

# APPENDICES

## **Appendix A**

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**REPORT OF THE  
GEOTECHNICAL INVESTIGATION**

**SUBURBAN PIPELINE PROJECT - PHASE II  
WATER DISTRIBUTION SYSTEM  
MANATEE COUNTY, FLORIDA**

December 16, 2009

Manatee County Government  
1022 - 26<sup>th</sup> Avenue East  
Bradenton, Florida 34208

Attention: Mr. Chuck Froman  
Project Manager

**RE: Report of the Geotechnical Investigation**  
**Suburban Pipeline Project - Phase II**  
**Water Distribution System**  
**Manatee County, Florida**  
**Our File: DES 096393**  
**Work Assignment #9**  
**IFAS # WO900254**

Dear Chuck:

Pursuant to prior authorization and the above referenced Work Assignment #9, **DRIGGERS ENGINEERING SERVICES, INC.** has completed the geotechnical investigation for Phase II of the subject project. Presented herein are the results of our field and laboratory studies together with a general discussion of subsurface soil and groundwater conditions along the proposed pipeline alignments. Results of our geotechnical studies for Phase I of the project were submitted in our report dated July 8, 2009.

#### **GEOTECHNICAL INVESTIGATION PROGRAM**

A program of shallow depth exploratory borings and laboratory classification testing was undertaken to characterize the general nature of the subsurface soils and potential impacts with respect to the planned potable water distribution system.

**FIELD INVESTIGATION** - Plates I-A through I-DD of the report attachments identify the respective positioning of forty-two (42) shallow classification borings which were generally spaced at the requested nominal 500 feet apart to investigate soil and groundwater conditions. The classification borings were typically advanced to the requested depth of 8 feet below existing grade. The locations of the classification borings were selected in the field by our personnel utilizing the 60% Design Submittal pipeline alignment plans, dated September, 2009, recently provided by CH<sub>2</sub>M Hill, and the marked locations of existing buried utility lines. The boring locations depicted are considered approximate since they were not surveyed. While some ground surface spot elevations are shown on the plans provided to us, ground surface elevations at the boring locations were not provided and no estimates were made from the available data.

The classification borings were conducted utilizing hand auger equipment wherein the soils were classified virtually continuously below existing grades to the termination depth. Logs of the classification borings are presented in the report attachments reflecting visual together with estimated Unified Soil Classification. Groundwater depths measured during the course of our field investigation are noted on each respective boring log.

**LABORATORY CLASSIFICATION TESTS** - A limited laboratory classification testing program was undertaken to aid in characterizing the engineering properties of the subsurface soils. Our laboratory tests included grainsize analyses, Atterberg liquid and plastic limits and organic content tests. Selected samples were also tested for corrosivity potential. Results are presented on the Summary of Laboratory Test Results in the appendix. Results of the grainsize analyses are included in the report attachments reflecting the percent finer (by weight) versus the equivalent grain diameter or U.S. Standard Sieve size.

### **GENERALIZED SUBSURFACE CONDITIONS**

The results of our classification borings indicate that the subsurface soils typically consist of fine sands comprising the SP to SP-SM Unified Soil Classifications. Also penetrated were occasional zones of silty to clayey sands (SM to SC soils) interbedded with the relatively cleaner sands. Based upon our laboratory testing program, the fine sands typically contain minimal silt and clay fines, less than 10% by weight. However, some of the silty to clayey sand seams exhibited fines contents of up to nearly 40 percent, with the clayey sands exhibiting low to moderate plasticity characteristics. Some of the sands also contained traces to various concentrations of shell and occasional rock fragments.

Note also that thin seams of organic sands and peat (muck) were encountered within a depth range of about 1.5 to 5.5 feet at boring locations HA-2-7 and HA-2-9. Results of organic content testing suggest that these soils have organic contents in the range of 9.7 to 11.9 percent, by weight. Other zones of organic stained sands with organic contents less than 5 percent were also penetrated at boring locations HA-2-10, HA-2-11, HA-2-27, HA-2-32 through HA-2-38 and HA-2-40.

An exception to the general trend occurred at boring location HA-2-3 where refusal to hand auger penetration was encountered at a depth of 4.0 feet. Note that at several boring locations in Phase I of the project, a discontinuous, thin rock unit was first encountered at varying depths ranging from about 0.8 to 5 feet beneath present grades. Review of the Manatee County Soil Survey indicates some areas of Broward and Wabasso Variant soils within the project limits. The typical profile of these soil types indicates that shallow depth limestone, limestone boulders or gravel may exist.

Groundwater was typically measured within a depth range of 3.3 to 7.9 feet below existing grade at the time of our geotechnical studies. At several locations, groundwater was not evident within the boring completion depth of 8 feet beneath present grade. It should be noted that these classification borings were conducted from the middle of November to early December, following the typical wet season. There is certainly the potential for groundwater to occur at shallower depths in response to more frequent or prolonged rainfall. Water may also occur in a temporarily perched state above the low permeability silty to clayey sand zones.

The Soil Survey indicates the presence of EauGallie-Myakka, Felda, Chobee, Okeelanta and Canova soils, in addition to the aforementioned Broward and Wabasso Variant soils, in the project area. Under natural conditions, seasonal high groundwater levels for EauGallie-Myakka soils would be between 0.5 and 1.5 feet below grade. Seasonal high groundwater for Felda, Chobee and Okeelanta soils may occur within a foot of the ground surface. Depressional soils such as Canova soils may, under natural conditions, have water levels above the ground surface. It should be noted that the Soil Survey estimates do not consider the effects of development and drainage improvements, all of which can affect groundwater levels. It appears that any depressional areas were filled during development of the area. In consideration of the time of year, the antecedent rainfall and the Soil Survey information, we would anticipate no more than a nominal 1.5 foot rise in groundwater above current water levels during the normal wet season. Confirmation of potential seasonal fluctuations would necessitate installing shallow piezometers and monitoring groundwater levels during the wet season.



## **GEOTECHNICAL EVALUATION AND RECOMMENDATIONS**

**PLANNED CONSTRUCTION** - The project area is west of U. S. 41 and is bounded roughly by 26<sup>th</sup> Street West on the west, 53<sup>rd</sup> Avenue West on the north and 58<sup>th</sup> Avenue Drive on the South. We understand that the project will include the construction of 6-inch and 8-inch diameter HDPE potable water mains. Based upon plans provided and discussions with Mr. Bob Cannarella, P.E. with CH<sub>2</sub>M Hill, the water mains will generally be constructed utilizing either directional drilling or standard cut and cover construction, with a minimum of 3 feet of cover and a burial depth of no more than about 5 feet in order to facilitate service and other connections. The main pipelines will generally be located outside of existing pavements, with services crossing beneath the existing streets.

**PIPELINE SUBGRADE CONDITIONS** - Our geotechnical studies suggest that the subgrade soils within the depth of exploration typically consist of fine sands containing some to minimal silt fines. These soil types should generally be suitable for pipe support provided that the subgrade is prepared in accordance with project specifications. In general, this will necessitate appropriate compaction at the bottom of excavation and throughout backfill soils required to re-establish existing grades in accordance with Manatee County specifications.

**SUITABILITY OF EXCAVATED SOILS FOR USE AS BACKFILL** - Fine sands indicated in our geotechnical studies will represent suitable materials for replacement and compaction as backfill following pipeline installation. These fine sands comprising the SP to SP-SM Unified Soil Classification should respond effectively to conventional vibratory compaction. Results of corrosivity testing suggest that the soils along the pipeline routes fall within the "Moderately Aggressive" FDOT corrosivity classification.

Where silty to clayey sands were evidenced, these soils typically occurred in relatively thin layers. Accordingly, the soils with increased fines and some plasticity can probably be mixed with the cleaner sands during the excavation and backfilling process to improve the workability of these soils. Similarly, the thin organic zones evidenced in several of the borings can probably be mixed with the overlying and underlying sands and incorporated in the backfill. Where highly organic soils or plastic soils may exist near the bottom of the excavation or in greater thickness than suggested by the program of borings, it may be necessary to undercut the highly organic or plastic soils at least 2 feet and replace these materials with properly compacted granular backfill or gravel so as to produce a firm and unyielding subgrade for subsequent pipeline construction and backfilling operations.

While refusal to hand auger penetration was encountered at only a single location, the exploratory borings conducted for Phase I of the project and the Soil Survey information indicate that shallow depth limestone, limestone boulders and limestone gravel could be present in some areas. Gravel sized material may be incorporated within the sandy backfill soils. Rocks larger than about 3 inches should be excluded. Of course, rocks and oversize materials should be excluded from the pipe zone to minimize the potential for damage to the pipe.

It is important to recognize that the soils may exist in a very low natural moisture content depending upon the rainfall occurring at the time of construction or at high moisture contents when excavated below the water table. Accordingly, the soils may require some adjustment in moisture content to achieve efficient and effective compaction. In general, it is beneficial to adjust moisture contents to within  $\pm 2\%$  of the optimum moisture as established by the Standard Proctor moisture-density relationship as set forth in AASHTO T-99.

**CONSTRUCTION CONSIDERATIONS** - We understand that much of the pipeline may be installed utilizing directional drilling. Care must be exercised during the directional drilling process in order to appropriately stabilize the horizontal borehole with drilling slurry so as to avoid potential caving of overlying soils that could cause unacceptable settlements to overlying or adjacent utilities, structures and pavements. Conversely, one must avoid over-pressuring the drilling slurry that could result in unacceptable discharge of drilling slurry to the ground surface. Shallow depth rock zones, which the Soil Survey suggests may exist in some areas, could also affect directionally drilled pipeline construction.

Portions of the pipeline, and certainly connections, will be constructed utilizing open-cutting and backfilling following pipeline installation. Depending on the depth of the cut, it may be necessary to adjust the excavation slope ratios to no steeper than about 1.5 horizontal to 1.0 vertical in order to minimize sloughing or caving during the backfilling operations. Utilization of this slope ratio will necessitate proper dewatering, where necessary, and protection of the slope with respect to erosion and sloughing. Alternatively, trench-box construction would be considered in lieu of a sloped excavation. Naturally, the contractor must comply with applicable OSHA requirements with respect to trench safety.

In anticipation of cut depths typically 4 to 5 feet or less, we would not anticipate the need for a significant amount of construction dewatering throughout the project. Of course, abnormal rainfall could produce higher than expected groundwater levels and necessitate some local management of groundwater during pipeline construction. In that event, we would envision that the dewatering could be effectively

accomplished by the application of a nominal 12 inch gravel drainage blanket of durable, washed limerock, granite or crushed concrete having a grading of no coarser than an FDOT No. 89. The gravel drainage blanket could then be used in conjunction with interior sumping in order to control groundwater levels below the invert of the pipeline and allow appropriate placement and compaction of the subgrade and backfill.

**CONSTRUCTION INSPECTION AND TESTING** - The authorized geotechnical investigation consisted of a series of relatively widely spaced, hand advanced classification borings intended to identify generalized subsurface conditions that may be expected throughout the project limits. Clearly, the potential exists that localized variations or unexpected conditions may occur that would warrant modifications in construction procedures. Accordingly, it will be important to implement an appropriate program of geotechnical inspection of any open cuts during the construction stage to assist in identifying any such anomalous conditions and to provide economical recommendations for any necessary remediation. Inspection should be performed by a qualified geotechnical inspector familiar with the detailed contents of this report.

Additionally, additional more closely spaced borings are suggested particularly in the vicinity of boring HA-2-3 where refusal to hand auger penetration was encountered, to aid in identifying the limits of the shallow depth rock zone. As noted, the Soil Survey suggests that this rock zone could be more widespread than suggested by the authorized soil boring program.

Compaction testing will also be required during the subgrade preparation and backfilling operations to check that the soils are being compacted in accordance with Manatee County compaction requirements. The compaction tests should be conducted in such a manner so as to check that all of the backfill soils are being uniformly densified to project specification requirements.

**LIMITATIONS** - The geotechnical investigation program was undertaken to provide general information to assist in the design and construction of the planned facilities. Our investigation may not have included all information that the prospective contractor may require in the preparation of his bid proposal. The contractor is certainly encouraged to conduct such additional studies as he may deem necessary to qualify his proposal.

Our geotechnical investigation was limited to an examination of subsurface soil and groundwater conditions so as to address geotechnical design and construction issues. Studies relative to environmental issues or impacts was not within the authorized scope of services.

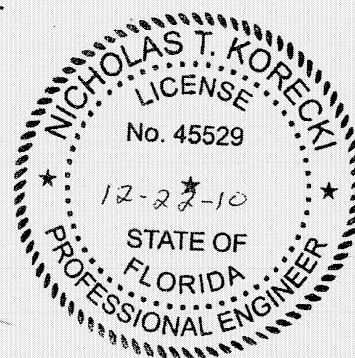
**DRIGGERS ENGINEERING SERVICES, INC.** appreciates the opportunity to serve you during this phase of the design stage of the water distribution system. Should you have any questions concerning our report, please do not hesitate to contact the undersigned at your convenience.

Respectfully submitted,

**DRIGGERS ENGINEERING SERVICES, INC.**

*Nicholas T. Korecki*

Nicholas T. Korecki, P.E.  
Senior Geotechnical Engineer  
FL Registration No. 45529



*F. Jaime Driggers*  
F. Jaime Driggers, P.E.  
President  
FL Registration No. 16989

NTK

NTK-REP\096393-II

Copies submitted: (3) Manatee County Government.; Attn: Chuck Froman  
(2) CH<sub>2</sub>M Hill.; Attn: Mr. Bob Cannarella, P.E.



**APPENDIX**

**PLATES I-A THROUGH I-DD - TEST BORING LOCATION PLANS**

**HAND AUGER BORING LOGS**

**SUMMARY OF LABORATORY TEST RESULTS**

**GRAINSIZE ANALYSES**

**PLATES I-A THROUGH 1-DD - TEST BORING LOCATION PLANS**

## **HAND AUGER BORING LOGS**



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
	<b>WATER TABLE:</b> 6.8'	<b>DATE:</b> 11/30/09
<b>TECHNICIAN:</b> M.B.	<b>DATE:</b> 11/30/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-DD	<b>TEST NUMBER:</b> HA2-1	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Brown Fine SAND with trace of shell and limestone fragments (SP)	0		
	Brown and light brown Fine SAND with trace of shell fragments (SP)			
	Tan and light gray Fine SAND with trace of roots (SP)	2		
	Gray slightly silty Fine SAND with shell fragments (SP-SM)			
	Very light gray Fine SAND with trace of shell fragments (SP)	4		
	Dark grayish-brown slightly silty Fine SAND (SP-SM)	6		
	Dark grayish-brown clayey Fine SAND (SC)			
	Brown Fine SAND (SP)	8		
		10		
		12		
		14		








# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> M.M.		<b>WATER TABLE:</b> See "Note"		<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-A		<b>DATE:</b> 11/17/09		<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-2		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Grayish-brown Fine SAND with some roots (SP)	0		Note: Water Table not encountered within depth of 8.0'.
	Gray Fine SAND with limestone fragments (SP)	2		
	Brown Fine SAND (SP)			
	Brownish-gray slightly silty Fine SAND with shell and limestone fragments (SP-SM)	4		
	Brown Fine SAND (SP)			
	Brownish-gray Fine SAND with some shell fragments and trace of dark brown Fine SAND (SP)	6		
		8		
		10		
		12		
		14		

# **DRIGGERS ENGINEERING SERVICES INCORPORATED**

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> J.R.		<b>WATER TABLE:</b> See "Note"		<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-X		<b>DATE:</b> 11/17/09		<b>COMPLETION DEPTH:</b> 4.0' *
		<b>TEST NUMBER:</b> HA2-3		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Brownish-gray Fine SAND with some roots and shell fragments (SP)	0		* Encountered refusal at depth 4.0'. Attempted Boring at 4 Locations.  Note: Water Table not encountered within depth of 4.0'.
	Dark gray Fine SAND (SP)			
	Brown Fine SAND (SP)	2		
	Light brown clayey Fine SAND with light orange veins (SC)			
	Light brownish-gray slightly silty, slightly clayey Fine SAND (SP-SM)	4		
		6		
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
	<b>WATER TABLE:</b> 6.0'	<b>DATE:</b> 11/17/09
<b>TECHNICIAN:</b> M.M.	<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-B	<b>TEST NUMBER:</b> HA2-4	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark gray Fine SAND with roots (SP)	0		
	Dark gray Fine SAND with some pockets of weakly cemented, clayey Fine SAND (SP/SC)	2		
	Brown Fine SAND with seams of dark gray clayey Fine SAND (SP/SC)			
	Grayish-brown silty, slightly clayey Fine SAND (SM)	4		
		6		
	Tan and light brown Fine SAND (SP)			
	Light grayish-brown Fine SAND with shell fragments (SP)			
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

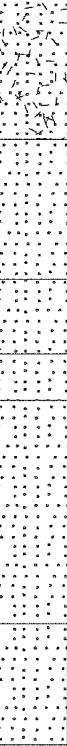
## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> M.M.		<b>WATER TABLE:</b> 5.6'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-B		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-5	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark gray Fine SAND with roots (SP)	0		
	Gray Fine SAND (SP)			
	Dark brown Fine SAND (SP)			
	Brown Fine SAND (SP)	2		
		4		
	Dark brown Fine SAND (SP)			
		6		
	Light brown Fine SAND (SP)			
		8		
		10		
		12		
		14		



# **DRIGGERS ENGINEERING SERVICES INCORPORATED**

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> M.M.		<b>WATER TABLE:</b> 4.9'		<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-C		<b>DATE:</b> 11/17/09		<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-6		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Brown Fine SAND with roots (SP)	0		
	Dark reddish-brown Fine SAND (SP)	2		
	Light brown Fine SAND (SP)			
	Brown Fine SAND (SP)	4		
	Light brown Fine SAND (SP)			
		6		
	Tan Fine SAND (SP)			
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
		<b>WATER TABLE:</b> 5.7'	<b>DATE:</b> 11/17/09	
<b>TECHNICIAN:</b> M.M.		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'	
<b>LOCATION:</b> See Plate I-C		<b>TEST NUMBER:</b> HA2-7		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark grayish-brown Fine SAND with roots (SP)	0		
	Very dark brown organic, slightly silty Fine SAND (SP-SM/Pt)	2		
	Dark brown Fine SAND with some roots (SP)	4		
		6		
		8		
	10			
	12			
14				



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> M.M.		<b>WATER TABLE:</b> 5.8'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-D		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-8	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS	
	Brown Fine SAND with roots (SP)	0			
	Grayish-brown Fine SAND (SP)				
	Brown Fine SAND (SP)	2			
	Mottled gray and brown Fine SAND (SP)				
	Brown Fine SAND (SP)	4			
		6			
		8			
10					
12					
	14				



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> M.M.		<b>WATER TABLE:</b> 7.1'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-D		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-9	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Brown Fine SAND (SP)	0		
	Brownish-gray Fine SAND (SP)	2		
	Light gray Fine SAND (SP)			
	Very dark brown organic Fine SAND with trace of roots (SP-SM/Pt)	4		
	Dark reddish-brown Fine SAND (SP)	6		
	Very dark brown slightly organic Fine SAND (SP)	8		
		10		
		12		
		14		



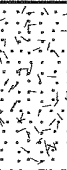
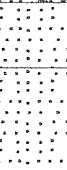

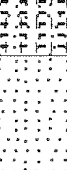
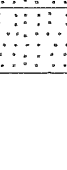




# DRIGGERS ENGINEERING SERVICES INCORPORATED

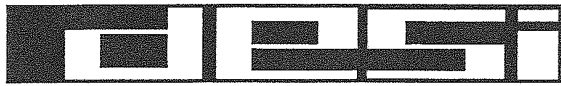
## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
	<b>WATER TABLE:</b> 7.7'	<b>DATE:</b> 11/17/09
<b>TECHNICIAN:</b> J.R.	<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-F	<b>TEST NUMBER:</b> HA2-10	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark gray Fine SAND with some roots (SP)	0		
	Gray Fine SAND (SP)	2		
	Very dark brown slightly organic Fine SAND (SP)			
	Dark reddish-brown Fine SAND (SP)	4		
	Dark brown Fine SAND (SP)	6		
	Reddish-brown Fine SAND (SP)			
		8		
		10		
		12		
		14		

# **DRIGGERS ENGINEERING SERVICES INCORPORATED**

HAND AUGER BORING LOG										
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County								
<b>TECHNICIAN:</b> J.R.		<b>WATER TABLE:</b> 5.3'		<b>DATE:</b> 11/17/09						
<b>LOCATION:</b> See Plate I-F		<b>DATE:</b> 11/17/09		<b>COMPLETION DEPTH:</b> 8.0'						
		<b>TEST NUMBER:</b> HA2-11								
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS						
	Dark gray Fine SAND with some roots (SP)	0								
	Light brown Fine SAND (SP)	2								
	Tan Fine SAND (SP)									
	Dark brown slightly silty Fine SAND with finely divided organic material (SP-SM)	4								
										
										
										
										
										



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.R.		<b>WATER TABLE:</b> 5.5'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-E		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-12	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Mottled gray and brown Fine SAND with trace of roots (SP)	0		
	Tan Fine SAND (SP)			
		2		
	Grayish-brown Fine SAND (SP)	4		
	Dark grayish-brown Fine SAND (SP)	6		
	Brown Fine SAND (SP)	8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.R.		<b>WATER TABLE:</b> 6.0'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-G		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-13	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Brown Fine SAND with trace of roots (SP)	0		
	Light grayish-brown Fine SAND (SP)			
		2		
	Light brown slightly silty Fine SAND with light orange veins (SP-SM)			
		4		
	Light brown Fine SAND (SP)			
		6		
		8		
		10		
		12		
		14		





# DRIGGERS ENGINEERING SERVICES INCORPORATED

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> M.M.		<b>WATER TABLE:</b> 6.6'		<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-H		<b>DATE:</b> 11/17/09		<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-14		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Light brown Fine SAND with trace of roots (SP)	0		
	Tan Fine SAND with limestone fragments (SP)	2		
	Tan Fine SAND (SP)			
	Light brown slightly silty Fine SAND (SP-SM)			
	Light grayish-brown Fine SAND (SP)	4		
	Tan Fine SAND (SP)			
		6		
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> M.M.		<b>WATER TABLE:</b> 7.8'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-J		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-15	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark grayish-brown Fine SAND with roots (SP)	0		
	Light brown Fine SAND (SP)			
		2		
		4		
	Tan Fine SAND (SP)			
		6		
	Light grayish-brown slightly silty Fine SAND with shell fragments (SP-SM)	8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
	<b>WATER TABLE:</b> 7.4'	<b>DATE:</b> 11/17/09
<b>TECHNICIAN:</b> J.R.	<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-J	<b>TEST NUMBER:</b> HA2-16	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Brownish-gray Fine SAND with some roots (SP)	0		
	Light brown Fine SAND (SP)	2		
	Light brown clayey Fine SAND with light orange veins (SC)			
	Light brown Fine SAND (SP)	4		
	Tan Fine SAND (SP)	6		
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
	<b>WATER TABLE:</b> 6.3'	<b>DATE:</b> 11/17/09
<b>TECHNICIAN:</b> J.R.	<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-I	<b>TEST NUMBER:</b> HA2-17	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark brownish-gray Fine SAND with some roots (SP)	0		
	Light brown Fine SAND (SP)			
	Light brown Fine SAND with some shell fragments (SP)	2		
		4		
	Light brown Fine SAND with thin seams of dark brown Fine SAND (SP)	6		
	Light brown Fine SAND with abundant shell fragments (SP)			
	Light grayish-brown Fine SAND (SP)	8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> M.M.		<b>WATER TABLE:</b> 7.2'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-K		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-18	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Grayish-brown Fine SAND with some roots (SP)	0		
	Light gray Fine SAND (SP)			
	Brown Fine SAND (SP)	2		
	Light brown Fine SAND (SP)			
	Light brown silty, slightly clayey Fine SAND with light orange veins (SM)	4		
	Light brown Fine SAND (SP)			
	Tan Fine SAND with abundant shell fragments (SP)	6		
	Light brownish-gray Fine SAND with shell fragments (SP)			
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.R.		<b>WATER TABLE:</b> 7.5'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-L		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-19	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Brownish-gray Fine SAND with trace of roots (SP)	0		
	Light grayish-brown Fine SAND (SP)			
		2		
	Light brown Fine SAND (SP)	4		
	Light tan Fine SAND (SP)	6		
	Grayish-brown Fine SAND (SP)			
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> M.M.	<b>WATER TABLE:</b> See "Note"	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-N	<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>TEST NUMBER:</b> HA2-20		

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Grayish-brown Fine SAND with trace of roots (SP)	0		Note: Water Table not encountered within depth of 8.0'.
	Mottled light brown and tan Fine SAND (SP)	2		
		4		
	Brown slightly silty Fine SAND (SP-SM)			
	Brown Fine SAND (SP)	6		
	Light brown Fine SAND (SP)			
	Tan Fine SAND with abundant shell fragments (SP)	8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.R.		<b>WATER TABLE:</b> 7.3'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-N		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-21	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Grayish-brown Fine SAND with trace of roots (SP)	0		
		2		
	Brown silty, slightly clayey Fine SAND (SM)	4		
	Light brown Fine SAND (SP)			
	Tan Fine SAND (SP)	6		
		8		
		10		
		12		
		14		





# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.R.		<b>WATER TABLE:</b> 6.9'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-M		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-22	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS	
	Brownish-gray Fine SAND with trace of roots (SP)	0			
	Light brown Fine SAND (SP)	2			
	Light brownish-gray slightly clayey Fine SAND (SP-SM)				
	Tan Fine SAND (SP)	4			
	Tan Fine SAND with abundant shell fragments (SP)				
		6			
		8			
10					
12					
	14				



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> M.M.		<b>WATER TABLE:</b> 7.3'	<b>DATE:</b> 11/17/09
<b>LOCATION:</b> See Plate I-O		<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-23	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Brown Fine SAND with trace of roots (SP)	0		
	Mottled brown and gray Fine SAND with trace of cemented sand (SP)	2		
	Dark brown clayey Fine SAND (SC)			
	Light brownish-gray CLAY with seams of brown Fine SAND (CH/SP)	4		
	Light brownish-gray clayey Fine SAND with trace of roots (SC)			
		6		
	Light brown Fine SAND (SP)			
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
	<b>WATER TABLE:</b> 7.4'	<b>DATE:</b> 11/17/09
<b>TECHNICIAN:</b> J.R.	<b>DATE:</b> 11/17/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-P	<b>TEST NUMBER:</b> HA2-24	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS		
	Dark grayish-brown Fine SAND with some roots (SP)	0				
	Brown Fine SAND (SP)					
	Light brown and brown clayey Fine SAND (SC)	2				
	Tannish-brown slightly silty Fine SAND (SP-SM)					
	Brown and light brown Fine SAND (SP)	4				
	Tan Fine SAND (SP)	6				
			8			
		10				
		12				
		14				



# DRIGGERS ENGINEERING SERVICES INCORPORATED

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
		<b>WATER TABLE:</b> See "Note"		<b>DATE:</b> 11/17/09
<b>TECHNICIAN:</b> M.M.		<b>DATE:</b> 11/17/09		<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-P		<b>TEST NUMBER:</b> HA2-25		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Brownish-gray Fine SAND with trace of roots (SP)	0		Note: Water Table not encountered within depth of 8.0'.
	Brownish-gray Fine SAND (SP)			
		2		
	Light gray Fine SAND (SP)			
		4		
	Dark reddish-brown Fine SAND (SP)			
	Dark brown Fine SAND (SP)			
		6		
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> M.B.		<b>WATER TABLE:</b> 7.9'	<b>DATE:</b> 11/30/09	
<b>LOCATION:</b> See Plate I-R		<b>DATE:</b> 11/30/09	<b>COMPLETION DEPTH:</b> 8.0'	
		<b>TEST NUMBER:</b> HA2-26		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Tan and light brown Fine SAND with trace of roots (SP)	0		
		2		
	Dark brown slightly silty Fine SAND (SP-SM)	4		
	Brown and light brown Fine SAND (SP)			
	Tan and light brown Fine SAND (SP)	6		
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> M.B.		<b>WATER TABLE:</b> 7.9'		<b>DATE:</b> 11/30/09
<b>LOCATION:</b> See Plate I-Q		<b>DATE:</b> 11/30/09		<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-27		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark brown Fine SAND with roots and trace of finely divided organic material (SP)	0		
	Light grayish-brown Fine SAND with trace of roots (SP)			
		2		
	Tan silty Fine SAND with cemented sand fragments (SM)			
	Tan clayey Fine SAND (SC)	4		
	Tan Fine SAND with shell fragments (SP)			
		6		
	Tan Fine SAND with shell fragments and trace of cemented sand fragments (SP)			
	Light gray Fine SAND (SP)	8		
		10		
		12		
		14		

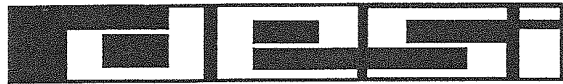


# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
	<b>WATER TABLE:</b> 6.9'	<b>DATE:</b> 11/30/09
<b>TECHNICIAN:</b> M.B.	<b>DATE:</b> 11/30/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-S	<b>TEST NUMBER:</b> HA2-28	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Gray Fine SAND with roots (SP)	0		
	Light gray Fine SAND (SP)			
	Brown Fine SAND (SP)			
	Brown and light brown silty, slightly clayey Fine SAND (SM)	2		
	Light brown slightly silty, slightly clayey Fine SAND (SP-SM)			
	Light brown Fine SAND with shell fragments (SP)	4		
	Tan and light brown Fine SAND (SP)			
	Light tan and light brown Fine SAND with trace of shell fragments (SP)	6		
	Light brown Fine SAND with shell fragments (SP)			
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> M.B.		<b>WATER TABLE:</b> 6.8'		<b>DATE:</b> 11/30/09
<b>LOCATION:</b> See Plate I-T		<b>DATE:</b> 11/30/09		<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-29		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark brown and light gray Fine SAND (SP)	0		
	Light tan Fine SAND (SP)			
	Brown silty, slightly clayey Fine SAND (SM)			
	Light brown Fine SAND (SP)	2		
	Tan Fine SAND with shell fragments (SP)			
	Light gray Fine SAND with trace of shell fragments (SP)	4		
		6		
	Gray Fine SAND with shell fragments (SP)			
		8		
		10		
		12		
		14		





# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> S.F.		<b>WATER TABLE:</b> 6.3'		<b>DATE:</b> 11/30/09
<b>LOCATION:</b> See Plate I-AA		<b>DATE:</b> 11/30/09		<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-30		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark gray and brown Fine SAND with roots (SP)	0		
	Gray and tan slightly silty, slightly clayey Fine SAND (SP-SM)			
		2		
	Tan and light gray Fine SAND with brown veins (SP)	4		
		6		
		8		
		10		
12				
14				



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
	<b>WATER TABLE:</b> 5.3'	<b>DATE:</b> 11/30/09
<b>TECHNICIAN:</b> S.F.	<b>DATE:</b> 11/30/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-T	<b>TEST NUMBER:</b> HA2-31	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark brown and gray slightly silty Fine SAND with roots (SP-SM)	0		
	Brown slightly silty Fine SAND with rock and shell fragments (SP-SM)			
	Orangish-brown Fine SAND with trace of shell fragments (SP)			
	Light tan Fine SAND (SP)	2		
	Brown silty, slightly clayey Fine SAND (SM)	4		
	Tan Fine SAND with trace of shell fragments (SP)			
		6		
		8		
		10		
		12		
		14		

# DESIGN

## DRIGGERS ENGINEERING SERVICES INCORPORATED

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> S.F.		<b>WATER TABLE:</b> 6.0'		<b>DATE:</b> 11/30/09
<b>LOCATION:</b> See Plate I-S		<b>DATE:</b> 11/30/09		<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-32		

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark gray slightly organic Fine SAND with roots (SP)	0		
	Gray Fine SAND (SP)			
	Dark brown slightly silty Fine SAND (SP-SM)			
	Brown Fine SAND (SP)	2		
		4		
	Dark brown slightly silty Fine SAND (SP-SM)			
	Gray and tan Fine SAND (SP)			
		6		
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

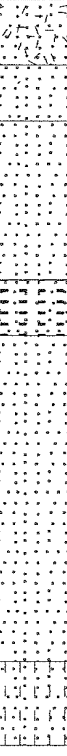
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.D.		<b>WATER TABLE:</b> 4.9'	<b>DATE:</b> 12/4/09
<b>LOCATION:</b> See Plate I-U		<b>DATE:</b> 12/4/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-33	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark brown Fine SAND with trace of roots (SP)	0		
	Light brown Fine SAND with shell (SP)			
	Gray Fine SAND (SP)			
	Dark brown Fine SAND with finely divided organic material (SP)	2		
	Brown slightly silty Fine SAND (SP-SM)			
	Light brown Fine SAND (SP)			
		4		
	Brown Fine SAND (SP)			
		6		
	Very light grayish-brown Fine SAND (SP)			
		8		
		10		
		12		
		14		

# **DRIGGERS ENGINEERING SERVICES INCORPORATED**

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> J.D.		<b>WATER TABLE:</b> 5.9'		<b>DATE:</b> 12/4/09
<b>LOCATION:</b> See Plate I-U		<b>DATE:</b> 12/4/09		<b>COMPLETION DEPTH:</b> 8.0'
<b>TEST NUMBER:</b> HA2-34				

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Grayish-brown Fine SAND with roots (SP)	0		
	Gray Fine SAND (SP)			
	Light gray Fine SAND (SP)			
		2		
	Dark brown Fine SAND with finely divided organic material (SP)			
	Dark reddish-brown Fine SAND (SP)	4		
		6		
	Dark brown slightly silty Fine SAND (SP-SM)			
		8		
		10		
		12		
		14		




# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.D.	<b>WATER TABLE:</b> 7.3'	<b>DATE:</b> 12/4/09
<b>LOCATION:</b> See Plate I-AA	<b>DATE:</b> 12/4/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>TEST NUMBER:</b> HA2-35		

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark grayish-brown slightly silty Fine SAND with trace of roots and gravel (SP-SM)	0		
	Gray Fine SAND with trace of roots (SP)			
		2		
	Dark brown Fine SAND with finely divided organic material (SP)			
		4		
	Reddish-brown Fine SAND (SP)			
		6		
	Light brown Fine SAND (SP)			
		8		
		10		
		12		
		14		

# **DRIGGERS ENGINEERING SERVICES INCORPORATED**

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> J.D.		<b>WATER TABLE:</b> 6.9'		<b>DATE:</b> 12/4/09
<b>LOCATION:</b> See Plate I-AA		<b>DATE:</b> 12/4/09		<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-36		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark brown Fine SAND with roots (SP)	0		
	Gray Fine SAND (SP)			
	Dark brown Fine SAND with roots and finely divided organic material (SP)	2		
	Brown to light brown Fine SAND (SP)			
	Light brown Fine SAND (SP)			
		4		
	Brown Fine SAND (SP)			
		6		
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.D.	<b>WATER TABLE:</b> 5.9'	<b>DATE:</b> 12/4/09
<b>LOCATION:</b> See Plate I-W	<b>DATE:</b> 12/4/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>TEST NUMBER:</b> HA2-37		

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Gray and brown Fine SAND with roots (SP)	0		
	Gray Fine SAND (SP)			
	Dark brown Fine SAND with finely divided organic material (SP)	2		
	Brown Fine SAND (SP)			
	Light brown Fine SAND (SP)			
		4		
		6		
	Very light grayish-brown Fine SAND (SP)			
		8		
		10		
		12		
		14		





# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
	<b>WATER TABLE:</b> 4.0'	<b>DATE:</b> 12/4/09
<b>TECHNICIAN:</b> J.D.	<b>DATE:</b> 12/4/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>LOCATION:</b> See Plate I-V	<b>TEST NUMBER:</b> HA2-38	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark grayish-brown Fine SAND with roots (SP)	0		
	Gray Fine SAND (SP)			
	Dark brown Fine SAND with trace of finely divided organic material (SP)	2		
	Light brown Fine SAND with trace of roots (SP)			
		4		
	Orangish-brown slightly silty Fine SAND (SP-SM)			
		6		
	Very light grayish-brown Fine SAND (SP)			
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393	<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.D.	<b>WATER TABLE:</b> 3.5'	<b>DATE:</b> 12/4/09
<b>LOCATION:</b> See Plate I-V	<b>DATE:</b> 12/4/09	<b>COMPLETION DEPTH:</b> 8.0'
<b>TEST NUMBER:</b> HA2-39		

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark gray Fine SAND with roots (SP)	0		
	Grayish-brown Fine SAND (SP)			
	Brown Fine SAND (SP)	2		
	Light brown Fine SAND (SP)			
		4		
		6		
		8		
	10			
12				
	14			



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.D.		<b>WATER TABLE:</b> 5.5'	<b>DATE:</b> 12/4/09
<b>LOCATION:</b> See Plate I-W		<b>DATE:</b> 12/4/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-40	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark gray Fine SAND with roots and finely divided organic material (SP)	0		
	Gray Fine SAND (SP)			
	Light gray Fine SAND (SP)			
	Dark brown slightly silty Fine SAND with finely divided organic material (SP-SM)	2		
	Brown Fine SAND (SP)	4		
	Light brown Fine SAND (SP)			
	Very light grayish-brown Fine SAND (SP)	6		
		8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

HAND AUGER BORING LOG				
<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County		
<b>TECHNICIAN:</b> J.D.		<b>WATER TABLE:</b> 3.3'		<b>DATE:</b> 12/4/09
<b>LOCATION:</b> See Plate I-BB		<b>DATE:</b> 12/4/09		<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-41		
ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Grayish-brown Fine SAND with trace of roots (SP)	0		
	Light brown Fine SAND with shell (SP)			
	Gray Fine SAND (SP)			
	Brown Fine SAND (SP)	2		
	Orangish-brown clayey Fine SAND (SC)			
	Light brown slightly silty Fine SAND with shell (SP-SM)	4		
	Very light grayish-brown Fine SAND (SP)	6		
	Brown Fine SAND (SP)	8		
		10		
		12		
		14		



# DRIGGERS ENGINEERING SERVICES INCORPORATED

## HAND AUGER BORING LOG

<b>PROJECT:</b> Suburban Pipeline Project - Phase II Manatee County, Florida Project No.: DES 096393		<b>CLIENT:</b> Manatee County	
<b>TECHNICIAN:</b> J.D.		<b>WATER TABLE:</b> 3.9'	<b>DATE:</b> 12/4/09
<b>LOCATION:</b> See Plate I-CC		<b>DATE:</b> 12/4/09	<b>COMPLETION DEPTH:</b> 8.0'
		<b>TEST NUMBER:</b> HA2-42	

ELEV. (FT)	DESCRIPTION	DEPTH (FT)	SYMBOL	REMARKS
	Dark gray slightly silty Fine SAND with trace of roots and gravel (SP-SM)	0		
	Grayish-brown Fine SAND with Crushed Limestone and pieces of asphalt (SP)			
	Gray Fine SAND (SP)	2		
	Dark brown slightly silty Fine SAND (SP-SM)			
	Orangish-brown clayey Fine SAND (SC)	4		
	Light tan cemented Fine SAND and shell (SP)			
	Light brown Fine SAND with shell (SP)			
	Light grayish-brown Fine SAND with trace of shell (SP)	6		
		8		
		10		
		12		
		14		

## **SUMMARY OF LABORATORY TEST RESULTS**

# SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	DEPTH (ft)	DESCRIPTION	W %	Y <sub>d</sub> (pcf)	G <sub>s</sub>	ATTERBERG LIMITS			P.P. (tsf)	U.C.	CON	G.S.	ORG (%)	pH	Cl. (ppm)	SO <sub>4</sub> (ppm)	RES. (Ohm-cm)
						LL	PL	SL									
HA-2-2	3.0' - 4.3'	Brownish-gray slightly silty Fine SAND with shell and limestone fragments										*					
HA-2-4	3.9' - 6.2'	Grayish-brown silty, slightly clayey Fine SAND										*					
HA-2-5	2.0' - 4.5'	Brown Fine SAND										*		6.3	38.9	60	17,000
HA-2-7	1.8' - 3.3'	Very dark brown organic slightly silty Fine SAND											11.9				
HA-2-8	3.1' - 4.2'	Mottled grayish-brown Find SAND										*					
HA-2-9	4.5' - 5.7'	Very dark brown organic Fine SAND with trace roots											9.7				
HA-2-10	3.0' - 4.7'	Very dark brown slightly organic Find SAND											3.9				
HA-2-11	4.0' - 6.0'	Dark brown slightly silty Fine SAND with finely divided organic material										*	1.2				
HA-2-12	1.0' - 3.5'	Tan Fine SAND										*					
HA-2-14	1.0' - 2.5'	Tan Fine SAND with limestone fragments										*					
HA-2-16	3.0' - 4.0'	Light brown clayey Fine SAND with light orange veins	8.8				28	20				*					
HA-2-18	3.7' - 4.3'	Light brown silty, slightly clayey Fine SAND with light orange veins	7.6				NP	NP				*					
HA-2-20	4.0' - 5.2'	Brown slightly silty Fine SAND										*		6.5	51.6	78	3,400
HA-2-21	0.0' - 3.5'	Grayish-brown Fine SAND with trace roots										*					
HA-2-23	4.5' - 6.3'	Light brownish-gray clayey Fine SAND with trace roots	16.3				25	11				*					
HA-2-26	0.0' - 3.7'	Light tan and brown Fine SAND with trace roots										*					
HA-2-27	0.0' - 0.8'	Dark brown Fine SAND with trace finely divided organic material and roots											2.9				
HA-2-27	2.8' - 4.0'	Tan silty Fine SAND with cemented sand fragments										*					

W % = Water Content  
Y<sub>d</sub> (pcf) = Dry Density  
G<sub>s</sub> = Specific Gravity  
LL = Liquid Limit  
PL = Plastic Limit  
SL = Shrinkage Limit  
P.P. (tsf) = Pocket Penetrometer  
U.C. = Unconfined Compression

Con. = Consolidation Test  
G.S. (H) = Grainsize Analysis (Hydrometer)  
ORG. (%) = Organic Content  
Cl. (ppm) = Total Chloride  
SO<sub>4</sub> (ppm) = Total Sulfate  
RES. (ohm-cm) = Lab Resistivity  
\* = See Test Curves  
\*\* = Percent Passing No. 200 Sieve

CLIENT: Manatee County Government  
PROJECT: Suburban Pipeline, Phase II  
Manatee County, Florida  
FILE: DES 096393

## SUMMARY OF LABORATORY TEST RESULTS

[illegible]

W %	=	Water Content	Con.	Consolidation Test
Y <sub>d</sub> (pcf)	=	Dry Density	G.S. (H)	Grainsize Analysis (Hydrometer)
G <sub>s</sub>	=	Specific Gravity	ORG. (%)	Organic Content
LL	=	Liquid Limit	Cl. (ppm)	Total Chloride
PL	=	Plastic Limit	SO <sub>4</sub> (ppm)	Total Sulfate
SL	=	Shrinkage Limit	RES. (ohm-cm)	Lab Resistivity
P.P. (tsf)	=	Pocket Penetrometer	*	See Test Curves
U.C.	=	Unconfined Compression	**	Percent Passing No. 200 Sieve

**CLIENT:** Manatee County Government

**PROJECT:** Suburban Pipeline, Phase II  
Manatee County, Florida

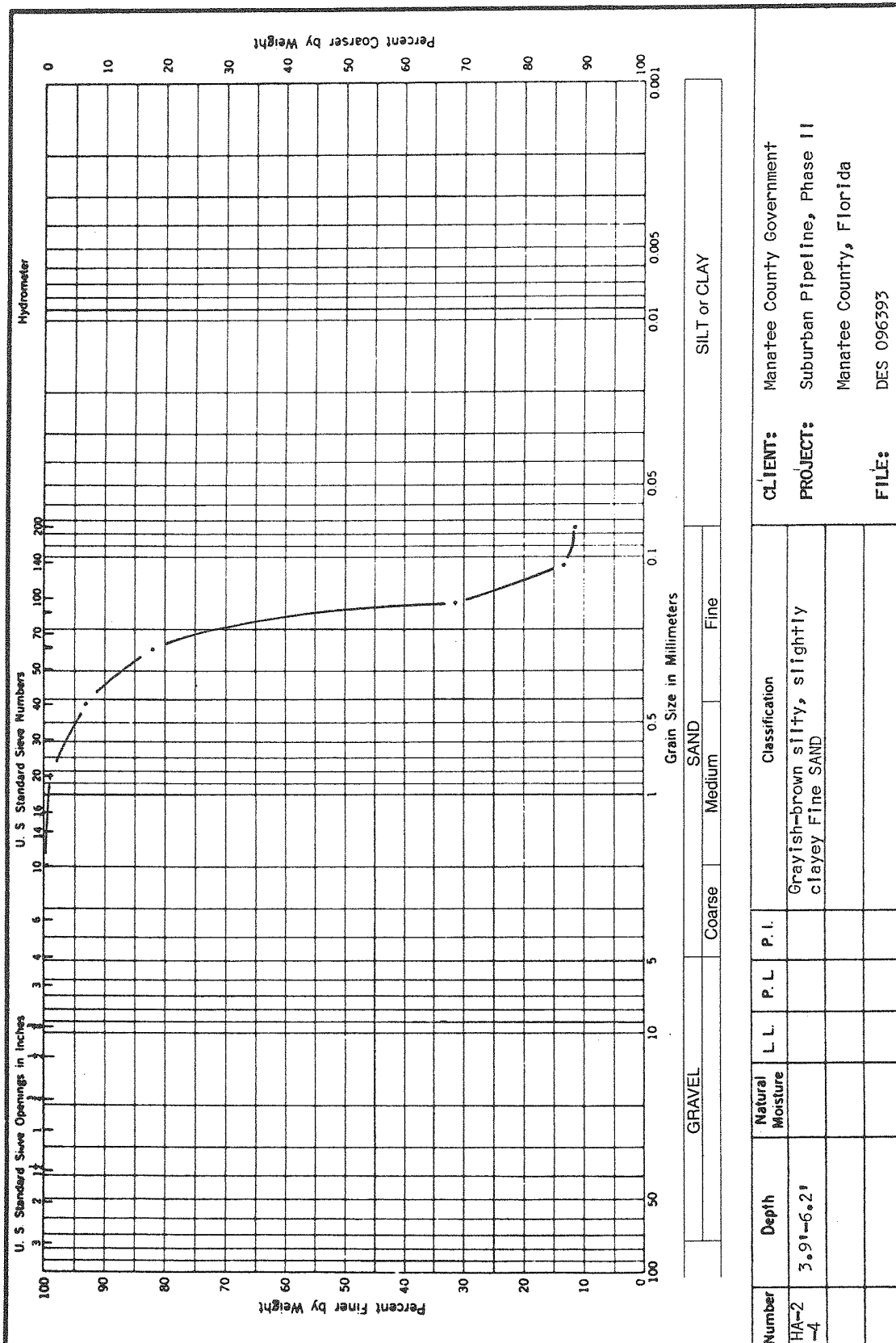
**FILE:** DES 096393



## **GRAINSIZE ANALYSES**

Number	Depth	Natural Moisture	Classification				CLIENT:	PROJECT:	FILE:
			L. L.	P. L.	P. I.				
HA-2	3.0' - 4.3'					Manatee County Government	Suburban Pipeline, Phase II	DES 096393	
						Brownish-gray slightly silty fine sand with shell and limestone fragments			

# DRIGGERS ENGINEERING SERVICES, INC.



GRAVEL		SAND		SILT or CLAY	
Coarse		Medium		Fine	
Number	Depth	Natural Moisture	L.L.	P.L.	P.I.
HA-2	3.9'-6.2'				
-4					
CLIENT:		Manatee County Government			
PROJECT:		Suburban Pipeline, Phase II			
		Manatee County, Florida			
FILE:		DES 096393			

Number	Depth	Natural Moisture	Classification				Gravel	Grain Size in Millimeters				SILT or CLAY	CLIENT:	PROJECT:	FILE:
			L L	P. L	P. I.	Brown Fine SAND		Coarse	Medium	Fine					
HA-2 -5	2.0' - 4.5'												Manatee County Government	Suburban Pipeline, Phase II	DES 096393

Number	Depth	Natural Moisture	L L	P. L	P. I.	Classification
HA-2 -8	3.1'-4.2'					Mottled grayish-brown Fine SAND

**CLIENT:** Manatee County Government

**PROJECT:** Suburban Pipeline, Phase II

**FILE:** DES 096393

**CLIENT:** Manatee County Government

**PROJECT:** Suburban Pipeline, Phase II

**FILE:** DES 096393

Number	Depth	Natural Moisture	L. L.	P. L.	P. I.	Classification
HA-1	4.0'-6.0'					Dark brown slightly silty Fine SAND with finely divided organic materials

**CLIENT:** Manatee County Government

**PROJECT:** Suburban Pipeline, Phase II

**FILE:** DES 096393

**Manatee County, Florida**

Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification
HA-2 -12	1.0'-3.5'					Tan Fine SAND

**CLIENT:** Manatee County Government

**PROJECT:** Suburban Pipeline, Phase II

**FILE:** DES 096393

**CLIENT:** Manatee County Government

**PROJECT:** Suburban Pipeline, Phase II

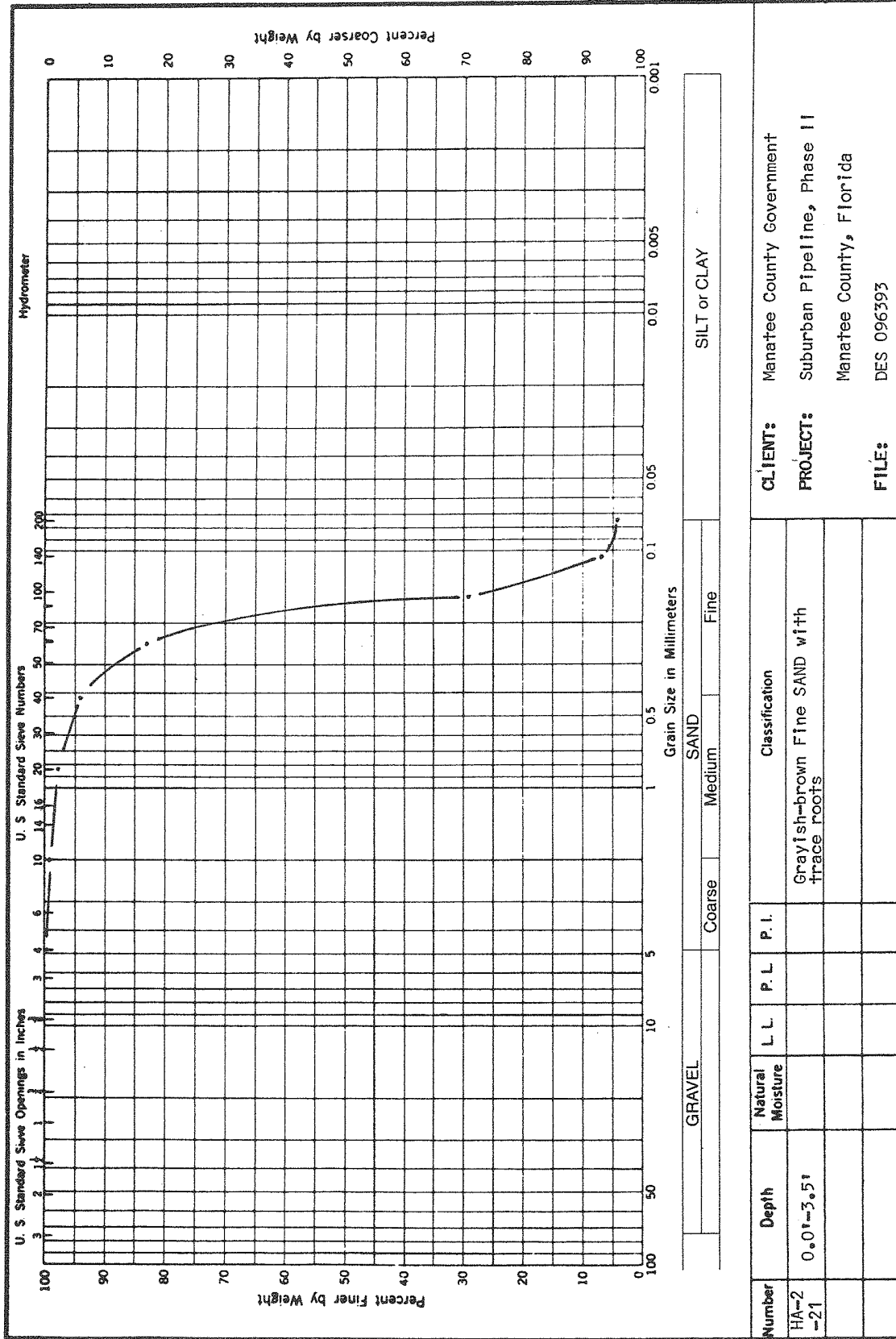
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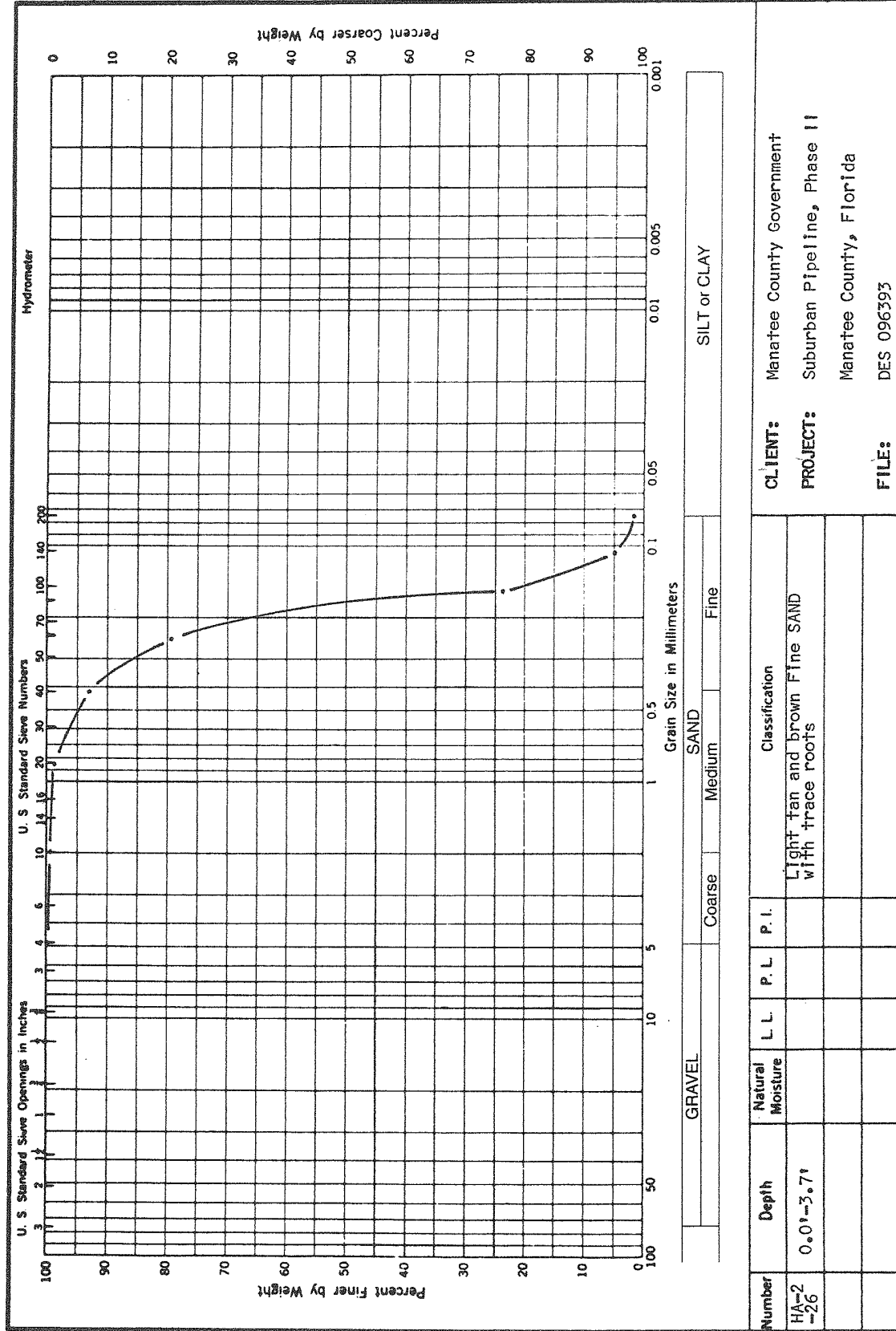
Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification	CLIENT:	PROJECT:	FILE:
HA-2 -20	4.0'-5.2'					Brown slightly silty Fine SAND	Manatee County Government	Suburban Pipeline, Phase II	DES 096393
							Manatee County, Florida		

DRIGGERS ENGINEERING SERVICES, INC.



Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification	CLIENT:	PROJECT:	FILE:
HA-2-21	0.01-3.5'					Grayish-brown Fine SAND with trace roots	Manatee County Government	Suburban Pipeline, Phase II	DES 096393
							Manatee County, Florida		

# DRIGGERS ENGINEERING SERVICES, INC.



Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification	CLIENT:	PROJECT:	FILE:
HA-2-26	0.0'-3.7'					Light tan and brown Fine SAND with trace roots	Manatee County Government	Suburban Pipeline, Phase II	DES 096393
							Manatee County, Florida		

Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification
HA-2 -27	2.8' - 4.0'					Tan silty fine SAND with cemented sand fragments

**CLIENT:** Manatee County Government

**PROJECT:** Suburban Pipeline, Phase II

**FILE:** DES 096393

Number	Depth	Natural Moisture	L. L.	P. L.	P. I.	Classification	CLIENT:	PROJECT:	FILE:
HA-2 -28	3.0'-3.8'					Light brown slightly silty, slightly clayey Fine SAND	Manatee County Government	Suburban Pipeline, Phase II	DES 096393

Number	Depth	Natural Moisture	L L	P. L	P. I.	Classification	GRAVEL			SAND			SILT or CLAY	CLIENT:	PROJECT:	FILE:
							Coarse	Medium	Fine							
HA-2 -50	4.0'-8.0'					Tan and light gray Fine SAND with brown veins								Manatee County Government	Suburban Pipeline, Phase II	DES 096393
														Manatee County, Florida		

Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification	GRAVEL			SILT or CLAY		
							Coarse	Medium	Fine	SILT or CLAY		
HA-2 -31	1.9'-3.5'					Light tan Fine SAND						

Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification
HA-2 -31	1.9'-3.5'					Light tan Fine SAND

**CLIENT:** Manatee County Government

**PROJECT:** Suburban Pipeline, Phase II

Manatee County, Florida

**FILE:** DES 096393

Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification	CLIENT:	PROJECT:	FILE:
HA-2 -23	2.5'-4.5'					Light brown Fine SAND	Manatee County Government	Suburban Pipeline, Phase II	DES 096393



Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification
HA-2 -35	2.4'-3.0'					Dark brown Fine SAND with finely divided organic materials

**CLIENT:** Manatee County Government

**PROJECT:** Suburban Pipeline, Phase II

**FILE:** DES 096393

Number	Depth	Natural Moisture	L. L.	P. L.	P. I.	Classification			CLIENT:	PROJECT:	FILE:
						GRAVEL	SAND	SILT or CLAY			
HA-2 -38	1.5'-2.5'						Dark brown, Fine SAND with trace finely divided organic materials		Manatee County Government	Suburban Pipeline, Phase II	DES 096393

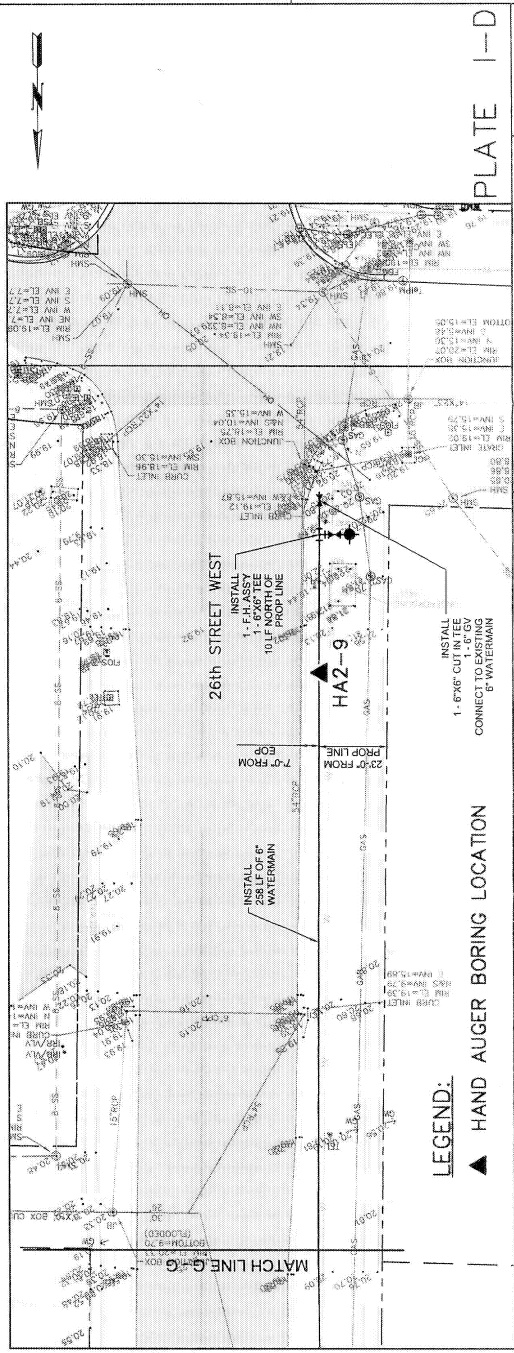
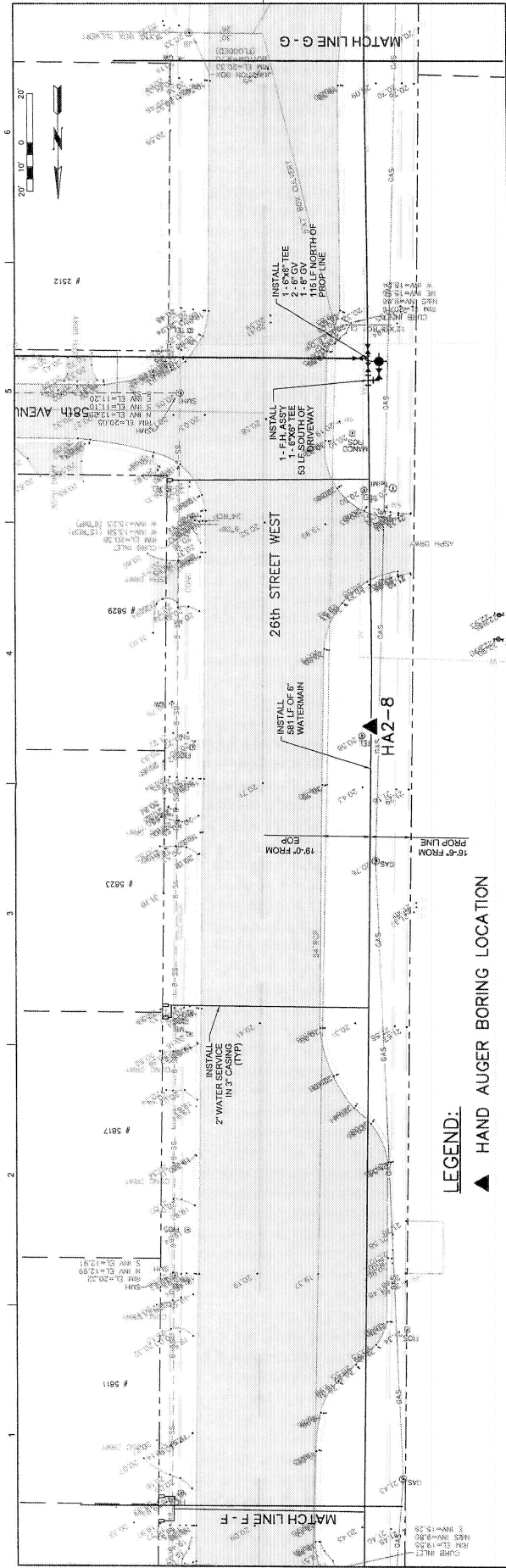
Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification	CLIENT:	PROJECT:	FILE:
HA-2 -39	3.0'-4.8'					Light brown Fine SAND	Manatee County Government	Suburban Pipeline, Phase II	DES 096393











LEGEND:  
▲ HAND AUGER BORING LOCATION

PLATE I-D

DESIGN	BLK	NO.	DATE
DR	BLK		
GRK	RAC		
APPD	RAC		
ROBERTA A. CANABARRELLA, P.E. FLA. P.E. NO. 17867			
BY: JPO DATE: RENSON			
VERIFY SCALE BARS ONE INCH ON PLAN ONE FOOT ON FIELD Scales accordingly.			
CH2MHILL 4350 WEST CYPRESS STREET SUITE 600 TAMPA, FLORIDA 33607-4155 LB 000294 *A* C00556			
MANATEE COUNTY SUBURBAN SYSTEM WATER LINE REPLACEMENT PROJECT PHASE 2 MANATEE COUNTY, FLORIDA PROJECT NO. 8974770			
PLAN SHEET WATER LINE 26th ST W FROM 5811 TO			
SHEET	04	DATE	SEPTEMBER 2009
DWG	CADDWG	PROJ	358575.WMI



LEGEND:

▲ HAND AUGER BORING LOCATION

VERIFY SCALE  
BAR IS ONE INCH ON  
PLAN AND ONE INCH  
IF NOT ONE INCH ON  
PLAN, SCALES ACCORDINGLY.

DESIGN	DATE	BY	REVISION	NO.	DATE
BJK					
BJK					
RAC					
RAC					

**CH2MHILL**  
4350 WEST CYPRESS STREET SUITE 600  
TAMPA, FLORIDA 33607-4155  
LB 00029541 AA 000656

MANATEE COUNTY  
SUBURBAN SYSTEM  
WATER LINE REPLACEMENT PROJECT  
MANATEE COUNTY, FLORIDA  
PROJECT No. 68747.70

PLATE I-E

SHEET	C5
DATE	SEPTEMBER 2009
PROJ	38879.00

PLAN SHEET WATER LINE  
25th ST W FROM 57th AVE W TO 5724





LEGEND:

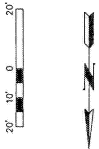
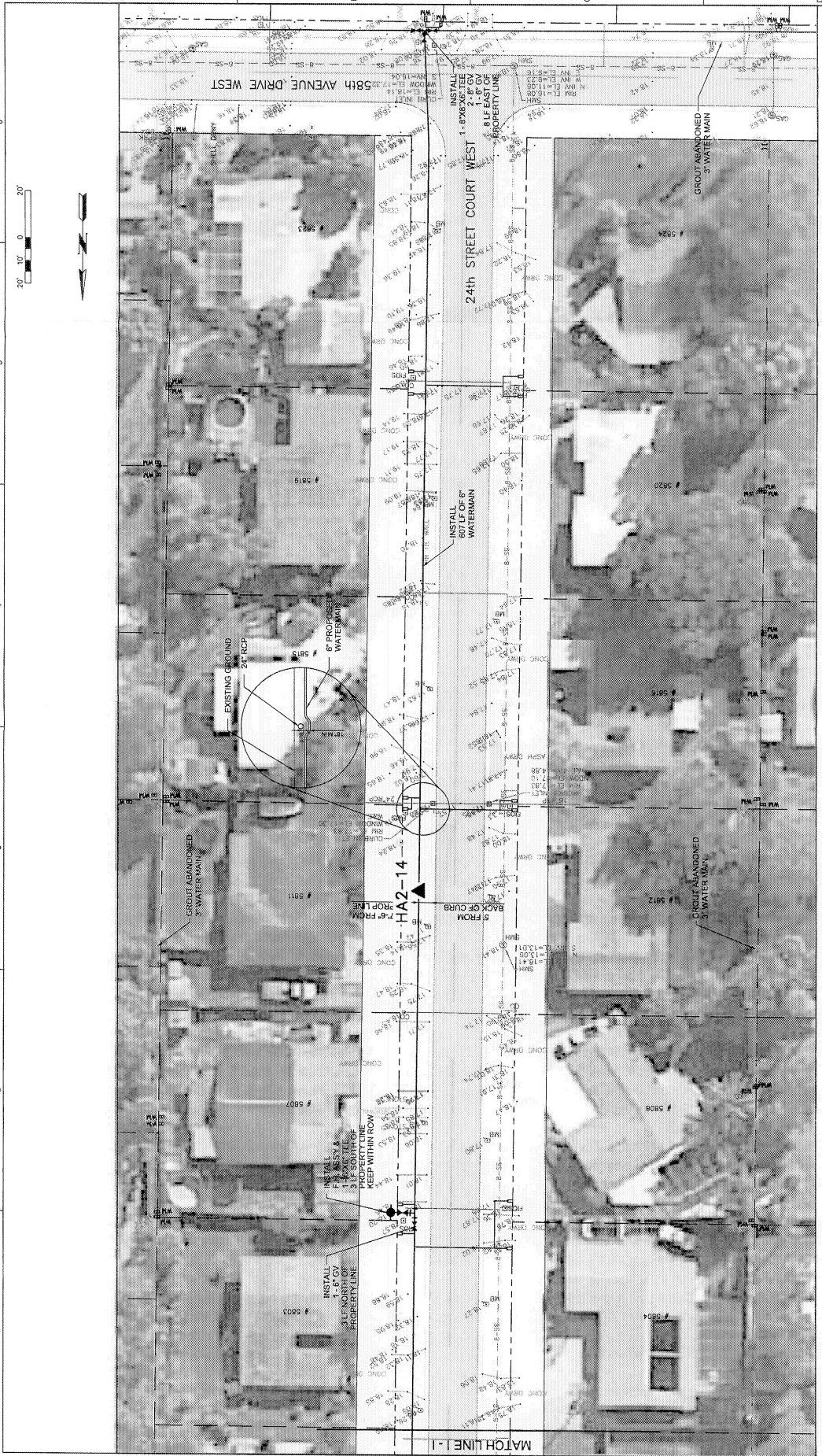
▲ HAND AUGER BORING LOCATION

PLATE I-F

DESIGN		BJK						VERIFY SCALE		MANATEE COUNTY		PLAN SHEET WATER LINE		SHEET		C6	
DR								BAR IS ONE INCH ON ORIGINAL DRAWING.		SUBURBAN SYSTEM		25th ST W FROM 5728 TO 58th AVE DR W		DWG		C6DWG	
CHK		BJK						IF NOT ONE INCH ON THIS DRAWING, SCALES ACCORDINGLY.		WATER LINE REPLACEMENT PROJECT		25th ST W FROM 5728 TO 58th AVE DR W		DATE		SEPTEMBER 2009	
APPD		RAC						BY		PROJECT NO. 60747.70		25th ST W FROM 5728 TO 58th AVE DR W		PROJ		386879.WM	
		RAC		RD.		DATE		REVISION		MANATEE COUNTY, FLORIDA		25th ST W FROM 5728 TO 58th AVE DR W					
ROBERT A. CANNARELLA, P.E.																	
EIT, P.E. No. 17357																	







LEGEND:

▲ HAND AUGER BORING LOCATION

VERIFY SCALE  
BAR IS ONE INCH ON  
GROUND  
IF NOT ONE INCH ON  
GROUND, SCALE ACCORDINGLY

NO.	DATE	REVISION	BY	APPROVED
1				

DESIGN	BLK
DR	BLK
CHK	RAC
APP'D	RAC

ROBERT A. CANABIELLA, P.E.  
FLA. P.E. No. 17267

PLATE I-H

SHEET	CS
DWG	CRDWG
DATE	SEPTEMBER 2009
PROJ.	388673 MM

PLAN SHEET WATER LINE  
24th ST COURT W FROM 58th TO 59th AVE DR W

MANATEE COUNTY  
SUBURBAN SYSTEM  
WATER LINE REPLACEMENT PROJECT  
MANATEE COUNTY, FLORIDA  
PROJECT No. 80747.70

**CH2MHILL**  
4350 WEST CYPRUS STREET, SUITE 600  
TAMPA, FLORIDA 33607-4155  
LB 000234 AA C00056



LEGEND:

▲ HAND AUGER BORING LOCATION

PLATE 1-1

DESIGN		DATE	NO.	DATE	REVISION	BY	APPROVED	VERIFY SCALE		MANATEE COUNTY		SHEET	
DR	BLK							BAR IS ONE INCH ON		SUBURBAN SYSTEM		03	03
CHK	BLK							IF NOT ONE INCH ON		WATER LINE REPLACEMENT PROJECT		DWG	C3 DWG
APP	RAC							Scales Accordingly		4350 WEST CYPRESS STREET SUITE 600		DATE	SEPTEMBER 2009
ROBERT A. CANABRELLA, P.E.								TAMPA, FLORIDA 33607-4155		MANATEE COUNTY, FLORIDA		PROJ	368879 MM
P.E. No. 17867								LB 0002934 AA C000555		PROJECT No. 69747.70			

PLAN SHEET WATER LINE  
2345 ST W FROM 57th AVE W TO 5738

MANATEE COUNTY  
SUBURBAN SYSTEM  
WATER LINE REPLACEMENT PROJECT  
MANATEE COUNTY, FLORIDA  
PROJECT No. 69747.70

**CH2M HILL**  
4350 WEST CYPRESS STREET SUITE 600  
TAMPA, FLORIDA 33607-4155  
LB 0002934 AA C000555

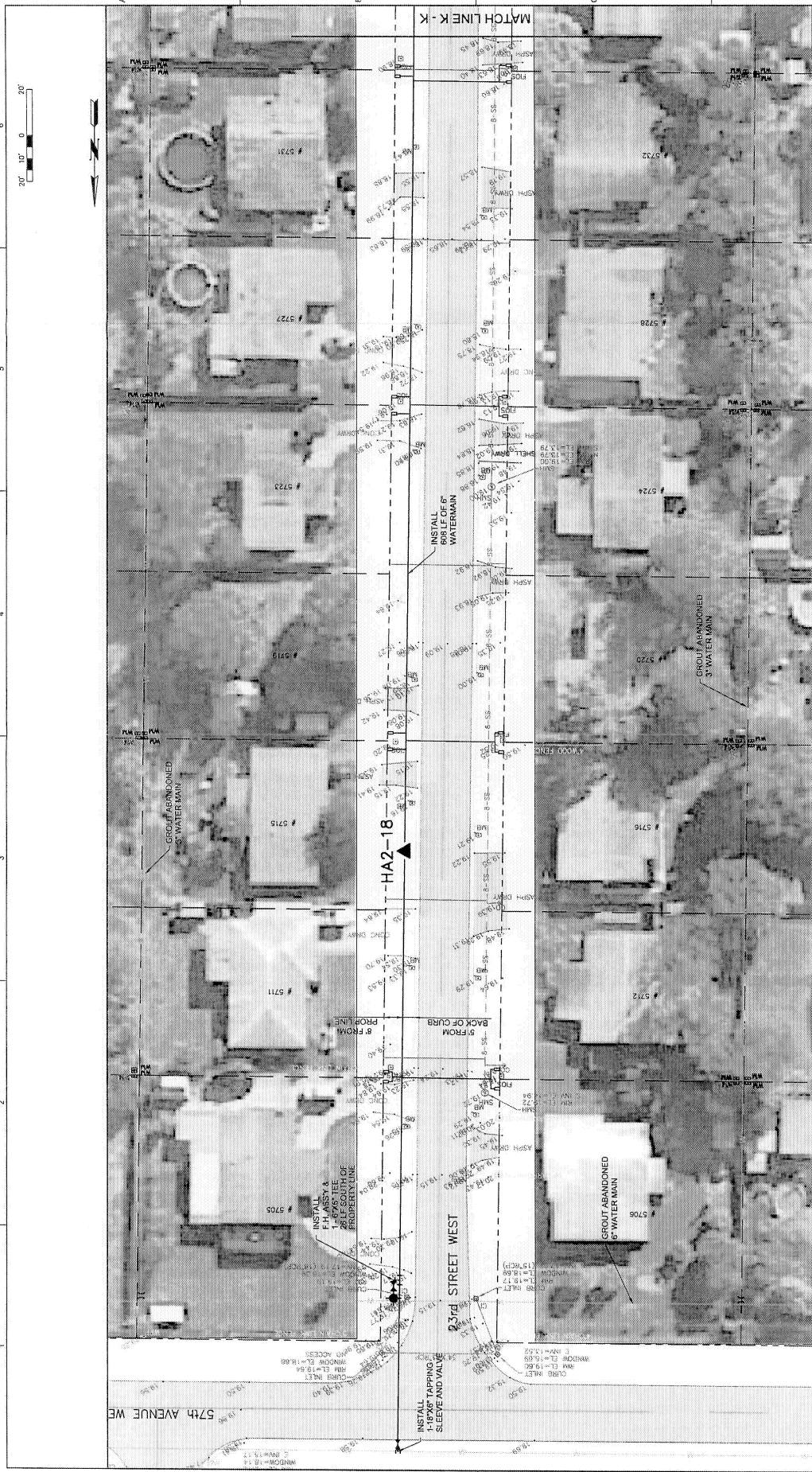
VERIFY SCALE  
BAR IS ONE INCH ON  
IF NOT ONE INCH ON  
Scales Accordingly

DESIGN	DATE	NO.	DATE	REVISION	BY	APPROVED
DR						
CHK						
APP						

ROBERT A. CANABRELLA, P.E.  
P.E. No. 17867







LEGEND:

▲ HAND AUGER BORING LOCATION

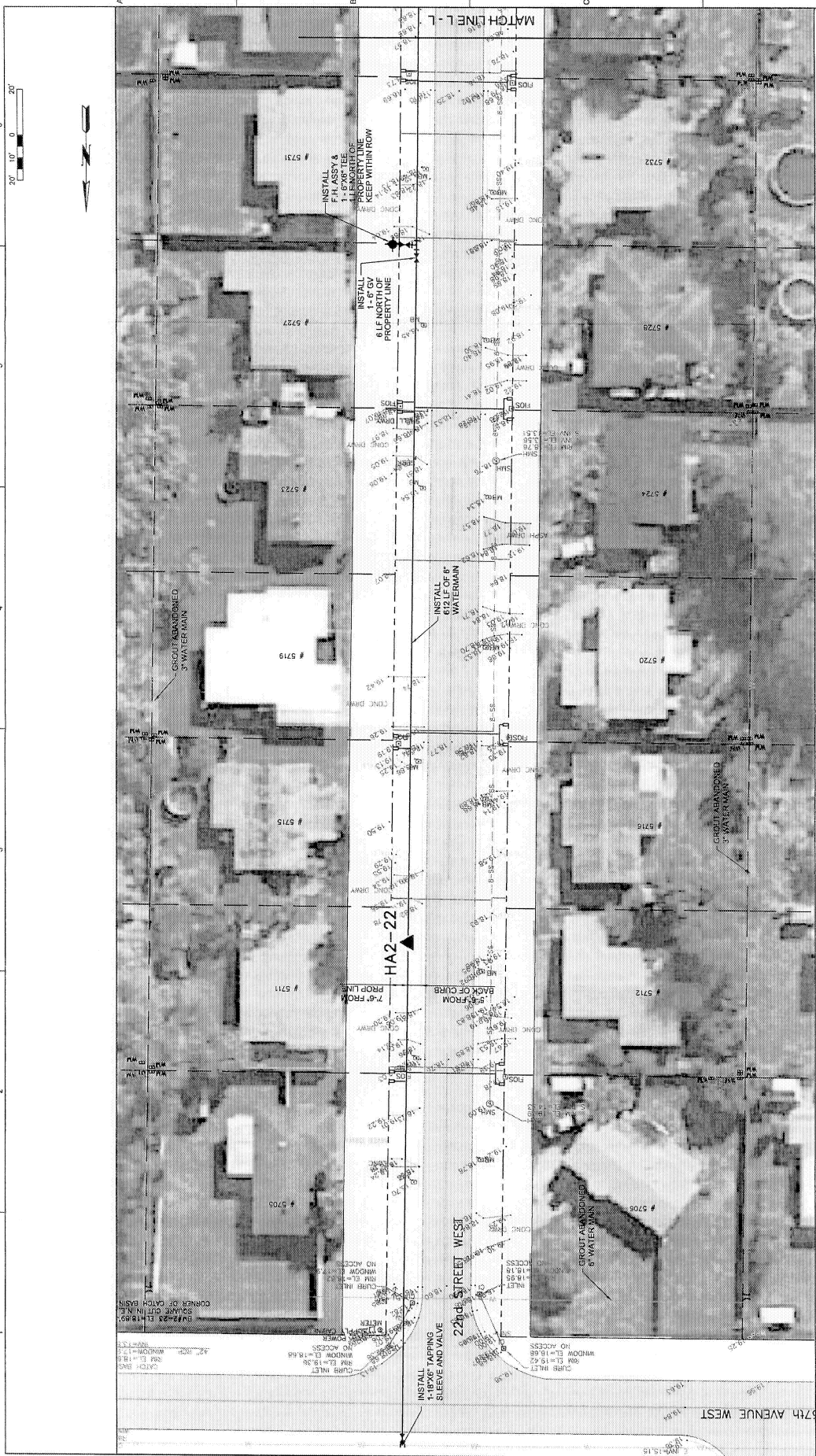
PLATE I-K

C11		C11 DWG		DATE: SEPTEMBER 2009		PROJ: 386879 WM	
MANATEE COUNTY		SUBURBAN SYSTEM		WATER LINE REPLACEMENT PROJECT		MANATEE COUNTY, FLORIDA	
CH2M HILL		386879 WM		SHEET: C11		PROJECT NO. 8074770	
TAMPA, FLORIDA 33607-4155		LB 0002324 AA C000666		PLAN SHEET WATER LINE		23rd ST W FROM 57th AVE W TO 5736	
VERIFICATION SCALE		BAR IS ONE INCH ON ORIGINAL DRAWING		IF NOT ONE INCH ON SCALES ACCORDINGLY			
BY: JAC/VD		REVISION		NO. DATE			
BJK		BJK		BJK			
RAC		RAC		RAC			
APD		APD		APD			

ROBERTA CANNON, P.E.  
10/16/2009







LEGEND:

▲ HAND AUGER BORING LOCATION

PLATE I-M

CH2M HILL		MANATEE COUNTY SUBURBAN SYSTEM		PLAN SHEET WATER LINE		SHEET C13	
4330 WEST CORTESIA STREET, SUITE 800		WATER LINE REPLACEMENT PROJECT		22nd ST W FROM 57th AVE W TO 5736		DWG C13.DWG	
TAMPA, FLORIDA 33607-4155		MANATEE COUNTY, FLORIDA		PROJECT No. 69747.0		DATE SEPTEMBER 2009	
LB 0002934 AA C200666						PROJ 386879.WM	
VERIFY SCALE		BY		DATE			
BAR IS ONE INCH ON ORIGINAL DRAWING							
IF NOT ONE INCH ON SCALES ACCORDINGLY							
REVISION		NO.		DATE			
		BY					
		APPROVED					
		RAC					
		BJK					
		BJK					
		APPROVED					

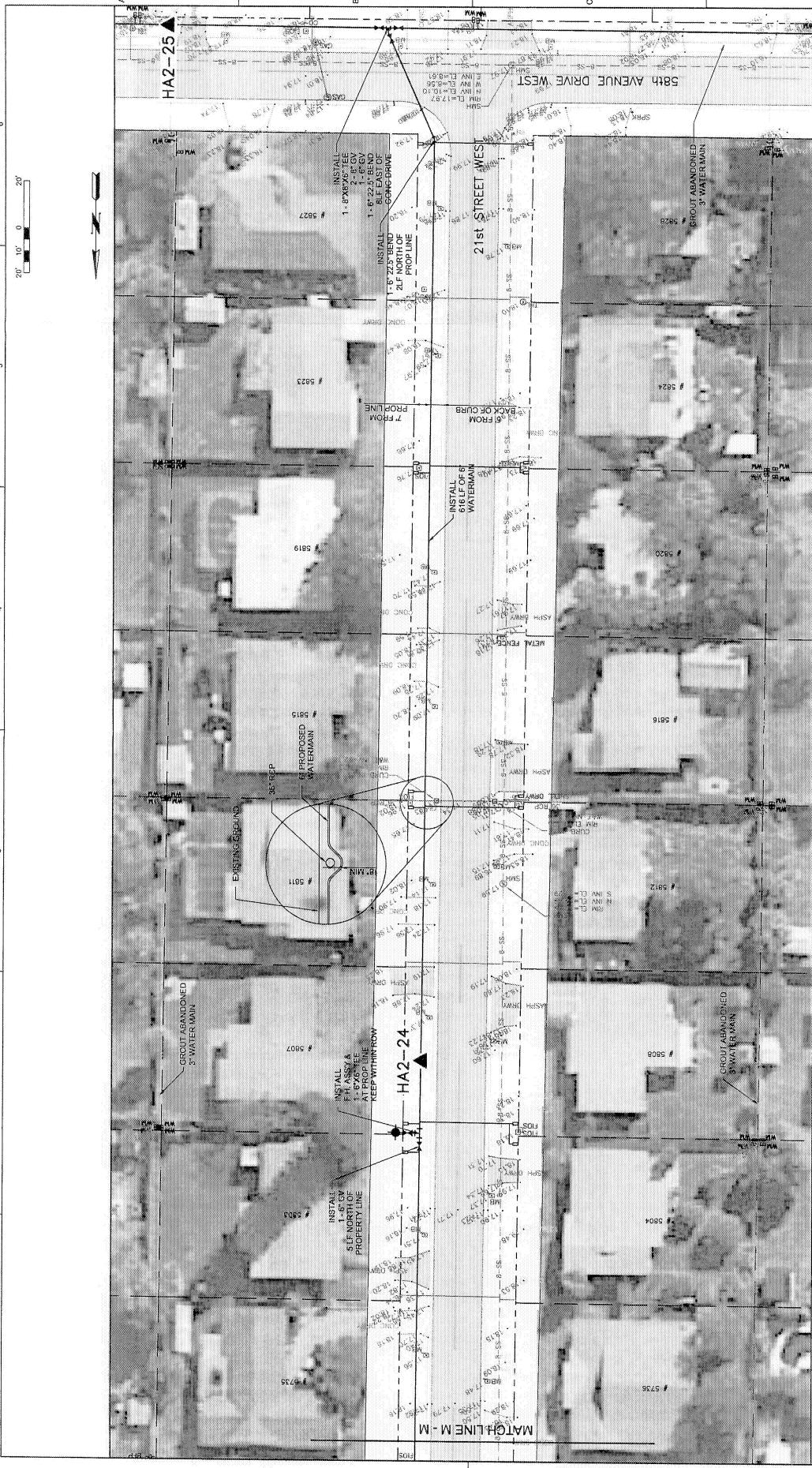
ROBERT A. CANANDELLA, P.E.  
FLA. P.E. No. 1737











LEGEND:

▲ HAND AUGER BORING LOCATION

VERIFY SCALE  
BASIS ONE INCH ON  
GROUND EQUALS  
FOOT  
IF NOT ONE INCH ON  
GROUND  
SCALE ACCORDINGLY

BY: JPK/IG

REVISION

DATE

NO.

RAC

DESIGN

DR

CHK

APP'D

ROBERT A. DANARELLA, P.E.  
File P.E. No. 17387

MANATEE COUNTY WATERLINE IMPROVEMENTS PROJECT  
21st ST W FROM 57th TO 58th AVE DR W

MANATEE COUNTY, FLORIDA  
PROJECT No. 60747.70

MANATEE COUNTY  
SUBURBAN SYSTEM  
WATER LINE REPLACEMENT PROJECT  
MANATEE COUNTY, FLORIDA  
PROJECT No. 60747.70

PLATE I-P

SHEET C16  
C16.DWG  
DATE SEPTEMBER 2008  
PROJ 388879.WM



LEGEND:

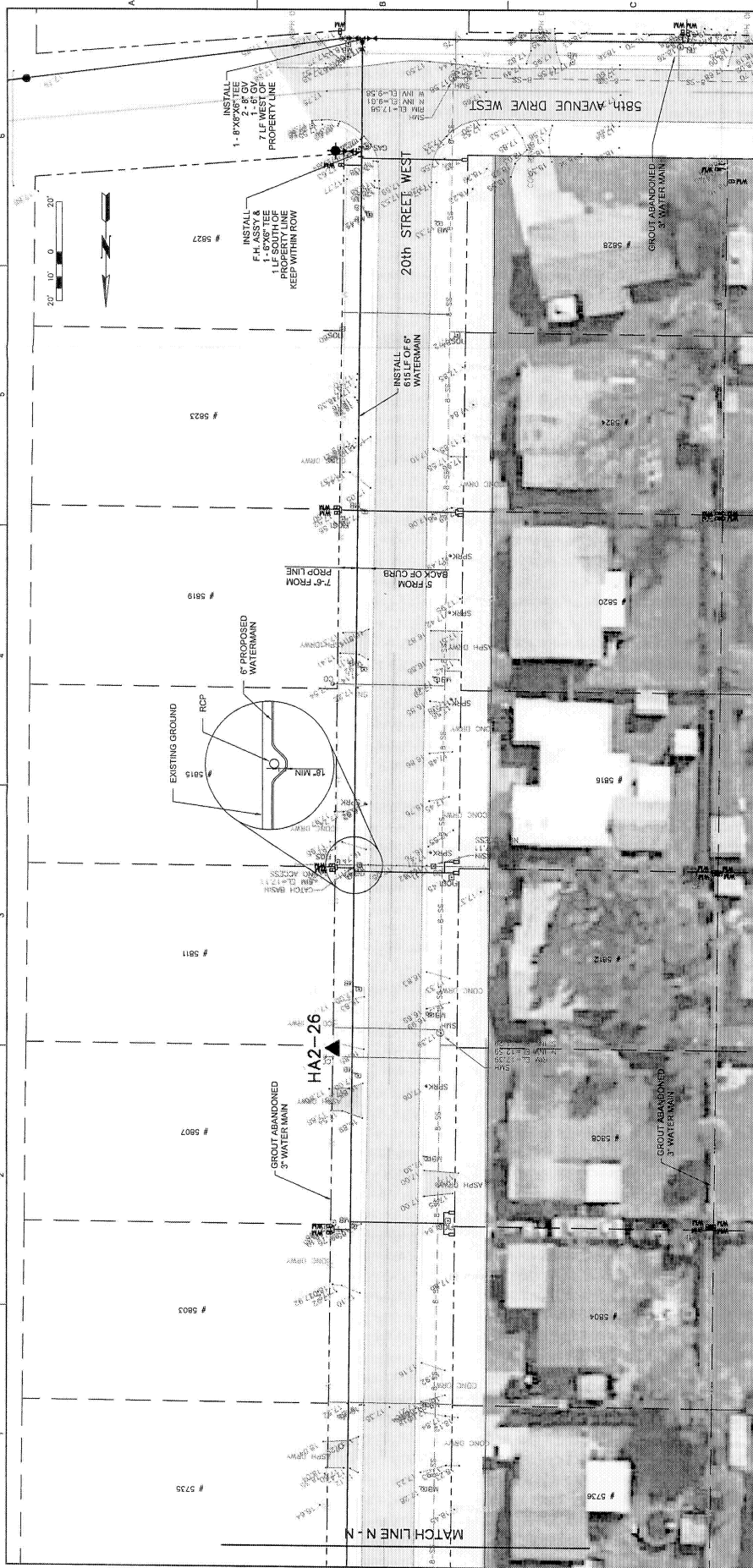
- ▲ HAND AUGER BORING LOCATION

PLATE I-Q

DESIGN		BY		REVISION		DATE		SHEET		CITY	
DR	BJK	DR	BJK					DWG	CIT/DWG		
CHK	RAC	CHK	RAC					DATE	SEPTEMBER 2009		
APP	RAC	APP	RAC					PROJ	368879 MM		
MANATEE COUNTY SUBURBAN SYSTEM WATER LINE REPLACEMENT PROJECT MANATEE COUNTY, FLORIDA PROJECT No. 60747.70											
PLAN SHEET WATER LINE 20th ST W FROM 57th AVE W TO 5736											

**CH2MHILL**  
4350 WEST CYPRESS STREET, SUITE 800  
TAMPA, FLORIDA 33607-4155  
LB 000234 AA 000555

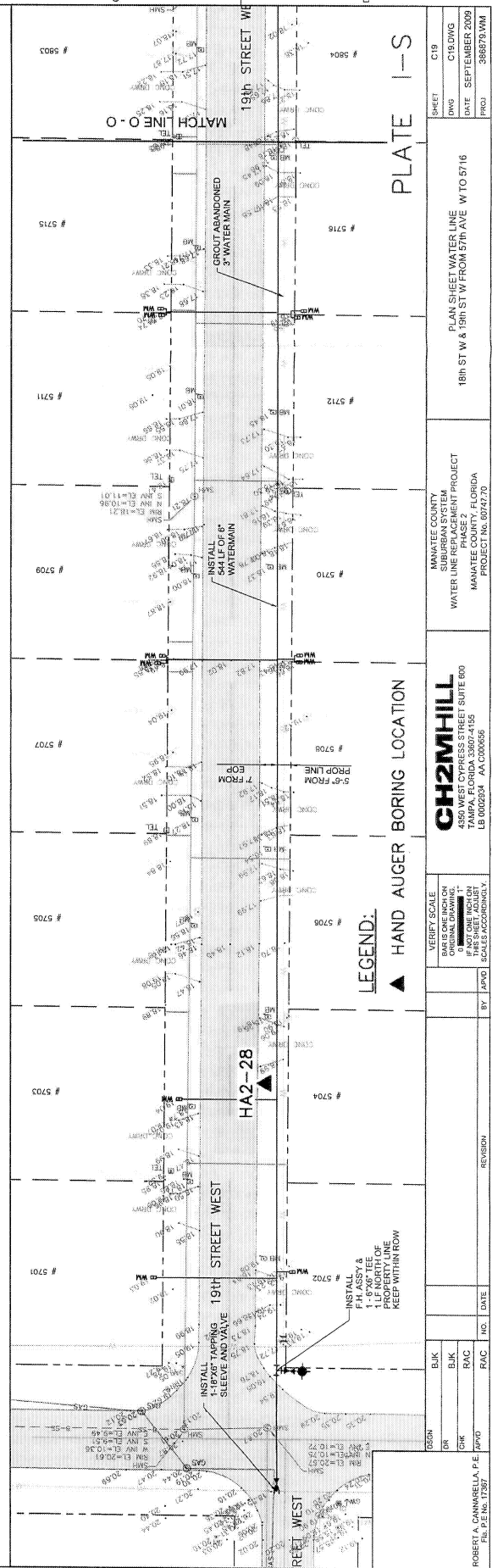
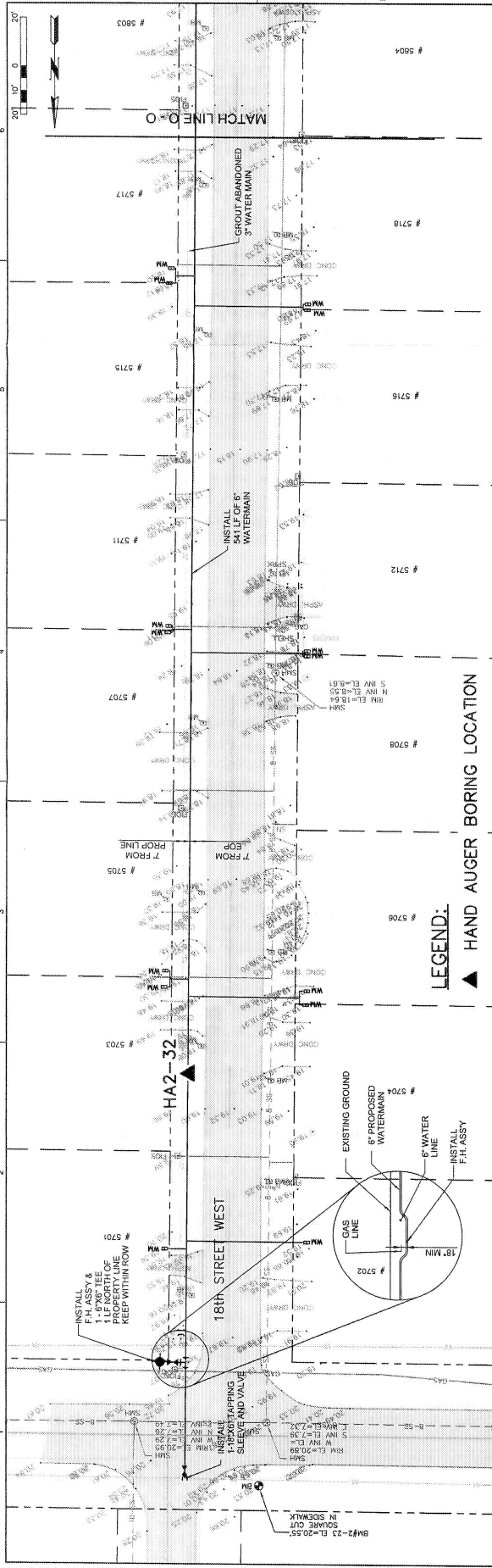
VERIFY SCALE  
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
IF NOT ONE INCH ON  
SHEET, SCALES ACCORDINGLY



**LEGEND:**  
 ▲ HAND AUGER BORING LOCATION

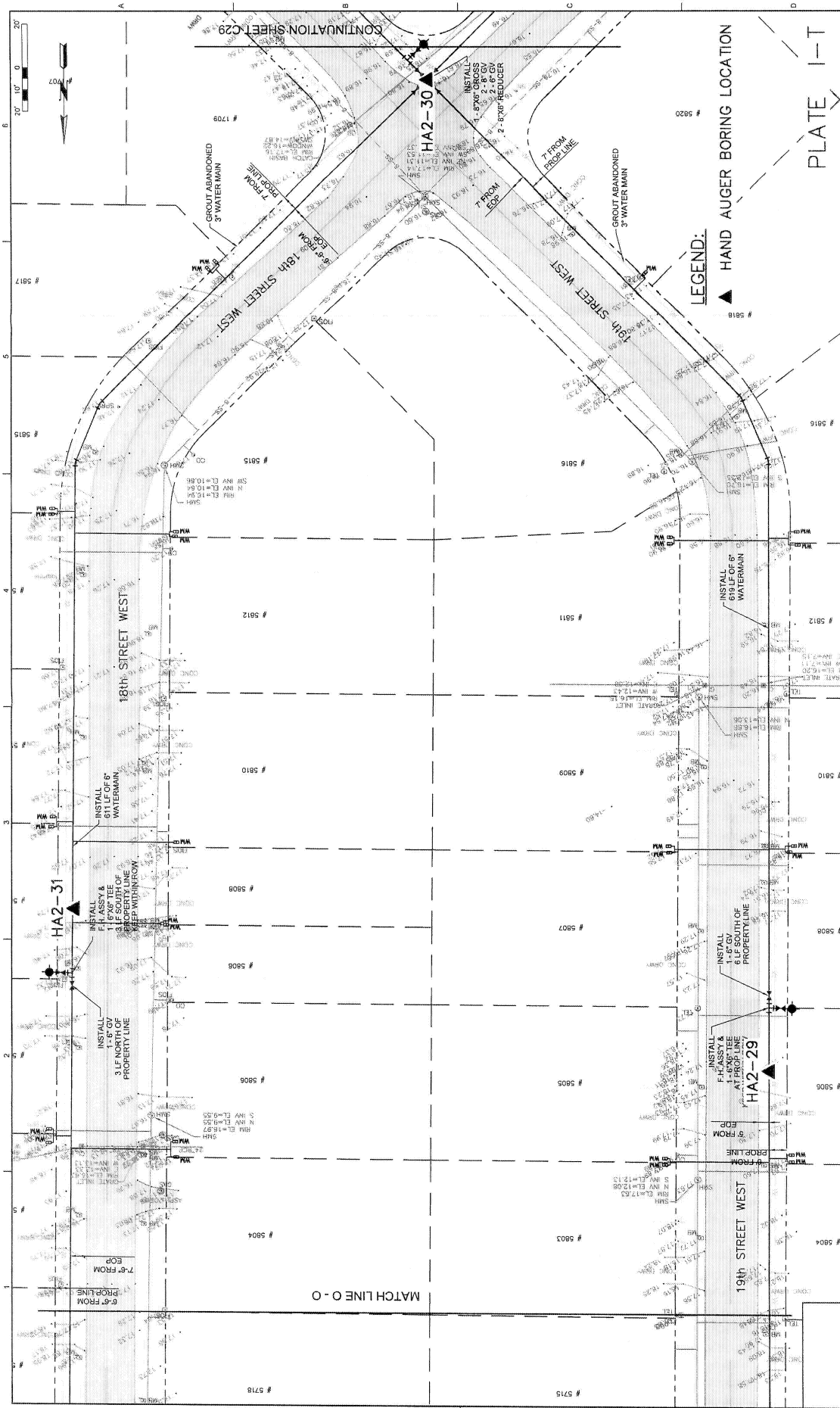
PLATE 1-R

										<b>CH2MHILL</b> 4350 WEST CYPRESS STREET SUITE 600 TAMPA, FLORIDA 33607-4155 LB 0002934 AA 000056 SCALES ACCORDINGLY.										MANATEE COUNTY SUBURBAN SYSTEM WATER LINE REPLACEMENT PROJECT PHASE 2, FLORIDA PROJECT NO. 60742.70										PLAN SHEET WATER LINE 20th ST FROM 5736 TO 58th AVE DR W										SHEET C18	
																																								DWG C18.DWG	
																																								DATE SEPTEMBER 2009	
																																								PROJ 366873.MXD	



<b>CH2M HILL</b> 3301 SOUTH BAY STREET, SUITE 500 TAMPA, FLORIDA 33607-4155 LB 000234 AA C00055		MANATEE COUNTY SUBURBAN SYSTEM WATER LINE REPLACEMENT PROJECT PHASE 2, FLORIDA MANATEE COUNTY PROJECT NO. 80747.70		SHEET C19
VERIFY SCALE ORIGINAL DRAWING IF NOT ONE INCH ON SCALES ACCORDINGLY	NO. 1 DATE	NO. 2 DATE	NO. 3 DATE	NO. 4 DATE
DESIGN RAC	CHECK RAC	IN CHARGE RAC	BY JAVO	DATE 09/28/2009
PROJECT NO. 80747.70 DATE: SEPTEMBER 2009 DWG: C19.DWG PROJ: 388679.MN				





MANATEE COUNTY SUBURBAN SYSTEM WATER LINE REPLACEMENT PROJECT MANATEE COUNTY, FLORIDA PROJECT No. 60747.70		PLAN SHEET WATER LINE 18th ST W & 19th ST W FROM 5804 TO INTERSECTION		SHEET C20	
CH2M HILL 4300 WEST CHAMBERS STREET, SUITE 800 TAMPA, FLORIDA 33607-4155 LB 0002294 AA C000655		DATE SEPTEMBER 2009		DWG C20.DWG	
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON SHEET, SCALE ACCORDINGLY.		BY JAVG		PRJ 386879.VMI	
REVISION		NO.		DATE	
EJK		EJK		RAC	
CHK		RAC		RAC	
APPD		RAC		RAC	
ROBERT A. CANACIELA, P.E. FLA. REG. NO. 17381					

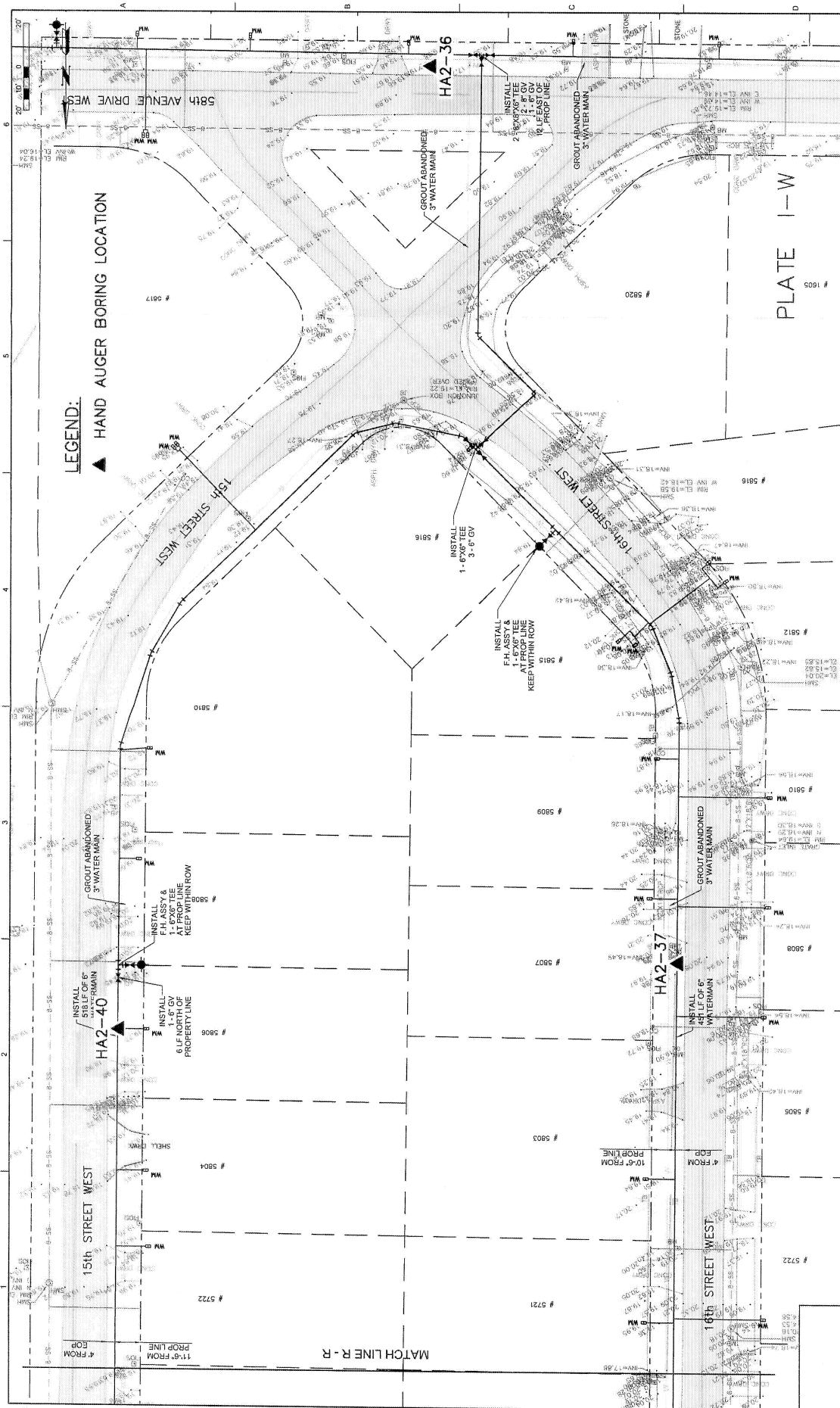
PLATE I-T

LEGEND:  
▲ HAND AUGER BORING LOCATION



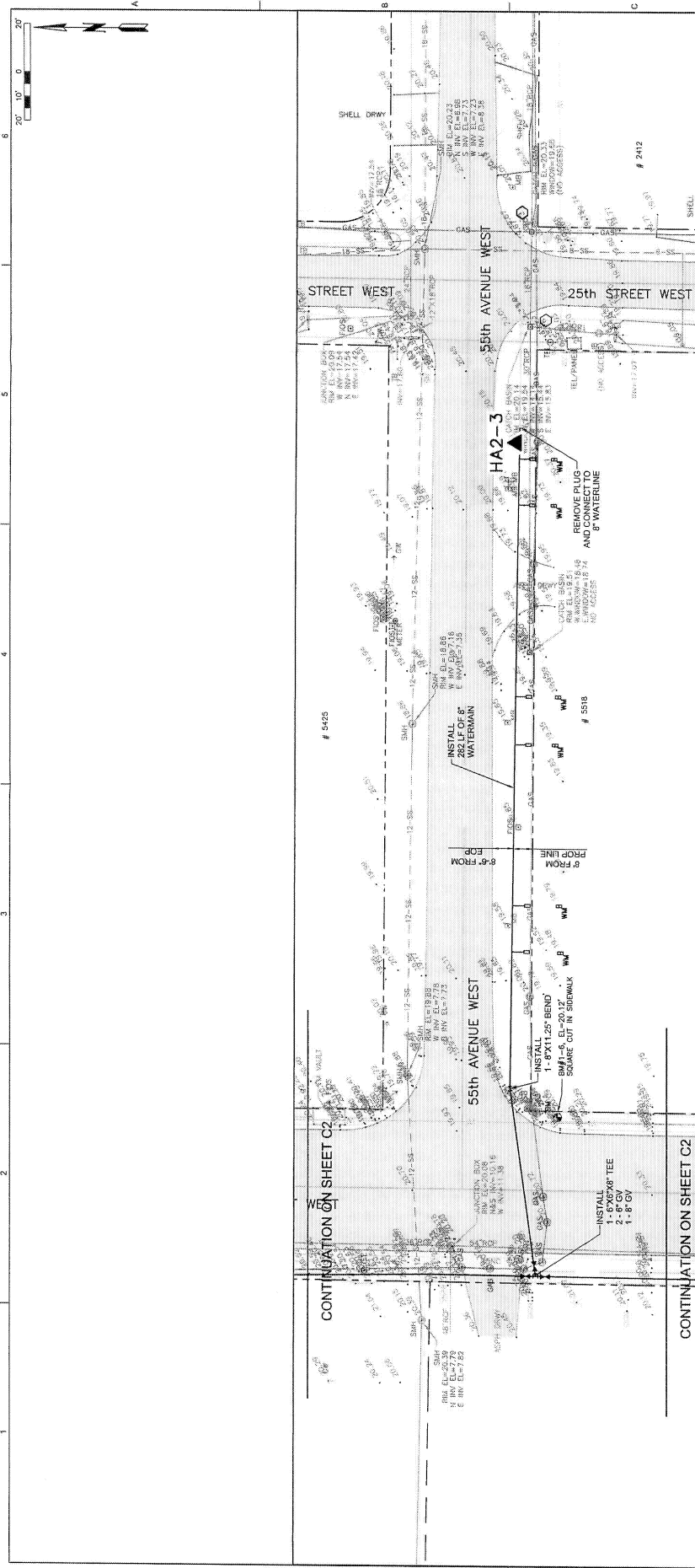






**LEGEND:**  
 ▲ HAND AUGER BORING LOCATION

DESIGN		BLK	DATE	NO.	REVISION	BY	APD	SCALE	VERIFY SCALE		MANATEE COUNTY		SHEET		C24	
DR		BLK							BAR IS ONE INCH ON		SUBURBAN SYSTEM		DWG		C24 DWG	
CHK		BLK							IF NOT ONE INCH ON		WATER LINE REPLACEMENT PROJECT		DATE		SEPTEMBER 2009	
APPD		BLK							ORIGINAL DRAWING		MANATEE COUNTY, FLORIDA		PROJECT NO. 60742.70		PROJ.	
		BLK							SHEET		PLAN SHEET WATER LINE		15th ST W & 16th ST W FROM 5716 TO INTERSECTION		388879 WA	

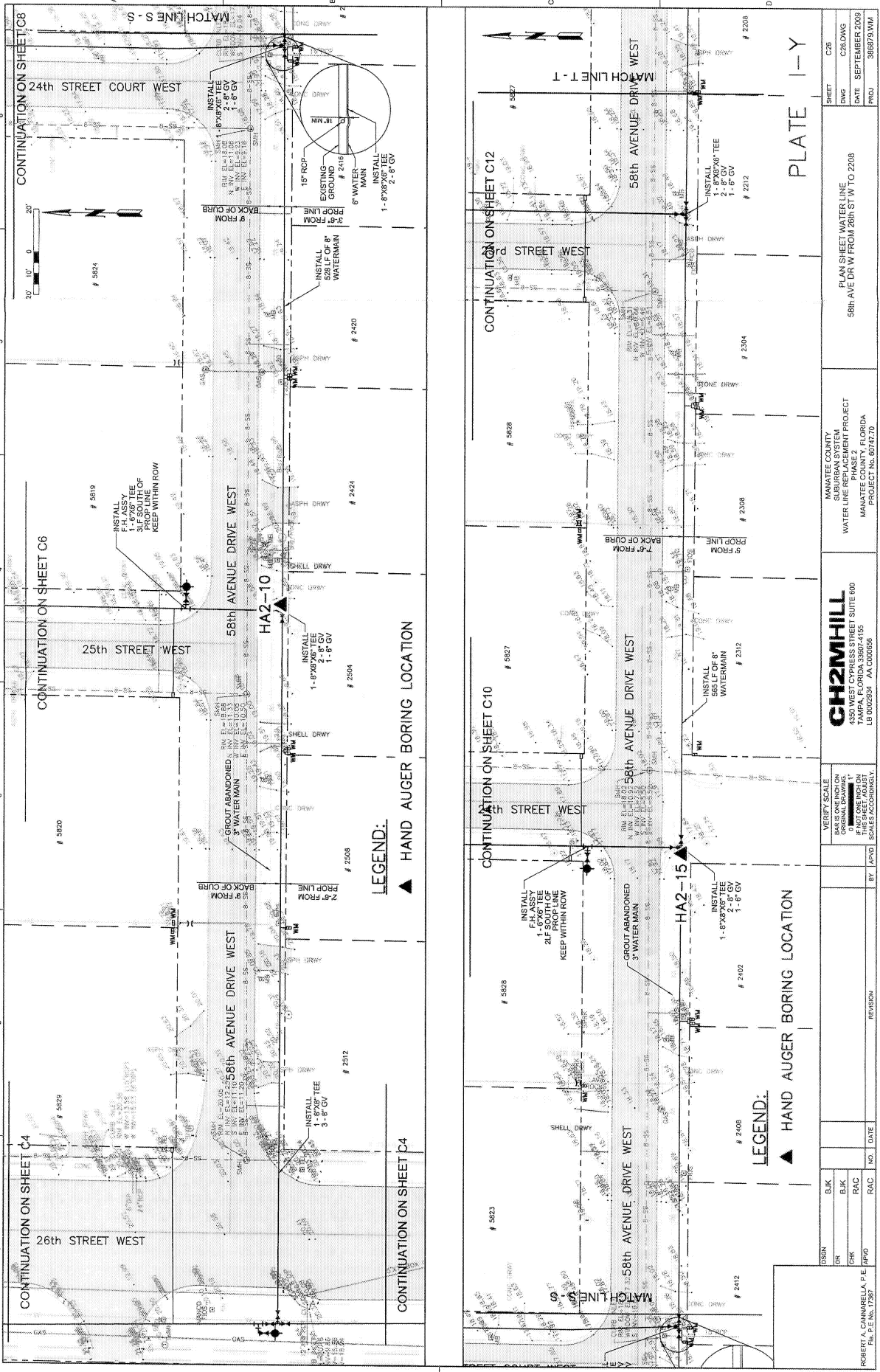


LEGEND:

▲ HAND AUGER BORING LOCATION

PLATE 1-X

DESIGN					VERIFY SCALE BAR IS ONE INCH ON DRAWING IF NOT ONE INCH ON DRAWING, SCALE SCALES ACCORDINGLY.	CH2MHILL 4350 WEST CYPRESS STREET SUITE 600 TAMPA, FLORIDA 33607-4155 LB 0002334 AA C000556	MANATEE COUNTY SUBURBAN SYSTEM WATER LINE REPLACEMENT PROJECT MANATEE COUNTY, FLORIDA PROJECT No. 60747.70	PLAN SHEET WATER LINE 55th AVE W FROM 26th ST W TO 25th ST W	SHEET C26 DWG C25.DWG DATE SEPTEMBER 2009 PROJ 388879.WM
	DR	BLK							
	CHK	BLK							
	APP'D	RAC							
ROBERT A. CANNARELLA, P.E. P.E. No. 17367									
					REVISION	BY JAP/O			



DESIGN	CHK	APP	DATE	REVISION	BY	APPROVED
DAK	DAK	DAK				
DAK	DAK	DAK				
DAK	DAK	DAK				
DAK	DAK	DAK				

VERIFY SCALE	BAR IS ONE INCH ON ORIGINAL DRAWING	IF NOT ONE INCH ON ORIGINAL DRAWING, SCALE ACCORDINGLY
MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
PROJECT NO. 69747.70		

CH2M HILL	4555 WEST CYPRUS STREET, SUITE 600	TAMPA, FLORIDA 33607-4155	LB 0002834	AA 0008586
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MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA	PROJECT NO. 69747.70
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DATE	SEPTEMBER 2009	PROJ	388879.WM
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SHEET	C28	DWG	C28.DWG
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PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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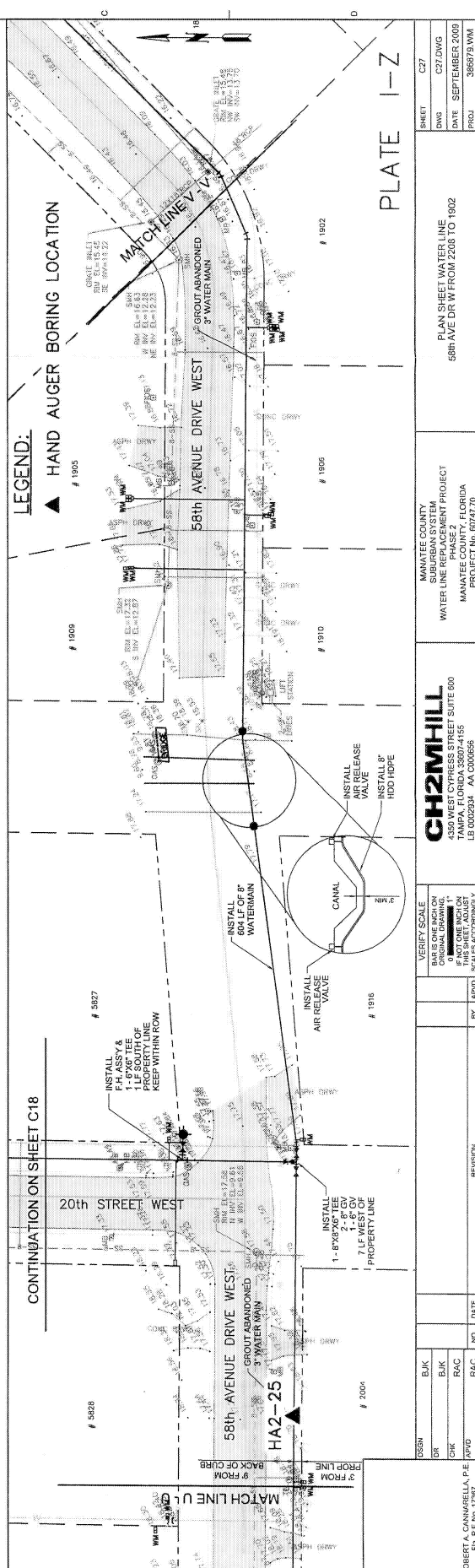
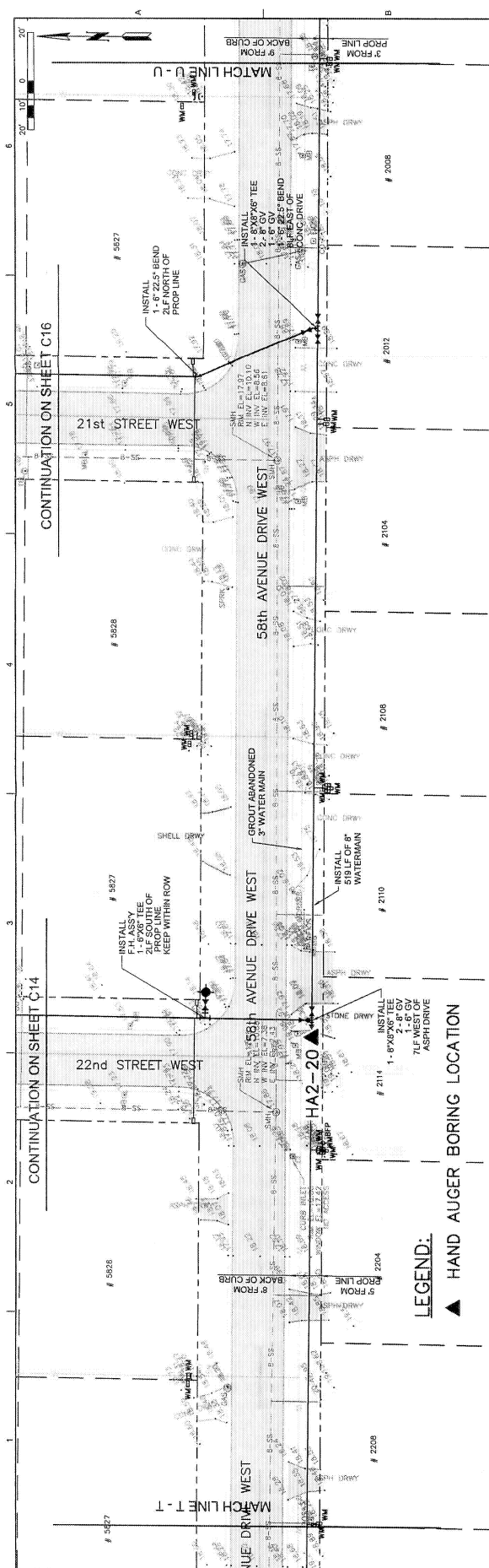
PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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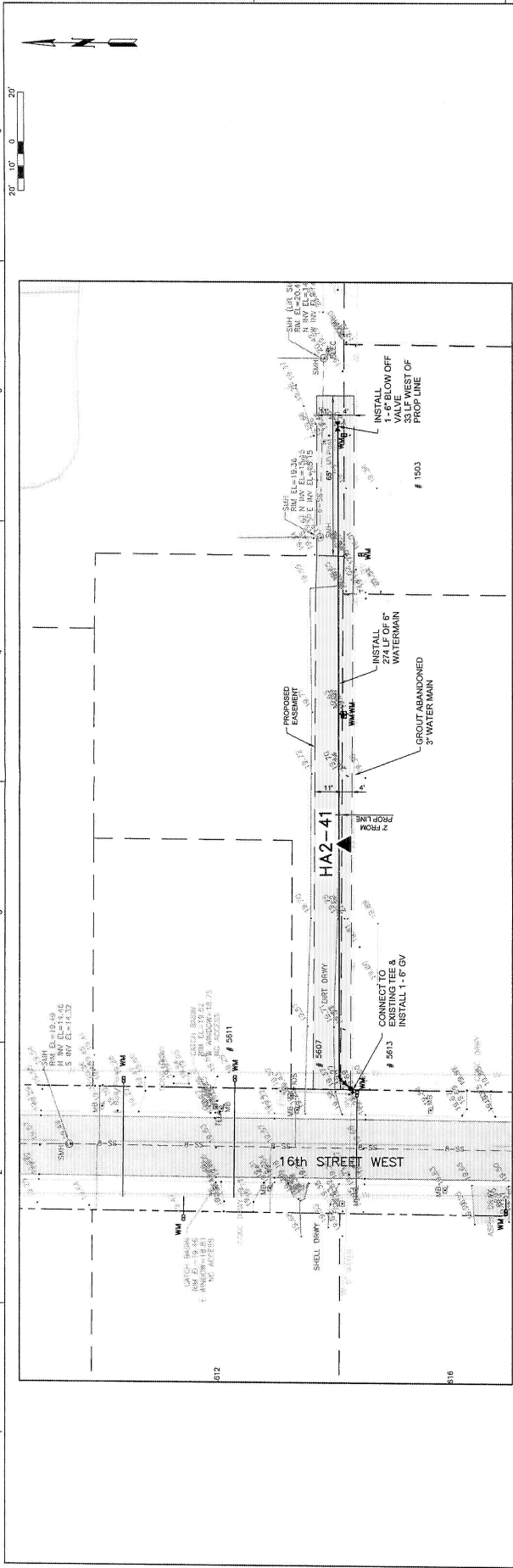
PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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PROJECT	MANATEE COUNTY SUBURBAN SYSTEM	WATER LINE REPLACEMENT PROJECT	MANATEE COUNTY, FLORIDA
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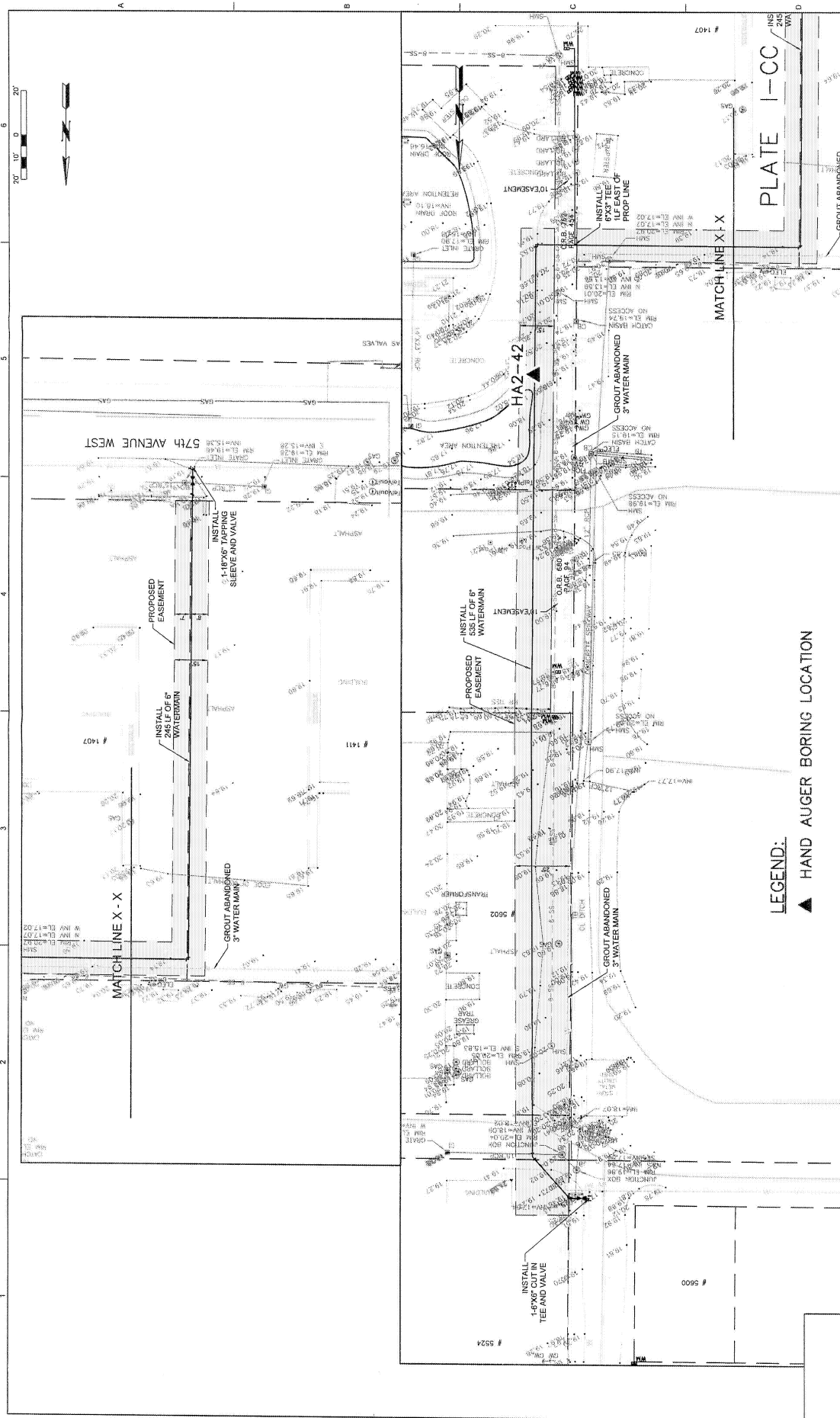




**LEGEND:**

- ▲ HAND AUGER BORING LOCATION

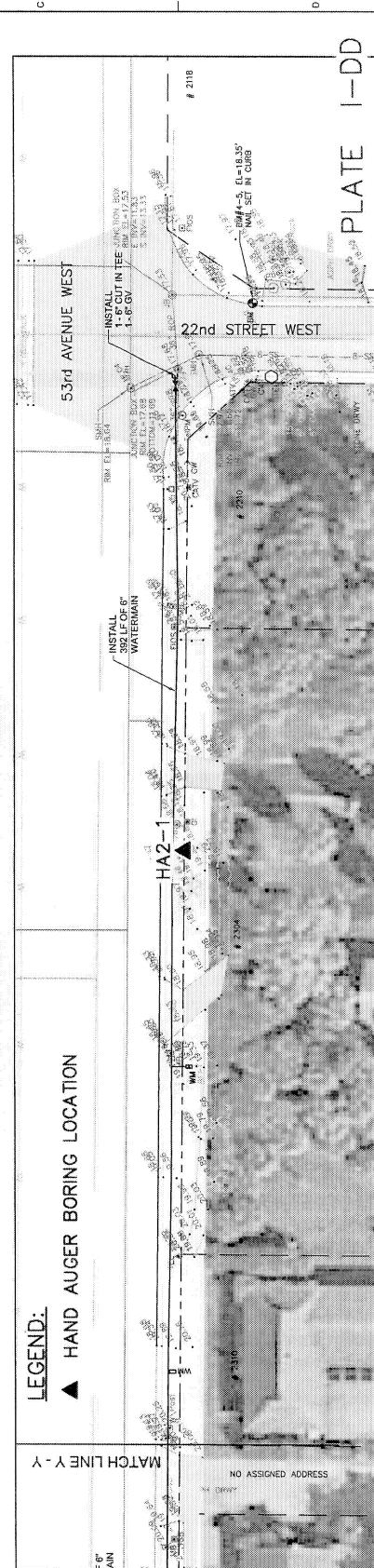
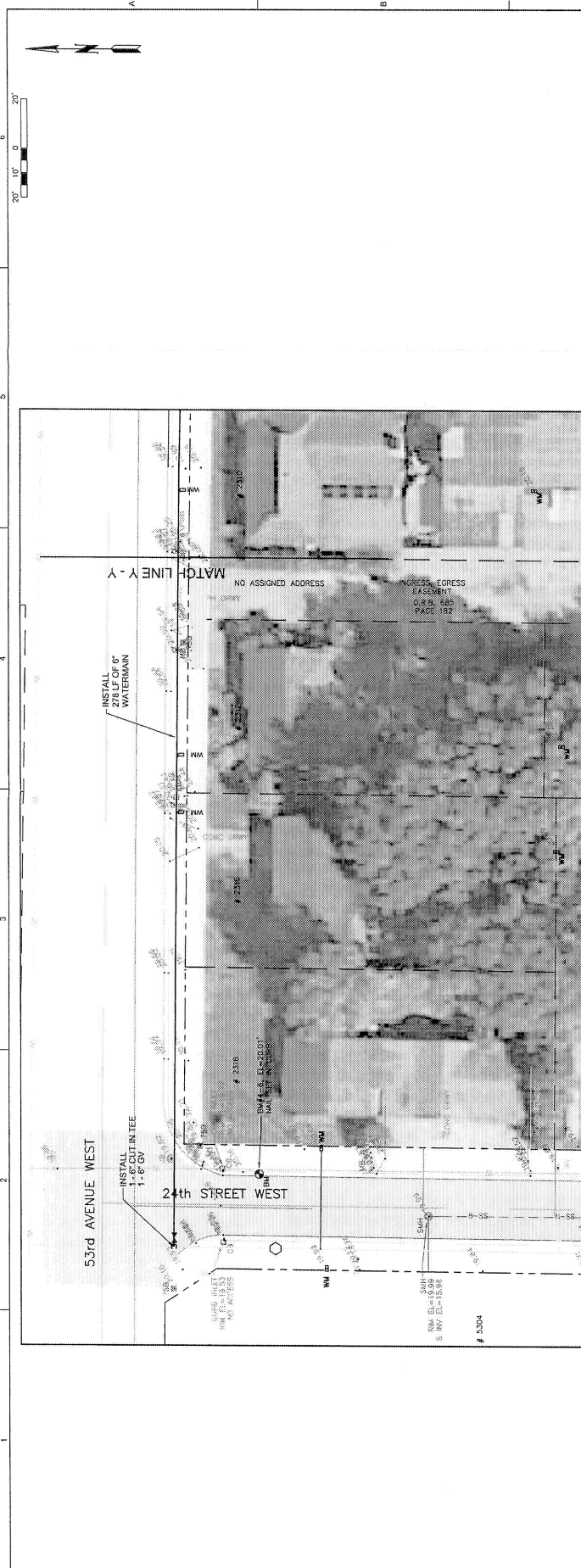
<div> <div> <div>DESIGN</div> <div> <div>RAK</div> <div>RAK</div> <div>RAK</div> <div>RAK</div> </div> </div> <div> <div>ROBERT A. CANABIELLA, P.E.</div> <div>FL P.E. No. 12367</div> </div> </div>				<div> <div>REVISION</div> <div>NO.</div> <div>DATE</div> </div>		<div> <div>VERIFY SCALE</div> <div> <div>BAR IS ONE INCH ON ORIGINAL DRAWING</div> <div>IF NOT ONE INCH ON SCALES ACCORDINGLY</div> </div> </div>		<div> <div>CH2MHILL</div> <div>4350 WEST CYPRUS STREET, SUITE 600</div> <div>TAMPA, FLORIDA 33607-4155</div> <div>LB 000234 AA C00055</div> </div>		<div> <div>MANATEE COUNTY</div> <div>SUBURBAN SYSTEM</div> <div>WATER LINE REPLACEMENT PROJECT</div> <div>MANATEE COUNTY, FLORIDA</div> <div>PROJECT No. 80747.70</div> </div>		<div> <div>PLAN SHEET WATER LINE</div> <div>16th ST W TO TRI-MOR TRAILER PARK</div> </div>		<div> <div>SHEET</div> <div>C29</div> </div>		<div> <div>DWG</div> <div>C29 DWG</div> </div>		<div> <div>DATE</div> <div>SEPTEMBER 2009</div> </div>		<div> <div>PROJ</div> <div>366879 WM</div> </div>		<div> <div>PLATE</div> <div>I-BB</div> </div>	
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**LEGEND:**  
 ▲ HAND AUGER BORING LOCATION

DESIGN										B/J/K						VERIFY SCALE		MANATEE COUNTY		SHEET		C-30	
DR										B/J/K						BAR IS ONE INCH ON DRAWING SCALE OF 1"		SUBURBAN SYSTEM		DWG		C30.DWG	
CHK										RAC						IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDANTLY.		WATER LINE REPLACEMENT PROJECT		DATE		SEPTEMBER 2009	
APPD										RAC		NO.		DATE		REVISION		BY		APPD		PROJ	
ROBERT A. CANNARELLA, P.E.																		4350 WEST CYPRESS STREET SUITE 600 TAMPA, FLORIDA 33607-4155 LB 0002394    AA C000556		MANATEE COUNTY, FLORIDA		386679.WM	
FILE P.E. No. 12357																		PROJECT No. 80747.70					





DSGN	BJK																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															</
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**Attachment B**

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Rick Scott  
Governor

H. Frank Farmer, Jr., M.D., Ph.D.  
State Surgeon General

July 28, 2011

Permit #: 0133068-971 DSGP

Mr. Sia Mollanazar, Deputy Director  
Manatee County Public Works Department  
1022 26<sup>th</sup> Avenue East  
Bradenton, Florida 34208

WATER SYSTEM: Manatee County  
PROJECT NAME: Suburban System Water Line  
Replacement Phase 2 – Project No. 60747.70  
EXPIRES: July 22, 2016

Dear Mr. Mollanazar:

Our office received the Notice of Intent to Use a General Permit for construction of the referenced water distribution system on **July 22, 2011**.

Please be advised that the activity must conform to the description contained in your Notice of Intent to Use a General Permit and that any deviation may subject the system to enforcement action.

Upon completion of the project, please provide us with the following:

- (1) A "Request for Letter of Release to Place Water Supply System into Service" DEP Form 62-555.900(9).
- (2) Copies of satisfactory bacteriological test results taken on two consecutive days at points indicated on approved plans. **Sample locations are at end of line connections (24), end of line blowoff (1 at C31 sheet), the 6" conflict piping on C1 sheet, cut in on C29 sheet and any internal phase lines.**
- (3) Pressure test results of the water system.

Following the receipt of this information we may then issue a clearance letter releasing the facilities for public use. This project may not be placed into service until a letter of clearance has been issued.

---

**Manatee County Health Department**

Environmental Health Services

410 Sixth Avenue East • Bradenton 34208-1928

PHONE (941) 748-0747 • FAX (941) 750-9364 • <http://www.floridashealth.com>

**Suburban System Water Line Replacement Phase 2**

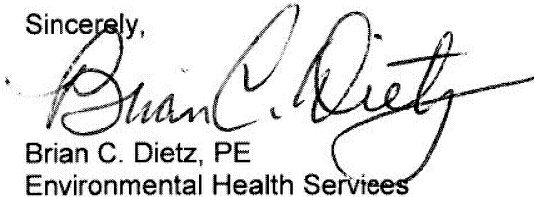
July 28, 2011

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This General Permit does not relieve the permittee of the responsibility for obtaining a Dredge and Fill Permit where it is required.

If you have any questions, please call Harry Messick at (941)748-0747, ext. 1355.

Sincerely,

A handwritten signature in black ink, appearing to read "Brian C. Dietz". The signature is fluid and cursive, with the first name "Brian" being more prominent than the last name "Dietz".

Brian C. Dietz, PE  
Environmental Health Services

BCD

cc: Wayne Troxler, P.E./MCPWD  
Andy Fischer/MCPWD  
David Schofield/MCUO  
Robert A. Cannarella, P.E / CH2M Hill  
File