DATA FORM
ROUTINE WETLAND DETERMINA ON
(1987 COE Wetlands Delineation Manual)

Project/Site:	Fort Stanton	**Project No:**	**Date:** 5-Jan-1999
Applicant/Owner:	KSI		**County:**
Investigators:	LS, RN		**State:** District of Columbia
			Plot ID: 3

SOILS

Map Unit Name (Series and Phase): Udorthents
Map Symbol: U1 **Drainage Class:** N/A **Mapped Hydric Inclusion?**
Taxonomy (Subgroup): Udorthents **Field Observations Confirm Mapped Type?** Yes (No)
Profile Description

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-2	A	10YR3/3	N/A	N/A	N/A	Clay loam
2-8	A	10YR4/4	N/A	N/A	N/A	Clay loam
8-16	B	10YR3/2	7.5YR5/8	Few	Faint	Clay loam

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
YES Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	Is the Sampling Point within the Wetland?	(Yes)	No
Wetland Hydrology Present?	(Yes)	No			
Hydric Soils Present?	(Yes)	No			

Remarks:
Wetland located in floodplain of stream with braided channel.

Board of Zoning Adjustment
District of Columbia
CASE NO.16457
EXHIBIT NO.131A4

DATA FORM
ROUTINE WETLAND DETERMINA ON
(1987 COE Wetlands Delineation Manual)

Project/Site: Fort Stanton	Project No:	Date: 5-Jan-1999
Applicant/Owner: KSI		County:
Investigators: LS, RN		State: District of Columbia
		Plot ID: 4

Do Normal Circumstances exist on the site?	(Yes) No	Community ID: PFO
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID:
Is the area a potential Problem Area?	Yes (No)	Field Location:
(If needed, explain on the reverse side)		Wetland data point 3

VEGETATION (USFWS Region No. 1)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Acer saccharinum	Tree	FACW	*Rosa blanda*	Herb	FACU
Maple,Silver			Rose,Smooth		
Ulmus americana	Tree	FACW-	*Acer rubrum*	Tree	FAC
Elm,American			Maple,Red		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 3/4 = 75.00%

FAC Neutral: 2/3 = 66.67%

Numeric Index: 11/4 = 2.75

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

- Depth of Surface Water: N/A *(in.)*
- Depth to Free Water in Pit: N/A *(in.)*
- Depth to Saturated Soil: N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO Inundated
- NO Saturated in Upper 12 Inches
- YES Water Marks
- NO Drift Lines
- YES Sediment Deposits
- YES Drainage Patterns in Wetlands

Secondary Indicators
- YES Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- YES FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:

DATA FORM
ROUTINE WETLAND DETERMIN. ON
(1987 COE Wetlands Delineation Manual)

Project/Site: Fort Stanton	Project No:	Date: 5-Jan-1999
Applicant/Owner: KSI		County: .
Investigators: LS, RN		State: District of Columbia
		Plot ID: 4

SOILS

Map Unit Name (Series and Phase): Udorthents, clayey
Map Symbol: U5 Drainage Class: N/A
Mapped Hydric Inclusion?
Taxonomy (Subgroup): Udorthents
Field Observations Confirm Mapped Type? Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
0+	A	10YR4/2	7.5YR5/8	Common Prominent	Clay loam

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
YES Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	(Yes)	No	Is the Sampling Point within the Wetland? (Yes) No
Wetland Hydrology Present?	(Yes)	No	
Hydric Soils Present?	(Yes)	No	

Remarks:

DATA FORM
ROUTINE WETLAND DETERMIN/ ON
(1987 COE Wetlands Delineation Manual)

Project/Site:	Fort Stanton	Project No:	Date: 5-Jan-1999
Applicant/Owner:	KSI		County:
Investigators:	LS, RN		State: District of Columbia
			Plot ID: S

Do Normal Circumstances exist on the site?	(Yes) No	Community ID: Forest
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID:
Is the area a potential Problem Area?	Yes (No)	Field Location:
(If needed, explain on the reverse side)		Upland data point 1

VEGETATION (USFWS Region No. 1)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Ulmus americana	Tree	FACW-	*Lonicera japonica*	Tree	FAC-
Elm,American			Honeysuckle,Japanese		
Robinia pseudoacacia	Tree	FACU-	*Ilex opaca*	Tree	FACU+
Locust,Black			Holly,American		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 1/4 = 25.00%

FAC Neutral: 1/3 = 33.33%

Numeric Index: 13/4 = 3.25

Remarks:

HYDROLOGY

NO Recorded Data(Describe in Remarks):
- N/A Stream, Lake or Tide Gauge
- N/A Aerial Photographs
- N/A Other

YES No Recorded Data

Field Observations

Depth of Surface Water:	N/A *(in.)*
Depth to Free Water in Pit:	N/A *(in.)*
Depth to Saturated Soil:	N/A *(in.)*

Wetland Hydrology Indicators

Primary Indicators
- NO Inundated
- NO Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- NO Drainage Patterns in Wetlands

Secondary Indicators
- NO Oxidized Root Channels in Upper 12 Inches
- NO Water-Stained Leaves
- NO Local Soil Survey Data
- NO FAC-Neutral Test
- NO Other(Explain in Remarks)

Remarks:

WetForm^{vn}

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Fort Stanton	Project No:	Date: 5-Jan-1999
Applicant/Owner: KSI		County:
Investigators: LS, RN		State: District of Columbia
		Plot ID: 5

SOILS

Map Unit Name (Series and Phase): Udorthents
Map Symbol: U1 Drainage Class: N/A
Taxonomy (Subgroup): Udorthents
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? Yes (No)
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0-5	A	2.5YR4/6	N/A	N/A	N/A	Sandy clay loam
5-18	B	7.5YR6/8	N/A	N/A	N/A	Sandy clay loam

Hydric Soil Indicators:

NO Histosol	NO Concretions
NO Histic Epipedon	NO High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	NO Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	NO Listed on Local Hydric Soils List
NO Reducing Conditions	NO Listed on National Hydric Soils List
NO Gleyed or Low Chroma Colors	NO Other (Explain in Remarks)

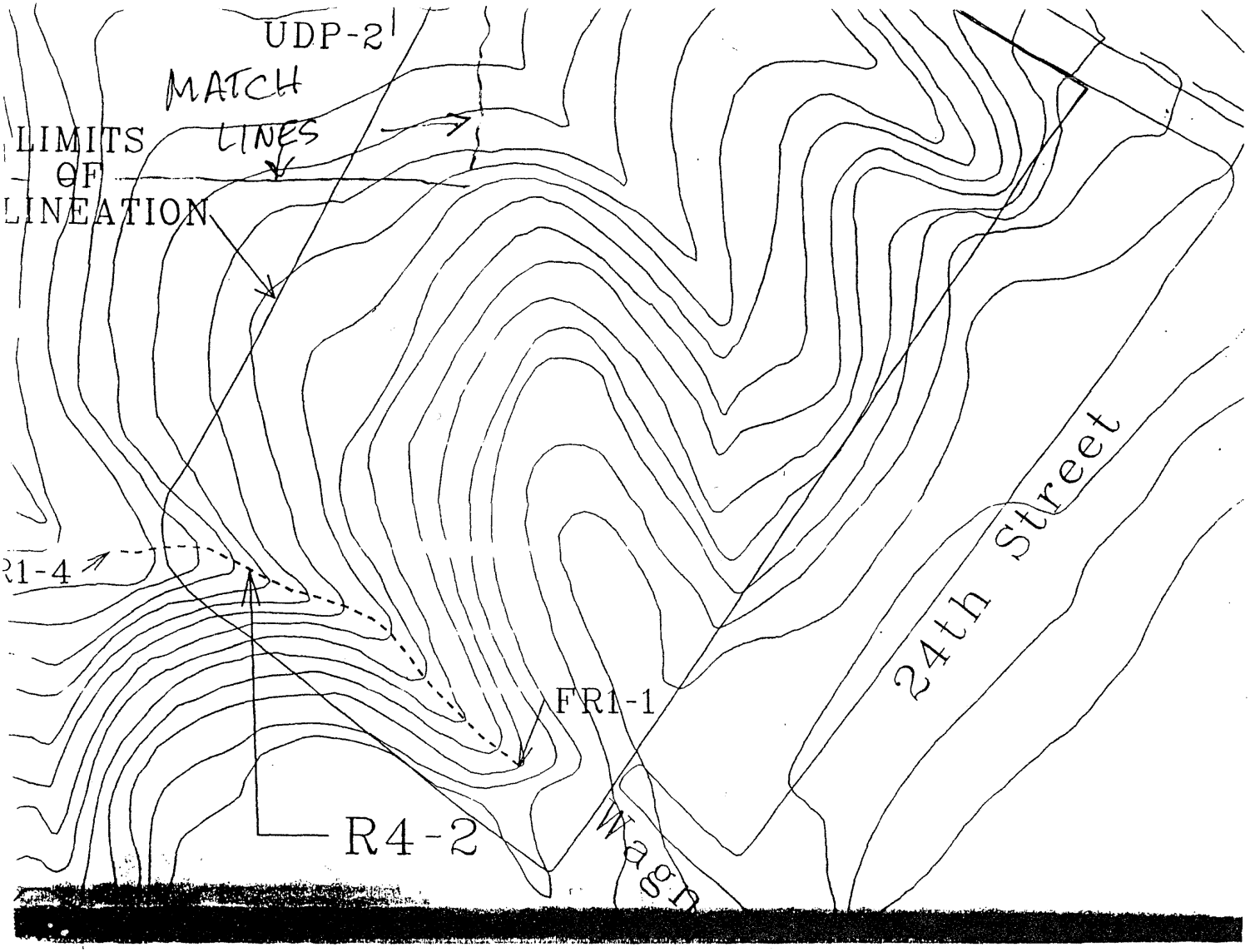
Remarks:

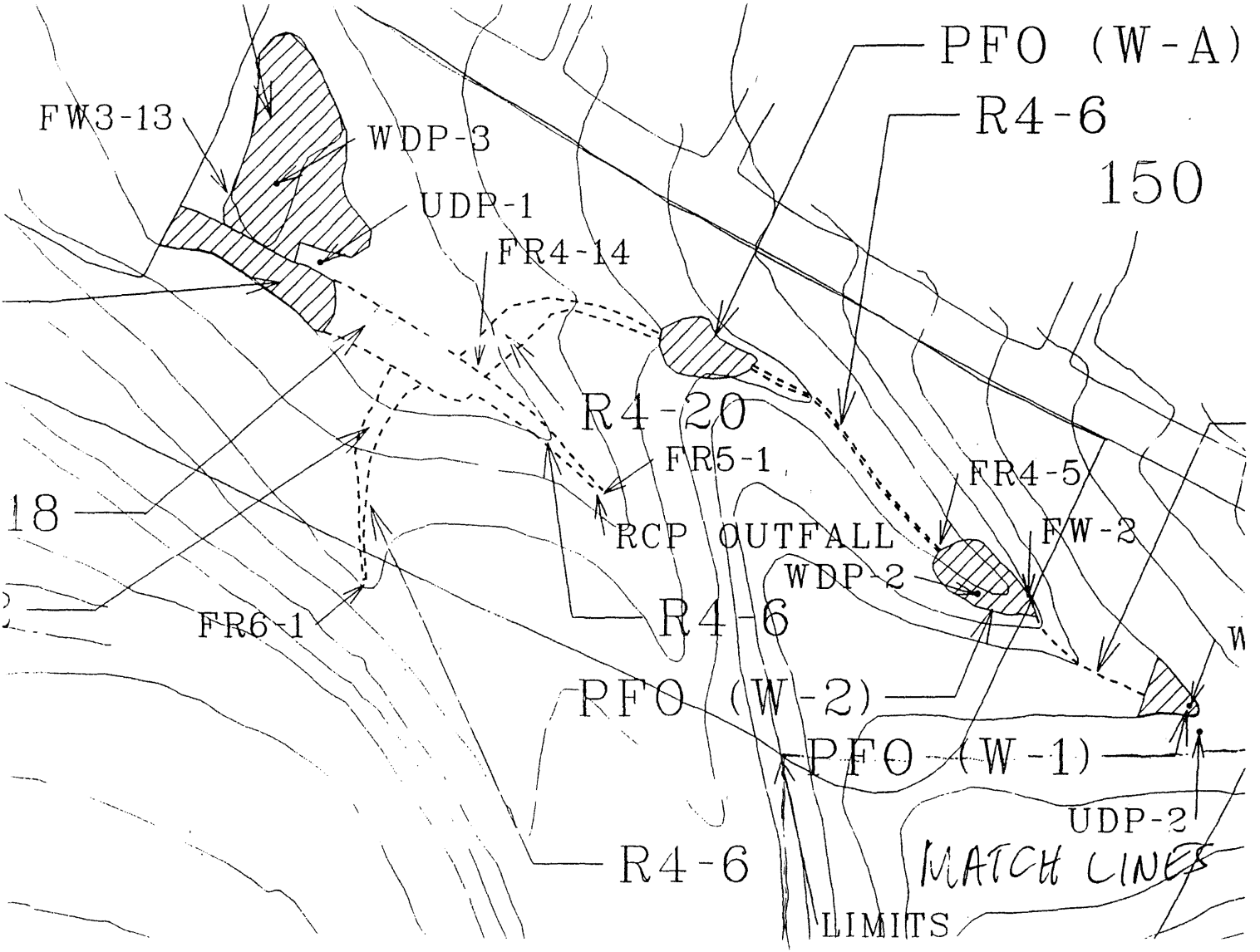
WETLAND DETERMINATION

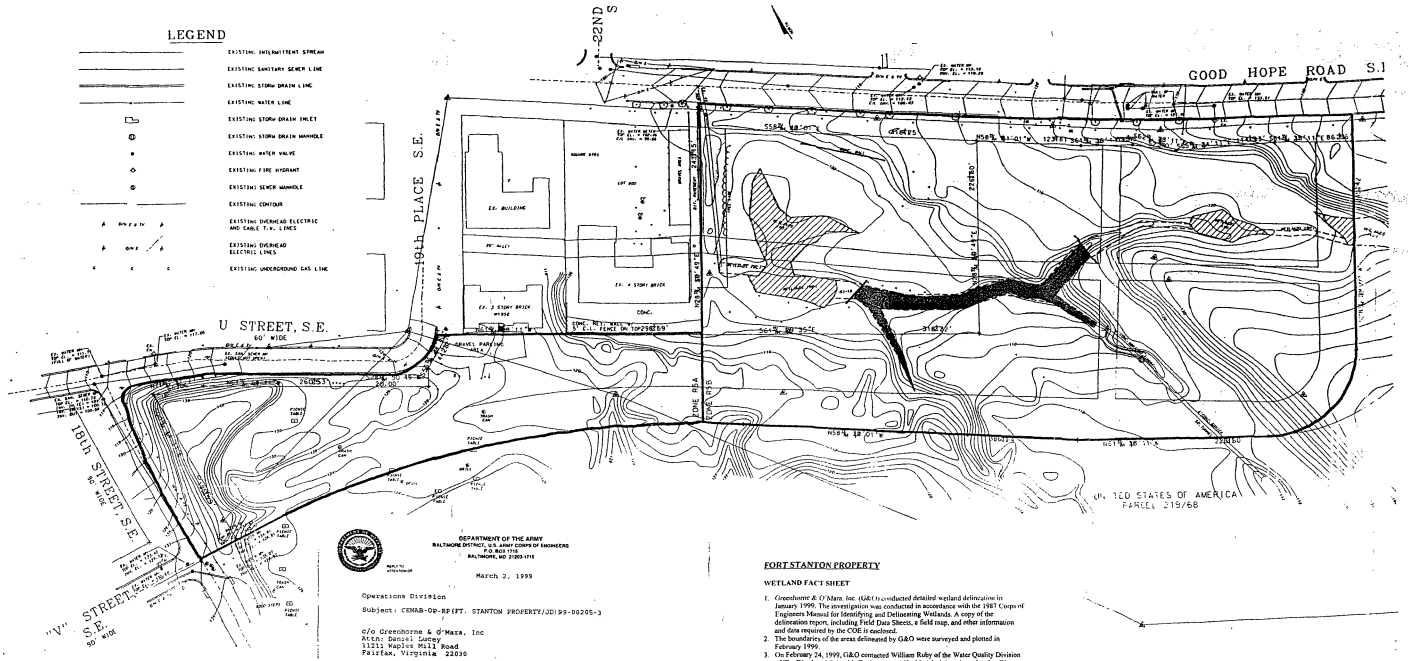
Hydrophytic Vegetation Present?	Yes (No)	Is the Sampling Point within the Wetland? Yes (No)
Wetland Hydrology Present?	Yes (No)	
Hydric Soils Present?	Yes (No)	

Remarks:

WetForm[MR]


UDP-2
MATCH
LINES
LIMITS
OF
LINEATION
R1-4
FR1-1
R4-2
24th Street
Wash


PFO (W-A)
R4-6
150
FW3-13
WDP-3
UDP-1
FR4-14
R4-20
FR5-1
FR4-5
18
RCP OUTFALL
FW-2
WDP-2
FR6-1
R4-6
PFO (W-2)
PFO (W-1)
UDP-2
R4-6
MATCH LINES
LIMITS



FORT STANTON PROPERTY
WETLAND DELINEATION MAP
West Parcel

(AS APPROVED BY US ARMY COE, March 2, 1999)

Approved Limits of Waters of the U.S. (non-vegetated)

Approved Limits of Vegetated Wetlands

Limits of proposed Impacts (Section 404 Permit)

Scale 1" = 50 feet. Greenborne & O'Mara, Inc.

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, US ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

March 2, 1999

Operations Division

Subject: CENAB-Op-RP(FT. STANTON PROPERTY/JD/99-00205-3

c/o Greenborne & O'Mara, Inc
Attn: Daniel Lacey
11211 Waples Mill Road
Fairfax, Virginia 22030

Dear Mr. Lucey:

I am replying to your letter, dated January 8, 1999, requesting a jurisdictional determination and verification of the delineation of waters of the United States, including jurisdictional wetlands, on property located off of Good Hope Road, District of Columbia.

A field inspection was conducted on January 22, 1999. This inspection indicated that the delineation of waters of the United States, including jurisdictional wetlands, on the enclosed map is accurate. Those areas indicated as waters of the United States, including non-tidal wetlands, are regulated by this office pursuant to Section 404 of the Clean Water Act. This verification is valid for five years from the date of this letter, unless new information warrants a revision before the expiration date.

You are reminded that any grading or filling of waters of the United States, including jurisdictional wetlands, is subject to Department of the Army authorization. In addition, the Interstate Land Sales Full Disclosure Act may require that prospective buyers be made aware, by the seller, of the Federal authority over any waters of the United States, including jurisdictional wetlands, being purchased.

If you have any questions concerning this matter, please call George Harrison of this office at (410) 962-6002.

Sincerely,

Richard E. Spencer
Chief, Potomac Basin Section

FORT STANTON PROPERTY

WETLAND FACT SHEET

1. Greenborne & O'Mara, Inc. (G&O) conducted detailed wetland delineation in January 1999. The investigation was conducted in accordance with the 1987 Corps of Engineers Manual for Identifying and Delineating Wetlands. A copy of the delineation report, including Field Data Sheets, a field map, and other information and data required by the COE is enclosed.
2. The boundaries of the areas delineated by G&O were surveyed and plotted in February 1999.
3. On February 24, 1999, G&O contacted William Ruby of the Water Quality Division of The District of Columbia Environmental Health Administration related to Water Quality Certification requirements for proposed wetland impacts on the project. Mr. Ruby requested that discussions be deferred until after the COE issued a JD and the COE had expressed a position related to wetland impacts under Section 404 (CWA).
4. On March 2, 1999, the Baltimore COE issued a Jurisdictional Determination (JD) approving the limits of the jurisdictional areas as proposed. The JD is valid for 5 years.
5. On May 4, 1999, G&O met with George Harrison of the Baltimore Office of the COE related to proposed wetland impacts on the property.
6. Mr. Harrison concluded that the nature and amount of proposed impact (approximately 0.15 acres to non-vegetated Waters of the US) are consistent with COE regulations, and that he would recommend that a permit be issued for the impacts upon request.
7. G&O is in the process of coordinating with Mr. Ruby to address Water Quality Certification Requirements, including mitigation.
8. Here is a summary of the Wetland Inventory and Proposed Wetland Impacts on the property:

	Vegetated Wetlands Present (Square Feet)	Waters of the US Non-vegetated Present (Square Feet)	TOTALS
WEST PARCEL	23,700	10,350	35,050
EAST PARCEL	0	600	600
TOTAL	23,700	10,950	35,650
PROPOSED IMPACT	0	6,400*	6,400

This estimated proposed impact is less than 0.15 acres. * = No impact is proposed on the Eastern Parcel

Exhibit F-4

Geotechnical Report – Public File

WHITLOCK DALRYMPLE POSTON & ASSOCIATES, INC.
CONSULTING ENGINEERS

November 20, 1998

Greenhorne & O'Mara, Inc.
11211 Waples Mill Road
Fairfax, Virginia 22030-6050

Attention: Mr. Dan Lucey

Subject: **Geotechnical Feasibility Study**
Fort Stanton Property
Goodhope Road and 24th Street, S.E.
Washington, D.C.
WDP Project No. 06-98106

Dear Mr. Lucey:

Whitlock Dalrymple Poston & Associates, Inc. (WDP) is pleased to transmit four (4) copies of the Geotechnical Feasibility Study for the Fort Stanton Property at the intersection of Goodhope Road and 24th Street, S.E. in Washington, D.C. Limited field exploration (backhoe test pits) including visual-manual soil classification and report preparation was performed in accordance with WDP's Work Authorization Form, dated November 4, 1998. To further aid in the preparation of this study, WDP received preliminary development information including approximate original and existing contour plans as well as proposed preliminary grade changes information from Mr. Lucey and Mr. Ernie Anderson with Greenhorne & O'Mara (G&O).

PROJECT UNDERSTANDING

From our discussions and review of preliminary development information, it is our understanding that several garden-style apartment structures and associated site improvements are proposed at this time. Retaining structures and/or slopes (both cut and fill) may be necessary in order to achieve final design grades, which are in preliminary design phase. Approximate grade changes may be on the order of 20± feet and 10± feet in cut and fill, respectively. A retaining structure is being considered along the south/southwest property boundary along the toe of the existing slope as well as the addition of fill soils upon the existing westerly facing slope.

WDP

8832 RIXLEW LANE

MANASSAS, VA 20109

703-257-9280 TEL

703-257-7589 FAX

wdpa@erols.com

SITE DESCRIPTION

The geotechnical feasibility study area is comprised of a nearly rectangular, 8± acre vacant parcel of land covered with a moderate growth of wild grass and a few small scattered trees. A lightly wooded area was noted within the southeast portion of the property. An existing earth berm/swale drainage feature crosses the property from near the northeast corner down towards the southwest corner/slope area. The site generally slopes to the west; relatively gently up to the earth berm/swale then gradually increasing in steepness to an approximate 2 to 2-1/2 H:1V ratio. Some erosion gulleys and rivulets (up to 18-24 inches deep) were observed within the grass-covered slope faces along the southern and western property limits. No apparent significant slope instabilities, either gross or surficial were observed. Total site relief is on the order of 60± feet with a high elevation of 210± north of the lightly wooded tree area and a low elevation of 150± along the western property boundary. The property is bordered by Goodhope Road to the north, by residences and 24th Street to the east, woods and residential development under construction to the south and heavily wooded, Fort Stanton Park to the west. A Site Vicinity Map has been included at the end of this report.

FIELD EXPLORATION/TEST PIT OBSERVATIONS

Thirteen (13) backhoe test pits were excavated on November 17, 1998 at the approximate location indicated on the attached Test Pit Location Plan. Test pit locations/elevations were approximated from the existing site features/topography and elevation contours indicated on the Test Pit Location Plan. Test pit logs are included with this report with visual-manual soil classification performed in accordance with ASTM D-2488 procedures. Laboratory testing was beyond the authorized scope of services for this phase of the project.

WDP

Beneath a moderate growth of wild grasses and thin 2± inch veneer of moderately organic silts/sands, test pit observations can be categorized into two (2) distinct strata as described below:

Stratum I - Existing Fill Materials

Consists of brown, grayish, and reddish/yellow brown, grayish black variable quality and strength existing fill materials comprised of Silty to Clayey SANDS (USCS SM/SC), Sandy to Silty CLAYS (USCS CL/CH) and Sandy SILTS (USCS ML) with variable gravel and cobble/boulder content. Miscellaneous debris such as brick, wood, concrete and asphalt pieces, wire, steel, glass, plastic, paper and rubber were observed in varying amounts throughout the existing fill materials. Several large concrete and asphalt pieces encountered with Test Pits Nos. 2, 3, 4, 5, 6, 10 and 13 resulted in backhoe excavation difficulties and subsequent refusal. A 5-gallon plastic oil/grease container was encountered within Test Pit No. 9. The existing fill materials generally ranged from loose/soft to medium dense/medium stiff and moist to very moist/wet. Some slight to moderate organic odors were detected during test pit explorations at random locations/elevations.

5 gallon plastic oil/grease can

-Odors at Random Locations

Based upon the topography/contour information from Greenhorne & O'Mara representatives superimposed by WDP on the Test Pit Location Plan, existing fill material depths exist across the site ranging from 4± to 20± feet and up to 40± feet. These fill depths appear to be located within previous drainage paths/valleys running through the north, central and southern portions of the site as well as the 50± foot high fill slope along the western property boundary.

50+ High

The table below presents the approximated depths of fill material at the Test Boring locations based upon the submitted contour plans. The test pit observations/logs correlate well to the approximate depths of fill where natural soils were encountered within the test pits.

Test Pit - Surface Elevation	Encountered Depth/Elevation of Fill	Plan-approximated Depth of Fill	Remarks
1 - 204±	11± ft/193	14-15± feet	
2 - 208±	3-1/2 ft/204.5	14-15± feet	Refusal on buried asphalt - possible road
3 - 210±	2-1/2 ft/207.5	19-21± feet	Refusal on buried asphalt - possible road

WDP

Test Pit - Surface Elevation	Encountered Depth/Elevation of Fill	Plan-approximated Depth of Fill	Remarks
4 - 211±	0.5 ft/210.5	10-12± feet	Refusal on buried asphalt - possible road
5 - 208±	7 ft/201	13-15± feet	Refusal on buried oversized debris
6 - 200±	8 ft/192	30-32± feet	Refusal on buried oversized debris
7 - 203±	6± ft/197	4-8± feet	Native soils at 6± feet
8 - 204±	3± ft/201	3-5± feet	Native soils at 3± feet
9 - 204±	10± ft/194	23-25± feet	
10 - 198±	5± ft/193	26-30± feet	Refusal on buried oversized debris
11 - 197±	11± ft/186	20-22± feet	
12 - 198±	10± ft/188	18-20± feet	
13 - 195±	8± ft/187	25-30± feet	Refusal on buried oversized debris

Limited soil compaction test data was submitted for review from Cohen Engineers, dated November 14, 1986. It is not known what the minimum compaction specification was under which these fill materials were placed and compacted/tested. Furthermore, the locations indicate an unknown station reference with no elevations for the test locations. All twenty-five (25) density tests were noted to be performed on the same day, October 7, 1986. The cover letter for the test data suggests that additional density tests were performed during other periods of fill placement and compaction.

Existing fill soils proposed for reuse should possess Liquid Limits and Plasticity Indices less than 45% and 20%, respectively, and be free of debris, oversized materials, and/or other deleterious matter. Moisture content adjustments can be expected, as well as screening of debris and/or oversized materials, in view of the test pit observations.

Stratum II - Native Soils

Consists of yellow to orange brown/gray, medium dense to medium stiff, Clayey SANDS (USCS SC), Sandy SILT (USCS ML) and Sandy CLAY (USCS CL) with some gravels and cobbles. These soils were in a generally moist condition and only encountered at Test Pit Nos. 7 and 8 at 6± feet and 3± feet below existing grade, respectively, which correlates well with the original ground and existing grade contours on the Test Pit Location Plan. These soils were classified as native soils due to the absence of miscellaneous debris, indications of geologic/soil structure, and increased consistency. These soils are generally considered suitable for reuse as structural fill; some moisture content adjustments should be anticipated in order to achieve proper compaction and develop suitable-bearing strengths.

Bedrock and/or Groundwater

Bedrock and/or groundwater was not encountered within the exploration limits of this study, and based upon the local geology, is not anticipated to be a significant problem. Groundwater seepage, or locally perched zones of water, should be anticipated to exist within the existing fill materials.

CONCLUSIONS AND RECOMMENDATIONS

In general, development and construction of garden-style apartment structures and related site improvements is considered feasible from a geotechnical perspective. Since preliminary details (site layout, desired elevations, slope and/or retaining wall locations) are unknown at this time, it is difficult to comment on the specifics of the above. However, special considerations (both design and construction) are considered appropriate and necessary in view of the test pit observations and anticipated, deep variable quality and strength existing fill materials.

Conventional residential construction (shallow foundation/basement walls/on-grade slab) may necessitate increased structural capacity (additional reinforcing, larger dimensions, better material qualities) and/or selective removals and replacement/recompaction for foundations and/or slab-bearing subgrades in view of the test pit observations of the existing fill materials. Sitework difficulties can be expected in view of the variable fill quality and miscellaneous debris content. Retaining structures and/or slopes should be appropriately evaluated and designed in view of the existing fill materials.

Existing fill materials and native soils may be suitable for reuse as structural fill provided the Liquid Limits and Plasticity Indices do not exceed 45% and 20%, respectively, and are screened of miscellaneous debris, oversized materials, and/or other deleterious matter. Moisture content adjustments should be expected in order to achieve adequate compaction densities and develop suitable-bearing strengths.

Although not apparent based upon the limited field investigation, the 30 to 50± foot high slopes on the southern and western property boundaries do not exhibit significant indications of gross and/or surficial instabilities. Some erosion gulleys and rivulets (up to 18-24 inches deep) were observed within the grass-covered slope faces along the southern and western facing sloped areas.

While significant evidence of environmentally-impacted or contaminated soils was not observed/detected, the presence of miscellaneous debris including a 5-gallon oil/grease container (Test Pit No. 9 area) suggests the possibility/probability of localized areas of contaminated soils/materials. Analytical testing of observed conditions/materials was beyond WDP's authorized scope of services for this phase of the project.

TEST pit 9 oil/grease CAN

In view of the above observations/findings and conclusions, WDP recommends the following be considered for planning and development of the property:

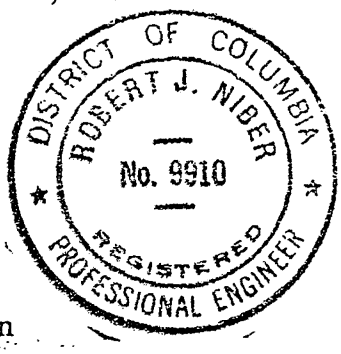
- A detailed, plan-specific geotechnical investigation utilizing both test borings and test pits to better geologically characterize the on-site conditions, obtain samples for laboratory testing, and provide geotechnical design parameters and construction considerations. The details of such a study can be discussed/developed as project details and particulars become available.

- An environmental site assessment (Phase II level minimum) be performed to better characterize the environmental impacts of the existing site conditions. It is WDP's understanding that Greenhorne & O'Mara is presently performing a preliminary environmental site assessment for feasibility study purposes.

WDP would be pleased to continue our involvement on the Fort Stanton property by providing additional, plan-specific geotechnical engineering services as necessitated by WDP's test pit observations. Furthermore, our geotechnical expertise and experience with challenging site conditions may be realized during grading and construction through proper geotechnical testing and inspection services. We would be pleased to discuss your future project needs further at your convenience.

WDP appreciates the opportunity to be of continued professional service to Greenhorne & O'Mara, Inc. and KSI Services, Inc. on this project. Should you have any questions after reviewing the above or enclosed information, please do not hesitate to contact me.

Respectfully Submitted,
WHITLOCK DALRYMPLE POSTON & ASSOCIATES, INC.



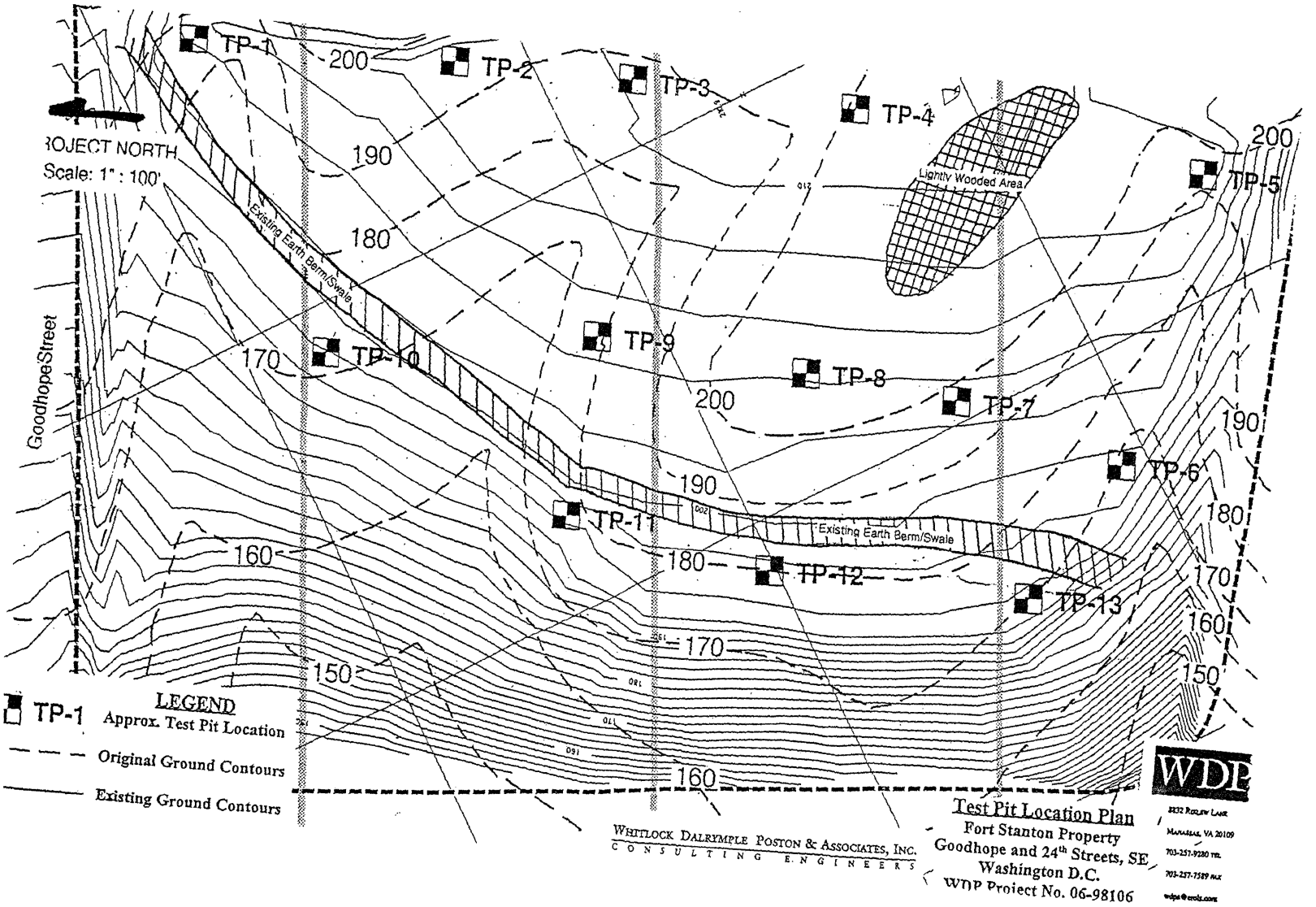
Robert J. Niber, P.E.
Senior Geotechnical Engineer

RJN/rp

cc: Greenhorne & O'Mara, Inc. - Mr. Ernie Anderson
KSI Services, Inc. - Mr. Dick Knapp

WDP


SITE
Anacostia
MARBURY PLAZA
Fort Stanton
Stanton ES
Garfield ES
Kimball ES
Beers ES
Overlook ES
Anacostia Pavillion
Anacostia Fieldhouse
Washington Yacht Club
District Yacht Club
Eastern Precinct
Boat Club
Congressional
DC Center for Therapeutic Rec
US Park Police
Douglass
Douglas JHS
Miner ES
Our Lady of Perpetual Help
Wilkinson Church
Penn Branch Shop Ctr
Penn Branch Center
Suitland Manor
Suitland Terrace
Silver Hill
Woodland
Garfield Heights
Knox Hill
Good Hope
Hillcrest
Penn Branch
Fairview
Good Hope Park
Anacostia Park
Anacostia Freeway
Douglas Memorial Bridge
Pennsylvania Ave
Alabama Ave
Good Hope Road
Nash Pl
Nash St
Mass Ave
Highwood Dr
Pope St
Texas Ave
Fort Dupont
Fort Dupont Park
Fort Stanton Park
Fort Stanton Dr
Fort Stanton Rd
Fort Stanton Terr
Fort Stanton Pl
Fort Stanton Ct
Fort Stanton Cir
Fort Stanton Ln
Fort Stanton Way
Fort Stanton Pkwy
Fort Stanton Blvd
Fort Stanton Ave
Fort Stanton St


TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
TP-7
TP-8
TP-9
TP-10
TP-11
TP-12
TP-13
200
190
180
170
160
150
PROJECT NORTH
Scale: 1" : 100'
GoodhopeStreet
Existing Earth Berm/Swale
Lightly Wooded Area
Existing Earth Berm/Swale
LEGEND
TP-1 Approx. Test Pit Location
Original Ground Contours
Existing Ground Contours
WHITLOCK DALRYMPLE POSTON & ASSOCIATES, INC.
CONSULTING ENGINEERS
Test Pit Location Plan
Fort Stanton Property
Goodhope and 24th Streets, SE
Washington D.C.
WDP Project No. 06-98106
WDP

TEST PIT LOG

BORING LOCATION: NE corner
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-1
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 204 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown and yellow brown, medium dense, Silty to Clayey fine-medium SAND (SM/SC) and fine Sandy SILT with Clay (ML/CL), gravels and cobbles - Moist to very moist								Wild grasses at surface. Variable amounts of debris - wood, brick, concrete, wire, asphalt, plastic and rubber.
200												
				4.5								
	5			FILL - Brown to gray brown, reddish brown and black, soft to medium stiff, silty CLAY (CL/CH) with sand, gravels - Very moist								Concrete, brick, wood pieces.
				Slight to moderate organic odor								
												Large concrete chunk/boulders at 8-9 feet.
195				9.0								
	10			FILL - Brown/gray brown, medium stiff, micaceous fine-medium Sandy SILT (ML) to Silty fine-medium SAND (SM), some gravels - Moist to very moist								
				11.0								
				Test pit terminated at 11 feet. No water. Backfilled.								
190												

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None	FEET
▼	AT COMPLETION	None	FEET
▽	AFTER ____ HOURS	____	FEET
▽	AFTER ____ HOURS	____	FEET

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8832 Rixlew Lane
Manassas, Virginia 20109
(703) 257-9280

Geotechnical Feasibility Study
Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

WDP-TP 98106 TP-1 11/20/98

TEST PIT LOG

BORING LOCATION: East property boundary - north central
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-2
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 208 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown to orange/yellow brown, medium dense, Silty to Clayey fine-medium SAND (SM/SC), gravels, some cobbles - Moist to very moist								Wild grasses at surface. Brick/concrete pieces, wood, asphalt, asphalt millings, CMU fragments.
205				Hard asphalt pavement — 3.5								
				Backhoe refusal at 3-1/2 feet on buried asphalt pavement. No water. Backfilled.								Backhoe excavation difficult.
	5											
200												
	10											
195												

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

DURING DRILLING	None	FEET	
AT COMPLETION	None	FEET	
AFTER ____	HOURS ____	FEET	
AFTER ____	HOURS ____	FEET	

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8832 Rixlew Lane
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(703) 257-9280

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Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

WDP-TP 98106 TP-2 11/20/98

TEST PIT LOG

BORING LOCATION: East property boundary - central
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-3
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 210 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown/yellow brown, medium dense, Silty to Clayey fine-medium SAND (SM/SC) with gravels, cobbles - Moist									Wild grasses at surface.
				FILL - Gray white/orange brown, fat CLAY (CH) and fine Sandy Silt/Clay (ML/CL) - Very moist (1.5)									Brick wall piece, concrete, asphalt.
				Backhoe refusal at 2-1/2 feet on buried asphalt pavement. (2.5) No water. Backfilled.									Asphalt pavement.
205	5												
200	10												

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None	FEET
▼	AT COMPLETION	None	FEET
▽	AFTER ____ HOURS	____	FEET
▽	AFTER ____ HOURS	____	FEET

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8832 Rixlew Lane
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Geotechnical Feasibility Study
Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

TEST PIT LOG

BORING LOCATION: East property boundary - south central
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-4
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 211 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
210	0			FILL - Brown, dense, Clayey fine-medium SAND (SC) - Moist								Wild grasses at surface.
				0.5								
				Backhoe refusal at 6 inches on buried asphalt pavement. No water. Backfilled.								
	5											
205												
	10											
200												

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

DURING DRILLING	None	FEET	
AT COMPLETION	None	FEET	
AFTER	HOURS		FEET
AFTER	HOURS		FEET

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(703) 257-9280

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Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

WDP-TP 98106 TP-4 11/2098

TEST PIT LOG

BORING LOCATION: SE corner - Near top of slope

BORING METHOD: JD310D Backhoe

LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-5

DATE STARTED: 11/17/98

DATE COMPLETED: 11/17/98

SHEET 1 OF 1

SURFACE ELEVATION: 208 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown/yellow brown, medium dense, Silty to Clayey fine-medium SAND (SM/SC), gravels, cobbles - Moist								Wild grasses at surface. Concrete/brick pieces. Wire cable pieces. Asphalt.
205												
				FILL - Gray brown, soft to medium stiff, Clayey SAND/Sandy CLAY (SC/CL), gravels, cobbles - Very moist								Brick, concrete, glass debris.
	5			Concrete/sheet metal pieces								Large asphalt chunk at 6 feet.
				Backhoe refusal at 7 feet on oversized (+2 feet) concrete/asphalt debris. No water. Backfilled.								
200												
	10											
195												

3.5

7.0

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None	FEET
▼	AT COMPLETION	None	FEET
▽	AFTER ____ HOURS	____	FEET
▼	AFTER ____ HOURS	____	FEET

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8832 Rixlew Lane
Manassas, Virginia 20109
(703) 257-9280

Geotechnical Feasibility Study
Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

WDP-TP 98106 TP-5 11/20/98

TEST PIT LOG

BORING LOCATION: South central property - Near top of slope
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-6
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 200 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown and yellow brown, dense Silty/Clayey fine-coarse SAND (SM/SC), gravels, cobbles - Moist								Wild grasses at surface.
				Large 2-3 foot concrete pieces. 1.5								Brick, asphalt, concrete pieces.
				FILL - Gray to gray brown, loose to medium dense, Silty/Clayey SAND (SM/SC) to Sandy CLAY (CL) - Moist to very moist								Wire strapping.
195	5											Miscellaneous concrete, wood, asphalt, brick debris.
				Backhoe refusal at 8 feet on miscellaneous buried debris. 8.0								
				No water. Backfilled.								
190	10											

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None		FEET
▼	AT COMPLETION	None		FEET
▼	AFTER ____	HOURS	____	FEET
▼	AFTER ____	HOURS	____	FEET

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8832 Rixlew Lane
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(703) 257-9280

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Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

TEST PIT LOG

BORING LOCATION: South central property
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-7
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 203 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown/yellow brown, medium dense, Silty to Clayey SAND (SM/SC), gravels, cobbles - Moist								Wild grasses at surface.
				1.0								
				FILL - Grayish black, loose to medium dense, Silty SAND (SM), gravels, some clay - Moist								Asphalt cinders, slag pieces, wood, brick/CMU, wire.
200												
	5											
				6.0								
				Native - Yellow brown, soft to medium stiff, fine Sandy SILT (ML) to fine Sandy CLAY (CL) - Moist								Possible original ground - Trace rootlets
195												
				9.0								
				Test pit terminated at 9 feet. No water. Backfilled.								
	10											
190												

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

DURING DRILLING	None		FEET
AT COMPLETION	None		FEET
AFTER		HOURS	FEET
AFTER		HOURS	FEET

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(703) 257-9280

Geotechnical Feasibility Study
Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

TEST PIT LOG

BORING LOCATION: South central property
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-8
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 204 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Yellow brown, medium dense, Silty to Clayey SAND (SM/SC) to Sandy CLAY (CL), gravels, cobbles - Moist								Wild grasses at surface.
				FILL - Grayish black, medium dense, Silty SAND (SM), gravels - Moist (1.5)								Asphalt cinders, brick.
				Native - Orange brown, medium dense/stiff, Clayey SAND (SC) to Sandy CLAY (CL), some gravels, cobbles - Moist (3.0)								Possible original ground.
200	5			Orange brown/gray, mottled, medium dense, Silty/Clayey SAND (SM/SC), trace gravels, cobbles - Moist								
				Native - Light gray brown, medium dense, Silty fine SAND/fine Sandy SILT (SM/ML) - Moist (8.5)								
195	10			Test pit terminated at 10 feet. (10.0) No water. Backfilled.								
190												

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None	FEET
▼	AT COMPLETION	None	FEET
▼	AFTER ____ HOURS	____	FEET
▼	AFTER ____ HOURS	____	FEET

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8832 Rixlew Lane
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(703) 257-9280

Geotechnical Feasibility Study
Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

TEST PIT LOG

BORING LOCATION: North central property
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-9
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 204 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown/yellow brown, medium dense, Silty to Clayey SAND (SM/SC), gravels, cobbles - Moist								Wild grasses at surface. Some brick, wood, concrete, asphalt, wire cable pieces.
				FILL - Greyish brown to gray black, medium stiff, fine Sandy CLAY to Silty CLAY (CL/CH) - Moist to very moist								Some brick, asphalt, concrete, wood debris.
200	5			Blue gray color - 5 gallon oil/grease can								Paper/plastic.
				Gray brown/gray black, soft to medium stiff, Clayey SAND/Sandy CLAY (SC/CL) to Silty CLAY (CL/CH) - Moist to very moist								
195	10			Test pit terminated at 10 feet. No water. Backfilled.								
190												

3.0

10.0

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None	FEET
▼	AT COMPLETION	None	FEET
▽	AFTER ____ HOURS	____	FEET
▼	AFTER ____ HOURS	____	FEET

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8832 Rixlew Lane
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(703) 257-9280

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Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

WDP-TP 98106 TP-9 11/20/98

TEST PIT LOG

BORING LOCATION: North central property
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-10
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 198 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown, medium dense, Clayey to Silty SAND (SC/SM), gravels, cobbles - Moist to very moist								Wild grasses at surface.
												Some brick, asphalt, concrete, wood debris.
195				Large asphalt sheets, concrete boulders, slab pieces at 3-5 feet								Difficult backhoe excavating.
	5			Backhoe refusal at 5 feet on buried oversized debris. 5.0								
				No water. Backfilled.								
190												
	10											
185												

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None	FEET
▼	AT COMPLETION	None	FEET
▽	AFTER ____ HOURS	____	FEET
▼	AFTER ____ HOURS	____	FEET

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(703) 257-9280

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Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

WDP-TP 8810G TP-10 11/2098

TEST PIT LOG

BORING LOCATION: West central property
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-11
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 197 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown, medium dense/medium stiff, Clayey SAND/Sandy CLAY (SC/CL), gravels, cobbles, boulders - Moist to very moist								Wild grasses at surface.
												Concrete slabs, brick, wood debris.
195												
				More clayey and more moist								
				Brown, soft, silty CLAY/Sandy CLAY (CL/CH), gravels, cobbles - Very moist								Railroad tie at 4 feet.
	5											Bricks, asphalt.
				Concrete debris								
190												
				Very moist and clayey								
	10											
				11.0								
				Test pit terminated at 11 feet. No water. Backfilled.								
185												

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None	FEET
▼	AT COMPLETION	None	FEET
▽	AFTER ____ HOURS	____	FEET
▼	AFTER ____ HOURS	____	FEET

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8832 Rixlew Lane
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(703) 257-9280

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Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

TEST PIT LOG

BORING LOCATION: Southwest central property
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-12
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 198 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown/yellow brown, medium dense, Clayey SAND (SC), gravels, cobbles - Moist								Wild grasses at surface.
												Brick, concrete, wire pieces.
				Brown/reddish brown, soft, Sandy CLAY (CL) - Very moist								
195												Brick, concrete pieces.
				Gray brown color								
	5											
				FILL - Gray brown, medium dense, Silty to Clayey SAND (SM/SC), gravels - Very moist								
190												
	10			Test pit terminated at 10 feet. No water. Backfilled.								
185												

7.5

10.0

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None		FEET
▼	AT COMPLETION	None		FEET
▽	AFTER ____	HOURS ____		FEET
▽	AFTER ____	HOURS ____		FEET

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8832 Rixlew Lane
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(703) 257-9280

Geotechnical Feasibility Study
Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

TEST PIT LOG

BORING LOCATION: Southwest property - Near top of slope
BORING METHOD: JD310D Backhoe
LOGGED BY: Robert Niber, P.E. DRILLER: Washington Air

BORING NO.: TP-13
DATE STARTED: 11/17/98
DATE COMPLETED: 11/17/98
SHEET 1 OF 1

SURFACE ELEVATION: 195 ±

Elevation (ft)	Depth (ft)	Groundwater	Stratum	MATERIAL DESCRIPTION	Sample	Dry Density (pcf)	Pocket Pentrometer (tsf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing No. 200 Sieve	REMARKS
				FILL - Brown/orange brown, medium dense, Silty/Clayey SAND (SM/SC), gravels, cobbles - Moist								Wild grasses at surface.
												Rebar pieces, wood, brick, concrete, asphalt pieces.
				FILL - Gray black, medium dense, Silty SAND (SM), gravels, cobbles - Moist (2.0)								
				Concrete slab pieces (3 feet diameter)								Steel angle. Asphalt cinders.
												Bricks, concrete debris.
190	5			Gray black/grayish brown, medium dense to medium stiff, Silty/Clayey SAND (SM/SC) to Sandy CLAY (CL/CH) - Very moist								
				Backhoe refusal at 8 feet on buried oversized materials/debris. (8.0) No water. Backfilled.								
185	10											

The lines between various strata on the test boring logs represent the approximate strata boundary; however, the transition between strata may be more gradual than shown, especially where indicated by a broken line.

GROUNDWATER DATA

▽	DURING DRILLING	None		FEET
▼	AT COMPLETION	None		FEET
▼	AFTER ____	HOURS ____		FEET
▼	AFTER ____	HOURS ____		FEET

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8832 Rixlew Lane
Manassas, Virginia 20109
(703) 257-9280

Geotechnical Feasibility Study
Ft. Stanton Property
Goodhope and 24th Sts., S.E.
WDP Project No.: 06-98106

WDP-TP 98106 TP-13 11/20/98

ATTACHMENT A

Chain of Custody Form and Analytical Data Sheet

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com

(1)

CLIENT: BLUE RIDGE PHONE NO: (703) 729-9196

PROJECT MGR: KENT CAMPBELL FAX NO: (703) 729-9197

PROJECT NAME: FT. STANTON

SITE LOCATION: WASHINGTON DC

PROJECT NUMBER:

P.O. NUMBER:

PSS Project #: 00012809

PAGE 1 OF 1

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No. CONTAINERS	SAMPLE TYPE C= COMP G= GRAB	Preservatives Used / Analysis Required (3) RCRA 8 METALS (DISSOLVED)	REMARKS
	SURF 1	1/28	10:15	W	1	G	X	

(5)

Collected / Relinquished By: (1)	Date	Time	Received By:
	11/28/00	12:20	
Relinquished By: (2)	Date	Time	Received By:
	11/28/00	2:06	
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received For Laboratory By:
	11/28/00	206	

(4)

Shipping Carrier: DIAL

Shipping Ticket No:

Sample Condition Upon Receipt: ON ICE

Data Deliverables Required

Level I Level II Level III

Chain of Custody Seal:

COOLER N/A CONTAINER

Requested Turnaround Time and Special Instructions:

STANDARD T/A/T

LAB FILTER BEFORE ANALYSIS

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • FAX (410) 788-8723

The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary.

OFFICES:
6630 BALTIMORE NATIONAL PIKE
ROUTE 40 WEST
BALTIMORE, MARYLAND 21228
410-747-8770
800-932-9047
410-788-8723 Fax
www.phaseonline.com

PHASE SEPARATION SCIENCE, INC.

ANALYTICAL CHEMISTRY • ENVIRONMENTAL SCIENCE

CERTIFICATE OF ANALYSIS
No. 00012809 Page 1 of 1
Blue Ridge Environmental
February 4, 2000

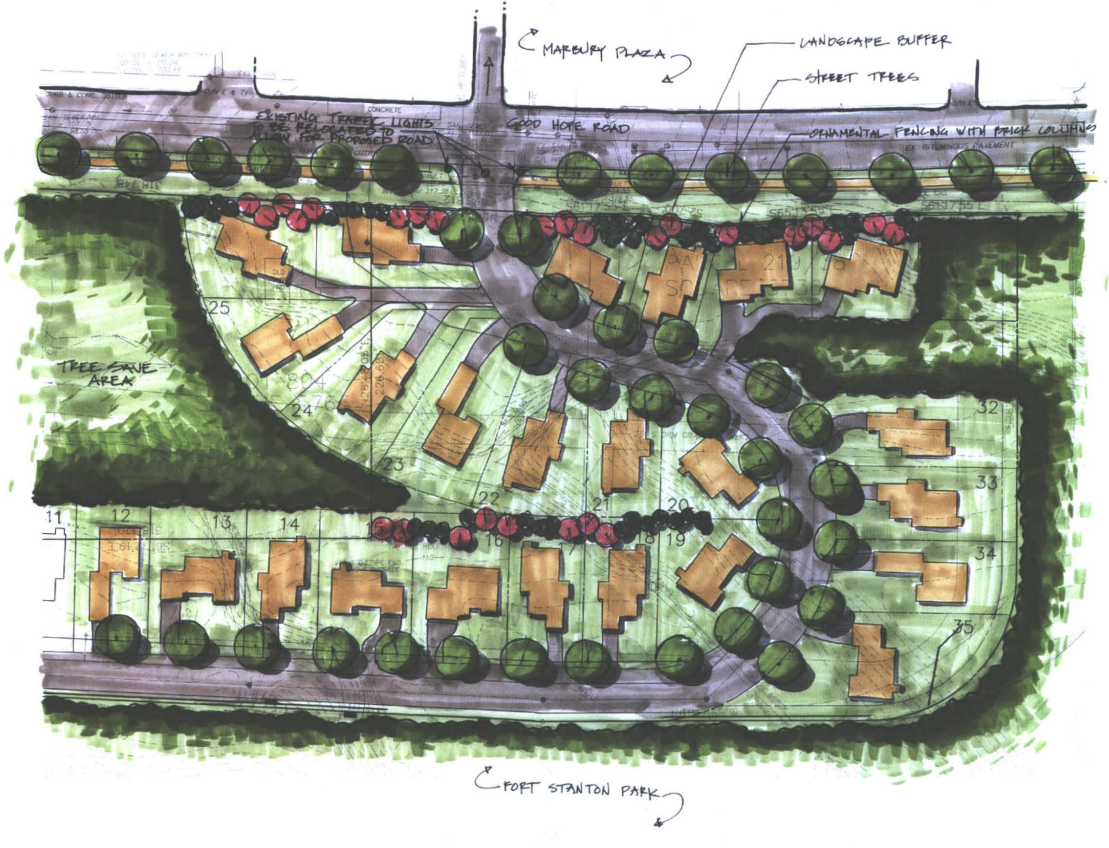
Project: Ft. Stanton
Site Location: Washington, DC
Project Number: N/A
Matrix: Water

Date Sampled: 01/28/00
Date Received: 01/28/00

		Result	Unit	Method	PQL	Prepared	Analyzed
Sample ID: Surf 1							
RCRA Metals, Dissolved							
Arsenic	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00
Barium		56	ug/L	EPA 200.8	5	01/31/00	02/03/00
Cadmium	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00
Chromium	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00
Lead	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00
Mercury	<	1	ug/L	EPA 200.8	1	01/31/00	02/02/00
Selenium	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00
Silver	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00

Notes/Comments:
PQL - Practical Quantitation Limit

Reviewed By: Matt Colee
Quality Assurance Chemist



NOTE: SITE PLAN FOR SCHEMATIC PURPOSES ONLY. PLANS NOT TO BE USED FOR CONSTRUCTION.

STUDIO39
Landscape Architecture, P.C.

THE HOMES AT WOODMONT

Washington, D.C.

KSI SERVICES, INC.

SINGLE FAMILY
SITE PLAN
(ENLARGEMENT)

NORTH

SCALE: 1"= 30'-0"

0 30 60 90

DATE: March 7, 2000
REVISIONS:

JOB# 98128D

STUDIO 39 LANDSCAPE ARCHITECTURE, P.C.
6411 Connecticut Avenue
Suite 100-A
Alexandria, Virginia 22306
Tel: 703.734.0580 Fax: 703.734.0583

CAD DWG: 98128 Schematic Design Xref 4-20 revsiteplan.dwg

FAIRBURN EXHIBIT 2

BLUERIDGE ENVIRONMENTAL, INC.

February 16, 2000

'00 MAR 20 P4:27
DISTRICT OF COLUMBIA
OFFICE OF ZONING

Mr. Doug Surges
Director of Pre-Construction
KSI Services, Inc.
8081 Wolftrap Road
Suite 300
Vienna, Virginia 22182

Re: Surface Water Sample Results
Fort Circle Park
Good Hope Road, SE
Washington, D.C.

Dear Doug:

BlueRidge Environmental, Inc. (BlueRidge), has prepared this letter report to detail the results of a single surface water sample collection and analysis event performed at the referenced site. This sampling event was conducted pursuant to a verbal request received by BlueRidge on January 19, 2000, from Ms. Sarah Davidson of your office. Ms. Davidson requested that BlueRidge evaluate water conditions in a small unnamed stream that appears to emanate from the west side of the *Homes at Woodmont* property owned by KSI Services, Inc. (KSI), and flow to the west onto and across the adjacent Fort Circle Park property owned by the National Park Service. Mr. Kent D. Campbell of BlueRidge visited the site on January 19, 2000, and observed what appeared to be a reddish-brown algal growth along the bottom of a small stream channel in the location described by Ms. Davidson.

Sample Collection

BlueRidge returned to the site on January 28, 2000, to collect a single surface water sample from the stream for analysis of dissolved metals concentrations according to Environmental protection Agency (EPA) Method 200.8. At the time of sample collection, the surface of the stream was completely covered with ice. BlueRidge removed the ice from the surface of the stream in several areas and allowed the resulting turbulence to abate. Once the stream was again flowing clear, BlueRidge collected one water sample from the stream. The sample was collected by lowering a one-liter-capacity, pre-cleaned, plastic bottle into the water column and allowing water to flow into the bottle. Once the sample was recovered, nitric acid was added to the bottle until the pH was reduced to less than 2, as is required by EPA protocol.

The single water sample was delivered on the same day it was collected to Phase Separation Science, Inc., in Baltimore, Maryland, under strict Chain Of Custody procedures. A copy of the Chain of Custody form is included in Attachment A to this letter report.

44082 FERNCLIFF TERRACE ASHBURN, VIRGINIA 20147 TELEPHONE 703 729 9196 FAX 703 729 9197

Results

The single water sample was submitted to the laboratory for analysis of dissolved metals according to EPA Method 200.8. For the purposes of this analysis, the sample was tested for the following eight Resource Conservation and Recovery Act (RCRA) metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. The results indicate that only barium was detected above the method detection limit. Barium was detected at 56 micrograms per liter (ug/L). The laboratory data sheet for the analysis is included in Attachment A to this report.

Conclusions

The concentration of barium detected in the water sample collected from the stream at the site was compared to applicable and appropriate standards for metals in surface water. BlueRidge spoke with Mr. Peter May of the District of Columbia, Watershed Protection Division and confirmed that the District of Columbia does not have any promulgated surface water standards. Mr. May indicated that the District of Columbia government uses applicable federal standards when evaluating local surface water data. Specifically Mr. May indicated that his office commonly refers to the *Quality Criteria for Water* document produced by the EPA, as well as the updates to the same document.

The latest revision to the *Quality Criteria for Water* is dated April 1999. This document indicates that the only surface water standard for barium is currently set at a concentration of 1,000 ug/L, almost 20 times the concentration detected in the sample collected. In addition, the National Primary Drinking Water Standard for barium is 2,000ug/L.

Based on the data generated as a part of this study and applicable regulations, the metals concentrations in the surface water sample do not exceed any set regulatory standards. No further action is recommended for this site.

Sincerely,

Kent D. Campbell
Principal Geologist

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com

(1)

CLIENT: BLUE RIDGE PHONE NO: (703) 729-9196

PROJECT MGR: KENT CARPENTER NO: (703) 729-9197

PROJECT NAME: FT. STANTON

SITE LOCATION: WASHINGTON DC

PROJECT NUMBER:

P.O. NUMBER:

PSS Project #: 00012809

PAGE 1 OF 1

(2)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX	No. CONTAINERS	SAMPLE TYPE C=COMP G=GRAB	Preservatives Used / Analysis Required (3) RCRA 8 METALS (DISSOLVED)	REMARKS
	SURF 1	1/28	10:15	W	1	G	X	

(5)

Collected / Relinquished By: (1)	Date	Time	Received By:
	11/28/00	12:20	
Relinquished By: (2)	Date	Time	Received By:
	11/28/00	2:06	
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received For Laboratory By:
	11/28/00	20:	

(4)

Shipping Carrier: DIAL

Shipping Ticket No:

Sample Condition Upon Receipt: ON ICE

Data Deliverables Required: Level I Level II Level III

Chain of Custody Seal: COOLER N/A CONTAINER

Requested Turnaround Time and Special Instructions:

STANDARD T/A/T

LAB FILTER BEFORE ANALYSIS

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • FAX (410) 788-8723

The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary.

ATTACHMENT A

Chain of Custody Form and Analytical Data Sheet

OFFICES:
6630 BALTIMORE NATIONAL PIKE
ROUTE 40 WEST
BALTIMORE, MARYLAND 21228
410-747-8770
800-932-9047
410-788-8723 Fax
www.phaseonline.com

PHASE SEPARATION SCIENCE, INC.

ANALYTICAL CHEMISTRY • ENVIRONMENTAL SCIENCE

CERTIFICATE OF ANALYSIS
No. 00012809 Page 1 of 1
Blue Ridge Environmental
February 4, 2000

Project: Ft. Stanton
Site Location: Washington, DC
Project Number: N/A
Matrix: Water

Date Sampled: 01/28/00
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		Result	Unit	Method	PQL	Prepared	Analyzed
Sample ID: Surf 1							
RCRA Metals, Dissolved							
Arsenic	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00
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Lead	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00
Mercury	<	1	ug/L	EPA 200.8	1	01/31/00	02/02/00
Selenium	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00
Silver	<	10	ug/L	EPA 200.8	5	01/31/00	02/03/00

Reviewed By: Matt Cohee
Quality Assurance Chemist

Notes/Comments:
PQL - Practical Quantitation Limit

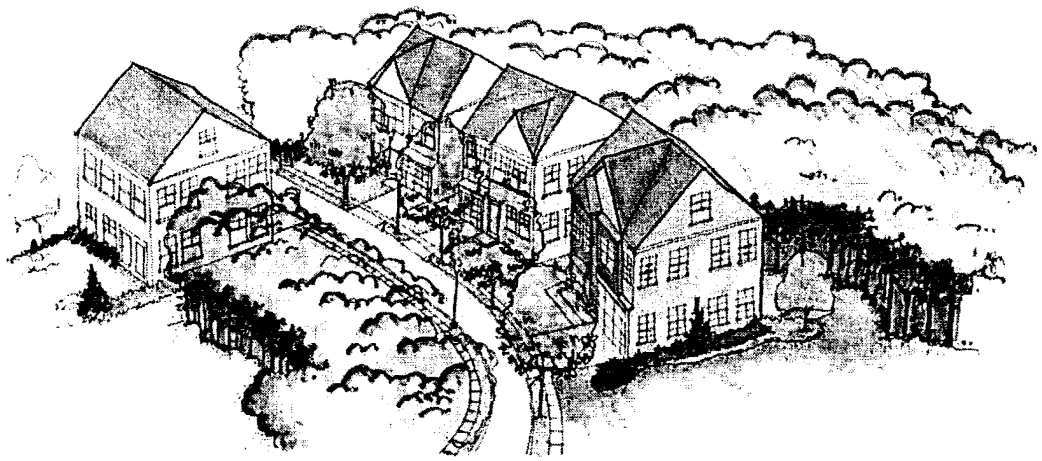
Fullerton Exhibit (13)

TRAFFIC IMPACT ANALYSIS:

FORT STANTON RESIDENTIAL DEVELOPMENT

DISTRICT OF COLUMBIA BOARD OF ZONING

ADJUSTMENT APPLICATION, WASHINGTON, D.C.



Prepared for:
KSI SERVICES INC.
8081 Wolftrap Road, Suite 300
Vienna, VA 22182

DISTRICT OF COLUMBIA
00 MAR 20 P4:27

Prepared by:
O. R. GEORGE & ASSOCIATES, INC.
Transportation Planning & Engineering Consultants
1738 Elton Road, Suite 321
Silver Spring, MD 20903

April 9, 1999

Exhibit D

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E - Correspondence with WMATA's Staff

F - Capacity Analysis Worksheets - Mitigation Measures

1.0 INTRODUCTION

1.1 Project Background

The Applicant is pursuing a Special Exception application before the Board of Zoning Adjustment of the District of Columbia, to develop a residential community along the south side of Good Hope Road, S.E. within the Anacostia area of the City. The property is divided in two (2) parcels, which are located between 19th and 24th Streets, S.E. The site is zoned R5-A and R5-B and is currently vacant. The applicant's plans call for 176 luxury-style multi-family (apartments units) on the eastern parcel, and 40 single-family homes on the western parcel.

The City's Zoning Regulations require the Applicant to demonstrate that the proposed use of the site is not likely to become objectionable to neighboring property, due to considerations of its traffic access and parking usage patterns, among other considerations. It is noted that the applicant's programmed density is considerably lower than that allowed under the current zoning for the site. Up to 499 multi-family units (western parcel) and 320 multi-family units (eastern parcel) could be developed in accordance with the zoning category. If approved, the applicant plans to build-out the development within three (3) years (i.e. by the year 2001).

Exhibit 1 shows the location of the site, which will be referred to hereinafter as the Fort Stanton residential community.

1.2 Study Purpose and Scope

The study was prepared as supporting documentation to the applicant's submission. The purpose of the study is to address the following key analysis elements:

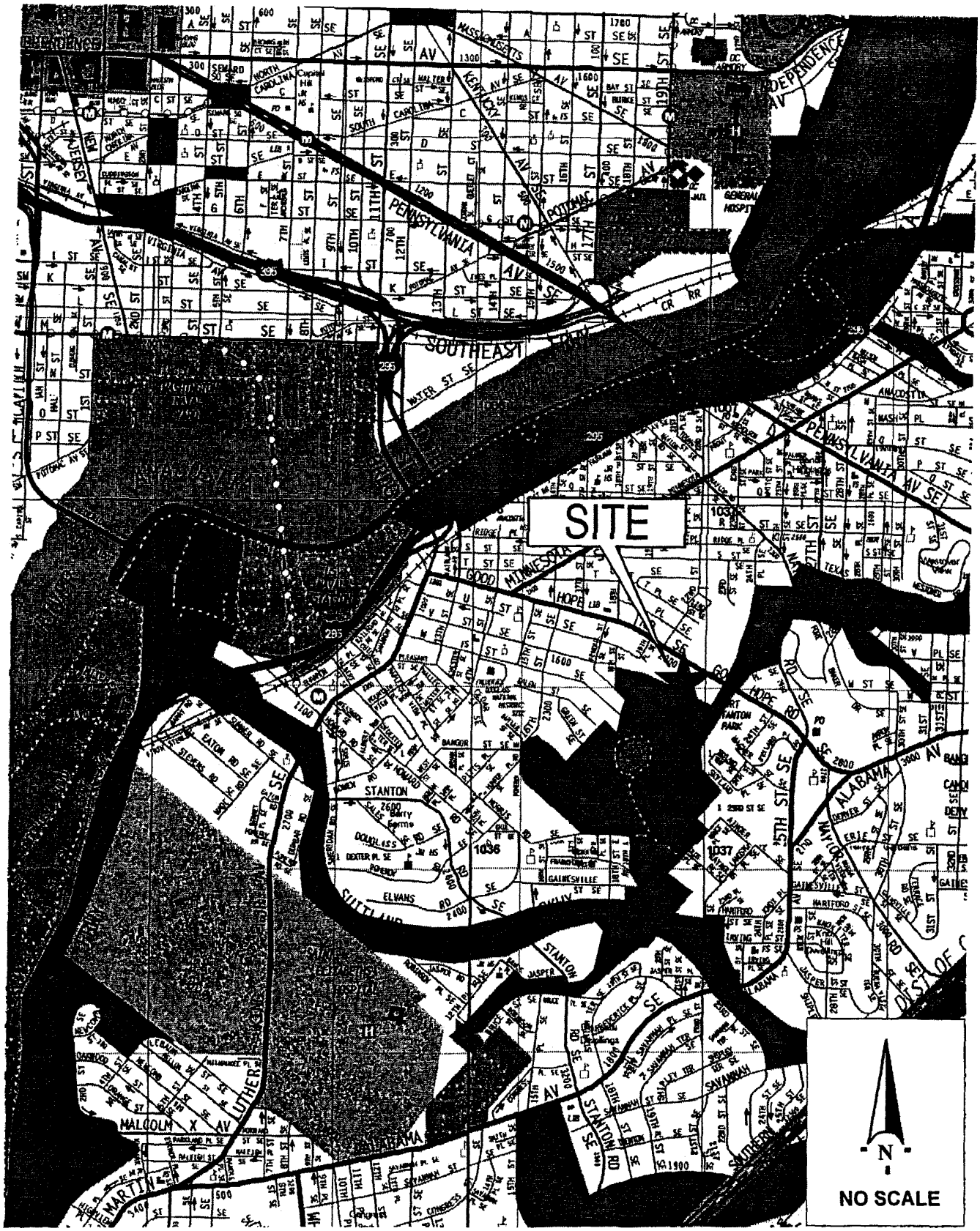
a) Existing roadway and traffic flow conditions within the immediate area of the subject site, defined as the study area;

b) Future "background" traffic condition based on a generalized examination of zoning and planned land use developments within the study area. This examination includes consideration of growth in through traffic, approved developments and programmed roadway improvements.

c) The traffic impact of the physical and operational changes for the subject site, considering existing and planned transportation facilities, site trip generation, access and parking; and

d) Any capacity, safety, or operational constraints to the planned development, as well as potential measures to mitigate such constraints, where appropriate.

More specifically, this report addresses the requirements of Sections §410 and §3108 of the City's Zoning regulations [District of Columbia Municipal Regulations (DCMR) Title 11 – Zoning] which requires the applicant to demonstrate that the proposed use will not result in appreciable adverse impacts and objectionable conditions affecting the use of area properties.



O. R. GEORGE & ASSOCIATES, INC.	EXHIBIT 1: Site Location Map

Based on discussions with the Applicant, two (2) issues raised by community residents pertain to their concern for the volumes of through traffic within the area (particularly along Good Hope Road), and their concern for the impact of the new residential developments on transit service within the corridor. These issues are therefore also addressed by this study.

1.3 Report Organization and Summary

This report is organized into five (5) sections. Section 2 evaluates existing roadway and traffic conditions. Section 3 addresses projected growth in through traffic, as well as growth due to the impact of approved developments within the study area. Section 4 analyzes the traffic impact of the Applicant's development proposal, and addresses related site access, circulation and parking provisions. Section 5 summarizes the study findings and makes recommendations, where appropriate, to mitigate any potential transportation impacts identified.

The study has concluded that the Fort Stanton residential community would be adequately accommodated by the existing study area road network. The study area intersections currently operate at acceptable Levels of Service, except for Good Hope Road at 25th Street, S.E. during the morning peak hour only. Even though the analysis shows that only a relatively small number of trips from the subject property utilizes the intersection during the peak hour, the analysis has determined that the latter situation could readily be mitigated by very minor adjustments in the signal timing.

Review of traffic volume data available from the City shows that peak period traffic volumes within the general study area have been quite stable. In a number of cases, volumes have decreased due to apparent shifts in residential and employment activity, as well as due to other demographic changes within the region in general. It is therefore projected that the study area intersections would continue to operate acceptably upon build-out and occupancy. The study has also concluded that the Fort Stanton Development would not create any appreciable roadway capacity, safety, or operational deficiencies; nor adversely impact the health, safety and general welfare of roadway users or the adjacent neighborhoods within the defined study area. As such, the proposed use should not be objectionable to neighboring property.

2.0 EXISTING ROADWAY AND TRAFFIC CONDITIONS

2.1 Land Use and Zoning

Based on the District of Columbia Generalized Land Use Policies Map, the general area of the subject property is zoned Residential (Moderate Density), consistent with the R5-A and R5-B zoning specifications to the site. As defined by the land use map, row houses and garden apartments are the predominant uses for this zoning category. Land uses may also include low-density housing. The adjacent areas are similarly zoned and developed with single-family semi-detached housing, low-rise multi-family apartments, institutional and strip commercial as the predominant uses. Other land uses within the immediate area include low density commercial along Good Hope Road (to the west), the Fort Stanton Park (to the west and south) and the Marbury High-rise apartments, to the north of the property.

2.2 Existing Study Area Roadway Network

The Fort Stanton development would have a favorable access situation. Regional access to the residential community is served principally by interstate and arterial facilities including, I-295, Pennsylvania Avenue, Branch Avenue, Minnesota Avenue, S.E., Good Hope Road, S.E. and 25th Street, S.E. These roadways are described further below. Immediate access to the site will be provided primarily via Good Hope Road, S.E., with secondary access via Wagner Street, S.E. and 19th Street, S.E.

Based on field reconnaissance of the site and its environs, the study area road network selected for evaluation and impact assessment was defined by the following intersections:

a) Good Hope Road at 19th Place, S.E. (unsignalized);

b) Good Hope Road at Marbury Plaza entrance, S.E. (unsignalized);

c) Good Hope Road at Almont Place, S.E. (unsignalized); and

d) Good Hope Road at 25th Street, S.E. (signalized).

The physical characteristics and service functions of the key study area roadways involved are described below:

- **I-295:** This is a six-lane divided interstate highway. This facility runs in a generally north-south direction, connecting the study area with the Washington Beltway and other freeways and major arterials. It is therefore a major commuter route serving the study area site; and within this area carries an average of approximately 80,000 vehicles daily. The posted speed limit is 55 MPH.

- **Good Hope Road, S.E.:** This is a four-lane undivided minor arterial on the City's street system. West of the entrance to the Marbury Plaza, parking is allowed along both sides of the roadway with restrictions during the morning and afternoon peak periods to allow 2-lane flow in the respective peak directions of travel. As will be discussed later, this parking restriction has a significant positive impact on the operational efficiency of this roadway.

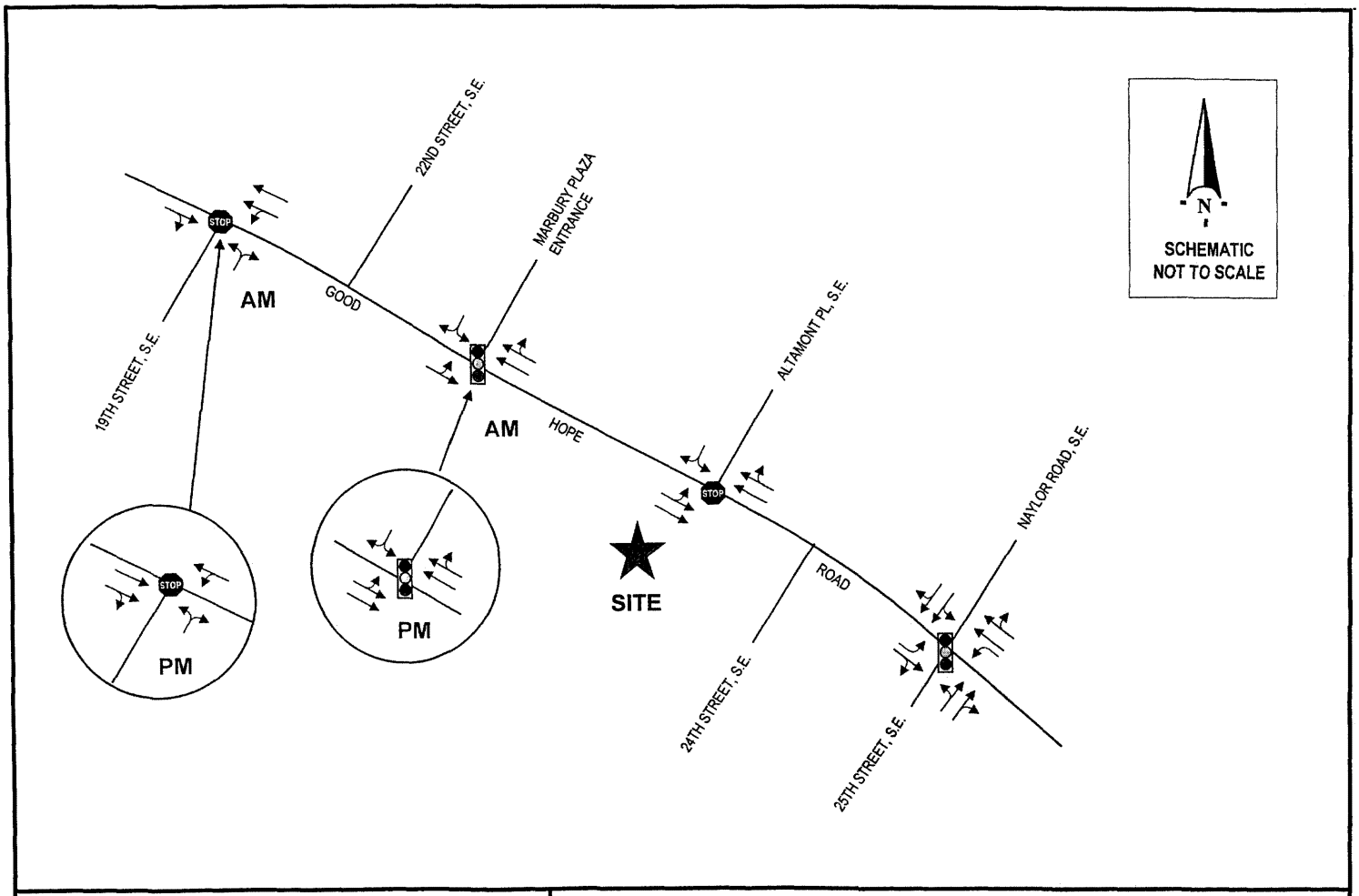
This facility runs in a generally east-west direction. It connects the study area with the City's central employment core to the west, and with the Maryland suburban areas of Prince George's County to the east and south, via its connection with Branch Avenue. Within this area Good Hope Road carries an average of approximately 17,000 vehicles daily. The posted speed limit is 25 MPH.

- **Minnesota Avenue, S.E.:** This is a two-lane undivided minor arterial, which runs in a generally northeast-to-southeast direction. Within the general area, this facility serves as a collector/connector roadway between Pennsylvania Avenue to the north and Good Hope Road to the south; and carries an average of approximately 7,700 vehicles daily. The posted speed is 25 MPH.

The other roadways within the immediate vicinity of the site are local residential streets. Exhibit 2 shows the existing roadway and intersection lane configuration for the intersections analyzed in the study.

2.3 Existing Peak Hour Traffic Situation

In order to assess current traffic operating conditions, field observations were made of the study area roadway network during the weekday morning and afternoon peak periods. Weekday vehicle turning movement counts were also undertaken at the four (4) study area intersections, during the periods 7:00 – 9:00 AM and 4:00 – 6:00 PM, in accordance with general evaluation procedures established by the City. Based on the turning movement count data obtained, the weekday morning and afternoon peak hours were determined to be: 7:30 – 8:30 AM and 4:45 – 5:45 PM. The only exception was the intersection of Good Hope Road @ 19th Place, where the morning peak hour occurred between 7:45 – 8:45. It is noted that the peak hours are not rigid and typically varies between the overall morning and afternoon peak periods.



O. R. GEORGE & ASSOCIATES, INC.	EXHIBIT 2: Existing Roadway Lane Configuration Fort Stanton Residential Community

The existing weekday morning and afternoon peak hour turning movement volumes for the study area intersections are shown on Exhibit 3. The turning movement count summaries are presented in Appendix A.

The existing morning and afternoon peak hour volumes were analyzed using the appropriate Highway Capacity Manual (HCM) analysis technique, in accordance with the requirements of the Office of Intermodal Planning within the City's Department of Public Works. The results show that the study area intersections currently operate at quite acceptable Levels of Service[1]. With the exception of Good Hope Road @ 25th Street, S.E., during the morning peak hour only. The Level of Service results are based on the average delay computed for all vehicles utilizing the particular intersection during the peak hour analyzed. Table 1 presents a summary of the capacity analysis results for the existing traffic situation. Capacity analysis worksheets are presented in Appendix B. Representative pictorial illustrations of the various levels of service are also shown in Appendix B.

TABLE 1

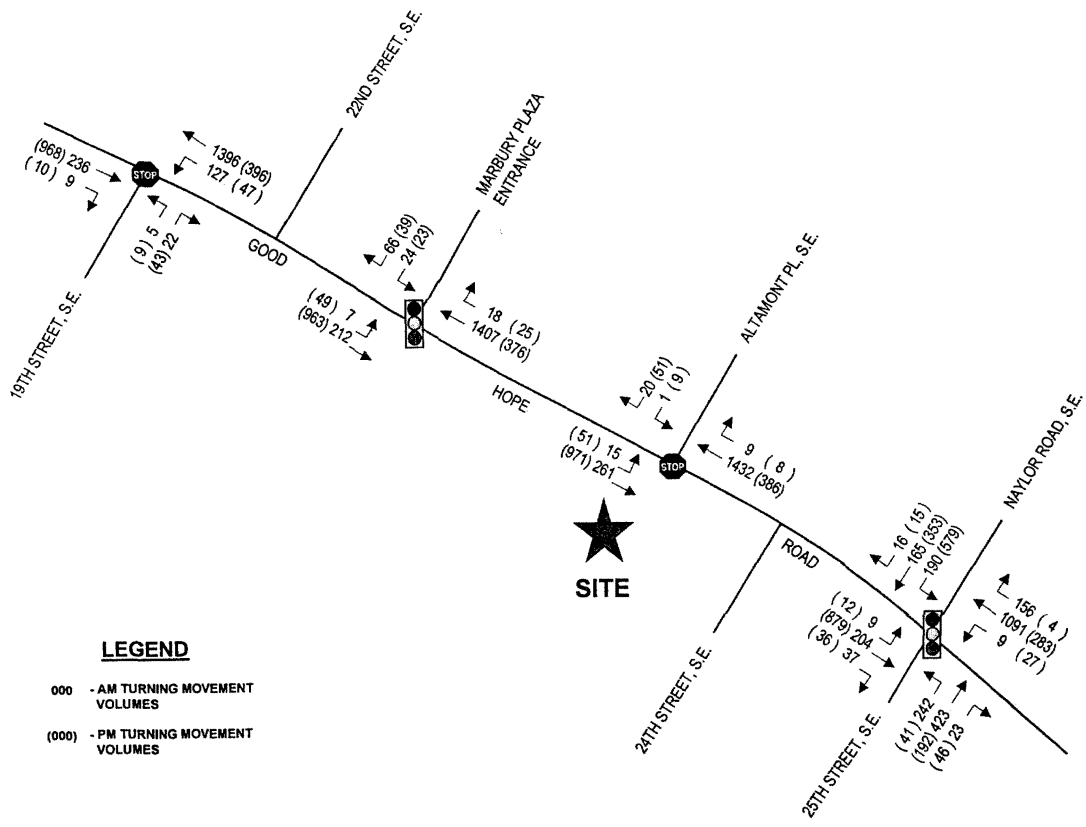
SUMMARY OF CAPACITY ANALYSIS RESULTS - EXISTING TRAFFIC SITUATION

INTERSECTION	AM PEAK HOUR		PM PEAK HOUR	
	Level of Service	Average Delay Sec./Veh.	Level of Service	Average Delay Sec./Veh.
Good Hope Road @ 19th Place, S.E. (unsignalized)	A	0.5	A	0.6
Good Hope Road @ Marbury Plaza Entrance (signalized)	B	12.8	A	4.8
Good Hope Road @ Almont Place, S.E. (unsignalized)	A	0.2	A	0.5
Good Hope Road @ 25th Street, S.E. (signalized)	Less Than Acceptable LOS**	***	C	21.4

Note:
Sec./Veh. = Seconds per Vehicle
*** (g/C)*(V/c) is greater than one.

Source: O. R. George & Associates, Inc.

1 Level of Service" is qualitative measure describing operational conditions within a traffic stream or at an intersection, and their perception by roadway users. Principal considerations are factors such as speed and travel time, delay, freedom of maneuver, traffic interruptions comfort, convenience and safety. Current engineering practice defines six (6) levels of service (A-F), with "A" representing best operating conditions, and Level of Service "F" representing worst conditions. Level of Service E is generally considered by the District of Columbia as the minimum acceptable conditions for planning and design purposes.



O. R. GEORGE & ASSOCIATES, INC.

EXHIBIT 3: Existing Peak Hour Turning Movement Volumes - Fort Stanton Residential Community

3.0 BACKGROUND TRAFFIC SITUATION

3.1 Introduction

As noted earlier, the applicant projects that the site will be built-out and occupied by the year 2001. Therefore, for purposes of this study, the year 2001 was considered the "design year". This section projects the traffic situation likely to occur by the design year, not including the impact of the subject development. This is referred to as the "background traffic" situation.

3.2 Projected Year 2001 Background Traffic Situation

The projected year 2001 background traffic situation was derived by combining the following:

a) Year 2001 base traffic situation, i.e., existing traffic (Exhibit 3) factored by an annual growth of two percent per year (i.e. 6% growth to the year 2001) per recommendations of the District of Columbia Department of Public Works, Office of Intermodal Planning staff. This reflects potential growth in through traffic.

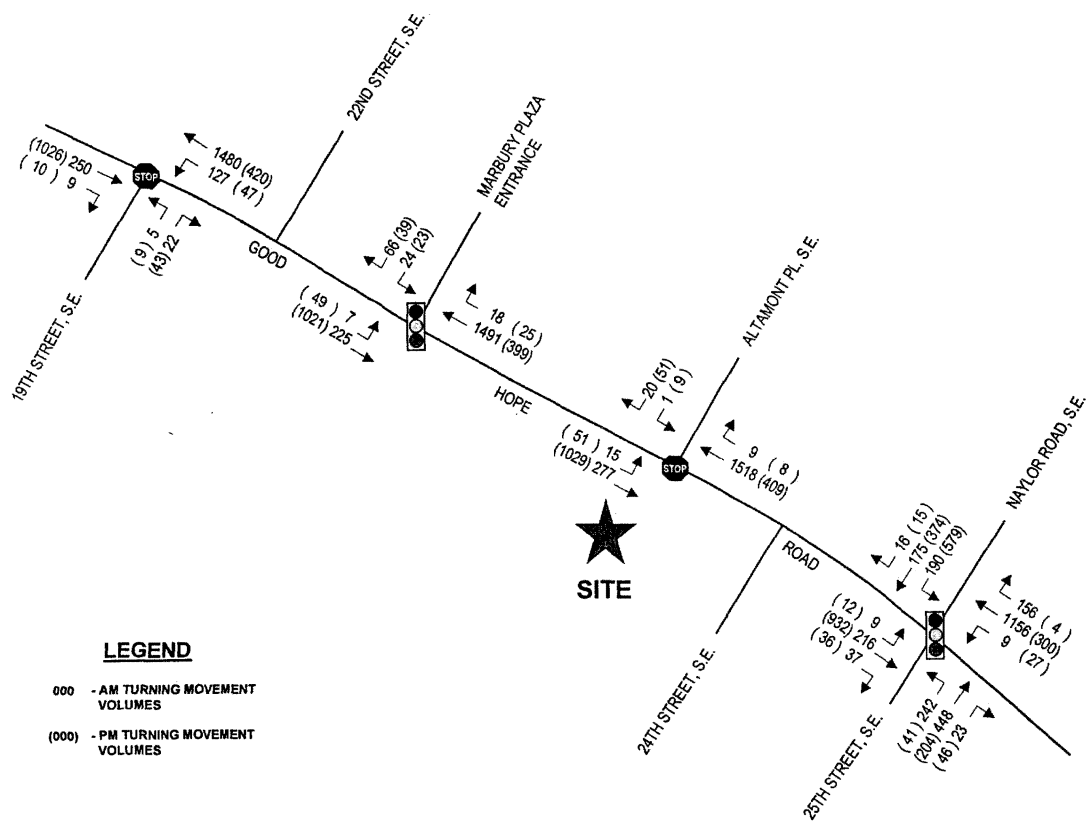
b) Traffic generation from approved developments, which are likely to be built-out within the immediate study area by the year 2001.

With regard to future traffic, the table following shows considerable "fluctuation" and traffic volumes and related growth patterns over the period 1990 –1996, based on data provided by the District of Columbia Department of Public Works. This is likely due to changes in the travel patterns of through traffic due to varying levels of congestion along arterial roadways such as Pennsylvania Avenue, and Branch Avenue which serve heavy commuter traffic to and from the Maryland suburbs and other areas of the City. Overall all the roadways show a decline in traffic volumes; and s such, the projection factors shown in item (a) above are quite conservative, (i.e., on the high side), and they include a considerable "factor of safety":

ROADWAY	1990	Growth '90-'93	1993	Growth '93-'96	1996	Average Growth per Year '90-'96
Good Hope Road, S.E.	20,600	-13.6%	17,800	-4.5%	17,000	-2.9%
Minnesota Avenue	8,000	-2.5%	7,800	-1.3%	7,700	-0.6
25th Street	20,100	5.5	21,200	-15.6%	17,900	-1.8%

The general area of the proposed Fort Stanton residential community is substantially built-out and developed. Based on our discussions with the District of Columbia, Office of Planning staff, no significant developments are planned or projected to be built-out within the immediate study area by the design year for the subject project.

The projected year 2001 background traffic volumes were developed by applying the growth factors noted in item (a) above. The projected year 2001 peak hour background traffic situation is shown in Exhibit 4.



O. R. GEORGE & ASSOCIATES, INC.

EXHIBIT 4: Projected Year 2001 Background Traffic Situation - Fort Stanton Residential Community

3.3 Commuter Traffic Impact

As part of our review, we conducted a license plate survey along Good Hope Road, S.E., and a travel time study along Pennsylvania Avenue, S.E. The travel time study resulted in a travel time of approximately 40 minutes between Southern Avenue (the MD/DC line) and I-295 during the AM peak period. This travel time indicates that Good Hope Road, S.E. is an attractive alternative commuter route to downtown Washington, D.C., particularly for vehicles approaching the area from the south via routes such as Branch Avenue. The preceding statement is supported by the results of the license plate survey of vehicles traveling westbound along Good Hope Road. The survey showed a vehicle registration split as follows: 23.5% for District of Columbia and 76.5% for Maryland and other states. These results demonstrate that a large percentage of the total traffic is commuter/"through" traffic.

3.4 Traffic Analysis – Year 2001 Background Traffic Situation

The year 2001 background intersection traffic volumes were analyzed using the appropriate capacity analysis techniques. The results show that the study area intersections would continue to operate within the standards and requirements of the Office of Intermodal Planning, with the exception of Good Hope Road @ 25th Street, S.E. during the morning peak hour only. As noted earlier this situation is already operating marginally below the City standards; and would not be significantly impacted by the proposed development in view of the proposed trip distribution pattern. Table 2 summarizes the capacity analysis results. Appendix C presents the capacity analysis worksheets for this situation.

TABLE 2

SUMMARY OF CAPACITY ANALYSIS RESULTS - BACKGROUND TRAFFIC SITUATION

INTERSECTION	AM PEAK HOUR		PM PEAK HOUR	
	Level of Service	Average Delay Sec./Veh.	Level of Service	Average Delay Sec./Veh.
Good Hope Road @ Minnesota Avenue, S.E. (unsignalized)	A	0.5	A	0.6
Good Hope Road @ Marbury Plaza Entrance, S.E. (signalized)	C	19.3	B	5.1
Good Hope Road @ Almont Place, S.E. (unsignalized)	A	0.2	A	0.5
Good Hope Road @ 25th Street, S.E.(signalized)	Less Than Acceptable LOS**	***	D	25.5

Note:
Sec./Veh. = Seconds per Vehicle
*** (g/C)*(V/c) is greater than one.

Source: O. R. George & Associates, Inc.

4.0 TRAFFIC ANALYSIS – FORT STANTON RESIDENTIAL COMMUNITY

4.1 Development Plan

As noted in Section 1.1 of this report, the applicant's current plans call for the development of one hundred seventy-six (176) luxury-style apartments within the eastern portion of the site. The Western portion of the property would be improved with forth (40) single-family detached residential units. Access to the site will be provided via four (4) entrances. Two (2) access points will serve the eastern parcel (176 apartments), and the other two to serve the western parcel (40 single-family) detached homes). The major access for each portion of the site will be off Good Hope Road, S.E. The additional entrance will be provided off Wagner Street, S.E. and 19th Place, S.E. for the eastern and western portions, respectively. Exhibit 5 illustrates the site access and parking plan for the site.

4.2 Trip Generation – Fort Stanton

The District of Columbia's general guidelines, and accepted procedures for assessing the impacts of development proposals, require that the trip generation and associated traffic impacts be assessed relative to the weekday morning and afternoon peak traffic demand periods of the adjacent roadway network. Therefore, this section addresses the potential vehicle trip generation of the site during these periods.

The trip generation for the site is presented in Table 3 following, and is based on rates recommended by the Institute of Transportation Engineers (ITE), as stipulated by DPW.

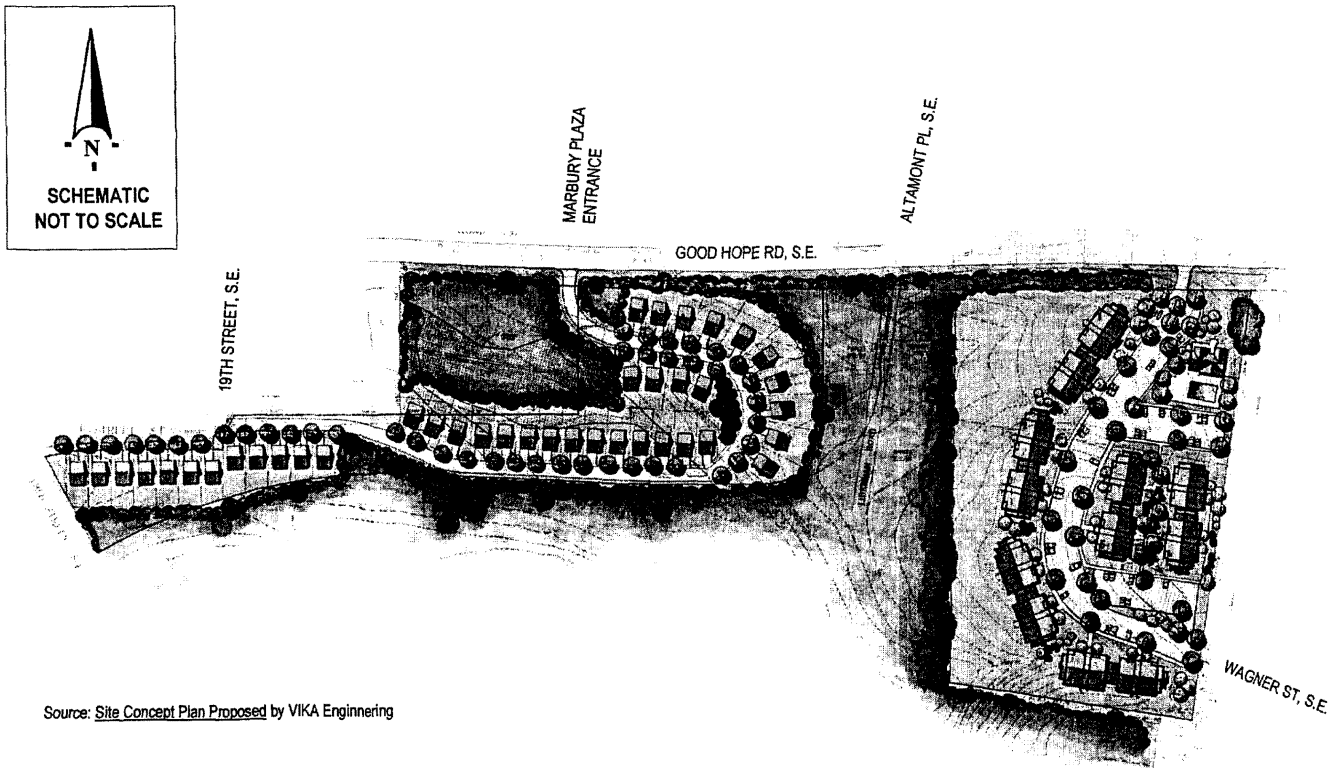
TABLE 3

TRIP GENERATION – FORT STANTON RESIDENTIAL COMMUNITY

Trip Rates	AM PEAK HOUR			PM PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Trips/Apartment Dwelling Unit	0.09	0.42	0.51	0.43	0.20	0.63
Trips/SFD Residential Unit	0.15	0.60	0.75	0.59	0.31	0.90
Trip Generation						
Trips/176 Apartment Dwelling Units	16	74	90	76	35	111
Trips/40 SFD Residential Units	6	24	30	17	8	25
TOTAL TRIPS	**22**	**98**	**120**	**93**	**43**	**136**

Source: ITE Trip Generation Manual, Fifth Edition, (1991) and O.R. George & Associates, Inc.

It is to be noted that the ITE trip generation rates are based on surveys of suburban sites, typically served by little or no transit service. Since over 80% of the proposed community will be apartment units and the subject site will have easy access to transit service along the Good Hope Road corridor, the above trip productions may be conservative (i.e., on the high side). This issue is discussed further in Section 4.6 – Transit Service Availability (page 20).



Source: Site Concept Plan Proposed by VIKA Enginnering

O. R. GEORGE & ASSOCIATES, INC.	EXHIBIT 5: On-Site Circulation Plan - Fort Stanton Residential Community

4.3 Trip Distribution and Traffic Assignment - Subject Development

The following factors were considered in projecting the trip distribution pattern for traffic accessing the subject property:

a) The configuration of the local roadway network, and estimates of travel time to the regional highway facilities serving the general area;

b) Existing traffic patterns observed on the general study area road network, and specifically based on the results of the turning movement counts described in Section 2.3; and

c) The general regional distribution of employment opportunities.

Based on these considerations, the general trip distribution pattern projected for the subject property is as follows.

Direction	Distribution (AM/PM)
Good Hope Road from the West	25% (75%)
Good Hope Road to the West	75% (75%)
Good Hope Road from the East	75% (25%)
Good Hope Road to the East	25% (25%)

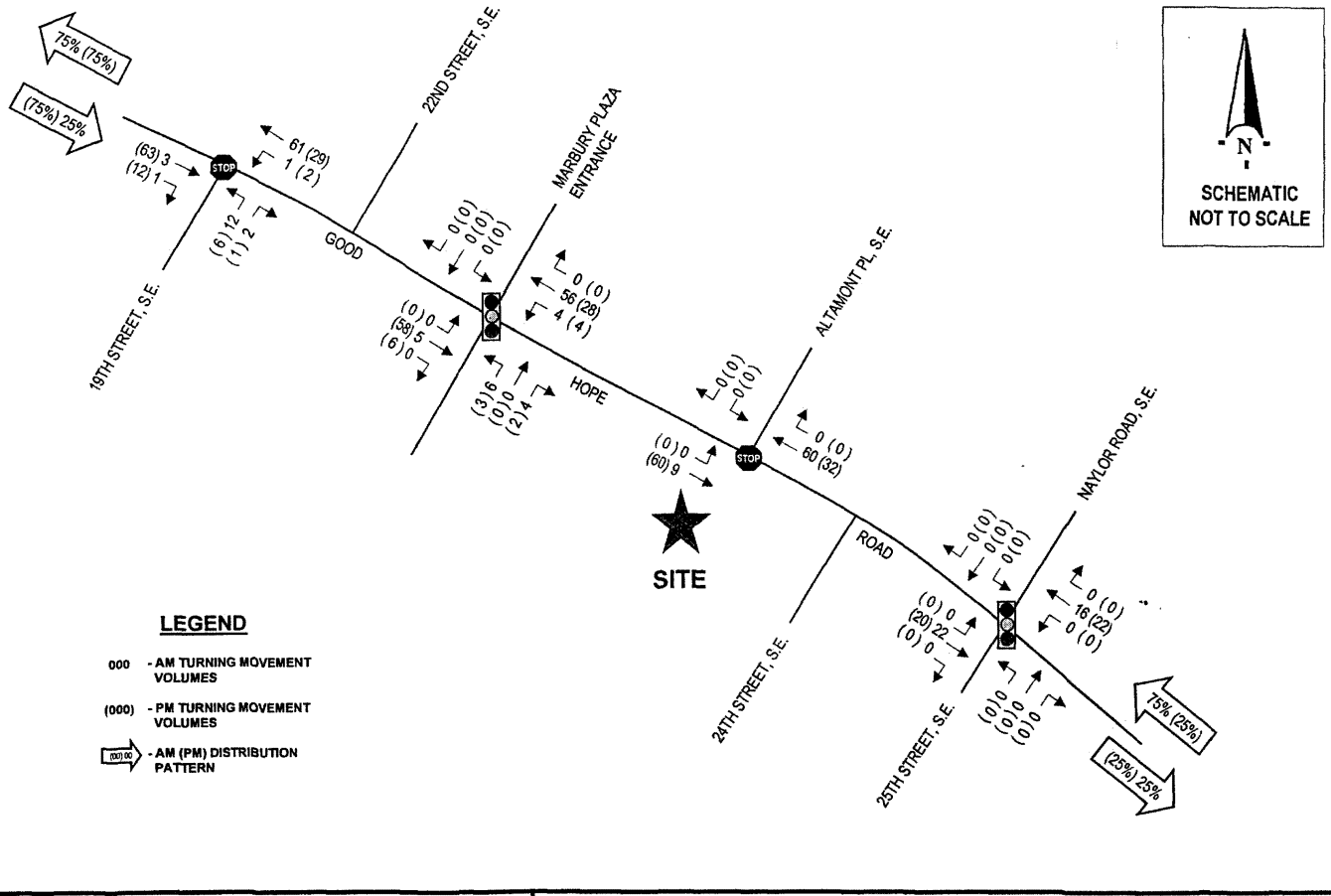
Source: O.R. George & Associates.

The morning and afternoon peak hour site trip generation for the year 2001, (presented previously in Table 3), were assigned to the study area roadway network using the trip distribution pattern shown above. As noted earlier, a minor percentage of vehicular trips accessing the east portion of the site from the south would use Wagner Street, S.E. A total of five (5) vehicular trips are estimated to access the property through that roadway during both the morning (3 vehicles out, 2 vehicles in) and the afternoon (2 vehicles in, 3 vehicles out) peak hours. These vehicular trips would have no appreciable impact at the intersection of Wagner Street and 25th Street, S.E., which is not analyzed in this study. The peak hour trip distribution pattern and traffic assignment for the Fort Stanton site is presented in Exhibit 6.

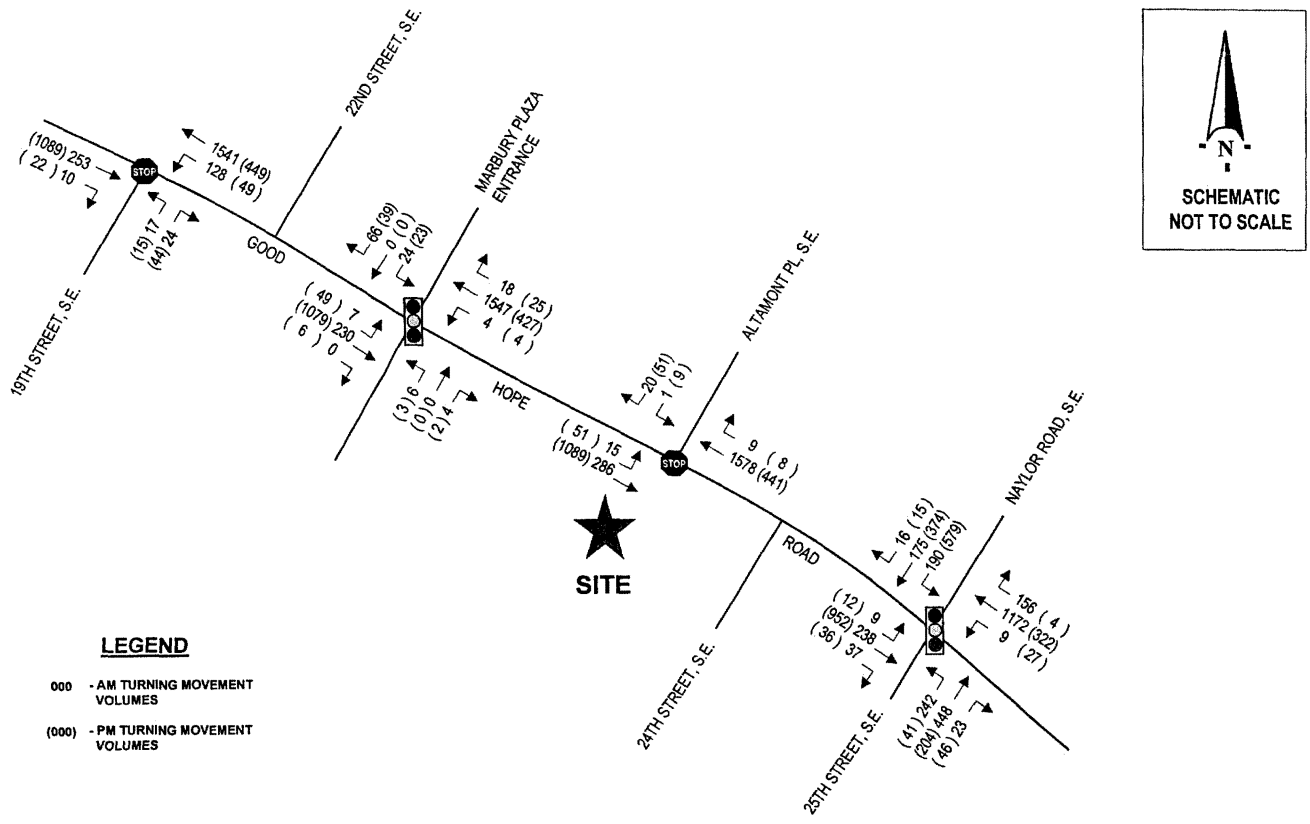
4.4 Traffic Analysis - Year 2001 Total Traffic Situation

The projected year 2001 total traffic situation was derived by combining the projected year 2001 background traffic situation (Exhibit 4 on page 10) with the projected trip assignments for the Fort Stanton development (Exhibit 6). The projected year 2001 total traffic situation is illustrated in Exhibit 7. These volumes were analyzed using the appropriate HCM analysis procedures as required by the DPW Office of Intermodal Planning.

The results are summarized in Table 4 (on page 17); and capacity analysis worksheets are presented in Appendix D. Table 4 shows that under the projected year 2001 total traffic situation, all study area intersections will continue to operate at acceptable levels of service with the exception of Good Hope Road @ Marbury Plaza, S.E. and Good Hope Road @ 25th Street, S.E., *during the morning peak hours only.* Here again, the analysis shows that with relatively minor signal timing modifications, acceptable levels of service could be for all the peak hours



O. R. GEORGE & ASSOCIATES, INC.	EXHIBIT 6: Projected Trip Distribution and Assignment - Fort Stanton Development as Planned



O. R. GEORGE & ASSOCIATES, INC.

EXHIBIT 7: Projected Year 2001 Total Traffic Situation
(Including Fort Stanton Development as Planned)

TABLE 4

SUMMARY OF CAPACITY ANALYSIS RESULTS -
PROJECTED 2001 TOTAL TRAFFIC SITUATION

INTERSECTION	AM PEAK HOUR		PM PEAK HOUR	
	Level of Service	Average Delay Sec./Veh.	Level of Service	Average Delay Sec./Veh.
Good Hope Road @ 19th Place, S.E. (unsignalized)	A	1.8	A	1.0
Good Hope Road @ Marbury Plaza Entrance, S.E. (signalized)	Less than Acceptable LOS	***	B	9.5
Good Hope Road @ Almont Place, S.E. (unsignalized)	A	0.2	A	0.5
Good Hope Road @ 25th Street, S.E. (signalized)	Less Than Acceptable LOS	***	D	28.2

Note:
Sec./Veh. = Seconds per Vehicle
*** (g/C)*(V/c) is greater than one.

Source: O. R. George & Associates, Inc.

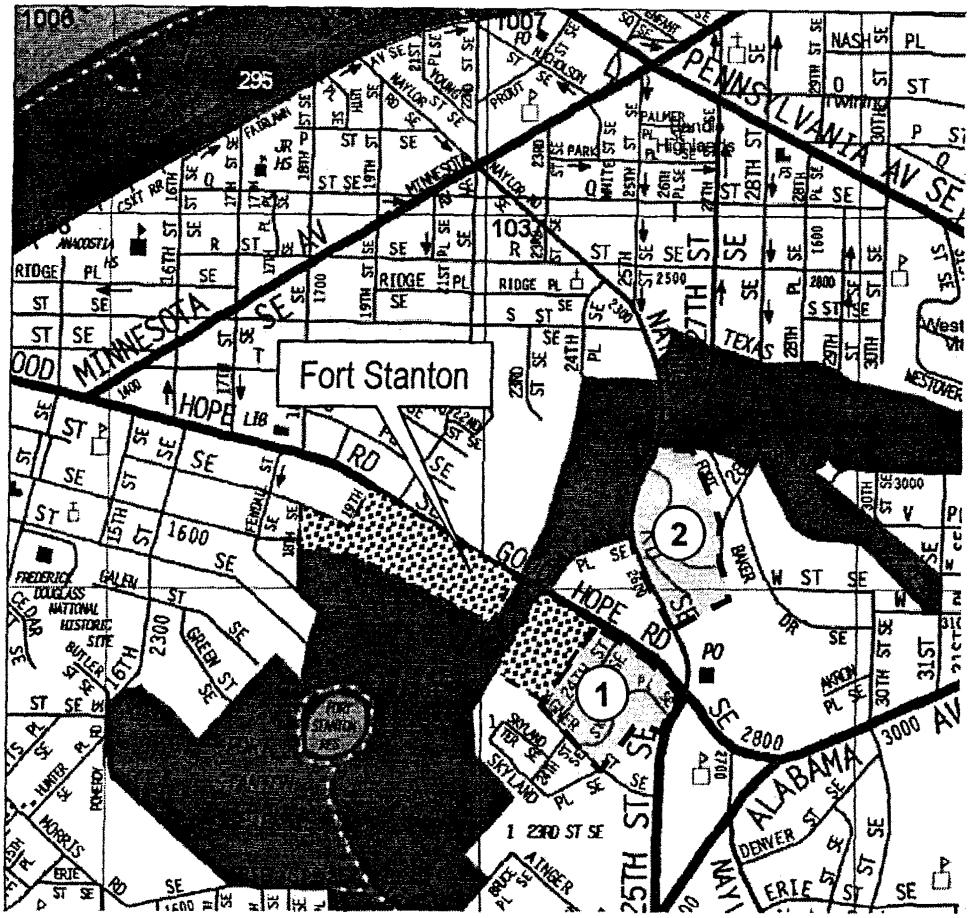
4.5 Parking Analysis

The applicant proposes to provide the following parking supply for the components of the future community. For purposes of evaluation and comparison, the parking requirements stipulated by the Zoning Regulations are also included in the table following.

Development Component	Zoning Ordinance Requirement		Applicant's Proposal	
	Parking Ratio	No. of Spaces	Parking Ratio	Supply
Multi-family Apartments (176 Units)	1 per unit	176	1 per unit	176
Single-family Detached (40 Units)	1 per unit	40	1 per unit	40
TOTAL		**216**		**216**

The above table shows that the Applicant's proposal fully satisfies the requirements of the Zoning Regulations. In addition, it is noted that the parking supply will be within a self-contained setting.

However, in order to further assess the parking needs of the proposed development, and to address concerns raised by area residents field inventories and usage surveys were undertaken for two (2) comparable residential developments within the vicinity of the subject site. The communities surveyed are described below, and the results of the survey are presented in Table 5. For ease of reference, Exhibit 8 shows their location in relationship to the proposed Fort Stanton development.



1 Map Key	2 Project Name	3 Number of Units	4 Occupied Rate	5 Available Parking	6 Occupied Parking (5:00AM)		7 Parking Generation 6 (3 X 4)
					#	%	
1	SKYLAND	213	99%	199	175	88%	0.83
2	PARK NAYLOR	231	100%	236	166	70%	0.72

O. R. GEORGE & ASSOCIATES, INC.

EXHIBIT 8: Parking Survey
5:00 AM - 2/26/99

Site Description

Skyland Apartments: This community is located south of Good Hope Road, SE and fronts on 24th Street and Skyland Place. It consists of 213 units of varying sizes (from 1-3 bedrooms) in a low-rise setting. It is currently 99% occupied. The site is provided with 59 off-street parking spaces, with the remainder of its parking demand met by on-street parking spaces.

The total parking supply is therefore estimated based on consideration of the lengths of adjacent roadway segments and typical passenger vehicle lengths. It is estimated that a total of 199 parking spaces are "available" for use by this community (59 off-street/140 on street).

Park Naylor: This residential community is located east of Naylor Road just north of its intersection with Good Hope Road. It consists of 231 units of varying sizes from 1 bedroom to duplexes. It is currently fully occupied. The site is provided with 236 off-street spaces within a self-contained environment.

Parking Survey and Results:

Surveys were conducted of the two communities described above during the period of peak demand (typically midnight to 6:00 AM on weekdays) during February, 1999. The surveys were supplemented by field observations made on Wednesday the 24th of February. The results of the survey are summarized in Table 5 following.

TABLE 5

PARKING USAGE SURVEY RESULTS –
ADJACENT COMPARABLE RESIDENTIAL DEVELOPMENTS

Project Name	Number of Units	Percent Occupancy	Parking Spaces Provided	Observed Peak Parking Demand	Parking Demand Ratios (Spaces per unit)
Skyland Apts.	213	99%	199	175	0.83
Park Naylor	231	100%	236	166	0.72

Based on the above, the average peak parking demand for the comparable units within the area of the proposed Fort Stanton residential community is in the range of 0.78 spaces per unit, (or 1 space for every 1.3 dwelling units).

The observations appear to confirm that the maximum parking requirement of 1 space per unit [as stipulated by the City's Zoning Regulations for multi-family residential uses] is quite reasonable. The proposed parking supply should also be adequate for varying product types within this category of rental housing. As such, the parking supply proposed by the Applicant should have no adverse impact on adjacent community.

4.6 Transit Service Availability

Studies have shown that residents of multi-family rental housing typically have lower per capita auto ownership, and use public transportation to a greater degree than either condominium or other types of owned housing. The study therefore considered whether transit service along the corridor will be adequate to serve the future community.

Our research and conversations with WMATA's staff show that WMATA operates five (5) bus routes (V5, W6, W8, 91 and 92) along the Good Hope Road corridor within the Anacostia area of Washington, DC. These routes provide direct service to downtown Washington, DC, and also connect to other routes serving other areas of the City and the broader metropolitan region. They also provide connection to the Anacostia Metrorail station less than two (2.0) miles away. WMATA's records show that bus stops along these routes are within close proximity and within acceptable walking distances to the Fort Stanton Development. The bus routes noted above provide service within 5-15 minute headways during the peak commuting period and 10-30 minutes during the off-peak period. WMATA's current ridership data shows no capacity deficiencies along the bus routes serving the area as noted above. Appendix E presents correspondence with WMATA's staff on the matter of transit service for the Anacostia area in general and the Good Hope Road corridor in particular.

5.0 SUMMARY OF FINDINGS AND CONCLUSION

5.1 Summary of Findings

This study has examined the potential traffic and parking impacts of developing the property, in accordance with the subject Special Exception application. The key findings of the study are as follows:

a) The key intersections within the area of the subject site currently operate at quite acceptable Levels of Service, with the exception of Good Hope Road @ 25th Street, S.E. during the morning peak hour period only. The morning and afternoon peak hours of traffic flow on the adjacent road network are typically 7:30 – 8:30 AM, and 4:45 - 5:45 PM.

b) Review of average daily traffic (ADT) volume data provided by the City indicates that the levels of usage for all key area roadways considered have remained generally stable over the past several years; and that volumes have actually decreased significantly on some roadways.

c) License plate surveys, conducted along Good Hope Road, SE within the area of the proposed development, show that over 75% are of out-of-state registration. In conjunction, travel time surveys along Pennsylvania Avenue between Southern Avenue and I-295, and along Branch Avenue show extreme levels of congestion. The congestion levels along these roadways endure considerable through traffic onto alternate collector roadways such as Good Hope Road during the peak commuter periods.

d) The Applicant proposes to develop the property by the year 2001 (considered the design year for this study). Analysis of traffic volumes projected to the design year, (using growth rates recommended by the City planning agencies), shows that levels of service will continue to be quite acceptable with the exception of Good Hope Road @ 25th Street, S.E., during the morning peak only.

e) Parking generation characteristics and assumptions were developed from surveys and field observations conducted for other residential developments within the general study area. Based on these surveys, it is projected that the parking supply proposed the Fort Stanton development will be quite adequate.

f) Capacity analyses indicate that future levels of service within the defined roadway network will continue to be quite acceptable with the exception of Good Hope Road @ 25th Street, SE and Good Hope Road @ Marbury Plaza, SE (during the morning peak only) potential deficiency can readily be mitigated by minor modifications in the signal phasing at these intersections.

g) Transit service along the Good Hope Road corridor have adequate capacity to accommodate potential demand from the proposed development.

5.2 Conclusions and Recommendations

Based on the foregoing data, analyses and discussions, this study has shown that the defined study area road network would be adequate to accommodate the Fort Stanton residential community proposed under the subject Special Exception application. It is quite apparent that the minor capacity deficiencies noted at two (2) intersections (AM peak hour only) is due to traffic diversions due to congestion along the major commuter routes. Recent improvements undertaken as part of the Barney Circle project have apparently reduced through traffic within the area. With further implementation, the situation can be expected to be enhanced. Should it be necessary, this study has shown that minor adjustments in signal timing could mitigate the minor capacity deficiencies identified. Appendix F presents capacity analysis computations utilizing the HCS methodology and Sig Cinema procedures for signal optimization typically stipulated by the Signals Division.

This study has concluded that the proposed development would not create any significant capacity, safety, or operational deficiencies within the study area road network, and would also not adversely impact the health, safety and general welfare of roadway users. As such the proposed special exception should not result in conditions that are objectionable to adjacent or area property owners and the community in general.

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C:\DOCUMENTS\REPORTS\\FORT STANTON - REPORT

FAIRLAWN Exhibit 4

ENGINEERING CONSULTING SERVICES, LTD.
Geotechnical • Construction Materials • Environmental

THIS WAS NOT Shared with FAIRLAWN for the MAY 5, 1999 HEARING

April 19, 1999

DISTRICT OF COLUMBIA MAR 20 P 4:28

Mr. Miles Haber
KSI Services, Inc.
8081 Wolftrap Road
Suite 300
Vienna, Virginia 22181

ECS Job No. 5349

Reference: Final Report of Subsurface Exploration and Geotechnical Engineering Analysis, The Homes at Woodmont, East Parcel, Southeast, Washington, D.C.

Dear Mr. Haber:

As authorized, Engineering Consulting Services, Ltd. has completed the subsurface exploration and geotechnical engineering analysis for the above referenced project. Attached is our revised report containing the results of our subsurface exploration, including boring and test pit logs and geotechnical engineering recommendations. The revisions are based on changes made to the slope and building elevations on the west side of the site.

Previous studies at the site have identified significant amounts of uncontrolled fill materials are present within the majority of the area proposed for development. Our current exploration has confirmed that the subsurface conditions within the limits of the proposed structures are consistent with those described in previous studies. Uncontrolled fill materials as deep as 40 feet were encountered in the borings and test pits. These fills are unsuitable for direct support of conventional shallow foundations. Therefore, we have recommended ground improvement of the fill will be required for proper foundation support.

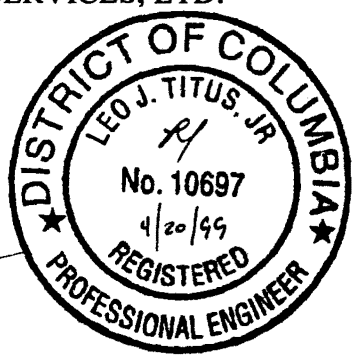
Given the proposed development, three and four story apartment buildings with related site improvements, and the existing subsurface conditions, it is our opinion that Deep Dynamic Compaction (DDC) will be the most effective method of ground improvement. Considering the large amount of fill, complete removal and replacement is not an economic alternative. In addition, the large amount of debris will make deep foundations difficult and costly to construct.

Our geotechnical analysis also included a slope stability study of the proposed slopes and retaining walls on the west side of the site. We have concluded that proposed retaining walls may be constructed; however, it will be necessary to modify the wall designs so that they will provide additional stabilization of the slope. For this reason it is very important that the retaining wall designer be thoroughly familiar with this geotechnical report so that the slope reinforcement parameters are included with the final wall design.

This report provides detailed recommendations for the issues discussed above. We have enjoyed being of service to KSI Services, Inc. on this project. If you have any questions with regard to the information in this letter or our geotechnical report, or if we can be of further assistance, please do not hesitate to contact us.

Respectfully,

ENGINEERING CONSULTING SERVICES, LTD.



Leo J. Titus, Jr., P.E.
Project Engineer

James W. Eckert, P.E.
Principal Engineer

LJT/tr/pp:geotech/report/5349rse2

REPORT

PROJECT

Subsurface Exploration
and Geotechnical Engineering Analysis
The Homes at Woodmont, East Parcel
Southeast, Washington, D.C.

CLIENT

KSI Services, Inc.
8081 Wolftrap Road
Suite 300
Vienna, Virginia 22181

PROJECT #5349

DATE April 19, 1999

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PROJECT OVERVIEW

Background

It is our understanding that this site was previously used by the Washington Metro Authority as a dump site for unwanted fill soils. There are no reliable records that describe the types of fill materials used on the site, or the degree of compactive effort used.

A previous exploration of this site was performed by Whitlock Dalrymple Poston & Associates, Inc. (WDP). The WDP exploration consisted of excavating 13 test pits across the project site. The details of the exploration are provided in WDP, Inc. Geotechnical Feasibility Study dated November 20, 1998 (WDP Project No. 06-98106). The test pits encountered existing fills with significant amounts of construction debris. The debris caused shallow refusal of test pits at several locations, and the depth of the fill was not able to be determined. Copies of the WDP test pit logs are presented in the appendix.

Historical topographic plans of the site show that original ground surface elevations across the western part of the site range from 20 to 40 feet below the now existing ground surface. The deepest fills are located in areas where natural drainage valleys previously existed.

Proposed Construction

Based on the conceptual site plan provided to us, we understand that the project will consist of six garden style apartment buildings and associated site improvements. These structures are expected to be three to four story wood frame with slab-on-grade construction. At this time, no detailed information regarding structural loads were available.

According to the site grading plans, dated March 1999, prepared by VIKA, Inc., the slab elevation for the buildings will range from EL. 202 on the east side of the site to EL. 186 on the west side of the site. These proposed grades will require cuts up to 10 feet on the east side of the site, and fills up to 12 feet on the west side.

There is an existing slope on the west side of the site with grades as steep as 2.2H:1V. It is our understanding that retaining walls will be constructed on the slope in order to allow the proposed grades to be constructed at the top of the slope. The existing slope below the walls will be cut to a maximum slope of 4H:1V.

Scope of Work

The conclusions and recommendations contained in this report are based on 12 soil borings, 7 test pits, and laboratory testing of selected samples. Also, previous geotechnical information for this site prepared by other consultants was reviewed in the development of our recommendations.

EXPLORATION PROCEDURES

Subsurface Exploration Procedures

A total of 12 soil borings were performed for this study to characterize the general subsurface conditions at the site. All borings were performed with an all-terrain vehicle (ATV) mounted drill rig utilizing continuous flight, hollow stem augers to advance the boreholes. The boring locations were selected and located in the field by Engineering Consulting Services, Ltd.

Representative soil samples were obtained by means of the split-barrel sampling procedures in accordance with ASTM Specifications D-1586. In the split-barrel sampling procedure, a 2-inch O.D., split-barrel sampler is driven into the soil a distance of 18 inches by means of a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler through a 12-inch interval is termed the Standard Penetration Test (SPT) value and is indicated for each sample on the boring logs. This value can be used to provide a qualitative indication of the in-place relative density of cohesionless soils. In a less reliable way, it also indicates the consistency of cohesive soils. This indication is qualitative, since many factors can significantly affect the SPT value and prevent a direct correlation between drill crews, drill rigs, drilling procedures, and hammer-rod-sampler assemblies.

A field log of the soils encountered in the borings was maintained by the drill crew. After recovery, each sample was removed from the sampler and visually classified. Representative portions of each sample were then sealed and brought to our laboratory for further visual examination and laboratory testing.

In addition to the borings, seven test pits were excavated under the direction of ECS, Ltd. in order to evaluate the condition fill in the slope, as well as determine the suitability of fills for reuse during construction.

Laboratory Testing Program

Representative soil samples were selected and tested in our laboratory to check field classifications and to determine pertinent engineering properties. The laboratory testing program included visual classifications and moisture content tests. Borings logs and laboratory test results are included in the appendix of this report.

EXPLORATION RESULTS

Findings

Our exploration has confirmed that the subsurface conditions within the limits of the proposed development are consistent with those described in previous studies, and the historical topographic plans. Fill materials as deep as 40 feet were encountered in our borings within the limits of the proposed development. The test pits confirmed that the fill material contained significant amounts of debris which caused auger refusal in certain borings. In borings where auger refusal was encountered, the borings were offset and reattempted.

The fill contained significant amounts of asphalt, concrete, brick, wood, steel, glass, paper and rubber. In general, fill materials with this type and amount of debris is considered unsuitable for use as structural fill. In addition, there is only very limited compaction test data available. Compaction data submitted by Cohen Engineers, dated November 14, 1986 was provided to us for review. However, this information does not provide depths of compaction tests, and only 25 compaction tests were taken on one day (October 7, 1986). Considering these facts, it is our opinion that the majority of the fill was placed in an uncontrolled manner and that the existing fills in their present state are unsuitable for direct support of conventional shallow foundations. Therefore, ground improvement will be required in order to develop the site using conventional spread footing foundation systems.

Groundwater Observations

Observations for groundwater were made during sampling and upon completion of the drilling operations at each boring location. In auger drilling operations performed prior to rotary drilling operations, water is not introduced into the boreholes, and the groundwater position can often be determined by observing water flowing into or out of the boreholes. Furthermore, visual observation of the soil samples retrieved during the drilling operations can often be used in evaluating the groundwater conditions.

Groundwater was observed in several of the test locations at depths ranging from 33 to 40 feet below ground surface. Perched water was observed in Borings B-2 and B-4 within the existing fill at depths of 8 to 13 feet. Considering the nature of the existing fill, we anticipate other isolated areas of perched groundwater are located at the site.

While the deeper groundwater will not have a direct impact on construction, the presence of water at these elevations will contribute to the weakening of the existing slope. The shallower, perched water at isolated locations may have an impact on the ground improvement operations. The contractor should be prepared to provide temporary dewatering of perched water using sump pits and pumps.

ANALYSIS AND RECOMMENDATIONS

The subsurface explorations conducted at this site have confirmed that random uncontrolled fills are present within the proposed building limits. These fills are unsuitable for direct support of building foundations. Therefore, we recommend that the existing fills be improved in place by Deep Dynamic Compaction.

In addition to the subsurface exploration for the proposed buildings, we have performed an analysis of the stability of the slope and proposed retaining walls on the west side of the site. We have concluded that proposed retaining walls may be constructed as conventional segmental retaining walls. However, it will be necessary to use longer than normal geogrid reinforcement in order to provide additional slope stability. The longer reinforcement will require the location of the walls be moved away from the proposed buildings. Since the wall system will be a part of the slope stabilization, it is very important that the retaining wall designer be thoroughly familiar with the recommendations outlined in this geotechnical report, so that the slope reinforcement parameters are included with the final wall design.

The following sections will provide detailed recommendations for the issues discussed above, as well as recommendations for foundation, slab and pavement design.

Dynamic Compaction

Given the proposed development, three to four story apartment buildings with related site improvements, and the existing subsurface conditions, it is our opinion that Deep Dynamic Compaction (DDC) will be the most effective method of ground improvement. Considering the large amount of fill, complete removal and replacement will not be an economic alternative. In addition, the large amount of debris would make it difficult and costly to construct deep foundations.

DDC is a ground modification technique where loose fill materials can be densified in place. The technique consists of the repeated impacting of the soils by a heavy weight dropped from a significant height. The weight drops are performed in a preplanned grid pattern, the depth and degree of improvement being dependent on the tonnage of the weight, height of the fall and the suitability of the soils being compacted to the application of dynamic compaction.

Based on the depth and nature of the existing fill, we recommend that the DDC consist of repeated drops of at least a 15 ton weight, dropped from a height of at least 60 feet, over the extended building pad areas in a grid pattern. These pads are to be extended beyond the intended building limits, including any attached stoops, by a minimum of ten feet in all dimensions. It is important that the extended building pad is sufficiently large so that no part of the building or any ancillary structures does not extend beyond the DDC improved pad, as significant differential settlements may occur. On a site such as this, the DDC can create craters as deep as 3 to 5 feet. The craters must be filled with select granular fill, which is then compacted with a lighter weight, in a process known as an "ironing pass". The "ironing pass" in