 2 3204

798	380	670	1569	18928	3023	2834	3400	4549	5903	3781	2642
476	381	1537	11791	7413	2513	3403	3514	6442	5403	3138	1624

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Monthly Totals	Averages
Daily Totals	6978	14132	19137	19249	15091	14542	6983	Total Daily	96112 ADT for 30.0 Days
Number of Days	4.0	4.0	5.0	5.0	4.0	4.0	4.0	Total Weekdays	82151 Wkdy for 22.0 Days
Daily Average	1745	3533	3827	3850	3773	3636	1746	Total Weekends	13961 Wknd for 8.0 Days

National Park Service

05-07-2003

*** Monthly Report for April , 2003 ***

13:11 Pg 2

File: M0403039.PRN

Sta: 5502

Id:

55

CommId: 01

City/Town: ROCR

County:

Location: ROCK CREEK & POTOMAC PKWY & WATERSIDE DR

Format: Lane

Lane/S: 2-2

Ln2-North

Hour Periods for 24 Hour Clock

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
T 01	102	38	23	13	25	89	237	114	134	189	244	333	364	398	418	422	470	518	733	740	584	380	366	281	7215
W 02	101	45	20	18	27	59	218	111	133	174	238	376	423	438	467	490	520	549	785	669	598	452	346	291	7548
T 03	126	70	22	20	29	74	202	136	145	203	243	351	425	430	471	497	483	566	793	641	573	435	393	360	7688
F 04	198	75	34	30	37	65	204	105	119	172	225	363	391	452	437	482	507	608	768	642	520	362	356	341	7493
S 05	193	114	52	43	31	54	125	110	175	220	286	343	389	432	419	398	422	468	453	443	282	331	349	6531	
S 06	224	115	60	43	65	100	65	50	0	2	147	251	307	293	312	341	457	445	306	328	296	298	202	136	4843
M 07	42	20	27	28	66	203	116	141	256	203	334	380	348	384	394	413	531	745	728	596	365	307	228	101	6956
T 08	57	19	22	28	69	221	107	140	190	174	329	358	377	363	442	442	574	740	696	547	403	354	298	88	7038
W 09	45	19	11	28	54	181	111	169	259	151	393	422	405	444	451	455	516	720	697	544	414	406	336	189	7420
T 10	54	35	29	35	63	240	123	116	146	236	310	416	420	447	453	453	532	753	660	557	429	445	323	135	7410
F 11	63	37	25	28	75	204	126	153	224	248	378	398	378	471	457	540	528	744	697	523	379	356	383	257	7672
S 12	100	71	46	24	63	135	102	182	229	330	314	363	388	509	528	530	566	587	537	487	360	376	434	334	7595
S 13	117	94	74	33	42	99	84	114	187	298	429	343	415	501	436	496	625	628	466	376	315	376	260	122	6930
M 14	60	25	18	32	61	221	118	116	148	216	330	371	424	449	454	356	503	739	727	508	354	304	233	83	6850
T 15	40	24	13	31	58	223	107	124	151	225	338	414	405	426	500	440	555	736	673	556	387	386	265	120	7197
W 16	48	28	22	28	57	198	121	127	162	222	349	424	384	409	472	446	589	742	696	498	329	363	287	109	7110
T 17	63	24	23	33	60	225	99	117	173	227	331	393	381	408	415	487	521	747	712	465	352	365	253	143	7017
F 18	43	35	36	37	58	183	103	86	102	176	322	418	421	491	417	549	540	658	488	412	294	280	231	157	6537
S 19	75	53	30	22	29	96	79	133	156	237	52	0	270	396	400	484	502	514	410	378	316	322	314	196	5464
S 20	97	70	40	33	31	73	74	188	191	308	419	331	407	427	393	437	380	435	374	326	307	328	201	104	5974
M 21	43	28	19	28	54	204	113	100	128	205	293	314	336	464	419	367	525	750	687	542	362	299	180	94	6554
T 22	48	24	22	31	44	209	116	114	128	212	361	367	364	453	403	437	535	748	683	500	368	369	218	129	6883
W 23	42	28	15	34	60	201	112	98	151	230	329	374	395	419	460	456	561	733	726	546	417	348	258	129	7122
T 24	44	24	23	25	58	187	115	119	145	234	368	341	437	471	436	454	533	737	742	520	398	465	279	180	7335
F 25	74	29	22	24	56	173	104	93	150	184	345	430	469	527	475	470	571	770	641	498	315	292	317	226	7255
S 26	101	64	40	29	32	66	81	129	219	313	284	308	364	383	394	483	454	531	451	404	360	332	475	335	6632
S 27	128	54	39	38	37	56	57	78	159	278	381	404	440	504	450	543	418	542	501	382	327	272	312	130	6530
M 28	63	23	15	23	65	171	112	68	137	230	339	374	388	439	421	444	572	783	686	532	378	318	195	98	6874
T 29	49	17	22	17	63	203	116	131	176	204	296	336	360	468	462	418	573	749	668	536	395	357	275	137	7029
W 30	57	26	24	20	60	192	105	112	138	186	377	409	395	365	395	464	544	756	686	498	411	366	289	134	7009

Hour Totals for Month

2497	868	1529	3552	4812	9384	11670	13051	15583	18885	11750	8838
1328	856	4605	3574	6487	10705	13061	13694	19695	15204	10595	5488

Avg - 6924

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Monthly Totals	Averages	
Daily Totals	24277	27234	35362	36209	29450	28957	26222	Total Daily	207711 ADT for 30.0 Days	6924
Number of Days	4.0	4.0	5.0	5.0	4.0	4.0	4.0	Total Weekdays	157212 Wkdy for 22.0 Days	7146
Daily Average	6069	6809	7072	7242	7363	7239	6556	Total Weekends	50499 Wknd for 8.0 Days	6312

MAY-07-03 WED 12:24 PM NPS FOTSC DENVER

FAX NO. 303 987 6784

P.07

National Park Service

05-07-2003

*** Monthly Report for April , 2003 ***

13:11 Pg 3

File: M0403039.PRN

Sta: 5502

Id: 55

County:

CommId: 01

City/Town: ROCR

Location: ROCK CREEK & POTOMAC PKWY & WATERSIDE DR

Lane/s: 3-3

Ln3-North

Format: Lane

Hour Periods for 24 Hour Clock

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
T 01	251	109	45	35	14	42	178	174	0	0	279	421	473	507	533	733	936	1064	1085	1144	874	617	534	464	10512
W 02	267	106	47	34	22	45	167	170	0	0	313	457	475	546	506	752	979	1069	1144	1126	932	635	568	478	10848
T 03	287	121	79	45	23	41	165	155	0	0	288	463	503	565	537	757	848	1032	1058	1083	914	645	587	508	10704
F 04	313	183	67	48	36	46	183	153	0	0	301	517	506	613	703	816	979	1016	1116	1043	821	565	573	551	11149
S 05	434	249	149	106	65	47	79	126	224	380	457	503	590	683	633	685	686	733	700	662	680	508	560	560	10445
S 06	477	296	183	130	102	92	121	57	2	2	222	467	558	548	578	600	676	358	1	16	543	473	357	280	7139
M 07	104	70	45	20	36	203	152	0	0	261	465	430	486	451	639	843	1018	996	1069	842	591	472	355	262	9810
T 08	116	57	37	18	41	181	163	0	0	287	411	495	512	496	697	958	1000	1083	1166	837	614	540	470	262	10441
W 09	131	61	44	15	33	170	170	0	0	193	533	423	491	540	745	910	1019	1103	1113	864	636	576	530	326	10626
T 10	132	69	38	35	50	176	154	0	0	273	424	480	487	514	707	964	1010	1153	1106	904	638	565	505	319	10704
F 11	140	69	62	41	52	157	141	1	1	265	452	487	519	601	800	1042	1022	1014	1058	811	664	640	566	402	10860

Avg = 10,238

MAY-07-03 WED 12:27 PM NPS FOTSC DENVER

FAX NO. 303 987 6784

P.01

National Park Service

05-07-2003

*** Monthly Report for April , 2003 ***

13:11 Pg 4

File: M0403039.PRN

Sta: 5502

Id: 55

CommId: 01

City/Town: ROCR

Location: ROCK CREEK & POTOMAC PKWY & WATERSIDE DR

Lane/S: 4-4

Ln4-North

County:

Format: Lane

Hour Periods for 24 Hour Clock

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
T 01	159	51	25	20	12	31	154	115	0	0	246	367	364	391	472	590	812	616	625	1129	1000	540	497	329	8545
W 02	161	66	36	13	17	29	157	113	0	0	297	419	433	449	485	645	894	616	616	1144	986	573	454	453	9056
T 03	195	100	64	34	13	40	143	123	0	0	308	440	484	480	457	642	889	691	587	1083	950	597	509	448	9277
F 04	268	88	46	30	22	33	139	103	0	0	276	406	420	532	537	743	921	641	681	1040	826	495	488	489	9224
S 05	369	179	97	65	45	43	70	103	213	296	399	437	538	572	586	659	677	692	715	661	650	449	483	548	9546
S 06	423	188	136	99	66	51	116	50	10	3	174	356	377	434	458	524	596	331	1	2	524	410	249	185	5763
M 07	80	27	20	10	31	133	107	0	0	213	340	363	360	356	505	658	542	630	1157	832	488	414	300	149	7715
T 08	87	33	14	10	28	121	86	0	0	230	437	378	388	418	604	826	620	665	1121	905	551	440	390	162	8514
W 09	89	29	20	20	36	136	93	0	1	114	434	500	455	403	589	794	607	658	1170	865	507	515	443	246	8724
T 10	84	46	23	16	33	148	116	0	0	272	370	428	422	454	609	816	614	637	1126	981	557	547	439	225	8963
F 11	93	42	38	26	35	128	102	1	2	248	393	378	424	505	681	930	718	651	995	785	466	442	490	340	8913
S 12	191	93	78	48	37	53	121	159	279	379	421	493	552	646	680	734	771	802	743	710	531	511	578	472	10082
S 13	235	130	81	54	35	49	103	122	195	317	479	473	500	595	617	662	681	767	644	588	444	476	351	175	8773
M 14	81	32	26	15	33	128	101	0	0	233	392	403	411	483	619	737	610	622	1094	799	534	412	326	133	8224
T 15	68	25	18	8	27	140	113	0	1	302	354	300	308	339	449	809	571	650	1074	868	550	547	386	201	8106
W 16	80	34	19	12	28	139	100	1	0	180	236	238	279	256	418	854	628	762	1055	819	523	535	428	226	7850
T 17	89	39	26	14	31	131	95	0	0	248	420	457	471	264	505	845	621	681	1124	705	440	452	342	232	8232
F 18	99	45	38	19	36	110	97	0	0	245	372	376	481	518	759	963	530	556	824	587	384	385	382	264	8070
S 19	147	74	58	30	28	53	79	123	185	295	488	600	520	499	518	621	658	711	625	518	467	409	481	346	8533
S 20	166	94	73	44	26	42	79	127	162	266	424	404	452	529	549	655	615	600	593	517	451	387	310	152	7717
M 21	64	23	17	12	33	121	110	0	0	337	761	817	925	975	926	682	595	714	1082	828	520	438	316	136	10432
T 22	86	33	17	11	30	112	102	0	0	277	401	371	437	434	598	790	655	667	1166	930	535	464	362	177	8655
W 23	79	36	21	11	33	135	118	0	1	283	407	426	458	462	640	787	609	643	1167	988	611	480	374	199	8968
T 24	80	22	19	17	39	144	118	1	0	292	457	398	475	448	614	789	665	606	1105	888	641	554	403	237	9012
F 25	100	51	33	13	33	128	112	1	0	257	284	182	170	169	610	939	612	678	929	779	431	432	449	335	7727
S 26	163	105	55	47	22	65	113	150	238	324	373	433	522	541	646	676	754	798	778	625	460	465	571	466	9390
S 27	232	127	108	53	53	52	106	138	185	313	449	558	549	602	713	665	747	716	732	562	486	406	399	168	9119
M 28	92	43	17	14	40	126	109	0	0	208	154	170	147	532	1075	808	565	650	1194	916	584	504	354	149	8451
T 29	83	33	16	24	35	123	117	0	0	205	448	449	378	429	609	886	606	697	1087	1014	606	504	409	190	8948
W 30	80	34	25	20	33	136	135	0	0	175	220	650	982	953	1012	854	603	693	1098	874	672	558	422	243	10472

Hour Totals for Month

4221	1264	970	3311	1472	11214	13682	18540	19986	26908	17375	12385
1922	809	2880	1430	6512	12670	14668	22583	19841	23942	14341	8075

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Monthly Totals	Averages
Daily Totals	31372	34822	42768	45070	35484	33934	37551	Total Daily	261001 ADT for 30.0 Days
Number of Days	4.0	4.0	5.0	5.0	4.0	4.0	4.0	Total Weekdays	192078 Wkdy for 22.0 Days
Daily Average	7843	8706	8554	9014	8871	8484	9388	Total Weekends	68923 Wknd for 8.0 Days

Avg. = 8,700

MAY-07-03 WED 12:28 PM NPS FOTSC DENVER

FAX NO. 303 987 6784

P.02

National Park Service

05-07-2003

*** Monthly Report for April , 2003 ***

13:11 Pg 5

File: M0403039.PRN

Sta: 5502

Id: 55

County:

Commlid: 01

City/Town: ROCK

Location: ROCK CREEK & POTOMAC PKWY & WATERSIDE DR

Lane/S: 5-5

Ln5-South

Format: Lane

Hour Periods for 24 Hour Clock

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
T 01	105	35	16	8	8	24	125	252	0	0	371	361	359	359	374	426	309	0	0	225	332	238	291	191	4409
W 02	89	40	22	10	15	22	133	279	0	0	436	445	389	392	424	428	317	0	0	253	309	255	260	168	4686
T 03	116	29	24	13	11	44	113	286	0	0	439	409	397	455	422	478	295	0	0	281	358	236	245	235	4886
F 04	117	45	22	20	14	23	107	242	0	0	365	442	500	587	581	482	326	0	0	272	337	205	237	224	5148
S 05	145	89	47	25	28	23	77	137	174	224	292	322	333	347	394	425	366	339	338	345	334	201	204	193	5402
S 06	191	121	60	45	28	67	124	67	0	0	144	337	445	427	428	387	308	291	308	246	181	205	143	72	4625
M 07	42	15	11	7	23	114	237	0	0	393	357	348	327	307	370	255	0	0	185	306	231	226	183	94	4031
T 08	41	15	14	5	18	115	239	0	0	414	428	373	355	346	403	321	0	0	249	295	240	244	143	93	4351
W 09	47	18	8	5	21	117	248	0	0	374	341	403	328	358	381	321	0	0	263	319	243	301	209	101	4406
T 10	37	26	7	14	22	102	240	0	0	393	365	425	392	384	418	312	0	0	280	327	247	279	183	110	4563
F 11	50	16	26	8	21	121	216	0	0	424	421	398	365	383	435	332	0	0	266	345	227	217	204	168	4644
S 12	84	38	41	28	29	83	96	151	188	259	293	336	342	400	336	393	366	351	364	384	227	187	222	163	5360
S 13	115	56	46	36	25	54	87	126	152	198	288	399	415	439	347	316	290	389	308	247	215	207	133	84	4972
M 14	45	23	21	10	19	117	237	0	0	355	367	367	323	394	403	317	0	1	195	285	248	253	178	98	4256
T 15	37	15	9	9	23	117	236	0	0	391	376	385	352	398	426	308	0	0	253	298	273	259	213	119	4497
W 16	48	22	12	15	23	97	223	0	0	395	443	423	460	386	473	309	0	0	254	297	230	256	213	127	4706
T 17	50	31	13	23	30	108	216	0	0	332	282	295	328	390	447	324	0	0	227	268	199	259	200	114	4136
F 18	55	26	23	15	30	91	192	0	0	365	383	348	391	425	500	317	0	0	191	294	183	183	159	136	4307
S 19	81	30	30	20	19	58	99	115	198	239	195	103	411	370	348	352	308	286	319	283	183	184	208	170	4609
S 20	80	42	31	22	13	54	75	64	116	196	314	317	447	472	358	375	269	287	248	226	196	205	119	73	4599
M 21	34	19	7	8	14	106	193	0	0	366	349	317	356	334	400	321	0	0	188	287	247	266	189	76	4077
T 22	48	15	11	6	29	95	225	0	0	409	372	358	375	348	425	328	0	0	234	328	237	252	213	88	4396
W 23	41	14	14	10	20	95	215	0	1	403	370	348	343	347	391	346	0	0	238	315	257	259	197	109	4333
T 24	48	20	14	14	36	107	237	0	1	434	408	353	372	412	421	341	0	0	287	339	262	310	230	123	4769
F 25	46	16	16	19	25	99	236	0	0	398	386	397	432	408	505	333	0	0	275	385	235	298	253	185	4947
S 26	101	38	34	26	21	71	104	179	213	272	323	395	390	463	347	365	315	339	357	381	203	204	223	235	5599
S 27	163	86	78	54	44	41	68	92	141	212	314	360	459	462	389	370	335	380	327	281	236	224	175	82	5373
M 28	40	15	10	8	25	121	232	0	0	451	410	405	382	417	501	276	0	0	214	264	257	259	266	105	4658
T 29	48	18	16	13	13	102	246	0	0	418	481	415	423	402	479	354	0	0	268	319	295	291	235	111	4947
W 30	47	21	10	7	21	104	261	0	0	379	373	421	403	331	270	363	0	0	291	343	243	297	226	109	4526

Hour Totals for Month

2191	693	668	5337	1184	10686	11594	12396	3804	6927	7465	6154
994	503	2491	1990	8694	11005	11943	10575	2663	9039	7260	3956

Avg. 2 4,674

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Monthly Totals	Averages
Daily Totals	19569	17022	22600	22651	18354	19046	20970	Total Daily	140212 ADT for 30.0 Days
Number of Days	4.0	4.0	5.0	5.0	4.0	4.0	4.0	Total Weekdays	99673 Wkdy for 22.0 Days
Daily Average	4892	4256	4520	4530	4589	4762	5243	Total Weekends	40539 Wknd for 8.0 Days

MAY-07-03 WED 12:28 PM NPS FOTSC DENVER

FAX NO. 303 987 6784

P.03

National Park Service

05-07-2003

*** Monthly Report for April , 2003 ***

13:11 Pg 6

File: M0403039.PRN

Sta: 5502

Id: 55

CommId: 01

City/Town: ROCR

Location: ROCK CREEK & POTOMAC PKWY & WATERSIDE DR

Lane/s: 6-6

Ln6-South

Format: Lane

Hour Periods for 24 Hour Clock

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
T 01	166	61	40	29	23	75	408	712	1209	1540	1115	630	539	571	572	649	490	291	430	469	507	429	396	297	11648
W 02	189	80	46	20	20	73	371	751	1218	1556	1080	707	613	623	556	656	521	283	477	464	580	438	428	347	12097
T 03	203	102	49	44	21	85	384	728	1156	1571	1131	676	597	619	636	662	450	257	420	453	581	437	375	322	11959
F 04	257	132	74	57	29	84	336	710	1166	1484	1042	694	628	614	670	682	491	354	450	542	655	432	414	390	12387
S 05	346	207	130	123	89	66	154	259	394	556	672	720	702	746	756	736	673	674	654	677	632	406	426	453	11251
S 06	457	302	197	150	107	109	246	98	3	6	323	609	724	758	802	687	621	408	2	2	397	369	338	167	7882
M 07	86	50	27	26	77	337	598	1041	1472	1176	650	537	519	508	562	448	221	417	454	496	386	364	283	188	10923
T 08	108	44	28	18	72	314	652	1096	1523	1167	674	567	552	567	643	454	278	472	475	556	452	385	298	157	11552
W 09	65	37	29	26	69	326	641	1127	1530	1204	694	572	606	590	619	461	280	474	490	520	427	432	296	214	11729
T 10	92	52	31	32	92	371	715	1169	1582	1089	684	570	573	566	617	470	259	453	453	508	441	429	351	234	11833
F 11	111	77	53	25	89	311	627	1033	1483	1046	711	592	572	511	661	467	256	471	469	589	443	382	357	361	11697
S 12	227	126	117	87	73	139	284	407	488	670	674	685	683	746	742	725	661	683	678	623	452	399	468	427	11264
S 13	282	182	180	116	71	81	153	236	359	492	648	647	741	723	691	684	685	685	623	512	438	344	315	192	10080
M 14	74	35	32	25	71	356	699	1098	1474	956	630	570	563	651	727	501	256	418	469	533	425	368	281	184	11396
T 15	69	37	26	32	91	350	654	1124	1515	1005	686	669	624	663	763	560	264	433	524	615	432	382	325	216	12059
W 16	58	34	37	32	87	338	677	1154	1484	1008	693	561	690	702	745	512	282	505	505	580	471	393	468	274	12390
T 17	135	73	42	22	73	339	658	1110	1405	978	706	678	608	684	719	544	274	486	464	538	414	400	345	208	11903
F 18	103	65	45	29	73	317	563	912	1190	911	691	625	625	590	655	432	235	308	461	492	394	366	325	274	10681
S 19	173	110	118	77	60	110	194	297	437	599	669	694	707	751	696	676	647	604	672	586	405	364	399	338	10383
S 20	232	165	130	89	56	85	158	198	327	439	585	606	653	734	702	690	662	599	561	508	478	364	258	159	9438
M 21	66	43	33	20	75	348	646	1131	1455	925	648	559	599	570	622	479	263	468	470	525	417	345	295	181	11183
T 22	83	48	21	24	57	353	727	1182	1537	1078	661	522	655	535	613	467	257	477	486	557	426	402	320	177	11665
W 23	80	35	24	21	68	350	732	1154	1455	1115	659	590	592	571	687	506	269	469	476	539	446	422	361	211	11832
T 24	101	50	37	20	73	348	698	1185	1490	1018	722	597	578	590	687	484	305	461	516	579	393	444	378	249	12003
F 25	115	53	51	29	67	336	680	1075	1424	949	675	592	657	590	673	457	328	422	497	617	483	429	423	340	11962
S 26	214	148	98	59	73	131	214	398	509	601	707	685	696	732	693	689	670	651	683	647	445	402	506	474	11125
S 27	336	243	196	144	71	95	178	257	360	516	678	705	753	788	736	718	665	681	652	551	434	394	334	176	10661
M 28	97	52	30	19	73	366	717	1121	1380	1005	494	476	451	419	580	474	260	468	499	577	439	398	349	207	10951
T 29	72	48	28	30	80	349	711	1195	1511	1079	510	438	480	481	586	489	259	487	500	564	532	421	380	202	11432
W 30	76	43	22	22	73	367	719	1221	1480	958	594	463	501	523	672	476	270	458	538	575	478	414	379	214	11536

Hour Totals for Month

4673	1971	2053	15194	34016	21106	18481	20083	12052	15048	13903	10871
2734	1447	7309	25179	28697	18336	18716	16935	14317	15994	11954	7833

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Monthly Totals	Averages
Daily Totals	38061	44453	58356	59584	47698	46727	44023	Total Daily	338902 ADT for 30.0 Days 11297
Number of Days	4.0	4.0	5.0	5.0	4.0	4.0	4.0	Total Weekdays	256818 Wkdy for 22.0 Days 11674
Daily Average	9515	11113	11671	11917	11925	11682	11006	Total Weekends	82084 Wknd for 8.0 Days 10261

National Park Service

05-07-2003

*** Monthly Report for April , 2003 ***

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File: M0403039.PRN

Sta: 5502

Id: 55

County: CommId: 01

City/Town: ROCK

Location: ROCK CREEK & POTOMAC PKWY & WATERSIDE DR

Lane/S: 7-7

Ln7-South

Format: Lane

Hour Periods for 24 Hour Clock

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
T 01	90	41	28	25	22	60	354	773	1682	2086	907	413	327	306	313	338	342	591	812	367	306	261	239	190	10873
W 02	127	41	33	16	29	61	366	838	1642	2065	862	468	373	379	346	425	328	622	872	358	324	253	253	207	11288
T 03	139	45	34	21	19	69	365	774	1647	2053	929	470	398	388	376	410	327	548	813	345	367	232	254	201	11224
F 04	145	64	41	27	33	66	344	721	1607	2008	878	469	381	432	405	436	347	652	831	368	393	265	235	227	11375
S 05	206	125	100	101	82	65	111	181	293	354	438	458	455	508	486	489	434	424	426	462	396	254	261	307	7416
S 06	273	164	137	131	78	76	135	92	4	2	202	423	541	529	553	475	385	204	2	1	257	218	176	106	5164
M 07	60	27	23	30	60	287	621	1489	1796	1025	457	317	324	280	385	284	544	924	321	211	230	201	155	122	10173
T 08	47	38	19	26	62	308	663	1607	2056	996	456	325	370	339	421	294	580	909	353	294	258	254	190	109	10974
W 09	41	24	19	20	78	299	688	1556	1958	1077	464	362	366	363	445	310	576	883	398	312	265	267	211	135	11117
T 10	50	45	26	29	62	344	746	1621	2093	976	426	332	357	361	415	327	607	819	357	339	262	277	188	121	11180
F 11	56	36	33	32	60	286	680	1502	1937	927	427	387	354	355	388	311	478	791	379	330	265	232	227	206	10579
S 12	106	88	89	63	54	133	209	282	360	448	408	449	459	476	415	489	416	380	438	432	270	259	298	272	7293
S 13	199	114	129	95	62	69	91	160	182	316	386	451	489	575	579	496	422	426	400	346	267	225	201	104	6784
M 14	52	30	27	36	64	328	662	1519	1970	750	371	331	323	359	434	388	573	770	340	303	261	250	195	102	10438
T 15	40	40	18	26	58	340	717	1503	1999	794	405	406	408	434	464	361	583	833	410	348	273	258	201	134	11053
W 16	51	24	21	30	63	317	711	1515	1900	817	434	441	440	405	463	374	642	850	362	330	292	289	259	161	11191
T 17	62	49	35	28	59	315	632	1521	1822	796	464	405	398	439	484	382	618	828	346	309	235	222	221	127	10797
F 18	50	62	49	37	59	314	612	1294	1513	772	428	429	423	399	410	288	562	659	328	303	233	206	199	168	9797
S 19	105	75	88	55	43	87	165	216	302	371	399	453	490	491	425	420	395	374	403	391	258	235	264	200	6705
S 20	154	96	102	84	48	74	95	138	174	257	391	408	448	490	472	421	438	397	377	306	322	212	193	98	6195
M 21	57	32	30	19	53	349	700	1577	1869	757	378	312	348	368	396	291	574	841	336	294	236	219	181	103	10320
T 22	40	34	16	30	53	330	735	1611	2053	899	417	400	369	375	386	416	463	385	559	856	324	313	283	267	229
W 23	48	27	20	23	51	354	742	1639	1951	1021	364	375	386	416	463	385	559	856	324	313	283	267	229	139	11235
T 24	59	27	29	25	63	346	741	1660	2029	900	431	365	361	399	463	380	594	844	405	307	276	260	239	135	11338
F 25	61	53	43	33	55	323	715	1510	1852	870	465	385	404	409	449	342	637	784	382	349	256	250	231	179	11037
S 26	111	87	90	52	48	103	155	287	328	426	441	469	437	478	469	462	430	409	384	435	274	248	290	330	7243
S 27	198	146	138	128	58	68	127	174	213	332	408	456	559	484	455	450	432	428	392	314	299	249	212	132	6852
M 28	56	37	30	24	57	336	725	1553	1980	795	221	215	197	228	391	310	587	879	377	287	259	240	219	115	10118
T 29	37	24	24	22	61	348	743	1668	1925	929	247	213	258	208	372	330	622	867	359	322	294	261	253	125	10512

Hour Totals for Month

Avg = 9,724

2765	1500	1652	15089	43052	13762	11696	12931	15251	12678	8450	6664
1732	1301	6786	32634	26651	11646	11921	11306	20458	9709	7365	4786

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Monthly Totals	Averages
Daily Totals	24995	41049	54485	55172	44539	42888	28657	Total Daily	291785 ADT for 30.0 Days
Number of Days	4.0	4.0	5.0	5.0	4.0	4.0	4.0	Total Weekdays	238133 Wkdy for 22.0 Days
Daily Average	6249	10262	10897	11034	11135	10722	7164	Total Weekends	53652 Wknd for 8.0 Days

APPENDIX E

CALCULATIONS & ANALYSIS

TABLE 1

FALLING-WEIGHT DEFLECTOMETER DATA

THOMPSON BOAT CENTER PARKING LOT

NDT No.	Force (kip)	d1 (0)	d3 (12")	d4 (24")	Subgrade Modulus (ksi)	Subgrade Modulus (ksi)	Subgrade Modulus (ksi)	Average Subgrade Modulus (ksi)
					d5 (36")	d6 (48")	(ksi)	
1	15.16	61.19	46.91	23.67	2.11	12.77	2.61	7.57
2	15.31	60.02	46.36	25.28	2.00	14.10	2.39	8.05
3	16.80	50.29	38.40	19.41	2.86	8.92	4.14	6.04
4	15.43	65.14	43.14	19.83	2.57	9.62	3.53	5.30
5	14.04	66.20	45.55	18.42	2.52	7.69	4.02	5.12
6	14.28	62.84	52.14	25.54	1.85	11.79	2.66	6.05
7	15.48	57.62	44.37	20.82	2.45	10.08	3.38	6.56
8	12.45	49.51	42.89	16.36	2.51	6.08	4.50	3.26
9	12.08	97.77	62.42	26.38	1.51	11.38	2.34	6.23
10	16.11	56.20	41.51	19.68	2.70	10.08	3.52	6.08
11	13.67			Bad Test				
12	15.87	50.42	36.24	15.74	3.33	6.95	5.02	3.99
13	18.07	35.69	30.78	23.68	2.52	17.03	2.33	10.98
								Average Subgrade Modulus (ksi) = <u>3.35</u>

Note: Pavement Deflections Shown Are In 1/1000 Inch

$$\text{Design MR} = 0.33 \times (0.24 \times P) / (dr \times r)$$

Where:
 MR = Resilient Modulus (ksi)
 P = Load (kips)
 dr = Pavement Deflection at Distance r
 From Center of Load (inch)
 r = Distance From Center of Load (inch)

TABLE 1 (cont'd)
FALLING-WEIGHT DEFLECTOMETER DATA

ROCK CREEK PARKWAY - NORTHBOUND (Right Lane)

NDT No.	Station	Force (kip)	d1 (0")	d3 (12")	d4 (24")	Subgrade Modulus (ksi)	d5 (36")	Subgrade Modulus (ksi)	d6 (48")	Subgrade Modulus (ksi)	Deflection Basin "Area" (inch)	Comment
1	3+25	41.06	18.77	17.74	16.27	6.31	14.14	4.84	12.15	4.22	32.3	
2	4+25	39.09	35.50	23.62	18.80	5.20	14.35	4.54	11.04	4.43	22.8	Weak Pavement & Subgrade
3	5+25	39.16	30.39	28.82	26.24	3.73	23.26	2.81	20.19	2.42	32.3	Strong Pav / Weak Subgrade
4	6+25	39.97	16.61	14.33	12.61	7.92	10.80	6.17	8.87	5.63	29.4	
5	7+25	39.45	17.67	14.65	12.09	8.16	9.40	6.99	7.19	6.86	27.4	
6	8+25	39.53	23.24	22.54	21.25	4.65	19.30	3.41	17.25	2.86	33.6	
7	9+25	38.21	21.79	20.78	18.06	5.29	15.09	4.22	12.10	3.95	31.5	
8	10+25	36.57	27.94	24.19	21.15	4.32	17.67	3.45	15.47	2.95	29.3	
9	11+25	33.91	55.61	36.06	28.53	2.97	27.59	2.05	20.11	2.11	22.9	Strong Pav / Weak Subgrade
10	12+17	34.38	15.02	14.14	13.44	6.40	12.57	4.56	11.29	3.81	33.1	
11	13+25	37.11	17.01	16.11	15.23	6.09	14.22	4.35	13.48	3.44	33.1	Atypical Deflections
12	14+25	37.89	6.07	5.18	4.83	4.51	4.51					
13	15+25	36.87	35.38	32.19	28.05	3.29	23.99	2.56	19.97	2.31	30.5	
14	16+25	37.84	24.18	21.72	18.71	5.06	15.96	3.95	14.67	3.22	30.0	
15	17+25	37.48	21.53	19.23	15.97	5.87	13.36	4.68	12.07	3.88	29.3	
16	18+25	36.65	28.01	25.03	19.90	4.60	16.33	3.74	13.78	3.32	28.7	
17	19+25	38.87	13.81	12.01	10.33	9.41	8.86	7.31	7.45	6.52	29.3	
18	20+25	38.18	22.18	17.48	16.16	5.91	14.97	4.25	13.50	3.54	28.2	
19	21+25	37.60	24.19	15.65	13.34	7.05	11.46	5.47	9.91	4.74	23.2	
20	22+25	37.28	27.23	25.11	22.70	4.11	19.95	3.11	16.68	2.79	31.5	

Note: Pavement Deflections Shown Are In 1/1000 Inch

$$\text{Design MR} = 0.25 \times (0.24 \times P) / (dr \times r)$$

Where: MR = Resilient Modulus (ksi)

P = Load (kips)

dr = Pavement Deflection at Distance r
From Center of Load (inch)

r = Distance From Center of Load (inch)

TABLE 1 (cont'd)

FALLING-WEIGHT DEFLECTOMETER DATA

ROCK CREEK PARKWAY - NORTHBOUND (Right Lane)

NDT No.	Station	Force (kip)	d1 (0")	d3 (12")	d4 (24")	Subgrade Modulus (ksi)	d5 (36")	Subgrade Modulus (ksi)	d6 (48")	Subgrade Modulus (ksi)	Deflection Basin "Area" (inch)	Comment
21	23+25	37.65	24.24	20.44	18.07	5.21	16.34	3.84	14.03	3.35	29.1	
22	24+25	37.21	27.47	26.12	25.58	3.64	22.36	2.77	16.51	2.82	33.5	
23	25+25	37.35	24.57	21.91	19.95	4.68	17.75	3.51	15.65	2.98	30.8	
24	26+25	37.04	22.46	17.93	14.08	6.58	10.95	5.64	8.21	5.64	26.0	
25	27+25	36.84	22.77	20.84	18.93	4.87	16.98	3.62	15.08	3.05	31.4	
26	28+25	37.06	22.79	20.08	17.83	5.20	15.69	3.94	13.72	3.38	30.1	
27	29+25	36.55	26.69	22.41	18.87	4.84	15.51	3.93	12.63	3.62	28.0	
28	30+25	35.06	31.07	23.42	17.91	4.89	14.25	4.10	11.28	3.89	24.7	
29	31+46	35.94	31.63	25.95	21.67	4.15	18.76	3.19	15.68	2.87	27.6	
30	32+25	34.89	34.17	31.55	28.83	3.03	26.28	2.21	21.86	2.00	31.8	
31	33+25	33.18	58.48	51.69	42.48	1.95	34.39	1.61	27.61	1.50	28.9	Strong Pave / Weak Subgrade
32	34+25	34.01	39.37	36.31	31.92	2.66	27.30	2.08	22.84	1.86	31.0	Strong Pave / Weak Subgrade
33	35+25	35.84	27.00	23.75	20.68	4.33	18.43	3.24	16.04	2.79	29.8	
34	36+25	36.01	22.28	20.74	18.86	4.77	16.94	3.54	14.71	3.06	31.9	Weak Pavement & Subgrade
35	37+25	36.01	29.14	18.67	13.76	6.54	10.48	5.73	7.88	5.71	21.5	Weak Pavement & Subgrade
36	38+25	35.47	18.76	16.74	14.74	6.02	12.95	4.56	11.09	4.00	30.3	
37	39+25	35.13	16.28	14.59	12.30	7.14	10.52	5.57	9.01	4.87	29.7	
38	40+25	35.33	23.91	20.92	16.41	5.38	13.33	4.42	10.91	4.05	28.1	
39	41+25	35.08	24.52	19.74	13.03	6.73	8.67	6.74	6.05	7.25	24.2	
40	42+25	34.59	25.98	22.91	16.48	5.25	11.99	4.81	8.96	4.83	27.0	
41	43+25	33.84	45.47	43.69	39.51	2.14	33.07	1.71	26.31	1.61	32.3	Strong Pave / Weak Subgrade
					Avg =	5.16		4.08		3.70		29.20

Note: Pavement Deflections Shown Are In 1/1000 Inch

$$\text{Design MR} = 0.25 \times (0.24 \times P) / (dr \times r)$$

Where: MR = Resilient Modulus (ksi)

P = Load (kips)

dr = Pavement Deflection at Distance r

From Center of Load (inch)

r = Distance From Center of Load (inch)

TABLE 1 (cont'd)

FALLING-WEIGHT DEFLECTOMETER DATA

ROCK CREEK PARKWAY - SOUTHBOUND (Right Lane)

NDT No.	Station	Force (kip)	d1 (0")	d3 (12")	d4 (24")	Subgrade Modulus (ksi)	d5 (36")	Subgrade Modulus (ksi)	d6 (48")	Subgrade Modulus (ksi)	Deflection Basin "Area" (inch)	Comment
45	42+30	35.08	17.67	16.09	14.38	6.10	12.91	4.53	11.15	3.93	31.1	
44	41+38	34.62	18.91	16.40	12.56	6.89	8.93	6.46	5.99	7.22	27.2	
43	40+75	34.99	24.96	15.80	11.11	7.34	23.26	4.93	20.19	2.17	24.5	
42												
41	38+75	30.91	63.72	55.85	35.85	2.16	22.96	2.24	15.40	2.51	25.4	Weak Pavement & Subgrade
40	39	37+75	32.06	57.47	42.34	25.47	3.15	15.42	3.47	10.54	3.80	21.8
	38	36+75	31.88	50.40	37.89	25.52	3.12	17.18	3.09	12.06	3.30	23.1
	37	35+75	32.25	45.28	35.43	26.96	2.99	20.27	2.65	14.38	2.80	25.2
	36	34+75	33.30	40.87	31.02	22.77	3.66	17.63	3.15	13.29	3.13	24.4
35	33+75	34.01	31.67	25.96	21.05	4.04	17.58	3.22	14.29	2.97	27.1	
34	32+75	34.30	31.25	25.80	20.17	4.25	14.37	3.98	7.03	6.10	26.4	
33	31+75	31.91	56.30	37.49	22.72	3.51	14.95	3.56	9.53	4.19	20.4	Weak Pavement & Subgrade
32	30+75	33.18	39.77	29.73	18.41	4.51	11.46	4.83	8.64	4.80	22.3	
31	29+75	33.06	38.49	27.42	16.54	5.00	10.95	5.03	7.61	5.43	21.4	
30	28+75	33.20	45.97	36.31	24.88	3.34	17.80	3.11	12.41	3.34	24.3	Weak Pavement & Subgrade
29	27+75	32.86	41.98	31.27	21.29	3.86	16.21	3.38	12.89	3.19	23.3	
28	26+75	32.25	43.15	34.36	24.38	3.31	18.31	2.94	14.14	2.85	24.9	
27	25+75	33.15	31.58	25.66	18.80	4.41	13.87	3.98	10.65	3.89	25.5	
26	24+75	32.69	36.42	27.83	18.91	4.32	13.74	3.97	10.29	3.97	23.7	

Note: Pavement Deflections Shown Are In 1/1000 Inch

$$\text{Design MR} = 0.25 \times (0.24 \times P) / (dr \times r)$$

Where: **MR** = Resilient Modulus (ksi)
P = Load (kips)
dr = Pavement Deflection at Distance **r**
From Center of Load (inch)
r = Distance From Center of Load (inch)

TABLE 1 (cont'd)

FALLING-WEIGHT DEFLECTOMETER DATA

ROCK CREEK PARKWAY - SOUTHBOUND (Right Lane)

NDT No.	Station	Force (kip)	d1 (0")	d3 (12")	d4 (24")	Subgrade Modulus (ksi)	d5 (36")	d6 (48")	Subgrade Modulus (ksi)	Deflection Basin "Area" (inch)	Comment
25	23+75	33.37	29.88	25.37	19.13	4.36	14.45	3.85	10.75	3.88	26.8
24	22+75	31.45	35.84	30.43	22.77	3.45	17.20	3.05	12.88	3.05	26.7
23	21+75	31.57	57.49	46.52	25.31	3.12	18.11	2.91	20.19	1.95	22.9
22	20+75	30.74	61.41	51.49	35.89	2.14	22.48	2.28	14.26	2.69	25.3
21	19+75	33.40	32.60	30.81	27.03	3.09	21.28	2.62	16.68	2.50	31.2
20	18+75	33.47	28.04	24.80	21.15	3.96	13.89	4.02	9.55	4.38	28.6
19	17+75	34.86	17.60	15.12	13.39	6.51	11.38	5.11	9.55	4.56	29.3
18	16+75	33.25	24.60	20.82	17.13	4.85	13.70	4.05	10.91	3.81	27.9
17	15+75	34.01	24.29	16.01	14.27	5.96	12.44	4.56	10.77	3.95	24.0
16	14+75	33.91	13.94	10.88	9.75	8.69	8.74	6.47	7.64	5.55	27.5
15	13+75	34.74	6.95	4.18	3.91		3.63		3.30		Atypical Deflections
14	12+93	33.59	26.02	25.10	23.25	3.61	21.66	2.58	19.32	2.17	33.3
13	11+73	34.30	12.96	11.71	11.78	7.28	11.63	4.92	11.62	3.69	33.1
12	10+75	34.45	18.75	16.48	15.23	5.65	13.79	4.16	12.22	3.52	30.7
11	9+75	34.35	15.18	13.63	12.06	7.12	10.44	5.48	8.62	4.98	30.4
10	8+75	33.57	19.49	17.45	15.40	5.45	13.15	4.25	10.94	3.84	30.3
9	7+75	34.35	14.73	13.25	11.53	7.45	9.56	5.99	7.81	5.50	30.1
8	6+75	31.93	41.01	33.31	26.21	3.05	20.63	2.58	15.83	2.52	26.4
7	5+75	32.03	15.00	12.84	11.46	6.99	9.93	5.38	8.56	4.68	29.4
6	4+75	33.72	14.72	11.55	9.93	8.49	8.47	6.64	5.68	7.42	27.0
5	3+75	34.59	7.87	6.72	6.09	14.20	5.54	10.41	4.93	8.77	29.8
4	2+75	32.84	23.78	15.23	8.41	9.76	6.13	8.93	5.06	8.11	19.5
					Avg.=	5.16		4.33		4.13	26.5

Note: Pavement Deflections Shown Are In 1/1000 Inch

Design MR = $0.25 \times (0.24 \times P) / (dr \times r)$

Where: MR = Resilient Modulus (ksi)

P = Load (kips)

dr = Pavement Deflection at Distance r

From Center of Load (inch)

r = Distance From Center of Load (inch)



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BY PAD DATE 6/7/03

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Determine Number of 18^k ESAL for

- Parkway
 - Thompson Boat Center
 - P- Street Ramps,

Traffic Survey Data

Daniel Consultants - Revised traffic count data for Parkway

Northbound Counts 1/29/03 Total = 23,874 vehicles
 1/30/03 = 24,912 " "

Southbound Counts 1/29/03 Total = 25,822 Vehicles
 1/30/03 = 27,343

National Park Service Data for April 2003
Rock Creek Parkway at Waterside Drive

Northbound Lanes 1 + 2 + 3 + 4

Darby Aug. 2 3204 + 6924 + 10,238 + 8700
= 29,066 vehicles

Southbound (Lanes 5+6+7)

$$\begin{aligned} \text{Daily Avg.} &= 4,624 + 11,297 + 9724 \\ &= 25,645 \text{ vehicles.} \end{aligned}$$

Use Average From Daniel Data.

$$\begin{aligned} \text{Avg. } \# \text{ Vehicles} &= (23,874 + 24,912 + 25,822 + 27,343) / 4 \\ &= 25,488 \text{ each direction} \end{aligned}$$

Vehicle Mix. - Use Manual Count Data for 5/4/03
By Daniel Consultants.

Type 1 (motorcycle)	=	0.57 %
Type 2 (passenger car)	=	94.97 %
Type 3 (truck - 2 axle / 4 tire)	=	4.02 %
Type 4 (buses)	=	0.33 %
Type 5 (truck - 2 axle / 4+ tire)	=	0.11 %
		100.00 %

Table D.19. Worksheet for Calculating 18-kip Equivalent Single Axle Load (ESAL) Applications

Location	Rock Creek Parkway	Analysis Period =	30 Years		
		Assumed SN or D =	6" PCC		
Vehicle Types	Current Traffic (A)	Growth Factors (B)	Design Traffic (C)	E.S.A.L. Factor (D)	Design E.S.A.L. (E)
Passenger Cars (2)	24,206	40.57	3.58×10^8	.0004	1.43×10^5
Buses (4)	84		1.24×10^6	.168060	8.44×10^5
Panel and Pickup Trucks (3)	1,025		1.52×10^7	.0122	1.85×10^5
Other 2-Axle/4-Tire Trucks (5)	28		4.15×10^5	.0052	2.16×10^3
2-Axle/6-Tire Trucks					
3 or More Axle Trucks					
All Single Unit Trucks					
3 Axle Tractor Semi-Trailers					
4 Axle Tractor Semi-Trailers					
5+ Axle Tractor Semi-Trailers					
All Tractor Semi-Trailers					
5 Axle Double Trailers					
6+ Axle Double Trailers					
All Double Trailer Combos					
3 Axle Truck-Trailers					
4 Axle Truck-Trailers					
5+ Axle Truck-Trailers					
All Truck-Trailer Combos					
All Vehicles	25,343		3.75×10^8	Design E.S.A.L.	1.17×10^6



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Calculate #18^k ESAL for Design Lane of Parkway.

Use Terminal Serviceability Index $P_t = 2.5$

Design Period = 30 years (AASHTO p. I-7)
Growth = 2% per year.

$$\text{Total } 18^k \text{ ESAL} = 1.17 \times 10^6$$

Lane Distribution - Use 80/20

$$\begin{aligned}\text{Design } 18^k \text{ ESAL} &= 0.80 \times 1.17 \times 10^6 \\ &= 936,000\end{aligned}$$

Thompson Boat Center - Entrance

ADT = 322 vehicles per day

30 year design period - 2% growth

$$\# \text{ Vehicles} = 322 \times 40.57 \times 365 = 4,768,192$$

$$\begin{aligned}\text{Weighted ESAL Factor} &= (.0004 \times 94.97/100) \\ &+ (.6806 \times 0.33/100) + (.0122 \times 4.02/100) \\ &+ (.0052 \times 0.11/100) = 0.0031\end{aligned}$$

$$\# 18^k \text{ ESAL} = 4,768,192 \times .0031 = 14,886$$

P-Street Ramps

Use higher Volume Entrance Traffic Counts

ADT = 5880 vehicles per day

30 yr. design life - 2% Growth

$$\# \text{ Vehicles} = 5880 \times 40.57 \times 365 = 87,071,334$$

$$\# 18^k \text{ ESAL} = 87,071,334 \times .0031 = 269,921$$



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Existing Pavement Conditions

Design Drawings Show 2" bituminous Surface
and 6"-8" PCC Base Course

Pavement Cores.

<u>Core #</u>	<u>Thickness AC</u>	<u>Thickness PCC</u>
1	3"	8.5"
2	12"	-
3	10"	7"
4	5"	6"
5	8"	7"
6	8"	6"
7	4"	6"
8	5"	-
9	5"	8"
10	11"	7"
11	6"	7"
12	5"	6"
13	13"	-
14	3"	6"

Pavement Sections with AC and PCC

Minimum 3" AC / 6" PCC
Max. 15" AC / 8" PCC

Pavement Sections with AC Only,

Minimum 5" AC
Maximum 13" AC



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Pavement Subgrade For Parkway.

Laboratory Tests - CBR ranges from 4 to 11
(typical modulus would range from 5,000 to 10,000 psi.)

Falling Wt. Deflectometer -
Subgrade Modulus = 4.4 ksi (avg.).

* Use Subgrade Modulus = 5,000 psi for design purposes.

Determine Requirements For New Pavement

Rigid Pavement - Use $18^k \text{ ESAL} = 936,000$

Concrete Elastic Modulus ($f'c = 4,000 \text{ psi}$)

$$E_c = 57,000 \sqrt{4000} = 3.6 \times 10^6 \text{ psi}$$

Concrete Modulus of Rupture

$$S'_c = 0.7 \sqrt{4000} = 570 \text{ psi}$$

Load Transfer Coefficient (T)

AASHTO type II 2S Use $T = 3.2$

Drainage Coefficient $C_d = 1.0$

Subgrade Modulus - Use $k = M_R / 19.4$

$$\text{Use } k = \frac{5000}{19.4} = 257 \text{ psi (seems high)}$$

Use $k = 200 \text{ psi}$

Design Serviceability Loss ΔPSI

$$\text{Use } \Delta \text{PSI} = 2.5$$

Standard Deviation $S_o = 0.30$

Reliability ($\% R$) = 95%

Figure 3.7 Design Slab Thickness = 6 $\frac{1}{2}$ "

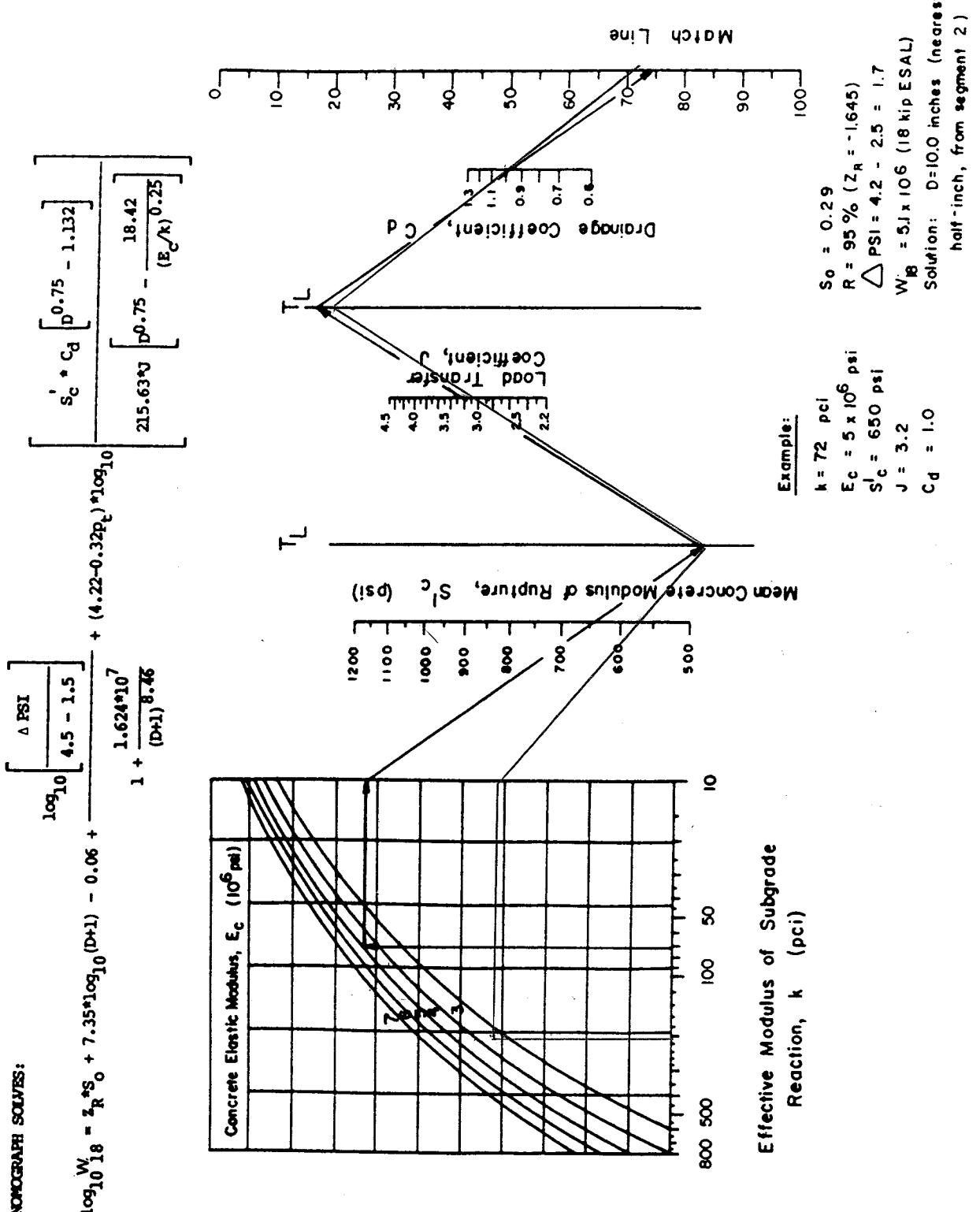


Figure 3.7. Design Chart for Rigid Pavement Based on Using Mean Values for Each Input Variable (Segment 1)

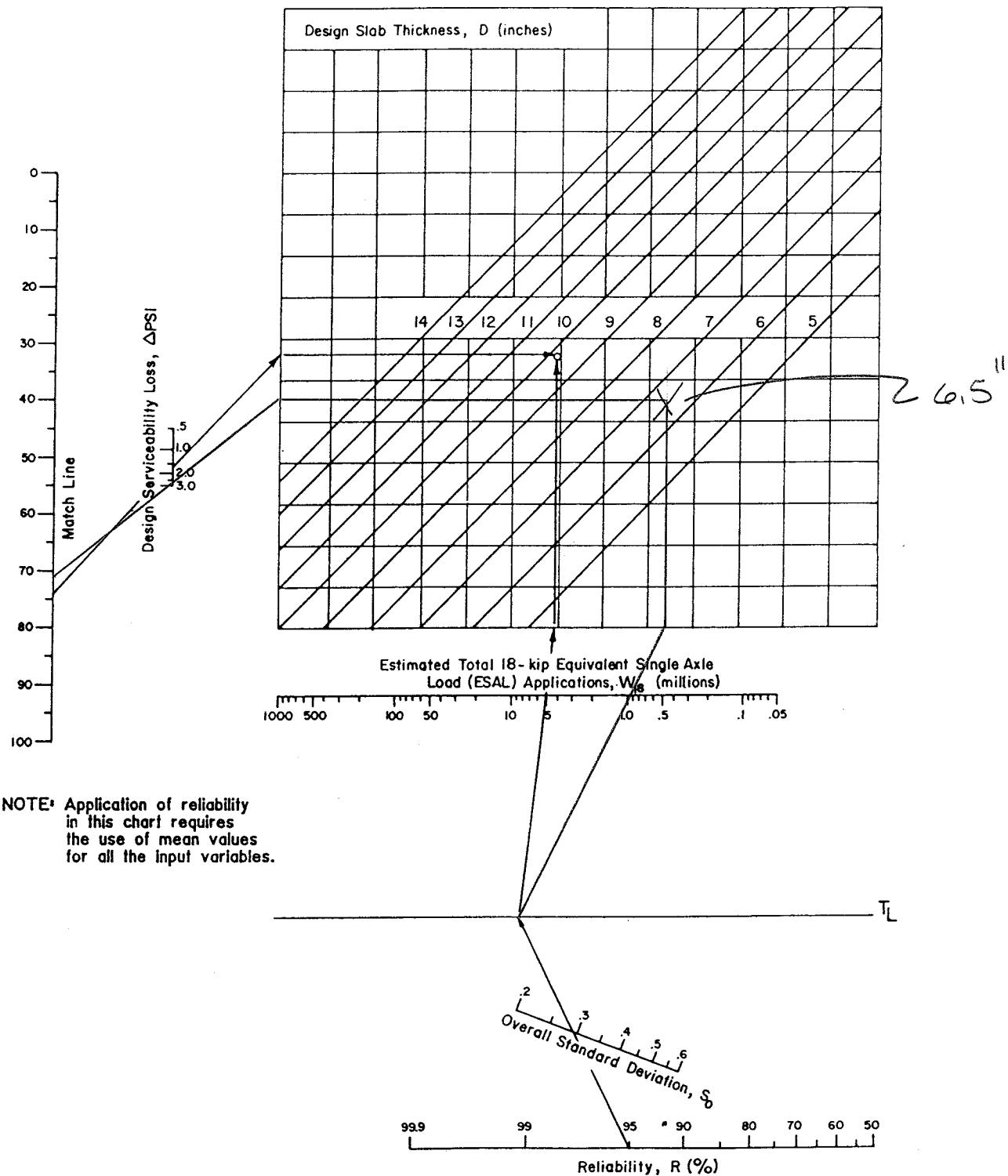


Figure 3.7. Continued—Design Chart for Rigid Pavements Based on Using Mean Values for Each Input Variable (Segment 2)



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Flexible Pavement

$$18^k \text{ ESAL} = 936,000$$

$$\text{Reliability } \% R = 95\%$$

$$\text{Standard Deviation } S_o = 0.40$$

$$\text{Subgrade Modulus } M_R = 5,000 \text{ psi}$$

$$\Delta P S I = 2.5$$

Figure 3.1 Structural Number Required
 $SN = 4.0$

Structural Evaluation of Existing Pavement

Use Asphalt Institute Conversion Factors

TABLE 20.2. The Asphalt Institute Conversion Factors^a

Material Type	Equivalency
Asphalt Materials	
1 in. A.C. (uncracked, little deformation)	0.9-1.0 in. A.C.
1 in. Asphalt-treated base (other than A.C.)	0.7-0.9 in. A.C.
1 in. Liquid asphalt mix (stable, uncracked, no def.)	0.7-0.9 in. A.C.
1 in. A.C. (fine cracking, slight deformation, stable)	0.7-0.9 in. A.C.
1 in. A.C. (appreciable cracking, little or no spalling, some deformation, but essentially stable)	0.5-0.7 in. A.C.
1 in. A.C. (large cracks, spalls, appreciable deformation)	0.3-0.5 in. A.C.
Portland Cement Concrete	
1 in. P.C.C. (stable, uncracked)	0.9-1.0 in. A.C.
1 in. P.C.C. base under A.C. (stable, little cracking)	0.9-1.0 in. A.C.
1 in. P.C.C. (stable, slight cracking)	0.7-0.9 in. A.C.
1 in. P.C.C. (appreciably cracked, faulted, fragments 1-4 yd ²)	0.5-0.7 in. A.C.
1 in. P.C.C. (broken, pieces 2 ft or less in max dimensions—with subbase)	0.3-0.5 in. A.C.
1 in. P.C.C. (broken, pieces 2 ft or less in max dimensions—on subgrade)	0.3-0.5 in. A.C.

Calculate SN for each pavement core

$$P-1 \quad SN = 0.44 (3 \times 0.8 + 8.5 \times 1.0) = 4.8$$

$$P-2 \quad SN = 0.44 (12 \times 0.9) = 4.8$$

$$P-3 \quad SN = 0.44 (10 \times 0.8 + 7 \times 0.4) = 4.8$$

$$P-4 \quad SN = 0.44 (5 \times 0.8 + 6 \times 1.0) = 4.4$$

$$P-5 \quad SN = 0.44 (8 \times 0.8 + 7 \times 1.0) = 5.9$$

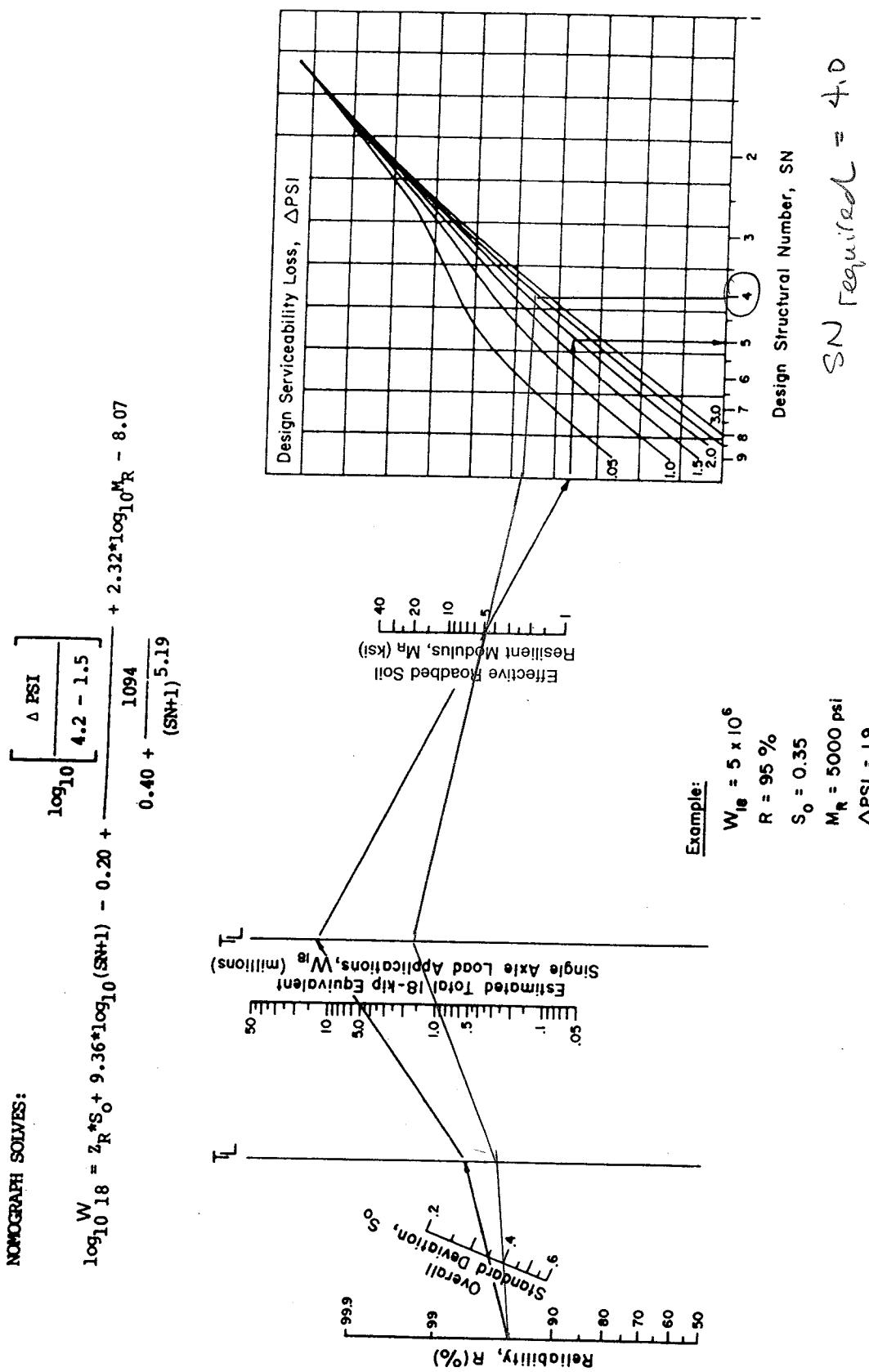


Figure 3.1. Design Chart for Flexible Pavements Based on Using Mean Values for Each Input

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P-6	SN =	$0.44 (8 \times 0.4 + 6 \times 1.0) = 4.0$
P-7	SN =	$0.44 (4 \times 0.4 + 6 \times 1.0) = 3.3$
P-8	SN =	$0.44 (5 \times 0.5) = 1.1$
P-9	SN =	$0.44 (15 \times 0.8 + 8 \times 1.0) = 8.8$
P-10	SN =	$0.44 (11 \times 0.8 + 7 \times 1.0) = 7.0$
P-11	SN =	$0.44 (6 \times 0.8 + 7 \times 1.0) = 5.2$
P-12	SN =	$0.44 (5 \times 0.8) = 1.8$
P-13	SN =	$0.44 (13 \times 0.8) = 4.6$
P-14	SN =	$0.44 (2 \times 0.8 + 10 \times 0.4) = 2.5$

* Existing Pavement - has sufficient structural capacity, except in localized damaged areas or in areas that have unusually thin pavement sections.



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P-Street Ramps

Determine Required PCC and AC Pavement Section
for 30 yr. Design life

Design Traffic = 270,000 18^k ESAL

PCC Pavement

Use $E_c = 3.6 \times 10^6$ psi

$S_c = 570$ psi

$T = 3.2$

$C_d = 1.0$

$K = 200$ psi

$\Delta \text{PSI} = 2.5$

$S_0 = 0.30$

% R = 95%

Figure 3.7 Design Slab Thickness = 5"

AC Pavement

Figure 3.11 Use % R = 95%

Std. Dev = 0.40

$M_R = 5,000$ psi

$\Delta \text{PSI} = 2.5$

SN Required = 3.5

Typical Section 6" AC

6" Crushed Stone Base

$$SN = 6 \times 0.44 + 6 \times 0.14 = 3.48 \\ \approx 3.5$$

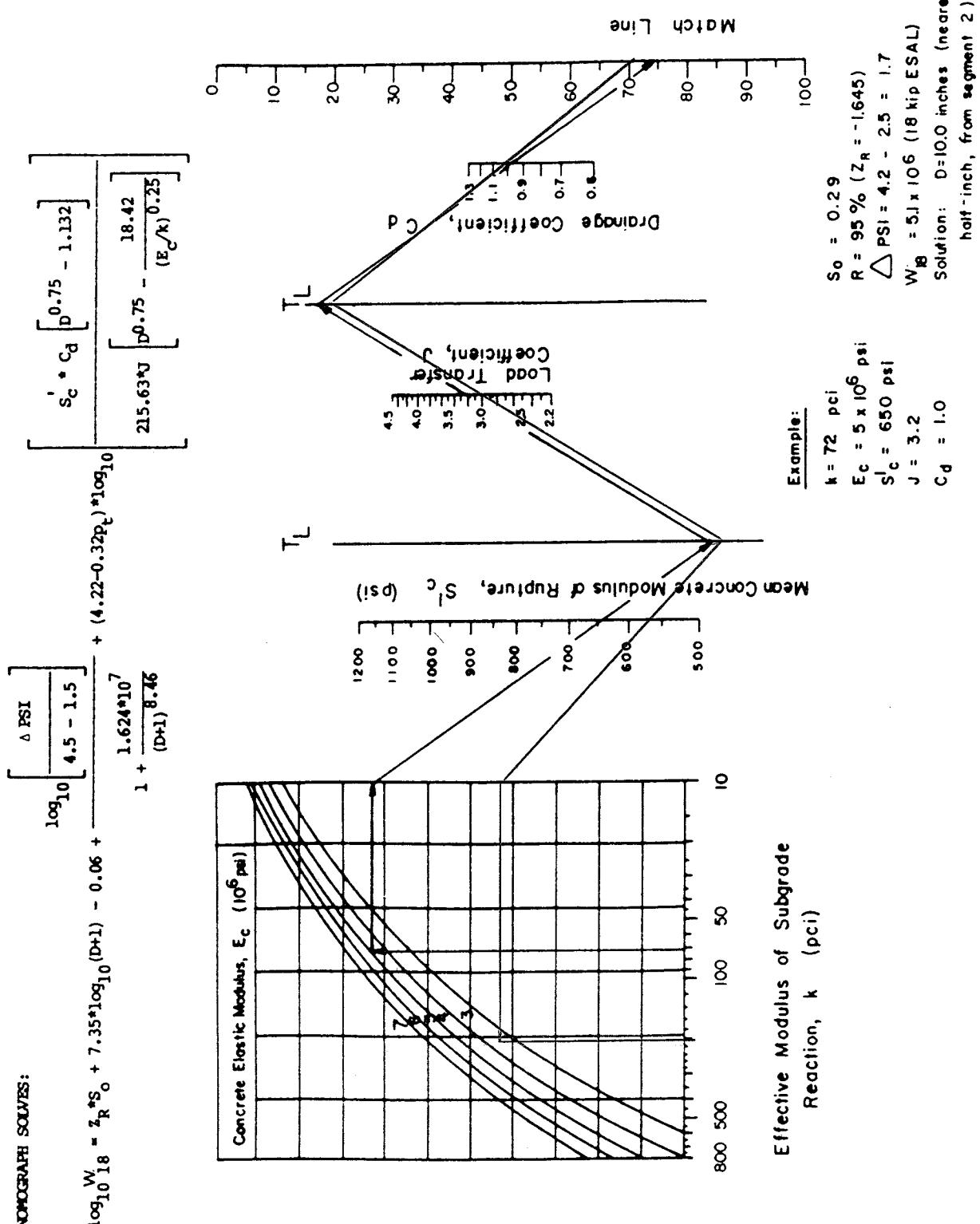


Figure 3.7. Design Chart for Rigid Pavement Based on Using Mean Values for Each Input Variable (Segment 1)

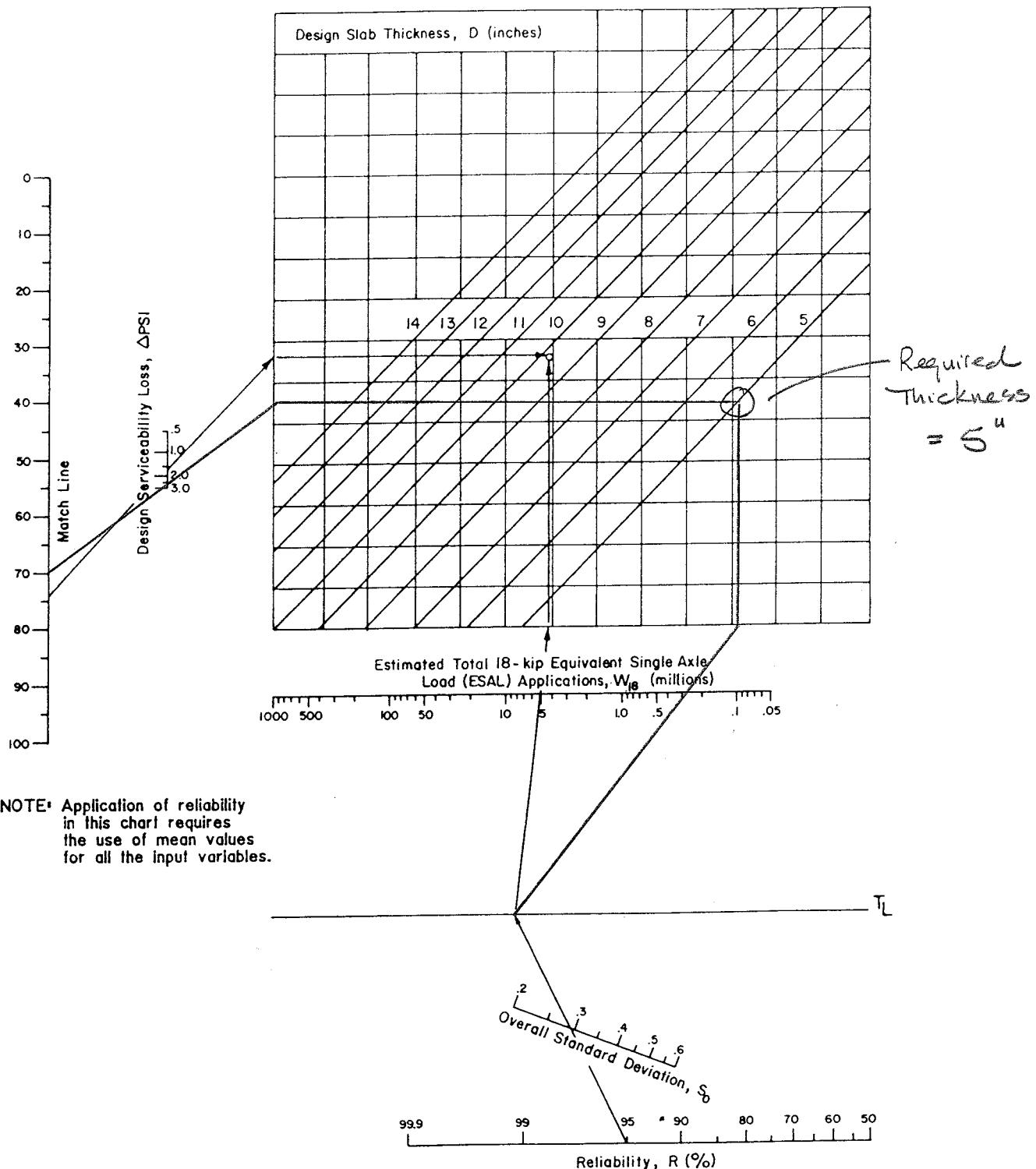


Figure 3.7. Continued—Design Chart for Rigid Pavements Based on Using Mean Values for Each Input Variable (Segment 2)

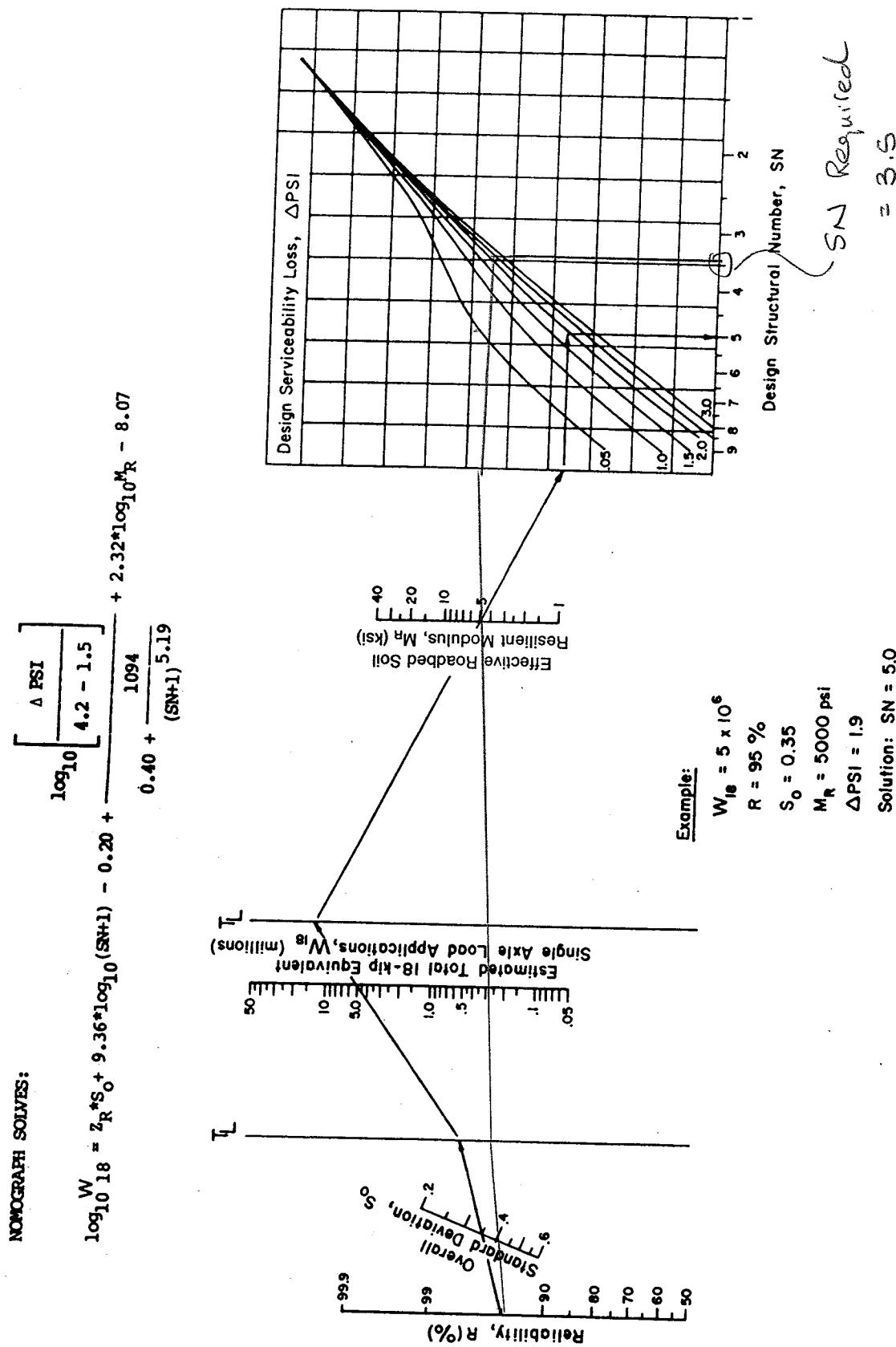


Figure 3.1. Design Chart for Flexible Pavements Based on Using Mean Values for Each Input



Earth
Engineering
& Sciences, Inc.

SUBJECT

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Pavement Design

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Thompson Boat Center

Parking Lot and Access Road

Traffic Volume is Light - Base Pavement Section
on Typical Design for Parking Lot

Typical Pavement Section

Use 4" AC (1.5" Surface Course)
(2.5" Base Course)
6" Crushed Stone Base

New Pavement for Southbound Right Turn Lane
At Entrance to Parking Lot

Design Traffic = 14,866 18k ESAL

Traffic Volume is Light - Replace With
Flexible Pavement Section

Use 8" Full depth Asphalt

3" AC Surface Course
(same as Overall Pavement)
5" AC Base Course,