

**HENLEY
JOHNSTON
& ASSOCIATES, INC.**
engineering geoscience consultants



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engineering geoscience consultants

27 December 1991

The PB/MK Team
7220 So. Westmoreland Road
Suite 200
Dallas, Texas 75237

Attention: Mr. Hugh Kelly

Re: Geotechnical Investigation
West Campus Stream Relocation
SSC Project
Ellis County, Texas
PB/MK Job No. I-355
Subcontract No. SC-A00-1088

Aubrey D. Henley, R.G., C.E.G.
president

John W. Johnston, P.E.
executive vice-president

William D. Flannigan, R.G.
senior vice-president

Herbert C. Crowder, R.G.
senior vice-president

Gentlemen:

We are pleased to submit our data report on the subject investigation for the West Campus Stream Relocation.

Please call us if you have any questions.



JWJ:kdh
Attachments

Very truly yours,

John W. Johnston, P.E.
Henley-Johnston & Associates, Inc.

I. INTRODUCTION

General

This report presents the results of a subsurface investigation for the West Campus Stream Relocation, conducted under Subcontract No. SC-A00-1088, Task No. I-355. The project site is located in Ellis County, Texas along a creek East of Bearden Road and South of Old Maypearl Road.

Scope

The project, as authorized, included the drilling and sampling of three (3) exploratory core borings to depths of ten feet. This information is intended to augment existing data generated by others for the relocation of an unnamed creek in the West Campus area. No laboratory testing or recommendations were requested; consequently, this data report consists of boring logs and field investigation contained in Appendix A and a brief description of site geology.

II. SITE GEOLOGY

General

The project site is located on the inland edge of the Gulf Coastal Plain. Specifically, the site is located on an unnamed south-southwest trending creek planned for relocation. The site is underlain by clay soils and weathered limestone of the Austin Chalk Formation.

The clay soils encountered in the borings ranged in thickness

from two (2) feet to greater than ten (10) feet and consisted of an upper brown silty clay with organics (ranging in thickness from 2.0 to 7.3 feet) and a lower tan silty clay with limestone fragments (ranging in thickness from 0 feet in Boring No. PBC-5 to at least 2.7 feet in Boring No. PBC-7). For the most part these soils are residual in nature; however, some minor alluvial influences may be present in Boring No. PBC-7.

Because of recent rainfall, the moisture content of the near surface soils probably were higher than in the previous studies which produced soil consistencies (as determined by field pocket penetrometers) in the stiff to very stiff range.

Two of the three borings encountered weathered limestone materials of the Austin Chalk Formation at depths shallower than the termination depth of the borings. The Austin Chalk Formation was encountered at depths of 2.0 feet in Boring No. PBC-5 and 4.9 feet in Boring No. PBC-6, and was not encountered in the upper 10 feet of Boring No. PBC-7. In this study, the depth to chalk increased and the elevation to chalk decreased in a downstream direction along the alignment proposed for this study.

The limestone materials encountered were highly to moderately weathered and ranged in hardness from soft to moderately hard. Rock Quality Designation (RQD) ranged from 38% to 70% and typically increased with depth. Numerous bedding plane joints were encountered in the weathered limestone. In addition, inclined planes having a greater degree of oxidization than the surrounding rock contained some occasional very fine plant roots along these

planes.

III. ENGINEERING PROPERTIES

Not a part of this task.

IV. CONSTRUCTION

Not a part of this task.

APPENDIX A

FIELD INVESTIGATION

A.1 General

The subsurface exploration program consisted of drilling and sampling borings. The drilling was performed by Henley-Johnston & Associates drill crews under the direct supervision of an Engineering Geologist. Three (3) borings were drilled for the project. Boring locations are shown on the illustration entitled "Location of Borings" presented on Plate 1, only three of the borings shown were drilled for this study (PBC-5, PBC-6 and PBC-7.

The borings were staked in the field by others prior to our mobilization. A tabulation of location coordinates and elevations was provided by The PB/MK Team. All borings were drilled at the staked locations.

The borings were drilled with truck-mounted drilling equipment using wet rotary techniques.

The sampling and testing procedures are discussed in detail in the following paragraphs. Boring logs are presented in Appendix A, along with a key to classification symbols, abbreviations, consistencies and hardness descriptions. The stratification lines shown on the boring logs represent approximate boundaries between subsurface material types.

A.2 Sampling and Lithologic Logging

The sampling techniques used were dependent on the material encountered. Samples of cohesive soils were obtained by

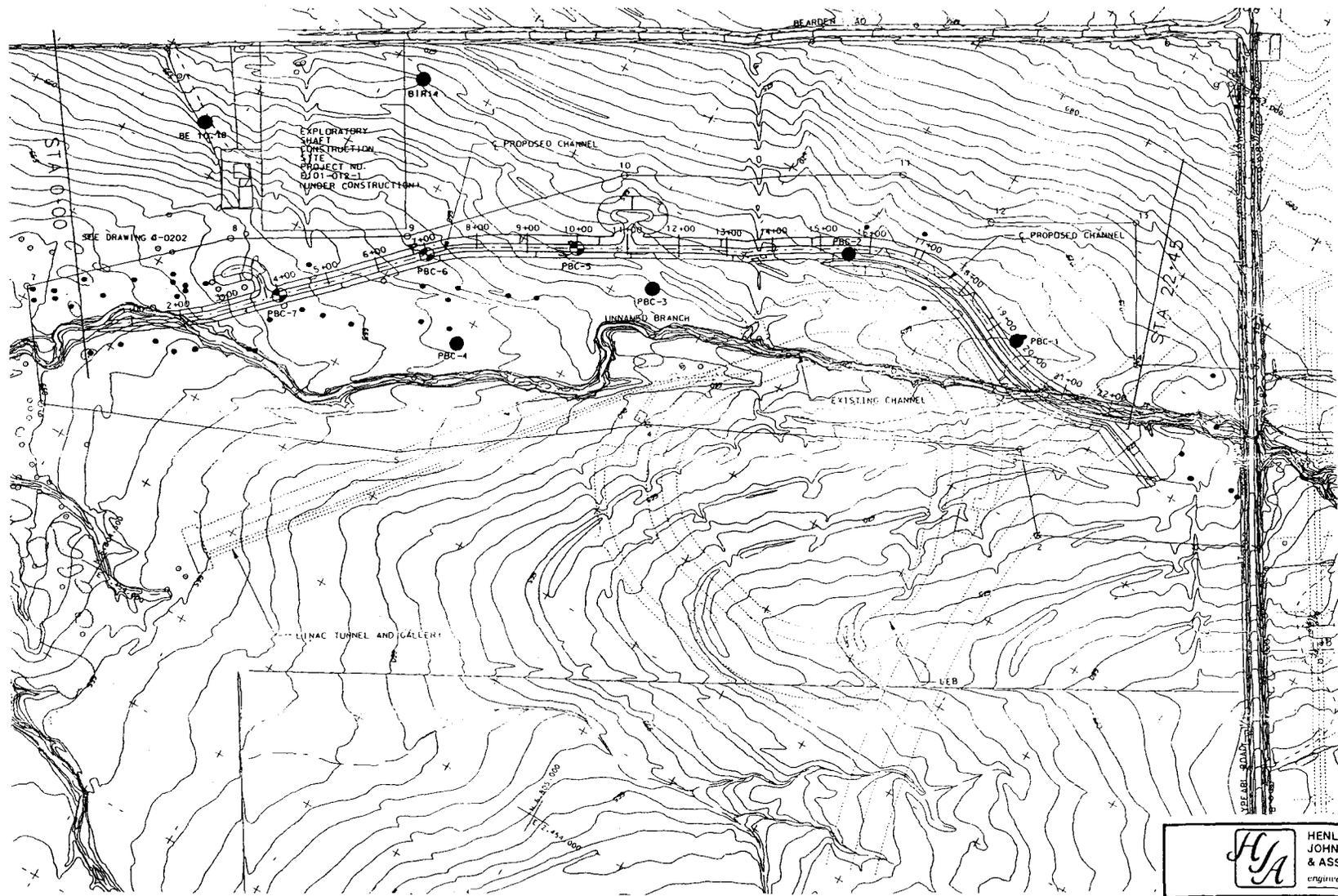
hydraulically pushing a 3-inch diameter thin-walled tube (Shelby Tube) into the deposits. This technique generally conforms with ASTM D-1587.

Soil samples recovered by thin-walled tube were removed from the sampler in the field, packaged for shipment to the laboratory, and visually classified in general accordance with the Unified Soil Classification System by an Engineering Geologist. The unconfined compressive strength of each cohesive sample was estimated with a hand-operated pocket penetrometer. These values are noted on the individual boring logs.

After drilling and sampling through the overburden soils, casing was installed in the borehole and the rock was sampled using a double-tube bottom discharge Nx core barrel with a split inner barrel. A carbide tipped sawtooth bit was used to core the rock. Near continuous rock cores were obtained to the completion depth of the borings. Core samples were removed from the core barrel and described in accordance with standard geologic nomenclature. Upon extraction, the amount cored and amount recovered were measured and recorded.

Rock Quality Designation (RQD) was measured and recorded. This value provides an estimate of the variation of rock mass properties. RQD is calculated by summing the length of all pieces of intact rock core greater than twice the diameter and dividing by the total length drilled. Pieces shorter than twice the diameter broken mechanically (drilling) or by handling were fitted together

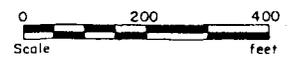
and considered as one piece. RQD is recorded on the boring logs. Upon completion of the logging process, all rock specimens were encased in polyethylene plastic, labeled as to boring number and depth, and placed in core boxes for transportation and storage.



SOIL BORING LOCATIONS

BORING	N	E	ELEV
PBC-1	6805366.97	2452680.02	666.1
PBC-2	6804389.99	2452995.01	666.5
PBC-3	6804669.97	2452959.99	660.6
PBC-4	6804389.96	2453245.96	656.4
PBC-5	6804501.78	2452963.79	662.0
PBC-6	6804250.05	2453124.89	657.5
PBC-7	6804040.64	2453239.71	654.2
BE14	6806066	2452821	667.5
BE10	6803739	2457109	667.7

- LEGEND**
- ⊗ BORING DRILLED THIS CONTRACT
 - OTHER BORING



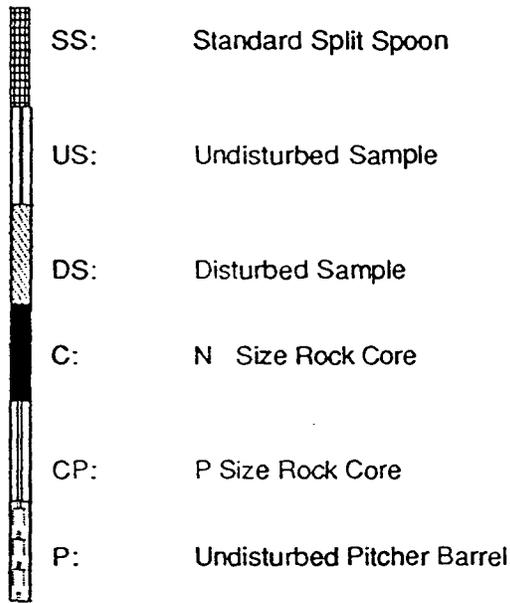
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LOCATION OF BORINGS
 WEST CAMPUS STREAM RELOCATION
 TASK No. 1-355

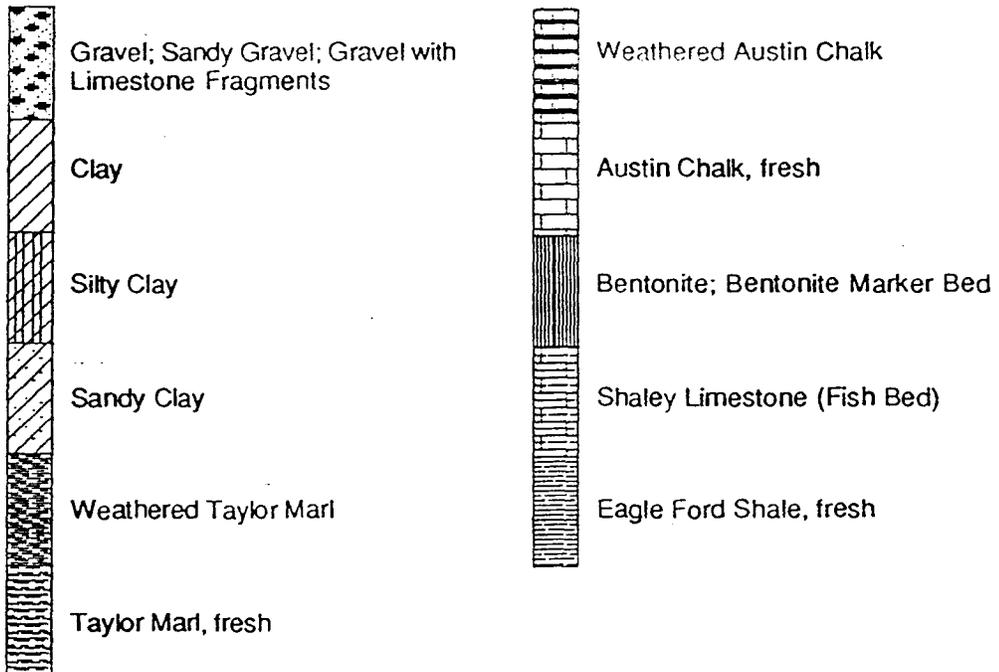
HJA No. 5858.01	DATE 12 / 91	PLATE 1
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BORING LOG GRAPHICS LEGEND

SAMPLE GRAPHICS



MATERIAL GRAPHICS



**HENLEY-JOHNSTON
& ASSOCIATES, INC.**

BORING LOG

Boring No.: PBC-5
Contract:
Sheet: 1 of 1

Project: SUPERCONDUCTING SUPER COLLIDER
Client: THE PB/MK TEAM
Client Representative: H. Kelly
Coordinates: N: 6804590 ft. E: 2452910 ft.
Trend: ----- Plunge: -90.0
Drill Contractor: HENLEY-JOHNSTON Driller: B. Cromeans

Logged by: W.D. Flanigan
Date Start: 11/22/91
Date Finish: 11/22/91
Ground Elevation: 662.0 ft.
Total Depth Drilled: 10.0 ft.
Rig Type: Failing 750

Methods:

Drilling Without Sampling:
Sampling Soil: Undisturbed Shelby Tube
Drilling Rock: Rotary wash with 3.125" NX carbide sawtooth bit
Sampling Rock: NX split inner core barrel

Comments: NX core 3-10 ft. Boring backfilled upon completion.

ELEV. (ft.)	DEPTH (ft.)	SAMPLE		BLOWS (r) or SCS (depth)	REC (%)	RQD (%)	SAMPLE DESCRIPTION
		TYPE	No.				
662.0	0	US	1	8			<p>CLAY, brown, moderately to highly plastic, very stiff, moist, with little organic matter to 1.0 ft and with little silt.</p> <p>US1, P.P.=2.5 US2, P.P.=3.75</p>
660		US	2	12			
		C	1		100	38	<p>LIMESTONE, (Austin Chalk), highly to moderately weathered, medium to moderately hard, tan, jointed.</p> <p>3.4-3.7 ft. multiple very closely spaced joints 4.1-4.4 ft. multiple closely spaced bedding plane joints</p>
	5	C	2		96	68	
655							<p>5.7 ft. 30 degree joint, oxidized, with fine roots 5.9-6.3 ft. soft, clayey, orange interbed with oxidized bedding plane joint at 6.1 ft.</p> <p>7.9-8.9 ft. multiple closely spaced bedding plane joints</p>
	10						
End of Boring @ 10.0 ft.							

LEGEND/NOTES:

Datum is NGVD 1929.
Coordinates are Texas State Plane
Coordinates, NAD 1983.
BLOWS = number of blows required to drive
sample spoon 6" or distance shown.
r = inches of soil sample recovery.
REC = rock core recovery, in %.
RQD = Rock Quality Designation, in %.

SAMPLE TYPE

SS = Standard Split Spoon
US = Undisturbed Sample
DS = Disturbed Sample
C = N-Size Rock Core
CP = P-Size Rock Core
P = Undisturbed Pitcher Barrel
SCS = Special Core Sample

Approved/Date

Last Edited

12/12/91

**HENLEY-JOHNSTON
& ASSOCIATES, INC.**

BORING LOG

Boring No.: **PBC-6**
Contract:
Sheet: **1 of 1**

Project: **SUPERCONDUCTING SUPER COLLIDER**

Logged by: **W.D. Flanigan**

Client: **THE PB/MK TEAM**

Date Start: **11/22/91**

Client Representative: **H. Kelly**

Date Finish: **11/22/91**

Coordinates: **N: 6804250 ft. E: 2453125 ft.**

Ground Elevation: **657.5 ft.**

Trend: **-----**

Plunge: **-90.0**

Total Depth Drilled: **10.0 ft.**

Drill Contractor: **HENLEY-JOHNSTON**

Driller: **B. Cromeans**

Rig Type: **Failing 750**

Methods:

Drilling Without Sampling:

Sampling Soil: **Undisturbed Shelby Tube**

Drilling Rock: **Rotary wash with 3.125" Nx carbide sawtooth bit**

Sampling Rock: **Nx split inner core barrel**

Comments: **Nx Core 5-10 ft. Boring backfilled upon completion.**

ELEV. (ft.)	DEPTH (ft.)	SAMPLE		BLOWS (r) or SCS (depth)	REC (%)	RQD (%)	SAMPLE DESCRIPTION
		TYPE	No.				
657.5	0	US	1	8			<p>CLAY, brown, moderately to highly plastic, stiff to very stiff, with little organic matter in upper 1.5 ft., and with little silt, brown.</p> <p>US1, P.P. = 1.25</p> <p>US2, P.P. = 2.0</p> <p>US3, P.P. = 2.25</p>
		US	2	10			
655		US	3	9			
		US	4	6			
	5	C	1		96	70	<p>CLAY, tan, moderately to highly plastic, silty, very stiff, with limestone particles, and with little of silt.</p> <p>LIMESTONE (Austin Chalk), moderately weathered, moderately hard to hard, tan, with very close to closely spaced bedding plane joints.</p> <p>6.2' oxidized pyrite nodule</p> <p>6.5' 20 degree joint, smooth, planar, with dark staining</p> <p>9.3s-9.8 medium to moderately hard, shaly interbed.</p>
650							
	10						End of boring @ 10.0'

LEGEND/NOTES:

Datum is NGVD 1929.
Coordinates are Texas State Plane
Coordinates, NAD 1983.
BLOWS = number of blows required to drive
sample spoon 6" or distance shown.
r = inches of soil sample recovery.
REC = rock core recovery, in %.
RQD = Rock Quality Designation, in %.

SAMPLE TYPE

SS = Standard Split Spoon
US = Undisturbed Sample
DS = Disturbed Sample
C = N-Size Rock Core
CP = P-Size Rock Core
P = Undisturbed Pitcher Barrel
SCS = Special Core Sample

Approved/Date

Last Edited

12/12/91

**HENLEY-JOHNSTON
& ASSOCIATES, INC.**

BORING LOG

Boring No.: PBC-7
Contract:
Sheet: 1 of 1

Project: SUPERCONDUCTING SUPER COLLIDER
Client: THE PB/MK TEAM
Client Representative: H. Kelly
Coordinates: N: 6804041 ft. E: 2453340 ft.
Trend: -----
Drill Contractor: HENLEY JOHNSTON

Logged by: W.D. Flanigan
Date Start: 11/22/91
Date Finish: 11/22/91
Ground Elevation: 654.2 ft.
Total Depth Drilled: 10.0 ft.
Rig Type: Failing 750

Plunge: -90.0
Driller: B. Cromeans

Methods:
Drilling Without Sampling:
Sampling Soil: Undisturbed Shelby Tube
Drilling Rock:
Sampling Rock:

Comments: Boring backfilled upon completion

ELEV. (ft.)	DEPTH (ft.)	SAMPLE		BLOWS (r) or SCS (depth)	REC (%)	RQD (%)	SAMPLE DESCRIPTION
		TYPE	No.				
654.2	0	US	1	8			<p>CLAY, dark brown, moderately to highly plastic, stiff to very stiff, moist with moisture content increasing with depth, with little organics in upper 1.5 ft and with trace of silt.</p> <p>US1, P.P.=1.75</p> <p>US2, P.P.=1.5</p> <p>US3, P.P.=2.25</p> <p>US4, P.P.=1.75</p> <p>US5, P.P.=3.0 CLAY, silty, tan to brown, moderately plastic, very stiff, moist to wet, with limestone particles increasing with depth</p> <p>US6, P.P.=2.25</p> <p>US7, P.P.=3.0</p> <p>End of Boring @ 10 ft.</p>
		US	2	9			
		US	3	7			
650		US	4	11			
	5	US	5	11			
		US	6	10			
645		US	7	12			
	10						

LEGEND/NOTES:

Datum is NGVD 1929.
Coordinates are Texas State Plane
Coordinates, NAD 1983.
BLOWS = number of blows required to drive
sample spoon 6" or distance shown.
r = inches of soil sample recovery.
REC = rock core recovery, in %.
RQD = Rock Quality Designation, in %.

SAMPLE TYPE

SS = Standard Split Spoon
US = Undisturbed Sample
DS = Disturbed Sample
C = N-Size Rock Core
CP = P-Size Rock Core
P = Undisturbed Pitcher Barrel
SCS = Special Core Sample

Approved/Date

Last Edited

12/12/91