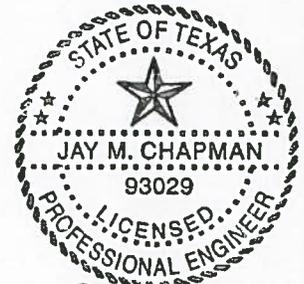


Document 00910

ADDENDUM NO. 1

Date of Addendum: 2/1/16



Jay M Chapman
29 JAN 2016

PROJECT NAME: New / Replacement of Water Well – Forest Cove III

PROJECT NO: WBS No. S-000100-0016-4

BID DATE: February 4, 2016 (There is no change to the Bid Date.)

FROM: J. Timothy Lincoln, P.E., City Engineer
City of Houston, Department of Public Works and Engineering
611 Walker Street, 15th Floor
Houston, Texas 77002
Attn: Na Yao, P.E., Project Manager

TO: Prospective Bidders

This Addendum forms a part of the Bidding Documents and will be incorporated into the Contract documents, as applicable. Insofar as the original Project Manual and Drawings are inconsistent, this Addendum governs.

This Addendum uses the change page method: remove and replace or add pages, or Drawing sheets, as directed in the change instructions below. Change bars (|) are provided in the outside margins of pages from the Project Manual to indicate where changes have been made; no change bars are provided in added Sections. Reissued Drawing Sheets show the Addendum number below the title block and changes in the Drawing are noted by a revision mark and enclosed in a revision cloud.

CHANGES TO PROJECT MANUAL

INTRODUCTORY INFORMATION

1. Document 00010 – Table of Contents. Replace Document in its entirety.
2. Document 00015 – List of Drawings. Replace Document in its entirety.

BIDDING REQUIREMENTS

3. Document 00410B – Bid Form – Part B. Replace Document in its entirety.

SPECIFICATIONS

4. Section 01110 – Summary of Work. Replace Section in its entirety.
5. Section 01562 – Tree and Plant Protection. Insert Section.
6. Section 02529 – Water Wells. Replace pages 02529-1, 02529-7, and 02529-15.
7. Section 15162 – Lineshaft Deep Well Pumps. Replace page 15162-1.

CHANGES TO DRAWINGS

8. Replace Sheet 2, Notes and Legend, with revised Sheet 2.
9. Replace Sheet 6, Surface Drainage and Grading, with revised Sheet 6.
10. Replace Sheet 7, Well Design and Discharge Manifold, with revised Sheet 7.
11. Replace Sheet 12, Storm Sewer Plan and Profile, with revised Sheet 12.
12. Replace Sheet 13, Stormwater Pollution Prevention Plan, with revised Sheet 13.
13. Replace Sheet 15, Project Sign, with revised Sheet 15.
14. Add Sheet 27, Traffic Control Plan Sheet 1.
15. Add Sheet 28, Traffic Control Plan Sheet 2.
16. Add Sheet 29, Traffic Control Plan Sheet 3.
17. Add Sheet 30, Traffic Control Plan Sheet 4.
18. Add Sheet 31, Traffic Control Plan Sheet 5.
19. Add Sheet 32, Traffic Control Plan Sheet 6.
20. Add Sheet 33, Miscellaneous Details Sheet 3.

CLARIFICATIONS

21. Question: What should be done about the tree listed as a 36-inch oak at the end of the proposed storm sewer line, by inlet 21?
- Answer: The storm sewer line's route from the water well site has been revised to protect the tree. The new route includes borings under Laurel Springs Lane.
22. Question: In Section 02529, why is the back pressure valve assembly size listed as 12-inch? The largest available size is 8-inch.
- Answer: Page 7 of Section 02529 has been revised to show an 8-inch size.
23. Question: Please confirm the well screen wire wrapping shall be 316L (rather than the standard 304) stainless steel.
- Answer: The stainless steel shall be the standard 304. Section 02529 is revised.
24. Question: Please confirm the well motor enclosure required: is it TEFC?
- Answer: The well motor enclosure to be provided as specified in Section 15170 – Low Voltage Motors is TEFC.
25. Question: Plan Sheet No. 7 and Bid Item No. 21 call for 253 feet of 14-inch diameter steel blank production casing. The Well Dimensions Schedule in Spec. Section 02529 calls for 173 feet of blank production casing. Bid Item No. 21 should reference 173 feet of blank production casing and 182 feet of screen. Will you correct Bid Item No. 21?
- Answer: The blank production length of 173 feet listed in Section 02529 is correct. Plan Sheet No. 7 and Bid Item No. 21 are revised.
26. Question: Bid Item No. 2.1. includes a sound barrier. Can you provide any information regarding this sound barrier? For example, is this a temporary sound barrier or something permanent? Are there any dimensions required (height, length, etc.)? Are there any required structural materials or engineering designs? Are there any noise reduction requirements?
- Answer: The sound barrier shall be a temporary plywood sound barrier 16 feet high, 237 feet long extending along the northern and eastern portion of the expansion area. There are no specific structural materials or engineering designs, and no specific noise reduction requirements except for complying with the City's noise ordinance.
27. Question: Where are we supposed to discharge the water when we develop and

test pump the well?

Answer: It is the contractor's decision as to where to discharge the water during well development and testing, and it is the contractor's responsibility to not flood residences, the water plant site or neighboring properties. The contractor may decide to install the storm sewer system before developing the well.

28. Question: Are we allowed to remove any trees and/or branches at the Laurel Springs Lane entrance and the water plant access road in order to get the drilling rig on and off the site?

Answer: Contractor shall endeavor to avoid damaging or killing any trees along the entrance or access road. Branches on trees within City of Houston property and within the water plant may be trimmed if necessary as approved by City's Project Manager. Tree pruning and any tree removal may require a Tree Protection Plan. See revised Section 01110 - Summary of Work and new Section 01562 - Tree and Plant Protection for more information.

29. Question: Forest Cove 3 communicates with the HMI at Kingwood Central WWTP. Is the HMI and Dialout messaging software to be updated, tested, documented and demonstrated?

Answer: All SCADA software is to be updated, tested, demonstrated, documented by the contractor and approved by the COH. The contractor shall make modifications to the HMI to indicate that Forest Cove III Well 3 is now Well 5. Data going to the historian and/or reports will be directed to a new column for Well 5 (so as not to confuse Well 3 historical data with Well 5's new data).

30. Question: On site there is a panel mounted CTC HMI. It is probably over 10 years old and may or may not be fully functional. Is updating the CTC HMI application part of the scope of this project?

Answer: Updating the CTC panel is not part of the scope of this project.

31. Question: Does the COH SCADA group have the existing application and CTC development tool and will it be made available for use on this project?

Answer: It is the understanding of the COH SCADA group that they do not have the items mentioned, and these items should be unnecessary if no changes are made at Forest Cove III.

32. Question: The existing surge protector is shown to be relocated to the outdoor electrical service switchrack. Since it is not in a weatherproof enclosure, what type of weatherproof enclosure is required, NEMA 3R or NEMA 4X stainless steel?

Answer: Section 16012 – Electrical Work calls for a NEMA 4x S.S. enclosure.

33. Question: The existing feeder wiring from the existing ATS to the existing MCC-1 is parallel 600 KcMil cables. Since the existing Water Well No. 3 is plugged and abandoned, there is a much smaller load on the existing MCC. The ATS is quite full of cable, and I see no way to add additional lugs to feed the new MCC. If we were to remove one set of the existing 600 KcMil cables to MCC-1, we could use those lugs to feed the new MCC. Would this be acceptable?

Answer: Existing conditions will allow for the work as shown on plans. Contractor should bid the project as shown.

34. Question: Since the bidders have never actually witnessed this Water Plant in operation, they have no idea what works and what doesn't work. Is it the responsibility of the (Electrical) Contractor under this contract to ensure a completely operational Water Plant? It appears that the extent of this contract, according to the plans and specifications, is to provide a functioning Water Well. There appears to be nothing in the contract documents requiring the contractor to verify, and/or make operational, the booster pumps, hydropneumatic tank, ground storage tank, generator, lighting, etc. Can you please verify that the contractor's obligation is a working water well?

Answer: The contractor's obligation is the working water well.

END OF ADDENDUM NO. 1

DATED:


Ravi Kaleyatodi, P.E., CPM
Senior Assistant Director
Department of Public Works and
Engineering

AEI Engineering, LLC
TBPE Firm Registration No. F-1697

END OF DOCUMENT

Document 00010

TABLE OF CONTENTS

NOTE: Bold capitalized Specification Sections are included in the City of Houston Department of Public Works and Engineering Standard Construction Specifications for Wastewater Collection Systems, Water Lines, Storm Drainage, Street Paving, and Traffic located here: <http://edocs.publicworks.houstontx.gov/engineering-and-construction/specifications.html>; and are incorporated in Project Manuals by reference as if copied verbatim. Documents listed "for filing" are to be provided by Bidder and are not included in this Project Manual unless indicated for example only. The Document numbers and titles hold places for actual documents to be submitted by Contractor during Bid, post-bid, or construction phase of the Project. Specification Sections marked with an asterisk (*) are amended by a supplemental specification, printed on blue paper and placed in front of the Specification it amends. Documents in the 200, 300 and 400 series of Division 00, except for Document 00410B – Bid Form, Part B, are not part of the Contract.

<u>Doc. No.</u>	<u>DocumentTitle</u>	<u>Doc. Date</u>
------------------------	-----------------------------	-------------------------

INTRODUCTORY INFORMATION

00010	Table of Contents.....	12-30-2015
00015	List of Drawings.....	05-14-2015

BIDDING REQUIREMENTS

INSTRUCTIONS TO BIDDERS

00200	Instructions to Bidders.....	08-01-2015
00210	Supplementary Instructions to Bidders.....	08-01-2015
00220	Request for Bid Information.....	06-11-2004

INFORMATION AVAILABLE TO BIDDERS

00320	Geotechnical Information	09-02-2005
00340	Environmental Information	09-14-2005

BID FORMS AND SUPPLEMENTS

00410	Bid Form, Parts A & B	10-21-2015
00430	Bidder's Bond (For filing; Example Form)	02-01-2004
00450	Bidder's Statement of MWBE/PDBE/DBE/SBE Status.....	07-01-2013
00452	Contractor Submission List - Fair Campaign Ordinance	04-30-2004
00453	Bidder's Statement of Residency	02-01-2004
00454	Affidavit of Non-interest.....	02-01-2004
00455	Affidavit of Ownership or Control.....	09-04-2007
00457	Conflict of Interest Questionnaire.....	02-28-2006
00460	(POP-1) Pay or Play Acknowledgement Form	07-03-2012
00470	Bidder's MWSBE Participation Plan.....	08-01-2015
00471	Pre-bid Good Faith Efforts.....	08-01-2015

Doc. No.	Document Title	Doc. Date
00472	Bidder's Goal Deviation Request	08-01-2015
POST-BID PROCEDURES		
00495	Post-bid Procedures.....	08-01-2013

CONTRACTING REQUIREMENTS

AGREEMENT

00501	Resolution of Contractor.....	02-01-2010
00520	Agreement.....	08-01-2013
00570	Contractor's Revised MWSBE Participation Plan.....	08-01-2013
00571	Record of Post-Award Good Faith Efforts	08-01-2013
00572	Contractor's Request for Plan Deviation	08-01-2013

BONDS AND CERTIFICATES

00600	List of Proposed Subcontractors and Suppliers	07-01-2013
00601	Drug Policy Compliance Agreement	02-01-2004
00602	Contractor's Drug Free Workplace Policy (For filing)	
00604	History of OSHA Actions and List of On-the-job Injuries	02-01-2004
00605	List of Safety Impact Positions	02-01-2004
00606	Contractor's Certification of No Safety Impact Positions	02-01-2004
00610	Performance Bond	05-17-2005
00611	Statutory Payment Bond	05-17-2005
00612	One-year Maintenance Bond	05-17-2005
00620	Affidavit of Insurance (with attached Certificates of Insurance).....	02-01-2004
00622	Name and Qualifications of Proposed Superintendent (For filing)	
00624	Affidavit of Compliance with Affirmative Action Program.....	02-01-2004
00630	(POP-2) Certification of Compliance with Pay or Play Program.....	07-03-2012
00631	(POP-3) City of Houston Pay or Play Program – List of Subcontractors	07-03-2012
00642	Monthly Subcontractor Payment Reporting Form	02-01-2010
00646	Payment Notification Explanation of Withholding	02-01-2010

GENERAL CONDITIONS

00700	General Conditions	08-15-2015
-------	--------------------------	------------

SUPPLEMENTARY CONDITIONS

00800	Supplementary Conditions	08-15-2015
00805	Equal Employment Opportunity Program Requirements.....	05-01-2012
00808	Requirements for the City of Houston Program for Minority, Women, and Small Business Enterprises (MWSBE), and	

<u>Doc. No.</u>	<u>DocumentTitle</u>	<u>Doc. Date</u>
	Persons with Disabilities Business Enterprises (PDBE) Program ..	08-01-2013
00820	Wage Scale for Engineering Construction	02-01-2014
00840	Pay or Play Program Requirements.....	07-03-2012

ADDENDA AND MODIFICATIONS

00931	Request for Information.....	02-01-2004
-------	------------------------------	------------

SPECIFICATIONS

DIVISION 1 - GENERAL REQUIREMENTS

01110	Summary of Work	11-11-2015
01145	Use of Premises.....	01-01-2011
01255	Change Order Procedures	08-01-2003
<i>01270S</i>	<i>Measurement and Payment</i>	<i>09-28-2015</i>
*01270	Measurement and Payment	08-01-2003
01292	Schedule of Values	08-01-2003
01312	Coordination and Meetings	08-01-2003
01321	Construction Photographs.....	08-01-2003
01326	Construction Schedule (Bar Chart)	08-01-2003
01330	Submittal Procedures.....	08-01-2003
01340	Shop Drawings, Product Data, and Samples	08-01-2003
01351	Environmental Safety and Worker Protection.....	01-01-2011
01410	TPDES Requirements (with Attachments)	02-01-2011
01422	Reference Standards	08-01-2003
01450	Contractor's Quality Control	08-01-2003
01452	Inspection Services	08-01-2003
01454	Testing Laboratory Services.....	08-01-2003
<i>01502S</i>	<i>Mobilization</i>	<i>08-25-2015</i>
*01502	Mobilization	08-01-2008
01504	Temporary Facilities and Controls.....	01-01-2011
01520	Temporary Field Office.....	02-08-2012
01555	Traffic Control and Regulation.....	01-01-2011
01562	Tree and Plant Protection.....	01-01-2011
01570	Storm Water Pollution Control.....	01-26-2012
01575	Stabilized Construction Access	02-01-2011
01576	Waste Material Disposal.....	08-01-2003
01578	Control of Ground and Surface Water	01-01-2011
01580	Project Identification Signs	08-01-2003
01610	Basic Product Requirements.....	01-01-2011
01630	Product Substitution Procedures.....	08-01-2003
01725	Field Surveying	01-01-2011

Doc. No.	<u>DocumentTitle</u>	<u>Doc. Date</u>
01731	Cutting and Patching	01-01-2011
01732	Procedure for Water Valve Assistance (with Attachments)	08-01-2003
01740	Site Restoration.....	08-01-2003
01755	Starting Systems	08-01-2003
01770	Closeout Procedures.....	08-01-2003
01782S	<i>Operations and Maintenance Data.....</i>	<i>08-25-2015</i>
*01782	Operations and Maintenance Data.....	08-01-2003
01785S	<i>Project Record Documents</i>	<i>08-25-2015</i>
*01785	Project Record Documents	08-01-2003
DIVISION 2 - SITE WORK		
02081	CAST-IN-PLACE CONCRETE MANHOLES.....	01-01-2011
02084	FRAMES, GRATES, RINGS AND COVERS	12-01-2014
02085	VALVE BOXES, METER BOXES AND METER VAULTS	01-01-2011
02087	BRICK MANHOLE FOR STORM SEWERS.....	10-01-2002
02136	WASTE MATERIAL HANDLING, TESTING AND DISPOSAL	01-01-2011
02221S	<i>Removing Existing Pavement and Structures</i>	<i>10-24-2012</i>
*02221	Removing Existing Pavements and Structures	07-01-2009
02233	CLEARING AND GRUBBING	01-01-2011
02260	TRENCH SAFETY SYSTEM	02-01-2011
02316	EXCAVATION AND BACKFILL FOR STRUCTURES	01-01-2011
02317	EXCAVATION AND BACKFILL FOR UTILITIES.....	01-01-2011
02319	BORROW	01-01-2011
02320	UTILITY BACKFILL MATERIALS.....	01-01-2011
02321	CEMENT STABILIZED SAND.....	01-01-2011
02448	PIPE AND CASING AUGERING FOR SEWERS	10-01-2002
02501	DUCTILE IRON PIPE AND FITTINGS	02-01-2011
02502	STEEL PIPE AND FITTINGS	01-01-2011
02506	POLYVINYL CHLORIDE PIPE.....	01-01-2011
02511S	<i>Water Lines.....</i>	<i>10-21-2013</i>
*02511	Water Lines.....	01-01-2011
02514	DISINFECTION OF WATER LINES	01-01-2011
02515	HYDROSTATIC TESTING OF PIPELINES	01-01-2011
02521	GATE VALVES.....	01-01-2011
02524	AIR RELEASE AND VACUUM RELIEF VALVES.....	01-01-2011
02528	POLYETHYLENE WRAP	01-01-2011
02529	Water Wells.....	10-16-2015
02536	Discharge Piping and Appurtenances	11-11-2015
02611	REINFORCED CONCRETE PIPE	12-01-2014
02621	GEOTEXTILE	10-01-2002
02631	STORM SEWERS.....	12-01-2014

<u>Doc. No.</u>	<u>DocumentTitle</u>	<u>Doc. Date</u>
02632	CAST-IN-PLACE INLETS, HEADWALLS AND WINGWALLS.....	10-01-2002
02662	PIPING, VALVES, FITTINGS AND ACCESSORIES FOR WATER STORAGE TANKS	01-01-2011
02741	ASPHALTIC CONCRETE PAVEMENT.....	07-01-2009
02751	CONCRETE PAVING	07-01-2009
02730	Porous Flexible Paving	05-22-2015
02821	Chain Link Fences and Gates	08-27-2015
02911S	Topsoil.....	08-25-2015
*02911	Topsoil.....	10-01-2002
02921	HYDRO MULCH SEEDING	01-01-2011
02922	SODDING	07-01-2009
 DIVISION 3 - CONCRETE		
03315	CONCRETE FOR UTILITY CONSTRUCTION	10-01-2002
 DIVISION 4 - MORTAR		
04061	MORTAR	10-01-2002
04210	BRICK MASONRY FOR UTILITY CONSTRUCTION.....	10-01-2002
 DIVISION 9 - FINISHES		
09971	Painting and Protective Coatings for Potable Water Storage Tanks	01-01-2011
 DIVISION 13 – SPECIAL CONSTRUCTION		
13203	Tank Clean-Up and Disinfection.....	01-01-2011
 DIVISION 15 – MECHANICAL		
15162	Lineshaft Deep Well Pumps	10-21-2015
15170	Low Voltage Motors	04-14-2015
 DIVISION 16 – ELECTRICAL		
16012	Electrical Work	08-27-2015
16060	Electrical Demolition.....	08-27-2015
16111	Conduit, Fittings and Bodies	08-27-2015
16120	600-Volt Control Cable	08-27-2015
16126	Instrumentation Cable	08-27-2015
16131	Device, Pull and Junction Boxes	08-27-2015
16160	Cabinets and Enclosures	08-27-2015
16161	Panelboards	08-27-2015
16170	Grounding and Bonding	08-27-2015
16195	Electrical Identification	08-27-2015

<u>Doc. No.</u>	<u>DocumentTitle</u>	<u>Doc. Date</u>
16290	Low Voltage Surge Protection Device	08-27-2015
16402	Underground Duct Banks	08-27-2015
16410	Low Voltage Power Factor Correction Capacitors.....	08-27-2015
16461	Dry-Type Transformers	08-27-2015
16476	Disconnects and Circuit Breakers	08-27-2015
16480	Motor Control Center.....	08-27-2015
16484	Electronic Soft-Start Controllers	08-27-2015
16662	Motor Management Relay	08-27-2015
16936	Pilot and Miscellaneous Control Devices	08-27-2015
16990	Facilities for CenterPoint Energy's Use	08-27-2015

END OF DOCUMENT

Document 00015

LIST OF DRAWINGS

Sheet No.	Drawing Title
1.	Cover Sheet
2.	Notes and Legend
3.	Survey Control Map
4.	Existing Yard Layout
5.	Proposed Yard Layout
6.	Surface Drainage & Grading
7.	Well Design & Discharge Manifold
8.	Well Discharge Manifold Details
9.	Ground Storage Tank Connection
10.	Miscellaneous Details Sheet 1
11.	Miscellaneous Details Sheet 2
12.	Storm Sewer Plan & Profile
13.	Project Sign
14.	Stormwater Pollution Prevention Plan
15.	Stormwater Pollution Prevention Plan Details
16.	Structural Well Foundation Plan and Sections
17.	Electrical Legends
18.	Electrical Abbreviations and Notes
19.	Electrical Site Plan
20.	Electrical Enlarged Site Plan
21.	Electrical One-Line Diagram
22.	Electrical Control Diagrams Sheet 1
23.	Electrical Control Diagrams Sheet 2
24.	Electrical Details
25.	Electrical Well Details
26.	Electrical Schedules
27.	Traffic Control Plan Sheet 1
28.	Traffic Control Plan Sheet 2
29.	Traffic Control Plan Sheet 3
30.	Traffic Control Plan Sheet 4
31.	Traffic Control Plan Sheet 4
32.	Traffic Control Plan Sheet 4
33.	Miscellaneous Details Sheet 3

END OF DOCUMENT

Document 00410B

BID FORM – PART B

1.0 TOTAL BID PRICE HAS BEEN CALCULATED BY BIDDER, USING THE FOLLOWING COMPONENT PRICES AND PROCESS (PRINT OR TYPE NUMERICAL AMOUNTS):

A. STIPULATED PRICE: \$ [N/A]

(Total Bid Price; minus Base Unit Prices, Extra Unit Prices, Cash Allowances and All Alternates, if any)

B. BASE UNIT PRICE TABLE:

Item No.	Spec Ref.	Base Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in Figures
1.	01502	Mobilization	LS	1	\$ 60,000.00 ¹	\$ 60,000.00 ¹
2.	01110	Drill, construct, test and equip Forest Cove Water Well No. 5, including: a) Pilot hole drilled and sampled. b) Reaming of pilot hole and conductor casing set and cemented in place. c) Underreaming the pilot hole below the conductor casing. d) Production casing set in place. e) Graveling, sterilizing and developing the well. f) Furnishing the test pump. g) Concrete foundation for permanent pump. h) Permanent pump, with electric motor. i) A 1/4-inch, PVC-coated, stainless steel air-line tubing, water-level monitor assembly and 1-1/4-inch Schedule 80 PVC solution tubing. j) Discharge piping manifold and pipe supports, complete. k) Chlorine line. l) Well yard clearing and grubbing, grading, fencing, sound barrier, sidewalks, surfacing, topsoil, seeding and sodding.	LS	1		
3.	01110	8-inch DIP	LF	85		

Item No.	Spec Ref.	Base Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in Figures
4.	01110	8-inch steel pipe connection to ground storage tank	LS	1		
5.	01110	All electrical work	LS	1		
6.	01110	Multilin programming	LS	1		
7.	01110	Controller programming	LS	1		
8.	02260	Trench Safety System	LF	90		
9.	01110	Concrete splash-pad inlet and storm sewer system	LS	1		
10.	01110	Permeable gravel paving	SY	230		
11.	01110	Permeable gravel sidewalk	SY	15		
12.	01570	Reinforced Filter Fabric Barrier	LF	420		
13.	01570	Inlet Protection Barrier	LF	25		
14.	01555	Traffic Control and Regulation	LS	1		
					\$3,000.00 ³	\$3,000.00 ³
15.	01555	Flagmen	LS	1		
					\$2,000.00 ³	\$2,000.00 ³
<u>TOTAL BASE UNIT PRICES</u>						\$ _____

REST OF PAGE INTENTIONALLY LEFT BLANK

C. EXTRA UNIT PRICE TABLE:

Item No.	Spec Ref.	Extra Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in Figures
16.	02529	Spectralog, if required by the City, in a pilot hole after making and reviewing Gamma Ray Log, all complete.	EA	1		
17.	02529	Furnish and install 30-sack cement plug, if required, in a pilot hole below the selected completion depth of the well, complete.	EA	1		
18.	02529	Extra sacks of cement more than the base amount of 30 sacks in a cement plug below the selected completion depth of the well included in Item 17 above.	SK	20		
19.	02529	Complete water-sampling operation in a pilot hole from which the City requires water samples to be taken with a base development and pumping time of 36 hours, water samples and associated static water-level measurements, all complete.	EA	2		
20.	02529	Pilot hole, as required, other than the 1,150-foot base depth for Forest Cove Water Well No. 5. See Footnote (2)	LF	100		
21.	02529	Abandonment, if required, of pilot hole included in Item 2.	EA	1	\$ 105,000.00 ¹	(leave blank)
22.	02529	20-inch diameter surface casing, as required, cemented in place other than the 710-foot base depth for the well in Item 2. See Footnote (2)	LF	10		
23.	02529	14-inch diameter steel blank production casing, as required, in place other than the 173-foot base length for the well in Item 2. See Footnote (2)	LF	10		
24.	02529	14-inch diameter stainless steel screen wrapped on steel pipe, as required in place other than the 182-foot base length for the well in Item 2. See Footnote (2)	LF	15		

Item No.	Spec Ref.	Extra Unit Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total in Figures
25.	15162	20-foot length of pump column assembly, air line, and 1 1/4-inch Schedule 80 PVC tubes in place complete, if required, other than the 460-foot base length in Item 2. See Footnote (2)	EA	4		
26.	15162	Intermediate stage of bowl assembly added to a pump, as quoted in Item 2, if required, and as shown in the pump data submittals for conditions.	EA	2		
27.	02529	One-hour of pumping or water-level recovery time, if required, other than 36 hours for a complete water sampling operation given in Item 19. See Footnote (2)	HR	20		
28.	02529	One-hour of pumping test time, if required, other than 96 hours given for each well in Item 2. See Footnote (2)	HR	10		
29.	01575	Stabilized Construction Access	SY	275		
30.	01110, 01562	Tree Protection, including any required permit	LS	1		
<u>TOTAL EXTRA UNIT PRICES</u>						\$ _____

REST OF PAGE INTENTIONALLY LEFT BLANK

D. CASH ALLOWANCE TABLE:

Item No.	Spec Ref.	Cash Allowance Short Title	Cash Allowance in Figures ⁽¹⁾
1.	01110	City of Houston Building Permit	\$ 30,000.00
<u>TOTAL CASH ALLOWANCES</u>			\$ <u>30,000.00</u>

E. ALTERNATES TABLE:

Item No.	Spec Ref.	Alternate Short Title	Unit of Measure	Estimated Quantity	Unit Price (this column controls)	Total Price for Alternate in figures
1.		N/A				
<u>TOTAL ALTERNATES</u>						\$ <u>N/A</u>

REST OF PAGE INTENTIONALLY LEFT BLANK

F. TOTAL BID PRICE: _____ \$ _____
(Add Totals for Items A., B., C., D., and E. above)

2.0 SIGNATURES: By signing this Document, I agree that I have received and reviewed all Addenda and considered all costs associated with the Addenda in calculating the Total Bid Price.

Bidder: _____
(Print or type full name of your proprietorship, partnership, corporation, or joint venture.*)

** By: _____
Signature Date

Name: _____
(Print or type name) Title

Address: _____
(Mailing)

(Street, if different)

Telephone and Fax Number: _____
(Print or type numbers)

* If Bid is a joint venture, add additional Bid Form signature sheets for each member of the joint venture.

** Bidder certifies that the only person or parties interested in this offer as principals are those named above. Bidder has not directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding.

Note: This document constitutes a government record, as defined by § 37.01 of the Texas Penal Code. Submission of a false government record is punishable as provided in § 37.10 of the Texas Penal Code.

Footnotes for Tables B through E:

- (1) Fixed Unit Price determined prior to Bid. Cannot be adjusted by the Bidder.
- (2) The same unit price applies if there is a unit quantity deduction.
- (3) Minimum Bid Price determined prior to Bid. Can be increased by the Bidder by crossing out the Minimum and noting revised price on the line above.

Section 01110

SUMMARY OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Summary of the Work including work by City, City furnished products, Work sequence, future Work, Contractor use of Premises, and City occupancy.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of the contract is for the drilling, construction, testing and equipping of Forest Cove Water Well No. 5 and related facilities in the City of Houston Forest Cove Well Field.

- B. Work includes:

1. Mobilization for Forest Cove Water Well No. 5 as described in Section 01502.
2. Drill, construct, test and equip Forest Cove Water Well No. 5 of the Forest Cove Well Field, including:
 - a) Pilot hole drilled to a base depth of 1,150 feet with driller's log, circulated drill cutting samples, mechanical drift indicator survey, and geophysical logs, all as described in Section 02529.
 - b) Reaming of pilot hole to a base depth of 715 feet, continuous alignment survey of uncased reamed hole, setting 20-inch surface casing to a base depth of 710 feet, sizing and alignment survey of surface casing in place, and cementing of surface casing, all as described in Section 02529 and shown on Drawings.
 - c) Underreaming the pilot hole below the surface casing to a diameter of at least 26 inches to a depth of 985 feet, and making a section gauge log of the underreamed hole, all as described in Section 02529 and shown on Drawings.
 - d) Production casing set in place with a base total length of 355 feet, 173 linear feet of 14-inch steel blank pipe and 182 linear feet of 14-inch stainless steel screen wrapped on stainless steel pipe, to a base depth of 985 feet, all as described in Section 02529 and shown on Drawings.

- e) Graveling, sterilizing and developing the well, all as described in Section 02529 and shown on Drawings.
 - f) Furnishing the test pump, motor and equipment, and testing the well, all as described in Section 02529.
 - g) Concrete foundation for permanent pump, complete and installed as described in Sections 02536, 03315 and 15162 and shown on Drawings.
 - h) Permanent pump and electric motor, discharge assembly, 460 feet of column pipe, bowl assembly and accessory equipment, all installed and tested and complete as described in Section 15162.
 - i) A 1/4-inch, PVC coated, stainless steel air-line tubing and a 1-1/4-inch Schedule 80 PVC solution tubing, all set in place to a base depth of 460 feet, all as described in Section 15162 and shown on Drawings.
 - j) Discharge piping manifold, complete, including valves, air and vacuum release, fittings, meters, blow-off, foundations, splash box, and auxiliary equipment, all installed and tested and complete as described in Sections 01570, 02316, 02320, 02521, 02536 and 03315 and as shown on Drawings.
 - k) Chlorine line from existing chemical room to welded steel fill line, all complete and installed as described in Section 02536 and shown on Drawings.
 - l) Well yard clearing and grubbing, grading, surfacing, fencing, sound barrier, seeding and sodding, removing designated existing fencing, all complete and installed as described in applicable provisions of Sections 01570, 02233, 02821, 02911, 02921, 02922 and 03315 and shown on Drawings.
3. 8-inch Ductile Iron Piping (DIP) between welded steel discharge piping and welded steel connection to ground storage tank, all installed, tested and complete as described in Sections 02316, 02320, 02501, 02511 and as shown on Drawings.
4. 8-inch welded steel pipe connection to ground storage tank, including valve and fittings, all installed, tested and complete as described in Sections 02316, 02320, 02502, 02511, 02521 and as shown on Drawings.

5. All electrical and related work for Forest Cove Well No. 5, including provide and install well solid-state reduced voltage starter, lighting and receptacles, pump motor feeders, instruments, and all required appurtenances and foundations, as described in Sections 03315 and Division 16 - Electrical Specifications and shown on Drawings.
6. Multilin programming. The Contractor is responsible for all programming of the proposed Multilin and for coordinating requirements with COH SCADA group and motor manufacturer.
7. Controller programming. The Contractor is responsible for all programming of the existing Siemens Simatic 505 and for coordinating sequence of operations and requirements with COH SCADA group.
8. Trench Safety System as described in Section 02260 and as shown on the Drawings.
9. Splash-pad inlet and storm sewer system, including storm sewer piping, subsurface drainage pipe, junction box, manholes, inlets, and connection to existing inlet, and culverts under new driveway, all complete and installed as described in applicable provisions of Sections 01570, 02084, 02087, 02316, 02317, 02320, 02448, 02506, 02536 and 03315 and shown on Drawings. Contractor shall coordinate with CenterPoint Energy to determine the depth of the existing gas line that the proposed storm sewer system will cross and shall coordinate any required relocation of the gas line with CenterPoint Energy.
10. Permeable gravel paving made with porous flexible paving, all complete and installed as described in applicable provisions of Sections 01570 and 02730 and shown on Drawings.
11. Permeable gravel sidewalk made with porous flexible paving, all complete and installed as described in applicable provisions of Sections 01570 and 02730 and shown on Drawings.
12. Reinforced filter fabric barrier, installed as described in Section 01570 and as shown on Drawings.
13. Inlet protection barrier, installed as described in Section 01570 and as shown on Drawings
14. Traffic Control and Regulation, provided as described in applicable provisions of Section 01555 and shown on Drawings.
15. Flagmen, provided as described in applicable provisions of Section 01555 and shown on Drawings.

C. Well requirements:

1. A pilot hole shall be drilled prior to continuing with drilling the well at the site. Section 02529 includes a provision for paying the Contractor a lump sum amount if the pilot hole should be abandoned.
2. Well No. 5 is to meet certain specific capacity requirements, pumping rate requirements and suspended solids production limits. These are described in Section 02529. Monetary penalty clauses for not meeting well specific capacity requirements and suspended solids production limits are given in Section 02529.

D. Tree Protection:

Tree Protection may be required in the project. Contractor shall adhere to City of Houston Tree Ordinance including latest amendments with regard to any trees that are to be removed. Contractor is responsible for preparing and submitting required documents and plans to obtain a tree removal permit prior to removing any protected tree. The permit can be obtained by contacting City of Houston, Department of Parks and Recreation representative Mr. Victor Cordova at 832-395-8454. Notify Mr. Cordova at least two (2) weeks in advance of clearing and cutting any tree. Contractor shall adhere to the requirements of Section 01562 - Tree and Plant Protection, Section 01740 - Site Restoration and any tree protection plan approved for the project.

1.03 CASH ALLOWANCES

- A. A cash allowance not to exceed \$30,000.00 shall be reimbursed to the Contractor for the City of Houston Building Permits at Well No. 5. The reimbursements shall be based on the actual costs of the permits.

1.04 CITY FURNISHED PRODUCTS

- A. Items furnished by City for installation and final connection by Contractor: SCADA system software.
- B. Contractor's Responsibilities:
 1. Arrange and pay for product delivery to site.
 2. Receive and unload products at site; inspect for completeness or damage.
 3. Handle, store, install, and finish products.
 4. Repair or replace damaged items.

1.05 WORK SEQUENCE

- A. Construct Work in phases during the construction period in accordance with the accepted construction schedule; coordinate construction schedule and operations with City. City reserves the right to change the sequence of work to meet project requirements at no penalty to City.
- B. Coordination of the Work: Refer to Section 01312 - Coordination and Meetings.

1.06 CONTRACTOR USE OF PREMISES

- A. Comply with procedures for access to the site and Contractor's use of rights-of-way as specified in Section 01145 - Use of Premises.
- B. Construction Operations: Limited to property, rights-of-way or easements provided by City and designated area shown on the plans.
- C. Utility Outages and Shutdown: Provide notification to City and private utility companies (if applicable) a minimum of 48 hours, excluding weekends and holidays, in advance of required utility shutdown. Coordinate all work as required.
- D. The Contractor is responsible for cleaning any drilling fluids or other materials sprayed or splashed onto the ground storage tank at Well 5 and repainting a portion of the tank, if needed.

1.07 WARRANTY

- A. Comply with warranty requirements in accordance with Document 00700 - General Conditions. Warranty all work, including equipment installed, for a minimum of 12 months following Substantial Completion.
- B. In addition to the above warranty, assign to City all warranty from equipment and materials issued by manufacturers or Subcontractors which extends beyond the month period specified above.

1.08 ALTERNATES

- A. No alternate bid items are specified or will be accepted for this project.

1.09 CITY OCCUPANCY

- A. City will occupy a portion of the Forest Cove Water Plant III for its operations.

1.10 GEOLOGIC, HYDROLOGIC AND DRILLING CONDITIONS

- A. Before submitting bid, make necessary geologic, hydrologic, drilling and construction condition studies insofar as they may affect bid for this Work. No plea of ignorance of conditions that exist or that may hereinafter exist or of conditions or difficulties that may be encountered in the execution of Work under this contract will be accepted as an excuse for failure or omission of the Contractor to fulfill in every detail all of the requirements of Contract, nor will such be accepted as a basis for any claim whatsoever for extra compensation or for an extension of time.

1.11 QUANTITIES AND MEASUREMENTS

- A. The depths and lengths and the pumping and testing times given herein are estimated and approximate. They are used for the purpose of obtaining lump sum and unit price bids covering these items, but are not necessarily the exact depths and lengths and pumping and testing times that will be required during actual drilling, construction and testing. Deviations from these depths, lengths and times are covered by the unit prices quoted in the Schedule of Extra Unit Prices in Document 00410 - Bid Form and apply as additions or deductions in depths, lengths and times.

1.12 INSPECTION

- A. City will appoint such representatives as City may deem proper to inspect the materials furnished and work done under this Contract to ensure that said materials are furnished and said Work is done in accordance with Specifications and other Contract Documents.

1.13 CONTRACTOR'S DUTY

- A. Provide personal attention to prosecution and completion of Work and be present continually at the site of the work either in person or by duly authorized representative fully authorized to act for him in his absence.
- B. The Contractor is responsible for obtaining Cyberkeys to access City of Houston groundwater facilities at no additional cost to the City of Houston. The Contractor shall contact BLTI at 832-698-8000 to make arrangements to purchase the number of Cyberkeys for each drilling rig crew, technicians, field superintendents, etc. Once the Cyberkeys have been obtained, the Contractor is responsible for contacting the City of Houston Security Management Section to request access to the well sites by providing the name of the person each key will be assigned, a list of sites where access is needed, each key's serial number and expected hours of operation. Once the keys have been programmed, it is the Contractor's responsibility to keep the keys updated as needed and at the Contractor's expense.

1.14 CONTRACTOR'S EXPERIENCE

- A. Contractor must have been regularly engaged in drilling and construction of water wells of this general size and yield for the past five years in the Texas Gulf Coast area and be thoroughly familiar with the construction and development of gravel-walled wells. During the past five years, he must have successfully and satisfactorily constructed and completed at least five wells substantially equivalent to the wells being bid in terms of depth, diameter, method of construction and development, yield, and equipping of wells. Provide to City names, locations and descriptions of five such wells as a part of bid submittal. Provide the City the names and Texas Drillers License Number of drillers who will work on the project as requested by the City after the Notice of Intent to Award has been issued. The Contractor must determine that he meets experience requirement before submitting a bid or that he has a working arrangement with a Subcontractor who does meet this experience.

1.15 CODE REQUIREMENTS AND PERMITS

- A. Perform work in accordance with applicable statutes, ordinances, codes and regulations of governmental authorities having jurisdiction. The Contractor shall be fully responsible and obligated to maintain procedures for safety of all work, personnel and equipment involved in the project. Contractor shall obtain any permits required for construction of the well and other facilities at his own expense. Well sites are located in proximity to residential areas and contractor is responsible for noise control.

1.16 PURPOSE

- A. This project is part of the City's program to upgrade and rehabilitate ground water production facilities. It will meet the area's water demand and ensure compliance with the Texas Commission on Environmental Quality regulations.

PART 2 PRODUCTS

2.01 QUALITY OF MATERIALS AND WORKMANSHIP

- A. Provide all new materials. All pipe, screen, and other equipment furnished shall have the manufacturers' type and quality designations stamped on them by manufacturers. Provide City with written proof, at time of delivery, the required types and qualities of materials being furnished. Provide City with mill test certificates on all piping, casing and pump column supplied on the Project.

PART 3 EXECUTION

3.01 MEASUREMENTS AND DIMENSIONS

- A. Before purchasing any material or performing any work, Contractor shall verify all measurements and dimensions of the work and shall be responsible for the correctness thereof. Any discrepancy that may be found shall be reported to City for verification before proceeding with the work. No extra charge or compensation will be allowed for differences between actual measurements and dimensions indicated on the drawings.

3.02 SUBCONTRACTS

- A. The Contractor shall not employ any Subcontractor not acceptable to City. Failure of City to object to any Sub contractor proposed by the Contractor shall in no manner relieve or limit the Contractor's responsibility for the work done by the Subcontractor, and such failure to object by City shall in no manner be considered as a waiver, consent, acceptance or ratification of any work done by such Subcontractor, but all such work and the conformance thereof to the Plans and Specifications shall continue to be the responsibility of the Contractor. Approval of a Subcontractor shall be subject to at least the following requirements:

1. Proof of financial ability and adequate insurance to perform the amount of work required of him and to provide assurance that he can maintain any guarantees required of him.
2. Evidence of acceptable completion on not less than five previous projects of work similar in scope and final effect to that required of him on this project. (In case of conflict between this and Sub-Item 1.14 of Item 1, "Contractor's Experience," Sub-Item 1.14 shall govern.)
3. A reputation for production of materials and/or work of the quality indicated in the Specifications.
4. Demonstrated ability to comply with requirements of this Item or Items of the Specifications applicable to his work.

3.03 DISPOSAL OF WATER, MUD AND OTHER WASTES

- A. No mud or sand pits may be excavated or built on these sites. The Contractor shall supply and use steel tanks for mud pits and sand containment. All water, mud and other wastes which result from drilling, construction and testing operations of the Contractor shall be disposed of as approved by City and by any local agencies responsible for drainage in the vicinity of the well sites. Before submitting his proposal, the contractor shall investigate the means of such disposal. Contractor shall prepare and obtain any permits necessary for such disposal at his own expense, and he shall subsequently act accordingly to dispose of the water, mud and other wastes properly.

- B. Before commencing drilling operations, the Contractor shall submit a detailed written plan to City for all such disposal and shall obtain City's review of such plan. City's review, however, shall not make City responsible for the adequacy of such plan, or for obtaining any permits for the Contractor, or to any other party for any damage or loss occasioned by the disposal of the water, mud and other wastes.
- C. The Contractor shall at all times maintain the premises to present a neat appearance. He also shall not discharge or allow the spillage of oil or any other material injurious to vegetation. If any oil or other material injurious to vegetation is accidentally spilled, it shall be immediately cleaned up and removed from the ground by the Contractor, and the Contractor shall pay for any damage caused by it.

3.04 WELDING

- A. Welding in the field for the described components shall be performed in accordance with best practices in construction of large deep water wells and accessory equipment in the Houston area. The field welding shall be inspected by representatives of testing laboratory.
- B. Field welding of any conductor casing, blank production casing, screened production casing and discharge header and appurtenances by the Contractor shall be performed by certified welders utilizing materials, equipment and methods designed specifically to achieve the operations herein described. General requirements for qualification shall be in accordance with AWS D1.1, Sec. 5, Part A, Qualification. Welding procedures shall be qualified in accordance with AWS D1.1, Sec. 5, Part B, Procedure Qualifications. Welders shall be certified for all position welding of each separate procedure, listed herein, in accordance with AWS D1.1, Sec. 5, Parts C, D and E, Welder and Welding-Operator Qualifications. The Contractor shall provide a copy of the welder's current certification, welding procedure record and procedure qualification record prior to performing any welding covered by this contract, after issuance of the Notice to Proceed.
- C. All welding shall be performed in strict accordance with the qualification procedures stated herein utilizing the shielded metal-arc welding process to achieve 100 percent full penetration welds. City reserves the option of performing non-destructive, normally sonic or visual examination methods of any welds performed. Examination of casing and liner welds by X-ray shall be limited to a maximum of four welds per well. Surfaces to be welded shall be free from scale, slag, heavy rust, grease, paint, cement, mud or any other foreign material. Joint surfaces shall be smooth, uniform and free from defects that adversely affect proper welding procedure. Surfaces that have been torch-cut or air-arc gouged shall be ground smooth to remove all loose slag and oxidation. Welding

shall not be performed when the ambient temperature is less than 0°F or when the surfaces are wet from rain, snow, ice, fog, or during periods of high wind velocity, unless the welder and the work are properly and adequately protected from the elements. When the ambient temperature is 50°F or less, preheating of the joint to be welded is required. Preheating to a minimum of 100°F shall extend ahead of the advancing arc a minimum distance of four times the wall thickness on each side of the joint.

- D. The welds shall be applied by means of continuous stringer beads or passes utilizing the shielded metal-arc welding process (SMAW). Welding procedures described herein require the use of the AWS electrode classification specified for each. Each pass shall be thoroughly cleaned and descaled by means of chipping and wire brushing or buff grinding before the succeeding pass is applied. The surface pass on groove welds shall be substantially central to the groove and shall be reasonably smooth and free from depressions. The final weld surface shall be free from all weld slag. Fillet welds shall have legs of equal size. The finished fillet weld must be free of grooves, deep valleys or ridges and contain no abrupt changes in section at the toe. The face of fillet welds may be flat or slightly convex. Cracks in a groove or fillet weld and/or the base metal, incomplete fusion, weld overlap and pinholes are unacceptable. Arc strikes must be avoided. Any arc strikes will be repaired by grinding smooth. Defective welds will be repaired or replaced at no cost to City.
- E. Butt joints shall be accurately aligned and retained in position for the welding operation by use of line-up clamps preferred or fit-up clips, minimum of four per joint equally spaced around the circumference of the pipe joint. The line-up clamps or fit-up clips shall not be removed prior to completion of at least the root pass. All weld splatter shall be removed by grinding smooth. Butt joints of any pipe diameter and similar or dissimilar materials shall be gapped a minimum of 1/16 inch and shall not exceed the 5/32-inch maximum. Inside penetration of any full penetration groove weld shall not exceed 1/8 inch. Surface cap build-up of any full penetration groove weld shall not exceed 5/32 inch.
- F. The assembly of random lengths of all materials stacked vertically for installation downhole, after welding in the form of surface casing liner, blank liner and screen liner, shall be connected to achieve at least the tensile strength of the pipe by means of gapped horizontal groove welds. All groove welds shall be accomplished with a minimum of three weld passes, as herein described. For a similar metal procedure of welding carbon steel to carbon steel, the root (first) pass of the gapped groove (butt) joint shall be made with a 1/8-inch maximum diameter E7010-A1 electrode utilizing the drag technique. The hot (second) pass shall be made with a 5/32-inch maximum diameter E7010-A1 electrode utilizing the drag technique. The filling, capping and surface (third or more) pass shall be made with a 3/16-inch maximum diameter E7018 electrode utilizing the drag technique. Low hydrogen electrodes require the specific use of proper and adequate furnace type drying and holding facilities.

- G. For a similar metal procedure of welding AISI Type 304 stainless steel to AISI Type 304 stainless steel, the root (first) pass of the gapped groove (butt) joint shall be made with a 5/32-inch maximum diameter E308-15 electrode utilizing the weaver technique. The hot (second) pass shall be made with a 5/32-inch maximum diameter E308-15 electrode utilizing the weaver technique. The filling, capping and surface (third or more) pass shall be made with a 3/16-inch maximum diameter E308-15 electrode utilizing the drag technique. All specified requirements for either procedure of welding similar metals or the procedure of welding dissimilar metals is applicable to either operation except the use of electrodes.
- H. For a dissimilar procedure of welding AISI Type 304 stainless steel to carbon steel, the root (first) pass of the gapped groove (butt) joint shall be made with a 5/32-inch maximum diameter E309-15 electrode utilizing the weaver technique. The hot (second) pass shall be made with a 5/32-inch maximum diameter E309-15 electrode utilizing the weaver technique. The filling, capping and surface (third or more) pass shall be made with a 3/16-inch maximum diameter E309-15 electrode utilizing the drag technique.
- I. The welding required for the installation of flanged outlets and the fabrication of random length steel pipe joints with weld neck flanges for discharge header modifications shall be accomplished utilizing vertical and horizontal, as required, fillet welds. All fillet welds shall be accomplished with a minimum of two weld passes, as herein described. Build-up per pass shall be a minimum of 3/16 inch and shall not exceed 1/4 inch maximum. For a similar metal procedure of welding carbon steel to carbon steel, the root (first) pass of the fillet weld shall be made with a 1/8-inch maximum diameter E7010-A1 electrode utilizing the drag technique. The filling, capping and surface (second or more) pass shall be made with a 3/16-inch maximum diameter E7018 electrode utilizing the drag technique.

- J. All requirements for field welding of the various similar and dissimilar metal procedures, as described herein, shall apply to all shop welding for fabrication of components prior to delivery to the field for assembly and installation. The Contractor may elect to utilize the gas tungsten arc (TIG) welding process for any shop welding of components fabrication, provided the welder and the welding procedure are fully certified, as herein specified. The TIG welding process may be used for the root pass of any shop weld with additional passes made utilizing other approved welding processes. If the TIG welding process is not used for the root pass of any such shop weld, no additional passes of the weld can be made utilizing the TIG process.
- K. The Contractor shall submit to City for review the welding methods and procedure(s) the Contractor plans to use for field welding of the conductor casing, blank production casing, screened production casing, discharge header, and appurtenances. The description of the welding procedures shall state the conditions under which the welding will be performed, the type and size of welding rods to be utilized, the minimum number of passes required to weld the various wall thicknesses of casing, liner or pipe, and the method that will be used to remove weld splatter from surfaces to be welded. The method for keeping butt joints accurately aligned during welding operations shall be described. Any other questions by City shall be answered. The welding methods and procedures submitted by the Contractor shall be reviewed and must be acceptable to City prior to the Contractor performing any field welding required herein.

3.05 PROGRESS REPORT

- A. City shall be provided with two copies of each driller's or foreman's tour report on the work contained in this contract. These tour reports shall be delivered to City's representative each day for that day's progress. The form of the tour progress report shall be approved by the City. All data pertaining to progress of the work, such as drilling depth, formation descriptions, materials received, tallies of materials installed during construction work, development time, waiting time, and time spent on repairs, shall be recorded accurately on these reports during each tour. Each tour report shall be prepared and signed by the Contractor's foreman in charge of the tour reporting. A "tour" is defined for the purpose of tour reports as the period of time a driller or foreman and crew work continuously without interruption.

Daily reports listing the personnel working at the site, number of hours worked per person, equipment used at the site, and a description of the work performed shall also be prepared by subcontractors working on the project. The form of the daily reports shall be submitted to the City for approval. These reports shall be delivered to the City's representative each day for that day's progress.

3.06 DAILY REPORT

- A. The Contractor shall report plans and progress to City's designated representatives approximately 24 hours before work is to be started and daily thereafter during the course of the work. If City's representative is at the well site, the daily report may be made in person. Otherwise, the report is to be made by telephone.

3.07 CLEAN UP

- A. Contractor shall clean all road surfaces to the well site at least on a weekly basis.
- B. Upon completion of the work at each site, the Contractor shall clear the construction site of all trash, rubbish, sand and other materials bailed or pumped from the well, temporary structures, and other temporary excavations to the original conditions, grade the entire site to City's satisfaction, hydro mulch seed the construction area, and replace and plant landscape plants removed during drilling.

3.08 ADDITIONAL REQUIREMENTS FOR SUBSTANTIAL COMPLETION

- A. Contractor shall complete an Excel spreadsheet, provided by the City, that describes the items installed at the project site. The information shall include the manufacturer, model, serial number, year built, service life and original cost.

ATTACHMENT A

SECURITY REQUIREMENTS FOR ALL PUD SITES

Security Requirements:

The Contractor agrees to strictly abide by all security and safety regulations issued by the City as stated below.

All Contractor employees and subcontractors must be a U.S. Citizen or have a legal work permit. Each person must also present a valid unexpired U.S. state driver's license or photo identification card. A U.S. issued resident alien card, with photo, passport, or other U.S. state or U.S. federal photo documentation is acceptable to present for identification purposes. It is the responsibility of the Contractor to immediately inform the COH of any personnel changes.

The COH/Public Utilities Division (PUD) Security Group will also conduct a criminal background check (at no cost to the Contractor) on all contractor and subcontractor employees assigned to work at any PUD site. The Contractor shall contact during normal business hours (8:00 am to 5:00 pm, M-F) one of the following PUD representatives identified below to coordinate completion of criminal background checks.

Tammy Spriggs, 832-395-5175
Shandra Jones, 832-395-5179

The Contractor shall agree to completion of the City's Disclosure and Consent for Release of Information and any other documentation necessary to complete criminal background checks.

Each employee of the Contractor and its subcontractors will be required to apply for, and receive, a COH identification card/access badge (at no cost to the Contractor) before being granted access to any PUD work site. The COH photo identification office is located at 611 Walker Street in Houston, Texas on the 3rd floor of the annex (832.395.5175 phone 832.395.5187 fax). Identification cards / access badges will only be issued by the City once a background check has been completed for the Contractor or subcontractor employee, and clearance has been granted by the City.

All Contractor employees without current identification cards will be stopped by COH employees and/or security personnel and will not be given access to any COH/PUD facility. All construction employees must show a valid identification card at the entrance gate and upon request while working on site.

Contract employees must present their card to enter and exit the site at the guard shack. Lost cards are disabled and replacement cost is \$5.00.

VEHICLES BELONGING TO CONTRACT EMPLOYEES AND THEIR SUBS:

Vehicles that are required in the performance of a contractor's job duties (welding truck, flat bed, etc.) will be allowed to operate freely on the plant site, but with the following conditions:

(1) They must have identification with the company's name and a phone number, along with the company's insignia, so that the operator's identity may be verified. The sign must be no smaller than 12 inches tall by 12 inches wide; (2) The employee agrees to adhere to all of the posted speed limits and parking restrictions, which include but are not limited to parking on the grass or on curbs, or leaving vehicles unattended in heavily trafficked areas.

CONTRACT EMPLOYEES AND THEIR SUBS:

a. Contractors and/or Subs that will be working on any PUD site for less than 60 days will not be issued a City of Houston Contractor badge. However, they must still pass a criminal check and wear a Photo ID issued by their company (A picture ID displaying their name, the company's name, logo, and the position they hold within the organization) along with having their state issued unexpired driver's license or ID.

b. Contractors and/or Subs that will be working on any PUD site for over 60 days will be issued a City of Houston Contractor badge with their picture after they pass a criminal check. They must also have in their possession their unexpired state issued driver's license or ID.

In addition, they must have a valid **Texas Driver's License** on their person at all times. (A valid **US** driver's license will be accepted only if the employee does not reside in Texas.)

c. Badges shall be worn in a clearly visible area on the employee's person. Badges may **not** be kept in a wallet or pocket of any sort.

d. Construction/Contract Management is responsible for providing security a monthly updated list of all employees (contractors and subs).

Enforcement:

No contract employee will be allowed to enter the facility without **both** badges in their possession. Any contract employee found on the plant site without proper identification will be immediately escorted off the property by HPD. In addition, construction management will issue a non-compliance letter to the contractor responsible. Furthermore, the City will not allow contract employees conditional access pending the arrival of requested badges. **If an employee does not have proper identification, he/she should not be allowed to report to duty at any PUD site.**

All General Contractors/Sub Contractors and their employees will be held accountable for the return of ALL City issued badges of their employees and subcontractor employees. Criminal charges may be filed in an effort to recover the outstanding badges.

END OF SECTION

Section 01562

TREE AND PLANT PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tree and plant protection.
- B. Minimum qualifications of Arborist and Urban Forester.

1.02 MEASUREMENT AND PAYMENT

- A. Payment for Tree Protection, including tree pruning or tree removal, shall be paid as a Lump Sum basis that shall include all items specified in this section unless payment is specified otherwise in this section
- B. Payment for Zero Curb Cutback will be on a per linear foot basis.
- C. Payment for Checker Plate will be on a square foot basis.
- D. Refer to Section 01270-Measurement and Payment for unit price procedures.

1.03 SUBMITTALS

- A. Conform to requirements of Section 01330 – Submittal Procedures.
- B. Submit name and experience of qualified Arborist, proposed for use on the Work, to Project Manager.

1.04 PROJECT CONDITIONS

- A. Preserve and protect existing trees and plants to remain from foliage, branch, trunk, or root damage that could result from construction operations.
- B. Prevent following types of damage:
 - 1. Compaction of root zone by foot or vehicular traffic, or material storage.
 - 2. Trunk damage from equipment operations, material storage, or from nailing or bolting.

3. Trunk and branch damage caused by ropes or guy wires.
4. Root or soil contamination from spilled solvents, gasoline, paint, lime slurry, and other noxious materials.
5. Branch damage due to improper pruning or trimming.
6. Damage from lack of water due to:
 - a. Cutting or altering natural water migration patterns near root zones.
 - b. Failure to provide adequate watering
7. Damage from alteration of soil pH factor caused by depositing lime, concrete, plaster, or other base materials near roots zones.
8. Cutting of roots larger than one inch in diameter.

1.05 DAMAGE ASSESSMENT

- A. When trees other than those designated for removal are destroyed or damaged as result of construction operations, remove and replace with same size, species, and variety up to and including 8 inches in trunk diameter. Trees larger than 8 inches in diameter shall be replaced with an 8 inch diameter tree of the same species and variety and total contract amount will be reduced by an amount determined from the following formula and paid to Tree Fund $0.7854 \times D^2 \times \13.25 where D is diameter in inches of tree or shrub trunk measured 12 inches above grade for that portion of the tree which is greater than 8 inches in diameter. A permit must be applied for and approved by the City of Houston, Urban Forestry Division prior to removal of any tree not scheduled for removal in the tree treatment schedule. Contractor shall contact City of Houston, Urban Forestry, at 832-395-8459 to apply for tree removal permit when needed.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Pruning Paint: Black latex, water based paint, free of all petroleum products.
- B. Fertilizer: Fertilizer shall be a root stimulant that contains at a minimum the following ingredients: Ectomycorrhizal Fungi, VA Mycorrhizal (VAM) Fungi, Rhizosphere Bacillus spp., Kelp Meal Humic Acid, and Soluble Yucca.

- C. Tree Protection Fencing: Orange, plastic mesh fencing, 4 feet in height with 6 feet high “t” bar posts installed 10 feet on centers as per drawings.
- D. Plastic Root/Soil Protection: Clear polyethylene sheeting, minimum 6 mil, thickness.

PART 3 EXECUTION

3.01 PROTECTION OF EXISTING TREES AND SHRUBS

- A. Site preparation work and/or construction work shall not begin in any area where tree preservation measures have not been completed and approved.
- B. Protect exposed roots and root zone areas from contamination from stabilization materials and concrete using polyethylene.
- C. Cover exposed roots within 4 hours to reduce damage caused by desiccation. Roots may be covered with soil, mulch, polyethylene, or wet burlap to help protect them from drying.
- D. Designate limited areas as concrete washout areas. Locate concrete washout areas away from root zones.
- E. Install root pruning trenching where designated in tree treatment schedule and shown on the tree protection drawings. Trees scheduled for root pruning are called out specifically in the treatment schedule. Trench shall be located 2 ft. from the edge of proposed waterline or sanitary sewer for trees called out for root pruning for water or fittings, or sanitary sewer in the treatment schedule, 2 ft. from edge of proposed storm sewer pipe for trees called out for root pruning for storm in the treatment schedule, 30” back of proposed curb for trees called out for root pruning for street, and at edge of sidewalk for trees called out for root pruning for sidewalk. Root pruning shall not be performed where there is not adequate space to be located sufficiently away from tree to prevent damage. All pruning must be evaluated by Contractor’s Certified Arborist and reviewed and approved by City Forester before being performed. Trench locations shown on tree preservation plan are drawn to scale and should be located in field as drawn on plan. Exact locations shall be approved in the field by engineer and/or project urban forester prior to installation. Trenching depth shall be a minimum of 2 ft. deep and a maximum of 6 inches wide for water, fittings, sanitary sewer, storm, and street. Trenching depth shall be to the anticipated bottom of sidewalk and base material for sidewalk root pruning, roots lower than sidewalk shall not be pruned. All roots shall be cut by trencher, chainsaw, or handsaw to the specified depth. Roots shall be cut cleanly, and or not ripped, torn, or chopped. Trench shall be backfilled and compacted immediately after trenching. Trench shall be installed prior to any clearing and grubbing, excavation for underground, or any other site work.

- F. Install tree protection fencing around each tree to be preserved as indicated in the tree treatment schedule and on the tree protection plan.
1. Each tree to be preserved shall be protected with a tree protection fence. The fencing shall be continuous between posts, shall be pulled taut prior to securing to posts, and shall be firmly attached to the posts with a minimum of 4 wire ties.
 2. All tree protection fencing shall be installed prior to site work or construction activity. The fence shall be placed in a continuous alignment as shown on the tree protection plan. Fences shown on tree protection plan are drawn to scale and shall be installed as drawn, in the field. In general fences shall be placed 30” back of existing curb or edge of pavement where root pruning or zero curb cutback is not specified, and 6” back of root pruning trench where root pruning is specified and immediately back of curb where zero curb cutback is specified. Exact locations shall be approved by the project urban forester and/or engineer in the field. The Fences shall be placed to protect roots, trunks, and foliage. The contractor shall not remove or relocate tree protection fencing and shall not operate within the limits shown without direct approval of the project urban forester. In areas where the proposed waterline is located in the existing road side ditch and where tree protection fencing can not be installed across the ditch, the fencing shall be installed at the top of outside ditch bank and no bore pits, peep holes, service taps, or any excavation should occur in the area immediately in front of the tree protection fencing for trees called out with “bore” in the Tree Treatment Schedule. The “bore” limits shall be the same as the limits of the tree protection fencing.
 3. Storage of equipment or materials will not be allowed inside a fence. Entryways and access into a protected area shall not be provided unless approved by the project urban forester.
 4. Damage to tree fences occurring during the progress of the work shall be repaired immediately at no additional cost to owner. Workmen shall be clearly instructed to exercise caution in performance of work near trees being preserved.
 5. Tree protection fencing shall be removed by contractor, at no additional costs, upon completion of all construction activity in each work zone area. Tree protection fencing materials used in the first two work zone areas shall be removed and utilized in subsequent work zone areas. Materials and labor shall be paid for each linear foot of fencing installed in first two work areas. All fencing installed in subsequent work zone areas shall be paid for labor only.
- G. Boring/Auguring of water lines or sanitary sewer lines
1. Water line or sanitary sewer line shall be bored/augured/ horizontally drilled under

critical root zones areas of trees designated with auger or bore in the tree treatment schedule. The entire area protected with tree protection fencing shall be bored. No bore pits, come through holes, peep holes, push pits, or long or short side service taps shall be allowed in the areas protected by tree protection fencing. The tree protection plan takes into consideration the limits of augering equipment, there should be room for adequately spaced bore pits, peep holes, come through holes, and push pits. Any changes to the location of the tree protection fencing shall be authorized by the project Urban Forester and City Engineer.

H. Hand digging of Service taps and leads

1. Trees called out for Hand dig short side service tap are located in very close proximity to existing short side water meters. Excavating the service tap with machinery would significantly impact the tree and be in violation of the City of Houston's Street Tree Ordinance. These short side service taps shall be excavated with manual labor to expose any roots 1" in diameter and larger. The first 24" of excavation shall be completed manually to expose the roots. Any root 1" in diameter and larger shall remain undamaged, the roots shall not be cut, nor shall the bark and cambium layer be scraped or damaged. Once the roots are exposed, if there is adequate room to utilize a mini-excavator without damaging the roots, the mini-excavator can be utilized to complete the excavation down to the water line. 1" plywood shall be placed on grade to provide root protection in the area of access of the mini-excavator. If roots 1" diameter or larger are cut or damaged, responsible party will be subject to a citation under the Street Tree Ordinance, and may also be required to incur the cost of tree removal and replacement of damaged tree on an inch for inch basis, if required by City of Houston Urban Forestry Division.
2. Trees called out for Hand dig short side or long side service lead are located in very close proximity to existing water meters. Excavating the service lead with machinery would significantly impact the tree and be in violation of the City of Houston's Street Tree Ordinance. Short side leads shall be excavated with manual labor to expose any roots 1" in diameter and larger from the service tap of the meter. Come out hole and excavation required for long service leads shall be excavated with manual labor to expose roots 1" in diameter and larger, from the come out hole to the meter. In each case, all roots 1" in diameter and larger shall remain undamaged, the roots shall not be cut, nor shall the bark and cambium layer be scraped or damaged. If roots 1" diameter or larger are cut or damaged, responsible party will be subject to a citation under the cost of tree removal and replacement of damaged tree on an inch by inch basis, if required by City of Houston Urban Forestry Division.
3. Trees called out for Hand dig sanitary stub up are located in very close proximity to proposed service lead. Excavating the service lead with machinery would significantly impact the tree and be in violation of the City of Houston's Street Tree

Ordinance. Excavation for sanitary stub up shall be completed with manual labor to expose any roots 1” in diameter and larger. The lead shall be bored from face of curb to stub up hole when called out in the tree treatment schedule. Come out and stub up holes shall be excavated with manual labor to expose roots 1” in diameter and larger. In case, all roots 1” in diameter and larger shall remain undamaged, the roots shall not be cut, nor shall the bark and cambium layer be scraped or damaged. If roots 1” diameter or larger are cut or damaged, responsible party will be subject to a citation under the Street Tree Ordinance, and may be required to incur the cost of tree removal and replacement of damaged tree on an inch by inch basis, if required by City of Houston Urban Forestry Division.

4. Long side service taps shall not be located in an area specified to be bored in the tree treatment schedule. Should it be absolutely necessary to locate a long side service tap in an area specified to be bored, the excavation shall be completed as specified in paragraph 1 of this section-Hand digging short side service taps.
5. All water meters and sanitary service leads called out on P&P drawings and visible in the field have been addressed in the Tree Protection Plan. Should any additional meters or lead be found during construction, or in any new meters or leads installed beneath the canopy of any tree, fenced for tree protection, the excavation shall be completed as specified in paragraph 1 and/or 2 of this section and paid for at the unit cost for each included in contract.

I. Pruning of Trees

1. Trees shall be pruned in accordance with the American National Standard for tree pruning, ANSI A300 (Part 1) – 2001 Pruning Revision of ANSI A300-1995 Tree, Shrub and Other Woody Plant Maintenance – Standard Practices. Pruning shall be completed by professional arborists who has received training in proper pruning techniques.
2. Clearance prune designated trees for public streets, sidewalks, and construction areas. Provide minimum 14 feet and maximum of 18 feet of vertical clearance over proposed water trunk lines. Provide minimum of 14 feet and maximum of 16 feet of vertical clearance over proposed street construction, from 24” back of curb on one side to 24” back of curb on the other side. Provide 20’ of vertical clearance over proposed storm sewer up to 38” in size, and 30’ of vertical clearance for storm sewer larger than 38” in size. Pruning to be installed prior to any construction activity. Contractor shall notify property owner prior to trimming or pruning any trees with trunks located on private property. Exceptions will be made for trees determined to be arboriculturally significant by City of Houston Urban Forestry. Pruning of trees identified will be completed with approval and supervision of City of Houston Urban Forestry.

3. All cuts should be made sufficiently close to the parent limb or trunk without cutting into the branch collar or leaving a protruding stub, so that closure can readily start under normal conditions. All lateral cuts shall be made to a lateral that is least 1/3 the diameter of the parent limb. Clean cuts shall be made at all times.
4. Trees shall be pruned in a manner that will not destroy or alter the natural shape and character of the tree. Apply black latex paint to all fresh wounds on Oak (*Quercus*) species immediately after each cut is made.
5. Crown cleaning prune designated trees shall include selective removal of dead, diseased, and/or broken limbs.

J. Tree Removal

1. Trees scheduled for removal shall be sawed down and debris hauled from the site the same day. The stump shall be ground to 6" below grade and excess grindings shall be hauled from the site the same day, so that a pile of grindings is not left where the stump was ground. Enough grindings should be left so that an open hole does not remain.
2. Only those trees called out for removal in the Tree Treatment Schedule shall be removed, or otherwise damaged. Should it be determined that any additional trees must be removed, a permit must be applied for and approved from the City of Houston Urban Forestry Division prior to removal. Contractor shall contact Urban Forestry at 832-395-8459.

K. Root Stimulation

1. Deep root stimulate designated trees. Mix fertilizer with wetting agent per label instructions.
2. Stimulate entire root zone area within the dripline of the tree and continue 10 feet beyond the dripline, leaving out areas of anticipated root loss (construction areas).
3. Mixture shall be injected into the top 10 inches of soil under pressure of 150 to 200 psi as soil conditions warrant.
4. Mix in a tank with agitation capability per label instructions. Inject the mixture on a 2.5 ft. square grid at 4 lbs, actual nitrogen per 1,000 sq. ft.

- L. Regularly water trees which have received root damage, to eliminate additional stress caused by lack of moisture. Water during periods without adequate rainfall. For example, should 1.0" of rain not be received within a week period, the trees should be thoroughly watered.

March through September, water once every two weeks. October through February, water every three weeks. Water thoroughly to saturate the entire root zone area.

- M. Chemically treat tree trunks with evidence of borer activity with the appropriate approved insecticide mixed and applied per the manufacturer's product application recommendations. Trees shall be sprayed within 24 hours after observance of borer activity.
- N. Grading and filling around trees.
1. Maintain existing grade within the dripline of trees, unless otherwise indicated.
 2. Where existing grade around trees is above new finish grade, under supervision of project urban forester, carefully hand excavate within the dripline to make transition to new finish grade.
 3. Where existing grade is below new finish grade, place clean bank sand in a single layer to make the transition to new grade. Do not compact; hand grade to required elevation. Specifically to areas where proposed curb is higher than existing and backfill will be required.
- O. Demolition, Forming and Pouring Sidewalks (Sidewalk on Grade)
1. Demolition of existing sidewalks, located in or adjacent to the limits of tree protection fencing, shall be completed without disturbing, cutting, or otherwise damaging tree roots and soil located beneath them.
 2. The new sidewalk shall be formed at or above the elevation of the existing sidewalk, without disturbing, cutting or otherwise damaging tree roots. Every effort has been made to address tree root and sidewalk elevation issues with information available in the field and on plan and profile sheets. The elevation of every tree root was not available, if tree roots are found to be in conflict with proposed sidewalk, project engineer and urban forester shall be consulted as to how to install sidewalks with minimal impacts to adjacent trees.
 3. Checkerplate shall be installed in areas called out only if tree root elevations prohibit construction of ADA compliant sloped concrete sidewalks. Checkerplate shall be installed per detail.
- P. Zero curb cutback
1. Disturbance of tree roots or soil behind the existing and/or proposed curb within root zones of trees designated for zero curb cutback shall be prohibited. If the curb can not be removed without disturbing soil or damaging roots back of curb when using

equipment for demolition, the curb shall be broken using a hand held jackhammer and removed by hand.

2. The exposed roots and soil shall be covered immediately after demolition with 6 mil polyethylene in order to avoid desiccation, and contamination by the lime used for road bed stabilization. The polyethylene shall be placed so that it covers the vertical face of soil back of curb and laid back onto the grade 12 inches back of curb. The polyethylene should remain in place, across the entire area specified for zero curb cutback, from the time the existing curb is demolished until the time when the new curb is formed and backfilled. The polyethylene can be pulled up from the vertical face while the road bed is being graded or mixed, to avoid catching the plastic with machinery, but shall be replaced immediately after equipment has completed. The vertical face shall not be exposed for more than 8 hours in any 24 hour period.
3. There shall be no stabilization back of curb in the zero curb cutback areas, or forming with steel forms. The existing grade and roots back of existing curb shall not be disturbed. This may require forming of the new street with wooden forms with stakes inside forms, which may require leaving the forms in place after the street is poured. Should wooden forms be utilized, the wood shall be at minimum a 2x6. The new curb may require hand finishing, as a slip curb machine may not have adequate clearance without disturbing the roots that are to be protected with the zero curb cutback.
4. Roots extending into the street, or on top of the existing curb, in areas to paved shall be cut and removed by hand prior to disturbance or removal with equipment. Roots shall be pruned flush with the proposed back of curb. Roots one inch in diameter and larger shall be cut in a manner to provide a smooth, clean cut surface. Cuts shall be made with the appropriate pruning shears or pruning saws. Roots shall not be chopped or broken.
5. In areas where proposed curb will be may be lower than existing top of curb and tree roots 2" diameter or larger are present, the soil and roots shall not be graded or laid back. The existing elevation shall be maintained and the curb formed to meet elevation or a short elevation difference roots and top of curb maintained.

Q. Demolition, Forming and Pouring of Drive Way Approaches

1. Demolition of existing driveway approaches located beneath the dripline of any tree shall be completed without disturbing, cutting, or otherwise damaging tree roots and soil located beneath them.
2. The new approach shall be formed at or above the elevation of the existing approach where tree roots 2" diameter or larger are present, without disturbing, cutting or

otherwise damaging tree roots. Maximum drive slopes may be needed at bottom of apron to allow forming of drive over tree roots at top of drive. As with sidewalks, the elevation of every tree roots was not available in design. If tree roots are found to be in conflict with proposed approach, project engineer and urban forester shall be consulted as to how to install drive way with minimal impacts to adjacent trees.

R. Replacement Trees for Tree Removals under Ordinance

1. Location, species, and size of replacement trees are indicated on the drawings. Contractor shall layout individual trees at locations shown on drawings. Contractor shall layout individual trees at locations shown on drawings and be responsible for utility locate requirements. In case of conflicts, notify City Engineer and City Urban Forestry before proceeding with work. Trees shall be laid out and locations approved by City Engineer prior to planting.
2. Trees shall meet and be planted according to City of Houston Standard Specification 02915.

S. Arborist and Urban Forester Qualifications

1. Arborist – Employ qualified arborist acceptable to City’s Parks and Recreation Department to complete all tree treatments. Arborist shall be normally engaged in the field and have a minimum of 5 years experience. Qualifications of the selected arborist shall be submitted for review and approval by the project engineer and City of Houston.
2. Urban Forester – An Urban forester shall be hired to monitor and assist with field layout (exact locations of fencing, root pruning, and zero curb cutback) of the tree preservation program during demolition and construction to ensure tree protection procedures and techniques are practiced as specified to address concerns and conditions which occur in the field. At a minimum, the individual responsible for monitoring and field layout of the tree protection shall have a minimum of 5 years of experience as a consultant, and shall not be affiliated with a tree care contractor in the Houston area. Qualifications of the selected urban forester shall be submitted for review and approval by the project engineer and City of Houston Urban Forestry Department.

END OF SECTION

Section 02529

WATER WELLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Contractor shall drill, collect drill cutting samples, and log pilot hole.
- B. Contractor shall analyze all data from pilot hole and present written report to City with recommendations for completion of water well.
- C. City shall review Contractor's recommendations, including the final depths and material settings for the well.
- D. Either City or Contractor may elect to abandon pilot hole without proceeding further.
- E. If pilot hole is not abandoned, Contractor shall complete construction, development and testing of well according to Contract Documents, including meeting all guarantees.
- F. Disinfect well.

1.02 UNIT PRICES

- A. The actual payment for the well will be based on the Contractor's Schedule of Values for the well, as determined by Items 1 through 15 of the Base Bid Section of Document 00410 - Bid Form, adjusted as necessary by the prices in Items 16 through 30 of the Extra Unit Price Section.
- B. No progress payments will be made for any part of a water well, except mobilization, a successfully completed pilot hole meeting the specifications and any water samples collected, until all the work on the well is completed and initial performance guarantees are shown to have been met. This provision applies to the well only and not to the permanent pump, motor, electrical work, discharge piping, and other above-ground installations. If a decision is made to abandon the pilot hole, payments will be made for mobilization, water samples collected and abandonment in accordance with the specifications as provided by subsection 3.01 E of Section 02529.

1.03 RELATED WORK

- A. Drawings: The work to be done under these specifications is described in part by the plans.

- B. Blank pipe in the production casing for Forest Cove Well No. 5 shall be 14-inch O.D., minimum wall thickness of 0.500 inch
- C. The upper portion of the blank liner shall be positioned inside the surface casing to form 80 feet of lap for the completed well.
- D. The screen in the production casing shall be new Houston Weld, All Welded, or Weld Underbar Pipe Base screen as manufactured by Alloy Machine Works, Weatherford/Johnson Screens or approved equal. The pipe used in the screen, before perforation, shall be the same as the pipe in the production casing.
- E. The steel pipe used in the Forest Cove screen shall be API Spec 5L line pipe, Grade B or equal, perforated to achieve at least 18 percent open area of the pipe under the screen. The bar spacers located on the outside of the perforated surface of the production casing shall be stainless steel, Type 304L, and shall be about 0.10-inch thickness. The wire wrapping over the bars shall be stainless steel, Type 304L.
- F. The size of the screen openings to be used on the screen shall be selected by the Contractor based on the character and sieve analysis of the formation samples and the type and grading of the gravel selected.
- G. The type, description and size of the screen components which the Contractor proposes to use shall be submitted to the City for approval before it is ordered by the Contractor.

2.04 BACK PRESSURE VALVE

- A. The back pressure valve assembly installed at the bottom of the production casing shall be at least 8-inch diameter, of cast iron construction, cone type, and spring loaded, as manufactured by Houston Well Screen, Abco-Vacucast Metals, or approved equal.

2.05 GUIDE ON SURFACE CASING AND CENTRALIZERS ON PRODUCTION CASING

- A. Each surface casing guide shall be made of 1/4-inch steel, about 2 inches wide, bowed to a depth of about 2 inches, and about 12 inches long, welded to the surface casing at both ends. The centralizers on the production casing below the surface casing shall be Weatherford or Antelope balloon spring type or equal.

2.06 GRAVEL

- A. The type and size of the gravel to be used shall be determined and selected by the Contractor based on the character and sieve analyses of the water-bearing formations. The gravel selected by the Contractor shall be one of or a mixture of

of gravel that the Contractor has selected for the well. The report shall also include a written technical analysis of the geophysical logs with regard to indication of natural gas and uranium rich zones by the logging company professional analyst acceptable to the City. Samples of the gravel and sieve analyses of the gravel and the gravel company's certificate shall be delivered to the City for approval at the time the Contractor submits his evaluation of the pilot hole. The City's approval of the gravel or any other part of the Contractor's recommendations, however, shall in no way relieve the Contractor of meeting all the well performance guarantees required by these specifications and other contract documents.

E. Abandonment:

1. The amount to be paid by the City for mobilization will be as per Item 1 in Document 00410 - Bid Form. The amount paid by the City for drilling, sampling and logging the pilot hole, abandonment and plugging of the pilot hole, and site cleanup if a pilot hole is abandoned will be based on Items 16 and 21 in Document 00410- Bid Form.
2. After the pilot hole is completed and the Contractor has made his written report to the City and the City has reviewed the Contractor's report, the City shall have the right to abandon the hole because of in its opinion the water-bearing formations have been found inadequate to make a well producing water of satisfactory quality and meeting the guarantees specified herein, or in case the City and Contractor cannot agree on the material settings or other recommendations by the Contractor for the well. The City Engineer may, at his option, lower the specific capacity guarantee and/or the suspended solids guarantee, all as the City considers to be reasonable. Any such decision by the City Engineer must be in writing, and the Contractor shall be bound by it. In the event that the pilot hole is abandoned, it shall be filled by placing neat cement plugs as required by the City and fresh heavy mud into the hole from the bottom of the hole to the land surface. The method used and the amount of cement and type and source of fresh heavy mud shall be approved by the City. The maximum amount of cement required by the City shall be 150 sacks.
3. In the event the pilot hole is abandoned by decision of either the City or Contractor after it is completed according to and meeting all these Specifications, the site shall be cleaned up as provided in these Specifications and the City shall pay the Contractor for the abandoned pilot hole in accordance with Items 1, 16 and 21 in Document 00410 - Bid Form. This amount plus the cost for any water samples collected from the pilot hole then shall be the total payment made by the City to the Contractor for the work at this site. If the City elects, this contract shall then be canceled with respect to this particular well, and no further payment shall be made to the Contractor for work or materials on this well. Alternatively, after making the payment to the Contractor for the abandoned pilot hole, the City shall

Section 15162

LINESHAFT DEEP WELL PUMPS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for furnishing, installing and testing a deep well lineshaft pump and constructing a concrete pump foundation at the sites indicated on Drawings. The complete installation include new lineshaft pump, steel discharge head, column pipe, tubing and shafting, air line, solution tubing and associated strainer and suction adapter to affect the complete operational water well pumping system.

1.02 UNIT PRICES

- A. No separate payment will be made for Work as required by this Section. Price for pump equipment is included as Item 2 in Document 00410-Bid Form and adjusted as necessary with Items 25 and 26.

1.03 ORDERING OF PUMP AND MOTOR

- A. The pump and motor shall not be ordered without written instructions or approval of the City. Written instructions or approval of the City shall occur after the satisfactory completion, as determined by the City, of the pumping test of a well. Once the City's instructions are received, the Contractor shall order the pump and motor as soon as practicable. No pump bowl assembly shall be assembled or released for shipment without the written approval of the City.

1.04 REFERENCE STANDARDS

- A. The pumping unit shall conform to the latest edition of each of the following standards as applicable, unless otherwise specifically stated in this section. Pump shall comply with all local and state sanitary and safety regulations.
 - 1. AWWA E103 – Horizontal and Vertical Line-Shaft Pumps.
 - 2. The Hydraulic Institute – Centrifugal Pump Section.

1.05 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit complete descriptive matter and data showing details of construction and other pertinent information pertaining to the equipment the Contractor proposes

CAUTION: UNDERGROUND GAS FACILITIES

LOCATIONS OF CENTERPOINT ENERGY MAIN LINES (TO INCLUDE CENTERPOINT ENERGY, INTRASTATE PIPELINE LLC, WHERE APPLICABLE) ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. SERVICE LINES ARE USUALLY NOT SHOWN. OUR SIGNATURE ON THESE PLANS ONLY INDICATES THAT OUR FACILITIES ARE SHOWN IN APPROXIMATE LOCATION. IT DOES NOT IMPLY THAT A CONFLICT ANALYSIS HAS BEEN MADE. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITTEE AT (713)223-4567 OR 1-800-669-8344 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

- 1. WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713)945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
2. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
3. WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
4. FOR EMERGENCIES REGARDING GAS LINES CALL (713)659-3552 OR (713)207-4200.

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

WARNING: OVERHEAD ELECTRICAL LINES

OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

- ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND
OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED, CALL CENTERPOINT ENERGY AT (713)207-2222.

ACTIVITIES ON OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

NO APPROVAL OR USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT (713)207-6248 OR (713)207-5769.

AT&T TEXAS/SWB/T FACILITIES

- 1. THE LOCATIONS OF AT&T TEXAS/SWB/T FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
2. THE CONTRACTOR SHALL CALL 1-800-344-8377 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.
3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWB/T FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWB/T FACILITIES.
4. WHEN AT&T TEXAS/SWB/T FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES, THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.
5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWB/T UNDERGROUND CONDUIT FACILITIES OR BURIED CABLES ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.
6. PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER MR. ROOSEVELT LEE, JR. AT (713)567-4552 OR EMAIL HIM AT RL7259@ATT.COM, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR AT&T/SWB/T FACILITIES.

GENERAL NOTES-INSIDE CITY LIMITS

- 1. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS AND DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING, PUBLISHED BY THE CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING.
2. THE GEOTECHNICAL INVESTIGATION FOR THIS PROJECT WAS CONDUCTED IN ACCORDANCE WITH CHAPTER 11 OF THE LATEST EDITION OF THE PUBLICATION INFRASTRUCTURE DESIGN MANUAL, PUBLISHED BY THE CITY OF HOUSTON, DEPARTMENT OF THE PUBLIC WORKS AND ENGINEERING. SOILS REPORT WAS PREPARED BY HWJ ASSOCIATES, INC. REPORT NO. HG1218881, DATED FEBRUARY 20, 2015.
3. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713-223-4567/811 OR 800-344-8377 AND LONE STAR NOTIFICATION CENTER AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE §18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE CITY OF HOUSTON, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING'S STANDARD CONSTRUCTION SPECIFICATIONS AND DETAILS FOR WASTEWATER COLLECTION SYSTEM, WATER LINES, STORM DRAINAGE AND STREET PAVING, REFERENCED ABOVE, AT NO ADDITIONAL COST.
5. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING @ 832-394-9098 OR VIA FAX AT 832-395-4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
6. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.
7. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.
8. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
9. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS AND RECORD AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURN IT TO THE OFFICE OF THE CITY ENGINEER.

TCEQ GENERAL CONSTRUCTION NOTES

PROPOSED WATER WELL

- 1. THESE WATER WELL FACILITIES MUST BE CONSTRUCTED IN ACCORDANCE WITH THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS 30 TEXAS ADMINISTRATIVE CODE (TAC) CHAPTER 290 SUBCHAPTER D.
2. THE PREMISES, MATERIALS, TOOLS, AND DRILLING EQUIPMENT SHALL BE MAINTAINED SO AS TO MINIMIZE CONTAMINATION OF THE GROUNDWATER DURING DRILLING OPERATION.
3. WATER USED IN ANY DRILLING OPERATION SHALL BE OF SAFE SANITARY QUALITY. WATER USED IN THE MIXING OF DRILLING FLUIDS OR MUD SHALL CONTAIN A CHLORINE RESIDUAL OF AT LEAST 0.5 MILLIGRAMS PER LITER (MG/L).
4. THE SLUSH PIT SHALL BE CONSTRUCTED AND MAINTAINED SO AS TO MINIMIZE CONTAMINATION OF THE DRILLING MUD.
5. NO TEMPORARY TOILET FACILITIES SHALL BE MAINTAINED WITHIN 150 FEET OF THE WELL BEING CONSTRUCTED UNLESS THEY ARE OF A SEALED, LEAKPROOF TYPE.
6. THE CONSTRUCTION, DISINFECTION, PROTECTION, AND TESTING OF A WELL TO BE USED AS A PUBLIC WATER SUPPLY SOURCE MUST MEET THE FOLLOWING CONDITIONS.
A. THE CASING MATERIAL USED IN THE CONSTRUCTION OF WELLS FOR PUBLIC USE SHALL BE NEW CARBON STEEL, HIGH STRENGTH LOW ALLOY STEEL, STAINLESS STEEL OR PLASTIC. THE MATERIAL SHALL CONFORM TO AWWA STANDARDS. THE CASING SHALL EXTEND A MINIMUM OF 18 INCHES ABOVE THE ELEVATION OF THE FINISHED FLOOR OF THE PUMP ROOM OR NATURAL GROUND SURFACE AND A MINIMUM OF ONE INCH ABOVE THE SEALING BLOCK OR PUMP MOTOR FOUNDATION BLOCK WHEN PROVIDED. THE CASING SHALL EXTEND AT LEAST TO THE DEPTH OF THE SHALLOWEST WATER FORMATION TO BE DEVELOPED AND DEEPER, IF NECESSARY, IN ORDER TO ELIMINATE ALL UNDESIRABLE WATER BEARING STRATA. WELL CONSTRUCTION MATERIALS CONTAINING MORE THAN 0.25% LEAD ARE PROHIBITED.
B. THE SPACE BETWEEN THE CASING AND DRILL HOLE SHALL BE SEALED BY USING ENOUGH CEMENT UNDER PRESSURE TO COMPLETELY FILL AND SEAL THE ANNULAR SPACE BETWEEN THE CASING AND THE DRILL HOLE. THE WELL CASING SHALL BE CEMENTED IN THIS MANNER FROM THE TOP OF THE SHALLOWEST FORMATION TO BE DEVELOPED TO THE EARTH'S SURFACE. THE DRILLER SHALL UTILIZE A PRESSURE CEMENTATION METHOD IN ACCORDANCE WITH THE MOST CURRENT AWWA STANDARD FOR WATER WELLS (A100), APPENDIX C, SECTION C.2 (POSITIVE DISPLACEMENT EXTERIOR METHOD); SECTION C.3 (INTERIOR METHOD WITHOUT PLUG); SECTION C.4 (POSITIVE PLACEMENT, INTERIOR METHOD, DRILLABLE PLUG); AND SECTION C.5 (PLACEMENT THROUGH FLOAT SHOE ATTACHED TO BOTTOM OF CASING). THE GROUTING MIXTURE USED TO PRESSURE CEMENT THE ANNULAR SPACE SHALL BE NEAT CEMENT AS SPECIFIED IN THE MOST CURRENT AWWA STANDARD FOR WATER WELLS AND TO WHICH A MAXIMUM OF 6% BY DRY WEIGHT, BENTONITE AND 2% BY DRY WEIGHT, CALCIUM CHLORIDE MAY BE ADDED. THE MINIMUM ANNULAR SPACE BETWEEN THE OUTSIDE DIAMETER OF THE CASING PIPE AND THE BOREHOLE SHALL BE NO LESS THAN 1/2 INCHES IN RADIAL THICKNESS OR THREE INCHES IN NET DIAMETRICAL DIFFERENCE AND THE PRESSURE GROUTING SHALL BE FROM THE BOTTOM UPWARD UTILIZING ONE OF THE METHODS LISTED IN THIS SUBPARAGRAPH FOR ALL PUBLIC WATER SYSTEM GROUNDWATER WELL CONSTRUCTION.
C. ALL GRAVEL SHALL BE OF SELECTED AND GRADED QUALITY AND SHALL BE THOROUGHLY DISINFECTED WITH A 50 MG/L CHLORINE SOLUTION AS IT IS ADDED TO THE WELL CAVITY.
D. SAFEGUARDS SHALL BE TAKEN TO PREVENT POSSIBLE CONTAMINATION OF THE WATER OR DAMAGE BY TRESPASSERS FOLLOWING THE COMPLETION OF THE WELL AND PRIOR TO INSTALLATION OF PERMANENT PUMPING EQUIPMENT.
E. UPON WELL COMPLETION, OR AFTER AN EXISTING WELL HAS BEEN REWORKED, THE WELL SHALL BE DISINFECTED IN ACCORDANCE WITH CURRENT AWWA STANDARDS FOR WELL DISINFECTION EXCEPT THAT THE DISINFECTANT SHALL REMAIN IN THE WELL FOR AT LEAST SIX HOURS.
7. THE WELL SITE SHALL BE FINE GRADED SO THAT THE SITE IS FREE FROM DEPRESSIONS, REVERSE GRADES, OR AREAS TOO ROUGH FOR PROPER MAINTENANCE SO AS TO ENSURE THAT SURFACE WATER WILL DRAIN AWAY FROM THE WELL. IN ALL CASES, ARRANGEMENTS SHALL BE MADE TO CONVEY WELL PUMP DRAINAGE, PACKING GLAND LEAKAGE, AND FLOOR DRAINAGE AWAY FROM THE WELLHEAD. SUITABLE DRAIN PIPES LOCATED AT THE OUTER EDGE OF THE CONCRETE FLOOR SHALL BE PROVIDED TO COLLECT THIS WATER AND PREVENT ITS PONDING OR COLLECTING AROUND THE WELLHEAD. THIS WASTEWATER SHALL BE DISPOSED OF IN A MANNER THAT WILL NOT CAUSE ANY NUISANCE FROM MOSQUITO BREEDING OR STAGNATION. DRAINS SHALL NOT BE DIRECTLY CONNECTED TO STORM OR SANITARY SEWERS.
8. A CONCRETE SEALING BLOCK EXTENDING AT LEAST THREE FEET FROM THE WELL CASING IN ALL DIRECTIONS, WITH A MINIMUM THICKNESS OF SIX INCHES AND SLOPED TO DRAIN AWAY AT NOT LESS THAN 0.25 INCHES PER FOOT SHALL BE PROVIDED AROUND THE WELLHEAD.
9. WELLHEADS AND PUMP BASES SHALL BE SEALED BY A GASKET OR SEALING COMPOUND AND PROPERLY VENTED TO PREVENT THE POSSIBILITY OF CONTAMINATING THE WELL WATER. A WELL CASING VENT SHALL BE PROVIDED WITH AN OPENING THAT IS COVERED WITH 16 MESH OR FINER CORROSION RESISTANT SCREEN, FACING DOWNWARD, ELEVATED AND LOCATED SO AS TO MINIMIZE THE DRAWING OF CONTAMINANTS INTO THE WELL. WELLHEADS AND WELL VENTS SHALL BE AT LEAST TWO FEET ABOVE THE HIGHEST KNOWN WATERMARK OR 100 YEAR FLOOD ELEVATION, IF AVAILABLE OR ADEQUATELY PROTECTED FROM POSSIBLE FLOOD DAMAGE BY LEVEES.
10. IF A WELL BLOW OFF LINE IS PROVIDED, ITS DISCHARGE SHALL TERMINATE IN A DOWNWARD DIRECTION AND AT A POINT WHICH WILL NOT BE SUBMERGED BY FLOOD WATERS.
11. A SUITABLE SAMPLING COCK SHALL BE PROVIDED ON THE DISCHARGE PIPE OF EACH WELL PUMP PRIOR TO ANY TREATMENT.
12. FLOW MEASURING DEVICES SHALL BE PROVIDED FOR EACH WELL TO MEASURE PRODUCTION YIELDS AND PROVIDE FOR THE ACCUMULATION OF WATER PRODUCTION DATA. THESE DEVICES SHALL BE LOCATED TO FACILITATE DAILY READING.
13. ALL COMPLETED WELL UNITS SHALL BE PROTECTED BY INTRUDER RESISTANT FENCES, GATES OF WHICH ARE PROVIDED WITH LOCKS OR SHALL BE ENCLOSED IN LOCKED, VENTILATED WELL HOUSES TO EXCLUDE POSSIBLE CONTAMINATION OR DAMAGE TO THE FACILITIES BY TRESPASSERS. THE GATES OR WELLHOUSES SHALL BE LOCKED DURING PERIODS OF DARKNESS AND WHEN THE PLANT IS UNATTENDED.
14. AN ALL WEATHER ACCESS SHALL BE PROVIDED TO EACH WELL SITE.
15. AN AIR RELEASE DEVICE SHALL BE INSTALLED IN SUCH A MANNER AS TO PRECLUDE THE POSSIBILITY OF SUBMERGENCE OR POSSIBLE ENTRANCE OF CONTAMINANTS. IN THIS RESPECT, ALL OPENINGS TO THE ATMOSPHERE SHALL BE COVERED WITH 16 MESH OR FINER, CORROSION RESISTANT SCREENING MATERIAL OR AN ACCEPTABLE EQUIVALENT.

GRADING NOTES

- 1. GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE STARTING CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
2. BEFORE STARTING CONSTRUCTION, CONTRACTOR SHALL VERIFY BENCHMARK ELEVATION AND NOTIFY ENGINEER IF ANY DISCREPANCY AND/OR CONFLICT IS FOUND.
3. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN PAVED AREAS, AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
4. CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION.
5. ALL EXISTING CONCRETE PAVING, SIDEWALK, AND CURB DEMOLITION SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR. DISPOSAL SHALL BE AT AN APPROVED OFF-SITE, LAWFUL LOCATION, UNLESS DIRECTED OTHERWISE BY THE OWNER.

WATER LINES

- 1. WATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON INFRASTRUCTURE DESIGN MANUAL, STANDARD SPECIFICATION, AND CONSTRUCTION DETAILS.
2. 4" THRU 12" WATER LINES SHALL BE P.V.C. CLASS 150, DR-18, AWWA C-900 AND 1" THRU 3" WATER LINES SHALL BE P.V.C. SCHEDULE 40, 4" THRU 54" D.I.P. WATER LINES SHALL BE AWWA C161 (ANSI A21.51) AND DOUBLE WRAPPED IN 8-MIL POLYETHYLENE. PIPE SHALL BE LINED IN ACCORDANCE WITH AWWA C104 (ANSI A21.4).
3. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT. USE RESTRAINED JOINTS WHERE PREVENTING MOVEMENT OF 16" OR GREATER PIPE IS NECESSARY DUE TO THRUST.
4. ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT OF ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12" OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE.
5. ALL WATER LINE AND SEWER LINE CROSSINGS SHALL BE CONSTRUCTED PER CITY OF HOUSTON AND TCEQ REGULATIONS.
6. ALL WATER VALVES SHALL BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C-500 AND SHALL BE OF THE RESILIENT SEAT TYPE.
7. ALL WATER LINES TO BE DISINFECTED IN CONFORMANCE WITH AWWA C-651 AND THE TEXAS STATE DEPARTMENT OF HEALTH, AT LEAST ONE BACTERIOLOGICAL SAMPLE SHALL BE COLLECTED FOR EVERY 1,000 LINEAR FEET OF WATER LINE AND SHALL BE REPEATED IF CONTAMINATION PERSISTS.
8. ALL BELOW GRADE VALVES SHALL BE GASKETED, HUB-END GATE VALVES WITH A CAST IRON BOX, EXCEPT WHERE FLANGES ARE CALLED OUT ON THE PLANS.
9. 4" THRU 12" FITTINGS SHALL BE CEMENT MORTAR LINED COMPACT DUCTILE IRON PRESSURE FITTINGS PER ANSI A21.53, OR PUSH ON FITTINGS PER ANSI A21.10 PRESSURE RATED AT 250 PSIG.
10. HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON STANDARD CONSTRUCTION SPECIFICATIONS. TESTS ARE TO BE PERFORMED ON THE ENTIRE FOOTAGE OF WATER PIPE LINE INCLUDED IN THE PROJECT.
11. ALL WATER LINES TO HAVE 4' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEARANCE TO OTHER UTILITIES AT CROSSING UNLESS OTHERWISE NOTED ON PLANS. ALL WATER LINE INSTALLED OVER 8' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.
12. CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAPPED (OR OTHERWISE EFFECTIVELY COVERED) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.

INDEX OF DRAWINGS
COVER SHEET 1
NOTES AND LEGEND 2
SURVEY CONTROL MAP 3
EXISTING YARD LAYOUT 4
PROPOSED YARD LAYOUT 5
SURFACE DRAINAGE & GRADING 6
WELL DESIGN & DISCHARGE MANIFOLD 7
WELL DISCHARGE MANIFOLD DETAILS 8
GROUND STORAGE TANK CONNECTION 9
MISCELLANEOUS DETAILS SHEET 1 10
MISCELLANEOUS DETAILS SHEET 2 11
STORM SEWER PLAN & PROFILE 12
STORMWATER POLLUTION PREVENTION PLAN 13
STORMWATER POLLUTION PREVENTION PLAN DETAILS 14
PROJECT SIGN 15
STRUCTURAL WELL FOUNDATION PLAN AND SECTIONS 16
ELECTRICAL LEGENDS 17
ELECTRICAL ABBREVIATIONS AND NOTES 18
ELECTRICAL SITE PLAN 19
ELECTRICAL ENLARGED SITE PLAN 20
ELECTRICAL ONE-LINE DIAGRAM 21
ELECTRICAL CONTROL DIAGRAMS SHEET 1 22
ELECTRICAL CONTROL DIAGRAMS SHEET 2 23
ELECTRICAL DETAILS 24
ELECTRICAL WELL DETAILS 25
ELECTRICAL SCHEDULES 26
TRAFFIC CONTROL PLAN SHEET 1 27
TRAFFIC CONTROL PLAN SHEET 2 28
TRAFFIC CONTROL PLAN SHEET 3 29
TRAFFIC CONTROL PLAN SHEET 4 30
TRAFFIC CONTROL PLAN SHEET 5 31
TRAFFIC CONTROL PLAN SHEET 6 32
MISCELLANEOUS DETAILS SHEET 3 33

LEGEND

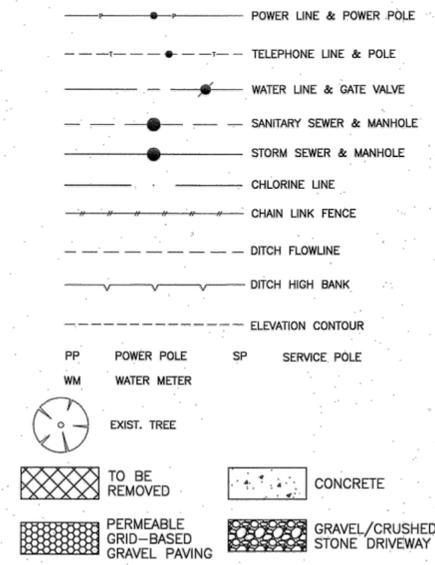


Table with columns: NO., REVISIONS, APP, DATE. Row 1: 1, ADDENDUM No. 1, JMC, 2-1-16

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL CENTERPOINT ENERGY AT 713-207-2222.
NOTICE:
FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINE CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

VERIFICATION OF PRIVATE UTILITY LINES

N/A Date:
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (This signature verifies that you have shown CNP Natural Gas lines correctly-not to be used for conflict verification.) (Gas service lines are not shown.) Signature valid for six months.
N/A Date:
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (This signature verifies existing underground facilities-not to be used for conflict verification.) Signature valid for six months.
AT&T TEXAS/SWB/T UTILITY LINES SHOWN
N/A Date:
Approved for AT&T Texas/SWB/T underground conduit facilities only. Signature valid for one year.

AEI ENGINEERING 616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 WWW.AEIENGINEERING.COM REGISTRATION No. F-1697

JAY M. CHAPMAN 616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 REGISTRATION No. F-1697
SURVEYED BY: GEO SOLUTIONS FB NO. P-5934
Professional Engineer Seal for Jay M. Chapman, Registration No. 93029, dated 24 SEP 2015.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEW/REPLACEMENT OF WATER WELL FOREST COVE III

NOTES AND LEGEND

Table with columns: WBS NUMBER, FOR CITY OF HOUSTON USE ONLY, DRAWING SCALE, CITY OF HOUSTON PM, SHEET NO. 2 OF 26. Includes drawing number 55254.

PA 2261226-003-004 New Replace Civil.dwg 9/24/2015 2:38:09 PM, Alex Long

LEGEND

- 63.4 PROPOSED NATURAL GROUND ELEVATION
- HB 63.4 PROPOSED HIGH BANK ELEVATION
- FL 62.0 PROPOSED FLOWLINE
- LIGHT POLE
- POWER POLE
- ELECTRIC BOX
- HIGH BANK

PROPOSED IMPROVEMENTS SURVEY CONTROL BASELINE STATIONS AND OFFSETS			
ITEM	DESCRIPTION	STATION	OFFSET
1	STORM MANHOLE	2+47.44	155.96' RT.
J1	STORM MANHOLE	2+47.44	126.49' RT.
J2	STORM MANHOLE	1+96.93	119.68' RT.
J3	STORM MANHOLE	1+56.66	81.19' RT.
J4	STORM MANHOLE	0+25.34	74.35' RT.
J5	STORM MANHOLE	-0+24.48	138.58' RT.
J6	STORM MANHOLE	-0+24.50	153.58' RT.
J7	TYPE "A" INLET	0+08.48	201.43' RT.
K	TYPE "A" INLET	2+67.46	169.90' RT.
L	TYPE "A" INLET	1+86.59	108.85' RT.

STORMWATER DETENTION VOLUME DETERMINATION		
	VALUE	UNITS
PROPOSED IMPERVIOUS AREA	100	SQUARE FEET
EXISTING OR PREVIOUS IMPERVIOUS AREA	0	SQUARE FEET
INCREASE IN IMPERVIOUS AREA	100	SQUARE FEET
DETENTION RATIO PER AVAILABILITY LETTER	0.50	ACRE-Feet/ACRE
DETENTION STORAGE REQUIRED	50	CUBIC FEET

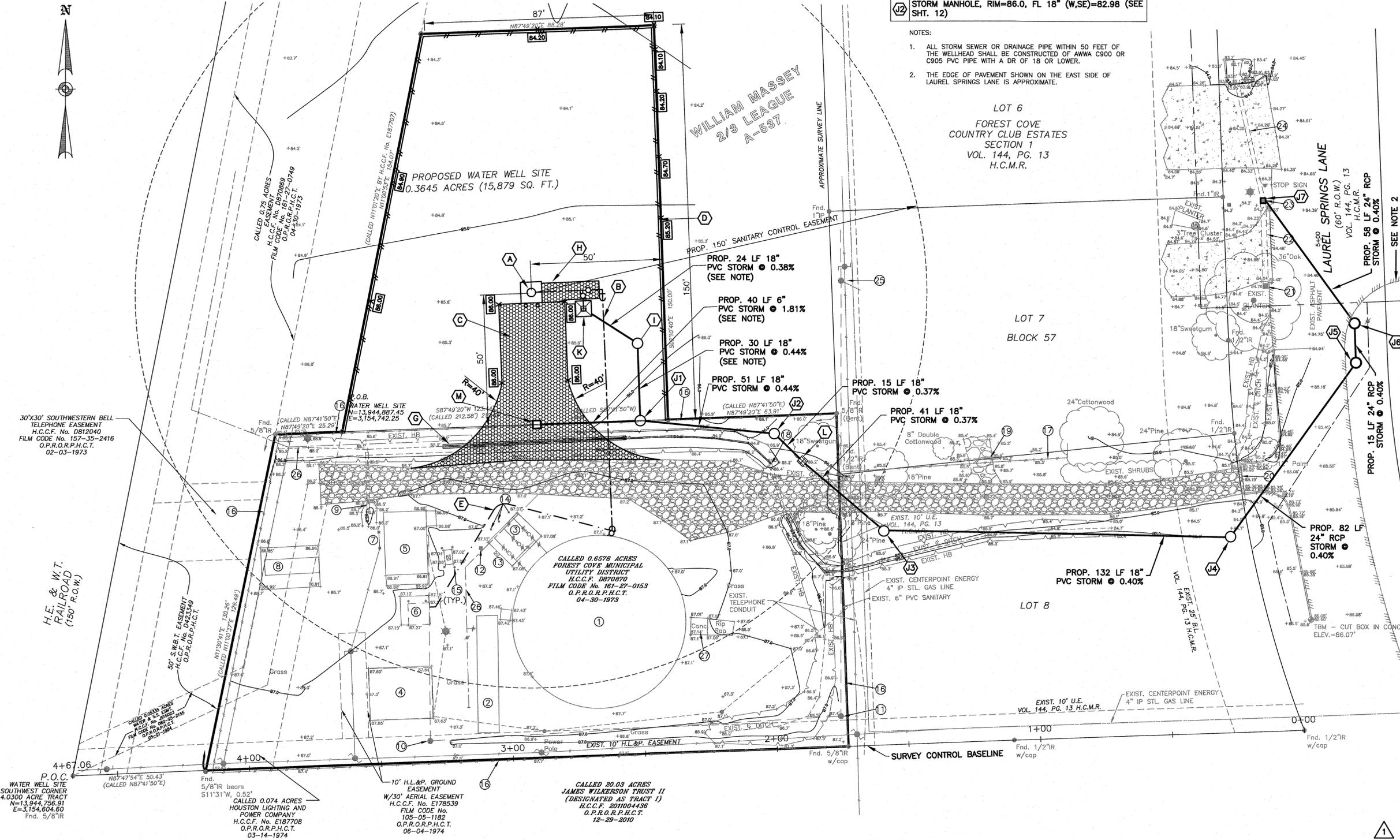
STORMWATER DETENTION VOLUME DETERMINATION IN PERMEABLE PAVING		
	VALUE	UNITS
PERMEABLE PAVING AREA	1,423	SQUARE FEET
PERMEABLE PAVING DEPTH	9.3	INCHES
PERMEABLE PAVING POROSITY	40%	
DETENTION STORAGE PROVIDED	441	CUBIC FEET

PROPOSED IMPROVEMENTS	
A	WATER WELL No. 5 (1,500-GPM DESIGN) (SEE SHT. 7)
B	8" WATER
C	PERMEABLE GRID-BASED GRAVEL PAVING (SEE SHT. 11)
D	6" HIGH CHAIN LINK FENCE W/3 STRANDS BARBED WIRE (SEE SHT. 11)
E	1" SCH 80 PVC CHLORINE LINE
F	BOLLARD (SEE SHT. 8)
G	TWO 6" PVC CULVERTS, FL TO MATCH EXISTING
H	PERMEABLE GRID-BASED GRAVEL SIDEWALK (SEE SHT. 11)
I	STORM MANHOLE, RIM=85.75, FL 18" (S,NW)=83.35 (SEE SHT. 12)
J1	STORM MANHOLE, RIM=86.0, FL 18" (N,E)=83.22, FL 6" (W)=84.00 (SEE SHT. 12)
J2	STORM MANHOLE, RIM=86.0, FL 18" (W,SE)=82.98 (SEE SHT. 12)

EXISTING IMPROVEMENTS	
1	1,000,000 GALLON GROUND STORAGE TANK
2	10,000 GALLON HYDRO-PNEUMATIC TANK
3	BOOSTER PUMPS AND SLAB
4	COVERED STORAGE
5	STORAGE AND ELECTRICAL BUILDING
6	CHLORINE BUILDING
7	ELECTRIC PANEL
8	DIESEL GENERATOR ON CONCRETE SLAB
9	12" RCP CULVERT, FL (N) 85.16, FL (S) 85.68
10	SANITARY MANHOLE, RIM ELEV. 87.33, 6" PVC (E) FL 79.93, 6" PVC (N) FL 80.93
11	SANITARY MANHOLE, RIM ELEV. 87.74, 6" PVC (W) FL 78.64, 6" PVC (N) FL 78.76
12	WATER METER
13	ELECTRIC BOX
14	CONCRETE COLUMNS
15	BOLLARD
16	6" CHAIN LINK FENCE
17	WOOD FENCE
18	12" RCP CULVERT, FL (N) 84.90, FL (S) 84.85
19	8" PVC CULVERT, FL (W) 84.96, FL (E) 85.07
20	12" PVC CULVERT, FL (N) 83.91, FL (S) 84.04
21	GRATE INLET, 24" RCP (N) 81.86
22	24" RCP CULVERT, FL (N) 81.68, FL (S) 81.86
23	GRATE INLET, 18" RCP FL (N) 81.65, 24" RCP FL (S) 81.86 (TO BE REPLACED)
24	18" RCP CULVERT, FL (N) 81.56, FL (S) 81.65
25	SANITARY MANHOLE, RIM ELEV. 85.46, 6" PVC (S) FL 79.06, 6" PVC (N) FL 79.01, 4" PVC (SE) FL 82.76
26	WATER LINE
27	CONCRETE BOX FOR OVERFLOW AND DRAIN

NOTES:

- ALL STORM SEWER OR DRAINAGE PIPE WITHIN 50 FEET OF THE WELLHEAD SHALL BE CONSTRUCTED OF ANWA C900 OR C905 PVC PIPE WITH A DR OF 18 OR LOWER.
- THE EDGE OF PAVEMENT SHOWN ON THE EAST SIDE OF LAUREL SPRINGS LANE IS APPROXIMATE.



NOTICE:
FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

VERIFICATION OF PRIVATE UTILITY LINES

N/A	Date:
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (This signature verifies that you have shown CNP Natural Gas lines correctly-not to be used for conflict verification.) (Gas service lines are not shown.) Signature valid for six months.	
N/A	Date:
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (This signature verifies existing underground facilities-not to be used for conflict verification.) Signature valid for six months.	
N/A	Date:
Suddenlink Communications	

AEI ENGINEERING
REGISTRATION No. F-1697

JAY M. CHAPMAN
616 CYPRESS CREEK PARKWAY
(FM 1960 WEST), SUITE 250
HOUSTON, TEXAS 77090
(281)350-7027
REGISTRATION No. F-1697

STATE OF TEXAS
JAY M. CHAPMAN
93029
LICENSED PROFESSIONAL ENGINEER
FEB 2016

SURVEYED BY: GEO SOLUTIONS
FB NO. P-5934

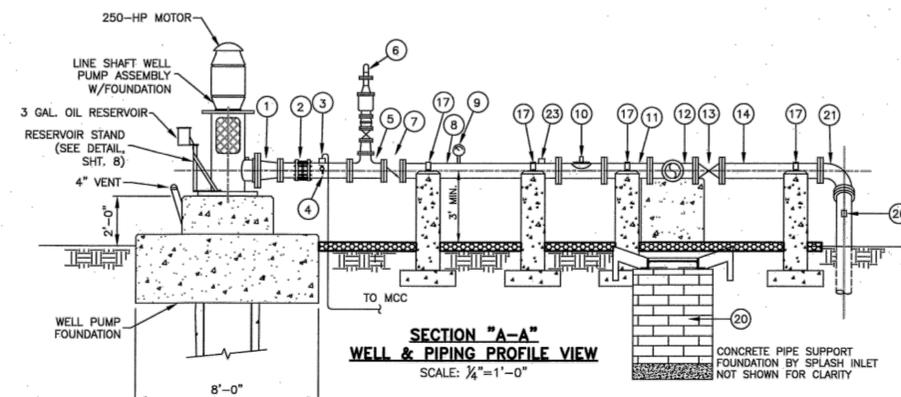
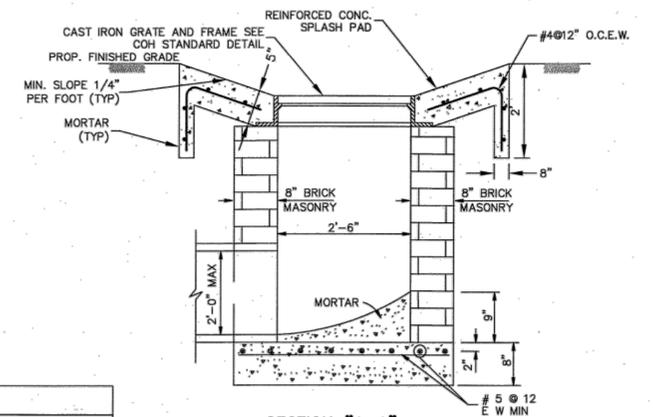
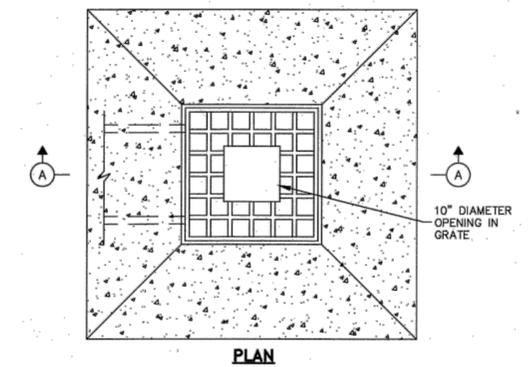
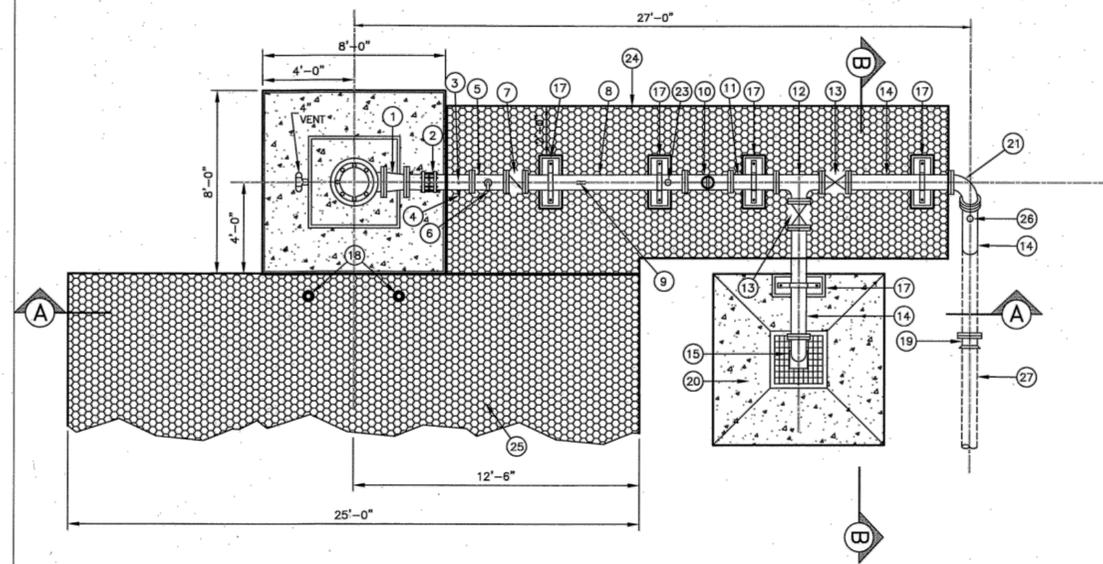
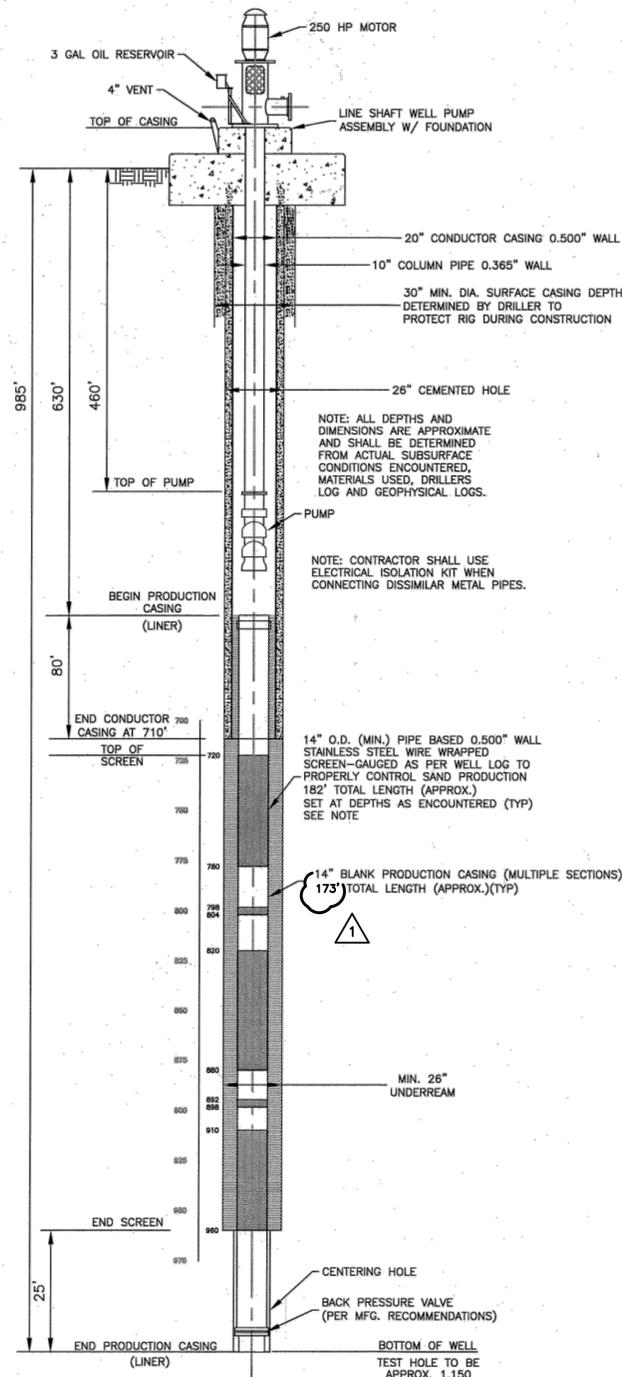
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
NEW/REPLACEMENT OF WATER WELL
FOREST COVE III

SURFACE DRAINAGE & GRADING

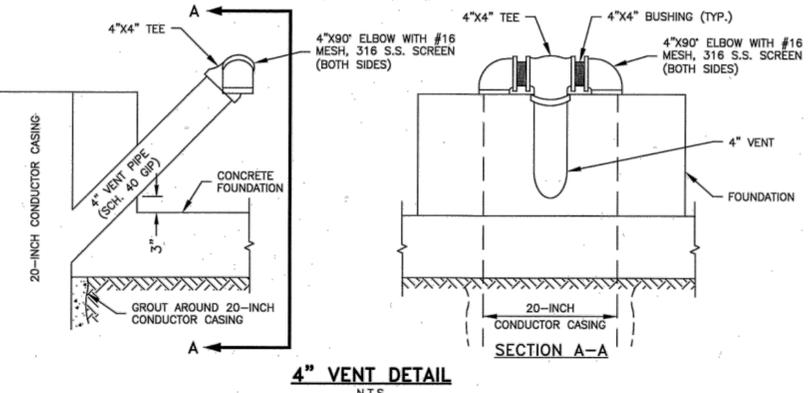
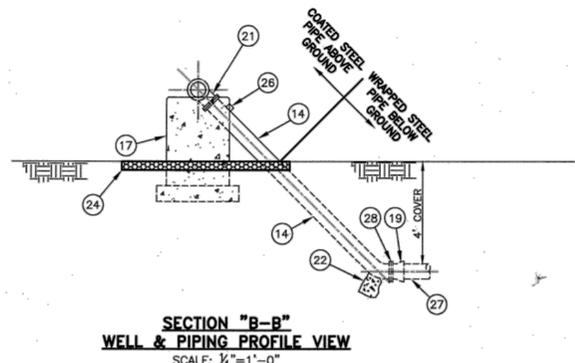
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
VERT. 1"=2' HORIZ. 1"=20'	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 6 OF 33	

NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16

P:\226-003-004 New Replace WW Forest Cove\dwg\07_Forest Well 5 Design Discharge.dwg, 8/27/2015 8:34:25 AM, Chau Luong



PIPING SCHEDULE	
1	10"x8" STEEL REDUCER (IF NECESSARY)
2	8" STEEL API 5L SPOOL W/ FLEXIBLE COUPLING (FIELD MEASURE)
3	HIGH PRESSURE CUTOFF SWITCH
4	3/4" SAMPLING COCK ASSEMBLY (SEE DETAIL, SHT. 8)
5	8"x4" TEE
6	4" AIR VACUUM RELEASE ASSEMBLY (SEE DETAIL, SHT. 8)
7	8" SILENT GLOBE CHECK VALVE
8	8" STEEL API 5L SPOOL (MIN. 6'-8")
9	PRESSURE GAUGE, 4" DIA., 1-150 PSI
10	8" FLOW PROPELLER METER PER COH STANDARD
11	8" STEEL API 5L SPOOL (MIN. 1'-4")
12	8" TEE
13	8" GATE VALVE, OS&Y
14	8" STEEL API 5L SPOOL (FIELD MEASURE)
15	8"x90° BEND (DISCHARGE ELEVATION SHALL BE AT LEAST 12" ABOVE GRATE)
16	8"x45° BEND
17	CONCRETE PIPE SUPPORT W/HOLD-DOWN STRAP (SEE DETAIL, SHT. 8)
18	BOLLARD (SEE DETAIL, SHT. 8)
19	8" BELL FLANGE D.I. ADAPTER
20	BLOWOFF SPLASH PAD W/INLET (SEE DETAIL, THIS SHT.)
21	8"x90° BEND, ROTATE 45° DOWN
22	CONCRETE THRUST BLOCK (SEE DETAIL, SHT. 8)
23	1" CORP. STOP WITH CAP
24	PERMEABLE GRID-BASED GRAVEL SIDEWALK (SEE DETAIL, SHT.11)
25	PERMEABLE GRID-BASED GRAVEL PAVING (SEE DETAIL, SHT. 11)
26	2" CORP. STOP WITH PLUG
27	8" DIP DISCHARGE PIPING
28	ISOLATION KIT



WELL BLOWOFF SPLASH PAD W/ INLET
N.T.S.

NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16

AEI ENGINEERING
616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 WWW.AEIENGINEERING.COM REGISTRATION No. F-1697

JAY M. CHAPMAN
616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 REGISTRATION No. F-1697

SURVEYED BY: GEO SOLUTIONS
FB NO. P-5934

Jay M. Chapman
27 AUG 2015

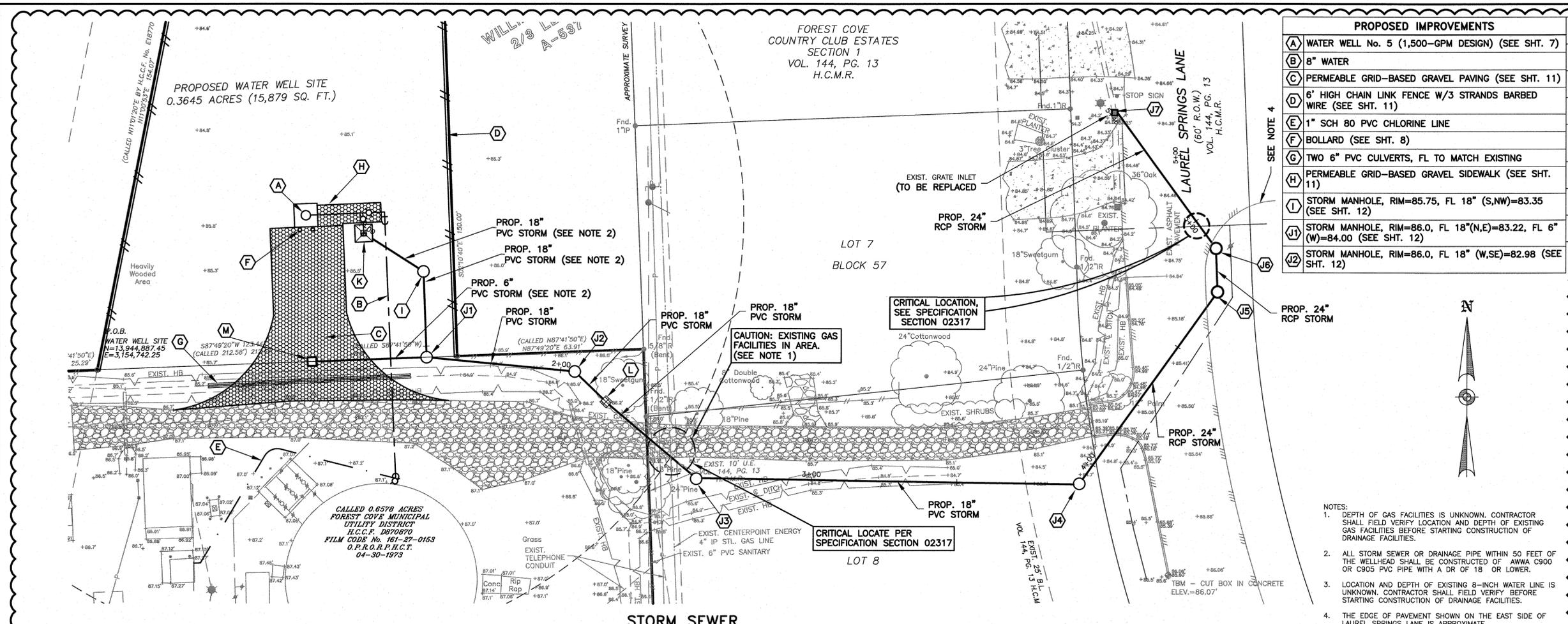
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
NEW/REPLACEMENT OF WATER WELL
FOREST COVE III

WELL DESIGN & DISCHARGE MANIFOLD

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
VERT. 1"=2' HORIZ. 1"=20'	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 7 OF 26	

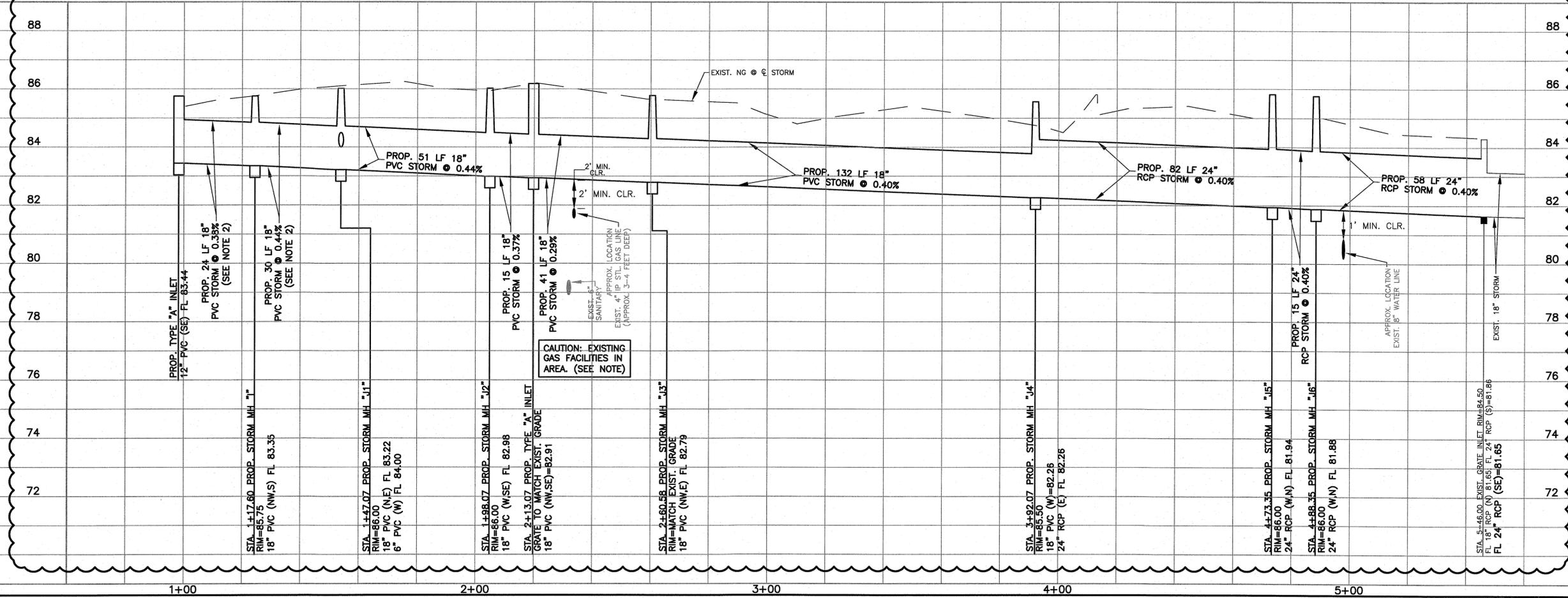
WELL PUMP SCHEDULE	
DESIGN PUMPING RATE (GPM)	1,500
T.D.H. (FEET)	355
R.P.M.	1,770
MOTOR HORSEPOWER	250
VOLTAGE	460
MFG.-MODEL	SEE SPECIFICATION

P:\226\226-003-004 New Replace WW Forest Cove\Drawings\12_Storm P&P.dwg, 1/28/2016 5:47:04 PM, Monet, Snyder



PROPOSED IMPROVEMENTS	
(A)	WATER WELL No. 5 (1,500-GPM DESIGN) (SEE SHT. 7)
(B)	8" WATER
(C)	PERMEABLE GRID-BASED GRAVEL PAVING (SEE SHT. 11)
(D)	6" HIGH CHAIN LINK FENCE W/3 STRANDS BARBED WIRE (SEE SHT. 11)
(E)	1" SCH 80 PVC CHLORINE LINE
(F)	BOLLARD (SEE SHT. 8)
(G)	TWO 6" PVC CULVERTS, FL TO MATCH EXISTING
(H)	PERMEABLE GRID-BASED GRAVEL SIDEWALK (SEE SHT. 11)
(I)	STORM MANHOLE, RIM=85.75, FL 18" (S,NW)=83.35 (SEE SHT. 12)
(J1)	STORM MANHOLE, RIM=86.0, FL 18"(N,E)=83.22, FL 6" (W)=84.00 (SEE SHT. 12)
(J2)	STORM MANHOLE, RIM=86.0, FL 18" (W,SE)=82.98 (SEE SHT. 12)
(J3)	STORM MANHOLE, RIM TO MATCH EXIST. GRADE, FL 18" (NW,E)=82.79 (SEE SHT. 12)
(J4)	STORM MANHOLE, RIM=85.50, FL 18" (W)=82.26, FL 24" (E)=82.26 (SEE SHT. 12)
(J5)	STORM MANHOLE, RIM=TO MATCH PVMT, FL 24" (W,N)=81.94 (SEE SHT. 12)
(J6)	STORM MANHOLE, RIM TO MATCH PAVEMENT, FL 24" (NW,S)=81.88
(J7)	TYPE "A" INLET, GRATE TO MATCH EXISTING, 18" RCP FL (N) 81.65, 24" RCP FL (S) 81.86, PROP 24" RCP FL (SE) 81.65
(K)	TYPE "A" INLET W/SPLASH PAD FOR BLOWOFF, GRATE=85.75, FL 18" (SE)=83.44 (SEE SHT. 12)
(L)	TYPE "A" INLET, GRATE TO MATCH EXIST. GRADE, FL 18" (NW,SE)=82.91 (SEE SHT. 12)
(M)	JUNCTION BOX, TOP TO MATCH PERMEABLE PAVING SURFACE, FL 6" (E)=84.73

- NOTES:
- DEPTH OF GAS FACILITIES IS UNKNOWN. CONTRACTOR SHALL FIELD VERIFY LOCATION AND DEPTH OF EXISTING GAS FACILITIES BEFORE STARTING CONSTRUCTION OF DRAINAGE FACILITIES.
 - ALL STORM SEWER OR DRAINAGE PIPE WITHIN 50 FEET OF THE WELLHEAD SHALL BE CONSTRUCTED OF AWWA C900 OR C905 PVC PIPE WITH A DR OF 18" OR LOWER.
 - LOCATION AND DEPTH OF EXISTING 8-INCH WATER LINE IS UNKNOWN. CONTRACTOR SHALL FIELD VERIFY BEFORE STARTING CONSTRUCTION OF DRAINAGE FACILITIES.
 - THE EDGE OF PAVEMENT SHOWN ON THE EAST SIDE OF LAUREL SPRINGS LANE IS APPROXIMATE.



NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-18

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL CENTERPOINT ENERGY AT 713-207-2222.

NOTICE:
FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS VERIFICATION DOES NOT FULFILL YOUR OBLIGATION TO CALL 811.

VERIFICATION OF PRIVATE UTILITY LINES

N/A Date: _____
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (This signature verifies that you have shown CNP Natural Gas lines correctly-not to be used for conflict verification.) (Gas service lines are not shown.) Signature valid for six months.

N/A Date: _____
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (This signature verifies existing underground facilities-not to be used for conflict verification.) Signature valid for six months.

N/A Date: _____
Suddenlink Communications

AEI ENGINEERING
616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 WWW.AEIENGINEERING.COM REGISTRATION No. F-1697

JAY M. CHAPMAN
616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 REGISTRATION No. F-1697

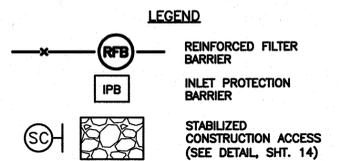
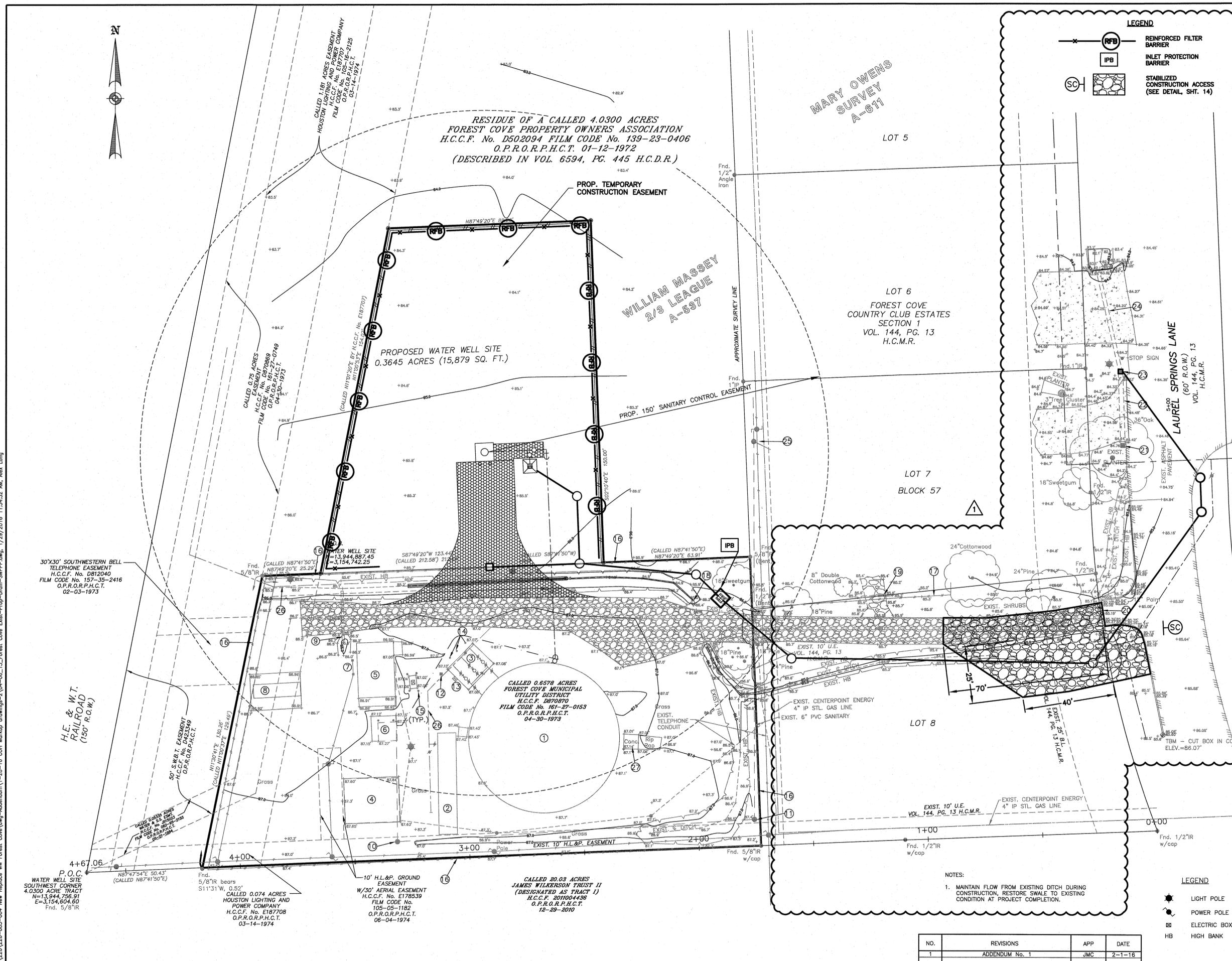
SURVEYED BY: GEO SOLUTIONS
FB NO. P-5934

Jay M. Chapman
FEB 28 2016

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
NEW/REPLACEMENT OF WATER WELL FOREST COVE III

STORM SEWER PLAN & PROFILE	
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
VERT. 1"=2' HORIZ. 1"=20'	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 12 OF 33	

P:\226\226-003-004 New Replace WW Forest Cove\wg-Addendum\1-28-16 COH Markup drawings-A\04-06-13_Forest Cove_Exist-Prop-SWPPP.dwg, 1/29/2016 11:54:52 AM, Alex Long



EXISTING IMPROVEMENTS	
1	1,000,000 GALLON GROUND STORAGE TANK
2	10,000 GALLON HYDRO-PNEUMATIC TANK
3	BOOSTER PUMPS AND SLAB
4	COVERED STORAGE
5	STORAGE AND ELECTRICAL BUILDING
6	CHLORINE BUILDING
7	ELECTRIC PANEL
8	DIESEL GENERATOR ON CONCRETE SLAB
9	12" RCP CULVERT, FL (N) 85.16, FL (S) 85.68
10	SANITARY MANHOLE, RIM ELEV. 87.33, 6" PVC (E) FL 79.93, 6" PVC (N) FL 80.93
11	SANITARY MANHOLE, RIM ELEV. 87.74, 6" PVC (W) FL 78.64, 6" PVC (N) FL 78.76
12	WATER METER
13	ELECTRIC BOX
14	CONCRETE COLUMNS
15	BOLLARD
16	6" CHAIN LINK FENCE
17	WOOD FENCE
18	12" RCP CULVERT, FL (N) 84.90, FL (S) 84.85
19	8" PVC CULVERT, FL (W) 84.96, FL (E) 85.07
20	12" PVC CULVERT, FL (N) 83.91, FL (S) 84.04
21	GRATE INLET, 24" RCP (N) 81.86
22	24" RCP CULVERT, FL (N) 81.68, FL (S) 81.86
23	GRATE INLET, 18" RCP FL (N) 81.65, 24" RCP FL (S) 81.86 (TO BE REPLACED)
24	18" RCP CULVERT, FL (N) 81.56, FL (S) 81.65
25	SANITARY MANHOLE, RIM ELEV. 85.46, 6" PVC (S) FL 79.06, 6" PVC (N) FL 79.01, 4" PVC (SE) FL 82.76
26	WATER LINE
27	CONCRETE BOX FOR OVERFLOW AND DRAIN

TO ARRANGE FOR LINES TO BE TURNED OFF OR MOVED, CALL CENTERPOINT ENERGY AT 713-207-2222.

VERIFICATION OF PRIVATE UTILITY LINES	
N/A	Date:
CENTERPOINT ENERGY/NATURAL GAS FACILITIES VERIFICATION ONLY. (This signature verifies that you have shown CNP Natural Gas lines correctly-not to be used for conflict verification.) (Gas service lines are not shown.) Signature valid for six months.	
N/A	Date:
CENTERPOINT ENERGY/UNDERGROUND ELECTRICAL FACILITIES VERIFICATION ONLY. (This signature verifies existing underground facilities-not to be used for conflict verification.) Signature valid for six months.	
N/A	Date:
Suddenlink Communications	

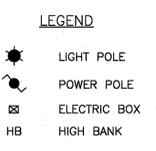
AEI ENGINEERING
 616 CYPRESS CREEK PARKWAY
 (FM 1960 WEST), SUITE 250
 HOUSTON, TEXAS 77090
 (281)350-7027
 WWW.AEIENGINEERING.COM
 REGISTRATION No. F-1697

JAY M. CHAPMAN
 616 CYPRESS CREEK PARKWAY
 (FM 1960 WEST), SUITE 250
 HOUSTON, TEXAS 77090
 (281)350-7027
 REGISTRATION No. F-1697

CITY OF HOUSTON
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
 NEW/REPLACEMENT OF WATER WELL
 FOREST COVE III
 STORMWATER POLLUTION
 PREVENTION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
VERT. 1"=2' HORIZ. 1"=20'	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 13 OF 33	

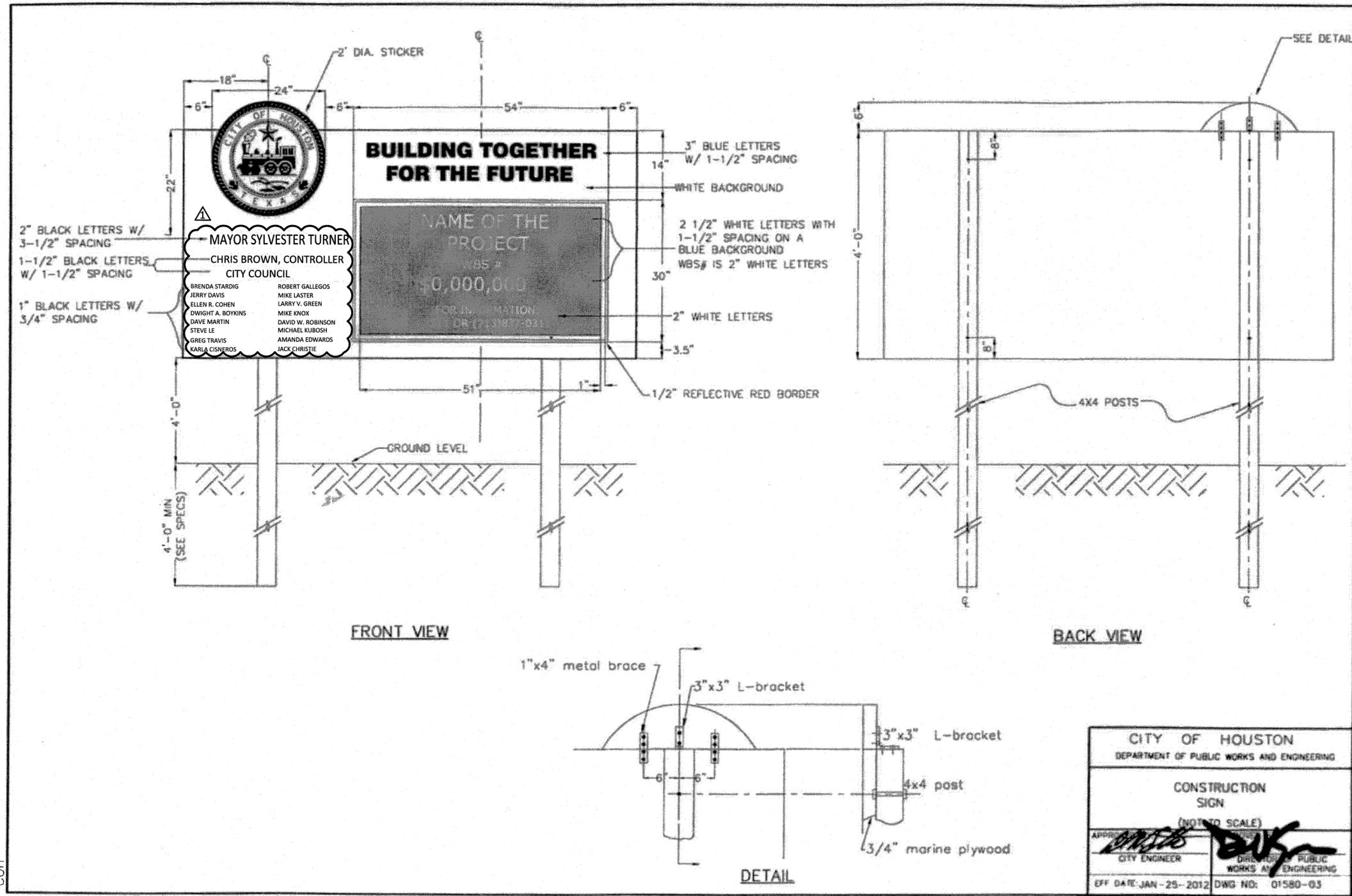
NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16



NOTES:
 1. MAINTAIN FLOW FROM EXISTING DITCH DURING CONSTRUCTION, RESTORE SWALE TO EXISTING CONDITION AT PROJECT COMPLETION.

P:\26\226-003-004 New Replace WW Forest Cove (dwg-Addendum)\1-26-16 COH Markup drawings-2\15_Project Sign Final.dwg, 1/29/2016 8:57:16 AM, Chau Luong

COH



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

CONSTRUCTION SIGN
(NOT TO SCALE)

APPROVED: [Signature] CITY ENGINEER

DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JAN - 25 - 2012 DWG NO: 01580-03

NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16

AEI ENGINEERING

616 CYPRESS CREEK PARKWAY
(FM 1960 WEST), SUITE 250
HOUSTON, TEXAS 77090
(281)350-7027
WWW.AEIENGINEERING.COM
REGISTRATION No. F-1697

JAY M. CHAPMAN
616 CYPRESS CREEK PARKWAY
(FM 1960 WEST), SUITE 250
HOUSTON, TEXAS 77090
(281)350-7027
REGISTRATION No. F-1697

SURVEYED BY: GEO SOLUTIONS
FB NO. P-5934

STATE OF TEXAS
JAY M. CHAPMAN
93029
LICENSED PROFESSIONAL ENGINEER

[Signature]
FEB 2016

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEW/REPLACEMENT OF WATER WELL
FOREST COVE III

PROJECT SIGN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
VERT. 1"=2' HORIZ. 1"=20'	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 15 OF 33	

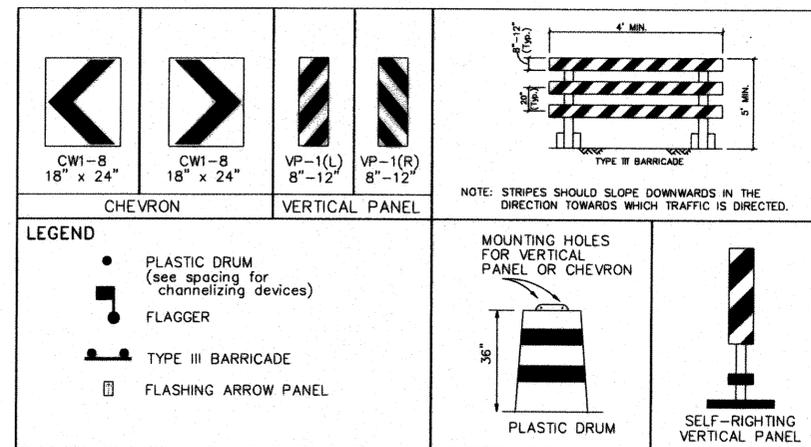
GENERAL NOTES

1. The Contractor shall provide and install traffic control devices in conformance with Part VI of Texas Manual on Uniform Traffic Control Devices (TMUTCD) latest edition with revisions during the entire construction period.
2. All signs and traffic control devices shall conform to the latest version of the TMUTCD.
3. No lanes shall be closed during the hours of 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM Monday thru Friday without approval of the City Traffic Engineer.
4. No work shall be performed in residential areas from 7:00 PM to 7:00 AM.
5. Contractor shall maintain approved number of thru lanes of traffic in each direction during construction working hours. Traffic control plans shall include one-way and/or detour plans.
6. Contractor shall maintain traffic lanes and detours according to traffic control plans during working hours.
7. Contractor shall cover open pavement excavations for minor utility work with anchored steel plates during non-working hours, and open lanes for normal traffic flow when feasible.
8. If the Contractor chooses to use a different method of "Traffic Control Plans" during the construction than what is outlined in the contract drawings, the Contractor shall be responsible to prepare and submit an alternate set of traffic control plans to the City of Houston Project Manager for approval ten working days prior to implementation. These plans shall be drawn to scale on reproducible mylars and shall be sealed by a Licensed Engineer in the State of Texas. Traffic Operations Division representative approval is required to accept the proposed changes.
9. Contractor shall secure lane/sidewalk closure permits from Traffic Operations Division (Mobility Permit Section at <http://www.gims.houston.tx.gov/portal/WS/MainPortal.aspx>) before implementing the traffic control plan. The application must be submitted at least ten business days prior to the implementation of the traffic control plan and/or beginning construction work. The contractor shall provide traffic control plans, construction sequencing, and schedule with the application.
10. Contractor shall have approved traffic control plan and permit at the job site for inspection at all times.
11. During pavement surface restoration projects; the Contractor shall not open closed lanes until the pavement surface has cured enough to allow vehicular traffic according to City of Houston Standard Specifications.
12. The Contractor is responsible for scheduling and coordinating all construction activities with stake holders in the vicinity including emergency response agencies such as Houston Police Department, Houston Fire Department, and Metropolitan Transit Authority.
13. Contractor shall be responsible for issuing all work directives to all sub-contractors, utility companies, and all other entities performing construction work associated with the project.
14. Nothing in these notes or plans shall relieve the Contractor of the responsibility for job site conditions during the course of construction of the project; including safety of all modes of transportation, persons, and property, and that this requirement shall apply continuously and not be limited to working hours.
15. The Traffic Operation Division (Mobility Permits Group) per the direction of the City Traffic Engineer have the right to demand the installation of additional traffic control devices or modifications to these plans and notes, as deemed necessary to promote the safe and orderly flow of traffic and pedestrians through the construction work zone. The Contractor shall comply with these additional requests or modifications with due diligence.
16. All existing traffic control signs and pavement markings shall be maintained in visible locations during construction unless prior written approval is obtained from City of Houston Project Manager. The Contractor shall restore or replace (at the discretion of the City Traffic Engineer) any pavement marking or signing damaged during construction operations, including Raised Pavement Markers (RPMs) and chip seal markers.
17. When entering or leaving roadways carrying public traffic, the Contractor's equipment, whether empty or loaded shall in all cases yield to public traffic with assistance by Contractor provided certified flagger/peace officer.
18. Access to driveways adjacent to the construction work zone shall be maintained at all times as much as possible. Additional cones delineators may be required to delineate the driveway access route through the construction work zone. A minimum of one travel lane shall be maintained across the driveways, unless prior written approval is obtained from City of Houston Project Manager.
19. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor.
20. The Contractor shall submit an application for temporary parking restrictions if there are parking meters located at the proposed lane closures from Parking Management Division (832-393-8690) at least ten business days before implementation of lane closures. In addition, temporary no parking signs shall be posted 24 hours prior to commencement of work.
21. Additional off duty police officers/flaggers may be requested to direct traffic when lanes are blocked at the discretion of the City Project Manager even if they are not specifically identified on the project plans.
22. The Contractor shall replace within 72 hours, all traffic signal loop detectors damaged during construction.
23. In general, a solar powered flashing arrow board shall be required on all major thoroughfare lane closures. Exceptions to flashing arrow boards and/or implementation on residential lane closures shall be approved by the City Traffic Engineer.
24. Approved traffic control plan shall be in place before starting any excavation.

SPACING FOR CHANNELIZING DEVICES

- A. Plastic drums on merging taper @ 30' c - c with chevron sign @ 60' c - c and warning lights for overnight closure.
- B. Plastic drums on downstream taper @ 30' c - c (return taper and barricade are optional and divided roadway section)
- C. Plastic drums on radii @ 35' c - c.
- D. Plastic drums on tangent @ 35' c - c with vertical panel at 70' c - c and approved warning light @ 70' c - c (for overnight closure).
- E. Plastic drums in front of construction zone @ 20' c - c with vertical panel at 40' c - c and approved warning light @ 40' c - c (for overnight closure).
- F. Concrete Traffic Barrier (CTB) or Low Profile Concrete Traffic Barrier (LPCTB) with approved reflectors @ 10' c - c if pavement drop is greater than 1 foot.
- G. Plastic drums w/Guard rail mounted.
- H. Self-Righting vertical panel spacing.
 - 4 lanes to 2 lanes undivided roadway section @ 20' c - c.
 - 4 lanes divided roadway to one side two way roadway @ 20' c - c.
 - Left lane and right lane storage bays @ 15' c - c.
- I. Spacing shown on traffic control shall supersede the above spacing.
- J. Spacing may be adjusted to provide driveways, intersections and /or median openings.

CHANNELIZATION AND BARRICADES



TYPICAL SIGN SPACING, TAPER LENGTHS, AND SUGGESTED SPACING OF CHANNELIZATION DEVICES						
Posted Speed (mph)	Sign Spacing "X"	Min. Desirable Taper Length "L"			Suggested Maximum Spacing Of Device	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	120'	150'	165'	180'	30'	60' - 75'
35	160'	205'	225'	245'	35'	70' - 90'
40	240'	265'	295'	320'	40'	80' - 100'
45	320'	450'	495'	540'	45'	90' - 110'
50	400'	500'	550'	600'	50'	100' - 125'
55	500'	550'	605'	660'	55'	110' - 140'

Length for Buffers	
Posted Speed (mph)	Length in Feet (B)
20	40
25	60
30	90
35	120
40	155
45	195
50	240
55	295
60	350
65	410
70	475

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TCP NOTES
CHANNELIZING DEVICES
AND BARRICADES

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER

APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2012 DWG NO: 01512-01

NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16

AEI ENGINEERING

616 CYPRESS CREEK PARKWAY
(FM 1960 WEST), SUITE 250
HOUSTON, TEXAS 77090
(281)350-7027
WWW.AEIENGINEERING.COM
REGISTRATION No. F-1697

JAY M. CHAPMAN
616 CYPRESS CREEK PARKWAY
(FM 1960 WEST), SUITE 250
HOUSTON, TEXAS 77090
(281)350-7027
REGISTRATION No. F-1697

SURVEYED BY: GEO SOLUTIONS
FB NO. P-5934

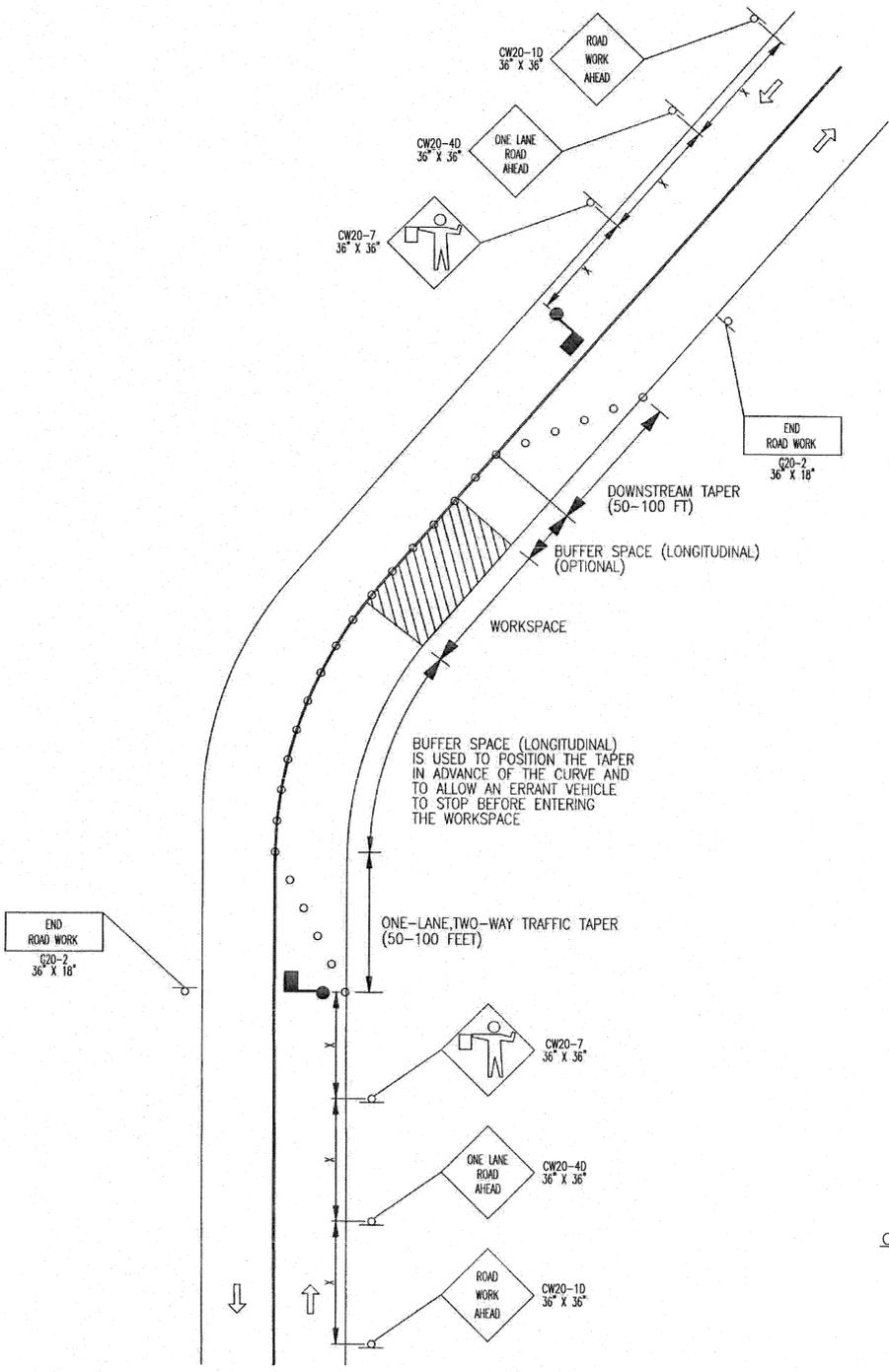
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEW/REPLACEMENT OF WATER WELL
FOREST COVE III

TRAFFIC CONTROL PLAN
SHEET 1

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 27 OF 33	

P:\226\226-003-004 New Replace WW Forest Cove Wdg-Addendum\1-28-16 COI Markup drawings-2\29_TOP Plan_3.dwg, 1/29/2016 8:11:35 AM, Monet Snyder



ONE-LANE, TWO-WAY TRAFFIC TAPER
SEE SHEET 20 FOR SIGN SPACING

- NOTES:**
- SEE SHEET No. 27 FOR TRAFFIC CONTROL NOTES AND SHEET No. 32 FOR STANDARD BARRICADE DETAILS.
 - CONTRACTOR SHALL ADJUST LOCATION OF TRAFFIC SIGNAL HEADS AND OVERHEAD SIGNS TO LINE-UP WITH TEMPORARY TRAFFIC LANES AT ALL TIMES.

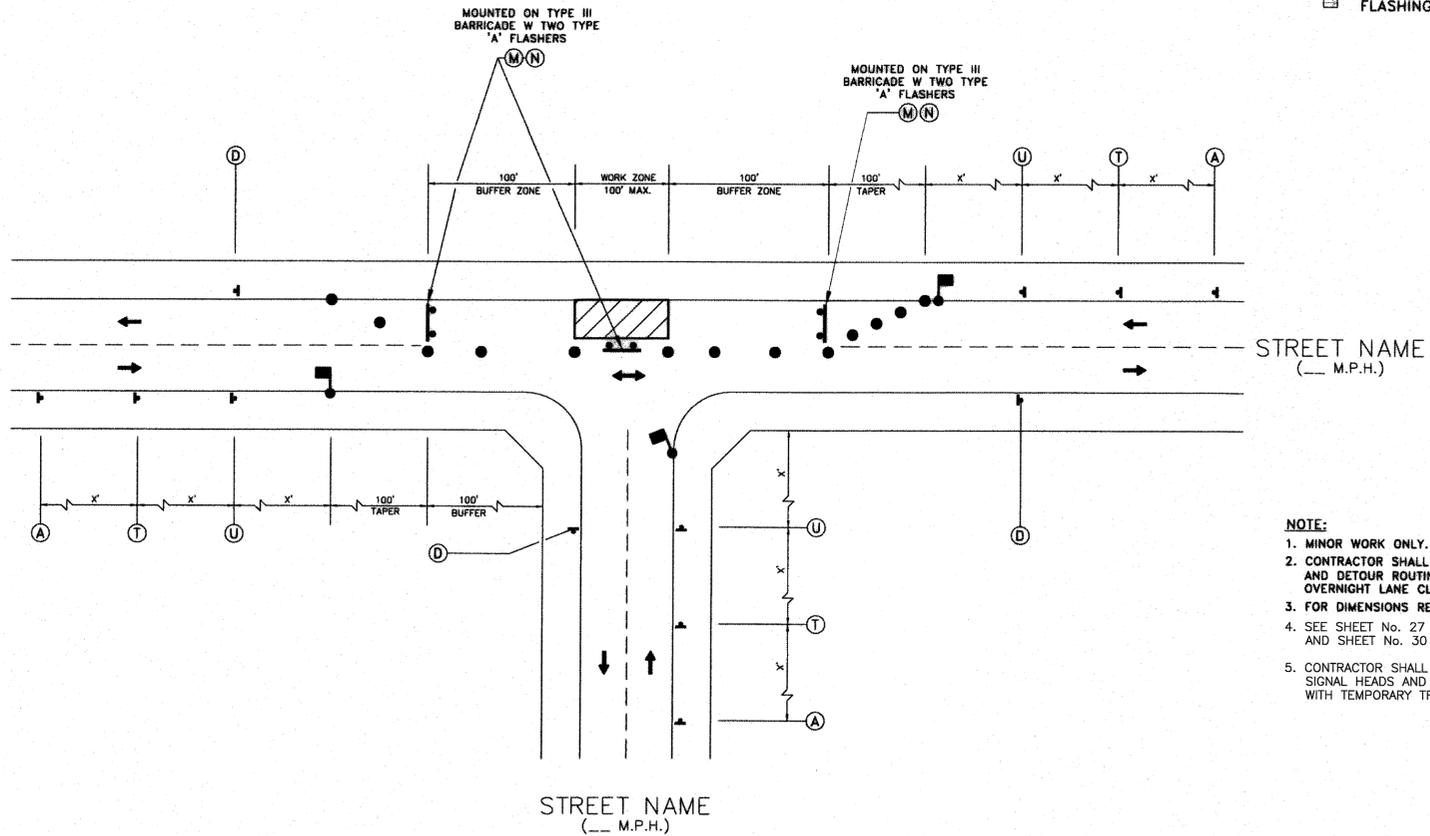
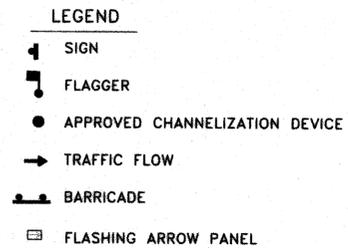
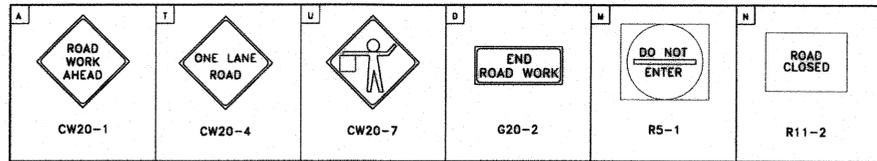
- LEGEND:**
- ➔ DIRECTION OF TRAVEL
 - CHANNELIZING DEVICE
 - ▨ WORK ZONE
 - 🚧 FLAGGER
 - △ SIGN

NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16

<p>AEI ENGINEERING</p>	<p>616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 WWW.AEIENGINEERING.COM REGISTRATION No. F-1697</p>
	<p>JAY M. CHAPMAN 616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 REGISTRATION No. F-1697</p>
<p>SURVEYED BY: GEO SOLUTIONS FB NO. P-5934</p>	

<p>CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING NEW/REPLACEMENT OF WATER WELL FOREST COVE III</p> <p style="text-align: center;">TRAFFIC CONTROL PLAN SHEET 3</p>	
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 29 OF 33	

P:\226\226-003-004 New Replace WW Forest Cove Hwy-Addendum\1-28-16 CH Markup drawings-2\30_TCP Plan 4.dwg, 1/28/2016 5:26:29 PM, Chau Liang



**PHASE 1 OF 3
TYPICAL CONSTRUCTION ZONE
AT A T-INTERSECTION**

- NOTE:**
- MINOR WORK ONLY.
 - CONTRACTOR SHALL USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR MAJOR OPERATIONS AND OVERNIGHT LANE CLOSURES.
 - FOR DIMENSIONS REFER TO SHEET 01512-01
 - SEE SHEET No. 27 FOR TRAFFIC CONTROL NOTES AND SHEET No. 30 FOR STANDARD BARRICADE DETAILS.
 - CONTRACTOR SHALL ADJUST LOCATION OF TRAFFIC SIGNAL HEADS AND OVERHEAD SIGNS TO LINE-UP WITH TEMPORARY TRAFFIC LANES AT ALL TIMES.

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
TCP TYPICAL 3-WAY INTERSECTION PHASE 1 OF 3 (NOT TO SCALE)	
APPROVED BY: <i>[Signature]</i> CITY ENGINEER	APPROVED BY: <i>[Signature]</i> DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2012	DWG NO: 01512-06

NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16

AEI ENGINEERING
616 CYPRESS CREEK PARKWAY
(FM 1960 WEST), SUITE 250
HOUSTON, TEXAS 77090
(281)350-7027
WWW.AEIENGINEERING.COM
REGISTRATION No. F-1697

JAY M. CHAPMAN
616 CYPRESS CREEK PARKWAY
(FM 1960 WEST), SUITE 250
HOUSTON, TEXAS 77090
(281)350-7027
REGISTRATION No. F-1697

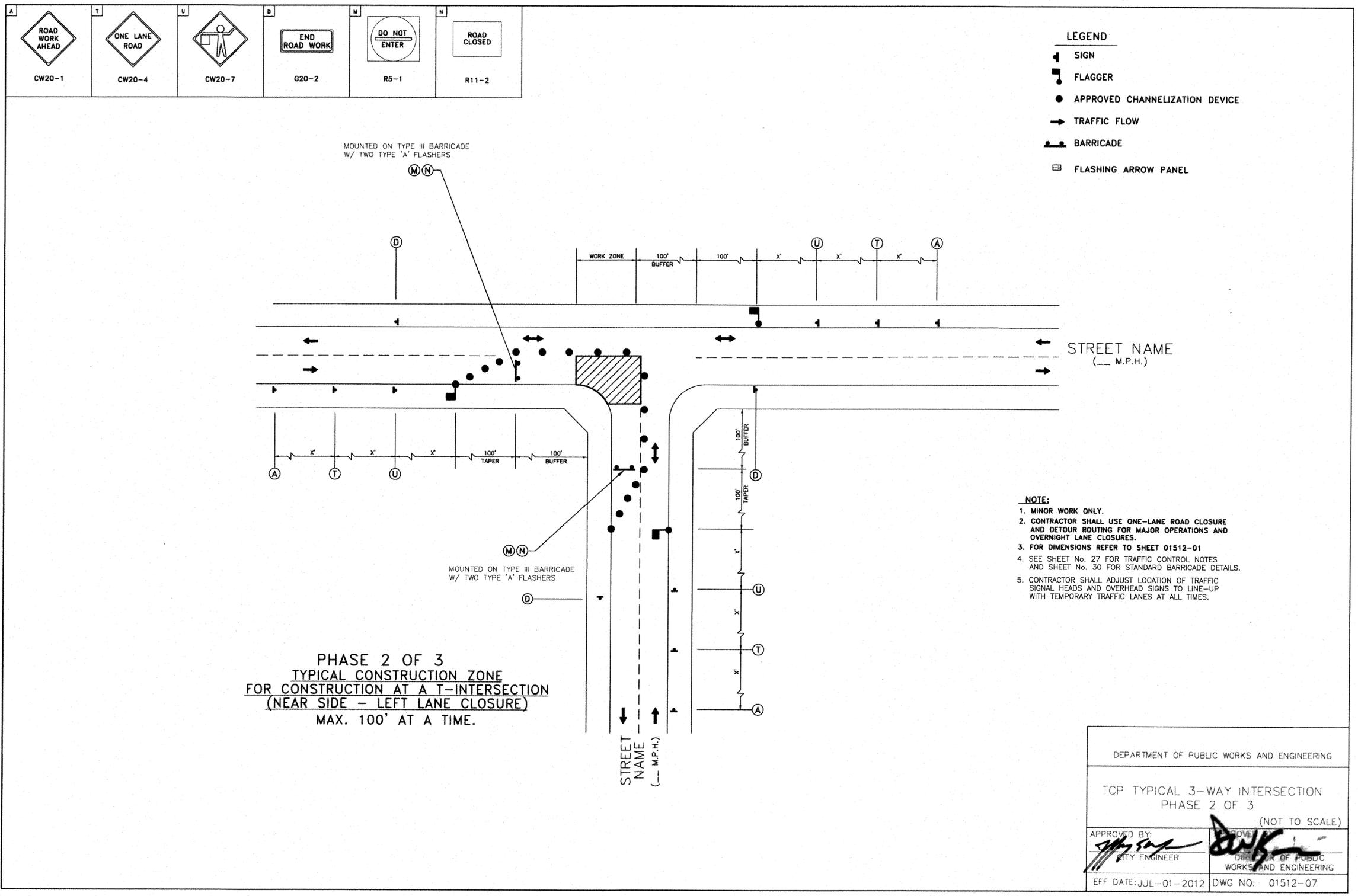
[Professional Engineer Seal]
JAY M. CHAPMAN
93029
LICENSED PROFESSIONAL ENGINEER

SURVEYED BY: GEO SOLUTIONS
FB NO. P-5934
[Signature]
1 FEB 2016

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
NEW/REPLACEMENT OF WATER WELL
FOREST COVE III
TRAFFIC CONTROL PLAN
SHEET 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 30 OF 33	

P:\226\226-003-004 New Replace WW Forest Cove.dwg-Addendum\1-28-16 CH Markup drawings-2\31_TCP Plan 5.dwg, 1/28/2016 5:24:03 PM, Chou Liang



- NOTE:**
1. MINOR WORK ONLY.
 2. CONTRACTOR SHALL USE ONE-LANE ROAD CLOSURE AND DETOUR ROUTING FOR MAJOR OPERATIONS AND OVERNIGHT LANE CLOSURES.
 3. FOR DIMENSIONS REFER TO SHEET 01512-01
 4. SEE SHEET No. 27 FOR TRAFFIC CONTROL NOTES AND SHEET No. 30 FOR STANDARD BARRICADE DETAILS.
 5. CONTRACTOR SHALL ADJUST LOCATION OF TRAFFIC SIGNAL HEADS AND OVERHEAD SIGNS TO LINE-UP WITH TEMPORARY TRAFFIC LANES AT ALL TIMES.

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TCP TYPICAL 3-WAY INTERSECTION
PHASE 2 OF 3
(NOT TO SCALE)

APPROVED BY: *[Signature]*
CITY ENGINEER

APPROVED BY: *[Signature]*
DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2012 DWG NO: 01512-07

NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16

AEI ENGINEERING
616 CYPRESS CREEK PARKWAY
(FM 1960 WEST), SUITE 250
HOUSTON, TEXAS 77090
(281)350-7027
WWW.AEIENGINEERING.COM
REGISTRATION No. F-1697

JAY M. CHAPMAN
616 CYPRESS CREEK PARKWAY
(FM 1960 WEST), SUITE 250
HOUSTON, TEXAS 77090
(281)350-7027
REGISTRATION No. F-1697

SURVEYED BY: GEO SOLUTIONS
FB NO. P-5934

Jay M. Chapman
1 FEB 2016

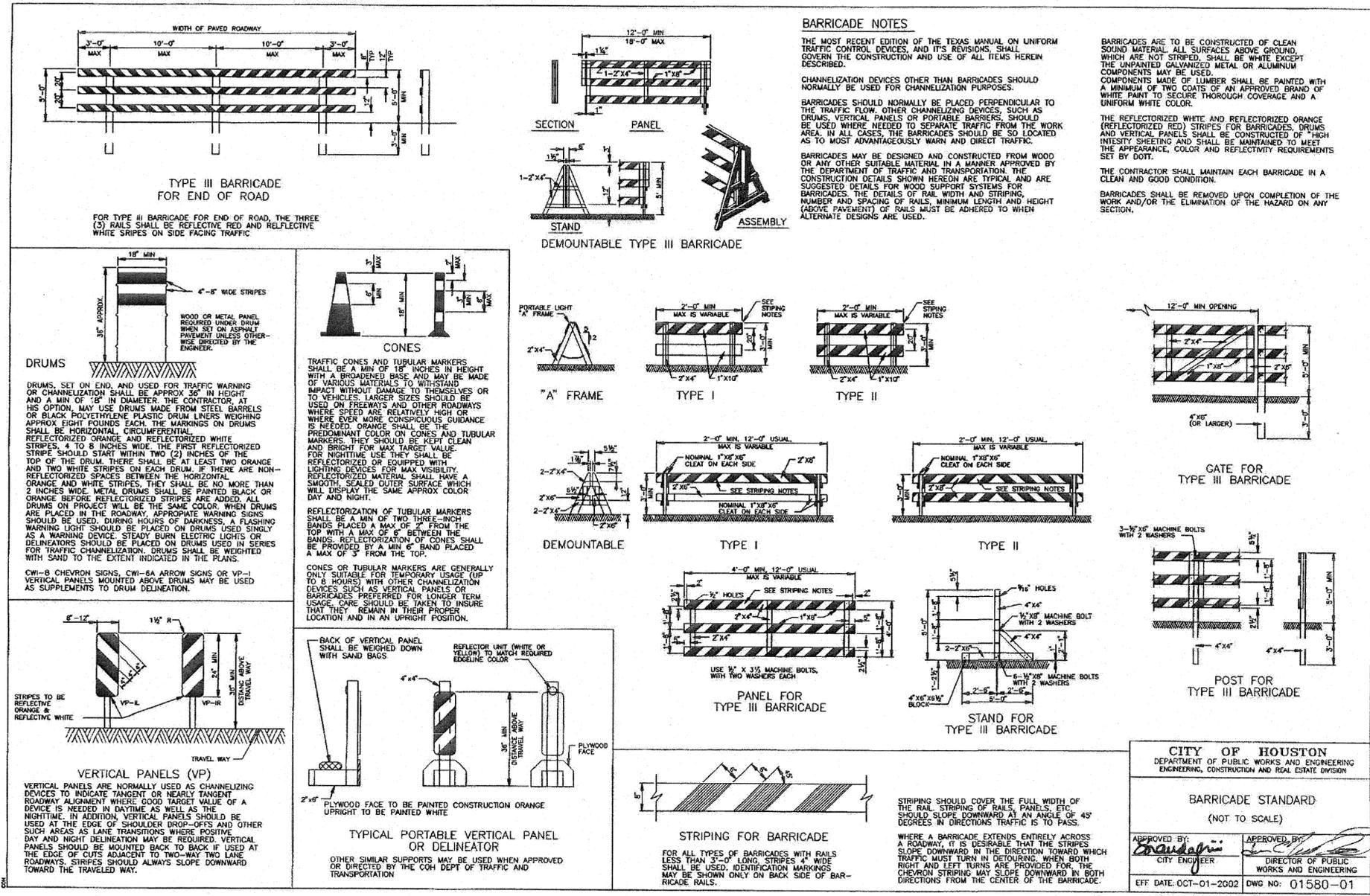
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEW/REPLACEMENT OF WATER WELL
FOREST COVE III

TRAFFIC CONTROL PLAN
SHEET 5

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 31 OF 33	

P:\206\226-003-004 New Replace WW Forest Cove\wpc-addendum\1-28-16 CH Markup drawings-2\32_TCP Plan 6.dwg, 1/29/2016 8:15:27 AM, Monet Snyder



- NOTES:**
- SEE SHEET No. 27 FOR TRAFFIC CONTROL NOTES AND SHEET No. 32 FOR STANDARD BARRICADE DETAILS.
 - CONTRACTOR SHALL ADJUST LOCATION OF TRAFFIC SIGNAL HEADS AND OVERHEAD SIGNS TO LINE-UP WITH TEMPORARY TRAFFIC LANES AT ALL TIMES.

NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16

AEI ENGINEERING
 616 CYPRESS CREEK PARKWAY
 (FM 1960 WEST), SUITE 250
 HOUSTON, TEXAS 77090
 (281)350-7027
 WWW.AEIENGINEERING.COM
 REGISTRATION No. F-1697

JAY M. CHAPMAN
 616 CYPRESS CREEK PARKWAY
 (FM 1960 WEST), SUITE 250
 HOUSTON, TEXAS 77090
 (281)350-7027
 REGISTRATION No. F-1697

SURVEYED BY: GEO SOLUTIONS
 FB NO. P-5934

Jay M. Chapman
 1 FEB 2016



CITY OF HOUSTON
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
 ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

BARRICADE STANDARD
 (NOT TO SCALE)

APPROVED BY: *[Signature]*
 CITY ENGINEER

APPROVED BY: *[Signature]*
 DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: OCT-01-2002 DWG NO: 01580-01

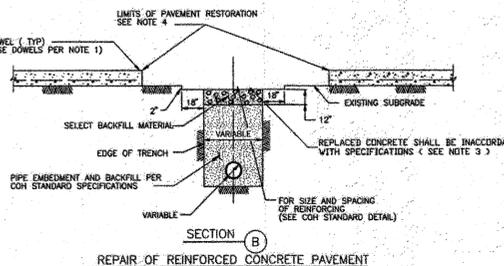
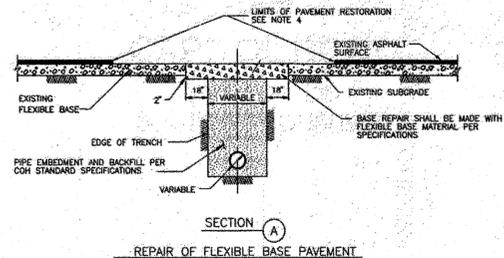
BARRICADE STANDARD

CITY OF HOUSTON
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

NEW/REPLACEMENT OF WATER WELL
 FOREST COVE III

TRAFFIC CONTROL PLAN
 SHEET 6

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 32 OF 33	



NOTE:

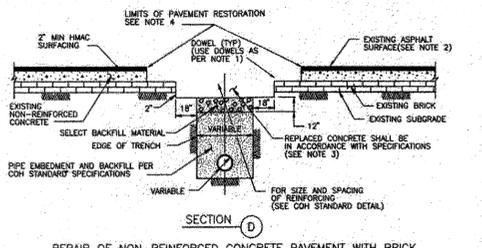
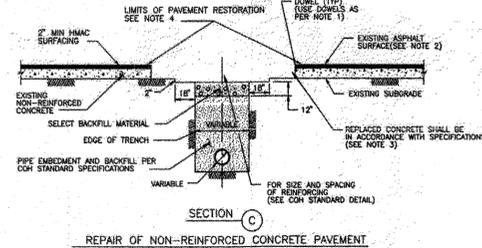
1. EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE # 6 BARS, 24" LONG, 24" C-C, DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB. WITH "PO ROC" OR EQUAL.
2. IF REINFORCED CONCRETE IS OVERLAYED WITH ASPHALT, REPLACE WITH 2" MIN HMAC SURFACING.
3. REFER TO STANDARD DETAIL 02751-01 FOR REINFORCING STEEL REQUIREMENTS.
4. REFER TO STANDARD DETAIL 02951-01 FOR PAVEMENT RESTORATION LIMITS.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

PAVEMENT REPAIR DETAILS
FOR STREET CUTS
(NOT TO SCALE)

APPROVED BY: *[Signature]* CITY ENGINEER
APPROVED BY: *[Signature]* DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: OCT-01-2002 DWG NO: 02902-01



NOTE:

1. EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE # 6 BARS, 24" LONG, 24" C-C, DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB. WITH "PO ROC" OR EQUAL.
2. IF REINFORCED CONCRETE IS OVERLAYED REPLACE WITH SAME THICKNESS OF HMAC SURFACING.
3. REFER TO STANDARD DETAIL 02751-01 FOR REINFORCING STEEL REQUIREMENT.
4. REFER TO STANDARD DETAIL 02951-01 FOR PAVEMENT RESTORATION LIMITS.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

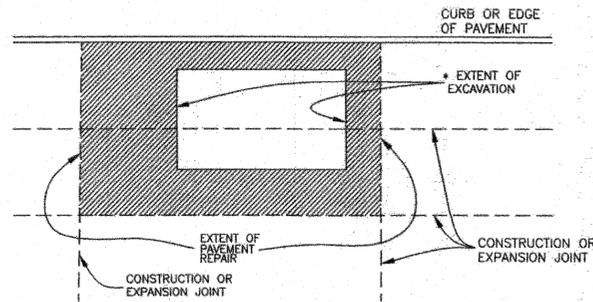
PAVEMENT REPAIR DETAILS
FOR STREET CUTS
NON REINFORCED CONCRETE AND BRICK PAVEMENT
(NOT TO SCALE)

APPROVED BY: *[Signature]* CITY ENGINEER
APPROVED BY: *[Signature]* DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: OCT-01-2002 DWG NO: 02902-02

CONCRETE PAVEMENT RESTORATION

AGE OF PAVEMENT
LESS THAN OR EQUAL TO 5 YEARS



NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.
2. REPLACE ENTIRE PANEL WIDTH AND LENGTH TO NEAREST CONSTRUCTION OR EXPANSION JOINT BEYOND EDGE OF EXCAVATION.
3. SAW CUT AND EXPOSE 15" OF REINFORCING STEEL WITHIN EXISTING PAVEMENT. PROVIDE HORIZONTAL DOWELS (PER SPECIFICATION SECTION 02902-01) IF EXISTING REINFORCING IS BROKEN OFF.
4. REPLACE CURB WHEN ADJACENT LANE IS REPLACED.
5. MAINTAIN EXPANSION JOINTS AT EXISTING LOCATIONS UNLESS OTHERWISE DIRECTED BY CITY ENGINEER.
6. SPECIALTY PAVEMENTS (IE: BRICK PAVERS) TO BE REPLACED WITH MATCHING PAVEMENT IN ALL CASES.
7. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY SPECIFICATIONS 02764 AND 02767.

* EXTENT OF EXCAVATION INCLUDES 18" OVERCUT AS SHOWN ON STANDARD DETAIL 02902-01.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

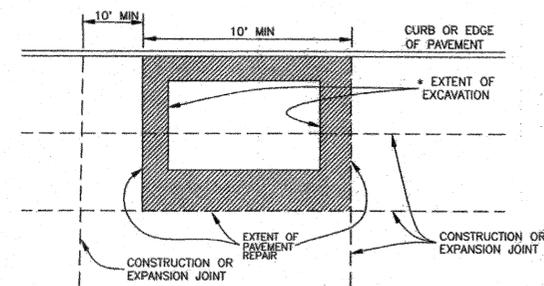
Street Cut Pavement Replacement
CONCRETE PAVEMENT LESS THAN 5 YRS IN AGE
(NOT TO SCALE)

APPROVED BY: *[Signature]* CITY ENGINEER
APPROVED BY: *[Signature]* DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUNE 2002 DWG NO: 02951-01

CONCRETE PAVEMENT RESTORATION

AGE OF PAVEMENT
GREATER THAN 5 YEARS



NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.
2. WIDTH: REPLACE PANEL WIDTH TO NEAREST CONSTRUCTION OR EXPANSION JOINT BEYOND EDGE OF EXCAVATION.
3. LENGTH:
 - a. MINIMUM LENGTH OF PAVEMENT REPAIR ALONG TRAVEL WAY IS 10' FROM THE NEAREST JOINT.
 - b. IF EDGE OF EXCAVATION IS LESS THAN 10' FROM EXISTING CONSTRUCTION OR EXPANSION JOINT, REPLACE PAVEMENT TO EXISTING JOINT.
4. SAW CUT AND EXPOSE 15" OF REINFORCING STEEL AROUND EDGE OF PANEL REPLACEMENT. PROVIDE HORIZONTAL DOWELS (PER SPECIFICATION SECTION 02902-01) IF REINFORCING IS BROKEN OFF OR DOES NOT EXIST.
5. REPLACE CURB WHEN ADJACENT LANE IS REPLACED.
6. MAINTAIN EXPANSION JOINTS AT EXISTING LOCATIONS UNLESS OTHERWISE DIRECTED BY CITY ENGINEER.
7. SPECIALTY PAVEMENTS (IE: BRICK PAVERS) TO BE REPLACED WITH MATCHING PAVEMENT IN ALL CASES.
8. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY SPECIFICATIONS 02764 AND 02767.

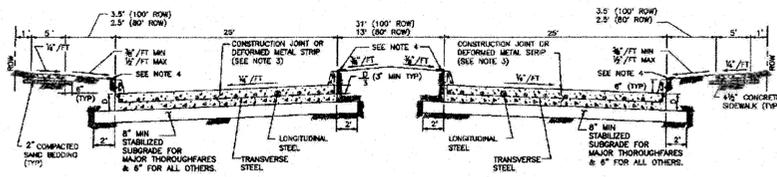
* EXTENT OF EXCAVATION INCLUDES 18" OVERCUT AS SHOWN ON STANDARD DETAIL 02902-01.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

Street Cut Pavement Replacement
CONCRETE PAVEMENT OVER 5 YRS IN AGE
(NOT TO SCALE)

APPROVED BY: *[Signature]* CITY ENGINEER
APPROVED BY: *[Signature]* DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUNE 2002 DWG NO: 02951-02



TYPICAL DOUBLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

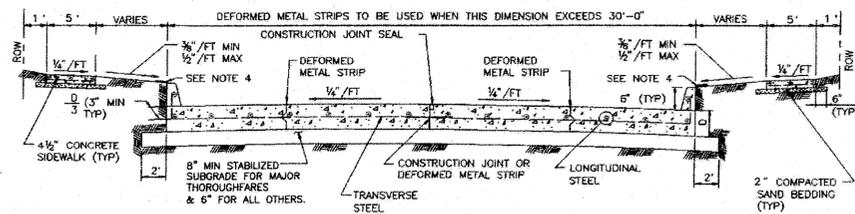
NOTES:

1. THE MAXIMUM WIDTH BETWEEN LONGITUDINAL JOINTS SHALL NOT EXCEED 15'-0".
2. ALL EARTHEN AREAS ARE TO BE HYDROMULCHED UNLESS SHOWN OTHERWISE ON DRAWINGS.
3. CONTRACTOR MAY SAW CUT IN LIEU OF DEFORMED METAL STRIP.
4. USE STRIP OF SOD GRASS TO PREVENT EROSION UNTIL STAND OF GRASS IS ESTABLISHED.
5. AN EQUAL OR LARGER AREA OF WELDED REINFORCEMENT BAR CONFORMING TO ASTM A497, MAY BE SUBSTITUTED FOR REBARS LISTED IN TABLE 1.
6. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE A 5-FOOT SIDEWALK, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER FOR A 4-FOOT WIDE SIDEWALK.

TABLE 1
REINFORCING STEEL BAR SIZES AND SPACINGS FOR VARIOUS PAVEMENT THICKNESSES (D) WITH MAXIMUM EXPANSION JOINT SPACING = 80 FT. (D = 3,500 PSI/28 DAYS AND FT = 60,000 PSI)

PAVEMENT THICKNESS (D) (IN)	PAVEMENT FT	NUMBER OF BARS	# 4 BARS		# 5 BARS		# 6 BARS		# 8 BARS	
			BAR SPACING (IN)	BAR SPACING (FT)						
6	28	17	26.50	4	20.00	3	36	18	36	
7	30	14	18.00	3	18.00	3	36	18	36	
7	30	22	17.5	4	18.00	3	36	18	36	
7	37	12	18.25	3	18.00	3	36	18	36	
7	43	10	17.75	3.75	18.00	3	36	18	36	
8	35	17	18.50	2.75	17.50	3	36	18	36	
8	35	22	18.00	3	18.00	3	36	18	36	
8	44	14	18.75	2.25	21.75	3	36	18	36	
8	48	12	18.75	2.25	21.75	3	36	18	36	
8	57	10	18.00	3	18.00	3	36	18	36	
8	57	11	18.75	3.75	20.75	3.75	36	18	36	
8	66	9	18.75	3.75	21.75	3	36	18	36	
8	75	8	18.75	3.75	21.75	3	36	18	36	
8	84	7	18.75	3.75	21.75	3	36	18	36	
8	93	6	18.75	3.75	21.75	3	36	18	36	
8	102	5	18.75	3.75	21.75	3	36	18	36	
8	111	4	18.75	3.75	21.75	3	36	18	36	
8	120	3	18.75	3.75	21.75	3	36	18	36	
8	129	2	18.75	3.75	21.75	3	36	18	36	
8	138	1	18.75	3.75	21.75	3	36	18	36	
11	34	36	11.50	2.75	17.50	2.75	28.75	4	24	
11	38	27	11.50	3	18.00	3	29.75	4	24	
11	42	20	11.50	3	18.00	3	30.75	4	24	
11	46	15	11.50	3	18.00	3	31.75	4	24	
11	50	12	11.50	3	18.00	3	32.75	4	24	
11	54	9	11.50	3	18.00	3	33.75	4	24	
11	58	8	11.50	3	18.00	3	34.75	4	24	
11	62	7	11.50	3	18.00	3	35.75	4	24	
11	66	6	11.50	3	18.00	3	36.75	4	24	
11	70	5	11.50	3	18.00	3	37.75	4	24	
11	74	4	11.50	3	18.00	3	38.75	4	24	
11	78	3	11.50	3	18.00	3	39.75	4	24	
11	82	2	11.50	3	18.00	3	40.75	4	24	
11	86	1	11.50	3	18.00	3	41.75	4	24	
12	36	30	12.50	2.5	17.50	2.5	28.75	3	24	
12	40	22	12.50	2.5	17.50	2.5	29.75	3	24	
12	44	15	12.50	2.5	17.50	2.5	30.75	3	24	
12	48	12	12.50	2.5	17.50	2.5	31.75	3	24	
12	52	9	12.50	2.5	17.50	2.5	32.75	3	24	
12	56	8	12.50	2.5	17.50	2.5	33.75	3	24	
12	60	7	12.50	2.5	17.50	2.5	34.75	3	24	
12	64	6	12.50	2.5	17.50	2.5	35.75	3	24	
12	68	5	12.50	2.5	17.50	2.5	36.75	3	24	
12	72	4	12.50	2.5	17.50	2.5	37.75	3	24	
12	76	3	12.50	2.5	17.50	2.5	38.75	3	24	
12	80	2	12.50	2.5	17.50	2.5	39.75	3	24	
12	84	1	12.50	2.5	17.50	2.5	40.75	3	24	

MINIMUM LAP LENGTHS (L):
A. # 4 BARS: L = 12 INCHES
B. # 5 BARS: L = 27 INCHES
C. # 6 BARS: L = 32 INCHES



TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

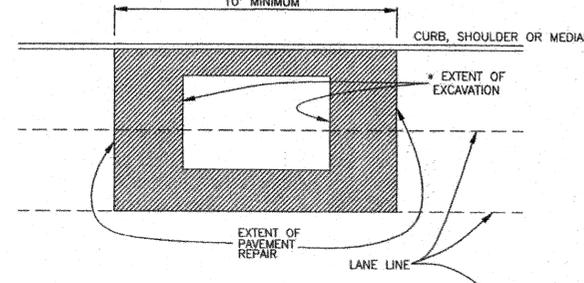
CONCRETE PAVEMENT
DETAILS
(NOT TO SCALE)

APPROVED BY: *[Signature]* CITY ENGINEER
APPROVED BY: *[Signature]* DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2009 DWG NO: 02751-01

ASPHALT PAVEMENT RESTORATION

FOR PAVEMENT OF ALL AGES



NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.
2. FLEXIBLE BASE: REPLACE BASE TO SAME THICKNESS PLUS TWO INCHES (2") FOR EXTENT OF EXCAVATION. USE APPROVED BASE MATERIAL TYPE. *
3. SURFACE COURSE:
 - A. WIDTH: SURFACE MILL AND OVERLAY FULL WIDTH OF LANE(S) TO NEAREST LANE DIVIDER BEYOND EDGE OF EXCAVATION.
 - B. LENGTH: MINIMUM LENGTH OF SURFACE MILL ALONG TRAVEL WAY IS 10'.
 - C. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY SPECIFICATIONS 02764 & 02767.

ADDITIONAL REQUIREMENTS FOR ASPHALT OVERLAY ON CONCRETE PAVEMENT:

1. REPLACE CONCRETE FOR EXTENT OF EXCAVATION. REPLACE TO SAME THICKNESS PLUS TWO INCHES (2").
2. WIDTH: IF EXCAVATION EXTENDS MORE THAN HALF OF A LANE, REPLACE ENTIRE LANE OF CONCRETE. OTHERWISE USE STANDARD DETAIL 02902-01.
3. SAW CUT AND EXPOSE 15" OF REINFORCING STEEL AROUND EDGE OF CONCRETE REPLACEMENT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS PER SPECIFICATION SECTION 02902.
4. REPLACE CURB WHEN ADJACENT LANE IS REPLACED.
5. MAINTAIN CONCRETE EXPANSION JOINTS AT EXISTING LOCATIONS UNLESS OTHERWISE APPROVED BY CITY ENGINEER.

* EXTENT OF EXCAVATION INCLUDES 18" OVERCUT AS SHOWN ON STANDARD DETAIL 02902-01.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

Street Cut Pavement Replacement
ASPHALT PAVEMENT
FOR PAVEMENT OF ALL AGES
(NOT TO SCALE)

APPROVED BY: *[Signature]* CITY ENGINEER
APPROVED BY: *[Signature]* DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUNE 2002 DWG NO: 02951-03

NO.	REVISIONS	APP	DATE
1	ADDENDUM No. 1	JMC	2-1-16

AEI ENGINEERING
616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 WWW.AEIENGINEERING.COM
REGISTRATION No. F-1697

JAY M. CHAPMAN
616 CYPRESS CREEK PARKWAY (FM 1960 WEST), SUITE 250 HOUSTON, TEXAS 77090 (281)350-7027 REGISTRATION No. F-1697
SURVEYED BY: GEO SOLUTIONS FB NO. P-5934

[Signature]
1 FEB 2016

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
NEW/REPLACEMENT OF WATER WELL FOREST COVE III

MISCELLANEOUS DETAILS
SHEET 3

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
S-000100-0016-4	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
NA YAO, P.E.	
SHEET NO. 33 OF 33	