CITY OF TAMPA
CONTRACT ADMINISTRATION DEPARTMENT

SOIL BORINGS

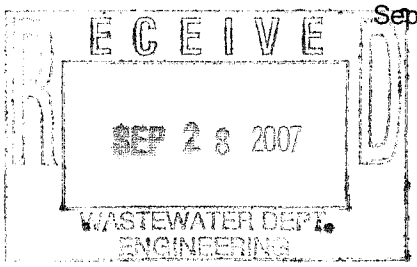
CONTRACT 08-C-07

BRUCE B DOWNS WASTEWATER RELIEF FORCE MAIN

PREPARED FOR CITY'S USE ONLY. BIDDERS SHALL NOT RELY ON THE ACCURACY OF ANY INFORMATION CONTAINED HEREIN, BUT SHALL BE RESPONSIBLE FOR ADHERING TO THE TERMS OF SECTION I-2.01, OF THE CONTRACT SPECIFICATIONS.

ADDITIONAL SOIL BORINGS AVAILABLE UPON REQUEST

TEST LAB INC.
GEOTECHNICAL & MATERIALS
ENGINEERING, TESTING & INSPECTION



September 25, 2007

City of Tampa
City Hall Annex, 6N
306 E. Jackson Street
Tampa, Florida 33602

Attention: Mr. Jack Ferras

Reference: Report of Subsurface Exploration
Proposed 24" HDPE Wastewater Force Main Line
E. Bearss Avenue
Tampa, Florida
Test Lab Project No.: **07-3309**

Dear Mr. Ferras:

As authorized, a subsurface exploration was performed for the proposed 24" HDPE wastewater force main line planned to be constructed along the south side of the right of way of E. Bearss Avenue in Tampa, Florida. The proposed construction will be performed from the intersection of E. Bearss Ave. and 22nd Street to the intersection of E. Bearss Ave. and Bruce B. Down Blvd. The proposed field exploration consisted of performing four (4) exploratory borings in the proposed wastewater line alignment. Due to the presence of overhead electric lines and traffic volume on the E. Bearss Ave., one (1) exploratory boring, STA. 28+00, was relocated approximately 20 feet to the south of the proposed 24" HDPE wastewater force main line. The following report briefly describes the field test procedures used for this exploration and presents the findings, an engineering evaluation of the subsurface conditions and estimated normal seasonal high water table (SHWT).

EXPLORATION PROGRAM

Four (4) exploratory borings were performed with a truck-mounted CME-45B drilling rig at the proposed locations identified by TestLab, Inc. Conventional rotary drilling procedures were utilized along with a bentonite drilling fluid to stabilize the bore hole. A standard penetration test was made and split-barrel soil samples obtained at intervals of 2 feet to a depth of 10 feet and intervals of 5 feet thereafter. The following is a brief description of this field test procedure.

The exploratory borings were performed in accordance with ASTM Specification D-1586, entitled "Standard Method for Penetration Test and Split-Barrel Sampling of Soils." After drilling to the required depth and cleaning the bore hole, the sampler (2" O.D.) was driven 18 or 24 inches into the undisturbed soil by a 140-pound drop-hammer falling 30 inches. The number of blows required to drive the sampler the second and third 6-inch increments is known as the "Standard Penetration Resistance" (N). The

numerals in parentheses below the 'N' values are the blow counts for each of the 6-inch increments that the split-barrel sampler was driven. The various soils encountered in the borings were visually classified in the field and representative soil samples obtained for further examination by a geotechnical engineer. The soils encountered in the borings were classified utilizing the "Unified Soil Classification System."

The data obtained from the borings are presented on the accompanying logs. Also attached is a legend explaining the classification terms and symbols used on the logs.

SITE CONDITIONS

The project site is located along the south side of the right of way of E. Bearss Ave. from 22nd Street to Bruce B. Downs Blvd. in Tampa, Florida. Based on our conversation with Mr. Jack Ferras of City of Tampa and "Plan View", Sheet 1 to Sheet 3, the proposed boring locations and depths were identified by City of Tampa along the existing roads where the existing overhead electric lines were observed in many proposed boring locations.

SUBSURFACE CONDITIONS

The following is a generalization of the subsurface conditions revealed during the field exploration. Boring B-1 encountered fill materials composed of 3.5 inches of asphalt, 6 inches of limerock base and firm to very hard brown fine SAND from existing ground surface elevation to a depth of 6 feet. Beneath the fill materials, cohesionless loose light gray-brown, gray-brown and black fine SAND was encountered to boring terminal depth of 15 feet.

Boring B-2 encountered cohesionless soils composed of loose gray-brown and brown fine SAND from existing ground surface elevation to a depth of 4 feet, subsequently underlain by cohesive medium stiff to very stiff light green-gray-brown and light gray-brown fine sandy CLAY from 6 feet to a depth of 12 feet. Beneath the cohesive materials, weathered limestone was encountered to boring terminal depth of 15 feet. Characteristically, the weathered limestone was hard light green- gray-brown calcareous sandy clay containing limestone fragments.

Boring B-3 encountered fill materials consisting of firm orange-brown slightly clayey fine sand and loose to firm gray-brown and brown fine sand from existing ground surface elevation to a depth of 6 feet. Beneath the fill materials, cohesionless firm to very firm light gray-orange-brown, light gray-brown and gray-brown fine SAND was encountered to boring terminal depth of 15 feet.

Boring B-4 encountered fill materials consisting of loose gray-brown fine sand from existing ground surface elevation to a depth of 2 feet, subsequently underlain by cohesionless very loose to loose dark gray-brown, gray-brown and light brown fine SAND from 2 feet to a depth of 12 feet. Beneath the cohesionless, semi-cohesive dense dark brown, very slightly clayey fine SAND was encountered to boring terminal depth of 15 feet. The following table provides a summary of the soil stratification.

Boring	Station	Testing Type	Depth (ft)					
			0-2	2-4	4-6	6-8	8-12	12-15
B-1	6+00	DCP	Fill Material	Fill Material	Fill Material	Fine SAND	Fine SAND	Fine SAND
B-1	6+00	DCP	Fine SAND	Fine SAND	Sandy CLAY	Sandy CLAY	Sandy CLAY	Weathered LIMESTONE
B-1	6+00	DCP	Fill Material	Fill Material	Fill Material	Fine SAND	Fine SAND	Fine SAND
B-2	6+75	SPT	Fill Material	Fine SAND	Fine SAND	Fine SAND	Fine SAND	Clayey SAND

GROUND WATER CONDITIONS

Due to the drilling technique (mud rotary for the test boring), water table depths in excess of 10 feet were not documented. The water table was encountered at a depth of 8.0 and 7.0 feet below existing ground surface elevation at boring locations B-2 and B-4, respectively. Fluctuations of the water table should be expected during the year due to local amounts of rainfall, site development and other factors. The United States Department of Agriculture "Soil Survey of Hillsborough County, Florida" indicates that the shallow soils at the site are composed of Basinger, Holopaw and Samsula, Myakka and Zolfo Fine Sand. However, the site has been situated in the urban land area. The soils in this area are artificially drained by sewer systems, gutters, retention pond, surface ditches and elevation changes with man made fill. The following table summarizes the estimated seasonal high water table at the individual boring locations.

Street Name	Boring	Station	Soil Type	Measured Water Depth Below Existing Grade	USDA Water Depth	Estimated SHWT
E. Bearss Ave	B-1	27+00	Zolfo	Not Encountered	24" – 40"	7'0"
	B-2	38+00	Basinger, Holopaw and Samsula	7'0"	Existing Grade	4'0"
	B-3	62+50	Zolfo	Not Encountered	24" – 40"	7'0"
	B-4	75+00	Zolfo	8'0"	24" – 40"	5'0"

LABORATORY PROGRAMS

Four (4) soil samples obtained from the field testing program were selected for Atterburg Limits (ASTM D 1557) and Grain Size Analysis (ASTM D 422) tests. The results of the laboratory gradation test indicate that the soils are granular materials of which 36% or less of particles pass through a No. 200 sieve. As a result of these tests, the soils are classified as SP and CH utilizing the Unified Soils Classification System (USCS) or A-3 and A-7-6 utilizing the American Association of State Highway and Transportation Officials (AASHTO) system.

SUMMARY OF LABORATORY TEST RESULTS

BORING No.	DEPTH (ft.)	pH	PERCENT PASSING SIEVE NUMBERS									LL	PI	ORGANIC CONTENT	AASHTO SOIL CLASS
			3/8	4	10	20	40	60	100	140	200				
B-1	4'-6'	-	-	100	100	100	99	95	72	16	3	NP	NP	-	A-3
B-2	6'-8'	-	-	100	100	100	99	96	76	46	36	55	37	-	A-7-6
B-3	8'-12'	-	-	100	100	100	99	93	70	19	4	NP	NP	-	A-3
B-4	6'-8"	-	-	100	100	100	99	93	64	14	1	NP	NP	-	A-3

EVALUATION

The field exploration revealed two subsurface conditions of concern. This is the loose consistency of the cohesionless soils at depth ranging from 4 to 12 feet in borings B-1, B-3 and B-4. This is not a serious problem, however, because it can be remedied by proper preconstruction site preparation. Subgrade preparation in the proposed wastewater pipe area include proof-rolling the exposed surface with a light weight, manually guided vibratory compactor to adequately densify these shallow very loose sands and

back fill the excavation with the suitable fill materials, as fill requirement recommendation section, compacted to 95% of Modified Proctor maximum dry density.

Second concern is a shallow cohesive material at a depth of 4 to 12 feet in borings B-2. Undercutting one (1) foot below the bottom of proposed wastewater pipe is required if the clay material is encountered and back fill the excavation with a one (1) foot of clean washed No. 56 stone to proposed bottom of wastewater pipe bearing elevation.

RECOMMENDATIONS

Site Preparation

The proposed wastewater pipe subgrade areas should be recompacted with a light weight, manually guided vibratory compactor to adequately a density of 95% of Modified Proctor maximum dry density (ASTM D 1557). An undercutting one (1) foot below the bottom of proposed wastewater pipe are required if the clay material is encountered and back fill the excavation with a one (1) foot of clean washed No. 56 stone to proposed bottom of wastewater pipe bearing elevation. It is recommended that the compaction operation be observed under the supervision of the geotechnical engineer or his representative to provide assurance that the 95% of Modified Proctor maximum (ASTM D 1557). Dynamic compaction should not be used if existing structures are within 20 feet of the area being compacted.

Ground Water Control

The water table is not expected to pose any problems during general site preparation and foundation construction. Any water in excavations can probably be controlled by pumping from sumps located in the excavations. However, it may require installing and continuously operating a well-point dewatering system to a depth of 3 feet below the excavation.

Fill Requirements

Suitable fill required in the proposed wastewater pipeline area should be a suitable material, which is placed in thin, properly compacted lifts. Material to be used for structural fill should be an inorganic soil of low plasticity, preferably clean sand containing less than 12 percent of the material passing a No. 200 sieve. Structural fill beneath wastewater pipe should be compacted to at least 95 percent of the maximum Modified Proctor dry density.

The permissible thickness of Suitable fill lifts will depend upon both the nature of the soil and the type of compaction equipment used. When clean sand is used for structural fill, lifts up to 12 inches in thickness may be placed if heavy drum-type vibratory compaction equipment is used whereas lifts should be limited to a maximum of 8 inches in thickness if either the structural fill is slightly cohesive or medium-weight drum-type vibratory compaction equipment is used. In restricted working areas, such as when backfilling around service line trenches beneath pavement, light-weight manually-guided vibratory compaction equipment may be used. But when such light equipment is used, lifts of structural fill should be limited to a maximum of 4 inches in thickness.

LIMITATIONS

This study was undertaken for design purposes only. Generally accepted geotechnical engineering practices were utilized in the preparation of this report; and no other warranty, either expressed or implied, is made as to the professional advice provided. The report is based upon the design information provided as discussed in this report. Consequently, we can assume no responsibility for misinterpretation or misapplication of these recommendations unless given an opportunity to review any changes in either the design or location of the structure, which may affect their validity. This report has been prepared solely for the use of our client and may not contain sufficient information for other uses or for the purposes of other parties. Therefore, conclusions or recommendations based upon these data but made by others are not our responsibility. The following are other limitations that are applicable to this report.

The lines on the logs designating the interface between the various strata may only be approximate boundaries when the transition is gradual or could not be detected by the drilling operations.

The depth to the groundwater table measured at the site during the investigation is only indicative of the conditions at that time. The groundwater table may fluctuate significantly due to seasonal changes, variations in rainfall, and other factors not evident at the time of the investigation nor reported herein.

The engineering evaluation, opinions, conclusions and recommendations presented in this report are based upon the data obtained from the borings made at the locations indicated on the plan; and are only valid so long as the site and subsurface conditions remain unchanged. This report does not reflect any variations that may occur between these borings, except as may be discussed in the report. The nature and extent of subsurface variations at the site may not become evident until during construction. Such variations should be observed to note their nature and re-evaluate and modify, if necessary, the recommendations presented herein.

The site is underlain by limestone bedrock that is susceptible to dissolution and the subsequent development of karst features such as voids and sinkholes in the natural soil overburden. Construction in a sinkhole prone area is therefore accompanied by some risk that internal erosion and ground subsidence could affect new structures in the future. It is not possible to investigate or design to completely eliminate the possibility of future sinkhole related problems. In any event, the owner must understand and accept this risk.

Test Lab, Inc. appreciates the opportunity to be of service on this very important project. Should you have questions or need additional information on this investigation, or if we may be of further assistance, please do not hesitate to call.

Respectfully submitted,
Test Lab, Inc.

S. Chomtid 09/25/07

Mark S. Chomtid, Ph.D., P.E.
Staff Geotechnical Engineer

Gilberto Ramos, P.E. 09/28/07
Florida License No. 48574

Copies Submitted: (2) Client

Attachments: Boring Location Plan
Exploratory Boring (B-1 thru B-4)
Soil Legend

General Notes

LEGEND

B- STANDARD PENETRATION TEST BORING

CAD DRAWING PROVIDED BY CLIENT

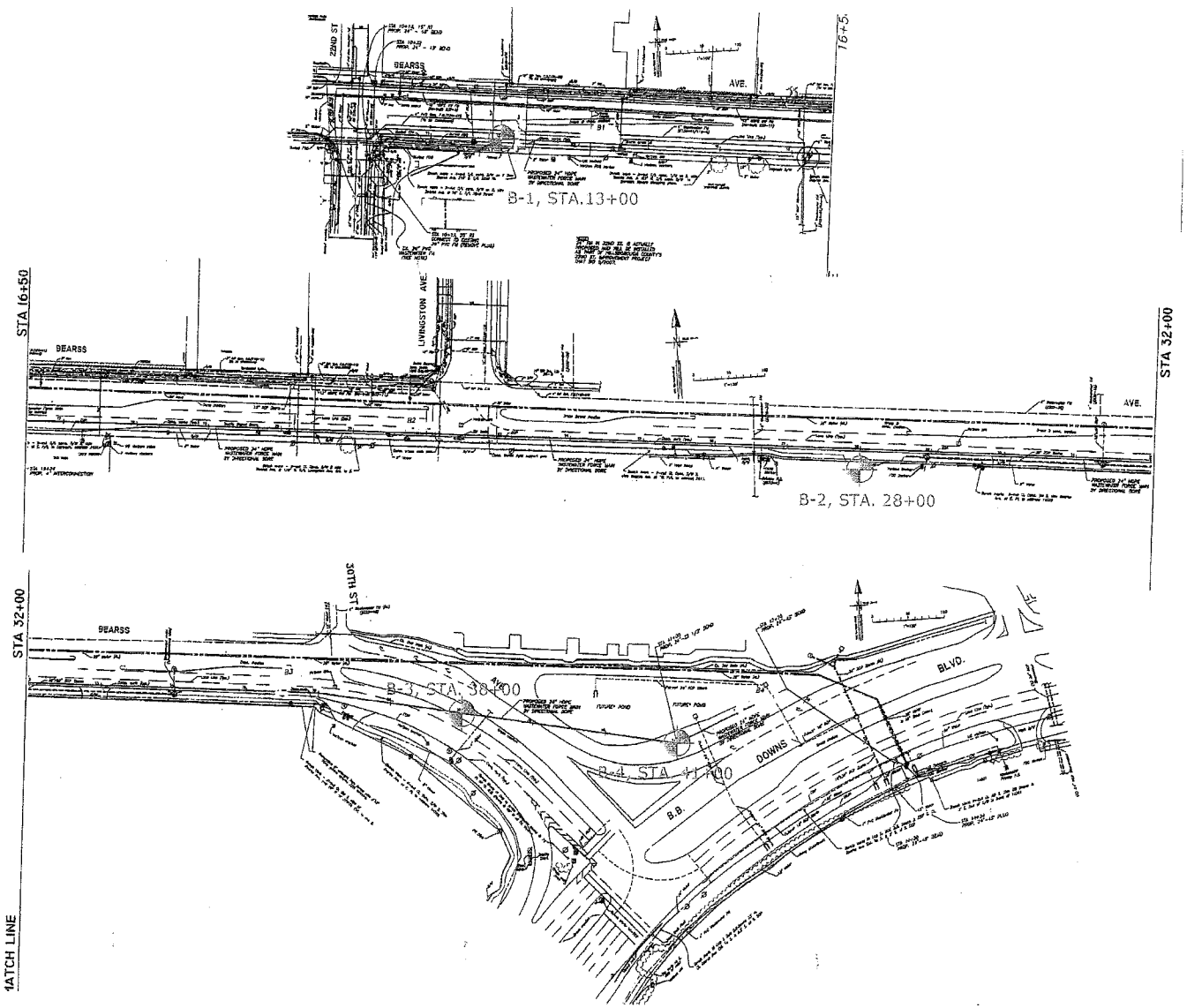
No.	Revision/Issue	Date

TEST LAB INC.
GEOTECHNICAL & MATERIALS ENGINEERING, TESTING & INSPECTION

Bruce B. Down
Relief Froce Main

East Bearss Ave.
Tampa, Florida

Project	Sheet
07-3309	1 of 1
Date: September 21, 2007	
Scale: SCALE: NTS	



BORING LOCATION

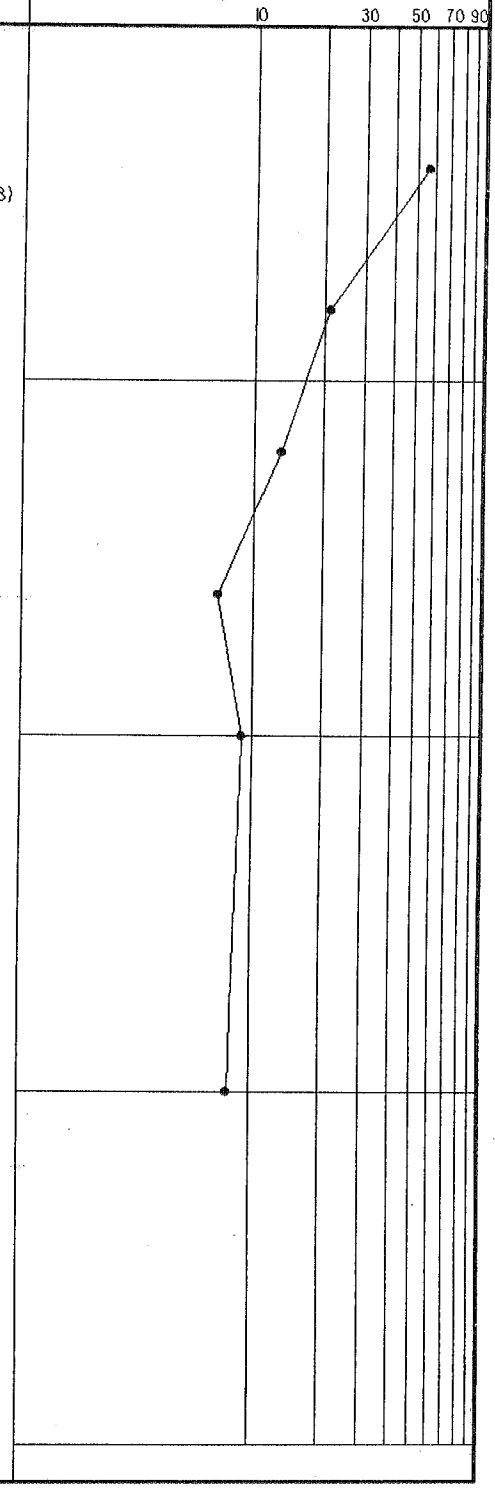
PROJECT:
Bruce B. Downs Relief Force Main
Tampa, Florida

LOG OF BORING B-1

DRILLER: *H. Davis*
ELEVATION: *N/A*
REMARKS:
DATE DRILLED: *9/18/07*
WATER LEVEL: *Not Encountered*
DRILLING METHOD: *Mud Rotary*
BORING DEPTH: *15 Feet*

DEPTH (feet)	GRAPHIC LOG	GEOLOGIC DESCRIPTION	'N' (blows/6 in.)
		asphalt layer (3.5") (fill)	
		limerock base (6.0") (fill)	
		very hard brown fine SAND (fill)	
		very firm brown fine SAND (fill)	56 (40,33,23,23)
		firm light brown fine SAND (fill)	21 (12,9,12,10)
5		loose light gray-brown fine SAND	13 (5,6,7,5)
		loose gray-brown fine SAND	7 (2,3,4,5)
10		loose black fine SAND	9 (3,4,5,4)
15		Boring terminated at 15'0"	8 (3,4,4)
20			

STANDARD PENETRATION TEST DATA (blows/ft)



TEST LAB, INC.

PROJECT NO: 07-3309

PROJECT:
Bruce B. Downs Relief Force Main
Tampa, Florida

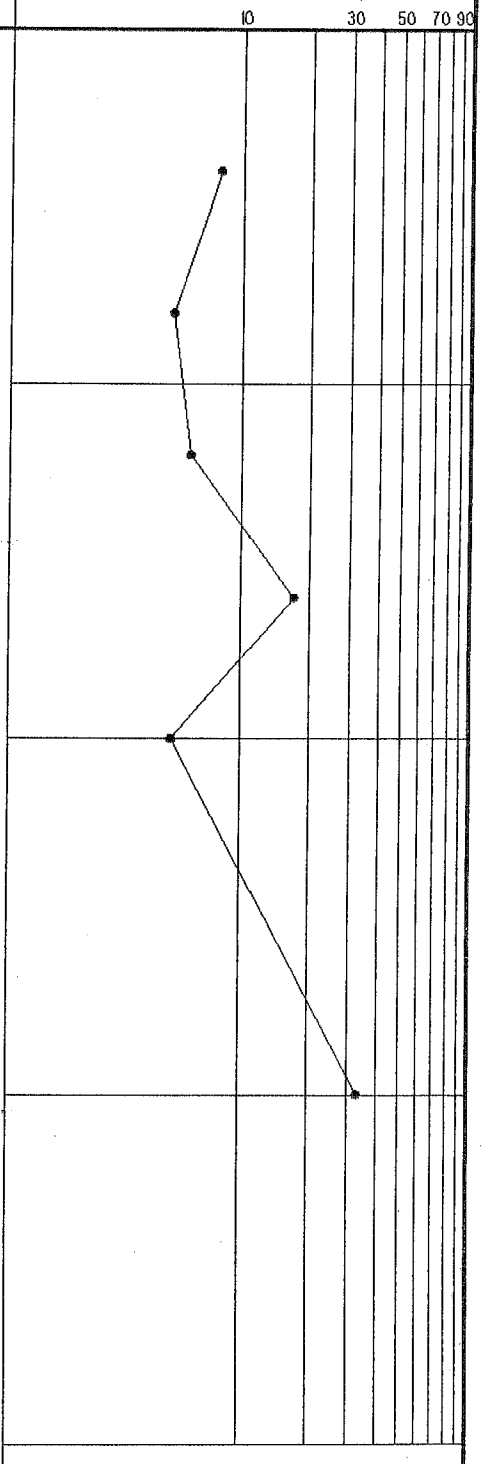
LOG OF BORING B-2

DRILLER: *H. Davis*
ELEVATION: *N/A*
DATE DRILLED: *9/18/07*
WATER LEVEL: *8'0"*
DRILLING METHOD: *Mud Rotary*
BORING DEPTH: *15 Feet*

REMARKS: Water losses at 11'9". Bore hole grouted.

DEPTH (feet)	GRAPHIC LOG	GEOLOGIC DESCRIPTION	'N' (blows/6 in.)
		loose gray-brown fine SAND (fill)	
		loose brown fine SAND	8 (5,4,4,5)
		medium stiff light gray-brown fine sandy CLAY	5 (4,2,3,2)
5		very stiff light gray-brown fine sandy CLAY	6 (3,2,4,7)
		medium stiff light green-gray-brown fine sandy CLAY	17 (11,8,9,7)
10			5 (2,2,3,2)
		hard light green-gray-brown fine sandy calcareous clay w/limestone (WEATHERED LIMESTONE)	
15		Boring terminated at 15'0"	33 (9,11,22)
20			

STANDARD PENETRATION TEST DATA (blows/ft)



TEST LAB, INC.

PROJECT NO: 07-3309

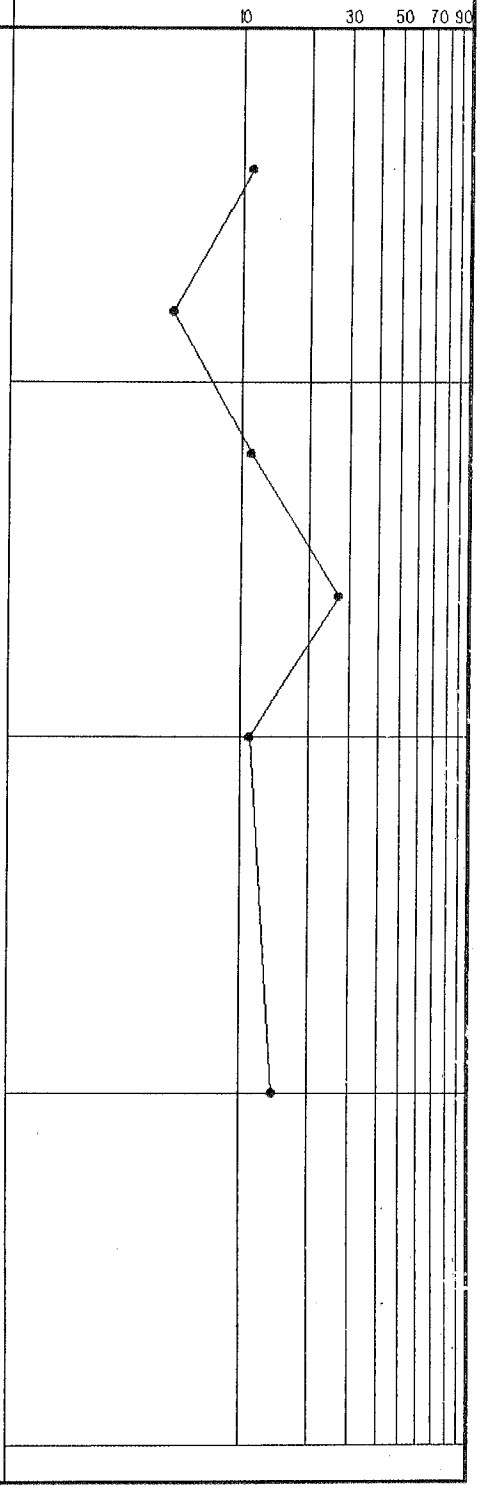
PROJECT:
Bruce B. Downs Relief Force Main
Tampa, Florida

LOG OF BORING B-3

DRILLER: *H. Davis*
ELEVATION: *N/A*
REMARKS:
DATE DRILLED: *9/18/07*
WATER LEVEL: *Not Encountered*
DRILLING METHOD: *Mud Rotary*
BORING DEPTH: *15 Feet*

DEPTH (feet)	GRAPHIC LOG	GEOLOGIC DESCRIPTION	'N' (blows/6 in.)
		firm orange-brown slightly clayey fine SAND (fill)	
		loose gray-brown fine SAND (fill)	11 (6,5,6,7)
		firm brown fine SAND (fill)	5 (5,3,2,3)
5		very firm gray-brown fine SAND	11 (3,5,6,8)
		firm light gray-brown fine SAND	27 (7,13,14,10)
10			11 (4,6,5,4)
		firm light gray-orange-brown fine SAND	
15		Boring terminated at 15'0"	14 (5,7,7)
20			

STANDARD PENETRATION TEST DATA (blows/ft)



TEST LAB, INC.

PROJECT NO: 07-3309

PROJECT:
Bruce B. Downs Relief Force Main
Tampa, Florida

LOG OF BORING B-4

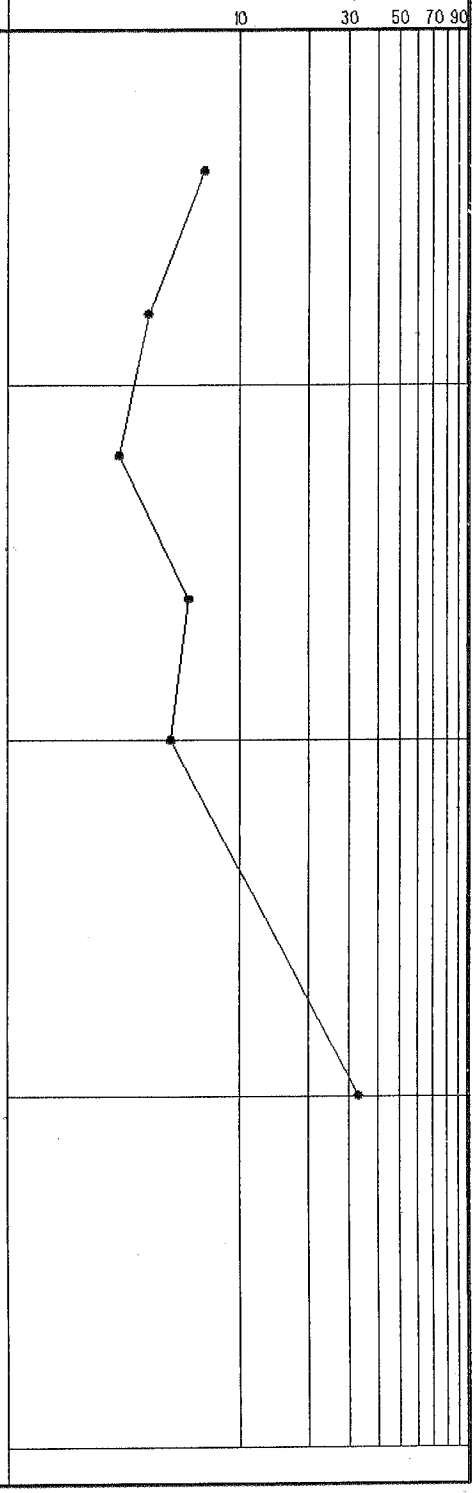
DRILLER: *H. Davis*
ELEVATION: *N/A*
REMARKS:

DATE DRILLED: *9/18/07*
WATER LEVEL: *7'0"*

DRILLING METHOD: *Mud Rotary*
BORING DEPTH: *15 Feet*

DEPTH (feet)	GRAPHIC LOG	GEOLOGIC DESCRIPTION	'N' (blows/6 in.)
		loose gray-brown fine SAND (fill)	
		very loose gray-brown fine SAND	7 (2,3,4,2)
		very loose light brown fine SAND	4 (2,2,2,1)
5		loose light brown fine SAND	3 (2,1,2,1)
		loose dark gray-brown fine SAND	6 (2,3,3,2)
10			5 (2,2,3,2)
		dense dark brown very slightly clayey fine SAND	
15		Boring terminated at 15'0"	33 (9,11,22)
20			

STANDARD PENETRATION TEST DATA (blows/ft)



TEST LAB, INC.

PROJECT NO: 07-3309